

NUCLEAR REGULATORY COMMISSION ISSUANCES

OPINIONS AND DECISIONS OF THE NUCLEAR REGULATORY COMMISSION WITH SELECTED ORDERS

January 1, 1978 — June 30, 1978

**Volume 7
Pages 1 - 1066**



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Samuel W. Jensch

PREFACE

This is the seventh volume of issuances (1 - 1066) of the Nuclear Regulatory Commission and its Atomic Safety and Licensing Appeal Boards, Atomic Safety and Licensing Boards, and Administrative Law Judge. It covers the period from January 1, 1978 to June 30, 1978.

Atomic Safety and Licensing Boards are authorized by Section 191 of the Atomic Energy Act of 1954. These Boards, comprised of three members conduct adjudicatory hearings on applications to construct and operate nuclear power plants and related facilities and issue initial decisions which, subject to internal review and appellate procedures, become the final Commission action with respect to those applications. Boards are drawn from the Atomic Safety and Licensing Board Panel, comprised of lawyers, nuclear physicists and engineers, environmentalists, chemists, and economists. The Atomic Energy Commission first established Licensing Boards in 1962 and the Panel in 1967.

Beginning in 1969, the Atomic Energy Commission authorized Atomic Safety and Licensing Appeal Boards to exercise the authority and perform the review functions which would otherwise have been exercised and performed by the Commission in facility licensing proceedings. In 1972, that Commission created an Appeal Panel, from which are drawn the Appeal Boards assigned to each licensing proceeding. The functions performed by both Appeal Boards and Licensing Boards were transferred to the Nuclear Regulatory Commission by the Energy Reorganization Act of 1974. Appeal Boards represent the final level in the administrative adjudicatory process to which parties may appeal. Parties, however, are permitted to seek discretionary Commission review of certain board rulings. The Commission also may decide to review, on its own motion, various decisions or actions of Appeal Boards.

The Commission also has an Administrative Law Judge appointed pursuant to the Administrative Procedure Act, who presides over proceedings as directed by the Commission.

This volume is made up of pages from the six monthly issues of the Nuclear Regulatory Commission publication *Nuclear Regulatory Commission Issuances (NRCI)* for this period, arranged in chronological order. Cross references in the text and indexes are to the NRCI page numbers which are the same as the page numbers in this publication.

Issuances are referred to as follows: Commission--CLI, Atomic Safety and Licensing Appeal Boards--ALAB, Atomic Safety and Licensing Boards--LBP, and Administrative Law Judge--ALJ.

The summaries and headnotes preceding the opinions reported herein are not to be deemed a part of those opinions or to have any independent legal significance.

CONTENTS

Issuances of the Nuclear Regulatory Commission

CITY OF AUSTIN

CENTRAL POWER AND LIGHT COMPANY

(South Texas Project, Units 1 and 2) Dockets 50-498A and 50-499A
Order, CLI-78-5, April 15, 1978 397

EDLOW INTERNATIONAL COMPANY

(Agent for the Government of India on Application to Export
Special Nuclear Material), Docket 70-2131 (License XSNM-845)
Correction, CLI-78-2, February 3, 1978 153

(Agent for the Government of India on Application to Export
Special Nuclear Materials), Dockets 70-2485 (License XSNM-
1060) and 70-2738 (License XSNM-1222)

Order, CLI-78-4, March 6, 1978 311
Decision, CLI-78-8, April 24, 1978 436
Order, CLI-78-9, April 24, 1978 455

FLORIDA POWER AND LIGHT COMPANY

(St. Lucie Plant, Unit 2), Docket 50-389A
Memorandum and Order, CLI 78-12, June 21, 1978 939

HOUSTON LIGHTING AND POWER COMPANY

(South Texas Project, Units 1 and 2), Dockets 50-498A and
50-499A
Order CLI-78-5, April 5, 1978 397

METROPOLITAN EDISON COMPANY, et al.

(Three Mile Island Nuclear Station, Unit 2), Docket 50-320
Order, CLI-78-3, March 2, 1978 307

MIXED OXIDE FUEL

(Dockets RM-50-5, 50-201, 50-332, 50-564, 70-1327, 70-1432, and
70-1821)
Memorandum of Decision, CLI-78-10, May 8, 1978 711

NORTHERN INDIANA PUBLIC SERVICE COMPANY

(Bailly Generating Station, Nuclear-1), Docket 50-367
Memorandum and Order, CLI-78-7, April 20, 1978 429

PETITION FOR EMERGENCY AND REMEDIAL ACTION

Memorandum and Order, CLI-78-6, April 13, 1978 400

PUBLIC SERVICE BOARD OF SAN ANTONIO

(South Texas Project, Units 1 and 2), Dockets 50-498A and
50-499A
Order, CLI-78-5, April 5, 1978 397

| | |
|--|-----|
| PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al. | |
| (Seabrook Station, Units 1 and 2), Dockets 50-443 and 50-444 | |
| Memorandum and Order, CLI-78-1, January 6, 1978 | 1 |
| Order, CLI-78-11, May 31, 1978 | 735 |
| Memorandum and Order, CLI-78-14, June 30, 1978 | 952 |
| TEXAS UTILITIES GENERATING COMPANY, et al. | |
| (Comanche Peak Steam Electric Station, Units 1 and 2), Dockets | |
| 50-445A and 50-446A | |
| Order, CLI-78-13, June 21, 1978 | 950 |

Issuances of the Atomic Safety and Licensing Appeal Boards

| | |
|--|-----|
| ATLANTIC CITY ELECTRIC COMPANY, et al. | |
| (Hope Creek Generating Station, Units 1 and 2), Dockets 50-354 | |
| and 50-355 | |
| Memorandum and Order, ALAB-460, February 17, 1978 | 204 |
| BOSTON EDISON COMPANY, et al. | |
| (Pilgrim Nuclear Generating Station, Unit 2), Docket 50-471 | |
| Decision, ALAB-479, May 25, 1978 | 774 |
| CAROLINA POWER AND LIGHT COMPANY | |
| (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), | |
| Dockets 50-400, 50-401, 50-402, and 50-403 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. | |
| (Indian Point Station, Unit 2), Docket 50-247 | |
| Decision, ALAB-453, January 11, 1978 | 31 |
| CONSUMERS POWER COMPANY | |
| (Midland Plant, Units 1 and 2), Dockets 50-329 and 50-330 | |
| Decision, ALAB-458, February 14, 1978 | 155 |
| Memorandum and Order, ALAB-468, April 19, 1978 | 465 |
| DETROIT EDISON COMPANY | |
| (Enrico Fermi Atomic Power Plants, Unit 2), Docket 50-341 | |
| Memorandum and Order, ALAB-466, April 7, 1978 | 457 |
| Memorandum and Order, ALAB-469, April 26, 1978 | 470 |
| Decision, ALAB-470, April 26, 1978 | 473 |
| DETROIT EDISON COMPANY | |
| (Enrico Fermi Atomic Power Plant, Unit 2), Docket 50-341A | |
| Decision, ALAB-475, May 9, 1978 | 752 |

| | |
|---|-----|
| (Greenwood Energy Center, Units 2 and 3, Dockets 50-452 and 50-453 | |
| Memorandum and Order, ALAB-472, April 28, 1978 | 570 |
| Decision, ALAB-476, May 11, 1978 | 759 |
| DUKE POWER COMPANY | |
| (Cherokee Nuclear Station, Units 1, 2, and 3), Dockets STN 50-491, STN 50-492, and STN 50-493 | |
| Memorandum and Order, ALAB-457, January 30, 1978 | 70 |
| Memorandum and Order, ALAB-478, May 17, 1978 | 772 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| Decision, ALAB-482, June 7, 1978 | 979 |
| DUQUESNE LIGHT COMPANY, et al. | |
| (Beaver Valley Power Station, Unit 1), Docket 50-334 | |
| Decision, ALAB-484, June 7, 1978 | 984 |
| FLORIDA POWER AND LIGHT COMPANY | |
| (St. Lucie Plant, Unit 2), Docket 50-389 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| KANSAS GAS AND ELECTRIC COMPANY | |
| KANSAS CITY POWER AND LIGHT COMPANY | |
| (Wolf Creek Generating Station, Unit 1), Docket STN 50-482 | |
| Decision, ALAB-462, March 9, 1978 | 320 |
| Memorandum and Order, ALAB-477, May 17, 1978 | 766 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| LONG ISLAND LIGHTING COMPANY | |
| (Jamesport Nuclear Power Station, Units 1 and 2), Dockets 50-516 and 50-517 | |
| Memorandum and Order, ALAB-481, May 31, 1978 | 807 |
| METROPOLITAN EDISON COMPANY, et al. | |
| (Three Mile Island Nuclear Generating Station, Unit 2), Docket 50-320 | |
| Memorandum and Order, ALAB-454, January 23, 1978 | 39 |
| Memorandum and Order, ALAB-456, January 27, 1978 | 63 |
| Memorandum and Order, ALAB-474, May 5, 1978 | 746 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| NORTHERN STATES POWER COMPANY (MINNESOTA) | |
| NORTHERN STATES POWER COMPANY (WISCONSIN) | |
| (Tyrone Energy Park, Unit 1, Docket STN 50-484 | |
| Decision ALAB-464, May 17, 1978 | 372 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| Memorandum and Order, ALAB-483, June 7, 1978 | 982 |

| | |
|--|-----|
| NORTHERN STATES POWER COMPANY | |
| (Prairie Island Nuclear Generating Plant, Units 1 and 2), Dockets 50-282 and 306 | |
| Decision, ALAB-455, January 27, 1978 | 41 |
| NUCLEAR ENGINEERING COMPANY, INC. | |
| (Sheffield, Illinois, Low-Level Radioactive Waste Disposal Site), Docket 27-39 | |
| Decision, ALAB-473, May 3, 1978..... | 737 |
| PHILADELPHIA ELECTRIC COMPANY, et al. | |
| Peach Bottom Atomic Power Station, Units 2 and 3), Dockets 50-277 and 50-278 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| PUBLIC SERVICE COMPANY OF INDIANA, INC. | |
| (Marble Hill Nuclear Generating Station, Units 1 and 2), Dockets STN 50-546 and STN 50-547 | |
| Decision, ALAB-459, February 16, 1978..... | 179 |
| Decision, ALAB-461, March 1, 1978 | 313 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al. | |
| (Seabrook Station, Units 1 and 2), Dockets 50-443 and 50-444 | |
| Decision, ALAB-471, April 28, 1978 | 477 |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| PUBLIC SERVICE ELECTRIC AND GAS COMPANY | |
| (Hope Creek Generating Station, Units 1 and 2), Dockets 50-354 and 50-355 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| PUBLIC SERVICE ELECTRIC AND GAS COMPANY | |
| ATLANTIC CITY ELECTRIC COMPANY | |
| (Hope Creek Generating Station, Units 1 and 2), Dockets 50-354 and 50-355 | |
| Memorandum and Order, ALAB-460, February 17, 1978 | 204 |
| ROCHESTER GAS AND ELECTRIC CORPORATION, et al. | |
| (Sterling Power Project, Nuclear Unit 1), Docket 50-485 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| TENNESSEE VALLEY AUTHORITY | |
| (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), Dockets STN 50-518, STN 50-519, STN 50-520 and STN 50-521 | |
| Decision, ALAB-463, March 17, 1978 | 341 |
| Memorandum and Order, ALAB-467, April 19, 1978 | 459 |

| | |
|--|-----|
| (Hartsville, Nuclear Plant, Units 1A, 2A, 1B and 2B), Dockets STN 50-518, STN 50-519, STN 50-520, and STN 50-521 and (Phipps Bend Nuclear Plant, Units 1 and 2), Dockets 50-553 and 50-554 and | |
| (Yellow Creek Nuclear Power Plant, Units 1 and 2), Dockets STN 50-566 and STN 50-567 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| TOLEDO EDISON COMPANY, et al. | |
| (Davis-Besse Nuclear Power Station, Units 2 and 3), Dockets 50-500 and 50-501 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| VERMONT YANKEE NUCLEAR POWER CORPORATION | |
| (Vermont Yankee Nuclear Power Station), Docket 50-271 | |
| Decision, ALAB-455, January 27, 1978 | 41 |
| VIRGINIA ELECTRIC AND POWER COMPANY | |
| (North Anna Power Station, Units 1 and 2), Dockets 50-338 and 50-339 | |
| Memorandum and Order, ALAB 480, May 30, 1978 | 796 |
| WASHINGTON PUBLIC POWER SUPPLY SYSTEM | |
| (WPPSS Nuclear Project No. 4), Docket 50-513 | |
| Memorandum and Order, ALAB-480, May 30, 1978 | 796 |
| WASHINGTON PUBLIC POWER SUPPLY SYSTEM | |
| (WPPSS Nuclear Projects 3 and 5), Dockets STN 50-508 and STN 50-509 | |
| Decision, ALAB-485, June 7, 1978 | 986 |

Issuances of the Atomic Safety and Licensing Boards

| | |
|--|------|
| CAROLINA POWER AND LIGHT COMPANY | |
| (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), Dockets 50-400, 50-401, 50-402, and 50-403 | |
| Memorandum and Order, LBP-78-2, January 12, 1978 | 83 |
| Initial Decision, LBP-78-4, January 23, 1978 | 92 |
| (H.B. Robinson, Unit 2), Docket 50-261 | |
| Partial Initial Decision (Environmental Matters Only), LBP-78-22, June 16, 1978 | 1052 |
| CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. | |
| (Indian Point Station, Unit 2), Docket 50-247 | |
| Order Granting Motion and Determining That All Governmental | |

| | |
|---|------|
| Approvals Have Been Received for Construction of Closed-Cycle Cooling Tower System LBP-78-21, June 14, 1978 | 1048 |
| THE DETROIT EDISON COMPANY | |
| (Enrico Fermi Atomic Power Plant, Unit 2), Docket 50-341 | |
| Order Denying Petitions for Leave to Intervene of (1) Martha G. Drake, (2) Citizens for Employment and Energy, and (3) Keith Stanley Titus, LBP-78-11, March 21, 1978 | 381 |
| DETROIT EDISON COMPANY | |
| (Enrico Fermi Atomic Power Plant, Unit 2), Docket 50-341A | |
| Order Denying Intervention Petition and Request for Antitrust Hearing of Martha G. Drake, LBP-78-13, April 7, 1978 | 583 |
| DUQUESNE LIGHT COMPANY, et al. | |
| (Beaver Valley Power Station, Unit 1), Docket 50-334 | |
| Initial Decision (Amendment to Operation License), LBP-78-16, May 4, 1978 | 811 |
| LONG ISLAND LIGHTING COMPANY | |
| NEW YORK STATE ELECTRIC AND GAS CORPORATION | |
| (Jamesport Nuclear Power Station, Units 1 and 2), Dockets 50-516 and 50-517 | |
| Partial Initial Decision (Construction Permit), LBP-78-17, May 9, 1978 | 826 |
| NEW ENGLAND POWER AND LIGHT COMPANY | |
| (NEP, Units 1 and 2), Dockets STN 50-568 and STN 50-569 | |
| Order Concerning Motions to Suspend Proceedings and Staff Review and Commencement of Discovery, LBP-78-9; February 21, 1978 | 271 |
| Order Regarding Intervention and Limited Appearances, LBP-78-18, May 25, 1978 | 932 |
| PACIFIC GAS AND ELECTRIC COMPANY | |
| (Diablo Canyon Nuclear Power Plant, Units 1 and 2), Dockets 50-275 OL and 50-323 OL | |
| Partial Initial Decision (Operating License) Environmental Issues, LBP-78-19, June 12, 1978 | 989 |
| (Stanislaus Nuclear Project, Unit 1), Docket P-564A | |
| Order Concerning Motion for Protective Order of State of California Department of Water Resources, LBP-78-20, June 13, 1978 | 1038 |
| PUBLIC SERVICE COMPANY OF INDIANA, INC. | |
| (Marble Hill Nuclear Generating Station, Units 1 and 2), Dockets 50-546 and 50-547 | |
| Initial Decision (Construction Permit), LBP-78-12, April 4, 1978 .. | 573 |

| | |
|---|-----|
| PUBLIC SERVICE ELECTRIC AND GAS COMPANY (Atlantic Nuclear Generating Station, Units 1 and 2), Dockets STN 50-477 and STN 50-478 | |
| Memorandum and Order, LBP-78-5, January 25, 1978 | 147 |
| PUBLIC SERVICE ELECTRIC AND GAS COMPANY ATLANTIC CITY ELECTRIC COMPANY (Hope Creek Generating Station, Units 1 and 2), Dockets 50-354 and 50-355 | |
| Second Supplemental Initial Decision, LBP-78-15, April 13, 1978 . | 642 |
| SOUTH CAROLINA ELECTRIC AND GAS COMPANY, et al. (Virgil C. Summer Nuclear Station, Unit 1), Docket 50-395 | |
| Memorandum and Order, LBP-78-6 February 3, 1978 | 209 |
| TENNESSEE VALLEY AUTHORITY (Phipps Bend Nuclear Plant, Units 1 and 2), Dockets 50-553 and 50-554 | |
| Initial Decision, LBP-78-1, January 12, 1978 | 73 |
| (Yellow Creek Nuclear Plant, Units 1 and 2), Dockets STN 50-566 and STN 50-567 | |
| Partial Initial Decision (Limited Work Authorization), LBP-78-7, February 3, 1978..... | 215 |
| VIRGINIA ELECTRIC AND POWER COMPANY (North Anna Nuclear Power Station, Units 1 and 2), Dockets 50-338 OL and 50-339 OL | |
| Order, LBP-78-3, January 13, 1978 | 89 |
| Memorandum and Order, LBP-78-10, February 27, 1978..... | 295 |
| WASHINGTON PUBLIC POWER SUPPLY SYSTEM (WPPSS Nuclear Project No. 4), Docket 50-513 | |
| Supplemental Initial Decision (Construction Permit) LBP-78-8, February 17, 1978..... | 254 |
| WPPSS Nuclear Project Nos. 3 and 5), Dockets STN 50-508 and STN 50-509 | |
| Initial Decision (Construction Permits), LBP-78-14, April 10, 1978 | 599 |

Issuances of the Administrative Law Judge

| | |
|--|-----|
| ATLANTIC RESEARCH CORPORATION Byproduct Material License 45-02802-04 | |
| Initial Decision, ALJ-78-2, April 6, 1978 | 701 |

J.G. SYLVESTER ASSOCIATES, INC.

Byproduct Material License 20-00302-02

Order Accepting Stipulation and Terminating Proceeding, ALJ-

78-1, January 19, 1978 151

INDEXES

| | |
|---------------------------------------|-------------|
| Case Name Index | I-1 |
| Legal Citation Index | I-7 |
| Cases | I-7 |
| Regulations | I-29 |
| Statutes | I-37 |
| Subject Index | I-43 |
| Facility Index | I-77 |

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Victor Gilinsky, Acting Chairman
Richard T. Kennedy
Peter A. Bradford

In the Matter of

**Docket Nos. 50-443
50-444**

**PUBLIC SERVICE COMPANY OF
NEW HAMPSHIRE, et al.**

(Seabrook Station, Units 1 and 2)

January 6, 1978

Upon consideration of intervenors' requests for review of ALAB-422, 6 NRC 33 (1977), the Commission (1) agrees with the conclusion of the Licensing Board and Appeal Board majority that the applicants have reasonable assurance of obtaining the funds necessary to build the facility, but imposes a monitoring requirement on the staff with respect to the possible withdrawal of two participating companies; (2) affirms the Appeal Board decision to give binding effect to certain findings of the Environmental Protection Agency made pursuant to §316 of the Federal Water Pollution Control Act; and (3) rejects claims that the Appeal Board distorted the meaning of testimony in its factual findings. The Commission also directs (1) further staff studies of the effects of relaxing the Commission's standards for a stay so that site-related issues may be considered earlier, and of ways in which the Commission's appellate administrative procedures may assure earlier resolution of issues; and (2) initiation of a rulemaking proceeding in which the factual, legal, and policy aspects of the financial qualifications issue may be reexamined.

Appeal Board decision affirmed.

**ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED
FOR LICENSING (FINANCIAL QUALIFICATIONS)**

The Atomic Energy Act does not impose any financial qualifications requirement but merely authorizes the Commission to do so. The Commission's implementing regulations, 10 CFR Part 50, Appendix C, make clear

that the “reasonable assurance” concept embodied in that regulation is more flexible than many of the Commission’s safety criteria. It does not normally contemplate refined analyses of an applicant’s likely future ability to meet specific costs.

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

More detailed financial information may be required of a new corporate entity formed for the purpose of constructing the facility in question than from an established organization. 10 CFR §50.33(f) and Appendix C.

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

The “reasonable assurance” requirement of 10 CFR §50.33 contemplates actual inquiry into the applicant’s financial qualifications. It is not enough that the applicant is a regulated public utility.

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

The “reasonable assurance” requirement of 10 CFR §50.33 means that the applicant must have a reasonable financing plan in the light of relevant circumstances.

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

Anticipated difficulties in raising funds are relevant to the reasonable assurance determination in connection with a financial qualifications inquiry, but a showing of some potential difficulty would not necessarily preclude that determination, all other relevant factors being taken into account.

ATOMIC ENERGY ACT: OWNERSHIP

A transfer of ownership of a utility’s share of a nuclear power plant requires Commission approval. Section 184, Atomic Energy Act, 42 U.S.C. 2234.

NEPA: COST-BENEFIT BALANCE

The Commission may accept and use without independent inquiry the Environmental Protection Agency's determination of the magnitude of marine environmental impacts from the cooling system in striking an overall NEPA cost-benefit balance for the facility.

RULES OF PRACTICE: COLLATERAL ESTOPPEL

Where another agency has acted in a judicial capacity and resolved disputed issues of fact properly before it which the parties have had an adequate opportunity to litigate, the Commission will not hesitate to give *res judicata* or collateral estoppel effect to its findings "to enforce repose."

RULES OF PRACTICE: COLLATERAL ESTOPPEL

Although the judicially developed doctrines of *res judicata* and collateral estoppel are not fully applicable in administrative proceedings, the considerations of fairness to parties and conservation of resources embodied in them are relevant. *Houston Lighting and Power Company* (South Texas Projects, Units 1 and 2), CLI-77-13, 5 NRC 1303, 1321 (1977).

NEPA: FINAL ENVIRONMENTAL STATEMENT

Where the Environmental Protection Agency has decided to change the location of a water intake structure in order to mitigate environmental impacts, reliance by the Commission on such decision without circulating for comment a supplemental impact statement reflecting the change does not violate the National Environmental Policy Act.

RULES OF PRACTICE: AUTHORITY OF APPEAL BOARD

The Commission or an appeal board has authority to modify or set aside findings made by a licensing board. 10 CFR §§2.740(b), 2.785.

Mr. Thomas G. Dignan, Jr., Boston, Massachusetts (with whom **Mr. John A. Ritscher** and **Mr. R.K. Gad III** were on the briefs), for the applicants, Public Service Company of New Hampshire, *et al.*

Ms. Karin P. Sheldon, Washington, D.C., for the intervenor, New England Coalition on Nuclear Pollution.

Mr. Robert A. Backus, Manchester, New Hampshire, for the intervenors, Seacoast Anti-Pollution League, the Audubon Society of New Hampshire, and the Society for the Protection of New Hampshire Forests.

Ms. Ellyn R. Weiss, Washington, D.C., Counsel for the Commonwealth of Massachusetts.

Mr. Richard C. Browne (with whom **Ms. Marcia E. Mulkey** was on the briefs), for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

In March 1973, Public Service Company of New Hampshire (PSCO) and several other New England utilities jointly applied to the Atomic Energy Commission for permission to build a two-unit nuclear electric generating station near the New Hampshire seacoast in the town of Seabrook. After extensive and vigorously contested hearings, the Atomic Safety and Licensing Board, by a divided vote, authorized issuance of construction permits in the summer of 1976. LBP-76-26, 3 NRC 857 (1976). Construction work commenced shortly thereafter and is taking place at the present time.

This case is now before us for the third time.¹ Our most recent consideration of the matter involved review and affirmance of the Appeal Board's action early last year staying the effectiveness of the construction permits because the uncertainty surrounding the type of cooling system that would ultimately be required by the Environmental Protection Agency made it impossible to strike a cost-benefit balance under the National Environmental Policy Act. As we noted at that time, numerous exceptions to the Licensing Board's decision were then still pending before the Appeal Board. In the interim, the EPA has acted on the cooling system question and, with one exception,² the Appeal Board has resolved the remaining

¹*Public Service Company of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503 (March 31, 1977); *Public Service Company of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), CLI-76-17, 4 NRC 451 (1976).

²There are pending before the Board exceptions to the Licensing Board's July 1977 Supplemental Initial Decision concerning southern New England sites. LBP-77-43, 6 NRC 134. The Board deferred that matter pending the Licensing Board's completion of a comparative analysis of Seabrook with other sites on the assumption that cooling towers will be employed. That analysis has now been completed, and the Appeal Board will proceed with consideration of both issues.

issues before it. We will summarize these and other intervening events to place the present review in context.

In November 1976, the EPA Regional Administrator withdrew his earlier approval of once-through cooling for Seabrook. That decision was reversed by the EPA Administrator in June 1977. In his June decision, discussed more fully below, the Administrator found that the impacts on the ecology of the ocean areas near the underwater intake and discharge structures of the proposed once-through cooling system would be small. He therefore approved the applicants' request for an exemption from EPA's closed-cycle cooling requirement. That decision removes the "considerable doubt ... as to the cooling system required for the Seabrook facility" that prompted us in March to affirm the Appeal Board's suspension of the Seabrook construction permits. Unless the EPA Administrator's decision is modified or reversed,⁴ we know what kind of cooling system will be built at Seabrook and the environmental impacts estimated from that system.

In late July 1977, the Appeal Board rendered two decisions: ALAB-422, 6 NRC 33, resolving all but one of the pending exceptions to the Licensing Board's decision; and ALAB-423, 6 NRC 115, granting the applicants' motion to reinstate the previously suspended construction permits. Construction resumed shortly thereafter. Timely petitions to review ALAB-422 were filed by the applicants and the New England Coalition on Nuclear Pollution ("NECNP"). We denied the applicants' petition and granted in part that of NECNP. Review was granted on the four issues discussed below: the applicants' financial qualifications, the effect of the EPA determinations of aquatic environmental impacts, alleged distortions of the record by the Appeal Board, and the presumptive validity of a recent supplemental initial decision of the Licensing Board concerning alternative sites.⁵ On November 4, after visiting the Seabrook site and hearing oral argument, we denied a motion by NECNP for a further stay of construction pending completion of our review.

When this case was argued before us, different aspects of the Seabrook project were being considered by an atomic safety and licensing board, an atomic safety and licensing appeal board, the Commission itself, and the United States Court of Appeals for the First Circuit. Furthermore, each of the NRC levels of review had already issued at least one major decision in the case, as had two separate reviewing levels within the Environmental

⁵ 5 NRC 503, *supra*, at 509.

⁴ The validity of that decision has been challenged in Federal court, where a decision is pending. *SAPL v. Costle*, No. 77-1284 (1st Cir.).

⁵ See note 2, *supra*. We also extended the time for review on the seismic issue until Mr. Farrar renders the further dissenting opinion promised in his partial dissent from ALAB-422.

Protection Agency. The First Circuit Court of Appeals, in an unpublished order denying a motion for a stay of construction at Seabrook, said of this process:

We are unable to identify any other field of publicly regulated private activity where momentous decisions to commit funds are made on the strength of preliminary decisions by several agencies which are open to reevaluation and redetermination. The risk of loss to the private investors is necessarily a real and always present one. Perhaps more important to the public weal, the risk of public agencies and courts accepting less desirable and limited options or, worse, countenancing a *fait accompli* are foreboding.⁶

We ourselves expressed serious concern with the Seabrook proceeding in our last opinion:

This case has been widely depicted as a serious failure of governmental process to resolve central issues in a timely and coordinated way—a paradigm of fragmented and uncoordinated government decisionmaking on energy matters and of a system strangling itself and the economy in red tape.⁷

Many of the difficulties with the Seabrook case have resulted from the lack of coordination between the EPA in exercising its FWPCA responsibility and the NRC in carrying out its NEPA obligation. The framework for improved coordination now exists⁸ and is being implemented in licensing proceedings now underway. We can therefore expect that this aspect of the Seabrook case is unlikely to recur.

However, there are other areas where jurisdiction is not clear and where interagency coordination is yet to be achieved. And there are problems in our licensing process itself.

Steps are now being taken which should go a long way toward assuring that the problems of the Seabrook case do not recur in future licensings. For example, early site review should eventually relieve the process of many of its pressures. Meanwhile, however, our rule giving immediate effectiveness to our Licensing Board's grant of a construction permit and our stay rule often operate together to assure that Commission-level review will not take

⁶*Audubon Society of New Hampshire v. United States*, No. 76-1347 (December 17, 1976).
⁷5 NRC 503, 509.

⁸"Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities," 40 Fed. Reg. 60115, effective January 1, 1976.

place until such time as construction is well underway.⁹ This case illustrates the need to develop a procedure for assuring early Commission-level review of controverted licensing proceedings, where appropriate, particularly where siting is an issue. Consequently, we intend to develop a process which will allow the Commission to monitor more effectively the proceedings of its lower boards.

We have also decided to initiate a study addressing but not necessarily limited to:

1. the effect which would be achieved by relation of our stay standards so that site-related issues in potentially troublesome cases may be taken up before large sums of money are committed and sites are irrevocably altered, and
2. ways in which our appellate administrative procedures may assure earlier resolution of all the issues arising out of a licensing and cut relitigation and piecemeal review to a minimum.

We therefore direct our Office of Policy Evaluation and our General Counsel to prepare a draft scope of work for this review for consideration by the full Commission. We take no larger step at this time because the generic problems illustrated by the experience of Seabrook should be addressed by the full Commission. Chairman Hendrie has disqualified himself from this proceeding because of his earlier involvement with the Seabrook application as Deputy Director for Licensing and Technical Review of the Atomic Energy Commission.

⁹At oral argument the Commission requested that the parties discuss the possibility of a remand on the issue of financial qualifications, and whether a stay would then be appropriate. The applicant answered in the negative to both questions. Commissioner Bradford then asked:

If we followed that logic as far as one can take it, would it be possible to actually complete construction of a nuclear plant, say, the Seabrook nuclear plant, while the agency still had the construction permit under review?

To which the applicant responded:

Yes. I think it is going to happen in Midland. Maybe you won't have it under review, but the Supreme Court or somebody will. This is the reason you have had the rule, and have had it since time immemorial, that you give out the permits.... The Board authorizes them and you get them.

The Commission review, the way we are going, is someday going to be going on, I think, when a plant is completed.

See Transcript pp. 153-154.

I. FINANCIAL QUALIFICATIONS

Introduction

The Licensing Board, unanimously, and the Appeal Board, by a divided vote, determined that the applicants had the requisite "reasonable assurance" of obtaining the necessary funds to cover the construction of Seabrook. The Commission's order granting review on this issue asked the parties to review the nature of the Commission's responsibilities under the Atomic Energy Act with regard to the financial qualifications of applicants and, more narrowly, to assess the state of the evidence in the present record on the financial qualifications issue. The discussion of these heretofore largely unexplored issues¹⁰ has shown the comparative vagueness of current NRC requirements and the speculative character of financial qualifications inquiries concerning complex, costly and long-term construction projects. Our independent assessment of the record in this case leads us to agree with the conclusion of the Licensing Board and of the Appeal Board majority—that there is a "reasonable assurance" that these applicants are financially qualified.¹¹ We describe hereafter the reasoning that leads us to that conclusion.

A. The Atomic Energy Act and Implementing Regulations

The Atomic Energy Act of 1954 provides in Section 182.a that:

Each application for a license hereunder ... shall specifically state such information as the Commission, by rule or regulation, may determine to be necessary to decide such of the technical and financial qualifications of the applicant ... as the Commission may deem appropriate for the license. 42 U.S.C. § 2232(a).

¹⁰Prior to 1973, when many utility applicants first began to experience substantial difficulties in raising large sums for capital investments, an applicant's financial qualification was rarely a contested issue. To date, the question has been litigated in relatively few cases. See *Power Reactor Development Corporation*, 1 AEC 128, 150 (1959). In *Northeast Nuclear Energy Company* (Millstone 3), the Licensing Board found that a 3.694% participant possessed only "marginal" financial qualifications; its earnings had plummeted, and Moody's Investors Service had withdrawn its ratings of all of the utility's outstanding first mortgage bonds. LBP-74-58, 8 AEC 187 (1974). Despite the weakness of this participant, the Licensing Board found that the applicant possessed the necessary financial qualifications. The Appeal Board endorsed the Licensing Board's findings, and observed that if the participant had owned a substantially larger share of the facility, such as the 40% interest of another participant, the applicant's financial qualifications would have been "doubtful." ALAB-234, 8 AEC 643 (1974).

¹¹We note, however, that two of the present participants may withdraw from the project, and we are therefore imposing a monitoring requirement on the staff, as we describe below.

The legislative history is silent as to the purpose of the financial qualifications showing. However, the statute itself does not impose any financial qualifications requirement; it merely authorizes the Commission to impose such financial requirements as it may deem appropriate.

The Atomic Energy Commission adopted the relevant financial qualifications implementing regulation in 1968:¹²

Each application shall state ... [i]nformation sufficient to demonstrate to the Commission the financial qualifications of the applicants to carry out, in accordance with the regulations in this chapter, the activities for which the permit or license is sought. If the application is for a construction permit, such information shall show that the applicant possesses the funds necessary to cover estimated construction costs and related fuel cycle costs or that the applicant has *reasonable assurance* of obtaining the necessary funds, or a combination of the two. 10 CFR §50.33(f). (Emphasis added.)

The regulations are amplified by Appendix C to 10 CFR Part 50, which sets forth guidance on the financial data required of license applicants. The appendix makes clear that the "reasonable assurance" concept embodied in the regulation is more flexible than many of the Commission's safety criteria.¹³ It states that:

The kind and depth of information described in this guide is not intended to be a rigid and absolute requirement....

* * * * *

In determining an applicant's financial qualifications, the Commission will require the minimum amount of information necessary for that purpose. No special forms are prescribed for submitting the information. In many cases, the financial information usually contained in current annual financial reports, including summary data of prior years, will be sufficient for the Commission's needs.

Appendix C goes on to specify the information to be furnished by applicants. For established organizations, like the utilities involved here, the applicant is required to submit estimates of construction costs, a "brief statement of the applicant's general financial plan for financing the cost of

¹²Prior to 1968, the Commission's regulations provided only that applications should state: "(f) The financial qualifications of the applicant to engage in the proposed activities in accordance with the regulations in this chapter." 10 CFR §50.33. The regulations offered no guidance as to how financial qualifications were to be demonstrated.

¹³See, for example, the highly quantified criteria for emergency core cooling systems in Part 50, Appendix K.

the facility, identifying the sources upon which the applicant relies for the necessary construction funds," its latest published annual financial report, and any pertinent interim financial reports. More detailed information may be required of a new entity formed for the purpose of constructing the facility in question.¹⁴

The history of the adoption of Appendix C also indicates that the "reasonable assurance" requirement is not rigid and that it does not normally contemplate refined analyses of an applicant's likely future ability to meet specific costs. The adoption of Appendix C in its present form followed the proposal and withdrawal of an earlier version. As the statement of considerations reflects, the appendix finally adopted eliminated much of the detail of the original proposed version. A comparison of the two is instructive.

Appendix C as first proposed in June 1967 would have required applicants for reactor construction permits, whether established utilities or entities formed specifically for the purpose of building a plant, to submit highly detailed information to the Commission. See 32 Fed. Reg. 8423. Cost projections of considerable specificity and detail were to be provided, to permit an item-by-item evaluation of the reasonableness of the estimates. Analyses of sources of funds of each applicant were to be similarly detailed, also on an item-by-item basis. The guide provided that "the capability or reasonable assurance of each source to produce its assigned portion of the estimated fund requirements should be demonstrated."

In July 1967, the first proposed version of Appendix C was withdrawn. 32 Fed. Reg. 10816. In response to a query from the Executive Director of the Joint Committee on Atomic Energy, the Director of Regulation explained the Commission's action. In a letter dated August 25, 1967, which was entered in the public docket file, the Director stated that:

After publication, and as a result of questions about the purpose of the guide, we carefully re-reviewed it and concluded that it would call for substantially more information in scope and detail than is likely to be necessary, particularly in the case of operating utilities with a history of financial stability.

¹⁴The introduction to Appendix C states that:

It is important to observe also that both §50.33(f) and this appendix distinguished between applicants which are established organizations and those which are newly formed entities organized primarily for the purpose of engaging in the activity for which the permit or license is sought. Those in the former category will normally have a history of operating experience and be able to submit financial statements reflecting the financial results of past operations. With respect, however, to the applicant which is a newly formed company ... somewhat more detailed data and supporting documentation will generally be necessary.

In rewriting the guide we are attempting to bring into sharper focus and detail the difference in the kind and detail of information to be required of an applicant with an established operating history as distinguished from the applicant which is a newly formed entity....

This history suggests that for established utilities with substantial operating records, close scrutiny of financial qualifications was not viewed as necessary to assure that financial considerations did not compromise safety.

The statement of considerations accompanying the final rule and Appendix C states:

Although the Commission's safety determinations required for the issuance of facility licenses are based upon extensive and detailed technical review, an applicant's financial qualifications can also contribute to his ability to meet his responsibilities on safety matters. 33 Fed. Reg. 9704.

As will be seen, much of the controversy in this case concerns just how this declared relationship between financial qualifications and safety applies in practice to a regulated public utility.

B. The Review of Financial Qualifications in This Case

Before a case proceeds to hearing, the NRC staff prepares its analysis of the applicant's financial qualifications, based on extensive data submitted by the applicant. Here, the NRC staff, assisted by a consultant, considered the information and the proposed financial plan submitted by each of the applicants and concluded they had demonstrated the requisite financial qualifications.¹⁵

The transcript of the Seabrook hearing documents an exhaustive examination of the financial qualifications issue: six days of testimony and cross-examination were devoted to the issue; the transcript of this portion of the hearing occupies more than 1,300 pages, exclusive of exhibits; ten expert witnesses appeared. Appearing in support of the applicants' qualifications were the senior financial analyst of the NRC staff and the consultant who together prepared the staff evaluation; the financial vice-president of PSCO; and a vice-president of PSCO's financial consulting firm. The intervenor NECNP presented in opposition to the application a professor of business administration and a professor of economics. Intervenor Donald B. Ross called an insurance company investment officer and officials of three other utility participants. The witnesses were cross-examined extensively.

¹⁵This analysis appears in the record in Supplement No. 3 to the Safety Evaluation Report.

The witnesses presented detailed testimony on such areas as: construction costs; sources of funds; the health of the utility industry generally and of the applicants in particular; the state of the bond market and the likely marketability of PSCO bonds under different assumptions; the reasonableness of PSCO's assumptions with regard to the projections of other applicants; the history of rate actions by the New Hampshire Public Utilities Commission (PUC); the upturn in the market price of PSCO stock following the favorable PUC action in December 1974 granting PSCO a 14% return on equity; and financing practices in the utility industry, including allowance for funds used during construction (AFUDC) and construction work in progress (CWIP). The financial qualifications inquiry here appears to have been the most searching examination of this question in the history of commercial power reactor licensing. The testimony of the witnesses presented by the applicants and the staff supported the conclusion of a "reasonable assurance" regarding financial qualifications. Intervenor's witnesses disputed that conclusion, contending not that the necessary funds could not be raised, but that the applicants would experience difficulty in raising them.

D. The Decision of the Licensing Board

The Licensing Board rendered its decision authorizing issuance of construction permits for the Seabrook facility in June 1976. The three members of the Board were in agreement on detailed findings of fact leading to the conclusion that the applicants were financially qualified to construct the facility. 3 NRC 857.

The Licensing Board's Supporting Opinion included a discussion of the major facts and reasoning underlying its conclusion. It noted that the controversy centered on the ability of PSCO to raise some \$800,000,000, a sum twice the total assets of the company as of December 31, 1974. The Board observed that while PSCO had raised a comparable proportion of its assets in a comparable period of time—167% of its assets in the eight-year period 1967 through 1974—the company had then enjoyed a Moody's bond rating of A. In February 1974, Moody's had derated PSCO's bonds to Baa, and PSCO's common stock, like that of many other utilities, had declined to substantially below book value between 1973 and 1975. During that time, the company had been involved in a protracted rate proceeding.

The Licensing Board also noted, however, that during the previous two years an unusual combination of tight money, recession, inflation, and the energy crisis had increased fuel costs and other expenses rapidly and had impaired utilities' fund-raising for all purposes, including plant construction.

It also observed that PSCO's earnings had begun to improve since the approval of its requested rate increase. The Board concluded that "the preponderance of the expert testimony in this case is that the necessary funds will be forthcoming from the market although the cost of money may be higher than originally projected to PSCO."¹⁶ 3 NRC at 917.

The Licensing Board hearings on the financial qualifications issue concluded in June 1975. In December of that year, Northeast Utilities, the parent company of Connecticut Light and Power Company, announced its intention to sell its entire 11.98% share of the Seabrook project. At the same time, the United Illuminating Company indicated its desire to sell half of its 20% interest in Seabrook. On the basis of these developments SAPL-Audubon moved to reopen the evidentiary proceedings on financial qualifications, need for power, and the overall cost-benefit balance for the facility.

In February 1976, the Licensing Board granted the motion with regard to need for power, noting that Northeast Utilities had publicly stated that one reason for its decision to sell its share of Seabrook was "changes ... in the long-range capacity and energy needs of NU's service area and of New England as a whole." Memorandum and Order at 8. The Board reserved judgment on whether to reopen the cost-benefit balance issue pending the outcome of the need for power inquiry. As to financial qualifications, the Licensing Board declined to reopen stating that it found no evidence that the applicants could not meet their financial obligations for the Seabrook project. It further reasoned that the Commission's regulations, under which any change in ownership requires an amendment to the construction permit and is subject to full adjudication, provided adequate protection of the public interest.

E. The Appeal Board's Divided Decision

1. The Majority View

The Board majority, Chairman Rosenthal and Member Buck, affirmed the Licensing Board's conclusion that the applicants were financially qualified. The majority observed that central elements in the intervenors' contentions were the undisputed facts that in February 1974 the Moody's

¹⁶Whereas PSCO had originally projected that it would issue bonds at 8%, its revised source of funds sheet raised this figure to 12%.

rating of PSCO bonds fell from A to Baa,¹⁷ and that between 1974 and 1976, the price of the company's stock declined to substantially below book value. The Board noted, however, that the Licensing Board had recognized these facts, as well as the fund-raising efforts which would be required of PSCO. Balanced against these considerations were favorable factors, including the company's fund-raising ability as demonstrated between 1967 and 1974; the higher rate of return allowed the company by the New Hampshire PUC's decision; the "possibility" that PSCO would regain its A rating from Moody's; and the extensive sales of Baa utility bonds in the first months of 1975. The majority quoted with approval the Licensing Board's discussion of the financial condition of utilities and the improving economic and regulatory climate. 6 NRC at 76.

The majority discussed at some length the intervenors' attack on the Licensing Board's decision, insofar as it had given weight to the prospect of future rate increases. The majority declared that:

These claims lose sight of one undeniable fact: the applicants here are public utilities which are under an obligation to render a public service and which are regulated by state regulatory bodies. Those bodies have considered and approved the Seabrook facility.... Given these considerations, it is scarcely likely that the PUC would stand in the way of the establishment of those rates necessary to enable Public Service to fulfill the obligations imposed upon it by its nuclear facility licenses. 6 NRC at 77.

The Appeal Board majority also pointed to the recent history of the New Hampshire PUC in granting rate relief to PSCO. In the circumstances, the Board concluded that:

... it was not improper for the applicants to have supported their showing of financial qualifications *in part* by relying on future, not-yet-obtained rate increases. And it was not error for the Licensing Board to

¹⁷The Board cited Moody's explanation of its rating system:

Bonds which are rated A possess many favorable investment attributes and are to be considered as upper medium grade obligations. Factors giving security to principal and interest are considered adequate but elements may be present which suggest a susceptibility to impairment sometime in the future.

Bonds which are rated Baa are considered as medium grade obligations, *i.e.*, they are neither highly protected nor poorly secured. Interest payments and principal security appear adequate for the present but certain protective elements may be lacking or may be characteristically unreliable over any great length of time. Such bonds lack outstanding investment characteristics and in fact have speculative characteristics as well. ALAB-422, 6 NRC 33, at 76, n. 49.

have *accorded weight* to the prospect of such future rate increases. 6 NRC at 78 (emphasis added).

The Appeal Board majority next considered the intervenors' claim that the increased cost of the project and the two utilities' plans to sell portions of the facility indicated that applicants would face greater difficulty than earlier anticipated in financing Seabrook. The majority observed:

This all well may be true. But it does not perforce undermine the conclusion below that the applicants are financially qualified.... Certainty need not be shown and all contingencies need not be foreseen. 6 NRC at 79.

The majority noted that none of the intervenors' witnesses had contended that, even with rising capital costs, the applicants would be *unable* to obtain the required funds. Reviewing the record before the Licensing Board, the majority noted that while one witness for NECNP had foreseen problems for the utility in raising funds, he had declined to predict that funds could not be raised. The Board found that his testimony, like that of the intervenors' other two witnesses on the financial qualifications issue, was that fund-raising would be more "difficult and expensive" than had been projected by the applicants. The Board continued:

That being so, it is unnecessary for us to consider here the particular strengths and weaknesses of each witness' testimony. For the financial qualifications inquiry contemplated by the Commission's regulations centers upon whether the funds can be obtained and not on the price of or difficulty in obtaining them. 6 NRC at 79.

The Appeal Board majority also considered and rejected intervenor contentions, earlier rejected by the Licensing Board, that developments following the hearing warranted a reopening of the financial qualifications inquiry.¹⁸

¹⁸These developments were the announcement of two utilities' plans to sell portions of the Seabrook facility and alleged inconsistencies between the testimony of a PSCO witness before the Licensing Board and his subsequent testimony to the FPC and to a committee of the New Hampshire legislature. As to the sale of ownership interests, the Board found no suggestion that either of the two utilities in question intended to breach its obligation under the Joint Ownership Agreement to continue financial participation in Seabrook "unless and until" the Commission issued a license amendment approving the substitution of other participants. Nor did the record suggest that either utility was not financially qualified to meet its obligations, should it be unable to find a financially qualified purchaser. The majority analyzed the alleged inconsistent statements in some detail and, while rebuking the practice, determined that they did not "undercut the conclusions we have reached on the basis of the record adduced below."

2. Member Farrar's Dissenting Views

Dissenting from the ruling of the majority on financial qualifications, Member Farrar viewed that holding as adopting the "singular principle ... that a large utility company which has received the approval of its State regulatory agency should, on that ground alone, be conclusively presumed by this Commission to be financially qualified." 6 NRC 106. He found a "superficial appeal" in the principle assertedly adopted by the majority, stating that in the case of a nonnuclear facility, he would be willing to endorse it. But, as he viewed the matter, "this is a nuclear power plant, and that makes a difference." 6 NRC at 108.

Stating that the majority's position rendered the financial qualifications inquiry "virtually meaningless," Mr. Farrar declared that an applicant's duty to prove itself capable of constructing the plant in a manner consistent with the Commission's safety goals

means that there is a need to avoid a situation in which financial pressures on an applicant become so pervasive as to influence the manner in which the plant is constructed. If the struggle to obtain funds becomes too difficult, even the most safety-conscious utility company might succumb and, in its efforts to reduce costs, end up cutting corners in constructing the plant.

His assessment of the evidence in this case showed that "at best, the lead applicant would have a long, difficult and costly struggle" obtaining the outside capital necessary to finance its share of the plant. As he saw it, "an applicant must show that it will be able to obtain funds in ready enough fashion to avoid the likelihood that temporary shortages may compromise safety [footnote omitted]. The applicants have not shown this here. It invites disaster to overlook it." 6 NRC at 110.

Mr. Farrar went on to assert that the Licensing Board erred in refusing to reopen the record to examine the announced desire of the two Connecticut utilities to sell interests aggregating 22% of Seabrook. This development, in his view, "cried out for further investigation," since it was "not unheard of" even for parties able to honor their contractual agreements to decide that it was in their interest not to do so. 6 NRC at 110.

F. Contentions of the Parties

In their briefs and at oral argument, the NRC staff argued for affirmation of ALAB-422, contending that the decision of the Appeal Board majority rested not only on assumptions as to the likelihood of favorable rate action by the New Hampshire PUC but also on the extensive record before

the Licensing Board, including the staff's analysis of the applicants' financial qualifications. In effect, staff takes the position that "reasonable assurance" of obtaining the funds necessary for construction means that the applicant has demonstrated that it has a reasonable financing plan.

The applicant also urged affirmance on similar bases, and on the theory that public utility commissions must be presumed to discharge their duties responsibly (*i.e.*, granting rate increases when justified), and that for regulated public utilities, the financial qualifications inquiry should therefore focus solely on regulatory climate.¹⁹ The fact that a utility is publicly regulated would therefore be sufficient proof of its financial qualifications, unless the state public utilities commission were shown to be derelict in its duty to grant needed rate increases.²⁰ Arguing against a linkage of financial qualifications and safe construction, the applicants contended that attempts by a utility to cut corners on safety-related construction would be both contrary to its long-run financial interests and certain of detection by the Commission's inspectors.²¹

Intervenors NECNP, SAPL-Audubon, and Massachusetts urge us to reverse the Appeal Board majority. All three agree with Mr. Farrar that applicants have failed to demonstrate their financial qualifications to build the plant, focusing much of their attack on the weight accorded by the majority to the prospect of favorable rate action by the New Hampshire PUC. Pointing to difficulties PSCO has experienced in the past in obtaining rate relief from the PUC, they contend that no weight whatsoever may be accorded to the prospect of future rate increases. The intervenors argue, in essence, that our present regulation assumes a direct and significant relationship between the safety of an applicant's construction practices and its financial condition, and that therefore only a financially strong utility—its stability to be demonstrated with considerable certitude—should be found qualified to build a nuclear power plant.²²

G. Financial Qualifications on the Record of this Case

The divergent contentions must be measured against our existing regulation. Given the record in this case, we need not define the precise relationship between safety and financial qualifications for we are satisfied that the applicants' financial condition presently provides "reasonable assurance of obtaining the necessary funds." Further exploration of these generic

¹⁹Applicant's brief at 12, n.9, and 25.

²⁰Transcript of oral argument at 70.

²¹Applicant's brief at 23.

²²Transcript of oral argument at 18.

issues—presumably applicable to all commercial nuclear plants—should be undertaken in rulemaking, with its broader opportunities for interested public and industry participation.

The “reasonable assurance” requirement of 10 CFR §50.33 does, however, contemplate actual inquiry into the applicants’ financial qualifications. It is not enough that the applicant is a regulated public utility. On the other hand, given the history of the present rule and the relatively modest implementing requirements in Appendix C,²³ a “reasonable assurance” does not mean a demonstration of near certainty that an applicant will never be pressed for funds in the course of construction. It does mean that the applicant must have a reasonable financing plan in the light of relevant circumstances.

As we noted earlier, the statement of considerations accompanying adoption of the present regulation stated that “an applicant’s financial qualifications can ... contribute to his ability to meet his responsibilities on safety matters.” While unexceptionable in the abstract, this proposition is less compelling in the case of a regulated public utility engaged in a construction project which is itself subject to high safety standards and ongoing inspection. No facts in the rulemaking record underlying the present regulation either support or negate the asserted link between financial qualifications and safety. Nor is there evidence in the present record that the applicants would be likely to engage in substandard construction should they ever run short of funds.

In the absence of any demonstrated direct connection between financial qualifications and safety in the utility industry—either generally or in this case in particular—we are left with the essentially speculative claims of the parties. It is not enough to say, as the applicant suggests, that failure to adhere to rigid safety standards is unlikely because this would be contrary to the applicant’s self-interest. To be sure, applicants have a near-term interest in avoiding possible civil penalties and adverse publicity arising out of safety violations, and a long-term interest in building a safe, reliable plant. Nevertheless, nuclear safety regulation is premised on a system of multiple and redundant safety measures. The “reasonable assurance” requirement was adopted to assure that financial conditions did not compromise the applicant’s clear self-interest in safety.

Counsel for Massachusetts expressed concern not so much with deliberate efforts to depart from safety standards, but rather with financial difficulties that might lead utility personnel, as a matter of human nature, to view potential safety problems with less seriousness than might otherwise be the case.²⁴ However, recent experience does not suggest that a utility

²³See text accompanying n. 10, *supra*.

²⁴Transcript of oral argument at 150.

short of funds will cut corners on safety. In the past few years, many utilities in the process of constructing nuclear facilities have experienced unforeseen financial difficulties. Common responses have been to slow down construction or to suspend construction altogether.²⁵ Such a response is not surprising in view of the fact that the sums involved in the process of building a nuclear power plant, even over a relatively short segment of the whole process, can run to the tens of millions, amounts far exceeding the comparatively small sums a utility might expect to save by cutting corners in construction.

These speculative and conflicting considerations do not support our reading the stringent test of financial qualifications urged by the intervenors and Mr. Farrar into the present regulation. And apart from the seemingly tenuous link between safety and financial qualifications, particularly for a large regulated utility, other considerations lead us to believe that a utility cannot provide more than a reasonable assurance that funds will be available through the course of a multiyear construction project. The number of variables—such as interest rates, the state of the stock and bond markets, the regulatory climate and the cost of fuel—that operate over the period required to construct a nuclear plant make financial forecasting over a ten-year period uncertain.

The resulting limited usefulness of the financial qualifications inquiry underscores the importance of ongoing inspections of reactor construction projects. Our Office of Inspection and Enforcement monitors the quality assurance programs of licensees and samples of the actual work performed by contractors and subcontractors. The Commission's inspection force has increased substantially over the past several years. On the basis of inspector field reports, the Commission can bring and has brought construction to an immediate halt when deficient practices indicated a safety problem.²⁶ The Commission is presently prepared to implement a plan under which resident NRC inspectors will be assigned to plants in the later stages of construction and to operating facilities. The quality and extensiveness of the Inspection and Enforcement effort is such that any significant pattern of unsafe cost-cutting should be detectable and would be dealt with appropriately.

²⁵See *Nuclear Power Plant Licensing: Opportunities for Improvement*, NUREG-0292 (June 1977) at 3-1; C. Behrens, *The Role of Licensing in Nuclear Power Plant Construction Times*, Congressional Research Service (October 20, 1977).

²⁶In *Consumers Power Company*, in which a licensee objected that the Director of Regulation had acted illegally in halting construction upon finding a pattern of deficient cadwelding, the Commission declared that where the public health, interest, or safety is involved, "a show cause proceeding—contemplating possible suspension, revocation or other appropriate action following a hearing—may be instituted without notice, and the order may be made effective immediately pending the hearing." CLI-74-3, 7 AEC 7, 10 (1974).

We need not undertake here any further examination of the nature and extent of the relationship between financial qualifications and safety, nor need we attempt a more precise determination of the standards by which financial qualifications should be judged. We are, however, directing the staff to initiate a rulemaking proceeding in which the factual, legal, and policy aspects of the financial qualifications issue may be reexamined.

Our determination that the generic issues raised in this proceeding require further exploration does not prevent our resolution of the case before us. Our review of the extensive record summarized earlier persuades us that the Licensing Board and the Appeal Board majority were correct in finding that the applicants possessed the requisite "reasonable assurance" of the funds necessary to construct the Seabrook facility. Based on our review of the original and revised source of funds sheets and the prospect of future rate increases, we believe that the Licensing Board was correct in finding that the applicants' financial plans should generate the necessary construction funds. Although the bond rating of the lead applicant has fallen to Baa, there is no evidence that a bond offering at that rating would be unsaleable.²⁷ The witnesses who testified were in general agreement that the lead applicant would be able to raise the funds necessary to build the plant, although the cost of financing would be higher than it had originally projected. And the cost record shows, among other things, that the New Hampshire Public Utilities Commission has granted the lead applicant a 14% rate of return on equity and has indicated its present intention to provide PSCO with the rate relief it needs in order to build the plant. We conclude that on the record before us, taken as a whole, the applicants have reasonable assurance of obtaining the funds necessary to build the plant, within the meaning of present requirements.

Our holding today rests on the factual record of this case, which does justify consideration of the prospect of future rate increases. Although speculative, this factor is no more speculative than numerous other factors, such as future interest rates, which should be taken into account. Though this factor received inordinate emphasis in the majority opinion, the Appeal Board discussed other elements in the record as well, notably the applicant's bond ratings and its fund-raising history.

The division between the majority and dissent focused in part on the concept of "difficulty." The majority asserted concern should center on "whether the funds can be obtained and not on the price of or difficulty in obtaining them." 6 NRC at 79. The dissent countered that difficulty in raising funds was precisely the circumstance in which corner-cutting was likely to occur. 6 NRC at 108.

²⁷It was pointed out at oral argument that twelve other utilities licensed by the Commission are rated Baa by Moody's. Transcript of Oral Argument at 76.

Both majority and dissent presumably would agree that at a certain point, an applicant could face so much difficulty in obtaining funds that the likelihood of its being able to finance the plant would fall below the level of "reasonable assurance." They appear to differ on what is "reasonable"; the majority would establish a low threshold to satisfy the "reasonable assurance" standard, while the dissent urges an exacting standard. As we have indicated, we believe that the correct approach falls between the majority and dissent. Anticipated difficulties in raising funds are relevant to the reasonable assurance determination, but a showing of some potential difficulty would not necessarily preclude that determination, all other relevant factors being taken into account.

Shortly before oral argument, counsel for SAPL-Audubon wrote to the Commissioners, enclosing a document consisting of excerpts of testimony before the New Hampshire PUC by a PSCO executive who had earlier testified before the Licensing Board. SAPL-Audubon asserted that this material had a bearing on the applicants' financial qualifications. At oral argument, the Commission indicated that it would treat the letter as a motion to file the material and that counsel for the applicants and the other parties would have an opportunity to comment on that motion and to offer additional material as they saw fit. The applicants' response urged that no additional material should be accepted, but that if the SAPL-Audubon submission were accepted, the applicants' submission should be received as well. As attachments, the applicants included the October 25, 1977, decision of the Connecticut Public Utilities Control Authority on Connecticut Light and Power Company's request for a rate increase, an affidavit of an official of CL&P's parent company, Northeast Utilities, and the testimony of a PUC staff witness before the New Hampshire PUC. We are granting the motions for leave to file, and we have considered the material proffered by both SAPL-Audubon and the applicants in our resolution of the financial qualifications issue.

The excerpted testimony submitted by SAPL-Audubon demonstrates that the company is eager to show the New Hampshire PUC that a rate increase is required, and believes that an upgrading of its bond rating would substantially facilitate its effort to finance the plant. The applicants' reply indicates that the PUC staff advocates granting in full PSCO's request for permission to include construction work in progress in the rate base.²⁴ In

²⁴Moreover, the PUC staff believes that PSCO meets the Federal Power Commission's "severe financial stress" tests for allowing inclusion of construction work in progress in the rate base. The submission also makes clear that a finding of "severe financial stress," as the term is defined by the Federal Power Commission, need not preclude a finding that a utility is "financially qualified," as defined by NRC. In the November 8, 1976, decision that concluded

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our view, these submissions are largely cumulative of material already in the record, both as to the means by which financing might be facilitated and as to regulatory climate. Accordingly, our finding that the applicants possess the requisite financial qualifications is not altered by the additional material.

These submissions raise questions, however, with respect to the two Connecticut utilities, Connecticut Light and Power and United Illuminating, which wish to dispose of interests in the plant. The October 25 decision of the Connecticut Public Utilities Control Authority, which granted Connecticut Light and Power a lower rate increase than it had requested, recommended that the company pursue all possibilities available to it for selling its 12% interest in Seabrook.²⁹ The Northeast Utilities affidavit states that Connecticut Light and Power will conform to the Seabrook Joint Ownership Agreement as long as it remains a participant; that it has entered into or is entering into agreements with various New England utilities for the sale of all its interest in Seabrook; and that when NU offered its interest in Seabrook to all New England utilities presently, or eligible to become, members of the New England Power Pool, the offer was oversubscribed. The affidavit did not specify the companies with which those contracts had been or would be concluded.³⁰

Any transfer of ownership would require Commission approval.³¹ We will await the filing of an application for a license amendment to consider the issue whether future applicants are financially qualified. In the event that the Connecticut PUC issues a further order related to the two utilities,

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its rulemaking proceeding on construction work in progress, the FPC explained "severe financial stress" as follows: "The financial circumstances that we contemplate are those in which it would be clearly detrimental to utility wholesale customers if some amount of CWIP were not permitted in rates base.... Such a circumstance might arise, for example, where the exigencies of the utility's construction program are such as to reduce its interest coverage to such an extent that additional capital cannot be raised at reasonable rates and that to attract capital would require a rate of return on equity substantially in excess of the cost of equity capital to otherwise similar electric utilities. Under such circumstances, it would be to the benefit of the consumer if the additional earnings necessary to attract capital were permitted by way of a return on CWIP rather than by way of an inflated return on the traditional rate base since the former treatment would eventually be reflected in a lower rate base ... while the latter would not." Docket No. RM 75-13.

²⁹Docket No. 770319 at 32.

³⁰Under Section 23.1 of the Joint Ownership Agreement, before any interest in the facility may be offered for sale, PSCO and United Illuminating "must have first been afforded in writing an opportunity to purchase the interest involved separately or in the aggregate on equal or better terms than those of the offer of sale and have declined such opportunity." The affidavit does not indicate the terms of the offer to the New England utilities generally or of the offer presumably first made to PSCO and UI.

³¹See Section 184 of the Atomic Energy Act, 42 U.S.C. 2234.

or that either utility independently withdraws from the project without disposing of its shares, the lead applicant shall advise the Commission's staff of its plans for dealing with the changed circumstances.³²

As described above, there is pending before the New Hampshire PUC a PSCO request for a rate increase and for the inclusion of construction work in progress in the rate base. The company has made it clear that it views the PUC's action on its request as critical to its plans for constructing Seabrook. Accordingly, we also direct the lead applicant to report promptly to the staff all orders entered by the PUC with regard to this rate proceeding, indicating any changes in financial planning to which the PUC's action may give rise. The staff shall duly report to the Commission on its findings and proposed course of action with regard to any such change in circumstances.

II. EFFECT OF EPA DETERMINATIONS OF AQUATIC IMPACTS

The second issue on which we granted review was the Appeal Board's decision to give binding effect to certain findings of EPA made pursuant to Section 316 of the Federal Water Pollution Control Act ("FWPCA"). The EPA Administrator found that the once-through cooling system he approved for Seabrook was, as required by the FWPCA, adequate to "assure the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife in and on" the ocean waters near Seabrook. June 17, 1977, Decision at 35. The Appeal Board read this conclusion as a finding that "the marine environment impacts of once-through cooling are small." 6 NRC at 71. The Board accepted those findings "without independent inquiry of our own into their record foundation," *id.*, and without itself resolving the conflict on precisely this issue between the Licensing Board's majority and dissent, *id.* The Appeal Board then concluded that this "small" effect of the once-through cooling system was not enough either to tilt the ultimate cost-benefit balance against the facility or to require the choice of an alternative site. *Id.*

The narrow question presented is whether the Commission may accept and use without independent inquiry EPA's determination of the magnitude of the marine environmental impacts from the cooling system in

³²Appendix C specifically contemplates that:

The Commission may, from time to time, request the applicant or licensee ... to submit additional or more detailed information respecting its financial arrangements and status of funds if such information is deemed necessary to determine an applicant's financial qualifications for a license or a licensee's financial qualifications to continue the conduct of the activities authorized by the licensee

striking an overall cost-benefit balance for the facility. Our conclusion is that we may and in this case should. The alternative suggested by the intervenors would be for the Commission to allow relitigation of an issue already ventilated before the EPA, possibly leading to different determinations concerning aquatic impacts, even though we are bound to accept the cooling system prescribed by EPA with which those impacts are associated. We cannot believe that Congress contemplated such a procedure. In its brief to us, the NRC staff seemed to argue that if the Appeal Board relied solely on EPA's determination of the magnitude of the aquatic impacts, it should be affirmed. Staff brief at 24. During oral argument staff espoused a somewhat different position, stating that the Board's decision could be affirmed either because the Board had independently evaluated the magnitude of the aquatic impacts,³³ or because the independent evaluation that was done by staff and by the Licensing Board was adequate to satisfy our NEPA obligation despite the Appeal Board's failure to make that analysis itself.³⁴ The explicit language of ALAB-422 cited above refutes the first contention staff raised in argument; the second contention, that staff and Licensing Board environmental analysis alone without final adjudicatory consideration and review satisfies our NEPA obligations, is one we need not decide in view of our decision herein to rely on the EPA findings.

Since an understanding of the statutory framework governing the relationship between the Commission and EPA in the area of nuclear power plant cooling systems is central to consideration of this issue, it is helpful to restate part of the Appeal Board's discussion of this subject in ALAB-366.³⁵ By virtue of NEPA and the FWPCA, both this Commission and EPA have significant roles to play in the overall effort to regulate the impact of nuclear generating facilities on the aquatic environment. The 1972 amendments to the FWPCA gave EPA a more expansive role in protecting water quality than any Federal agency previously had. At the same time, in furtherance of the expressed policy of the FWPCA to reduce "needless duplication and unnecessary delays at all levels of government,"³⁶ they significantly reduced the scope of obligations this Commission had been discharging under NEPA.

Under Section 402 of the FWPCA, EPA may issue a permit allowing discharge of a pollutant if the discharge complies with certain standards. Heat is included as a pollutant under the FWPCA. The most important EPA heat standards are set pursuant to Section 301, under which, by 1983,

³³Transcript at 105-06, 108.

³⁴Transcript at 117, 118-19.

³⁵See 5 NRC 39 at 48-58.

³⁶Section 101(f) of the FWPCA, 33 U.S.C. 1251(f).

EPA must set effluent limitations based on the "best available technology economically achievable."³⁷ With respect to thermal pollution, EPA also has authority to insure that intake locations reflect the best technology available for minimizing adverse environmental impact.³⁸

Congress recognized that EPA's general standards governing heat discharges might be more restrictive than necessary in particular cases. Accordingly, Section 316(a) of the Act permits the Administrator to grant an exemption from Section 301 standards if an applicant has shown to his satisfaction that the 301 standards are more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, and wildlife at the site. EPA's current policy is that unless a 316(a) exemption is obtained, there may be essentially no discharge of heat from cooling water condensers, thus requiring closed-cycle cooling and the use of cooling towers for plants such as Seabrook.

The major change the FWPCA made in this Commission's NEPA responsibilities is contained in Section 511(c). As the Appeal Board said in ALAB-366, 5 NRC 39, *supra*, at 51-52 (footnotes omitted):

In order to establish a different role for this Commission with respect to water pollution matters than that mandated by *Calvert Cliffs*, Congress provided that nothing in NEPA was to be deemed to authorize this Commission either (1) "to review an effluent limitation or other requirement established pursuant to" the FWPCA or "the adequacy of any certification under Section 401 of" the FWPCA; or (2) "to impose ... any effluent limitation other than any such limitation established pursuant to the FWPCA...."

The meaning of section 511(c)(2) can perhaps best be understood by examining how, in light of it and in ideal circumstances, the responsibilities of the two agencies are to mesh in passing upon an applicant's proposal. As Senator Baker explained in introducing the floor amendment which was the forerunner of section 511(c)(2), duplication was to be avoided by leaving to EPA and the states the decision as to the water pollution control criteria to which a facility's cooling system would be held. This Commission would not then be free to ignore considerations of aquatic impact; it would have to consider them, but only as part of its overall "balancing judgment" on whether "it is in the public interest" to grant the requested permit. In other words, this Commission still must consider any adverse environmental impact that would accrue from operation of the facility in compliance with EPA-imposed stand-

³⁷Section 301(b)(2)(A), 33 U.S.C. 1311(b)(2)(A).

³⁸Section 316(b), 33 U.S.C. 1326(b).

ards; but it cannot go behind either those standards or the determination by EPA or the state that the facility would comply with them.³⁹

The relationship of EPA and this Commission in the present setting may be summarized thus: EPA determines what cooling system a nuclear power facility may use and NRC factors the impacts resulting from use of that system into the NEPA cost-benefit analysis.

Viewed against the statutory framework, the board's reliance on the EPA findings was clearly correct. The FWPCA reflects a Congressional judgment that the primary repository of expertise on water pollution questions generally, and on the environmental impacts of heat specifically, should be the EPA. Indeed, the legislative history of the FWPCA indicates that agencies such as NRC should *not* develop expertise "with respect to water quality considerations." Legislative History of the FWPCA Amendments of 1972 at 139 (Remarks of Senator Baker).⁴⁰

When this case was last before us, we emphasized that a finding of environmental acceptability made by a competent State authority after environmentally sensitive hearings was entitled to "substantial weight" in the conduct of our NEPA analysis. 5 NRC 503, *supra*, at 527. Here the justification for reliance on the EPA findings is much stronger. EPA is a sister Federal agency with expertise in the subject area, and it is being relied on for determination of a single entirely factual issue which Congress has specifically entrusted to it.

But perhaps the strongest reason for accepting as conclusive the EPA determinations of aquatic impact is to avoid protracted relitigation of these factual issues. Where litigants have one full and fair opportunity to contest a particular issue, they need not be given a second opportunity to reopen the whole matter before another tribunal where the same issue is relevant.⁴¹ The

³⁹See also 5 NRC 39, *supra*, at 52, n. 20.

Massachusetts argues that the position taken on this issue by the Appeal Board and affirmed by us is inconsistent with the analysis of the Commission's NEPA obligations the Board outlined in the above-cited portions of ALAB-366. The Board explicitly did "consider any adverse environmental impact that would accrue from operation . . .," but, since it properly accepted EPA's determination that the magnitude of that impact was slight, its consideration of that impact did not lead it to reject the Seabrook application. 6 NRC 33, *supra*, at 71.

⁴⁰*Cf. U.S. Energy Research and Development Administration* (Clinch River Breeder Reactor Plant), CLI-76-13, 4 NRC 67, 83-84 (1976).

⁴¹Our position on this issue is consistent with the approach recently taken by the Civil Aeronautics Board (CAB) in a similar situation. The Department of Transportation had conducted a full NEPA analysis of a proposal to permit a limited number of Concorde flights to this country and had approved the proposal. Thereafter, the CAB was asked to undertake a second environmental analysis of those flights. The CAB noted that all environmental issues

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Board quoted *United States v. Utah Construction and Mining Company*, 384 U.S. 394, 421-22 (1966), for the proposition that where another agency has acted

“in a judicial capacity and resolve[d] disputed issues of fact properly before it which the parties have had an adequate opportunity to litigate,” we will not hesitate to give *res judicata* or collateral estoppel effect to its findings “to enforce repose.” ALAB-422 at 75.

As we recently noted, “[a]lthough these judicially developed doctrines are not fully applicable in administrative proceedings ... the considerations of fairness to parties and conservation of resources embodied in them are relevant here.” *Houston Lighting and Power Company, et al.* (South Texas Project, Units 1 and 2), CLI-77-13, 5 NRC 1303, 1321 (1977). See K. Davis, *Administrative Law Treatise*, § 18.02 at 360 (3rd ed. 1972).

The EPA regulations provide for a formal adjudicatory hearing before the Regional Administrator on the issue of aquatic impact. SAPL-Audubon, the intervenor seeking to litigate such impact questions here, requested and received such a hearing. EPA’s regulation gave SAPL-Audubon the right to raise contentions, to present witnesses, and to cross-examine witnesses presented by EPA and by the applicant. See 40 CFR §125.36 (1976). Apart from these familiar procedural rights, where one agency has given collateral estoppel effect to the findings of another agency, the courts have focused on the nature and purpose of the two proceedings, the relative expertise of the agencies involved, and other relevant policy considerations. See generally *Utah Construction*, *supra* at 422; *FTC v. Texaco*, 555 F.2d 862, 879-81, 893-94, 923-35 (D.C. Cir. 1977)(*en banc*)(majority, concurring and dissenting opinions); *Safir v. Gibson*, 432 F.2d 137, 148 (2nd Cir.)(Friendly, Ch. J.), *certiorari denied*, 400 U.S. 942 (1970). Here the aquatic impacts were crucial to EPA’s Section 316 determination. Under that provision, EPA had to approve a cooling intake system which would reflect the “best technology available for minimizing adverse environmental impact,” and a discharge system that would not imbalance the marine populations. EPA’s cooling system decision therefore not only is sensitive

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relating to the Concorde flights had previously been fully considered by DOT. Expressing the view that for it to conduct further duplicative proceedings “would serve no useful purpose,” the Board held that such a proceeding was not required by NEPA. *Petition of Environmental Defense Fund, Inc.*, CAB Order 76-4-21 at 3 (April 6, 1976). Like the EPA decision on which we rely here, the Department of Transportation decision relied on by the CAB was under judicial review at the time.

to aquatic impacts, it is controlled by them. In these circumstances, we should not go behind EPA's determinations unless compelled to do so.⁴²

SAPL-Audubon is appealing aspects of the EPA Administrator's review of the Regional Administrator's decision. For the reasons already set forth, we will nevertheless rely on determinations reached in that proceeding subject to possible reconsideration following its judicial review.

SAPL-Audubon argues that the Appeal Board's reliance on the EPA decision, without circulation for comment of a supplement to the impact statement discussing changed locations of the seawater intakes, violates NEPA. There is no reason in this case why a supplement should have been recirculated after the EPA decision. The CEQ guidelines provide that an agency may "at any time" supplement or amend an EIS and that recirculation for comment depends on the particular circumstances. 40 CFR §1500.11(b). In our view, the change from the inshore to the offshore location for the cooling system intakes does not present an appropriate case for recirculating for further comments. First, since the decision as to intake location is solely within EPA's jurisdiction, and since as discussed above the Commission is bound by EPA's determination of the magnitude of the associated impacts, any comments could not have been used by the Commission either as a basis for considering possible changes in the location or as a basis for reevaluating the magnitude of those impacts. Moreover, the Administrator found that the effect of moving the intake from the inshore to the offshore location "... will further minimize any potential environmental effects." EPA Administrator's June 17 Decision at 24. While circulation of a supplement may well be appropriate or necessary where the change in the proposed action has significant aggravating environmental impacts, there is no reason for a supplement when, as here, the change

⁴²Intervenors argue that our action here—accepting EPA's determination of the magnitude of aquatic impacts instead of ourselves determining it—is in conflict with the spirit if not the letter of *Calvert Cliffs' Coordinating Committee v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971). We reject that argument for two reasons. First, the "spirit" of the *Calvert Cliffs'* decision means to us that we must consider all environmental factors in the course of making our own environmentally sensitive decision on licensing a proposed facility. See 449 F.2d *supra* at 1122. This the Appeal Board did. Neither the spirit nor the letter of *Calvert Cliffs'* demands that the magnitude of each of those impacts be measured or determined solely by NRC personnel as long as they are fairly and accurately determined. The second reason is that the only language in *Calvert Cliffs'* that contemplated the Commission's rejecting an EPA decision—by imposing a stricter effluent limitation—has been specifically overruled by Congress in Section 511(c)(2) of the FWPCA.

Our action in this case rests on the nature and extent of the EPA proceedings. In future cases where EPA has made the necessary factual findings for approval of a specific once-through cooling system for a facility after full administrative proceedings, we expect our adjudicatory boards to do as we have done today. There is no question before us as to how to treat other EPA actions reached through other proceedings, and we express no view in that regard.

mitigates such impact.⁴³ Cf. *Environmental Defense Fund v. Froehlke*, 368 F. Supp. 231, 237 (W.D. Mo. 1973), *aff'd*, 497 F.2d 1340 (8th Cir. 1974).

III. ALLEGED APPEAL BOARD DISTORTIONS OF THE RECORD

In its petition for review, NECNP asserted that the Appeal Board "distort[ed] the meaning of the testimony, and thus, its rulings are in error." In our Order granting review we invited NECNP to provide us with "specific instances where testimony distorted by the Appeal Board resulted in erroneous rulings" With one possible exception relating to the seismic issue, NECNP's response does not provide any specific instances to support its claim. Indeed, although NECNP repeats its "distortion" claims and adds charges of "stretching" and "skew[ing]," the section of its brief devoted to this issue offers no citation to the record made before the Licensing Board. Without such citations we cannot test the validity of NECNP's claims.

The Commission's regulations explicitly provide that the Commission or the Appeal Board has authority to modify or set aside findings made by the Licensing Board. 10 CFR §§2.740(b), 2.785. This accords with well-established principles of administrative law. 5 U.S.C. 558; Attorney General's Manual on the Administrative Procedure Act (1947) at 83. None of the distortions offered by NECNP involves issues as to the credibility of witnesses, the one area where the reviewing body's fact-finding power may be somewhat limited. In the absence of specific explanations of how the record was allegedly distorted and of record citations from the NECNP in support of its distortion claims, both of which were contemplated by our Order granting review, further consideration of those claims is unwarranted.

We leave aside the extensive discussion of the Appeal Board's treatment of Dr. Chinnery's seismic testimony. Since we do not yet have before us Mr. Farrar's dissenting opinion on the seismic issue, we have decided to reserve judgment until we are able to consider that issue with the views of the entire Appeal Board before us. We note in that regard that Mr. Farrar has assured us resolution of his concerns will not be foreclosed by construction taking place in the near future. 6 NRC 33, *supra*, at 106.

⁴³In the course of its argument SAPL implies that 10 CFR §51.52(b)(3), providing that the FES is deemed modified by subsequent decisions of our adjudicatory tribunals, violates NEPA. Two courts of appeal have approved of that rule. The Court of Appeals for the District of Columbia Circuit has approved of our practice as not departing "from either the letter or the spirit of [NEPA]." *Citizens for Safe Power v. NRC*, 524 F.2d 1291, 1294 n. 5 (D.C. Cir. 1975). See also *Ecology Action v. AEC*, 492 F.2 998, 1001-02 (2nd Cir. 1974), where Judge Friendly recognized that omissions from an FES can be cured by subsequent consideration of the issue in an agency hearing.

IV. PRESUMPTIVE VALIDITY OF THE SUPPLEMENTAL INITIAL DECISION

We also asked the parties to discuss whether the Appeal Board erred in treating the July 7, 1977, Supplemental Initial Decision ("SID") of the Licensing Board as presumptively valid. Both NECNP and SAPL raise arguments similar to those made by Mr. Farrar in his dissent to ALAB-423; namely, that when viewed against the background of the original Initial Decision and in light of alleged weaknesses in it, the SID is a "fit candidate for reversal" and should not have been relied upon in lifting the stay at Seabrook.

When we granted review of this issue, it was central to the resumption of construction at Seabrook. In ALAB-416, 5 NRC 1438, 1440 (June 29, 1977), decided before the SID, the Appeal Board held that the permits had to remain suspended at least until the Licensing Board ruled on the issues presented in the SID. In ALAB-423, 6 NRC 115, *supra*, at 117, decided after the SID, the Appeal Board majority cited issuance of the SID as one of the recent developments supporting reinstatement of the permits. Subsequent to our grant of review, however, we directly addressed the resumption of construction issue in the context of NECNP's stay motion⁴⁴ and the presumptive validity issue thereby lost its significance.

The decision of the Appeal Board is affirmed. The Commission staff is directed to prepare and present to us a proposal which can serve as the basis for initiating the rulemaking described above.

It is so ORDERED.

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 6th day of January 1978.

⁴⁴Under our recently adopted certiorari and stay rules, 10 CFR §§2.786 and 2.788, if a party is aggrieved by an Appeal Board decision denying a stay, that party should file stay papers with us pursuant to 10 CFR §2.788(a) rather than seeking review of the Board decision under §2.786(b). If the Board makes a decision on the merits and also rules on a stay in the same decision, both procedures should be employed if a party seeks both a stay and review.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Jerome E. Sharfman, Chairman
Dr. John H. Buck
Dr. Lawrence R. Quarles

In the Matter of

Docket No. 50-247
OL No. DPR-26

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

(Indian Point Station,
Unit No. 2)

January 11, 1978

Upon appeals from a Licensing Board order (LBP-77-63, 6 NRC 799) granting intervenor's motion for a Board finding that, as a result of prolonged inaction by the Buchanan Zoning Board of Appeals, approval by that body is no longer a required approval for construction of a closed-cycle cooling system at the Indian Point site and that all governmental approvals required to begin such construction have been received, the Appeal Board determines that (1) contrary to the expressed belief of the Licensing Board, the Federal preemption discussion in ALAB-399, 5 NRC 1156, did not mandate the finding in question; and (2) in view of the Licensing Board's June 17, 1977, extension of the termination date for operation of the plant with once-through cooling to May 1, 1982 (LBP-77-39, 5 NRC 1452), a decision on preemption should have been deferred pending the decision of the New York Court of Appeals defining the authority of the Buchanan Zoning Board of Appeals under New York law.

Order reversed and intervenor's motion denied, without prejudice to renewal at least 45 days subsequent to the decision of the New York Court of Appeals.

NEPA: FEDERAL PREEMPTION

While a State may refuse to authorize construction of a nuclear power plant on environmental grounds and may prevent or halt operation of an already built plant for some valid reason under State law, it may not nullify

an environmental condition imposed on the plant's operating license by the NRC, pursuant to its NEPA responsibilities.

STATE STATUTES: FEDERAL PREEMPTION

Federal tribunals should generally await State courts' interpretation of a State statute which may or may not conflict with Federal law before determining whether or not such a conflict exists.

Mr. Edward J. Sack, New York, New York, for the licensee, Consolidated Edison Company of New York.

Ms. Sarah Chasis, New York, New York, for the Hudson River Fishermen's Association.

Mr. Stephen H. Lewis for the Nuclear Regulatory Commission staff.

DECISION

On May 20, 1977, we issued ALAB-399.¹ On June 2, 1977, the Village of Buchanan's motion for leave to appeal to the New York Court of Appeals from the Appellate Division's decision on its rights with respect to the proposed cooling tower was granted.² On June 17, 1977, the Licensing Board extended the termination date for operation of the plant with its once-through cooling system to May 1, 1982.³ No one appealed from that decision. In the meantime, all of the parties to the appeal had petitioned the Commission for review of ALAB-399 pursuant to 10 CFR §2.786(a). On August 26, 1977, the Commission granted the NRC staff's petition and denied the petitions of the other parties. Its order stated that the issues to be addressed in its review "are the Appeal Board's holding that the approval of the Village of Buchanan Zoning Board of Appeals is a 'necessary governmental approval' required by the license prior to commencing construction on the closed-cycle cooling system (ALAB-399, [5 NRC at 1166-68]) and the

¹5 NRC 1156.

²*Consolidated Edison Co. v. Hoffman*, 42 N.Y. 2d 801. This case was pending at the time ALAB-399 was decided. See 5 NRC at 1161.

³LBP-77-39, 5 NRC 1452. It had previously extended the date by one year to May 1, 1980. LBP-76-46, 4 NRC 659 (December 27, 1976). Although, ALAB-399 reversed this order, it did so "without prejudice to the merits of any applications for deferral of that date or elimination of the conversion requirement which are pending before the Licensing Board." 5 NRC 1156 at 1174.

discussion to the effect that NEPA preempts the Zoning Board of Appeals' power to deny a zoning variance for the facility (*id.* at [1168-71])." The Commission's order also affirmed our denial⁴ of the motion of Hudson River Fishermen's Association ("HRFA") for a partial stay of ALAB-399 pending Commission review.

On August 31, 1977, HRFA moved for a finding by the Licensing Board that the approval of the Buchanan Zoning Board of Appeals is no longer a required governmental approval under paragraph 2.E.(1)(b) of the license "and that, therefore, all governmental approvals required to proceed with the construction of a closed-cycle cooling system have been received."⁵ HRFA submitted an affidavit stating that counsel for the Village of Buchanan had admitted that, as of August 29, 1977, the Zoning Board had taken no action of any kind directed toward the issuance of variances for construction of a cooling tower for Indian Point 2 and had not attempted any local or incidental regulation of such construction. As this was well beyond the 45-day period after which ALAB-399 permitted a party to seek relief from the Licensing Board for Zoning Board inaction, HRFA maintained that ALAB-399 required "a finding that the Zoning Board's inaction is inconsistent with and hence preempted by federal law."⁶ Such a finding, HRFA alleged, entitled it to the relief requested by the motion. Despite the fact that it is not a party to this proceeding,⁷ the Village of Buchanan filed a response to HRFA's motion.⁸ It related the status of the Zoning Board's pending appeal in the New York Court of Appeals concerning its authority to prevent or regulate construction of the proposed cooling tower.⁹ It then stated that, until the Court of Appeals has rendered its decision, the Village will not take any legal action "with respect to the granting of any variances and/or regulating local and incidental conditions since they feel it may prejudice their case."¹⁰ The Village asked the Board to dismiss HRFA's mo-

⁴ALAB-414, 5 NRC 1425 (June 23, 1977).

⁵Motion, p. 1.

⁶*Id.*, p. 2.

⁷See ALAB-369, 5 NRC 129 (January 27, 1977).

⁸The Licensing Board accepted the response without comment and, indeed, its Chairman wrote the Village attorney requesting additional information, which was supplied. See the Chairman's letter of October 11, 1977, and the Village attorney's response of October 15, 1977. These submissions could have been properly received as those of an *amicus curiae*. Cf. ALAB-369, *supra*.

⁹For a discussion of that case, see ALAB-399, *supra*, 5 NRC 1156 at 1160-61.

¹⁰See the Village's Response at p. 3. The Village attorney later stated, in his October 15, 1977, letter to the Licensing Board Chairman: "The local and incidental regulations mean very little to the Village of Buchanan as we see it" But that does not necessarily mean that the Village will not attempt to exercise the power of local and incidental regulation over construction of the closed-cycle cooling system, should the Court of Appeals affirm the Appellate Division's holding that that is the only power which it has with respect to that construction.

tion. Consolidated Edison Company of New York ("Con Ed"), the licensee, also opposed the motion. The staff asked the Board to defer ruling on the motion until the Commission issues its decision on review.

On November 23, 1977, the Licensing Board issued an order granting HRFA's motion,¹¹ apparently on the theory that ALAB-399 permitted it no other course of action. Board member Briggs dissented. Both the staff and Con Ed appealed.¹² For the reasons which follow, we reverse.

In ALAB-399, we were confronted with a narrow and novel question. We did not have the case of a State (or one of its political subdivisions) refusing to authorize the construction of a nuclear power plant on environmental grounds. Clearly, such a refusal would not conflict with Federal law. Although, by virtue of the National Environmental Policy Act, this Commission must make an environmental assessment of all proposals to construct and operate nuclear power plants, nothing in that Act requires a State to place its own stamp of approval on a specific proposal simply because it has passed Federal muster. To the contrary, States (and, upon appropriate delegation, their political subdivisions) retain the right, even in the face of the issuance of an NRC construction permit, to preclude construction on such bases as a lack of need for additional generating capacity or the environmental unacceptability of the proposed facility or site. We also did not have before us the case of a State (or one of its political subdivisions) acting to prevent or halt the operation of an already built nuclear plant for some valid reason under State law. There are at least some grounds on which that could be done without conflicting with Federal law.¹³ Instead,

¹¹LBP-77-63, 6 NRC 799.

¹²The staff moved that we refrain from ruling on its exception pending the Commission's decision on review. By our order of December 9, 1977, we denied that motion for it seemed to us that our resolution of the appeal would be more helpful to the Commission and to the cause of justice than a refusal even to consider the issues it raises.

¹³For example, under the Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (August 7, 1977), [September 1977] U. S. CODE CONG. & AD. NEWS (codified in 42 U.S.C. §§7401, *et seq.*), States may establish and enforce emission standards for radioactive pollutants into the air either under the Clean Air Act itself or under State law. See Sections 122 (a), 110, 112(d)(1), and 116 of the Clean Air Act, 42 U.S.C. §§7422(a), 7410, 7412(d)(1), and 7416. The Conference Report, in its discussion of Section 122, states:

Under this provision, radioactive pollutants, including source material, special nuclear material, and byproduct material are covered by Section 116 of the Clean Air Act. Thus, any State, or political subdivision thereof, may establish standards more stringent than Federal, or where a Federal standard has not been established, may establish any standards they deem appropriate. Thus the provision would not preempt States and localities from setting and enforcing stricter air pollution standards for radiation than the Federal standards, and would not follow the holding of *Northern States Power Co. v. State of Minnesota*, 447 F.2d 1143 (8th Cir. 1971) *aff'd* 405 U.S. 1035 (1972) in the context of radioactive air pollution.

(Continued on next page)

what confronted us here was a nuclear power plant which no State or local governmental body, not even the Village of Buchanan, wanted to shut down. The major question before us was whether the Village could eschew any effort to bar the plant's operation and yet, at the same time, act to nullify a condition which was imposed by us upon its NRC operating license, pursuant to the National Environmental Policy Act, for the purpose of protecting the striped bass population in the adjacent Hudson River.¹⁴

Our approach to this question was a cautious one. While stating that an outright refusal by the Village to permit construction of the cooling tower mandated by the license would be inconsistent with Federal law and hence unlawful under the Supremacy Clause of the Constitution, we took cognizance of the long litigation between the Village and Con Ed in the New York State courts which had produced an Appellate Division ruling that the Buchanan Zoning Board of Appeals, though lacking the power to block construction of the cooling tower, does have the power to "regulate local and incidental conditions relative to the construction of the proposed facility."¹⁵ We said: "If the Zoning Board uses this declaration of its power under state law in such a way as substantially to obstruct or to delay the license conditions imposed on Con Ed by this Commission pursuant to NEPA, then its 'regulation' would be preempted by Federal law." But we also acknowledged the possibility that such regulation "may be exercised in such a way as not to frustrate compliance with the conditions in the Indian Point 2 license."¹⁶ Reciting the admonitions of the Supreme Court about the need for Federal tribunals to refrain from ruling on questions of Federal preemption of State law where a State statute has not yet been definitively interpreted by the State courts or where an actual conflict between Federal and State authority has not yet ripened, we declined to rule as to "whether the Zoning Board's local and incidental regulation might be preempted by this Commission's license conditions."¹⁷

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H.R. Rep. No. 95-564, 95th Cong., 1st Sess. 141, *reprinted in* [September 1977] U.S. CODE CONG. & AD. NEWS 2207, 2653-54.

Of course, any State action along such lines would have to comport with all the requirements of substantive due process.

"In this connection, it should be noted that, to our knowledge, Buchanan has never suggested that, if the choice were between plant operation with a cooling tower and no plant operation at all, it would opt for the latter alternative. However, we do not intend to imply any opinion as to whether the Village has the power under New York law to force the Indian Point 2 plant to cease operating.

¹⁴5 NRC at 1169.

¹⁵*Id.* at 1169-70.

¹⁷*Id.* at 1170.

If time had not been of the essence, we would have been inclined to await the outcome of both the Zoning Board's appeal to the New York Court of Appeals¹⁸ and the proceeding before the Licensing Board on Con Ed's application for extension of the date for termination of operations with the once-through cooling system. However, there was a sense of urgency pervading this proceeding. We had come to the conclusion in ALAB-188 that Con Ed would need three years and five months, after obtaining all necessary governmental approvals, in which to complete construction of the closed-cycle cooling system.¹⁹ And when this matter was before the Licensing Board in late 1976, all parties agreed that this was still the time period which had to be allowed.²⁰ A new deadline of May 1, 1980, was established by the Licensing Board.²¹ If this date was not to be postponed by more than a year, and any greater extension would have meant that the closed-cycle cooling system would not be ready for the 1981 spawning season, then the issue as to the necessity for approval from the Buchanan Zoning Board had to be settled expeditiously.²²

Taking all these things into account, we decided to afford the Zoning Board an opportunity to clarify matters by exercising the powers of local and incidental regulation over the construction of the cooling tower which the Appellate Division had ruled that it possessed. If a party felt that the Zoning Board had acted unlawfully in its attempted regulation or if, after 45 days, it had still declined to take any action to issue variances, we stated that that party would "be free to come back to the Licensing Board and ask that it find that the Zoning Board of Appeals' inaction or local and incidental regulation is inconsistent with and hence preempted by Federal law."²³

As was cogently pointed out in the dissenting opinion of Mr. Briggs below, there are two aspects of ALAB-399 which were crucial to a proper decision of HRFA's August 31st motion and, hence, are critical to the determination of this appeal. The first is that, although we permitted a party to ask the Licensing Board for a preemption ruling within 45 days of the issuance of ALAB-399, we did not hold that inaction by Buchanan during that period would automatically require a finding of preemption. We

¹⁸As indicated at p. 32, *supra*, at the time of our decision, the Court of Appeals had not yet granted the Zoning Board leave to appeal.

¹⁹7 AEC 323, 408 (1974).

²⁰See Tr. of December 8, 1976, hearing at 319-26.

²¹See n. 3, *supra*.

²²We had no way of knowing that the Licensing Board would grant Con Ed's pending request for an extension of the termination date for operation with the present cooling system. Even had it been proper for us to speculate, it would have been difficult to foretell that the Board would give Con Ed a year more than it had asked for.

²³5 NRC at 1170-71.

left open the possibility that the Board might not make such a finding.²⁴ Implicit in our opinion was the idea that the Licensing Board should consider a preemption motion in the light of the principles enunciated in ALAB-399 and the situation as it might exist at the time that the Board would make its decision. The second critical aspect of ALAB-399 was its statement that preemption would arise if the Zoning Board used its power "in such a way as substantially to obstruct or to delay the license conditions imposed on Con Ed by this Commission pursuant to NEPA"²⁵ Although we were speaking there about the power of local and incidental regulation, the legal standard must apply equally to the question of whether inaction by the Village would justify a finding of preemption.

Applying these principles to the situation presented by the motion, it becomes clear that the motion should have been denied. The Licensing Board's extension of the date for termination of operation with once-through cooling to May 1, 1982, means that it is not necessary for Con Ed to begin construction of a closed-cycle cooling system until December 1, 1978. Therefore, it is impossible to say rationally that the Zoning Board's inaction in 1977 substantially obstructed or delayed compliance with the license condition. Moreover, the extension has now made it possible to await the decision of the New York Court of Appeals in *Consolidated Edison Co. v. Hoffman*²⁶ without further delaying effectuation of that condition,²⁷ thus fully accommodating the rule, adverted to be in ALAB-399,²⁸ that Federal tribunals should await State courts' interpretation of a State statute which may or may not conflict with Federal law.²⁹

²⁴See *id.* at 1171.

²⁵*Id.* at 1169.

²⁶*Supra*, n. 2.

²⁷The case was argued on January 5, 1978. We have been informally advised by the office of the Clerk of the Court of Appeals that the court usually decides by no later than July all cases which have been argued and submitted in the first half of the year.

²⁸5 NRC at 1170.

²⁹In ALAB-399, we declined to wait for a final decision from the Court of Appeals because we concluded that "the Court of Appeals could not give the Zoning Board of Appeals any greater powers than those afforded to it by the decision of the Appellate Division and still remain consistent with Federal law." 5 NRC at 1170. We reached that result in light of the fact that the State court litigation had already forced a one-year extension of the termination date in the license; and we were determined not to permit the Village of Buchanan to compel further extensions merely by its persistence in litigation. *Ibid.* Under the situation as it existed then, we believed that the delay up to that time, which permitted the Zoning Board to have its appeal to the Appellate Division decided, constituted sufficient deference to the New York courts. We note, in this regard, that the Zoning Board's right to appeal to the Court of Appeals was not resolved until over seven months after the decision of the Appellate Division in October 1976, and that a decision on the merits of this latter appeal may still be months away. See n. 27, *supra*. However, in view of the extension of the termination date for operation with once-through cooling, we perceive no reason to make a decision on preemption before the Court of Appeals' decision on the merits is issued.

For these reasons, the Licensing Board's order of November 23, 1977, is *reversed* and HRFA's motion of August 31, 1977, is *denied*, without prejudice to its renewal at least 45 days subsequent to the decision of the New York Court of Appeals in *Consolidated Edison Co. v. Hoffman, supra*, n. 2.³⁰

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

³⁰The 45 days is designed to give the Village of Buchanan time to take such action as may be permitted to it by the court's decision.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matter of

Docket No. 50-320

METROPOLITAN EDISON COMPANY,
et al.

(Three Mile Island Nuclear
Generating Station, Unit 2)

January 23, 1978

The Appeal Board denies appeal of a nonparty.

**RULES OF PRACTICE: STANDING TO APPEAL OR SEEK
RECONSIDERATION**

A person who has made only a limited appearance before the Licensing Board may not appeal from that Board's decision.

MEMORANDUM AND ORDER

Carl J. Jarboe has attempted to appeal from the December 19, 1977, initial decision of the Licensing Board in this operating license/environmental review proceeding involving Unit No. 2 of the Three Mile Island Nuclear Generating Station. LBP-77-70; 6 NRC 1185. It clearly appears, however, that he is not a party to the proceeding but, rather, confined his involvement below to the rendition of limited appearance statements. In this circumstance, the appeal will not lie. With the single exception of a State which is participating under the "interested State" provisions of 10 CFR 2.715(c), "a nonparty to a proceeding may not appeal from a licensing board's decision in it." *Consolidated Edison Co. of New York* (Indian

Point Station, Unit No. 2), ALAB-369, 5 NRC 129, 130 (1977), and cases there cited.

*Appeal dismissed.*¹

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹In *Indian Point*, ALAB-369, *supra*, we elected to accept the document filed with us by the nonparty (a political subdivision of the State of New York) "as if it were a brief *amicus curiae*." We did so because that governmental entity had "a substantial interest in [that] proceeding and [was] a party in a closely related proceeding concerning [the Indian Point] reactor." 5 NRC at 130. Like considerations do not appear to be present here. Because he assertedly resides approximately 15 air miles from the plant site (Tr. 196), Mr. Jarboe's personal interest in this proceeding might well have been sufficient to enable him to intervene. But that interest has not been shown to be either so large or of such unique character as to warrant our according special recognition to his appellate filings notwithstanding his conscious choice not to seek intervenor status below.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Dr. W. Reed Johnson

In the Matters of

**NORTHERN STATES POWER
COMPANY**

**Docket Nos. 50-282
50-306**

**(Prairie Island Nuclear
Generating Plant, Units
1 and 2)**

**(Spent Fuel Pool
Modification)**

**VERMONT YANKEE NUCLEAR
POWER CORPORATION**

**Docket No. 50-271
Amendment
(Increase Spent Fuel
Storage)
January 27, 1978**

**(Vermont Yankee Nuclear
Station)**

Upon appeals by respective intervenors from two initial decisions (LBP-77-51, 6 NRC 265 (1977) and LBP-77-54, 6 NRC 436 (1977)) permitting expansion of the spent fuel pool capacity of each facility, the Appeal Board affirms. Upon licensee's appeal from the imposition by LBP-77-51 of a license condition, the Appeal Board (citing *United States v. Munsingwear*, 340 U.S. 36 (1950)) vacates on grounds of mootness so much of that decision as undergirded the condition.

NEPA: PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Under the plain terms of NEPA, the environmental assessment of a particular proposed Federal action coming within the statutory reach may be confined to the proposed action together with, *inter alia*, its unavoidable consequences. *Kleppe v. Sierra Club*, 427 U.S. 390 (1976).

NEPA: SCOPE OF REVIEW

NEPA does not require that the environmental review of an operating license amendment cover anew the same ground as the operating license review.

NEPA: RULE OF REASON

The environmental review mandated by NEPA is subject to a "rule of reason" and as such need not "include all theoretically possible environmental effects arising out of an action" but rather "may be limited to effects which are shown to have some likelihood of occurring." *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 836 (1973).

NEPA: SCOPE OF INFORMATION REQUIRED FOR LICENSING

In the evaluation of a proposed expansion of the capacity of a spent fuel pool, neither the staff nor the Licensing Board need concern itself with the possibility that the pool will become a permanent waste repository. For the Commission has found "reasonable assurance" that methods of safe permanent disposal of high-level wastes can be available when needed. 42 Fed. Reg. 34391.

RULES OF PRACTICE: OPPORTUNITY FOR PARTIES TO ADDRESS ISSUES RAISED BY LICENSING BOARD

When a licensing board elects to decide a case on a basis different from that on which it was brought and tried, it has a concomitant obligation to bring this fact to the attention of the parties before it and to afford them a fair opportunity to present argument and, where appropriate, evidence on the new issues. *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 354 (1975).

Mr. Bruce W. Churchill, Washington, D.C., for the Northern States Power Company, applicant in Docket Nos. 50-282 and 50-306.

Mr. Thomas G. Dignan, Jr., Boston, Massachusetts (with whom **Messrs. John A. Ritscher** and **R. K. Gad III** were on the brief), for the Vermont Yankee Nuclear Power Corporation, applicant in Docket No. 50-271.

Ms. Jocelyn Furtwangler Olson, Special Assistant Attorney General of Minnesota, Roseville, Minnesota (with whom **Mr. John-Mark Stensvaag**, Special Assistant Attorney General of Minnesota, was on the briefs), for the Minnesota Pollution Control Agency, intervenor in Docket Nos. 50-282 and 50-306.

Ms. Elyn R. Weiss and **Ms. Karin P. Sheldon**, Washington, D.C., for the New England Coalition on Nuclear Pollution, *et al.*, intervenors in Docket No. 50-271.

Mr. Edwin J. Reis (with whom **Ms. Ellen B. Silbershtein** and **Messrs. Auburn L. Mitchell** and **David A. Kubichek** were on the briefs) for the Nuclear Regulatory Commission staff.

DECISION

Before us are appeals from two licensing board decisions rendered last August on applications for amendments to operating licenses which would allow the expansion of the capacity of the spent fuel pools of the facilities involved. *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), LBP-77-51, 6 NRC 265, and *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), LBP-77-54, 6 NRC 436. The expansion would be accomplished by the removal and disposal of the existing fuel storage racks in the pools and the substitution of new racks. In the case of the Prairie Island facility, the rack substitution would effect an increase in the storage capacity of the pool from 198 to 687 spent fuel assemblies; in the case of the Vermont Yankee facility, the pool capacity would be enlarged from 600 to 2,000 assemblies.

In each instance, the Boards below authorized the issuance of the sought amendment. The authorization in *Prairie Island* was subject, however, to the imposition of two conditions. 6 NRC at 292-93. The appeals embrace both the challenge of the intervenors in each proceeding¹ to the authorization itself, and the *Prairie Island* applicant's disagreement with one of the

¹In *Prairie Island*, the Minnesota Pollution Control Agency (MPCA); in *Vermont Yankee*, the New England Coalition on Nuclear Pollution, the Vermont Public Interest Research Group, Inc., and the Conservation Society of Southern Vermont (which jointly intervened and have been represented throughout by the same counsel). Although the States of Vermont and New Hampshire participated to some extent below (see 6 NRC at 437), neither has involved itself on the appellate level.

conditions (even though, as shall be seen, that condition was subsequently withdrawn by the Board as "no longer needed").

The two proceedings were consolidated for the purpose of oral argument on the intervenors' appeals. It appearing at argument that those appeals rest ultimately upon the same basic foundation, they will be considered together in Part I of this opinion. The applicant's appeal in *Prairie Island* raises entirely discrete issues, was not heard orally, and will be separately addressed in Part II.

I. THE INTERVENORS' APPEALS

A. In passing upon an application for an amendment to an operating license (or construction permit), "the Commission will be guided by the considerations which govern the issuance of initial licenses or construction permits to the extent applicable and appropriate." 10 CFR 50.91. These considerations are broadly identified in 10 CFR 50.40. In essence, Section 50.40 requires that the Commission be persuaded, *inter alia*, that the applicant will comply with all applicable regulations, that the health and safety of the public will not be endangered, that the issuance of the amendment will not be inimical to the health and safety of the public, and that any applicable requirements of 10 CFR Part 51 (governing environmental protection) have been satisfied.

To this end, the NRC staff prepared safety evaluations respecting the proposed enlargement of the capacity of the Prairie Island and Vermont Yankee spent fuel pools. On the basis of the detailed analyses contained in these evaluations, the staff concluded that "(1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical . . . to the health and safety of the public."²

Further, upon its examination of the environmental impacts which would attend upon the proposed pool modifications, the staff concluded that the issuance of a negative declaration³ was appropriate in each case. See 10 CFR 51.5(c)(1). In accordance with the terms of that section and 10 CFR 51.7, such declarations were issued in conjunction with environmental impact appraisals. The Prairie Island appraisal (fol. PI Tr. 736) sets forth (at p. 24) the express determination that "the environmental impacts

²*Prairie Island* Safety Evaluation (dated April 15, 1977), fol. PI Tr. 685 at p. 8; *Vermont Yankee* Safety Evaluation (dated June 10, 1977), fol. VY Tr. 142 at p. 10.

³A "negative declaration" is "a statement that the Commission has determined not to prepare an environmental impact statement for a particular action." 10 CFR 51.2(f). The basis for the determination is provided in an "environmental impact appraisal." 10 CFR 51.2(g).

associated with the proposed modification would not be significantly changed from those analyzed in the Final Environmental Statement for Prairie Island, Units 1 and 2, issued in May 1973." The Vermont Yankee appraisal (fol. VY Tr. 142) contains (at p. 23) a like determination, albeit in the context of the FES which had been issued for that facility in July 1972.

As is reflected by the two initial decisions under appeal, the respective Licensing Boards either explicitly or implicitly accepted these safety and environmental assessments on the part of the staff. Indeed, it was on the strength of that acceptance that the Boards reached the result which the intervenors would have us overturn.

B. We have scrutinized with care the entire record in each proceeding—which includes not only the staff safety analyses and environmental appraisals but, as well, independent evidence adduced by the parties. This scrutiny leaves us with the firm conviction that there is ample basis for finding that the enlargement of the storage capacity of the pools—and the operation of the pools with this enlarged capacity *for the period of licensed plant operation*—would not give rise to either an undue risk to the public health and safety or incremental environmental effects of significant proportions.

We need not elaborate further on this point for the reason that the intervenors do not appear seriously to argue to the contrary. Nowhere in their briefs have they referred to any evidence of record which might cast reasonable doubt upon the staff's safety and environmental determinations or upon the Licensing Board's findings in accord therewith. And although afforded the opportunity to do so, counsel for the intervenors likewise did not identify at oral argument any safety hazards or significant incremental environmental effects which would or might stem during the reactor's lifetime from an increase in the spent fuel storage capacity of the two pools in issue.

Rather, in both their briefs and at oral argument, the intervenors have proceeded on a quite different tack—which has taken as its base point the very reason why an increase in the capacity of the spent fuel pools is now necessary. As the initial decisions emphasize, absent expanded storage capacity, neither facility could continue to operate much longer. This is because, at the time the amendment applications were filed, both pools were already close to being filled to the limits of their existing capacity—without any immediate prospect of an offsite disposition of any portion of the spent fuel.

It is this lack of currently available and utilized offsite spent fuel repositories which underlies the intervenors' concerns. More specifically, the claim is that, in the totality of present circumstances, both the staff and the Licensing Boards too narrowly drew the outer boundaries of the safety

and environmental inquiries. The intervenors raise the spectre of the Prairie Island and Vermont Yankee sites becoming long-term repositories for the still greater amounts of spent fuel which would be generated by reason of the continued operation of the two facilities. We are told that there is no reasonable assurance that offsite disposition will be possible even at such time as the facilities' operating life has come to an end and decommissioning takes place. According to the intervenors, before an increase in pool storage capacity might be authorized, the possible safety and environmental implications of indefinite onsite storage would have to be fully explored. It is undisputed that no such exploration was undertaken by the staff in either its safety evaluations or environmental appraisals. It is equally clear that both Licensing Boards excluded from consideration any matters related to the ultimate disposal of the spent fuel. Rather, once again, the Boards' focus was wholly upon the effects associated with the carrying out of the modifications themselves and the storage of increased amounts of spent fuel in the pool during the facilities' lifetimes.

In sum, although there are some differences in the manner in which the respective intervenors framed their positions below and in which their contentions were procedurally dealt with, at bottom we are confronted with a single ultimate question: To what extent, if any, must the safety and environmental assessment of an application for authorization to increase the capacity of a spent fuel pool take account of the possibility that, of necessity, the pool will remain the repository for the spent fuel beyond the time when the reactor's operating license terminates? Whether the decisions below can be upheld wholly depends on the answer to that question.⁴

⁴We reject summarily those few arguments advanced by the intervenors which do not appear to be tied directly to the question stated in the text. Only one of those arguments requires specific comment. Because the practical effect of not now increasing the capacity of the Prairie Island spent fuel pool would be that that facility would have to cease operation, the MPCA appears to believe that what is being licensed is in reality plant operation. Therefore, according to MPCA, the license amendment could not issue without a prior exploration of the environmental impact of continued operation and the consideration of the alternatives to that operation (e.g., energy conservation). We do not agree. The issuance of operating licenses for the two Prairie Island units was preceded by a full environmental review, including the consideration of alternatives. See LBP-74-17, 7 AEC 487 (1974), *affirmed on all environmental questions*, ALAB-244, 8 AEC 857 (1974). Nothing in NEPA or in those judicial decisions to which our attention has been directed dictates that the same ground be wholly replowed in connection with a proposed amendment to those 40-year operating licenses. Rather, it seems manifest to us that all that need be undertaken is a consideration of whether the amendment itself would bring about significant environmental consequences beyond those previously assessed and, if so, whether those consequences (to the extent unavoidable) would be sufficient on balance to require a denial of the amendment application. This is true irrespective of whether, by happenstance, the particular amendment is necessary in order to enable continued reactor opera-

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1. The applicants and the NRC staff insist that we need not go beyond *Kleppe v. Sierra Club*, 427 U.S. 390 (1976), in quest of that answer. We are reminded that all that the applicants' operating licenses (as amended to enable enlargement of spent fuel pool capacity) authorize is the storage of the spent fuel in the pool for the license term. Any further period of storage would necessitate an additional authorization. We are told that *Kleppe* teaches that the assessment of the environmental impacts associated with that additional authorization can abide the event of the filing of the application for the authorization. By a parity of reasoning, the safety evaluation could likewise be deferred until that time.

We find that line of argument unpersuasive. As scarcely requires extended discussion, no consideration would be given to the continuation of onsite storage of spent fuel beyond the term of the operating license unless there were absolutely no feasible alternative—*i.e.*, there still were a lack of temporary or permanent offsite repositories which could accommodate that fuel. Stated otherwise, the assumption that the spent fuel will remain in the pool is perforce an assumption that there will be no other offsite location at which it might be stored. This being so, what the intervenors are asking be appraised at this time is not the relative benefits and costs (or the safety implications) of two different future courses of action (continued onsite storage and offsite shipment), either of which might be selected depending upon the outcome of the appraisal. Rather, as is readily apparent, the sought evaluation is respecting a consequence of enlarging the capacity of the pools which will be unavoidable if, as they would have us presume, offsite repositories likely will remain unavailable at the end of the license term; *i.e.*, the consequence of the indefinite presence onsite of an increased quantity of spent fuel.³

Upon due recognition of these considerations, it becomes equally apparent that *Kleppe* is entirely inapposite. What the Supreme Court there held was that, in connection with its proposed issuance of four short-term coal mining leases in the Northern Great Plains region, the Department of

(Continued from previous page)

tion (although such a factor might be considered in balancing the environmental impact flowing from the amendment against the benefits to be derived from it).

In this connection, it should be noted that the Prairie Island units were licensed for operation on the basis that they would generate radioactive wastes in a certain amount over the full term of their licenses. The amendment in question does not alter the situation; *i.e.*, the proposed increase in the storage capacity of the spent fuel pool would not occasion the generation of more wastes than had been previously projected.

³If the licensee were not authorized to continue to maintain the pool, the responsibility would have to be placed elsewhere (very likely in a governmental agency).

the Interior was not required by the National Environmental Policy Act to prepare an environmental impact statement on the entire region. In reaching that conclusion, the Court relied on the fact that Section 102(2)(C) of NEPA⁶ provides that the statement must be addressed to the environmental impact of the proposed action—including, *inter alia*, any adverse environmental effects which cannot be avoided should the proposal be implemented. There was, of course, no suggestion that implementation of the action proposed by Interior—the issuance of a limited number of short-term coal leases—might entail environmental impacts of a regional scope. And, as the Court noted, the District Court had “expressly found that there was no existing or proposed plan or program on the part of the Federal Government for the regional development of the area described in the [plaintiffs’] complaint.” 427 U.S. at 400.

Thus, insofar as it is of any possible relevance to the cases before us, *Kleppe* stands for no more than that, under the plain terms of NEPA, the environmental assessment of a particular proposed Federal action coming within the statutory reach may be confined to that action together with, *inter alia*, its *unavoidable* consequences. As such, that decision is of no assistance to the applicants and the staff if there is a sufficient basis in fact for assuming, in the assessment of proposals to enlarge the capacity of spent fuel pools, that offsite spent fuel repositories would be unavailable at the end of the operating license term. It is to whether such basis exists that we now must turn.

2. We have long been of the belief that the environmental review mandated by NEPA is subject to a “rule of reason” and as such need not “include all theoretically possible environmental effects arising out of an action,” but rather “may be limited to effects which are shown to have some likelihood of occurring.” *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 836 (1973).⁷ See also, *e.g.*, *Maine Yankee Atomic Power Co.* (Maine Yankee Atomic Power Station), ALAB-161, 6 AEC 1003, 1011-12 (1973);⁸ *Consolidated Edison Co.* (Indian Point Station, Unit No. 2), ALAB-188, 7 AEC 323, 358 (1974); *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Unit No. 2), ALAB-254, 8 AEC 1184, 1191-92 (1975). This conclusion draws direct sup-

⁶42 U.S.C. 4332(2)(C).

⁷In an unpublished order entered on November 7, 1976, the District of Columbia Circuit affirmed that portion of ALAB-156 which applied this principle, albeit remanding the proceeding to the Commission on other, unrelated grounds. *Lloyd Harbor Study Group, Inc. v. NRC* (No. 73-2266).

⁸Petition for review denied, *sub nom. Citizens for Safe Power v. NRC*, 524 F.2d 1291 (D.C. Cir. 1975).

port from the judicial interpretation of the statutory command as imposing "the obligation to make reasonable forecasts of the future." *Natural Resources Defense Council v. NRC*, 547 F.2d 633, 639 (D.C. Cir. 1976), citing *Scientists' Institute for Public Information, Inc. v. AEC*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). See also, e.g., *Arkansas Power and Light Co. v. FPC*, 517 F.2d 1233, 1236 (D.C. Cir. 1975); *Natural Resources Defense Council v. Morton*, 458 F.2d 827, 834-36 (D.C. Cir. 1972); *Life of the Land v. Brinegar*, 485 F.2d 460, 472 (9th Cir. 1973); *Environmental Defense Fund v. Corps of Engineers*, 348 F. Supp. 916, 933 (N.D. Miss. 1972).

The appropriate inquiry here, then, is not into whether it is "theoretically possible" that no offsite spent fuel repositories will be available when the operating license term for these reactors is due to expire. What must be decided instead is whether it is reasonably probable that that situation will obtain. Had we been compelled to come to grips with that question unaided, it is not certain what result might have been reached. It has turned out, however, that the Commission has spoken on the subject.

In November 1976, the Natural Resources Defense Council filed a petition with the Commission asking that it (1) initiate a rulemaking proceeding to determine "whether radioactive wastes can be generated in nuclear power reactors and subsequently disposed of without undue risk to the public health and safety"; and (2) refrain from granting any further operating licenses "until such time as this definite finding of safety can be made." On July 5, 1977, the Commission published a notice in the Federal Register to the effect that the petition had been denied. 42 Fed. Reg. 34391. In the course of its explanation of the foundation of the denial, the Commission had this to say:

The Commission would not continue to license reactors if it did not have reasonable confidence that the wastes can and will in due course be disposed of safely. *The accumulating evidence as discussed below continues to support the Commission's implicit finding of reasonable assurance that methods of safe permanent disposal of high-level wastes can be available when they are needed.*

Id. at 34393; emphasis supplied. The "accumulating evidence" to which the Commission had referenced included:

Most importantly, ERDA has dramatically expanded the U.S. program for development of a permanent high-level waste repository. ERDA has issued a report on technology for high-level waste repositories (ERDA-76-43), and has a programmatic EIS on high-level waste management in preparation. ERDA has greatly expanded its program for selection of sites for geologic disposal and is expected to apply to the NRC for a license for such a facility in early 1980 or before. In addition,

ERDA is involved in programs to consider the effects on disposal of emplacement of spent fuel rods in a repository. Furthermore, it is involved in extensive program to develop methods of stabilizing (e.g., solidifying) high-level wastes to provide for optimum safety during transportation, storage and disposal should reprocessing be commenced sometime in the future. Finally, ERDA is engaged in developing interim storage sites in case Federal custody of wastes becomes necessary before a working repository is available. Thus, there is now a coordinated Federal program to develop an actual disposal facility. Similarly, the NRC is expanding its own program to set the regulatory requirements for such an operation. The NRC is presently developing a set of regulations to govern licensing of Federal repositories to insure that permanent disposal of high-level radioactive wastes will be accomplished safely.

Ibid.

In common with the Licensing Board in *Vermont Yankee* (see 6 NRC at 438), we perceive no good reason why effect should not be given to the Commission's "reasonable assurance" finding⁹—which in full measure comports with the statement at pages 72-73 of the National Energy Plan released by the President on April 29, 1977, that

Improved methods of storing spent fuel will enable most utilities at least to double their current storage capacity without constructing new facilities. *Two actions have been taken to ensure that long-term waste storage facilities are available by 1985.*

The Energy Research and Development Administration's waste management program has been expanded to include development of techniques for long-term storage of spent fuel. Prototype technologies, complete designs, and initial environmental criteria for waste repositories will be developed by 1978. Licensing of the first repository should be completed by 1981.

[Emphasis supplied.] It may well be, as the intervenors stress, that the find-

⁹The *Vermont Yankee* Board took note (6 NRC at 438, fn. 5) of the additional statements of the Commission:

The statutory provisions cited above make it clear that no statutory requirement exists that the Commission determine the safety of ultimate high-level waste disposal activities in connection with licensing of individual reactors.

The Commission believes that the direction and progress of the present overall high-level waste management program is satisfactory and provides a reasonable basis for continued licensing of facilities whose operation will produce nuclear wastes.

42 Fed. Reg. at 34392, 34393.

ing did not rest upon disclosures in a formal record developed in either a rulemaking or an adjudicatory proceeding. As seen, however, the Commission itself employed the finding in justification of its determination not to halt the issuance of further operating licenses. In our view, this has to be taken as a policy declaration that, for the purposes of licensing actions, it both can and should be presumed that there will be spent fuel repositories available "when needed"—*i.e.*, well before the termination of either the Prairie Island or Vermont Yankee operating licenses.¹⁰ As such, it must be respected by the licensing boards and ourselves unless and until rescinded by the Commission or overturned by the courts.¹¹

We accordingly hold that, in the evaluation of a proposed expansion of the capacity of a spent fuel pool, neither the staff nor the Licensing Board need concern itself with the matter of the ultimate disposal of the spent fuel; *i.e.*, with the possibility that the pool will become an indefinite or permanent repository for its contents. This being so, the limitations placed by the Boards below upon the scope of the inquiry here were proper and the intervenors' attack upon those limitations must be rejected.

II. THE PRAIRIE ISLAND APPLICANTS' APPEAL

A. In its March 1, 1977, written response to certain questions posed by the staff the prior January, the Prairie Island applicant disclosed that it proposed to cut up the removed spent fuel racks and ship them offsite in 55-gallon drums. None of the contentions of the intervenor Minnesota Pollution Control Agency (MPCA) was specifically addressed to that proposal. MPCA did advance a contention (identified as No. 17 and admitted by the Licensing Board) to the effect that the applicant had failed to provide "sufficient information to assess the occupational radiation dosage to the workers engaged in the activity of rearranging stored spent fuel and installing new spent fuel storage racks." In the course of the consideration of this contention at the evidentiary hearing, staff counsel directed questions to an applicant witness (Dale M. Vincent) with respect to whether, in determining

¹⁰It appears from the environmental impact appraisals that, absent offsite disposition in the meanwhile, the expanded capacity of the Prairie Island and Vermont Yankee spent fuel pools will be exhausted (assuming essentially uninterrupted reactor operation) in 1982 and 1987, respectively. *Prairie Island* appraisal, p. 2; *Vermont Yankee* appraisal, p. 2. Although the matter was not explored in any depth in either proceeding, it is at least doubtful whether the pools' capacities could be further enlarged to an appreciable extent. In any event, it is highly improbable that, by its reference to "when needed," the Commission had in mind a date even approaching the years 2007-2009 (when the *Prairie Island* and *Vermont Yankee* operating licenses are due to expire).

¹¹NRDC has sought judicial review of the denial of its petition for rulemaking. *Natural Resources Defense Council v. NRC* (2nd Cir. No. 77-4157).

what means of carrying out the pool modification would be employed, the applicant had taken into account the requirements of 10 CFR 20.1(c). That section provides that:

In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974 should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

Thereafter the "as low as is reasonably achievable" (ALARA) standard was explored with the witness in the context, *inter alia*, of the proposed rack disposal method (PI Tr. 449-54, 461-66, 478-85, 494-501). During the course of this exploration, some attention was directed to the fact that the total occupational radiation exposure experienced as a consequence of spent fuel pool modification at the Point Beach facility in Wisconsin was less than the exposure which, according to the applicant's estimates, would be incurred by the workers engaged in the modification of the Prairie Island pool. In this connection, it was disclosed that the removed Point Beach racks were crated and shipped offsite intact, rather than cut into pieces and placed in drums prior to offsite shipment.

In its August 12 initial decision, LBP-77-51, *supra*, the Licensing Board undertook to examine "in its discretion" (*i.e.*, on its own initiative) the question whether the applicant's proposed method of rack disposal would comply with 10 CFR 20.1 and, more particularly, the ALARA standard set forth in subsection (c) of that section. 6 NRC at 281, *et seq.* It noted, *inter alia* (1) the estimate of Mr. Vincent that the occupational exposure associated with the cutting up of the racks would be approximately 10 man-rem (out of a total dose of 28 man-rem); and (2) the testimony that resort to the Point Beach method of rack disposal would involve an additional expense of between \$30,000 and \$50,000. *Id.* at 284-85. On this basis, it went on to state:

We believe the evidence suggests a possibility that the total occupational dose associated with the proposed spent fuel pool modification could be reduced by as much as 10 man-rem if the Applicant crated the old racks

for shipment offsite rather than cutting them and packing the pieces in drums. The technology for crating the racks is available, as evidenced by the fact that the method has been used at other facilities. The additional financial burden that would be imposed by crating the racks, \$30,000 to \$50,000, is not, in our view, prohibitive and is a reasonable amount to expend for a possible radiation exposure reduction of as much as 10 man-rem. In any event, the alternate method of rack disposal is deserving of more analysis than this record indicates that method has received.

. . . We have found, *supra*, that the estimated 28 man-rem occupational exposure is not, *per se*, an unacceptable total dose for the proposed project. We do not now decide that such an exposure is not in fact as low as is reasonably achievable. Consequently, we do not deny the requested license amendments on this account. It might be reasonable for the Applicant to modify its plans to reduce the radiation exposure associated with this job. We *do* decide that this issue needs further exploration. Accordingly, we condition the license amendments authorized herein as follows: the Licensee shall be authorized to proceed with the fuel pool modification as requested, except for rack disposal. After the old racks have been removed and washed down, measurements shall be made of the radiation levels that would be experienced by workers cutting the racks and packing the pieces in drums and by workers preparing the racks for crates and crating them. The Applicant will then assess, based on these measurements, the total occupational dose that would result from each method of disposal: cutting and packing the pieces in drums, and loading the drums for shipment offsite; and preparing intact racks for placement into crates, placing them in crates, and loading the crates for shipment offsite. This assessment will be submitted to the Regulatory Staff for its evaluation. Following its evaluation, the Staff shall recommend to this Licensing Board whether the Licensee should be allowed to proceed with disposal as planned or shall be required to crate intact racks for shipment. Upon considering the Staff's recommendation, and any additional evidence presented to us at that time, the Board will issue its further decision on this matter.

Id. at 286. These conclusions were given express effect in Condition 1 appearing in the order portion of the initial decision. *Id.* at 292-93.

A week after the initial decision issued, the applicant filed a timely exception to Condition 1. On the same date, it moved the Licensing Board to reconsider the condition. Both the exception and the reconsideration motion were founded on the proposition that, in withholding authorization to proceed with the proposed mode of rack disposal, the Board had misapplied the ALARA standard contained in 10 CFR 20.1(c).

On September 6, the applicant filed its brief in support of its exception. In an accompanying letter, its counsel informed us that, no matter what its outcome, the appeal might very well have little actual effect upon the applicant's activities. This was because, as a matter of practical necessity, the applicant had already embarked upon crating the removed racks intact for temporary onsite storage pending the rendition of the Licensing Board's further decision. Counsel stressed, however, that the applicant nonetheless intended to press the appeal because of the potential precedential significance of the Licensing Board's imposition of Condition 1.

Two days later, the Licensing Board denied the motion for reconsideration. LBP-77-55, 6 NRC 473. Thereafter, on September 15, the applicant filed a written request with the Licensing Board for authority to ship the removed racks offsite intact in crates. The request noted that the applicant had already crated some of the racks; that it was likely that some or all of the remaining racks would be crated; and that it was unlikely that racks, once crated, would later be removed from the crates for cutting and shipment in the manner originally proposed. By unpublished order of September 21, the Licensing Board granted (without objection) the request on a finding that "the ALARA requirements of 10 CFR Part 20 will be met if all of the racks are shipped intact." In the same order, the Board struck Condition 1 as "no longer needed."

In this set of circumstances, both the NRC staff and MPCA maintain that the issue raised by the applicant's appeal is moot and that the appeal should be dismissed on that basis.¹² For its part, the applicant does not, of course, dispute the mootness point—particularly because, as we were told in a September 26 letter accompanying the filing (with our leave) of a supplemental brief, it has now decided to ship intact all of the removed racks. It continues to maintain, however, that we should consider its attack upon the Licensing Board's application of the ALARA standard in the initial decision. What it seeks to achieve is to strip that application of any precedential value.

B. Because we are not subject to the jurisdictional limitations placed upon the Federal courts by the "case or controversy" provision in Article III of the Constitution, there would appear to be no insuperable barrier to our rendition of an advisory opinion on issues which have been indisputably mooted by events occurring subsequent to licensing board decision. Nonetheless, a sensitive regard for the state of our docket—among other considerations—suggests that we not embark upon such a course in the absence of the most compelling cause.

In effect, the applicant asserts the existence of such cause here. As above

¹²These parties also oppose the appeal on the merits.

noted, it is concerned respecting the potential precedential impact of the views articulated by the Licensing Board in dealing with the ALARA question. Although not expressly so stated, that concern might possibly have been generated by the fact that, at the time of its filings with us, the same applicant had pending before a differently constituted licensing board an application for authorization to modify the spent fuel pool of another of its operating facilities. *Northern States Power Co.* (Monticello Nuclear Generating Plant, Unit 1), Docket No. 50-263.

Just recently (on January 6, 1978), all parties to the *Monticello* proceeding joined in a motion to terminate it. In view of that development, it would appear extremely unlikely that the initial decision before us might be brought into play in that proceeding. We can take official notice, however, of the pendency of still other proceedings involving proposed operating license amendments to enable an increase in spent fuel pool storage capacity (albeit initiated by different utilities). Further, 10 CFR 20.1 is not restricted in scope to spent fuel pool modifications. The correctness of the application of the ALARA standard by the Licensing Board in this case thus might very well be of importance in the disposition of a number of present and future licensing proceedings.

This consideration dissuades us from accepting the suggestion that we simply dismiss the appeal as moot. Rather, in the totality of all circumstances, another course commends itself to us. Taking our lead from what the Supreme Court indicated was appropriate practice in a related context (see *United States v. Munsingwear*, 340 U.S. 36 (1950)), we shall vacate on grounds of mootness so much of the initial decision as undergirded the imposition of the now struck Condition 1.

The warrant for the selection of this remedy is reinforced by the preliminary analysis we made of the portion of the initial decision here in question and the underlying record. Although we are refraining from the rendition of a final judgment on the matter in light of the now absence of a live controversy, it seems appropriate to take brief note of two aspects of the Licensing Board's treatment of the ALARA question which seem troublesome to us.

1. As earlier observed, the issue whether the applicant's proposed method of rack disposal complied with the ALARA standard found in 10 CFR 20.1(c) was not placed into controversy by any party to the proceeding but, rather, was considered by the Licensing Board on its own initiative. The Board had, of course, the right to take this action; indeed, if it deemed there to be a serious question respecting compliance with Commission regulations, the Board would have been derelict in the discharge of its responsibilities had it not done so. We have previously held, however, that "when the Board (or any administrative agency) elects to decide a case on a

basis different from that on which it was brought and tried, it has a concomitant obligation to bring this fact to the attention of the parties before it and to afford them a fair opportunity to present argument and, where appropriate, evidence on the new issues." *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 354 (1975). In this instance, the record leaves us in some doubt that the Licensing Board sufficiently heeded this admonition.

It is quite true that, in the course of the relatively diffuse interrogation of the applicant's witness (Mr. Vincent) on MPCA Contention 17, the broad question of the applicant's compliance with 10 CFR Part 20 arose and, at various points during that interrogation, there were references made to the occupational exposure associated with the two rack-disposal methods (*i.e.*, cutting and intact shipment). But, insofar as our study has disclosed, at no time prior to the close of the evidence was the applicant put on reasonable notice that the Board regarded the acceptability of the cutting proposal from an ALARA standpoint to be a matter of serious concern. In this connection, even when Mr. Vincent was recalled to the witness stand at the Board's instance, the applicant was given little reason (from the Board's questions on the recall or otherwise) to believe that it was being called upon to establish specifically the cutting proposal's conformity with 10 CFR Part 20.

2. As has been seen (see p. 52, *supra*), ALARA has been expressly defined in 10 CFR 20.1(c) to mean "as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest" (emphasis supplied). Thus, whether a particular method of rack disposal meets the ALARA test does not hinge entirely upon the existence or nonexistence of some alternative, feasible method which would occasion a lesser amount of radiation exposure. Assuming that (as here) such an alternative does exist but would be more expensive to implement, it must also be determined, *inter alia*, whether the health and safety benefits which might be occasioned by the exposure reduction are sufficient to warrant the additional monetary expenditure.¹³

It is by no means clear that the Licensing Board gave sufficient effect to this consideration. True enough, as the staff and MPCA emphasize, the

¹³It bears emphasis that the ALARA standard comes into play only after it has been determined that the applicant's proposal will comply with all other requirements imposed by Part 20, including the *absolute* limitations on permissible doses, levels, and concentrations set forth in 10 CFR 20.101 *et seq.* Stated otherwise, the ALARA concept is addressed to the reduction of radiation exposure to levels *below* those which, no matter what the economic and other considerations, must not be exceeded.

Board did not hold in its initial decision that the rack-cutting proposal failed to satisfy the ALARA standard; rather the Board expressly reserved judgment on that question pending further assessment of the radiation doses which would attend upon the alternative rack-disposal methods. But on the evidence then before the Board, there was no reason to suppose that the radiation exposure reduction which would be achieved by crating the racks intact would *exceed* the 10 man-rem figure referred to by the Board. There was not the slightest suggestion by any witness that a still greater reduction might be achieved; nor did the Board state or imply in the initial decision a belief that, upon the additional assessment it was directing in Condition 1, it might turn out that the 10 man-rem estimate was too low.

By the same token, the Board did not dispute that crating the racks intact would entail an additional expense of between \$30,000 and \$50,000. To the contrary, quite plainly that estimate was accepted. As earlier noted, however, the Board thought that sum to be “not prohibitive” but, rather, “a reasonable amount to expend for a *possible* radiation exposure reduction of as much as 10 man-rem.” See p. 53, *supra* (emphasis supplied).

What we take this to constitute is an expression of the Board’s view that if the further assessment of estimated exposures called for in Condition 1 indicated that the differential would be in the neighborhood of 10 man-rem (and not some appreciably lower amount), the cutting proposal would not comply with the ALARA standard in 10 CFR Part 20.¹⁴ The Board failed, however, to explicate the basis on which it arrived at this conclusion. Certainly, the bare statement that \$30,000 to \$50,000 is not a “prohibitive” expenditure is insufficient. Similarly unsatisfactory is the undeveloped assertion that it is “reasonable” to expend such an amount in order to accomplish “as much as” a 10 man-rem reduction in the total occupational exposure to the workmen engaged in the rack-disposal project. 10 CFR 20.1(c) requires that, before any such ultimate determination is made, some attention be given to the significance of a 10 man-rem reduction from the standpoint of “the public health and safety, and other societal and socioeconomic considerations.” What the Board deemed that significance to be cannot be ascertained from the initial decision.

In fairness to the Licensing Board, however, we must hasten to add that the ALARA standard contained in Part 20 is much more easily stated than applied. It is difficult enough to measure the quantum of the public health and safety—let alone the societal and socioeconomic—benefits which would be brought about by any given reduction in radiation exposure. Even more difficult—if possible of achievement at all—is the informed assignment of monetary values to those benefits. Part 20 containing no guidelines whatever, the Licensing Board’s task was formidable indeed.

¹⁴No other purpose underlying the imposition of the condition is readily perceptible.

In its initial brief on its appeal, the applicant pointed to Appendix I to 10 CFR Part 50—which is addressed to the identically defined ALARA standard applicable to the equipment to be installed in nuclear power reactors to maintain control over the release to unrestricted areas of radioactive materials in effluents produced during normal reactor operations. 10 CFR 50.34a, 50.36a. Appendix I was promulgated following an extensive rulemaking proceeding (RM-50-2), and its issuance was accompanied by a lengthy Commission opinion. CLI-75-5, 1 NRC 277 (1975). The appendix contains numerical guides, the observance of which “shall be deemed a conclusive showing of compliance with” the ALARA requirements of Part 50.

In paragraphs A, B, and C of Section II, the appendix sets out certain specific dose limits. It then goes on in paragraph D to provide:

In addition to the provisions of paragraphs A, B, and C above, the applicant shall include in the radwaste system all items of reasonably demonstrated technology that, when added to the system sequentially and in order of diminishing cost-benefit return, can for a favorable cost-benefit ratio effect reductions in dose to the population reasonably expected to be within 50 miles of the reactor. As an interim measure and until establishment and adoption of better values (or other appropriate criteria), the values \$1000 per total body man-rem and \$1000 per man-thyroid-rem (or such lesser values as may be demonstrated to be suitable in a particular case) shall be used in this cost-benefit analysis.

Acknowledging that they were developed with respect to the dosage received by members of the general public, and that what is here involved are instead occupational dosages received by plant employees, the applicant nonetheless urged that those values would appropriately serve as a reference point in applying the ALARA standard for Part 20 purposes.¹³

In its supplemental brief, the applicant indicated that, by reason of the supervening developments which had mooted the controversy (see p. 54, *supra*), it was no longer pressing upon us the use of the \$1,000 per man-rem value in determining whether the rack cutting proposal met the Part 20 ALARA standard. In any event, we would have been very loath to import that value—or indeed any other specific numerical guideline—into Part 20 in the absence of a clear indication that the Commission intended that this be done. Such indication is not readily to be found. Quite the opposite. As the staff notes, 10 CFR 50.34a(a) explicitly states that the numerical guides

¹³In this connection, the applicant pointed to the Commission's characterization of the \$1,000 per man-rem value as being “conservative.” See e.g., 1 NRC at 284, 318. We were also referred to an expression of the view of the Environmental Protection Agency that a lesser value was warranted.

contained in Appendix I "are not to be construed as radiation protection standards." Part 20, of course, is specifically addressed to those standards.

In sum, whatever might be the merit of simply carrying over the Appendix I monetary values into Part 20, it cannot be done unless and until the Commission sanctions it. Our point here, once again, is that, whether or not that course is followed, there appears to be manifest justification for providing utilities, the staff, the concerned public, and the adjudicatory boards with considerably more guidance than is now contained in Part 20 with respect to how the ALARA standard should be applied for the purposes of occupational exposure. Absent such guidance, questions such as that raised by the Licensing Board in this case almost inevitably will recur and very likely will receive equally doubtful resolution.

The August 30, 1977, initial decision of the Licensing Board in *Vermont Yankee* (LBP-77-54, 6 NRC 436) is *affirmed*. The August 12, 1977, initial decision of the Licensing Board in *Prairie Island* (LBP-77-51, 6 NRC 265) is likewise *affirmed*, except for the portion thereof beginning with paragraph 47 (at page 281) and concluding with paragraph 59 (at page 286). That portion is *vacated* on the grounds of mootness.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

Additional Remarks of Dr. Buck and Dr. Johnson:

We believe that the disposal of the now moot ALARA issue in the foregoing decision is correct. However, the record reflects certain particulars in connection with this matter which in our opinion call for further consideration.

I. Criteria for Application of ALARA Under 10 CFR Part 20

We of course agree that the provisions of 10 CFR Part 50, Appendix I, do not relate to occupational exposures and that the record developed at the rulemaking hearing which led to the promulgation of that appendix does not concern itself to any meaningful extent with occupational exposure.

However, we note that the ALARA standard embraced by the Commission regulations (10 CFR Parts 20 and 50) echoes the philosophy and recommendations of the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP).¹ In fact the dollar per man-rem values found in ICRP Publication 22 appear to have provided the basis for the \$1,000 figure adopted by the Commission for Appendix I purposes.

A review of the reports referenced in ICRP Publication 22 reveals that, in developing the values set forth therein (table on page 15), consideration was given to occupational doses as well as exposures experienced by the public.

Although we are of the opinion that the economic factor should not be a dominant consideration in efforts to keep radiation exposures low, the record before us shows that a decision under the ALARA standard may at times come down to a dose vs. dollar trade-off for occupational doses as well as doses to the public. We therefore urge the Commission to set an interim dollar value for collective occupational doses based on figures in ICRP Publication 22 just as it has set an interim dollar value to assess doses received from plant effluents. In our opinion the lack of such a guideline value surely contributed to the inconsistent position of the staff on the evaluation of ALARA in this proceeding. We discuss this in the following section.

II. Staff Position on the ALARA Issue

Throughout this proceeding, until the initial decision was issued, the staff position was that the radiation exposure associated with the rack-disposal task was reasonable, and met the ALARA standard of 10 CFR §20.1(c). This view was expressed on a number of occasions.

In opposing applicant's Motion for Summary Dismissal of Contention 17 the staff noted that in the modification the "workers will not be exposed to unreasonable amounts of radiation" (Staff Response to Applicant's Motion for Summary Dismissal of Contention 17, June 6, 1977). In the

¹ *Rulemaking Hearing Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as Practicable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents*, CLI-75-5, 1 NRC 277, 280 (1975).

In this opinion the NRC notes its adoption of the terminology change from "as low as practicable" to "as low as is reasonably achievable," in accordance with the action of the ICRP in Publication 22.

The Commission opinion also repeatedly stresses the need for a monetary evaluation of dose in order to perform the cost-benefit analysis demanded under ALARA (*id.* at 279, 283, 284, and 317).

Safety Evaluation of applicant's proposed amendment, the staff found the radiation exposure of 28 man-rem to be reasonable (fol. Tr. 685, Safety Evaluation, April 15, 1977, p. 7). The staff also concluded there that applicant's activities would be carried out in compliance with Commission regulations (presumably including §20.1(c)). *Id.*, p. 8. The statements appearing in the Safety Evaluation regarding occupational exposure are repeated in virtually the same form in the staff's environmental assessment, April 18, 1977 (fol. Tr. 736, at p. 10). On cross-examination, staff witness Block characterized the applicant's dose estimates as conservative (Tr. 784, 800), and the occupational exposures as reasonable (Tr. 796, 799).

Finally, and most significantly since at that time all the evidence had been presented, the staff devoted five pages of its proposed findings to MPCA Contention 17 (occupational dose estimates). Among the findings it asked the Board to make were: applicant's 28 man-rem estimate was based on conservative assumptions (NRC Staff's Proposed Findings of Fact and Conclusions of Law, July 8, 1977, p. 20); the dose estimate was reasonable, based on the record of actual radiation exposures at other facilities (*ibid.*); the applicant had given careful consideration to occupational exposure in planning the proposed modification, and "*has met the requirements of the 'as low as is reasonably achievable standard' as this standard is defined in 10 CFR §20.1(b)*" [sic] (*id.*, pp. 22 and 23, emphasis supplied); and

[w]hile Applicant's plan of cutting the racks with a plasma arc technique prior to shipment in drums involves a significant amount of man-rem, shipping the racks whole in crates or boxes is not only more expensive (about \$30,000 to \$50,000 more expensive) but also requires decontamination procedures which involve a significant amount of man-rem. *Based on the entire record, we are convinced that the Applicant has given proper consideration to minimizing occupational exposure (id., pp. 23 and 24, emphasis supplied, footnotes omitted).*

In view of this continuing and unequivocal stance with respect to the occupational dose issue and ALARA, we cannot understand the apparent abandonment of this position when the staff chose to oppose the applicant's motion for reconsideration of Condition 1.² The only basis given for the opposition was as follows:

The NRC staff agrees with the MPCA that the rack disposal issue is not one which can be resolved by the affidavit and Report attached to Applicant's motion. As MPCA points out in its response, at pages 8-10,

²The applicant attached to this motion a three-page affidavit and a three-page document entitled "Report of Investigation of Alternative Methods and Resulting Exposure and Cost Associated with Spent Fuel Rack Disposal" ("Report") dated August 16, 1977.

Applicant's Report contains a number of conclusory statements. Moreover, there is no basis in the record of this proceeding for Applicant's argument, at pages 4 and 5 of its motion, that a licensee is not required by the "as low as reasonably achievable" standard of 10 CFR §20.1 to expend more than \$1,000 per man-rem in an effort to reduce occupational exposure.³

Condition No. 1 reflected a judgment by the Board that there was room for question whether the applicant's proposed method of rack disposal met ALARA. Staff opposition to setting aside this condition, as applicant was requesting, seems to be a direct contradiction of its earlier explicit conclusion that the proposed rack-disposal method met ALARA. This opposition came at a time when the issue was not moot and applicant could have benefited directly from the relief sought.

In view of the other difficulties which an assessment of the ALARA requirement of §20.1(c) raises, it is distressing to us to encounter a situation in which the staff explicitly concludes that a procedure meets ALARA and then, without any intervening change in the technical circumstances or evidentiary record, supports a Licensing Board condition which calls for further exploration of the matter. This apparent inconsistency is particularly vexing inasmuch as the cutting vs. crating matter which formed the basis for the Board's questioning was specifically addressed by the staff in its proposed findings.

³NRC Staff's Response Opposing Applicant's Motion for Reconsideration, September 2, 1977, p. 2 (footnotes omitted).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matter of

Docket No. 50-320

METROPOLITAN EDISON COMPANY,
et al.

(Three Mile Island Nuclear
Station, Unit No. 2)

January 27, 1978

Upon intervenors' motion to stay plant operation pending appeal of LBP-77-70, 6 NRC 1185, the Appeal Board (1) finds little likelihood that they will prevail on the issue presented, since their allegation that the amount of radon (Rn-222) generated by uranium mill tailings has been understated in the environmental review of the facility is an impermissible attack on a generic regulation, and (2) determines that the intervenors have failed to show irreparable injury.

Motion for stay denied.

RULES OF PRACTICE: CHALLENGE TO COMMISSION
REGULATIONS

Claim that the amount of radon (Rn-222) generated by uranium mill tailings was understated in a facility's environmental review is an attack upon a generic regulation of the Commission (Table S-3, appearing in 10 CFR 51.20(e)) and is barred as a matter of law. *Potomac Electric Power Co.* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 89 (1974).

Mr. Ernest L. Blake, Jr., Washington D.C., for the
applicants, Metropolitan Edison Company, *et al.*

Mr. Chauncey R. Kepford, State College, Pennsylvania,
for the intervenors, Citizens for a Safe Environment
and York Committee for a Safe Environment.

Mr. Henry J. McGurren for the Nuclear Regulatory
Commission staff.

MEMORANDUM AND ORDER

Before this Board is the appeal of intervenors, Citizens for a Safe Environment and York Committee for a Safe Environment, from the December 19, 1977, initial decision of the Licensing Board in this operating license/environmental review proceeding involving Unit No. 2 of the Three Mile Island Nuclear Station. LBP-77-70, 6 NRC 1185. In conjunction with their exceptions to that decision, the intervenors moved for a stay of its effectiveness. The motion was said to be based upon the content of the exceptions.

By unpublished order of January 3, 1978, we called attention to the fact that the motion was deficient in that it failed to address adequately the four well-settled criteria governing the grant or denial of stay relief which are now embodied in 10 CFR 2.788(e), 42 Fed. Reg. 22128, 22130. See *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-27, 6 NRC 715, 716 (November 4, 1977); *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-437, 6 NRC 630, 631-32 (October 14, 1977).¹ Because, however, the intervenors are represented by a lay person, we decided to provide them with an opportunity to cure the deficiency in a supplemental memorandum.

The intervenors have availed themselves of that opportunity. It is manifest to us, however, that the showing contained in their supplemental filing falls far short of what would be required to warrant our foreclosing reactor operation pending the outcome of the appeal.

The intervenors do not contend, let alone attempt to establish, that the operation of Unit 2 during the pendency of the appeal would pose an immediate and direct threat to the health and safety of their members. Rather, their request for stay relief turns out to relate exclusively to one aspect of the consideration of the environmental effects associated with the uranium fuel cycle—the amount of radon (Rn-222) that is generated by the uranium

¹As stated in Section 2.788(e), those criteria are (1) whether the moving party has made a strong showing that it is likely to prevail on the merits; (2) whether the party will be irreparably injured unless a stay is granted; (3) whether the granting of a stay would harm other parties; and (4) where the public interest lies.

mill tailings produced in the course of the mining and milling process. The claim is that that amount is far greater than was assumed for the purposes of the environmental review of this facility.

Were we to reach the merits of that claim and to find it to be substantial, there would remain the question whether the error was of such potential magnitude as might possibly require the denial of an operating license to this now completed reactor. It is clear, however, that we need not reach that question. This is because assertion of the claim in this proceeding is barred as a matter of law for the reason that it constitutes an impermissible attack upon a generic regulation of the Commission.

1. Some years ago, the then Atomic Energy Commission embarked upon a rulemaking proceeding addressed to the manner in which the environmental effects associated with the uranium fuel cycle were to be considered in the individual NEPA cost-benefit analyses for light-water reactors. The result was the adoption in April 1974 of a regulation which was codified in 10 CFR 51.20(e). As summarized by us in *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-349, 4 NRC 235, 238-39 (1976), *vacated on other grounds*, CLI-76-17, 4 NRC 451 (1976):

Reflecting the Commission's conclusion that the environmental effects of the fuel cycle, including reprocessing of spent fuel and waste disposal, were "relatively insignificant" but nonetheless should be taken into account, the regulation in substance required the introduction of quantified environmental effects of the uranium fuel cycle into the cost-benefit analysis for each individual reactor—and went on to stipulate that "[n]o further discussion of such environmental effects shall be required." The particular numerical values to be factored into the analysis for various stages of the fuel cycle (including reprocessing of spent fuel and waste disposal) were set forth in an accompanying Table, identified as S-3. These values were derived from the "Environmental Survey of the Nuclear Fuel Cycle" issued by the Commission's staff in November 1972, as subsequently revised in a staff document entitled "Environmental Survey of the Uranium Fuel Cycle" (WASH-1248, April 1974) which incorporated comments and recommendations offered during the course of the rulemaking proceeding.

[Footnote omitted.]

In 1976, the Court of Appeals for the District of Columbia Circuit held invalid so much of the regulation as was concerned with the spent fuel reprocessing and waste disposal phases of the fuel cycle. *Natural Resources Defense Council v. NRC*, 547 F.2d 633, *certiorari granted sub nom. Ver-*

mont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 429 U.S. 1090 (1977). In the wake of this decision, the Commission promulgated in March 1977 a new interim rule designed essentially to replace those portions of the existing rule which had been struck down by the court. 42 Fed. Reg. 13803 (March 14, 1977). In taking this action, the Commission expressly directed that "any *operating license*, construction permit, or limited work authorization (LWA) that may hereafter be issued *must take into account the revised values contained in this rule.*" *Id.* at 13806 (emphasis supplied).²

2. As originally promulgated, Table S-3 assigned a numerical value to, *inter alia*, the Rn-222 which would be released in the form of gaseous effluents from the uranium mill tailings. That value was 75 curies per annual fuel requirement of a model 1,000 MWe light-water reactor. Because the decision of the District of Columbia Circuit in *Natural Resources Defense Council, supra*, did not invalidate the portions of the table which pertained to the mining and milling phases of the fuel cycle, there was no necessity to focus on those phases in the consideration of an appropriate replacement interim rule. And, as it turned out, little change was made in the Rn-222 value. The value assigned in the interim rule is 74.5 curies, with the notation that it is derived "[p]rincipally from milling operations and excludes contributions from mining." 42 Fed. Reg. 13803, 13807.

It is this value which the intervenors assert is far wide of the mark. They rely not only on the testimony of their own witness below but also on the "corroboration" of that testimony to be found in a September 21, 1977, memorandum from Dr. Walter H. Jordan, a technical member of the Licensing Board Panel, to the Chairman of that Panel. Dr. Jordan expressed the view therein that the 74.5-curie value was in error and that the "correct value would be some 100,000 times greater." He went on to set forth the analysis which led him to this conclusion—adding, however, that the numerical result which he reached "is insignificant compared. . .to the radon contribution in natural background."

The Jordan memorandum was immediately transmitted by the Chairman of the Licensing Board Panel to the Chairman of the Commission. On October 5, 1977, the latter acknowledged receipt of the memorandum. Noting that it involved "a generic matter," the Chairman of the Commission indicated that the memorandum was being made publicly

²The Commission indicated that the interim revised rule was to remain in effect for "the limited period of eighteen months," expressing confidence that final rulemaking proceedings can be completed within this period. 42 Fed. Reg. 13803, 13806. At this writing, those proceedings are in progress. They are confined to the reprocessing and waste disposal phases of the uranium fuel cycle (*i.e.*, the portions of the original rule which were judicially invalidated). See fn. 5, *infra*.

available and that copies were being specifically furnished to the NRC staff and to counsel for an organization which had filed a petition for rulemaking on a related matter.

3. In the totality of these circumstances, we think it clear that, in the absence of contrary instructions from the Commission, the Licensing Board was obliged to give effect to the values in the revised Table S-3 in this proceeding. This conclusion follows not only from what we said several years ago in rejecting a similar attack upon the original Table S-3¹ but, as well, from the Commission's express direction last April that "any operating license. . .that may hereafter be issued *must take into account* the revised values contained in [the interim] rule." See p. 66, *supra*. Still further, now as before, 10 CFR 51.20(e) mandates that, in the applicant's environmental report, "the contribution of the environmental effects of uranium mining and milling. . .be as set forth in Table S-3" and goes on to state unequivocally that "[n]o further discussion of such environmental effects shall be required."⁴

It is difficult to perceive how the Commission could have spoken in plainer terms. Nor is there any reason to doubt that, had the Commission believed that the Jordan memorandum necessitated some other course, it would have so notified the adjudicatory boards. In this regard, there was not the slightest hint in the acknowledgment by the Chairman of the Commission of the receipt of the memorandum that either he or the other

¹Specifically:

[T]he environmental values assigned in Table S-3. . .reflect the Commission's considered evaluation and quantification of the adverse environmental effects of the uranium fuel cycle attributable to individual reactors. The figures were developed in public rulemaking proceedings convened by the Commission specifically to consider such matters. 37 FR 24191 (1972). They form an integral part of the new regulation. To go behind them and challenge the basis on which they rest is in effect a challenge to the regulation itself. It may well be that these values rest on unfirm footing. The Licensing Board, however, is not the proper forum for consideration of such matters. The Commission's regulations provide that "any rule or regulation of the Commission, or any provision thereof. . .shall not be subject to attack. . .in any adjudicatory proceeding involving initial licensing. . ." 10 CFR §2.758 (1974 rev.).

Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 89 (1974) (footnote omitted); *accord*, *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-262, 1 NRC 163, 204 (1975); see *Union Electric Co.* (Callaway Plant, Units 1 and 2), ALAB-347, 4 NRC 216, 217-219 (1976). See also *Public Service Electric & Gas Co.* (Salem Nuclear Generating Station, Units 1 and 2), ALAB-426, 6 NRC 206, 210-11 (1977).

⁴Section 51.20 governs environmental reports at the construction permit stage. No different rule obtains respecting the environmental reports at the operating license stage. See 10 CFR 51.21.

members of the Commission thought that the then—and still—outstanding instruction should be modified to any extent.⁵

4. In light of the remoteness of the possibility that the intervenors will ultimately prevail on the single issue pressed upon us in their supplemental memorandum, stay relief would be appropriate only upon the most compelling demonstration that the other factors to be considered (see fn. 1, *supra*) weigh very heavily in their favor. That demonstration has not been made.

For present purposes, we need not go beyond the especially important irreparable injury factor.⁶ As already noted, the intervenors do not even endeavor to show that plant operation during the pendency of the appeal will pose a direct threat to the health and safety of their members, who reside in the general vicinity of the facility site. And their motion papers do not suggest that any—let alone irreparable—injury would be sustained during the period in question by reason of the mining and milling of additional uranium. The intervenors do make vague references to the “radioactive contamination” of the reactor and the creation of radioactive waste as a source of injury; here too, however, we are left entirely in the dark regarding

⁵In issuing its notice of reopened hearing on the interim fuel cycle rule last May, the Commission announced that “[t]he subject of the hearing will be confined to the environmental effects of spent fuel reprocessing and radioactive waste management in the light-water power reactor uranium fuel cycle, and to the question whether the outcome of the interim rulemaking should be made permanent for future use, or if it should be altered, in what respects.” The notice went on to state that the NRC staff “has initiated a study designed to examine information that has developed since promulgation of the fuel cycle rule for the purpose of *generally updating the rule in other subject areas*” and that “[t]his updating will be the subject of a *separate rulemaking proceeding*.” 42 Fed. Reg. 26987, 26989 (May 26, 1977) (emphasis supplied). In its comments on the scope of the reopened hearing, the NRC staff brought these statements to the attention of the hearing board and asserted that one example of material which is appropriate for consideration in the future rulemaking proceeding is “the document submitted to the Commission by Dr. Walter H. Jordan. . . in which he suggests the need for changes to the front end portions of the rule due to radon emissions from mill tailings.” See *First Round of Suggested Staff Questions and Comments on Scope of Proceeding*, filed on October 31, 1977, in *Uranium Fuel Cycle Impacts From Spent Fuel Reprocessing and Radioactive Waste*, Docket No. RM-50-3 at p. 3, fn. 2.

Although we agree with that position, it does not follow that, pending the outcome of the future rulemaking proceeding, the value assigned in Table S-3 to radon releases is subject to reexamination in individual licensing proceedings. The short of the matter is that there is no room for such reexamination given the Commission’s unmistakable command (see text above) that the now assigned S-3 values be taken as establishing, *inter alia*, “the contribution of the environmental effects of uranium mining and milling.” To repeat, we are obliged to give total respect to that command so long as the Commission chooses to leave it in effect.

⁶We might note parenthetically, however, that the intervenors’ showing on the remaining two factors is extremely weak.

what the nature and extent of that injury might be. And intervenors did not complain about these consequences in the proceedings below.

Motion for a stay *denied*.
It is so ORDERED.

**FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD**

**Margaret E. Du Flo
Secretary to the Appeal Board**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Richard S. Salzman

In the Matter of

Docket Nos. STN 50-491

DUKE POWER COMPANY

STN 50-492

STN 50-493

(Cherokee Nuclear Station,
Units 1, 2, and 3)

January 30, 1978

For good cause shown, the Appeal Board grants the staff's motion to extend the time for filing a brief on one of its exceptions.

RULES OF PRACTICE: MOTIONS

When the caption of a filing in which certain immediate affirmative relief is requested does not include the word "motion" and explicitly describe the relief sought, the movant will not be heard to assert that it has been prejudiced by the failure to take timely action on its motion.

MEMORANDUM AND ORDER

On January 10, 1978, the NRC staff filed two exceptions to the December 30, 1977, partial initial decision rendered by the Licensing Board in this construction permit proceeding involving the Cherokee Nuclear Station. LBP-77-74, 6 NRC 1314. On the last page of the filing, the staff moved us to defer the briefing of one of the two exceptions on the ground that it had filed a motion with the Licensing Board to reconsider that portion of the partial initial decision to which that exception applied.

There was nothing in the caption of the filing to indicate that it contained anything more than the exceptions themselves.¹ Because exceptions do not *per se* call for any action on our part, we perceived no necessity to ex-

¹The caption read "NRC Staff's Exceptions to Partial Initial Decision dated December 30, 1977."

amine the filing prior to briefing. Accordingly, the staff's motion went entirely unnoticed until counsel telephoned the secretary to the Board this morning to ascertain what action had been or would be taken on it.

For good cause shown, we *grant* the motion and, accordingly, extend the time for the filing of the staff's brief on the exception in question (but not on its other exception) until 20 days after the Licensing Board rules on the motion for reconsideration pending before that Board.

So as to obviate a repetition of what occurred in this instance, we will expect the caption of every future filing in which certain immediate affirmative relief is being requested to make reference to that fact explicitly by adverting to the relief sought and including the word "motion." In the absence of such a reference, the movant will not be heard to assert that it has been prejudiced by our failure to take timely action on its motion.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Edward Luton, Chairman
David R. Schink
Ernest E. Hill

In the Matter of

Docket Nos. 50-553
50-554

TENNESSEE VALLEY AUTHORITY

(Phipps Bend Nuclear Plant,
Units 1 and 2)

January 12, 1978

Upon consideration of radiological health and safety matters, the Licensing Board authorizes issuance of permits to construct the Phipps Bend Nuclear Plant, Units 1 and 2 (subject to certain terms and conditions).

TECHNICAL ISSUE DISCUSSED: Relief valve control system.

INITIAL DECISION

Appearances

William L. Dunker, Esq., David G. Powell, Esq., W. Walter LaRoche, Esq., Alvin H. Gutterman, Esq., and James W. Bain, Esq., on behalf of the Applicant

William M. Barrick, Esq., on behalf of the State of Tennessee

Steven Goldberg, Esq., and Henry J. McGurren, Esq., on behalf of the Regulatory Staff

I. INTRODUCTION

1. Pursuant to the Partial Initial Decision issued by this Board on October 14, 1977, the Director of Nuclear Reactor Regulation issued a limited

work authorization to the Applicant, authorizing certain work activities at the plant site. Thereafter, on October 25, 1977, an evidentiary hearing on the radiological health and safety issues in this construction permit proceeding was held in Bethesda, Maryland. The record is now supplemented by the transcript of that evidentiary hearing containing, *inter alia*, the testimony of witnesses appearing on behalf of the Applicant and the Staff, and all of the exhibits received in evidence at the hearing. This Decision addresses the remaining health and safety matters and states the Board's ultimate conclusion regarding the issuance of construction permits for the Phipps Bend facility.

II. FINDINGS OF FACT

A. Description of the Proposed Facility

2. The Preliminary Safety Analysis Report (PSAR) describes the site and the design of the plant. It incorporates by reference the General Electric Standard Safety Analysis Report (GESSAR). The nuclear island described in GESSAR and the balance-of-plant described in the PSAR constitute the nuclear facility under review. The proposed nuclear island design (GESSAR-238 Nuclear Island) incorporates a single-cycle, forced circulation BWR-6 class boiling water reactor in a Mark III type of pressure suppression containment. The nuclear island scope of design includes the nuclear steam supply system, the engineered safety features, the reactor and auxiliary buildings, the control building, rad-waste building, fuel building, diesel generator buildings, the off-gas treatment system (housed in the turbine building), the onsite electrical power system, and related systems and structures (GESSAR §1.1; SER §1.2). The reactor core for each of the reactors will contain 732 fuel assemblies. Fuel will consist of slightly enriched uranium dioxide in the form of sintered ceramic pellets. Some of the fuel rods will contain gadolinium oxide and uranium dioxide, also in the form of sintered ceramic pellets. The gadolinium oxide is a "burnable poison" designed to flatten the power distribution and limit the core reactivity variation throughout the core lifetime. The fuel pellets will be enclosed in Zircaloy-2 tubes (cladding) which will be evacuated, backfilled with helium, and sealed by welding Zircaloy-2 end plugs at each end. A Zircaloy-4 fuel channel will enclose a bundle of 63 fuel rods in an 8 x 8 array (GESSAR §§1.2, 4.1; SER §1.2.1).

3. The reactor coolant pressure boundary includes the reactor pressure vessel, the recirculation lines, the main steam lines, feedwater lines, and branch lines to their outermost containment isolation valves. Water flowing through the core serves as both moderator and coolant. Water is pumped through the core by 20 jet pumps supplied by two recirculation pumps.

Steam produced in the reactor core is separated from the water and dried in the upper region of the vessel. The steam passes through the four steam lines to the turbine generator where its energy is converted into electrical energy. The steam is exhausted to a condenser located beneath the turbine where the condensate is collected and returned through a cleanup system for recycling through the reactor (GESSAR §§1.2, 5.1; SER §1.2.2).

4. Plant protection systems will automatically initiate appropriate action whenever a monitored condition approaches preestablished safety limits. These protection systems will act to shut down the reactor, close containment isolation valves, and initiate operation of the engineered safety features should any or all of these actions be required. The engineered safety features systems will have instrumentation and controls to sense accident situations and to respond appropriately (GESSAR §§1.2, 7.1; SER §1.2.4).

5. The plant will have independent offsite electric power sources at the 500 kilovolt and 161 kilovolt levels to supply power for normal startup and shutdown and to operate the engineered safety features in the event of an accident. The normal offsite power source will be the 500 kilovolt transmission system which will supply Unit 1 via the 500 kilovolt switchyard and Unit 2 via the 161 kilovolt switchyard. Failure of the normal offsite power source will cause automatic transfer of the safety and nonsafety-related buses of both units to a physically independent reserve 161 kilovolt power source (PSAR §§1.2, 8.1; SER §1.2.6). The sharing of safety-related systems by the two units will be limited to only the fire protection system, the liquid and solid radioactive waste treatment system, the offsite electrical power, and the two adjacent spray ponds which will provide cooling water for essential equipment during normal and abnormal conditions (PSAR §§3.1.2, 9.5.1; SER §1.3).

6. The proposed radioactive waste treatment systems will be designed to collect and process the liquid, gaseous, and solid wastes which are byproducts of station operation and which might contain radioactive materials. The liquid radioactive waste treatment system will consist of process equipment and instrumentation necessary to collect, process, monitor, recycle, or release radioactive liquid waste. The gaseous radioactive waste treatment system will consist of a low-temperature charcoal delay system for treating the off-gas from the main condenser air ejector, and iodine and particulate control systems for certain building ventilation systems. The Applicant has proposed to adopt the GESSAR solid waste system design.

7. The Commission's regulations require that discharges of radioactive effluents during normal operation of a facility be "as low as is reasonably achievable" (10 CFR §50.34a). To this end, certain design objectives are set forth in Appendix I of 10 CFR Part 50. The evidence presented by the Ap-

plicant and the Staff demonstrate that the design objectives of the Phipps Bend facility meet the design objectives of Appendix I (Applicant Exhibit 4; Staff Exhibit 3). Also, the Staff performed an analysis to determine whether additional gaseous and liquid rad-waste system augments would be cost-effective. It determined that there were no such equipment additions which would effect a cumulative dose reduction within a 50-mile radius of the plant at a cost of less than \$1,000 per total body man-rem or \$1,000 per man-thyroid rem.

8. Based upon the evidence before us, the Board finds that the design objectives of the Phipps Bend facility meet the design objectives of Appendix I. Additionally, we find that the proposed liquid and gaseous radioactive management systems for the plant satisfy the requirements of 10 CFR Part 50, Appendix I, and are acceptable.

9. At the time it was issued, the SER identified four outstanding issues requiring resolution. These had to do with (1) emergency core cooling, (2) design basis flood, (3) spray pond slope stability, and (4) financial qualifications (SER §1.9). The Staff and Applicant have now resolved these issues (Tr. 508; SER Supp.), and there are no items outstanding which should preclude issuance of construction permits.

B. Technical Qualifications and Quality Assurance

10. The Applicant has had considerable experience in the design, construction, and operation of both fossil and nuclear generating facilities including the Browns Ferry Nuclear Plant, Sequoyah Nuclear Plant, Watts Bar Nuclear Plant, Hartsville Nuclear Plants, and Bellefonte Nuclear Plant. Personnel within TVA's Office of Power, and in both its Division of Engineering Design and Division of Construction, have had extensive training and experience in large-scale nuclear and conventional power production activities and are presently engaged in design or construction of 14 nuclear units. The Staff concluded, based on its review of the Applicant's organizational structure, quality assurance program, and past assessment of TVA's technical qualifications, that the Applicant is technically qualified to design and construct the proposed facility (SER Chapter 21).

11. The Applicant has engaged the General Electric Company (GE) to supply the nuclear steam supply systems and to design the nuclear island. The General Electric Company has subcontracted with the C. F. Braun and Company for engineering services relating to the design of the nuclear island structure, including the reactor building, the fuel building, the auxiliary building, the rad-waste building, the control building, and the diesel generator buildings (PSAR §17.1; SER §17.1). The General Electric Company has been engaged in the design, development, construction, and

operation of boiling water, test, and research reactors for 20 years. It has also gained experience by conducting nuclear research and development programs for the utility industry and for the Government. C. F. Braun and Company has been performing engineering and construction services throughout the world since 1909. It has provided these services to the chemical, mining, utility, and nuclear industries (SER, App. A, §1.9). The Board finds that the Applicant and its principal contractor are technically qualified to design and construct the proposed plant.

12. Descriptions of the quality assurance program for the Phipps Bend plant are contained in Chapter 17 of the PSAR and GESSAR and in SER Chapter 17. The Applicant will be responsible for the total quality assurance program for the plant and will control and verify the quality assurance programs of contractors furnishing safety-related equipment (PSAR §17.1; SER §17.1).

13. Applicant's quality assurance and quality control organizations are sufficiently independent of the organizations whose work they verify; there exist clearly defined responsibilities and authorities; qualification requirements for supervisory personnel have been adequately defined; the organizations are structured so that they will be able to identify quality assurance problems in organizations performing quality-related work; they can initiate, recommend, or provide solutions; and they can verify implementation of solutions. There exist well-defined procedures, an independent inspection program, an adequate personnel training program, an adequate system of recordkeeping, an audit system to inform management of the effectiveness of the quality assurance program, and satisfactory management assessment of the status and adequacy of the quality assurance program. We conclude that the Applicant's quality assurance program for the Phipps Bend plant will satisfy the requirements of Appendix B to 10 CFR Part 50 (1977).

14. Based on our review of the material contained in GESSAR Chapter 17 and the Staff's analysis in SER §17.3 (*see also* SER, Appendix A, Chapter 17), we conclude that GE's quality assurance program includes an acceptable organization and contains the necessary quality assurance provisions, requirements, and controls for compliance with Appendix B to 10 CFR Part 50 (1977). Similarly, we conclude with regard to C. F. Braun and Company that its organizational arrangement and its quality assurance program description comply with Appendix B to 10 CFR Part 50 (1977).

C. Common Defense and Security

15. The activities proposed to be conducted under the construction permits will be within the jurisdiction of the United States. All of the directors

and principal officers of the Applicant are United States citizens. TVA is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government (Applicant's Exhibit 8 at 1-3; SER Chapter 19). The activities to be conducted do not involve any restricted data, but the Applicant has agreed to safeguard any such data that might become involved, in accordance with the requirements of 10 CFR Part 50 (1977). The Applicant will seek to obtain fuel as it is needed from sources of supply available for civilian purposes, so that no diversion of special nuclear material from military purposes is involved (SER Chapter 19). The Board finds that the issuance of construction permits for the facility will not be inimical to the common defense and security.

D. Research and Development

16. The research and development programs applicable to the plant, which are to be conducted by GE, have been described by the Applicant and Staff (GESSAR §1.5; SER §1.8; SER, Appendix A, §1.8; SER, Appendix C, §1.8). These programs are intended to verify and confirm the capability of the nuclear steam supply system and containment designs and confirm the design margins. The Staff has concluded that the test programs outlined in GESSAR will be performed on a timely basis and, in the event the results of any of these programs are not successful, appropriate restrictions on operation can be imposed or a proven alternate design can be utilized to protect the health and safety of the public (SER, Appendix A, §1.8.1). The Board finds this resolution acceptable.

E. Financial Qualifications

17. The Tennessee Valley Authority is a corporate agency of the United States created by the Tennessee Valley Authority Act of 1933 (Act), 48 Stat. 58, *as amended*, 16 U.S.C. §§831-831dd (1970; Supp. V, 1975). TVA's power program is not now funded by Federal appropriations; it is self-supporting, with necessary construction and operational funds being derived from the sale of revenue bonds and notes and from available revenues from the power program. To enable TVA to finance its power system operations, Congress has given the agency specific authority to borrow funds, including bonds and notes, in the open market, from the U.S. Treasury and from the Federal Financing Bank. TVA is now authorized by the Act to have an outstanding indebtedness of \$15 billion. Its actual indebtedness is \$5.9 billion. TVA's power bonds are considered to be prime investment quality and all of its publicly sold bonds have received a "Triple A" rating, the highest rating by both Moody's Investors Service and Stand-

ard and Poor's, the two principal bond-rating agencies in the United States (Gilleland at 7-8, attachment (1976 TVA Power Ann. Rep.); *see* SER Supp. Chapter 20).

18. The current estimated total cost of the proposed facility is \$1.8 billion. The nuclear fuel inventory cost for the first cores is estimated to be \$255 million (Gilleland at 8; Applicant's Exhibit 10; *see* SER Supp. Chapter 20).

19. During the years in which the plant is being erected, about 35 percent of the funds required for the construction of power facilities will be provided by power revenues and 65 percent will be borrowed (Gilleland at 8).

20. The information presented adequately describes the financial qualifications of the Applicant. Based on this record, the Board finds that the Applicant is qualified to finance the plant.

F. Additional Considerations

21. Applicant and Staff have analyzed the ability of the proposed Phipps Bend plant to comply with the requirements of 10 CFR Part 50, Appendix I (1977), and 10 CFR Part 20 (1977). (*See* PSAR Chapters 11, 12; SER Chapters 11, 12; Staff FES §5.4; ER §5.2; TVA FES §5.3.) Both conclude that the plant will comply with the applicable regulations. Based on our review of the evidence, we concur in that judgment.

22. Upon the basis of the Staff's analysis of the capability of the GESSAR-238 Nuclear Island to withstand abnormal transients and postulated accidents (SER, Apps. A, C, D (ch. 15)), the Applicant's analysis (GESSAR Chapter 15), the Staff's and Applicants' site-related analysis of radiological consequences of postulated design basis accidents (SER Chapter 15; PSAR Chapter 15), and our own independent review of the materials provided, we conclude that the requirements of 10 CFR Part 100 (1977) will be met.

23. On October 6, 1977, GE, pursuant to 10 CFR Part 21 (1977), advised the NRC Staff of a reportable condition which affects the proposed Phipps Bend Nuclear plant design. A copy of the written report concerning the condition was submitted by GE by letter dated October 11, 1977, from Glenn G. Sherwood to Norman C. Moseley (Tr. 508, 526; Applicant's Exhibit 11). The condition involves the control system for the relief valves of the BWR-6 GESSAR-238 Mark III containment design utilized for Phipps Bend. GE has determined that the current relief valve control system would reopen 11 valves after the initial design basis pressure transient event. Because of a misinterpretation of analysis results in GESSAR-238, only one valve was assumed to reopen. The reopening of 11 valves would certainly exceed the GESSAR-238 design loads (Tr. 508, 526; Applicant's Exhibit

11). GE and TVA discussed the status of the condition with the NRC Staff in a meeting held on October 13, 1977. GE expects to have a control system redesign ready for Staff review by mid-December (Tr. 509, 532; Applicant's Exhibit 11). GE anticipates that the modification will only affect the safety relief valve control system (Tr. 514, 527, 531), and should not require major structural modifications (Tr. 541). The Board is of the view that the safety relief valve redesign is an item which can be resolved during any stage of the construction of the plant. *See* Tr. 509, 541, 546; 10 CFR §50.35(a) (1977).

24. The Applicant has described its preliminary plans for coping with emergencies (Applicant's Exhibit 1, §13.3, and Amendments 4, 5, 7, 9, 10, 12, and 13 thereto). A final emergency plan will be presented in the Final Safety Analysis Report for review during the operating license phase of this application, and detailed emergency procedures will then be developed to implement the final plan.

25. The Applicant has performed analyses to confirm the practicability of taking protective measures, including evacuation, within and beyond the site boundary during the expected lifetime of the plant. These protective measures will be based on previously determined dose rates, population distributions, meteorological conditions, and plant conditions that could result in conditions at the site boundary requiring action. The measures will include preplanned evacuation routes, reassembly points, traffic control, and public announcements (*id.*, Applicant's Exhibit 1, §13.3). The Staff performed an evaluation of the population distribution and evacuation routes in the area of the proposed site and determined that it is feasible and practicable to take protective measures, including evacuation, on a timely basis within and beyond the site boundary during the expected lifetime of the plant. The Staff concluded that the Applicant's preliminary plans for coping with emergencies meet the requirements of 10 CFR Part 50, Appendix E, and provide reasonable assurance that appropriate protective measures can be taken in the event of a serious accident.

III. CONCLUSIONS OF LAW

26. Based upon our review of the entire record in this proceeding, the Board concludes as follows:

- A. The application and the record of the proceeding contain sufficient information, and the review of the application by the Staff has been adequate, to support the foregoing findings and the following conclusions and Order.
- B. In accordance with the provisions of 10 CFR §50.34(a):
 - (a) The Applicant has described the proposed design of the facility, including, but not limited to, the principal architectural and

engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public.

- (b) Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied in the Final Safety Analysis Report.
 - (c) Safety features or components, if any, which require research and development have been described by the Applicant, and the Applicant has identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components.
 - (d) On the basis of the foregoing, there is reasonable assurance that (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of the proposed facility; and (ii) taking into consideration the site criteria contained in 10 CFR Part 100, the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public.
- C. The Applicant is technically qualified to design and construct the proposed facility.
 - D. The Applicant is financially qualified to design and construct the proposed facility.
 - E. The issuance of permits for construction of the facility will not be inimical to the common defense and security or to the health and safety of the public.
 - F. Subject to the conditions set forth in the Partial Initial Decision:
 - (a) The environmental review performed by the Staff (pursuant to the National Environmental Policy Act of 1969) and set forth in the Final Environmental Statement has been adequate.
 - (b) Sections 102(2)(A), (C), and (E) of NEPA and 10 CFR Part 51 have been complied with.
 - (c) The Board has considered the final balance among conflicting environmental factors, and has weighed the various benefits against costs, taking account of the need for power, and the

alternatives to the plant and certain of its design features. As a result, the Board concludes that these considerations favor the issuance of construction permits for the facility.

IV. ORDER

Based on the Board's findings and conclusions in its Partial Initial Decision and this Initial Decision, and pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations, IT IS ORDERED that the Director of Nuclear Reactor Regulation is authorized to issue to the Tennessee Valley Authority permits to construct the Phipps Bend Nuclear Plant, Units 1 and 2, consistent with the terms of the October 14, 1977, Partial Initial Decision and this Initial Decision.

IT IS FURTHER ORDERED, in accordance with Sections 2.754, 2.760, 2.762, 2.764(a), 2.785, and 2.786 of the Commission's Rules of Practice, 10 CFR Part 2, that this Initial Decision shall be effective immediately and shall constitute the final action of the Commission forty-five (45) days after its issuance, subject to any review pursuant to the Rules of Practice. Exceptions to this Initial Decision and supporting briefs may be filed by any party within seven (7) days after the service of this Initial Decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff) any other party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND LICENSING BOARD

David R. Schink, Member

Ernest E. Hill, Member

Edward Luton, Chairman

Dated at Bethesda, Maryland,
this 12th day of January 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Ivan W. Smith, Chairman
Glenn O. Bright
Dr. J. V. Leeds

In the Matter of

Docket Nos. 50-400
50-401
50-402
50-403

CAROLINA POWER & LIGHT
COMPANY

(Shearon Harris Nuclear Power
Plant, Units 1, 2, 3, and 4)

January 12, 1978

Upon *sua sponte* consideration of new information, the Licensing Board reopens the record and receives additional exhibits into evidence.

ADJUDICATORY HEARINGS: NEW INFORMATION

The tests for reopening an evidentiary record at the request of a party are whether the issues could have been raised earlier, the gravity of the issues, and whether the issues require further evidence for their resolution. *Vermont Yankee Nuclear Power Corp.*, ALAB-138, 6 AEC 520 (1973).

ADJUDICATORY HEARINGS: NEW INFORMATION

The *Vermont Yankee* tests for reopening the evidentiary record are only partially applicable where reopening the record is the Board's *sua sponte* action. The Board has broader responsibilities than do adversary parties, and the timeliness test of *Vermont Yankee* does not apply to the Board with the same force as it does to other parties.

ADJUDICATORY HEARINGS: NEW INFORMATION

For it to be received, new evidence need not be so significant that the Board's findings or conclusion would be altered.

ADJUDICATORY HEARINGS: NEW INFORMATION

By responsibly providing new information pursuant to the mandate in *Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623 (1973), an applicant does not concede that the information is relevant and material to the issues under consideration.

MEMORANDUM AND ORDER

In December 1977 the Board was provided with information by the Applicant and NRC Staff which, in the Board's view, was of sufficient materiality to warrant reopening the record in this proceeding to receive additional evidence as provided by 10 CFR §2.718(j). This information pertains to the discovery of a small geologic fault at the Harris plant site, new load forecasts, and changes in Applicant's construction schedule. Accordingly by Order dated December 21, 1977, reinstated by Order dated December 27, the Board indicated its intention to consider receiving additional exhibits into evidence and provided to the parties an opportunity by January 5, 1978, to object to the proposed exhibits and to request an opportunity to cross-examine, submit interrogatories, offer rebuttal evidence amend proposed findings, or seek other relief. The Board indicated that it would consider the reasons offered in support of any request and afford appropriate relief if necessary.

The NRC Staff did not respond. The State of North Carolina responded that it had no objections nor requests for other relief. The Consolidated Intervenor did not object to any proposed exhibit but requested an opportunity for relief with respect to the issues of load forecasts and construction scheduling. The Applicant objects to the reopening of the record for any purpose and objects to the receipt into evidence of any of the proposed exhibits, but does not request any other form of relief. Applicant also opposes all relief requested by Intervenor.

The Applicant cites and the Board has considered the *Vermont Yankee*¹ tests for reopening an evidentiary record. In *Vermont Yankee*, ALAB-138, 6 AEC 520, the Appeal Board stated that a licensing board must consider the timeliness of the motion to reopen, *i.e.*, whether the issues could have been raised earlier; the significance or gravity of the issues; and if those fac-

¹*Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-167, 6 AEC 1151 (1973); ALAB-138, 6 AEC 520 (1973); and ALAB-124, 6 AEC 358 (1973). See also *Georgia Power Company* (Alvin W. Vogtle Power Plant, Units 1 and 2), ALAB-291, 2 NRC 404, 409 (1975).

tors are found in the movant's favor, whether the issues require further evidence for their resolution.

In discussing the disposition of the proposed exhibits below, we have viewed the *Vermont Yankee* tests to be only partially applicable to the situation at hand. First, unlike the case in *Vermont Yankee*, reopening the record here is the Board's *sua sponte* action. We are not adversaries; our responsibilities are broader. The timeliness test of *Vermont Yankee* does not apply to the Board with the same force that it would apply to parties.

Nor do the other tests fit neatly into our consideration. We agree with the Applicant that there is no need to receive the proposed exhibits into evidence to determine whether they are significant enough to reopen the record (citing *Vermont Yankee*, 6 AEC 393, 395). But we reject the argument that the evidence must be of such significance that our findings or conclusions would be altered before we should receive new evidence. (See e.g., Applicant's Objections dated January 5, 1978, pp. 2, 4, 10, and 12.) We cannot identify any practical reason nor compelling legal basis to deny this Board the opportunity to consider material and relevant evidence in our findings when, as is the case here, this can be accomplished with little or no burden upon the parties.

Of greater significance is the fact that an important responsibility in an administrative adjudicative proceeding is to preserve a record suitable for review (10 CFR §2.756). To exclude otherwise competent evidence because our conclusions may remain unchanged would not always satisfy this requirement.

Geologic Fault

Letters identified as Board Exhibits 2 through 5 relate to a small geologic fault discovered at the site on December 7, 1977, the subsequent investigation by the Staff and Applicant, and the determination that the fault is not capable within the meaning of Appendix A to 10 CFR Part 100. The issue affected by these proposed exhibits well demonstrates why the Board rejects Applicant's arguments that only evidence likely to alter findings and conclusions should now be considered. The subject matter is important, not only with respect to the safety of the plant, but to the public's confidence in the plant's safety and in our processes. Certainly the reports of the discovery of the fault (identified as Board Exhibits 2 and 3) were worthy of our initial consideration. Merely because it turns out that the faults were found to be not "capable" (letters identified as Board Exhibits 4 and 5) the Board is not relieved of the responsibility to evaluate the matter on an evidentiary record suitable for review and public inspection. Below we receive Board Exhibits 2 through 5 for identification into evidence.

Changes in Load Forecast

Need for power was one of the principal environmental issues contested in the proceeding. By letter dated December 9, 1977 (identified as Board Exhibit 6), Applicant's counsel wrote to the Board informing it of a new load and energy forecast in which the 1984 peakload is 592 MW lower than the 1976 forecast which was current during the evidentiary hearing. Subsequently the Applicant identified and, at the Board's request, provided a copy of the Report of the Public Staff of the North Carolina Utilities Commission concerning its analysis for 1978 of long-range needs for electric generation facilities in North Carolina (identified as Board Exhibit 7). The report also changes downward the load forecast. Applicant objects to receiving both items and submits a detailed analysis of the evidentiary record which, together with the identified exhibits, demonstrates, according to Applicant, that conclusions concerning need for power to be drawn from the existing record would not be changed. Whether the reports change the conclusions to be drawn from the existing record or not, the Board wishes to consider the reports in its findings and conclusions and, for the reasons stated above, believes that it is within its discretion to do so. Therefore below we receive into evidence the documents identified as Board Exhibits 6 and 7.

Intervenors' Request For Relief

In response to the Board's Order of December 21, counsel for the Intervenors on January 5, 1978, requested the opportunity to cross-examine previous Applicant and Staff witnesses on the revised load forecasts, and to offer rebuttal evidence and to amend proposed findings. Intervenors desire the opportunity to examine the statistical basis for the downward revision and the basis for advancing Applicant's Mayo 1 generating plant. Intervenors also observe that there has been a series of reductions in the projected rate of growth in peak demand, and the Board is urged to reexamine this trend. As noted above, Intervenors do not object to any of the proposed exhibits.

With respect to the Intervenors' request for relief concerning the lower load forecasts we must, of course, evaluate the reasons advanced by Intervenors and the overall need for such relief. To do this, the potential effect of the new forecasts on the Intervenors' case must also be considered. The new load forecasts project a *lower* peakload. This is evidence in the direction of Intervenors' position that the Harris power is not needed. What then would Intervenors accomplish by cross-examination or rebuttal on the forecast exhibits? They do not dispute that the forecasts are lower, but

claim that the statistical bases for all of the load forecasts, already in evidence and prospective, are inconsistent, faulty, and unreliable. This is quite different from attacking the merits of the proposed exhibits. We understand from Intervenor's response that they regard the lower load forecasts as a sufficient basis to reopen the record generally on this subject. This is the only reasonable conclusion to be drawn from Intervenor's rather sparse response.²

This being the case, the tests of *Vermont Yankee, supra*, must be applied to Intervenor's requests, and we have applied them. We are persuaded by Applicant's observations that Intervenor had timely opportunity to inquire into forthcoming load forecasts (see Applicant's Objections, pp. 7-9). In addition the Board has reviewed the Intervenor's previous cross-examinations of earlier witnesses, their rebuttal, and their proposed findings on need for power. The probable result of reopening the record for cross-examination and rebuttal would be more evidence of the same nature and needlessly cumulative.

Intervenor has not demonstrated that any additional evidence to be produced by reopening the record is required for the resolution of the need for power issue, nor does the Board believe that this is the case. Moreover, our Order of December 21 was intended to provide an opportunity to address only the proposed exhibits, and was not an invitation to move to reopen the record generally. Therefore the Board denies Intervenor's request to cross-examine witnesses and to produce rebuttal evidence on the subject of load forecasts. With respect to Intervenor's request to amend proposed findings, the Board sees no need for such a filing, but will consider the additional evidence in light of the Intervenor's previous proposed findings and their comments in the letter of January 5, 1978.

The Board Questions

The Board directed the Applicant to answer questions concerning whether the schedule for the Mayo 1 generating plant was advanced and, if so, what does the advance signify about the Applicant's financial condition and capacity to finance the Shearon Harris units. The Applicant answered in the form of an affidavit from its Vice-President, Wilson Morgan. The answer favors the Applicant's position that it can finance the plants. Intervenor does not object to the Morgan affidavit but wish to examine on the decision to advance the Mayo plant.

²We have some difficulty in reconciling Intervenor's position that, on one hand, the forecasts by the Staff, Applicant, and Utilities Commission are unreliable because they are inconsistent but, on the other hand, they are reliable where they project a downward trend in load growth.

The Board requested answers on this subject, not with the expectation that the answers would add materially to the evidentiary record, but only to determine if there is a need to reopen the record as to whether advancing Mayo 1 could adversely affect the Applicant's capacity to finance the Harris units. We are now satisfied that there is no need to inquire further. Therefore the Board will not receive Mr. Wilson's affidavit into evidence.

Throughout this consideration the Board has been attentive to the Applicant's concern that confusion may arise concerning its responsibility under the *McGuire* decision¹ to inform parties and boards of new information which may be relevant and material to matters being adjudicated. The information involved here was provided responsibly by the Applicant pursuant to *McGuire*. This does not carry with it any presumption that the Applicant thereby concedes in litigation that the information is relevant and material. It is important that parties in a proceeding not be prejudiced by the *fact* of disclosure, but that the information be independently evaluated. We have done this, and as stated, find the proposed exhibits to be relevant and material to the adjudication.

Accordingly the Board reopens the record and receives into evidence the following:

Board Exhibit 2: CP&L letter dated December 12, 1977, from McDuffie to Case.

Board Exhibit 3: Staff letter dated December 12, 1977, from Cutchin to Board.

Board Exhibit 4: CP&L letter dated December 15, 1977, from McDuffie to Case.

Board Exhibit 5: Staff letter dated December 19, 1977, from Cutchin to Board.

Board Exhibit 6: CP&L letter dated December 9, 1977, from Jones to Board.

Board Exhibit 7: Report of the Public Staff of the North Carolina Utilities Commission "Analysis of Long Range Needs For Electric Generating Facilities in North Carolina."

BY ORDER OF THE BOARD.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Ivan W. Smith, Chairman

Dated at Bethesda, Maryland,
this 12th day of January 1978.

¹*Duke Power Company* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623 (1973).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Frederic J. Coufal, Chairman
Dr. Paul W. Purdom
R. B. Briggs

In the Matter of

Docket Nos. 50-338 OL
50-339 OL

**VIRGINIA ELECTRIC AND POWER
COMPANY**

**(North Anna Nuclear Power
Station, Units 1 and 2)**

January 13, 1978

Upon consideration of evidence at hearing reopened at the instance of the staff to consider two events of potential safety significance which the applicant allegedly failed to report in a timely fashion prior to issuance of the initial decision of December 13, 1977 (LBP-77-68, 6 NRC 1127), the Licensing Board orders that the applicant draft and submit revised procedures for internally evaluating potentially reportable events and amends the initial decision to restrict the operation of North Anna, Units 1 and 2, to Mode 3 (hot standby) status pending issuance of a supplemental initial decision.

ORDER

The Staff filed a motion on December 16, 1977, and a supplement thereto on December 19, 1977, to reopen the record of this proceeding because, it was alleged, VEPCO failed to timely report two events of potential safety significance. One event related to a faulty computer code and the other to faulty integrated circuit chips. The alleged failures, according to the Staff's motion, could bear on the Staff's evidence and the Board's decision regarding VEPCO's technical qualifications and commitment to operate North Anna, Units 1 and 2, safely and in compliance with regulations. The Board reopened the record and on December 29, 1977, took evidence on the matters raised by the Staff. Proposed findings of fact and conclusions of law were filed on January 7, 1978, and the Board is in the process

of writing a supplemental initial decision. Because we will be unable to complete that decision as promptly as we would like, we find it desirable to issue this order pending that event.

Two things are made clear by the evidence. The first is that there is disagreement between VEPCO and the Staff as to the requirements of the applicable regulations or technical specifications, as the case may be, with respect to when an item must be reported. This, in turn, involves a dispute as to what is a proper length of time for evaluation of a potentially reportable circumstance.

The second item that the evidence clearly discloses is a failure of communications within VEPCO. This is illustrated by the fact that the North Anna Station Manager was not informed of the computer code problem until two or three weeks after it had been discovered. It is further shown by the fact that the Senior Vice-President and the Executive Manager-Licensing had not been informed of at least the computer code problem at a time when they were urging the NRC to quickly complete the licensing process.

The matter of the communication of reportable events may be resolved by the adoption by VEPCO of internal procedures which will define more precisely when and under what circumstances potential safety questions are reported to the Staff. The failure of internal communication may also be resolved by company procedures. Accordingly,

IT IS ORDERED:

- (1) That VEPCO draft and submit to the Board revised procedures incorporating a limit on the time for evaluating potentially reportable events before they are reported to the Staff.
- (2) That VEPCO draft and submit to the Board a procedure for the recording of and dissemination of information regarding possible reportable circumstances to the end that there is assurance that persons within VEPCO who may have need for the information are given it promptly.
- (3) That the Staff review the procedures developed by VEPCO in compliance with this order and consult with VEPCO in an attempt to reach an agreement on the procedures; the other parties are invited, but not directed, to comment.
- (4) That any disagreements between VEPCO and the NRC Staff with respect to the draft procedures will be resolved by the Board.
- (5) That the initial decision issued herein on December 13, 1977, is amended to restrict the operation of North Anna, Units 1 and 2, to a Mode 3 (hot standby) status until further order of the Board.
- (6) That the Staff will provide the level of inspection for North Anna, Units 1 and 2, that they consider to be appropriate for the operations being conducted.

Mr. Briggs and Dr. Purdom have authorized the Chairman to execute this order on behalf of the Board.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

Frederic J. Coufal, Chairman

**Dated at Bethesda, Maryland,
this 13th day of January 1978.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Ivan W. Smith, Chairman
Glenn O. Bright
Dr. J. Venn Leeds

In the Matter of

Docket Nos. 50-400
50-401
50-402
50-403

CAROLINA POWER & LIGHT COMPANY

(Shearon Harris Nuclear Power Plant,
Units 1, 2, 3, and 4)

January 23, 1978

Upon consideration of health and safety and environmental matters, the Licensing Board authorizes the Director of Nuclear Reactor Regulation to issue construction permits, subject to certain terms and conditions.

TECHNICAL ISSUES DISCUSSED: Fuel cycle environmental impacts (Table S-3); radiological monitoring; site meteorology and emergency planning; cooling water supply; need for power; financial qualifications.

**INITIAL DECISION
(Construction Permit)**

Appearances

Richard E. Jones, Esq., George F. Trowbridge, Esq.,
Thomas A. Baxter, Esq., and Ernest L. Blake, Esq.,
for the Applicants.

Thomas Erwin, Esq., and Larkin Kirkman, Esq., for
the Intervenor.

Richard Griffin, Esq., and Jesse C. Brake, Esq., for
the State of North Carolina.

Charles A. Barth, Esq., James M. Cutchin IV, Esq.,
and Bruce Berson, Esq., for the U.S. Nuclear
Regulatory Commission.

TABLE OF CONTENTS

| | Page |
|---|------|
| I. PRELIMINARY STATEMENT AND DESCRIPTION OF THE RECORD | 94 |
| II. FINDINGS OF FACT: UNCONTESTED RADIOLOGICAL HEALTH AND SAFETY ISSUES | |
| A. The Application and Its Review | 98 |
| B. The Site | 100 |
| C. Facility Design | 103 |
| D. Research and Development | 106 |
| E. Technical Qualifications | 106 |
| F. Quality Assurance | 107 |
| G. Conduct of Operations | 109 |
| H. Common Defense and Security | 110 |
| III. FINDINGS OF FACT: UNCONTESTED ENVIRONMENTAL ISSUES | |
| A. Environmental Report and Impact Statements | 110 |
| B. Impacts of Construction | 112 |
| C. Impacts of Operation | 113 |
| D. Monitoring Programs | 116 |
| E. Effects of Postulated Plant Accidents | 117 |
| F. Alternatives | 117 |
| G. Cost-Benefit Balance | 121 |
| IV. FINDINGS OF FACT: MATTERS IN CONTROVERSY | |
| A. Radiological Monitoring (Contentions C.1(a) and C.1(b)) | 122 |
| B. Site Meteorology and Emergency Planning (Contentions C.4 and C.14) | 127 |
| C. Cooling Water Supply (Contentions C.6(a), C.6(b), and C.6(d)) | 129 |
| D. Need for Power and Alternatives (Contentions C.17 and C.18) | 134 |
| E. Financial Qualifications (Contention C.19) | 139 |
| V. CONCLUSIONS OF LAW | 143 |
| VI. ORDER | 146 |

ATTACHMENT: LIST OF EXHIBITS

I. PRELIMINARY STATEMENT AND DESCRIPTION OF THE RECORD

1. On September 21, 1972, the Atomic Energy Commission¹ issued "Notice of Hearing on Application for Construction Permits,"² with respect to the application filed on June 7, 1971, pursuant to the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2011, *et seq.*, by Carolina Power & Light Company (hereinafter "Applicant" or "CP&L") for permits to construct four pressurized water nuclear reactors, designated the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4 (hereinafter "the plant," or "SHNPP"), to be located approximately 20 miles southwest of Raleigh, in Wake and Chatham Counties, North Carolina.

2. The notice of hearing provided that a hearing would be held by an atomic safety and licensing board to consider and make certain determinations on radiological health and safety issues pursuant to the Atomic Energy Act, and on environmental issues pursuant to the National Environmental Policy Act ("NEPA"), 42 U.S.C. §4321, *et seq.*, and Appendix D to 10 CFR Part 50.³ On November 15, 1972, the Chairman of the Atomic Safety and Licensing Board Panel designated an Atomic Safety and Licensing Board ("the Board") to conduct the hearing in this proceeding.⁴ This Initial Decision includes the Board's findings of fact and conclusions of law on all of the matters prescribed by the Commission's notice of hearing. In our Order below the Director of Nuclear Reactor Regulation is authorized to issue construction permits for the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4.

3. The notice of hearing provided that any person whose interest may be affected by the proceeding may file a petition for leave to intervene, in accordance with 10 CFR §2.714. Petitions or requests for leave to intervene were filed by Mr. John Speights of Raleigh, by Mr. Thomas Tillman Ragland of Holly Springs, North Carolina, by Wake Environment, Inc., a North Carolina corporation with offices in Raleigh, and by the Conservation Council of North Carolina, an unincorporated association. Pursuant to notice and order of the Board, a special prehearing conference, as contemplated by 10 CFR §2.751a, was held in Raleigh on January 30, 1973.

¹Now Nuclear Regulatory Commission pursuant to the Energy Reorganization Act of 1974, 42 U.S.C. §5801, *et seq.*, effective January 20, 1975. The term "Commission" refers to either the Atomic Energy Commission or the Nuclear Regulatory Commission.

²37 Fed. Reg. 20344 (September 29, 1972).

³Pursuant to 10 CFR §51.56, Appendix D to Part 50 remains applicable to these proceedings.

⁴Notice of "Establishment of Atomic Safety and Licensing Board," 37 Fed. Reg. 24697 (November 18, 1972). A new Chairman of this Board was appointed on August 26, 1976. See notice of "Reconstitution of Board," 41 Fed. Reg. 37678 (September 7, 1976).

Following the special prehearing conference, the Board issued a Special Prehearing Conference Order, dated February 14, 1973, and a Supplemental Special Prehearing Order, dated February 26, 1973. These orders reflected the actions taken by the Board at the conference and the Board's subsequent rulings on matters argued at the conference. The Board denied the intervention requests of Mr. Speights and Mr. Ragland, but granted them limited appearance status under 10 CFR §2.715.

4. The Board considered the January 25, 1973, amended petition filed by the Conservation Council of North Carolina, the written request dated January 25, 1973, of Wake Environment, Inc., to adopt the Conservation Counsel's amended petition, and the additional amendments offered at the special prehearing conference. The Board admitted the Conservation Council of North Carolina and Wake Environment, Inc., ("Intervenors") jointly as one party to the proceeding.

5. The Board admitted, as issues in controversy in the proceeding, the following contentions put forth by Intervenors: C.1(a), C.1(b), C.1(d), C.4, C.6(a), C.6(b), and C.8. On May 13, 1974, Intervenors filed a further amended petition for intervention, which included contentions C.6 (a) through (d) in place of the previously admitted contentions C.6(a) and C.6(b). The amended petition also pleaded ten new contentions. In an order dated May 24, 1974, the Board admitted contentions C.6(a), C.6(b), C.6(c), C.6(d), C.14 as modified by the Board, C.17, C.18, C.19(a), C.19(b), and C.19(c). All other contentions were rejected by the Board.

6. By letter dated October 3, 1974, Intervenors withdrew contentions C.1(d), C.6(c), and C.8. By letter of July 8, 1977, Intervenors submitted amended versions of contentions C.17, C.18, and C.19, which Applicant and the NRC Staff agreed should be substituted for the original contentions of the same designation. Amended contention C.19 superseded previous contentions C.19(a), C.19(b), and C.19(c). In its Memorandum and Order of August 30, 1977, the Board accepted amended contentions C.17, C.18, and C.19 as matters in controversy. Intervenors' contentions are quoted in their entirety in our findings on matters in controversy in Part IV of this Initial Decision.

7. Pursuant to appropriate notices and orders issued by the Board, further prehearing conferences were held on July 2, 1973, at Raleigh, North Carolina, and on July 2, 1974, at Bethesda, Maryland. Counsel for Applicant, Intervenors, and the Staff appeared and participated in the prehearing conferences at which various actions were taken concerning stipulations among the parties, delineation of the key issues, discovery, and the schedule for the proceeding.

8. The evidentiary hearing, originally scheduled to commence on August 6, 1973, was postponed by Board Order dated July 26, 1973, because of the

need for a major change in the design of the plant's circulatory water system.

9. The Commission's Regulatory Staff on January 14, 1974, granted the Applicant's request of December 14, 1973, for an exemption under 10 CFR §50.12 permitting certain onsite construction activities. On February 11, 1974, Intervenors protested to the Commission that it had not received notice of the exemption proceeding and requested an opportunity to be heard on the matter. Pursuant to the Commission's Order of March 4, 1974, (7 AEC 197) the Board, in March 1974, conducted evidentiary hearings in Raleigh, North Carolina, on Applicant's request for an exemption.

10. On March 11, 1974, the Board ordered a partial suspension of the exemption pending a hearing on the merits of the exemption (7 AEC 272). On April 3, 1974, the Board authorized the Director of Regulation to continue in effect the exemption (7 AEC 538). The Intervenors appealed directly to the Commission which, on June 11, 1974, affirmed this Board's decision (7 AEC 939).

11. The exemption provided for the construction of certain temporary facilities, clearing and grading, foundation excavation for the plant area, relocation of railroad tracks and harvesting of timber, and clearing for the main and auxiliary reservoirs. (See *e.g.*, Applicant's submission in support of continuation of exemption dated March 7, 1974.)

12. Addressing the elements of 10 CFR §50.12(b) the Board concluded that the activities under the exemption would cause a significant adverse impact upon the environment; that redress of any adverse environmental impact can be reasonably effected if necessary; that conduct of such activities would not foreclose the subsequent adoption of alternatives; and that the public interest would not be served by delaying such activities (7 AEC 553). The Applicant was committed to any necessary redress and Board found that "[T]he cost of redress, so long as it is within the Applicant's means to pay, is not relevant here."¹

¹We digress here from issues directly relevant to our Initial Decision because we believe that it is appropriate to address Intervenors' concern about the activities under the exemption. In opposing the exemption Intervenors stated that there never would be redress and that the substantial undertaking and sunk costs to be permitted by the exemption would prevent an unprejudiced decision on the merits of any construction permit. Applicant estimated the cost of the exemption activities to be about \$4.5 million (then 1/3 of 1% of total plant costs) with redress possible at about \$1.5 million. When we viewed the plant site in October 1977 it was our impression (without reason to inquire into actual costs) that work at the site had exceeded \$4.5 million in substantial degree even allowing for inflation, and that \$1.5 million for any required redress would also be very inadequate. The excavation at the site produces a strong visual impact. Nevertheless each of us is satisfied that his contribution to this Initial Decision has not been biased by this circumstance, and that without hesitation we would have arrived at different conclusions herein had Applicant failed in its burden of proof on each issue to be adjudicated.

13. Pursuant to a Supplemental Notice of Hearing⁶ issued on September 17, 1974, sessions of the evidentiary hearing were held in Raleigh, North Carolina, on October 8 through 10, 1974. The scope of the hearing was limited by stipulation among all of the parties and filed with the Board. The stipulation advised the Board that neither Applicant nor the Staff intended to introduce evidence at the hearing beginning on October 8, 1974, on the issues of need for power, energy conservation, Applicant's financial qualifications, a geological fault discovered at the site, and Applicant's compliance with the Commission's acceptance for emergency core cooling systems. Evidence on all other issues was received.

14. The hearing was not immediately resumed for the remaining issues because of Applicant's announcement, in May 1975, of a deferral in the scheduled commercial operation dates for each of the plant's four units.

15. On August 3, 1976, the State of North Carolina, through its Office of Attorney General, petitioned to participate in the proceeding as an interested State pursuant to the provisions of 10 CFR §2.715(c). In an Order issued on August 15, 1976, the Board granted the petition.

16. Pursuant to a Notice and Order issued by the Board on June 6, 1977, a prehearing conference was held in Raleigh on June 16, 1977, in anticipation of the resumption of hearings. Following the prehearing conference, the Board issued a Prehearing Conference Order, dated June 17, 1977, which recited the actions taken by the Board at the conference, including the establishment of a prehearing schedule.

17. Because of the delay of three years in the continuation of hearings in this proceeding, the Board, on its own motion, issued "Notice of Intervention Procedures" on June 17, 1977,⁷ in which it advised the public of the impending resumption of the hearings and of the Commission's standards for the entertainment of nontimely petitions for leave to intervene. No petitions were filed in response to the Board's notice.

18. Pursuant to "Notice of Continuation of Evidentiary Hearing," issued by the Board on August 30, 1977,⁸ the hearing resumed in Raleigh, with sessions on September 27 through 29, and October 4 and 5, 1977.

19. Appearing and presenting evidence in both the 1974 and 1977 sessions of the hearing were Applicant, the Staff, and Intervenor. In addition, the State of North Carolina appeared at, and participated in, the 1977 sessions. The record of the hearing, which encompasses both the 1974 and 1977 sessions, includes the testimony of the witnesses for the parties and ex-

⁶39 Fed. Reg. 34092 (September 23, 1974).

⁷42 Fed. Reg. 31844 (June 23, 1977).

⁸42 Fed. Reg. 44615 (September 6, 1977).

hibits.⁹ By Board Orders dated October 27, 1977, and January 12, 1978, the record was reopened for the receipt into evidence of additional exhibits.

20. Pursuant to §557(c) of the Administrative Procedure Act and 10 CFR §2.754, the parties and the State of North Carolina were provided an opportunity to file proposed findings of fact and conclusions of law. Proposals were filed by the Applicant, the NRC Staff, and the Intervenor. In some instances, where supported by the record, the Board has adopted proposed findings of parties in substantially the form submitted. Those proposed findings submitted by the parties which are not adopted directly or inferentially, or specifically discussed elsewhere, are rejected as not being supported by reliable, probative, and substantial evidence. This initial decision, the conclusions of law, and the order are based upon the entire record and upon full consideration of all of the proposed findings.

21. A list of exhibits offered by the parties, marked for identification, and either received into evidence or rejected, is set forth as an attachment appended to this Initial Decision.

II. FINDINGS OF FACT: UNCONTESTED RADIOLOGICAL HEALTH AND SAFETY ISSUES

A. The Application and Its Review

22. Applicant submitted on September 7, 1971, its application for construction permits and operating licenses for the four Shearon Harris units. The application itself consists of a general information section meeting the requirements of 10 CFR §50.33 (Applicant Exhibits Q and T).

23. In support of its application, CP&L provided detailed technical information on the proposed facility and site in a Preliminary Safety Analysis Report ("PSAR") (Applicant Exhibits R and U). The PSAR contains a description of the site and the basis for its suitability, a detailed description of the proposed facility, including those reactor systems and features which are essential to safety, an analysis of the safety features provided for in the facility design, an evaluation of various postulated accidents and hazards

⁹The Board has adopted Applicant's recommendation that the record not be encumbered by evidence received during the exemption hearing, which is not relevant to our findings and conclusions. We have not then considered the record of the exemption hearing nor, as noted above, have we considered the work already done under the exemption. We have continued, however, the system employed by that hearing for the identification of exhibits. Accordingly, Applicant's first exhibit in the record considered for this Initial Decision is "Exhibit Q," the Staff's first exhibit is "Staff Exhibit 6," and Intervenor's first exhibit is "Intervenor's Exhibit 4." The testimony of witnesses begins with the transcript of the opening session on October 8, 1974 (Tr. 953).

involved in the operation of such a facility, and a description of the engineered safety features provided to limit their effect. It also includes a description of the technical qualifications of Applicant to design and construct the facility, and a description of Applicant's quality assurance program and plans for the conduct of operation. The Board finds that the application and supporting PSAR adequately describe the proposed facility in accordance with the Commission's regulations.

24. The Staff reviewed the information provided by Applicant and performed its own analyses and investigations evaluating the radiological health and safety aspects of the plant. During the course of its review, which has spanned six years, the Staff has requested and Applicant has provided additional information on a large number of subjects. In light of the delay in the Harris schedule, the NRC Staff required Applicant during 1976 and 1977 to upgrade its design in many respects to conform with more recent criteria and technical guides. (See generally SER, Supp. 3 paragraphs 1.1, 19.0, and Appendix A.) The results of the Staff's technical evaluation of the proposed plant design and the scope of the technical matters considered by the Staff in that evaluation are set forth in the Staff's Safety Evaluation Report ("SER") which was issued initially on December 22, 1972, and since has been the subject of four supplements, the latest dated September 20, 1977 (Staff Exhibits 7, 8, and 9).

25. The Advisory Committee on Reactor Safeguards ("ACRS") has also reviewed the radiological health and safety aspects of the application. ACRS has reported the results of its review in letters to the Chairman of the Commission dated March 8, 1972, January 7, 1973, and August 19, 1977. In its letter of August 19, 1977, to the Chairman of the Commission, the ACRS concluded that if due consideration is given to certain items identified in that letter which ACRS believes can be resolved during construction, and if due consideration is given as well by Staff and Applicant to identified generic problems as solutions are found to those problems, the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.¹⁰ At the request of the Board, the NRC Staff sought from ACRS clarification of its position with respect to the need for resolution of generic items identified in its August 19, 1977, letter prior to issuance of a construction permit or operating license for the Shearon Harris Plant (Staff Exhibit 10; see also Licensing Board Exhibit 1). In a letter dated October 11, 1977, the ACRS responded that where ACRS determines that a generic matter should be resolved prior to issuance

¹⁰The August 1977 ACRS letter is reprinted as Appendix B in the Staff's Supplement 4 to the SER, admitted as Staff Exhibit 9.

of a particular construction permit or, more likely, prior to operation of the plant, a recommendation to this effect is made specifically in the ACRS letter related to that project (Staff Exhibit 11). In the same letter, ACRS further stated that the generic items referred to in an ACRS letter on an individual plant are intended to be considered generically, outside the scope of the particular licensing action, the intent being that, when solutions are found, a determination will be made by the NRC Staff and the ACRS as to their implementations on all plants for which they are applicable and necessary (*id.*). In the case of the Shearon Harris Plant, the Board notes no such specific recommendations have been made by ACRS.

B. The Site

26. Applicant and the Staff have evaluated the site against the reactor site criteria contained in 10 CFR Part 100. The evaluations consider the exclusion area and low population zone specified by Applicant, nearby population centers, use characteristics of the site environs, including whether nearby industrial, transportation or military facilities could influence acceptability of the site, and the physical characteristics of the site, including its geology, seismology, hydrology, and meteorology. (See generally PSAR Ch. 2 and SER §2.0.)

27. The Harris Plant site is located in the extreme southwest corner of Wake County, North Carolina, and the southwest corner of Chatham County, North Carolina (PSAR Ch. 2; SER §2.2). The site is on essentially undeveloped, rolling, wooded land (*id.*). The immediate area surrounding the site is a sparsely populated rural area (*id.*).

28. The Applicant has specified a circular site exclusion area with a radius of 7,000 feet (2,133 meters) located entirely within the boundaries of property now owned by CP&L (SER, Supp. 3, § 2.2.1). There will be no residents within the exclusion area (SER § 2.2). U.S. Highway No. 1 traverses the northern boundary of the exclusion area (*id.*). The relocated Norfolk and Southern Railroad will traverse the exclusion area at approximately the same location (*id.*). In response to the Staff's request, Applicant has agreed to relocate an underground liquefied petroleum gas pipeline which traverses the site. The pipeline will be rerouted to a location outside the exclusion area with a closest point of approach to the plant of about 2.5 kilometers (SER, Supp. 3, § 2.2.2).

29. The Applicant has specified a low population zone with a radius of three miles (4,827 meters) (SER § 2.2). The Applicant states that there are no schools or hospitals, and no mental or penal institutions located within the low population zone (*id.*). The nearest population center of more than 25,000 people is the city of Raleigh, North Carolina, the nearest boundary

of which is approximately 16 miles northeast of the site (*id.*). Sanford, North Carolina, is about 10 miles southwest. The 1970 Census Bureau data indicate populations for Raleigh and Sanford of 123,793 and 11,716, respectively. Both Raleigh and Sanford are well beyond the minimum distance of one and one-third times the low population zone radius of 3.0 miles, as required by 10 CFR Part 100.

30. Land use within a 40-mile radius of the site is devoted primarily to farming and dairying, and the Applicant states that there are no industrial facilities within five miles of the plant site (SER § 2.2). Industrial activity in the area, consisting mostly of tobacco processing, furniture manufacturing, textile manufacturing and processing, light electronic component manufacturing, and industrially oriented research, is concentrated to the north and northwest in Orange, Alamance, and Guilford Counties. Raleigh and Durham, North Carolina, are the nearest highway, rail, and air transportation centers. Raleigh-Durham Airport is located about 20 miles to the north-northeast, and Pope Air Force Base is located 32 miles south of the site (SER § 2.2).

31. The proposed plant site is situated in the transition zone between the Coastal Plain and the Piedmont Plateau of North Carolina (SER § 2.3). The climate of the region is mainly governed by its location in the semipermanent belt of high pressure which forces most of the cyclonic storm centers to pass north of the area. Frontal passages are relatively frequent (*id.*). The expected atmospheric diffusion conditions for the plant site have been evaluated from measurements of wind direction and speed from off-site and onsite data (SER § 2.3; SER, Supp. 3, § 2.3). In our consideration and disposition of contentions C.4 and C.14, the Board has addressed and found adequate Applicant's assessment of offsite doses as a function of meteorological conditions at the Harris site.

32. The Harris site is located about 7-1/2 miles north of the confluence of the Cape Fear River and one of its small tributaries, Buckhorn Creek, on a peninsula which is to be created by impounding the waters of Buckhorn Creek and its principal tributary, White Oak Creek (SER § 2.4). The plant, at a grade elevation of 260 feet above mean sea level ("MSL"), will be cooled by natural-draft cooling towers with makeup from, and blowdown to, a main reservoir with a normal maximum pool elevation of 220 feet MSL (SER, Supp. 2, §2.4.1). An auxiliary reservoir will be used as the primary standby source of cooling in the event of an emergency, and will be located adjacent to the plant (*id.*). Water levels in the auxiliary reservoir will be maintained at a minimum elevation of 250 feet MSL. Seismic Category I dams with uncontrolled concrete spillways are to be provided for both reservoirs; intake and discharge channels will be built between the plant and the auxiliary reservoir (*id.*). Losses from the cooling towers and reservoirs will

be made up from both local natural runoff and pumping from the Cape Fear River (*id.*).

33. Based both upon the above description and the detailed consideration given to Intervenor's contentions C.6(a), C.6(b), and C.6(d), following, the Board finds that an adequate water supply will be available for both operational and safety-related purposes.

34. The possibility of flooding in the area of the Harris Plant has been assessed. It is estimated that a probable maximum flood could produce water levels in the main and auxiliary reservoirs of 239.1 feet MSL and 255.8 feet MSL, respectively, both of which are below plant grade (SER, Supp. 2, § 2.4.2). In addition, Applicant has conservatively evaluated the effects of wind-generated wave activity and its potential for flooding the plant area (SER, Supp. 2, § 2.4). The results of the evaluations show that the plant will not be flooded (*id.*).

35. The plant site is located in the Deep River Triassic Basin near the eastern edge of the Piedmont Physiographic Province (SER, § 2.5). The basin is a northeast trending, trough-shaped graben in which the Triassic sedimentary rocks dip gently to the southeast (*id.*). Bedrock at the site is in the Sanford Formation and consists of conglomerates, and fanglomerates in the upper part of the formation and claystone, siltstone, and shales in the lower part of the formation (*id.*). Extensive evaluations of the site have been conducted by Applicant, the Staff, and their consultants which have revealed no active faults or other major geologic structures in the area that are believed to be capable of localized seismicity (PSAR § 2.4; SER § 2.5; SER, Supp. 3, § 2.5). Based on a review of the seismological and geological characteristics of the site, it was determined that an acceleration of 0.08g, resulting from an intensity VII (MM) earthquake, is adequate for representing the maximum seismic disturbance on bedrock likely to occur within the lifetime of the facility, and that an acceleration of 0.15g, resulting from an intensity VII-VIII (MM) earthquake, could be used to represent the maximum bedrock ground motion from the maximum earthquake likely to affect the site (SER § 2.6). The Staff initially concluded that those structures founded on fresh bedrock, which includes all Category I structures other than the dams, will be adequately supported where accelerations of 0.08g and 0.15g are used to represent maximum bedrock motions resulting from the operating basis earthquake (OBE) and from the safe shutdown earthquake (SSE), respectively (SER § 2.7). The Staff has also determined that the dams will be stable and will maintain their integrity during a seismic event having a peak acceleration of 0.15g (SER, Supp. 3, § 2.7).

36. In July 1974, a fault was discovered in the Harris excavation. Subsequent investigations and evaluations determined that the fault is not capable and that the impoundment of Harris Lake will not adversely affect the

fault (SER, Supp. 3, §§ 2.5 and 2.7). On December 12, 1977, Applicant formally notified the NRC that a minor geological feature had been observed during excavation associated with relocation of the railroad which traversed the exclusion area. After investigation, Staff concluded that this geological feature is not a capable fault within the meaning of Appendix A to 10 CFR Part 100 (Board Exhibits 2-5).

37. The Board finds that, based upon the geological evaluations of the site and the area, as well as the above-noted investigations of the fault and the minor geological feature, the Applicant's seismic design criteria are adequate.

38. The Board finds that the population density and the use characteristics of the environs of the site and the physical characteristics of the site have been adequately described in the record, that they have been given appropriate consideration in the design of the Shearon Harris Plant, and that they conform to the Commission's reactor site criteria, 10 CFR Part 100, taking into account the plant design and proposed engineered safety features. The Board therefore finds that, taking into consideration the site criteria contained in 10 CFR Part 100, the proposed plant can be constructed and operated at the proposed location without undue risk to the health and safety of the public.

C. Facility Design

39. The Staff has evaluated the design, fabrication, construction, testing criteria, and expected performance characteristics of the plant structures, systems, and components important to safety to determine that they are in accord with the Commission's General Design Criteria, Quality Assurance Criteria, Regulatory Guides, and other appropriate rules, codes, and standards, and that any departures from this criteria, codes, and standards are identified and justified. The Staff also has evaluated the expected response of the facility to various anticipated operating transients and to a broad spectrum of postulated accidents, and determined the design basis accidents—those whose consequences would exceed the consequences of all other accidents considered. Based on conservative analyses of these design basis accidents, the Staff has determined that the calculated potential offsite doses that might result in the very unlikely event of their occurrence would not exceed the Commission's guidelines for site acceptability given in 10 CFR Part 100 (SER § 1.1).

40. The nuclear steam supply system (NSSS) for each unit of the Harris Plant will consist of a three-loop pressurized water reactor (PWR) which will be initially rated at 2,775 core thermal megawatts (tMW) and its associated auxiliary systems. The reactor core will be composed of fuel rods

formed by enclosing uranium dioxide pellets in zircaloy tubes with welded end plugs. The fuel rods will be pressurized with helium and supported in assemblies by a spring-clip grid structure. Water will serve as both moderator and coolant. Each of the three parallel coolant loops will contain a steam generator and a pump. An electrically heated pressurizer attached to one of the coolant loops will establish and maintain reactor coolant system pressure and provide a surge chamber and a water reservoir to accommodate reactor coolant volume changes during operation. The reactor coolant water, heated by the reactor core, will be pumped through the steam generators where heat will be transferred to the steam and power conversion system. The water will then be pumped back to the reactor core to repeat the cycle. The steam produced in the steam generators will be transported to the turbine-generator where about one-third of its heat energy will be converted into electrical energy. After passing through the turbine the steam will be condensed and the condensate returned to the steam generators to repeat the cycle. Each unit's condenser will be cooled by a cooling water system which employs a natural-draft cooling tower whose makeup water is obtained from and whose blowdown water is discharged to an approximately 4,000-acre reservoir formed by impounding the waters of Buckhorn and White Oak Creeks. Major structures for the Harris Plant will include four reinforced concrete containment buildings, two reactor auxiliary buildings, two turbine buildings, one waste processing building, one fuel handling building and four natural-draft cooling towers (SER § 1.1; SER, Supp. 2, § 1.0).

41. Those structures, systems, and components important to safety that are designed to remain functional in the event of an SSE are designated as Seismic Category I. (SER § 3.2.) The Staff has concluded that Applicant has appropriately classified the safety-related Harris structures, systems, and components as Category I, and their design is adequate (SER §§ 3.2, 3.6, 3.7, and 3.8). Applicant also has appropriately designed essential structures and equipment for high winds and tornados (SER § 3.3; SER, Supp. 3, § 3.3); protection against internally generated missiles (SER § 3.4; SER, Supp. 3, § 3.4); and dynamic effects associated with a loss-of-coolant accident (SER § 3.5; SER, Supp. 3, § 3.5).

42. The Shearon Harris Plant incorporates a large number of engineered safety features designed to limit the consequences of accidents, including the loss-of-coolant design basis accident. The containment for each of the four reactors will be a steel-lined, reinforced-concrete structure, designed for a leak rate no greater than 0.1 percent of the containment free volume per day at the design pressure of 45 psig (SER § 6.2; SER, Supp. 3, Table 13.1). The containment heat removal systems, consisting of the containment spray and containment cooling systems, function to reduce containment pressure

and temperature below containment design conditions following a loss-of-coolant accident (PSAR §§ 6.3, 6.4; SER § 6.2). Also included with the containment systems at Harris is an isolation system to isolate fluid systems which penetrate containment but are not necessary to mitigate accident consequences, and a hydrogen recombiner system capable of controlling combustible gas concentrations which could be generated in the containment following a loss-of-coolant accident (SER § 6.2). The emergency core cooling system ("ECCS") at Harris will be designed to provide emergency core cooling for postulated accidents where it is assumed that a failure in the reactor coolant system (RCS) piping results in a loss of coolant from the system greater than the available coolant makeup capacity can restore using normal operating equipment (SER § 6.3). The ECCS subsystems that will be provided will be of such number, diversity, reliability, and redundancy that even if a single failure of ECCS equipment should occur during a loss-of-coolant accident (LOCA), the minimum required performance will be attained (*id.*). Each of the ECCS subsystems will be designed to function over a range of reactor coolant piping system break sizes, up to and including the flow area associated with a postulated double-ended break in the largest reactor coolant pipe (*id.*). The Staff has concluded that the Harris ECCS performance conforms to the acceptance criteria in Section 50.46 of 10 CFR Part 50 and the requirements of Appendix K to 10 CFR Part 50 and is, therefore, acceptable (SER, Supp. 4, § 6.3.6). The Harris Plant design also incorporates reactor protection and control systems, engineered safety feature circuits, and circuits that initiate and control vital engineered safety feature supporting systems (SER §§ 7.2-7.5). The instrumentation and control systems have been reviewed by the NRC Staff against present criteria and found acceptable (SER § 7.6; SER, Supp. 1, §§ 7.3 and 7.6; SER, Supp. 3, § 7.2).

43. Applicant has analyzed reactor performance for normal steady state plant operation on the basis of the initial core thermal power of 2,775 MW (SER § 13.0). For the evaluation of radiological consequences, accident analyses were performed for an ultimate core thermal power level of 2,900 MW (PSAR, Ch. 14; SER § 13.0). The postulated accidents analyzed for offsite radiological consequences include various types of steam line break accidents, a steam generator tube rupture accident, a loss-of-coolant accident, feedwater system piping breaks, a fuel-handling accident, and a rupture of a boric acid storage tank (PSAR, Ch. 14; SER § 13.0; SER, Supp. 3, § 13.0).

44. The Board finds that the Harris Plant design and the results of analyses performed on postulated design basis accidents for the plant are adequate to support issuance of a construction permit.

D. Research and Development

45. Although the design of the plant is primarily based on proven concepts which have been developed and successfully applied in the design of pressurized water reactors, Applicant has identified research and development programs which are applicable to the Harris Plant (PSAR § 1.6). These programs relate to departure from nucleate boiling (DNB) and the 17 x 17 fuel arrays which are or have been conducted by Westinghouse (*id.*). The Staff has concluded that Applicant and its suppliers have identified and will perform the research and development necessary for the design and safe operation of the Harris Plant as proposed on a timely schedule and that in the event this research and development work is not successful, appropriate restrictions in operation can be imposed or proven alternate designs can be installed to protect the health and safety of the public (SER § 1.3).

46. The Board finds that the research and development effort identified and proposed by Applicant and evaluated by the Staff is adequate to support the issuance of a construction permit.

E. Technical Qualifications

47. Carolina Power & Light Company is the sole Applicant for the construction permits and operating licenses, and as owner will be responsible for the design, construction, and operation of the Shearon Harris Nuclear Power Plant. Carolina Power and Light Company has engaged Ebasco Services, Incorporated, for engineering services and has contracted with Westinghouse Electric to provide the major components. Applicant also has engaged other contractors to perform engineering and consultant services and provide equipment for the Shearon Harris Nuclear Power Plant and Daniel Construction Company for the actual construction of the plant (PSAR § 1.7).

48. Carolina Power and Light Company has been active in the nuclear power field since 1956, when the company joined with three neighboring utilities to form the Carolinas-Virginia Nuclear Power Associates to build and operate a nuclear steam generating plant at Parr, South Carolina. The Parr Nuclear Plant achieved sustained operation in 1964, and the Applicant actively participated in the management, technical and operational support of the facility during the period the facility was in operation. In 1966, Carolina Power and Light Company commenced work on a nominal 700,000 kW pressurized water reactor nuclear unit at its H. B. Robinson Plant at Hartsville, South Carolina. This unit was placed in commercial operation in 1971. In 1968, Carolina Power & Light Company commenced work on the Brunswick Steam Electric Plant located at Southport, North Carolina, which consists of two units, each utilizing a nominal 821,000 kW

boiling water reactor. Unit 2 was placed in commercial operation in 1975, and Unit 1, which was granted a full power operating license in November 1976, became commercially operational in 1977 (PSAR § 1.7.1).

49. Carolina Power and Light Company has engaged Ebasco Services, Inc., (Ebasco) for engineering of the Shearon Harris Nuclear Power Plant. Ebasco is an Enserch subsidiary with over seventy years of worldwide service to the utility and other industries, as well as to commerce, government, and institutions. Ebasco's present technical staff totals more than 2,000 persons engaged in all phases of public utility engineering, design, construction, purchasing, inspection, and expedition of material, as well as consultation on utility operating matters. Ebasco has available and is able to bring to bear on any given project a broad range of engineering, construction, and consulting experience. Ebasco's nuclear experience includes engineering studies, the evaluation of reactor systems, selection of nuclear sites, safety evaluations, detailed engineering design, construction and start-up, and testing of nuclear power facilities. Some of the nuclear power facilities with which Ebasco has been associated are Millstone, Unit No. 1; H.B. Robinson, Unit No. 2; Vermont Yankee Plant; St. Lucie, Units 1 and 2; Waterford Nuclear Steam Electric Station, Units 3 and 4; Allen's Creek Nuclear Generating Station; and Washington Public Power Service System, Units 3 and 5 (PSAR § 1.7.2).

50. Westinghouse Electric Corporation is to design, fabricate, and deliver the nuclear steam systems, nuclear fuel, and turbine generators for the Shearon Harris Nuclear Power Plant. Westinghouse has had extensive experience in the design and development of power-producing, pressurized water reactors. Westinghouse now has more than 100 pressurized water reactor plants completed, under construction, or on order (PSAR § 1.7.3).

51. The Board finds that Applicant, its contractors, and its consultants are collectively technically qualified to design and construct the Shearon Harris Plant.

F. Quality Assurance

52. CP&L has established a three-level program to obtain adequate quality assurance ("QA") and quality control ("QC"). The third level is the audit program conducted by a CP&L Quality Assurance and Training Audit organization. This organization includes full-time auditors with no other responsibilities. The second level is the surveillance conducted by the CP&L QA organization and by Ebasco's Chief Quality Compliance Engineer and Chief of Vendor Quality Compliance. The first level, QC, is provided by supplier inspectors during manufacturing and by CP&L inspectors during construction. This first level also includes review of design

drawings and procurement documents by Ebasco Engineering (PSAR § 1.8). Based on a review of the QA program and the program's implementation by CP&L, the Staff has concluded that an acceptable QA program has been documented and that this program is in compliance with Appendix B of 10 CFR Part 50 (SER § 15.2.2). The Staff has also concluded that the program provides for sufficiently detailed procedures, requirements, and elements of control to assure that all safety-related structures, systems, and components are designed, constructed, installed, inspected, and tested in accordance with the requirements of 10 CFR Part 50, Appendix B (SER § 15.2.3). Finally, the Staff has concluded that the organizational structure and the division of responsibilities within the CP&L organization provide the necessary independence and authority to effectively implement the QA program (SER § 15.2.1).

53. The Staff has reviewed the QA organizations and procedures of Applicant's principal contractors as well as Applicant's own organization and procedures. The constructor, Daniel Construction Company, is required to follow the CP&L QA program (SER § 15.2.1). Ebasco and Westinghouse have developed and implemented their own QA and QC programs (PSAR § 1.8). The Staff has concluded that these programs and procedures of these principal contractors on the Harris project comply with 10 CFR Part 50, Appendix B, for the respective roles played by these entities in the construction of the Harris Plant (SER §§ 15.3 and 15.4).

54. The Board finds that the record amply demonstrates that the QA organizations of CP&L, Ebasco, and Westinghouse provide the independence and authority to effectively carry out their QA programs without undue influence from those organizational departments directly responsible for cost and schedules, and that the QA programs describe adequate QA procedures, requirements, and controls demonstrating that quality-related activities will be conducted in accordance with the requirements of Appendix B of 10 CFR Part 50.

55. The Board asked Applicant and the NRC Staff to respond to a number of questions related to CP&L management and quality control and procedures to ensure that storage of materials at the Harris site are adequate. Both Applicant and the Staff provided witnesses to address those areas¹¹ and the Board, in addition, toured the Harris site. The Board is

¹¹See Applicant's Answer to ASLB January 23, 1975, Question No. 2, following Tr. 1816; Applicant's Answer to ASLB January 23, 1975, Question No. 4, following Tr. 1816; Applicant's Answer to ASLB January 23, 1975, Question No. 5, following Tr. 1816; Applicant's Answer to ASLB August 30, 1977, Question No. 1, following Tr. 1823; Direct Testimony of Virgil L. Brownlee and Hugh C. Dance of the Nuclear Regulatory Staff, following Tr. 2076. The Board also questioned Applicant and the Staff on the maintenance of the excavation of the

(Continued on next page)

satisfied with the responses to its questions regarding management and quality control of the Harris site and the programs and procedures being implemented at the Harris site to care for and store materials received on site.

G. Conduct of Operations

56. The Applicant has proposed a total complement of approximately 100 personnel for Units 1 and 2 of the plant and of approximately 200 personnel for the four-unit plant. These personnel will form three main groups: Operations, Engineering (Technical), and Maintenance. The Staff has concluded that Applicant's plans for staffing are acceptable (SER § 12.1).

57. Applicant has described the processes it will use to select personnel and its training programs (PSAR Ch. 12 and 13; Applicant's Answer to ASLB January 23, 1975, Question No. 4; Applicant's Answer to ASLB January 23, 1975, Question No. 5). Applicant had initial training programs as well as refresher programs appropriate for all levels of employees and management (*id.*). For its staffing of the Harris Plant, Applicant expects to draw on personnel already trained and experienced at its Robinson and Brunswick Plants, especially for supervisory positions (Tr. 1818-19). The Staff has concluded that Applicant's program being developed for the selection and training of station personnel is adequate to ensure that a qualified, capable staff will be trained for the Harris Plant (SER § 12.2).

58. Applicant has outlined an organization for coping with emergencies (SER § 12.3). It has contacted appropriate offsite agencies at the State and local levels as well as the Norfolk and Southern Railway and agreed with these entities to develop detailed emergency plans (SER, Supp. 3 § 12.3). The Applicant has an agreement with the University of North Carolina Memorial Hospital for the definitive care of any victims of radiological accidents (SER § 12.3). Although detailed plans have not been developed (and are not required at the construction permit stage), the Staff has determined that Applicant has provided an acceptable base of information from which emergency plans can be fully developed at the operating license stage (SER, Supp. § 12.3).

(Continued from previous page)

site, placement of the seal mat in the excavation, and sharing of the control rooms by two units at the Harris Plant. The Board is satisfied with the answers to these questions. *See* Direct Testimony of Robert G. Fitzpatrick Regarding Sharing of the Common Control Room and Direct Testimony of Dr. Abdel Hafiz and Dr. Franz Shauer Regarding the Quality of the Seal Mat, following Tr. 1639; Applicant's Answer to ASLB August 30, 1977, Question No. 1, *supra*; Applicant's Answer to ASLB August 30, 1977, Question No. 2, following Tr. 1872. Tr. 1824-34, 1873-75.

59. In addition to the above, the Board has considered and has discussed Applicant's plans for coping with emergencies which affect offsite areas in the Board's findings on Intervenor's contention C.14, following. We found there and reiterate that the record demonstrates that an adequate emergency plan can be formulated to cope with design basis accidents.

60. On February 24, 1977, the Commission published new requirements for the physical protection of nuclear power plants against acts of sabotage (10 CFR § 73.55). This new rule does not require applicants for construction permits to demonstrate compliance at this stage but does require such at the operating license stage. As a result of the Staff's review of the Applicant's preliminary plans for physical security, the Staff concludes that a satisfactory planning base has been described by the Applicant upon which a complete security program can be developed to demonstrate compliance with the new regulations at the appropriate time. (See SER § 12.4.)

61. The Board finds that Applicant's program to develop a security plan is adequate to support issuance of a construction permit.

H. Common Defense and Security

62. The application¹² reflects that the activities to be conducted will be within the jurisdiction of the United States, and that all of the directors and principal officers of the Applicant are United States citizens. The Applicant is not owned, dominated, or controlled by an alien, a foreign corporation, or a foreign government. The activities to be conducted do not involve any restricted data, but the Applicant has agreed to safeguard any such data which might become involved in accordance with the requirements of 10 CFR Part 50. The Applicant will rely upon obtaining fuel as it is needed from sources of supply available for civilian purposes, so that no diversion of special nuclear material from military purposes is involved. (See SER § 18.0.)

63. For these reasons set forth above and in the absence of any information to the contrary the Board finds that the activities to be performed will not be inimical to the common defense and security.

III. FINDINGS OF FACT: UNCONTESTED ENVIRONMENTAL ISSUES

A. Environmental Report and Impact Statements

64. Pursuant to Appendix D to 10 CFR Part 50,¹³ Applicant submitted to the Commission on September 7, 1971, and subsequently amended, an

¹²See Applicant Exhibit T.

¹³Now 10 CFR Part 51.

Environmental Report¹⁴ ("ER") which contains detailed information on, and evaluations of, the environmental impacts associated with the construction and operation of the facilities. Notice of Availability of Applicant's Environmental Report was published at 36 Fed. Reg. 23263 (December 7, 1971).

65. Based on the information submitted by Applicant and its own dependent review and analysis, the Staff prepared a Draft Environmental Statement related to the construction and operation of the facilities. Notice of Availability of Applicant's Environmental Report, Supplemental Statement, was issued on November 16, 1972, and published at 37 Fed. Reg. 24842 (November 22, 1972). The notice provided that interested persons could, within forty-five days from the date of publication of the notice, submit comments on the proposed action, Applicant's Environmental Report, and the Staff's Draft Environmental Statement, for consideration by the Commission. The notice further provided that Federal and State agencies were being provided with copies of the Draft Environmental Statement, and that any comments received from these or local agencies would be available for public inspection.

66. After receipt and consideration of the comments submitted on the Draft Environmental Statement, the Staff prepared a Final Environmental Statement, which included a discussion of the comments received. Notice of Availability of the Final Environmental Statement was issued on May 11, 1973, and published at 38 Fed. Reg. 12842 (May 16, 1973). In the Final Environmental Statement, the Staff concluded that the action called for under NEPA and Appendix D to 10 CFR Part 50 was the issuance of construction permits subject to certain conditions for the protection of the environment. The plant, as designed at that time, would have used a once-through cooling system consisting of an approximately 10,000-acre cooling reservoir, 1,300 acres of which were to be thermally isolated, and a 300-acre auxiliary reservoir for emergency cooling.

67. As a result of subsequent actions by the U.S. Environmental Protection Agency and the North Carolina Board of Water and Air Resources, Applicant was forced to abandon the original cooling system design. The redesigned cooling system makes use of an approximately 4,000-acre storage reservoir and four natural-draft cooling towers. The Staff concluded that this was a significant change in plant design and operation such that preparation of a new environmental impact statement was necessary. Notice of Availability of a Revised Draft Environmental Statement was issued on January 10, 1974, and published at 39 Fed. Reg. 2287 (January 18, 1974). The notice provided that interested persons could, within forty-five days from the date of publication of the notice, submit comments on

¹⁴Applicant Exhibit S and Applicant Exhibit V.

Applicant's Environmental Report as supplemented and the Revised Draft Environmental Statement for consideration by the Commission. The notice further provided that comments received from Federal, State, and local officials and interested members of the public would be available for public inspection.

68. After receipt and consideration of the comments submitted on the Revised Draft Environmental Statement, the Staff prepared a Revised Final Environmental Statement¹¹ ("RFES"), which included a discussion of the comments received. Notice of Availability of Revised Final Environmental Statement was issued on March 25, 1974, and published at 39 Fed. Reg. 11638 (March 29, 1974).

69. The RFES contains a detailed description of the site and the plant, and includes a discussion of the impact of site preparation and plant construction. In addition, the RFES evaluates the environmental impact of plant operation and assesses the environmental monitoring and study programs and the environmental impact of postulated accidents. It includes an evaluation of the adverse environmental effects which cannot be avoided, the relationship between short-term uses of man's environment, and irreversible and irretrievable commitments of resources. The RFES also contains an evaluation of alternative energy sources and sites, plant design alternatives, and the Staff's cost-benefit analysis.

70. During the evidentiary hearing in September and October 1977, the NRC Staff updated in certain respects the information presented in the 1974 RFES. Areas updated included uranium fuel cycle effects, effects of transportation of radioactive material, transmission line impacts, socioeconomic impacts, health effects attributable to coal and nuclear fuel cycle alternatives, need for power, and comparative economics of nuclear and coal generating systems. Subsequent to the closing of the record, the Staff raised questions about the adequacy of the nuclear fuel cycle evidence which the Board addresses below.

71. The Board finds that the RFES, as updated through Staff testimony during the hearing and modified by the findings of this Board is an adequate and comprehensive review and evaluation of the environmental impact resulting from plant construction and operation. Further, the Board finds that the RFES, as modified, sets forth an adequate evaluation of the reasonable alternatives to the proposed action.

B. Impacts of Construction

72. The principal adverse effect brought about by the construction of the Harris Plant is the destruction of of about 4,000 acres of terrestrial

¹¹Staff Exhibit 6.

wildlife habitat and flora by construction of the Harris makeup reservoir (RFES §8.1). No known terrestrial species are on the site that face extinction as a result of the reservoir, and terrestrial productivity will be replaced by aquatic productivity (RFES §4.3). Construction practices including sediment traps, collection ditches, and intercepts, will be employed which will minimize discharge of soil to the Cape Fear River during construction of the plant (RFES §4.4).

73. No significantly adverse socioeconomic impacts are expected to occur due to construction (Direct Testimony of Robert C. DeVault Regarding Socioeconomic Impacts, following Tr. 1601 ("DeVault Testimony")). One unavoidable adverse effect will be the relocation of 25 families (DeVault Testimony at §4.2.4). Direct economic impacts on the public sector will be small except for Wake County, which will receive substantial tax revenues from the plant (*id.*). Most of the work force, whose peak will be about 3,500 during construction, can be hired from the local area (*id.* at §4.2.2). Since the plant is located in a rural, sparsely populated area, noise impacts from the equipment and machinery used during construction and from plant-associated traffic on local roads should be minimal (*id.* at §4.2.1).

74. Power generated at the Harris Plant will be distributed using six 230 kV lines and two 500 kV lines (RFES §3.7). For the most part, the 230 kV lines follow existing rights-of-way (*id.*). Exact routing of the new 500 kV lines has not been decided; however, generally they will run some 30 miles from the plant site northeast to a substation a few miles east of Raleigh and from the plant about 30 miles southeast to a substation at Erwin (*id.*; Direct Testimony of Robert M. Reed Regarding Transmission Lines, following Tr. 1603 ("Reed Testimony")). Construction of new rights-of-way will require complete clearing of about 150-foot wide paths, with about 15 feet on the edge of each side being selectively cut to reduce visual impact (Reed Testimony at 5). Herbicides will not be used during the construction and maintenance of the right-of-way (*id.*). Although removal of trees will result in an alteration of habitat for a few species, the effect is expected to be temporary and insignificant since there is a great deal of similar habitat available (RFES §4.3). Applicant has committed to employ practices to minimize the impact of transmission line construction (RFES §4.6.1.2). In addition, when exact routing of the Harris to Erwin line within the corridor assessed by the Staff has been selected, Applicant will submit descriptions of the route and immediate environs to the Staff for their approval prior to construction (Reed Testimony at 5-6; Tr. 1607-1608).

C. Impacts of Operation

75. The Shearon Harris Plant will employ four large, natural-draft cooling towers for cooling purposes (RFES §3.3). The most obvious at-

mospheric impact of these towers will be the visible plume which under certain limiting meteorological conditions, may extend for two miles (RFES §5.1.2.1). The plume rarely, if ever, will reach ground level and no ground interaction of the visible plume is expected (RFES §5.1.2.2). Although drift droplets entrained in the plume may contain chemicals and minerals from the cooling system and result in some deposition of these chemicals, the relatively heavy rainfall in the region is expected to prevent any buildup of surface concentrations of deposited chemicals (RFES §5.1.2.3). No synergistic effects of cooling tower operation have been identified (RFES §5.1.2.4).

76. Makeup water for the cooling system at the Harris Plant is drawn from an approximately 4,000-acre lake (RFES §3.3). In the cooling system, water circulates through the condensers and the natural-draft cooling towers (*id.*). During normal full load operation, approximately 2.7×10^{10} Btu/hr of waste heat will be removed from the four units by circulation of 4,300 ft³/s of water through the condensers and towers with an increase in temperature across the condensers of about 28° F (*id.*). Blowdown water from the cooling system tower basin is returned to the lake (*id.*). While most of the heat is dissipated to the atmosphere through the towers, some waste heat will be discharged to the lake in tower blowdown (RFES §5.2.2). Applicant's present design, which reflects a modification to allow increased makeup water and blowdown water in order to eliminate the need for chemical treatment to prevent scaling of condenser pipes, results in a maximum blowdown of 60 million gallons per day for four-unit operation; consumptive use will be about 55 million gallons per day (RFES §5.2.1; Testimony of James M. Sell on Behalf of Applicant, following Tr. 2119 ("Sell Testimony") at 5; Applicant's Contention Testimony at 12; Tr. 2125).

77. Intake and discharge effects due to the cooling tower system are expected to have minimum effects on the cooling lake. The intake structure of the plant has been designed to keep the entrainment and impingement rates as low as possible by limiting velocities to less than 0.5 ft/s, by placing the structure in deep water, and by minimizing the structure's attractiveness to fish (Testimony of Dr. William T. Hogarth on Behalf of Applicant, following Tr. 2127 ("Hogarth Testimony") at 11-12). The blowdown discharge similarly is not expected to have any significant environmental impact (Direct Testimony of Clarence R. Hickey, Jr., Regarding Impacts as a Result of Changes in Discharge Location, Blowdown, and Makeup Volumes, following Tr. 2131 ("Hickey Testimony"); Hogarth Testimony). Applicant has estimated that the mixing zone for the cooling tower blowdown (defined by limits of 5°F rise above ambient cooling lake temperature and 90°F maximum temperature) could extend to 200 surface

acres in the winter and 90 surface acres in the summer of a total of 4,000 surface acres in the lake (Hogarth Testimony at 5). The NRC Staff predicts even smaller mixing zones (Tr. 2132-2133). The NRC Staff has concluded that the biological effects due to heated discharge into the lake will be minimal and acceptable (Hickey Testimony at 9; Tr. 2133-2134). The Staff's assessment includes the impacts due to chemical releases (RFES §5.4.3). With the increased makeup and blowdown recently included in its design, Applicant has reduced the concentration of all chemicals released except chlorine (Hogarth Testimony at 7). With respect to chlorine, Applicant anticipates chlorinating only one tower at a time for no more than one hour per day (Sell Testimony at 9). Without taking chlorine demand into account, Applicant estimates that the total chlorine residual at the point of discharge into the lake will be less than 0.2 mg/l, that within five acres a 0.2 mg/l concentration would be reduced to 0.01 mg/l, and that with the 3-5 ppm chlorine demand that exists the actual levels will be even less (Sell Testimony at 9-10; Hogarth Testimony at 7-8).

78. On September 14, 1977, the State of North Carolina, pursuant to §401 of the Federal Water Pollution Control Act, as amended ("FWPCA"), issued to CP&L a certification that the discharge resulting from construction and operation of the Harris Plant will not violate §§301, 302, 306, and 307 of the FWPCA (State 401 Certificate, Applicant Exhibit W). The Board finds that this certificate satisfies the requirements of §401 of the FWPCA.

79. The NRC Staff has evaluated information supplied by Applicant to permit an evaluation with respect to Appendix I to 10 CFR Part 50 (SER, Supp 3; Staff Exhibit 8, §11.1). The quantity of radioactive materials that could be released in liquid effluents from the four-unit plant is calculated to be less than five curies per year per reactor, excluding tritium and dissolved noble gases (*id.* and Table 11.1). The resultant annual dose or dose commitment to the total body or to any organ of an individual in an unrestricted area is calculated to be less than five mrem per year per site (SER, Supp. 3, §11.1 and Table 11.4). For gaseous effluents, the NRC Staff has calculated the annual gamma and beta air doses at or beyond the site boundary to be less than 10 mrad per site and 20 mrad per site, respectively (*id.*). The iodine-131 release is calculated to be less than one curie per year per reactor which will result in a dose or dose commitment to any organ of an individual in an unrestricted area of less than 15 mrem per year per site (*id.*). On the basis of its evaluation, the NRC Staff has concluded that the radioactive waste treatment systems proposed by Applicant for the Harris Plant will be capable of maintaining releases in effluents during operation, including anticipated operational occurrences, such that the dose will not exceed the numerical design objectives of §§II.A, B and C of Appendix I;

that the proposed design satisfies the design objectives set forth in Rulemaking Hearing RM-50-2 specified in the option provided by the Commission's September 4, 1975, amendment to Appendix I to demonstrate compliance with §II.D of that appendix, and, therefore, that the rad-waste systems will reduce radioactive materials in effluents to "as low as is reasonably achievable" levels (*id.*).

80. The Board finds that the Harris Plant design complies with Appendix I to 10 CFR Part 50 and that Applicant's radiation protection program provides reasonable assurance that doses to personnel will be less than the Part 20 limits and will be maintained as low as is reasonably achievable.

81. The environmental effects associated with the uranium fuel cycle and transportation of radioactive materials related to operation of the Harris Plant have been evaluated. The impacts related to transportation of new fuel to reactors such as the Harris units, or irradiated fuel from such reactors to a fuel reprocessing plant, and of solid radioactive wastes from the reactor to burial grounds have been assessed and incorporated into the Staff's cost-benefit balance in accordance with §51.20(g) of 10 CFR Part 51. The NRC Staff has determined that application of Summary Table S-4, which sets out the environmental impact of transportation of fuel to and waste from a light-water-cooled nuclear power reactor is appropriate for the Harris units, and that the effects are so small that they neither significantly adversely affect the environment nor significantly affect the overall cost-benefit balance (Direct Testimony of Dr. F. S. Echols Regarding the Transportation of Radioactive Material, following Tr. 1597).¹⁶ In accordance with the Commission's Interim Rule (42 Fed. Reg. 13803, March 14, 1977) regarding consideration to be given in individual licensing proceedings to the environmental impacts associated with the uranium fuel cycle, the Staff included in its evaluation of the Harris Plant, the fuel cycle effects presented in Table S-3 of 10 CFR Part 51. The Staff concluded that these fuel cycle effects are sufficiently small that when superimposed upon the other assessed environmental impacts associated with the Shearon Harris Plant, the overall environmental impacts are not appreciably changed, and the overall cost-benefit balance is unaltered (Direct Testimony of Dr. F. S. Echols Regarding the Uranium Fuel Cycle, following Tr. 1599).¹⁷

D. Monitoring Programs

82. In our discussion and disposition of contentions C.1(a) and C.1(b)

¹⁶This testimony was accepted by the Board, without objection, at Tr. 1599, but appears in the transcript following Tr. 1597.

¹⁷This testimony was accepted by the Board, without objection, at Tr. 1597, but appears in the transcript following Tr. 1599.

following, the Board has described, and found satisfactory, Applicant's proposed environmental radiological monitoring program.

E. Effects of Postulated Plant Accidents

83. For site evaluation in the Commission's safety review, extremely conservative assumptions are used to compare calculated doses resulting from a hypothetical release of fission products against the 10 CFR Part 100 siting guidelines. Realistically computed doses that would be received by the population and environment from postulated accidents are significantly less. The NRC Staff in the RFES has evaluated a broad spectrum of possible accidents. The realistically estimated radiological consequences of this spectrum of postulated accidents would result in exposures of an assumed individual at the site boundary to concentrations of radioactive materials that are within the maximum permissible concentrations of 10 CFR Part 20 (RFES § 7.1). Table 7.1 of the RFES indicates the estimated integrated exposure of the population within 50 miles of the plant from each postulated accident (*id.*). Any of these integrated exposures would be much smaller than that from naturally occurring radioactivity (*id.*). When considered with the probability of occurrence, the annual potential radiation exposure of the population from all the postulated accidents is an even smaller fraction of the exposure from natural background radiation and, in fact, is well within naturally occurring variations in the natural background. (See RFES § 7.1.)

84. The Board finds that the environmental effects due to postulated radiological accidents are exceedingly small.

F. Alternatives

Methods of Generation

85. In our consideration of Intervenor's contentions C.17 and C.18, following, we deal with energy conservation and other alternatives available to consumers such as solar and wind power. We found that Applicant has shown a need for power, and that the need is for additional baseload capacity on the CP&L system. In this section we will treat the alternatives of purchasing power and generation by oil, gas, or coal of a quantity of electricity equivalent to that of the proposed Harris nuclear units.

86. Interchanges between CP&L and its neighboring utilities provide a dimension of reliability to CP&L's system in emergencies; however, purchases of large blocks of power on a firm basis are not possible to supply an equivalent amount of power to that which will be supplied by the Harris

Plant (RFES § 9.2.1; Tr. 1720). Availability of oil at any reasonable price makes consideration of an oil-fired baseload plant of Harris size highly speculative (RFES § 7.2.3). As for gas, its use has been in turbines used for peaking units; turbines are not designed for long, uninterrupted service as is required of baseloaded facilities (RFES § 9.2.4).

87. Coal is the only viable alternative to nuclear to meet Applicant's needs, and has been evaluated in detail as to both its relative economics and its comparative environmental effects, including potential health effects. In its evaluation, the NRC Staff concluded that under conditions considered most likely to occur, the nuclear Harris Plant will provide lower cost generation of power than an equivalent coal-fired alternative, and that nuclear's economic superiority holds even if it is assumed that the nuclear plant operates at 50% capacity factor and the coal-fired alternative at 70% (Spore Testimony at 2-23).

88. The environmental impacts associated with a coal-fired alternative have been assessed. While there would be less heat rejection, solid and gaseous products from an equivalent sized coal plant measure tens of thousands of metric tons of SO₂, NO_x, and particulates and hundreds of thousands of metric tons of ash each year (RFES, Table 9.4). To fuel an equivalent coal station would require two 100-car trains of coal a day with the attendant transportation impacts (RFES § 9.2.2). In addition, based on a compilation of data and statistics on the health effects associated with entire coal and nuclear fuel cycles, the NRC Staff concludes that the nuclear fuel cycle is considerably less harmful to man than the coal fuel cycle (Direct Testimony of Dr. R. L. Gotchy Regarding Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives, following Tr. 1611 ("Gotchy Testimony")). The coal fuel cycle alternative may be more harmful to man by factors of 4 to 260 depending on the effect being considered (Gotchy Testimony at 13). On the assumption that all of the electricity used in the fuel cycle comes from coal plants, the nuclear cycle still is less harmful by factors of 3 to 22 than the coal alternative (*id.*).

89. By letters dated November 9, 1977, and December 21, 1977, the NRC Staff informed the Board that it is reevaluating its evidence regarding the contribution of Radon-222 in mill tailings, and that it would submit its reevaluation in the latter part of January 1978. This is a reference to the concerns raised by Dr. Walter Jordan, a member of the ASLBP, that Table S-3 is apparently inaccurate with respect to the time during which mill tailings will continue to produce Radon-222. The NRC Staff has been directed by the Commission to reevaluate Table S-3 in light of Dr. Jordan's comments.

90. This Board has become aware that, in two other proceedings, *Tyrone*, Initial Decision dated December 23, 1977, and *Cherokee*, Initial Decision dated December 30, 1977, the Staff has filed exceptions asserting

as error Licensing Board failures to delay Initial Decisions pending the report of the Staff's Radon-222 reevaluation. In neither case had the Staff moved to delay the Initial Decision.

91. Because of the Staff's filing in *Tyrone*, by Memorandum and Order of January 6, 1978, the Board directed the Staff, in this proceeding to inform it as to whether the Staff believed that the Board would err in issuing an Initial Decision prior to its consideration of the Staff's reevaluation of its evidence.

92. The Board also directed the NRC Staff to advise it on or before January 9, 1978, by motion filed pursuant to the Commission's Rules of Practice if it wants a delay or other relief.

93. By a response dated January 9, the NRC Staff stated "[T]he Board should not issue an Initial Decision based on a record which may contain error in Staff testimony without providing the Staff with the opportunity to correct such error and for the Board to determine its significance."

94. The Staff also informed the Board that:

Present indications are that the corrected evidence will not lead the NRC Staff to a different conclusion regarding the comparative environmental effects of alternative fuels nor substantially change its assessment of the health effects of the nuclear fuel cycle. However, until the Staff's reassessment is completed, the Staff cannot take a position as to the impact of Radon-222 releases with sufficient certainty to recommend that the Board disregard the errors which exist in the record.

95. The Staff did not file a motion under the rules indicating that it wants a delay. By comments dated January 12, 1978, the Applicant recommends against delay. For several reasons the Board has decided to proceed with the Initial Decision.

96. First, we are bound by Table S-3. The Commission is aware of Dr. Jordan's stated concerns and has not authorized a moratorium in construction permits. Below we find that the power to be generated by Harris is badly needed during portions of the Applicant's proposed construction schedule and the forecasted period. Moreover, either this Board or the Appeals Board will continue to have jurisdiction to reconsider the matter should the Staff's analysis indicate the need.

97. In addition we may draw some conclusions from the Staff's position on this issue. The Staff alone is in possession of the results of its reevaluation to date. It has the responsibility and had had the opportunity to move formally for a delay as a party to this proceeding under the Rules of Practice if a delay is required to correct important errors in its evidence. We conclude that the Staff does not believe a delay is necessary.

98. The Board finds that the Harris nuclear units are preferred to coal,

the only available viable alternative, to supply CP&L's demonstrated need for baseload power.

Sites

99. Six sites were identified in the general area where a need for additional generating capacity is claimed by Applicant. Although each site potentially is adequate for siting the Harris Plant with a cooling lake concept, the site selected by Applicant was judged most satisfactory (RFES § 9.3). Four of the five alternate sites would have resulted in inundation of considerably more farm land than the chosen site (*id.*). Two of these four alternate sites have larger land use impacts and less favorable water supplies (*id.*). Transmission at a third site is limited to one direction in contrast to the current site which has transmission possibilities in four directions (*id.*).

100. The fifth alternate site is the Brunswick Plant site in the eastern division of CP&L's system. Projected load demands and need for capacity, however, are concentrated in Applicant's northern division. Thus, while the present site requires less than 100 miles of new 500 kV transmission line routing, selection of the Brunswick site for the Harris Plant would require construction of well over 400 miles of new lines (*id.*; Reed Testimony).

101. The Board finds that the site selected by Applicant is preferable to each of the alternate sites considered.

Design Features

102. In addition to the present design of four natural-draft cooling towers, Applicant has considered other heat dissipation alternatives. Dry cooling towers are considered unacceptable because their performance has not been demonstrated for large heat loads like the Harris units and because of other disadvantages such as lower plant efficiency, increased cost, and unusual noise impacts (RFES § 10.4). As noted above, use of once-through cooling with a cooling lake was initially selected by Applicant but later abandoned following a denial by the North Carolina Board of Water and Air Resources of a request by CP&L for a variance of State water quality standards for a portion of the cooling lake (RFES §§ 1.2.5 and 1.2.6). Mechanical-draft cooling towers are a practical alternative to natural towers, but Applicant has determined that because the best location for these towers is to the northeast of the present reactor location they would necessitate relocation of the plant (RFES § 10.2). Without relocation, Applicant believes that an additional naturally flowing creek would have to be diverted from its present course causing additional impact on the local ecosystem (*id.*). Mechanical towers also have the disadvantage of greater

potential for ground-level fogging and icing than natural-draft towers because of the lower release height, reduced buoyance, and increased potential entrainment of the plume within the wake of the tower, nearby structures, or topographic features (*id.*). The alternative of a spray pond was initially considered possible but since a spray pond would involve impoundment of Buckhorn Creek and would require a variance of water quality standards from the State, it is no longer considered possible (RFES § 10.3). A spray canal which would not impinge on the Buckhorn-White Oak watershed would involve some 4-5 miles of canals and aqueducts, and is not considered practical due to the topography at the Harris site (*id.*).

103. The Board finds that Applicant's current design of natural-draft cooling towers and cooling lake reservoir is acceptable when evaluated against the alternatives available to Applicant at the Harris site.

G. Cost-Benefit Balance

104. The Board finds on the record in this proceeding that a systematic, interdisciplinary approach has been employed in the environmental review of the Shearon Harris Plant, that environmental factors have been given appropriate consideration in decisionmaking along with technical and other considerations, and that evaluation of alternatives to minimize environmental impacts and suitable cost-benefit analyses, as required by NEPA and 10 CFR Part 50, Appendix D, have been conducted.

105. The Board, on the basis of the entire record in this proceeding, finds that the major cost of the Shearon Harris Plant is destruction of about 4,000 acres of flora and terrestrial habitat due to inundation and that the minor costs are:

- (a) A 40-year commitment of 10,744 acres to industrial use.
- (b) 75,000 acre-feet/year additional consumptive use of water.
- (c) Release of 1,000 tons of CO₂ per year plus small amounts of other gases and particulates from testing of auxiliary diesel generators.
- (d) Destruction of benthic organisms in inundated Buckhorn-White Oak Watershed.
- (e) Visual impact of four 480-foot high cooling towers.
- (f) Displacement of 25 families.
- (g) Removal of 3,200 acres from marketable timber reserves.
- (h) Increased traffic, dust, etc., associated with construction.
- (i) Generation of radioactive wastes which must be managed.

106. The Board finds that the primary benefit from the operation of the Harris Plant will be the production of electricity.

IV. FINDINGS OF FACT: MATTERS IN CONTROVERSY

A. Radiological Monitoring

Contention C.1(a) The monitoring and surveillance program proposed by the Applicant is not adequate to assess fully the radiological consequences of the proposed plant and to take proper remedial action to protect the health and safety of the public. The surveillance program is deficient in that (1) there are too few monitoring sites; (2) the frequency of monitoring at these sites is too small; (3) the preoperational monitoring will not have been conducted for a sufficient period of time to establish and verify operational data; and (4) the monitoring proposed will not determine the concentrations and biological magnification of radioactivity of all affected plant and animal life in the food chain in the vicinity of the proposed plant.

107. The principal objectives of a radiological surveillance program are the detection of changes and evaluation of long-term trends of radionuclide concentrations in the environment around a nuclear facility. A preoperational survey is necessary to determine the levels of background radiation and radionuclide concentrations (including variations) which will not be attributable to the facility. An adequate survey should permit a determination of the fate of the radionuclides released from the facility and accumulation in various environmental media and organisms, with the objective of detecting previously unconsidered mechanisms of exposure. It should provide reliable data for an estimation of probable upper limits of dose to an individual and populations from actual measured radioactive materials released by the facility to the environment (Direct Testimony of David A. Baker Regarding Contention C.1, following Tr. 1142 ("Baker Testimony")) at 5, 6).

108. During normal operation SHNPP will release radioactive effluents to the environment in two forms—liquid and gaseous. Liquid effluents will be released into the reservoir via the cooling tower blowdown water. Immediately upon entering the reservoir, the effluent will begin to mix with the receiving waters, thereby becoming less concentrated. Similarly, airborne radioactive effluents released into the atmosphere will mix with the air and therefore become less concentrated (Baker Testimony at 8, 9). The pathway to man can be via air inhalation, ingestion of surface and ground water, and absorption of radiation either directly from external sources or indirectly through intermediaries (including terrestrial and aquatic biota). Applicant's radiological surveillance program has been designed to monitor the critical pathways from both atmospheric and liquid releases (Responses

to Intervenor Contentions, following Tr. 1020 (hereinafter "Applicant's Contention Testimony") at 1;¹⁴ Baker Testimony at 10-12).

109. Applicant's radiological surveillance program will be conducted in two phases. The first phase is preoperational and will be conducted to determine the naturally occurring levels of radioactivity in the environment surrounding the site. The resulting data will then be compared with data derived during the second phase, the operational program, to estimate the level of radionuclides being released from the plant and concentrated in the environment. Essentially the same media and organisms will be sampled, and at approximately the same frequencies, in the operational program as will be sampled in the preoperational program, so that any changes in radionuclide concentrations will be readily detected (Baker Testimony at 13; Applicant's Contention Testimony at 1-3).

110. Applicant's preoperational monitoring program includes the measurement of surface water both from the main reservoir and Cape Fear River, drinking water from the river, ground water, sediment, fish, aquatic plants, air particles, airborne iodine, and ambient gamma radiation. In addition, milk, food crops, meat products, and tobacco will be sampled and analyzed (Baker Testimony at 13). The air sampling provides continuous environmental monitoring, with four samples at the site exclusion area boundary and four samples in nearby communities to obtain population-related air measurements (*id.* at 14; Applicant's Contention Testimony at 2). In addition, a network of 28 sensitive thermoluminescence dosimetry monitors has been established to measure the external radiation levels at distances of up to 10 miles from the site (Applicant's Contention Testimony at 3).

111. The sampled media, sampling sites and frequencies, and sample analysis for Applicant's preoperational environmental monitoring program are described in Table 2.8-1, following Applicant's Contention Testimony at 4, as corrected at Tr. 1055-1058. The number of stations and sampling frequencies for various media are compared with those recommended by the Environmental Protection Agency, in the Baker Testimony at Tables 2 and 3. In all respects Applicant's program equals or exceeds the number of sampling locations for media and the minimum sampling frequencies recommended by EPA (Baker Testimony at 15).

112. The Board finds that Applicant's radiological surveillance program

¹⁴Applicant's Responses to Intervenor Contentions were incorporated into the transcript as if read following Tr. 1020. Portions of the responses (*i.e.*, the testimony in response to a particular contention or group of contentions) were subsequently sponsored by witnesses and offered into evidence. The responses to contentions C.1(a), C.1(b), C.4, and C.14 were received into evidence at Tr. 1030, as corrected at Tr. 1025, 1026.

is adequate from the standpoint of the number of sampling locations and the frequency of sampling.

113. Intervenors also challenge, in contention C.1(a), the length of the preoperational phase of the surveillance program. EPA recommends that preoperational radiation surveillance of the environment around nuclear power reactors should be carried out for one year prior to facility operations. The Staff has concluded that a one-year program provides an adequate amount of baseline data (Baker Testimony at 15). In this instance, Applicant's preoperational program will be conducted for *two* years before fuel loading (Applicant's Contention Testimony at 2). A two-year period will permit observation of any fluctuation in seasonal data and will therefore provide, contrary to the allegation in contention C.1(a), a reliable and adequate baseline for the operational data (*id.*).

114. Applicant's radiological monitoring program has been designed to concentrate on those pathways which have been found to be the most critical to and most sensitive for man (such as the air-vegetation-milk-man pathway, the air-man pathway, and the water-aquatic food-man pathway). Extensive monitoring of these pathways makes it unnecessary to undertake the impractical task of monitoring, as Intervenors appear to suggest in contention C.1(a), *every* plant or animal species in the food chain in the vicinity of the plant (*id.* at 3). It is the Staff's conclusion that Applicant's program will be adequate to determine the background radiation and radionuclide concentration at the site and the various media and organisms which may be included in a food chain for man (Baker Testimony at 13; *see also*, Direct Testimony of Donald G. Watson (Regarding Contentions C.1(a)(4) and C.1(d), following Tr. 1142 at 5-7). The Intervenors presented no evidence upon this issue (contention C.1(a)), nor did they cross-examine the Applicant's or Staff's witnesses who testified as to the adequacy of the Applicant's monitoring and surveillance program.

115. The Board finds, from the uncontroverted probative evidence submitted at the hearing, that the Applicant's radiological monitoring and surveillance program is adequate to assess fully the radiological consequences of the proposed plant, and in addition, that Applicant's program will achieve the objectives for such surveillance programs.

Contention C.1(b) The proposed monitoring system is inadequate in that provisions are not made for continuous and widespread monitoring sufficient to give the location, intensity, and flow of accidental radioactive emissions into the atmosphere or into the water system, and to provide for adequate warning plans to the residents affected outside the immediate area of the proposed plant site.

116. All liquid radioactive wastes to be released from SHNPP will be

collected in storage tanks for sampling, and additional processing, if necessary, prior to release to the cooling tower blowdown water. The operating license technical specifications set by the NRC will require that liquid effluent release paths be monitored and that the monitors be set to alarm and to initiate automatic closure of the waste discharge valve below a predetermined level. This level shall be set so that the concentration of radioactive materials released in liquid wastes from all reactors at the site will not exceed the values specified in 10 CFR Part 20 for unrestricted areas (Direct Testimony of James C. Malaro Regarding C.1.(b), following Tr. 1266 at 2, 3). The technical specifications will also require that the releases of gaseous wastes from the primary system waste gas holdup system be monitored and that the monitor be set to alarm and to initiate automatic closure of the waste gas discharge valve below a predetermined level. This predetermined value will be the level at which continuous release would be expected to result in offsite annual doses (above background) below the limits in 10 CFR Part 20 (*id.* at 3, 4).

117. In addition to the environmental surveillance program (evaluated above in our findings on contention C.1(a)), which is not intended to be an emergency monitoring system, all releases of radioactive materials are monitored at the plant itself. The radiation monitoring system, which continuously monitors releases, performs two basic functions: to warn of any radiation hazard which may develop and to give early warning of a plant malfunction which may lead to a health hazard or damage to the plant. Area monitors are used in such locations as the control room, containment building, laboratories, fuel-handling areas, and radioactive waste drumming areas. The process monitoring system, which includes monitoring points for each of the four SHNPP units, is employed to measure effluent releases as well as the quantity of radioactive material that might potentially be in the reactor system (Applicant's Contention Testimony at 5, as corrected at Tr. 1025; PSAR at 11.3-15 to 11.3-24).

118. In the event that there was a release of radioactive material of the magnitude which could potentially affect the public, the process monitoring system would detect the release and indicate the extent of the release. Plant personnel would then use plant meteorological data to determine the offsite areas affected by the release and the concentration in those areas. Field survey teams would then be dispatched immediately to confirm the calculations and would communicate their findings by radio to plant control room personnel, who could likewise advise the survey team of any changes in meteorological conditions (Tr. 1030-32, 1086, 1087).

119. The Intervenor, in support of their contention C.1(b), introduced testimony of two witnesses, Dr. Bell and Mr. Martin (Tr. 1149 and 1280). Dr. Bell proposed the establishment of a ring of monitoring stations spaced

at intervals of one mile forming a ring with a radius of five miles from the center of the exclusion area, and a second ring of stations spaced two miles apart on a circle with a radius of approximately 20 miles. In addition, Intervenor proposed five monitoring stations in the circulating receiving waters. All of these stations are proposed to be continuously monitoring, with telemetry systems connecting each monitoring station to a central control authority (outline of supplemental testimony of Carlos G. Bell, following Tr. 1155).¹⁹ David H. Martin advocated continuous monitoring outside of the plant boundaries without articulating any basis or reasons for his proposal (Tr. 1280).

120. The atmospheric monitoring stations proposed by Intervenor then amount to 93 stations in two rings, plus 50 to 75 stations at population centers. (See Tr. 1160-1163.) Acknowledging the problems of expense and reliability associated with such a system, Dr. Bell conceded that, assuming a unidirectional wind at a speed of one meter per second, a sizable release of radioactive material from the plant would be detected by the first ring of monitors 2 to 3 hours later, and by the second ring of monitors eight hours later than the release would be detected by Applicant's proposed plant monitors (Tr. 1163-1165). Dr. Bell further testified he could not readily identify the locations of, or the radioactive materials to be detected by, the five continuous monitors he proposed be placed somewhere in the receiving waters. First suggesting that the monitors be located outside the site boundary, the witness then discovered that the entire reservoir and discharge stream is within the site boundary (Tr. 1167-1170). The hypothetical accident, postulated by the witness, which would release radioactivity to be detected by the five proposed monitors, is the spill of a spent fuel element taken from the storage pool and physically deposited in the discharge water outside the plant (Tr. 1176-1180, 1195, 1196). This is an event which could not be the result of an accident. Dr. Bell testified he was unfamiliar with the site (Tr. 1170); that he had not read the Draft or Final Environmental Statement (Tr. 1187); that his premise of inadequacy of monitoring requirements was not particularized for the Harris project (Tr. 1187); that he had not read the PSAR for this project (Tr. 1196); that he had not read the SER for the project (Tr. 1197); that he had read no documentary materials regarding the Harris project whatsoever (Tr. 1197).

121. The Board gives little or no weight to the evidence of Dr. Bell, who is totally unfamiliar with the technical documents describing the facility and its surrounding environment. Mr. Martin gave only his impressions and no basis or substance for additional monitoring. The Board finds that neither the atmospheric nor aquatic monitoring stations proposed by Intervenor

¹⁹Received into evidence as limited by the Board at Tr. 1154, 1155.

would serve to improve upon Applicant's proposed system for the monitoring of radioactive emissions from the plant. The Board finds that the philosophy of monitoring at the point of release, as required by the PSAR and SER and as explained by Staff witness, Mr. Malero (Tr. 1266), more adequately protects the public health and safety by providing warning two to eight hours earlier than the system proposed by Intervenors.

122. In sum, the Board finds that Applicant's proposed monitoring system will permit adequate warning of residents outside the immediate area of the plant site, should the need for such warning arise.

B. Site Meteorology and Emergency Planning

Contention C.4 Construction and operation of a nuclear facility at the proposed Shearon Harris site is unsuitable because of insufficient consideration of the prevailing wind direction in the area of the site.

Contention C.14 With a high wind speed in the direction of Raleigh, it is impossible to provide adequate emergency plans in the event of a design basis accident.

123. Prevailing wind direction in the area of the site is a factor in the calculation of normal releases of radioactive materials from the facility. The dilution factor ("X/Q") is computed using a joint frequency distribution of wind speed and direction by atmospheric stability class. Meteorological data used in the evaluation of the dispersion of radioactive materials was obtained from the Research Triangle Institute and the Raleigh-Durham Airport Weather Station. On an annual basis, the prevailing wind direction in the site vicinity is from the southwest, *i.e.*, in the direction of Raleigh. The expected maximum whole body dose at the site boundary for expected routine releases using conservative assumptions is 0.000222 rem/year. This would result in an individual dose of 0.000022 rem/year at the Raleigh city limits nearest the plant (Applicant's Contention Testimony at 9, as corrected at Tr. 1026). These doses are well below the limit of 0.5 rem/year for unrestricted areas established by 10 CFR § 20.105(a). In addition, the NRC Staff's evaluation of more recent (1976-77) meteorological data obtained from onsite instrumentation has not changed the Staff's earlier conclusions with respect to routine release estimates for gaseous effluents at the Shearon Harris Nuclear Power Plant site (NRC Staff Exhibit 8 at 2-5). The Staff's independent evaluation has also demonstrated that the radioactive waste treatment systems proposed for the Shearon Harris Nuclear Power Plant will be capable of maintaining releases of radioactive materials in effluents during operation, including anticipated operational occurrences, such that

the dose will not exceed the numerical design objectives of Sections II.A, B, and C of Appendix I of 10 CFR Part 50 (NRC Staff Exhibit 8 at 11-6 and 11-7). Likewise, the Staff's evaluation shows that the proposed design of the liquid and gaseous waste treatment systems for the four-unit plant satisfies the design objectives set forth in Rulemaking Hearing RM-50-2 specified in the option provided by the Commission's September 4, 1975, amendment to Appendix I and, therefore, meets the requirements of Section II.D of Appendix I of 10 CFR Part 50. Thus, the liquid and gaseous rad-waste treatment systems will reduce radioactive materials in effluents to "as low as is reasonably achievable" levels in accordance with 10 CFR § 50.34a and Appendix I. The Board finds that wind direction and speed in the area of the site have been adequately considered in the evaluation of routine radioactive releases from the Shearon Harris Nuclear Power Plant and do not render the site unsuitable for construction or operation of the plant.

124. The analysis for releases from potential accidents is treated more conservatively than for normal operating releases. Accident meteorology is based upon a conservative X/Q calculated from data obtained at the site. The wind is assumed to blow in the direction which would maximize offsite doses. Applicant has calculated that the maximum hypothetical accident would result in a 2.01 rem whole body dose at the site boundary for the time 0 to 2 hours after the accident. Applicant has calculated a dose of 0.066 rem for this same time period for the Raleigh City limits nearest the plant (0-2 hours after the plume reaches the city limits). Each is well within the limits set by 10 CFR Part 100. The wind speed of one meter per second used in this calculation, it should be noted, would result in a 9-hour travel time for the radioactive materials to reach the Raleigh city limits nearest the plant. This 9-hour delay time has been completely ignored, however, in the calculation of the dose at the city limits (Applicant's Contention Testimony at 9, 10; Tr. 1032, 1033). Subsequently, a reanalysis by the NRC Staff of the radiological consequences of design basis accidents was performed to reflect the effects of revised onsite meteorological data, the resulting changes in the atmospheric dilution factors used for dose calculational purposes, and the dose-modeling assumptions made in the calculations. The results of the revised calculations indicate that the doses will be within the guidelines of 10 CFR Part 100 (NRC Staff Exhibit 8 at 13-1, 13-4, and 13-5). An independent analysis of the radiological consequences of a design basis accident by the Applicant also indicates that the resultant doses are acceptable in that they meet the dose guidelines of 10 CFR Part 100 (Applicant's Exhibit R at 14.6-19 and 14.6-20). These evaluations thus show that wind speed and direction have been considered in the evaluation of accidental releases from the Shearon Harris Nuclear Power Plant, and that such releases meet ap-

plicable criteria at the site boundary. (See generally *supra* and Applicant's Contention Testimony at 10.) The radiological doses at the site boundary and beyond are inversely proportional to the wind speed associated with the relative concentration values utilized to calculate the dose consequences of design basis accidents. Wind speed higher than one meter per second thus would result in lower doses at the site boundary and beyond, primarily due to greater atmospheric dilution. Therefore, a high wind speed considered in conjunction with a design basis accident would result in smaller doses at Raleigh (Applicant's Contention Testimony at 22).

125. The Board finds that adequate consideration has been given to wind direction and speed in the area of the site and that both routine and accidental radiological releases will be within NRC requirements.

126. 10 CFR Part 50, Appendix E, Part II, requires Applicant to show the feasibility of evacuating the public within the low population zone (LPZ), but does not require a fully detailed emergency plan as a prerequisite for a construction permit. The LPZ for the SHNPP is an area with a radius of 3 miles from the reactors. This is the area that could conceivably require some protective measures under the most adverse postulated conditions following the design basis accident. Doses in areas beyond the LPZ including the city of Raleigh, would not require immediate protective action as a result of any credible accident (Applicant's Contention Testimony at 22). The Staff has also concluded that no additional protective measures would be necessary at twenty miles distance (Raleigh) even for the most consequential design basis accident, and that it is feasible to develop adequate emergency warning plans for the Shearon Harris site (Direct Testimony of R. Wayne Houston Regarding Contentions C.1(b) and C.14, following Tr. 1272). The Intervenor introduced no affirmative evidence to support their contentions C.1(b) and C.14, and their cross-examination of the Staff's witness (Tr. 1273-1278) does not impeach the NRC Staff's position that feasible emergency plans can be developed for the Harris site and the low population zone.

127. The Board finds that adequate emergency warning and evacuation plans for the Harris site can be developed prior to operation of the plant.

C. Cooling Water Supply

Contention C.6(a) The Cape Fear River will not be able to provide enough supplemental cooling water in drought periods to adequately compensate for the net consumptive loss produced by the operation of the proposed facility and still retain sufficient flow to support dependent aquatic and terrestrial animals and plants in the Cape Fear ecosystem.

Contention C.6(b) Due to a recent settlement in the case of *Conservation Council of North Carolina v. Froehlke*, it is unknown at this time whether the B. Everett Jordan Dam (New Hope Reservoir) will be permanently operated as a wet or as a dry dam. Should the Jordan Dam be operated as a wet dam, future impounding of water within the dam will significantly reduce water flow on the Cape Fear River and thus imperil the proposed plant's ability to provide adequate cooling water for operation, lessen the availability of water to support existing plant and animal life in the Cape Fear River ecosystem below the plant location, and increase the proposed temperature in the makeup pond.

Contention C.6(d) Since February 4, 1974, the date of the judgment in *Conservation Council of North Carolina v. Froehlke*, neither the applicant nor the staff has published or even undertaken, to the knowledge of Intervenor, any studies as to the effects of that judgment on the construction and operation of the Harris Plant. Such a study is imperative before a decision as to the adequacy of the water supply to the plant may intelligently be made.

128. As stated in the Revised Final Environmental Statement (RFES), Section 3.3, the Applicant's Environmental Report (ER), Section 2.2.8.1, the Staff's Safety Evaluation Report (SER), Supplement 2, Section 2.4, and the Applicant's Preliminary Safety Analysis Report (PSAR), Section 2.6.2.4, the streamflow in Buckhorn Creek and the Cape Fear River during drought conditions will not be sufficient to provide makeup water for the cooling towers. This fact is the basis for the proposed 4,100-acre main (makeup water) reservoir. This reservoir has been designed to contain sufficient storage for the plant to operate during a drought of greater severity than has been observed to have occurred historically without withdrawing any water from the Cape Fear River when its flow, either regulated by dams in the future or unregulated as at present, is less than 600 ft³/s, as measured at the USGS Lillington streamflow gauge. In addition, no withdrawals will be made that would exceed 25 percent of the streamflow or in no case would water be withdrawn when flows are less than 600 ft³/s, as stated in the RFES, Sections 2.6 and 5.2.4, in the ER, Section 2.2.8.2, and in the PSAR, Section 2.6.2.4. Thus, the Staff (Testimony of David Schreiber, Tr. 1309) concludes that the plant will be able to operate and shut down safely during droughts of greater than historical severity without putting undue stress on the Cape Fear River.

129. The effect on the Cape Fear River of impounding water for the proposed New Hope Reservoir and the resulting ability of the river to provide adequate cooling water for operation of the plant was raised by the In-

tervenors. During the filling of New Hope Reservoir (if this should occur), which is located on the Haw River, runoff from about half the Cape Fear River drainage area located upstream of Buckhorn Dam (location of the Applicant's river makeup pumping station) will be committed to filling. Therefore, approximately half the naturally occurring streamflow will still pass Buckhorn Dam during the New Hope Reservoir filling period.

130. The Applicant has analyzed the ability of the Cape Fear River to provide makeup water during operation of the plant coincident with the filling of the New Hope Reservoir and a drought of severity greater than has been observed historically. Furthermore, the Applicant's analysis was constrained by the pumping restrictions of no withdrawal of water when Cape Fear River flow is less than 600 ft³/s, and, in addition, pumping never to exceed 25 percent of the river flow. This analysis is described in the ER, Section 2.2.8.2, and in the PSAR, Section 2.6.2.2.6. Following the severe drought, the main reservoir would still contain a 30-day supply of water necessary to safely shut down the plant, as stated in the ER, Section 2.2.8.2, and in the PSAR, Section 2.6.2.2.6. The main reservoir serves only as a backup source of water for the ultimate heat sink. The auxiliary reservoir is the primary source of water for the ultimate heat sink in the event that the water stored in the cooling tower basins is not available for safe shutdown and cool down of the plant, as stated in the PSAR, Section 2.6.2.2.6. The Staff has independently reviewed the Applicant's calculations and finds them acceptable (Schreiber Testimony, p. 5).

131. The plant requirements for water from the Cape Fear River will be greatest during the filling of the main and auxiliary reservoirs. The Staff conducted an independent analysis to evaluate this critical period. Assuming coincident filling of New Hope Reservoir, the plant reservoirs, and a range of streamflow conditions ranging from average to the worst historical drought period, Staff computations indicate that the plant reservoirs could be filled within a time period ranging from less than 4 months to a maximum of about 14 months. The 4-month estimate is based on average rainfall-runoff conditions, whereas the 14-month estimate is based on drought conditions more severe than have occurred historically. These estimates also include the constraint of the pumping restrictions described above. During operation, the plant will require considerably less water from the Cape Fear River (only about 20 cubic feet per second on the average) than during plant reservoir filling. Therefore, the Staff concluded that the future impounding of water within New Hope Reservoir (and the subsequent operation of the B. Everett Jordan Dam as a "wet" dam) coincident either with the filling of the plant reservoirs, or with plant operation, will not significantly affect plant operation or reduce the availability of water in the Cape Fear River (Schreiber Testimony, p. 6).

132. The effect on the Cape Fear River (and subsequently on plant operation) should the Jordan Dam (New Hope Reservoir) be operated as a "dry" dam was also raised by Intervenor. Such operation of Jordan Dam may readily be asumed to result in flow conditions in the Cape Fear River similar to those that have occurred historically. Since the analyses discussed in the immediately preceding paragraph were made with more severe flow conditions (no flow from the Haw River due to filling New Hope Reservoir), the Staff concluded that the Applicant's proposed water supply system should be capable of providing sufficient water, even during periods of severe drought, should the Jordan Dam be operated as a "dry" dam. Although pumping from the Cape Fear River would be minimal during such drought periods, the main reservoir would be adequate to provide a sufficient water supply for plant operation, and if necessary, the main and auxiliary reservoirs would each have adequate water supply to safely shut down and cool down the plant (Schreiber Testimony, p. 7).

133. The analyses and discussions provided in the preceding paragraphs address the adequacy of the Applicant's water supply system no matter whether the upper Cape Fear River remains unregulated by any known proposed dam, whether Jordan Dam is constructed and operated as a wet dam, or whether Jordan Dam is constructed and operated as a dry dam. It is the conclusion of the Staff, based upon its independent analysis, that an adequate supply of water will be available for the Shearon Harris project (Schreiber Testimony, p. 9).

134. The Staff and the Applicant witnesses testified that assuming for purposes of argument that the presentation of Intervenor's witness Dr. Wiser is completely correct (Tr. 1206), there would be no adverse safety effects (Schreiber Tr. 1310 and Sell Tr. 1324 and 1330); that is, the units could be safely shut down. The Staff's analysis of Dr. Wiser's presentation is that adequate water will be available to operate the facility over its normal lifetime. The Staff is of the further opinion that the Applicant's calculations of water availability are adequately conservative. The Applicant testified that its water availability analysis took into account a drought more severe than has ever been recorded in the area. The Applicant also testified that under Dr. Wiser's analysis the worst occurrence would be to shut the plant down for one 30-day period during the 40-year life of the plant, a shutdown of some two-tenths of one percent, but that a more likely alternative would be to reduce power rather than to shut down the plant (Tr. 1330). The Board notes that Dr. Wiser's position is premised upon (a) drought conditions more severe than ever recorded for the area (Tr. 1329), (b) no contribution from the Buckhorn Creek, and (c) a 100 percent plant load factor.

135. The Board takes notice that the facility will not operate at 100 per-

cent of design power for each of its expected 14,600 days of useful life. There will be scheduled and forced outages which will reduce the overall plant capacity factor and thus reduce the consumptive use of water. Assuming, *arguendo*, that the plant would have to be shut down once in 30 years on the average, the Board finds that the cost-benefit balance would not be adversely affected.

136. The Board finds that adequate water should be available so that the facility as designed may be safely and normally operated for its designed lifetime whether the New Hope Reservoir will, or will not, be filled. The testimony of Dr. Wiser does not impeach this conclusion nor does the cross-examination by the Intervenor of Applicant and Staff witnesses diminish the probative value of their evidence.

137. Operation of the Jordan Reservoir is expected to regulate flows downstream of the dam in order to reduce flood flows and to provide a minimum flow of 600 ft³/s in the Cape Fear River at the Lillington stream gauge. While the Jordan operation will change the flow regime of the river downstream of the dam—in that there will be somewhat reduced flows in the spring when the flows are usually high, and increased flows in the summer and fall when the flows are usually low—this will not significantly affect the average annual flows of the Cape Fear River. The effect will be approximately 15 ft³/s, compared with an average flow of 3,200 ft³/s (Applicant's Contention Testimony at 13).

138. The Board finds that the operation of the Harris facility should not have an adverse effect upon the Cape Fear River ecosystem below the point of the intake structure for the makeup reservoir.

139. The Applicant has analyzed the ability of the makeup reservoir to dissipate blowdown heat under drought conditions (low water surface elevation and corresponding reduced water surface area for heat dissipation), as described in the ER, Section 3.3.1. The Applicant's results indicated a minimal mixing zone of only 60 acres within the 5°FΔT isotherm under extreme conditions (Schreiber Testimony, p. 7). As described in the RFES, Section 5.2.2, the Staff's independent analysis of the ability of the makeup reservoir to dissipate blowdown heat indicated that the Applicant's analysis is conservative.

140. The Applicant has relocated the cooling tower discharge pipe and reduced the cycles of concentration in the cooling towers. The Applicant presented evidence that the 5°FΔT plume above ambient reservoir temperature would be 200 acres under worst-winter conditions and about 90 acres under worst-summer conditions (Testimony of James Sell, p. 7, following Tr. 2118). Applicant's fisheries biologist testified that the changed location and increased amount of discharge would have no significant adverse effects upon the ecosystem in the makeup water lake (Tr. 2127 and following,

Testimony of Dr. William T. Hogarth). The NRC Staff fisheries biologist testified that the new location and increased volume of blowdown should not impose unacceptable impacts upon the reservoir fish (Testimony of Clarence R. Hickey, Jr., p. 7 following Tr. 2131). The NRC Staff independently calculated the expected thermal plume and concluded that Applicant's calculations adequately defined the expected $5^{\circ}\text{F} \Delta T$ under worst conditions and that the size of the $5^{\circ}\text{F} \Delta T$ plume during normal or average conditions would be much smaller (Tr. 2134).

141. The Board finds that the location of the discharge pipe and the volume of discharge proposed as of the time of this Initial Decision should have no significant adverse effects upon the ecosystem of the makeup reservoir.

D. Need for Power and Alternatives

Contention C.17 Energy conservation, increased consumer use of alternative energy sources, and increasing electrical rates will significantly reduce the rate of growth of demand for electricity in the Carolina Power and Light service area over the next fifteen (15) years.

Contention C.18 The Applicant will not need the electricity to be generated by the Shearon Harris Nuclear Power Plant in order adequately to meet the needs of its service area over the next fifteen (15) years.

142. No one can predict nor forecast the future precisely, and all forecasts or predictions in some way assume regularity, either statistical or deterministic. Econometric forecasts are also based on historical data and in this sense are historical in nature, and depend on regularity assumptions. Most forecasts when made by different people use different data, criteria, and equations. Further, if a forecast is a set of subforecasts of some additive quantity, the final forecast is merely the sum of the subforecasts. Thus, if energy usage is forecast for residential, industrial, and commercial customers, the total energy usage forecast for the utility is the sum of those forecasts.

143. If one compares the subforecasts of different forecasters for a particular class of customers, one would actually expect different results. Some would be high, some would be low. When the subforecasts of an individual forecaster are added to get the final forecast of that forecaster, the high forecasts and low forecasts of that forecaster tend to cancel and approach the forecasts of the other forecasters. Of course, this would not occur if one forecaster was uniformly optimistic or pessimistic.

144. With these observations in mind, the Board finds no special significance in the different forecasts for the different customer classes

which the record of this proceeding reveals. We are urged by the Intervenor to place no reliance whatever upon the forecasts of the Staff, Applicant, and the North Carolina Utilities Commission because their subforecasts differ. They are, according to the Intervenor, inconsistent, contradictory, and not reconcilable.²⁰ We disagree. In fact, the Board would be concerned in this instance if the subforecasts were identical because this would indicate lack of independence.

145. In order to substantiate the Intervenor's contention that the Harris units will not be needed to meet the demand for electricity within the Applicant's service area over the next 15 years (1977-1992) and that energy conservation, electrical rates, and alternative energy sources will significantly reduce the rate of growth of demand for electric power in Applicant's service area over the next 15 years, the Intervenor presented the testimony of Amory B. Lovins (Tr. 1504, 1560). Mr. Lovins has had no academic training or work experience in economics or econometrics (Tr. 1512), or in forecasting future power needs for public utilities. The testimony itself does not address the projected need of Applicant to produce electricity in its service area during the next 15 years nor does it address the effect of energy conservation, alternative energy sources, and increased electrical rates on demand for electricity in the Applicant's service area during the next 15 years (Intervenor's Ex. 5). He made no studies with respect to the need for the Shearon Harris project nor calculations or projections concerning the development of energy alternatives in Applicant's service area.

146. The Applicant's Vice-President for System Planning and Coordination described CP&L's projections of energy and peakload demands on its system through the period encompassing scheduled commercial operation of each of the four Shearon Harris units (Direct Testimony of Wilson W. Morgan on Behalf of Applicant, fol. Tr. 1659 (Morgan Testimony)). Mr. Morgan described the methodology CP&L uses to forecast its energy requirements for the different sales classifications (Morgan Testimony at 4-8). Similar information is contained in Amendment 64 to the Preliminary Safety Analysis Report (PSAR).

147. Dr. Robert M. Spann, a private consultant, who had assisted the staff of the North Carolina Public Utility Commission (NCPUC) in its preparation of an independent forecast of electric sales and peak demands for the CP&L service area in late 1976 also testified for the Applicant (Direct Testimony of Robert M. Spann on Behalf of Applicant, fol. Tr. 1731 (Spann Testimony)). This forecast,²¹ subsequently adopted by the NCPUC

²⁰Intervenor's Proposed Findings 10-12. Intervenor would have us accept forecasts of all predictors where the projection is downward, however. *Id.*, 3, 6, 7, and 8.

²¹Applicant's Exhibit CC.

itself as a reasonable estimate of CP&L's future electricity growth,²² was developed using both econometric and noneconometric methodologies (Spann Testimony at 3-6); both reaching the same conclusions. Finally, Dr. Spann testified that both the NCPUC forecast and that of CP&L were within the range of FEA and ERDA projections of electricity growth rates for the South Atlantic region, which includes CP&L's service territory (Spann Testimony at 11-12, 15).

148. Dr. Hoyt C. Hottel testified (Tr. 1746 *ff* (Hottel Testimony)) that the adoption of solar energy would not substantially reduce the need for the Harris units (Hottel Testimony, 21-23). Dr. Hottel is eminently qualified in this area, his experience going back to 1938 when he became the first Chairman of MIT's Solar Energy Committee and 1939 when he was in charge of the design and testing of the world's first solar-heated house (Tr. 1746 *ff*).

149. Dr. Alvin Cook and Mr. Dennis Carter specifically addressed the impact of conservation on behalf of Applicant. Dr. Cook, who is a consulting economist specializing in energy problems, described the effects of conservation efforts to date and studies undertaken by FEA and by his firm to forecast future conservation effects not attributable to price changes (Direct Testimony of Alvin A. Cook, Jr., fol. Tr. 1858 (Cook Testimony)). He testified that an FEA study indicates that implementation of nonprice conservation measures reduces the demand in the South Atlantic region by 1.1 percent in 1985 (Cook Testimony at 6). Based on his own studies, Dr. Cook stated that nonprice conservation will reduce electric demand in North Carolina by less than 1.5 percent by 1990 (*id.* at 3). As to price-related conservation, Dr. Cook's estimate is that the growth in real price of electricity in the South Atlantic region will be less than ½ to 1 percent per year, in contrast to the 1 percent per year figure taken into account in CP&L's forecasts (*id.* at 8, 10).

150. Mr. Carter has been directly involved with development and implementation of Applicant's conservation programs, including contact with its customers (Direct Testimony of Dennis W. Carter fol. Tr. 1804 (Carter Testimony)). Mr. Carter summarized Applicant's conservation programs and summarized results of the Applicant's efforts to encourage use of recognized conservation techniques and sound management practices (Carter Testimony, 4-7). Mr. Carter's contact with solar interests in North Carolina led him to conclude that while solar is the subject of considerable conservation and will grow in acceptance with time, the rate of growth will be slow, and no more than 2-3 percent of the homes in North Carolina existing in the year 2000 will be solar-heated even with Federal and State solar

²²Applicant's Exhibit DD (a new forecast, Board Exhibit 7, does not change this result significantly, *see* discussion of new evidence *infra*).

legislation (*id.* at 18). Customer shifts to the alternatives of wood, coal, or biomass were dismissed by Mr. Carter as clearly being economically inferior to electric heating (Tr. 1920). In short, Mr. Carter observed, over the time frame in question no combination of conservation or viable alternatives is available to consumers which reduce the need for the Harris units on their current schedule (*id.* at 22).

151. An econometrician provided an updated assessment of need for the Harris Plant for the NRC Staff (Direct Testimony of Robert C. Spore Regarding Need for Power and Comparative Economics of Nuclear and Coal Generating Systems, fol. Tr. 1991 (Spore Testimony)). Dr. Spore conducted a review and analysis of the methodologies and results of the Applicant and NPCUC staff's forecasts for the CP&L system and also performed his own analysis (Spore Testimony at 1-44). Table 1.9 of this testimony contains a comparison of the forecasting results reached by the Applicant, the North Carolina Public Utility Commission, and the NRC Staff. Differences appear in the forecasts for individual consuming classes. He was not concerned about the sector differences because different methodologies were used by CP&L, NCPUC, and by the Staff (*id.*; Tr. 2027, and Spore Testimony, 1-4). Dr. Spore details most of the variables he used in his econometric model on page 1-42 of his testimony. The NCPUC variables used in their econometric model are set forth in Section II.F, NCPUC Report of Analysis, Applicant Exhibit CC (Spann Testimony, Attachment 4). Dr. Spore viewed as remarkable the agreement between the total energy forecasts arrived at independently by CP&L, NCPUC, and the NRC Staff, and regarded their overall agreement as confirmatory of each other, and stated that his confidence in the results would not have been disturbed by a greater variation between them (Spore Testimony at 1-44; Tr. 2027, 2050).

152. Based on its review, the Staff found the methodology and results of Applicant's forecast to be reasonable and accepted them for use in its assessment of need for new baseload generating capacity (Spore Testimony at 1-44). Dr. Spore pointed out that the NRC Staff made assumptions most favorable to solar (which is the only presently viable consumer use alternative in the Staff's view) and still determined that it will not have a significant impact on the need for new capacity (*id.* at 1-26 to 1-27). This conclusion was also reached by Dr. Hottell, Mr. Cook, and Mr. Carter. Dr. Spore also addressed energy conservation, alternative sources of energy, and increasing rates and concluded that they would not substantially reduce the need for power in the Applicant's service area in the next 15 years (Spore Testimony, pp. 1-16 *ff.*, 1-20, 1-22, 1-28).

153. The Board reopened the evidentiary record to receive into evidence CP&L's load forecast of December 9, 1977,²¹ and NCPUC's forecast for

²¹Licensing Board Exhibit 6, received by Order dated January 12, 1978.

1978²⁴ Both exhibits project a downward direction in the rise in peak demand. The Staff submitted a revision to its Table 1 of paragraph 46 of its proposed findings²⁵ for the purpose of incorporating the revised forecasts into the tabulations for comparison. Also for comparison purposes the Staff converted its earlier tables to indicate reserves as a percent of a peak demand rather than as a percent of capacity. Below we have reproduced the portion of revised Table 1 which demonstrates the effect of the new forecasts on reserves and, for comparison, the Staff's base case upon the original hearing record.

| Year | Installed Capacity Hearing Record (MW) | CP&L December 9, 1977, Forecast | | NCPUC 1978 Forecast | | Staff's Base Case | |
|------|--|------------------------------------|-------------------------------|------------------------|-------------------------------|----------------------|-------------------------------|
| | | Peak | Reserves as a % of Peak | Peak | Reserves as a % of Peak | Peak | Reserves as a % of Peak |
| 1982 | 8,215 | 7,480 | 9.8 | 7,663 | 7.2 | 8,044 | 2.1 |
| 1983 | 8,935 | 7,929 | 12.7 | 8,196 | 9.0 | 8,528 | 4.8 |
| 1984 | 9,835 | 8,427 | 16.7 | 8,765 | 12.2 | 9,039 | 8.8 |
| 1985 | 10,555 | 8,914 | 18.4 | 9,375 | 12.6 | 9,582 | 10.2 |
| 1986 | 11,455 | 9,424 | 21.5 | 9,974 | 14.8 | 10,089 | 13.4 |
| 1987 | 11,455 | 9,933 | 15.3 | 10,611 | 7.9 | 10,624 | 7.7 |
| 1988 | 12,355 | 10,463 | 18.0 | 11,289 | 9.4 | 11,187 | 10.4 |
| 1989 | 13,505 | 10,983 | 23.0 | 12,010 | 12.4 | 11,780 | 14.6 |
| 1990 | 14,405 | 11,549 | 24.7 | 12,777 | 12.7 | 12,405 | 16.1 |

154. CP&L testified that 15-20% reserve margins were desirable (Tr. 1696); NCPUC and Federal Power Commission find 15-20% reserve margins desirable (Morgan Testimony, p. 20) (Spore Testimony, pp. 1-50; Tr. 1712 and 1713). The Board finds that a reserve margin in the range of 15 to 20% of peak demand is reasonable and it applies with respect to Applicant's service area.

155. We note that the NCPUC's forecast for 1978 now comes closer to the Staff's base case current in 1977. We note also that in only one year, 1986, does the NCPUC 1978 forecast approach the lower threshold of a

²⁴Licensing Board Exhibit 7, received by Order dated January 12, 1978.

²⁵Amendment dated January 18, 1978.

desirable reserve margin. We are not disturbed that Applicant's projection now predicts the possibility of excess reserve margins in 1989 and 1990. Applicant has in the past demonstrated that it is ready to and capable of deferring its scheduled construction when required by conditions in its industry. Applicant could for example certainly delay its nebulous 1,150 MW nuclear plant labeled "SR1" which is currently scheduled for operation in 1989 (Bd. Ex. 6). In any event, all projections, except the Staff's low case show a need for Harris power in the 1980's, if desirable reserves are to be maintained.

156. We are not disturbed by the variations in the projections. No one, including this Board, can predict the future with certainty. Our conclusions as to need for power would remain unchanged even if forecasts predicted an even lower peak demand in the forecasted period. For example, as an informal test of the reliability of the forecasts received into evidence, the Board made its own experimental projection of power demands as well as estimates of variations of its projection using data in the record (Applicant Ex. U; PSAR, Amendment 64; Applicant Ex. AA). Our projections and estimates are not evidence, only an evaluation of evidence. The Board's projection, which uses only pre-1974 data, predicts the peak demands in 1974 through 1976 with no more maximum error than in the years 1965 through 1973—about 6% of the 1974 peak. This projection predicts power demand about 500 MW lower than the Applicant currently projects for 1984.

157. We do not rely upon our projection because the parties have not had an opportunity to address it, but even if we were to accept its predictions, our conclusions would remain unaltered. The effect could be that the timing of the Harris units might be changed, but the need to schedule the Harris units for construction would remain. We arrive at this conclusion without even entering into a consideration of whether substitution of the Harris units for existing fossil fire generation would be desirable.

158. In this proceeding the Board is presented with an overwhelming weight of uncontradicted probative evidence, not only that the four Harris units will be needed within the time frame presently scheduled by the Applicant, but that energy conservation, increased consumer use of alternative energy sources, and increasing electrical rates over the next 15 years will not substantially reduce this need.

159. The Board finds that the four Shearon Harris nuclear power units will be needed as now scheduled, or sooner, and that this need is not diminished by increased consumer use of alternative energy sources or energy conservation or increasing electrical rates over the next 15 years.

E. Financial Qualifications

Contention C.19 The Applicant will not be able to generate enough

funds to complete construction of the Shearon Harris Nuclear Power Plant within the present construction schedule.

160. Section 50.33(f) of the 10 CFR Part 50 states that to demonstrate to the Commission its financial qualifications to carry out the activities for which a construction permit is sought, the Applicant shall submit information to show that it possesses the funds necessary to cover estimated construction costs and related fuel cycle costs or that it has reasonable assurance of obtaining the necessary funds, or a combination of the two. Appendix C to 10 CFR Part 50 identifies the kinds of information to be submitted by an Applicant to demonstrate its financial qualifications. If the application is for a construction permit, Appendix C directs an Applicant to submit an estimate of construction costs, a general plan (including projected sources of funds) for financing these costs and its latest published annual and interim financial statements.

161. The Applicant's submitted estimate of the cost of design and construction of the nuclear plant, including related transmission costs and the costs of the initial fuel for the four units, is \$4,201,962,000 (PSAR, Amendment No. 58).

162. The Applicant submitted also a general plan for financing these costs (including its projections of sources of funds) and its financial statements (PSAR, Amendment No. 58).

163. Those documents indicate that the Applicant will rely on a combination of internally and externally generated funds. The Applicant based its projections on an assumed capital structure that is historically typical of the electric utility industry and on an assumed rate of return on common equity that is within the range that has been determined to be just and reasonable in recent rulemaking cases before the agencies having jurisdiction over rates charged by the Applicant (SER, Supp. 4, pp. 17-3 and 17-4).

164. A rate of return of the magnitude assumed by the Applicant in its projections when applied to the capital structure historically typical of the electrical utility industry will result in adequate coverages of fixed charges (SER, Supp. 4, p. 17-4).

165. The Applicant's 1976 financial statistics for return on common equity, capital structure, and interest coverages were comparable to those for the average of the 100 largest electric utilities (SER, Supp. 4, p. 17-4).

166. Based on its review of the financial information submitted by the Applicant and on its own analysis, the Staff concluded that there is reasonable assurance that Carolina Power and Light Company can raise the necessary funds to design and construct the Shearon Harris Nuclear Plant, Units 1, 2, 3, and 4 (SER, Supp. 4, p. 17-4).

167. Applicant's ability to generate funds sufficient to complete con-

struction of the Harris Plant as well as its other units on the present construction schedule was addressed by Applicant's chief financial officer, by an economic analyst familiar with Applicant and its abilities to raise funds, and by an NRC Staff witness who had been a principal in the Staff's review of Applicant's financial qualifications. Intervenors presented neither direct testimony nor proposed findings on this contention. That the Applicant's financial standing has improved since the 1974-1975 period and continues to improve is evidenced by its bond rating which dropped in 1975, but has now been restored to its previous rating. (See Direct Testimony of Carl H. Seligson on Behalf of Applicant, following Tr. 1865 ("Seligson Testimony"); Tr. 1867-68.)

168. Applicant's current construction program does not represent as great a growth rate as experienced in the past, when related to total system capability (Direct Testimony of Edward G. Lilly, Jr., on Behalf of Applicant, following Tr. 1771 ("Lilly Testimony") at 5). When related to the Applicant's size, the average construction expenditures required during the next 14 years are actually smaller than those of the past seven years (Lilly Testimony at 7-8).

169. The Applicant plans to provide a significant portion of required construction funds through internally generated capital (*id.* at 8). The balance of its construction expenditures will be obtained from long-term capital markets (*id.*). A mixture of long-term debt, common stock, and preferred stock will be sold in such a way that the capital structure will consist roughly of 50% debt, 35% common equity, and 15% preferred equity (*id.*). Short-term borrowings will be used to fund construction expenditures between permanent financings (*id.*).

170. In Amendment 58 to its application,²⁶ Applicant provided its best estimate of the future sources of funds for construction which are currently serving as the basis for the company's financial planning. This same estimate was relied upon in testimony during the hearing (*id.* at 8-9). In making its estimate, Applicant first developed a projection of internally generated funds. This was based on expected revenues from future sales, projected operating and maintenance expenses, depreciation, taxes, and dividend distributions (*id.* at 9-10). Next, the amount of external financing was determined by comparing the projections of funds generated internally with the amount needed for construction (*id.* at 10). The types of external financing are dictated by the desired capitalization rates (*id.*). In the development of its estimate, the Applicant has made two key assumptions. The first concerns load projection and therefore income from the sale of energy. Applicant's load projections were discussed at length above and

²⁶See Applicant Exhibit T.

found to be reasonable. The second assumption is the projected rate of return on common equity which will be allowed by State regulatory commissions in setting rates. The Applicant assumes its rate of return on yearend equity will average 13% over the 14-year period (*id.* at 11). This rate of return is less than the rate of return currently approved by the North Carolina Utility Commission. The Applicant anticipates interest rates of 10% on low-risk, long-term debt issuances (*id.* at 11-14).

171. One measure of Applicant's financial strength is the ratio of internally generated funds to total capital needs, since a company's ability to demonstrate a positive flow of funds from its operations indicates security for investor funds (*id.* at 15; Seligson Testimony at 6-7). Over the 14-year period for construction of the four Harris units, Applicant projects that it will be providing for approximately 44% of its total needs with internally generated funds (Lilly Testimony at 16; Seligson Testimony at 6-7). This contrasts with values of 19% during the period 1970-76 and 9% during 1970-74, which Applicant endured despite heavy expenditures which were made for construction of two nuclear units (Brunswick, Units 1 and 2) (Lilly Testimony at 16, 20). If a combination of (1) an economic recession which resulted in a sharp decline in rate of growth of Kwh sales, (2) double-digit inflation which caused sharp increases in operating and fuel costs, and (3) delays in the granting of necessary rate relief were to reoccur, the Applicant stated that it would not be placed under the same financial pressures that it bore in 1974 and 1975. The potential for regulatory lag is now alleviated by use of approved fuel adjustment clauses, and the Applicant's position will be more stable throughout the next 14 years because the expected ratio of internal to external capital resources is more favorable (Lilly Testimony at 17-21; Seligson Testimony at 9).

172. A recent State law will permit the Applicant after July 1, 1979, to include construction expenditures in its rate base. With this change, the Applicant will substitute a cash return in the form of revenues for the noncash return represented by allowance for funds used during construction (AFUDC) for expenditures on projects under construction (Lilly Testimony at 21-23). Applicant's current estimates of the effect of this law are that it will improve the percentage of internal generation of funds from 44% to 53% during the 14-year construction period, allowing elimination of some \$900 million in outside financing (*id.* at 23; Seligson Testimony at 8-9).

173. The Staff's witness was cross-examined at some length by Intervenors, and questioned extensively by the Board, about the basis on which the Staff concluded that there is reasonable assurance that the Applicant can raise the funds necessary to design and construct the Harris Plant (Tr. 1888-1988).

174. The witness testified that in reviewing the Applicant's financial qualifications the Staff assumed that the Applicant's sales projections (an annual compound growth rate of 6.5 percent in kilowatt hour sales) are accurate (Tr. 1898-99, 1921, and 1953). The Staff assumed further that the rate regulators in the Applicant's service area will allow it to achieve a rate of return on its invested capital sufficient to attract additional capital (Tr. 1909), and that capital will be available at some price (Tr. 1900-1903).

175. Having made these basic assumptions, the Staff evaluated the Applicant's financial circumstances and the reasonableness of the financial projections submitted by the Applicant to demonstrate its ability to raise the funds necessary to design and construct the Harris Plant (Tr. 1918). In its review of the Applicant's financial projections, the Staff evaluated the Applicant's assumptions on which the financial projections were based for their reasonableness (Tr. 1963). The Staff also compared the magnitude of the projected construction program with the magnitudes of those achieved by the Applicant in the immediate past (Tr. 1983).

176. After having thoroughly evaluated the evidence presented, the Board finds that there is reasonable assurance that the Applicant can raise the funds necessary to design and construct the Harris Plant and therefore, the Applicant to be financially qualified. The Board also relies on the assumption that the North Carolina Utility Commission will provide for an appropriate rate structure. The record justifies such an assumption (*e.g.*, Lilly Testimony at 21-23; Seligson Testimony at 8-9).

V. CONCLUSIONS OF LAW

177. Based upon a review of the entire record in this proceeding and the foregoing discussion and findings of fact, the Board concludes as follows:

Issues Pursuant to the Atomic Energy Act of 1954, as Amended

a. In accordance with the provisions of 10 CFR §50.35(a):

(i) Applicant has described the proposed design of the facilities including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public.

(ii) Such further technical or design information as may be required to complete the safety analysis and which can reasonably be left for later consideration, will be supplied in the final safety analysis report.

(iii) Safety features or components, if any, which require research and development have been described by the Applicant and Applicant has identified, and there will be conducted a research and development program reasonably designed to resolve any safety questions associated with such features or components.

(iv) On the basis of the foregoing, there is reasonable assurance that (1) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of the proposed facilities, and (2) taking into consideration the site criteria contained in 10 CFR Part 100, the proposed facilities can be constructed and operated at the proposed location without undue risk to the health and safety of the public.

b. Applicant is technically qualified to design and construct the proposed facilities.

c. Applicant is financially qualified to design and construct the proposed facilities.

d. Issuance of permits for construction of the facilities will not be inimical to the common defense and security or to the health and safety of the public.

Issues Pursuant to National Environmental Policy Act of 1969 (NEPA)

a. The environmental review conducted by the NRC Staff pursuant to Appendix D, 10 CFR Part 50, has been adequate.

b. The requirements of §§102(2)(A), (C), and (E) of NEPA and Appendix D of 10 CFR Part 50 have been complied with in this proceeding.

c. Having considered and decided all matters in controversy among the parties related to construction, and having independently considered the final balance among conflicting factors contained in the record of the record of the proceeding with a view to determining the appropriate action to be taken, and after weighing the environmental, economic, technical, and other benefits against environmental costs, and considering available alternatives, construction permits for the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, should be issued, subject to the following conditions which were recommended by the Staff and may be subsequently modified upon proper determinations made by the Staff pursuant to 10 CFR Part 51:

(i) The Applicant will not dispose of morpholine to the makeup reservoir. Alternative disposal methods or use of a different chemical acceptable to the Staff will be adopted prior to the operation of the plant (*RFES at iii*).

(ii) The Applicant will conduct a comprehensive environmental

sampling, monitoring, and surveillance program (biological, chemical, thermal, and radiological) adequate to determine an ecological baseline for measuring the operational impact of the station on land and water ecosystems. The program, which has been initiated, shall be continued throughout the construction period and for at least one full year after all four units are in operation (*RFES at iii*).

(iii) The Applicant will continue its onsite meteorological program and collect weather data with a minimum of 90% recovery. Prior to operation of the plant, at least one full year of data (covering all seasons) will be collected and analyzed to enable a complete description of the site weather so that accurate predictions of the impact of gaseous releases to the surrounding area can be made for both normal and accident conditions of plant operation (*RFES at iii*).

(iv) The Applicant will, as a design objective, provide for the control of the use of chlorine such that average total residual chlorine concentrations in water discharged to the makeup reservoir will not exceed 0.2 ppm (*RFES at iv, as modified at Tr. 1605*).

(v) The Applicant shall take the necessary mitigating action, including those summarized in Section 4.6 of the Revised Final Environmental Statement, during construction of the station and associated transmission lines to avoid unnecessary adverse environmental impacts from construction activities.

A control program shall be established by the Applicant to provide for a periodic review of all construction activities to assure that those activities conform to the environmental conditions set forth in the construction permit.

Before engaging in a construction activity which may result in a significant adverse environmental impact that was not evaluated or that is significantly greater than that evaluated in the Staff's Revised Final Environmental Statement, the Applicant shall provide written notification to the Director of Nuclear Reactor Regulation (*RFES at iv*).

(vi) Prior to initiation of construction of the Harris-Erwin segment of the offsite transmission line, Applicant shall submit descriptions of the route and immediate environs to the Staff and obtain Staff approval on the proposed route within the corridor reviewed by the Staff (*Tr. 1607-08*).

In addition to the conditions recommended by the Staff, the Board places the following conditions upon any construction permit:

(vii) No withdrawals of water from the Cape Fear River will be made which will reduce the streamflow at the site or below the site (at

the Lillington gauge station of the U.S. Geological Survey) to less than 600 cubic feet per second nor reduce the flow at either point by more than 25% of the streamflow which would exist without withdrawal of water.

VI. ORDER

WHEREFORE, IT IS ORDERED, in accordance with the Atomic Energy Act of 1954, as amended, and the rules and regulations of the Commission, that the Director of Nuclear Reactor Regulation is authorized to issue to Carolina Power and Light Company permits to construct the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, consistent with the terms of this Initial Decision.

IT IS FURTHER ORDERED, in accordance with 10 CFR §§2.760, 2.762, and 2.764, that this Initial Decision shall be effective immediately and shall constitute the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the above-cited rules. Exceptions to this Initial Decision must be filed within seven (7) days after service of the decision. A brief in support of the exceptions must be filed within fifteen (15) days thereafter (twenty (20) days in the case of the NRC Staff). Within fifteen (15) days of the filing and service of the brief by the appellant (twenty (20) days in the case of the NRC Staff), any other party may file a brief in support of, or in opposition to the exceptions.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND LICENSING BOARD

Glenn O. Bright, Member

Dr. J. V. Leeds, Jr., Member

Ivan W. Smith, Chairman

Dated at Bethesda, Maryland,
this 23rd day of January 1978.

[The List of Exhibits has been omitted from this publication but is available in the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Sheldon J. Wolfe, Chairman
Dr. David R. Schink
Dr. Marvin M. Mann

In the Matter of

Docket Nos. STN 50-477
STN 50-478

**PUBLIC SERVICE ELECTRIC
AND GAS COMPANY**

**(Atlantic Nuclear Generating
Station, Units 1 and 2)**

January 25, 1978

The Licensing Board denies a motion to disqualify itself as (1) nontimely and (2) an impermissible attack on 10 CFR Part 50, Appendix M, Section 12.

RULES OF PRACTICE: DISQUALIFICATION

The Administrative Procedure Act (5 U.S.C. 556(b)) explicitly provides that motions for the disqualification of an adjudicator must be filed in a timely manner.

RULES OF PRACTICE: DISQUALIFICATION

Failure of a party to file a motion to disqualify an adjudicator once the information giving rise to the claim is known amounts to a waiver of the disqualification objection. *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-101, 6 AEC 60, 63 (1973).

MEMORANDUM AND ORDER

On November 11, 1977, pursuant to 10 CFR §2.704(c), the city of Brigantine moved to disqualify this Licensing Board. Brigantine's basic complaint is that the members of this Licensing Board (AGS Board) also serve as the members of the Offshore Power Systems Board (OPS Board).

The nature of Brigantine's complaint requires a discussion of the relationship between the Atlantic Nuclear Generating Station (AGS) proceeding and the Offshore Power Systems (OPS) proceeding. OPS has applied for a license to manufacture eight pressurized floating nuclear power reactors. Under the provisions of the Appendix M to 10 CFR Part 50, the OPS proceeding will consider the health and safety aspects of the reactor designs and certain generic environmental impacts.

The Applicant in the AGS proceeding proposes to purchase two of the reactors to be manufactured by OPS to be installed off the southeastern New Jersey coast near Brigantine. Under Appendix M, the AGS proceeding will be directed to determining whether the proposed site falls within the postulated site parameters of the OPS license, if granted.

Section 12 of Appendix M specifically provides that:

In making the findings required by this part for the issuance of a construction permit or an operating license for a nuclear power reactor(s) that has been manufactured under a Commission license issued pursuant to this Appendix M, or an amendment to such a manufacturing license, construction permit, or operating license, the Commission will treat as resolved those matters which have been resolved at an earlier stage of the licensing process, unless there exists significant new information that substantially affects the conclusion(s) reached at the earlier stage or other good cause.

Brigantine asserts three grounds for its motion. First, that “. . . it is inevitable that the AGS Board will prejudice the facts and issues of this proceeding. . .” because members of the AGS Board also serve on the OPS Board; second that “. . . the present AGS Board will be unable to determine objectively what precise matters will or will not be controlling here”; and third, that disqualification is necessary in order to preserve the appearance of justice. The Natural Resources Defense Council has filed a brief memorandum supporting Brigantine's motion.

Both Applicant and the NRC Staff oppose Brigantine's motion. Among other things, they argue that the motion is, first, untimely and second, a transparent attack on the Commission's regulations which is barred by 10 CFR §2.758.

The Board agrees with the Applicant and Staff that the motion must be denied. Primarily, the Board notes that the motion simply is not timely. The issue of timeliness was addressed by the Appeal Board in *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-101, 6 AEC 60, 63 (1973), in which it was stated:

For motions for the disqualification of an adjudicator to be entertained, they must be filed in a timely manner. The Administrative Pro-

cedure Act, which applies to Commission licensing proceedings, explicitly so provides. 5 U.S.C. 556(b). The failure of a party to file a motion for disqualification once the information giving rise to such a claim is available to him amounts to a waiver of the disqualification objection. . . .

Brigantine was a party to both proceedings from their inception until it withdrew from the OPS proceeding on June 24, 1977. Further, Brigantine has been represented by counsel for over two years. However, Brigantine merely moved through its counsel on October 5, 1976, to have the Board withdraw from the consideration of the issues in the AGS proceeding, and acknowledged that it had no grounds for a motion under §2.704(c). Clearly the grounds upon which Brigantine supports the instant motion were available to it when it moved to have the Board withdraw from the AGS proceeding, as they were from the very inception of both proceedings when the same individuals were named to both Boards. In view of its long delay in bringing to the Board's attention the question of the Board's qualifications to conduct this proceeding, and particularly in view of the fact that over one year earlier Brigantine had made a similar motion to this Board without seeking disqualification, we believe that the city has waived any rights which it might have had in regard to the qualifications of the Board.

Further, after careful analysis it appears that Applicant and Staff are correct in their characterization of Brigantine's complaint as being an impermissible attack on Section 12 of Appendix M. Brigantine's argument falls within only one of the five grounds for disqualification laid out by the Appeal Board in the Midland case. That argument is that somehow the fact that the same members serve on both the AGS and OPS Boards will serve to insure that the AGS Board will prejudice issues in that proceeding. Brigantine does not tell us how that might happen. Brigantine further argues that disqualification is necessary to preserve the appearance of justice, but that argument seems inextricably based upon the first argument that somehow prejudgment of the issues in the AGS proceeding will occur.

It is evident from Brigantine's motion that the prejudgment with which it is concerned is that mandated by Section 12 of Appendix M. Having withdrawn from the OPS proceeding, apparently Brigantine seeks, through this motion, to litigate OPS issues in the AGS proceeding. This is clearly prohibited by Section 12. Further, granting of Brigantine's motion would not avail it because any new Board appointed to hear the AGs proceeding would be equally bound by Section 12. The motion consequently must also be denied as an impermissible attack upon the Commission's regulations.

Finally, we deny the instant motion because we deem it, as we deemed Brigantine's earlier motion of October 5, 1976, as being frivolous in barrenly challenging the objectivity of this Board.

Because Brigantine has sought to invoke §2.704(c), and because that section specifically requires that a denial of such a motion be referred to the Atomic Safety and Licensing Appeal Board, we are hereby referring our ruling for the consideration of the Appeal Board.

Dr. Schink concurs but was unavailable to sign the instant Memorandum and Order.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

Dr. Marvin M. Mann, Member

**Sheldon J. Wolfe, Esquire
Chairman**

**Dated at Bethesda, Maryland,
this 25th day of January 1978.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ADMINISTRATIVE LAW JUDGE

Samuel W. Jensch

In the Matter of

J. G. SYLVESTER ASSOCIATES, INC.
900 Hingham Street
Rockland, Massachusetts 02370

BML 20-00302-02

January 19, 1978

Upon consideration of a stipulation of the staff and the licensee, the Administrative Law Judge agrees that the civil penalty may be modified to permit payment in 24 consecutive monthly installments.

ORDER ACCEPTING STIPULATION
AND TERMINATING PROCEEDING

The Nuclear Regulatory Commission issued a Notice of Hearing in this proceeding in response to a request for hearing filed by J.G. Sylvester Associates, Inc., Licensee for Byproduct Material License No. 20-00302-02. The request for hearing related to a proposed imposition of civil penalties in the amount of \$6,000 to be made by the Director of the Office of Inspection and Enforcement following his statement asserting violations by the Licensee of the Commission's regulations and the terms and conditions of the byproduct material license.

The Regulatory Staff of the Commission has undertaken several discussions and negotiations with the Licensee in aid of a stipulation of facts as well as proposed methods for disposition of the proceeding. As a result of these efforts, the Licensee has filed a statement which admitted that the asserted violations did occur and which requested adjustments in the payment schedule for the civil penalties. In addition, the Regulatory Staff and the Licensee have executed a stipulation dated December 27, 1977, whereby the Licensee has agreed to withdraw its request for hearing and to pay the civil penalties in the total amount originally proposed, provided that the payment schedule permits twenty-four consecutive monthly payments of \$250 each. This installment method of payment is requested in view of the Licensee's present financial condition. The Director of the Office of Inspec-

tion and Enforcement has reviewed this provision for payment and has agreed to this method of payment with the belief that this arrangement for payment will retain the intended effect of the civil penalties of assuring future compliance with the Commission's requirements.

Upon the basis of the record in this proceeding, including a review of the statements pertaining to the Licensee's financial condition, it is found that the stipulation between the Licensee and the Regulatory Staff is fair and reasonable and will retain the intended effect of the imposition of the civil penalties of assuring future compliance with the Commission's requirements.

WHEREFORE, IT IS ORDERED, in accordance with the Atomic Energy Act, as amended, and the Rules of Practice of the Nuclear Regulatory Commission, particularly 10 CFR Section 2.203, that the imposition of civil penalties in the amount of \$6,000 on J. G. Sylvester Associates, Inc., of 900 Hingham Street, Rockland, Massachusetts, Licensee of Byproduct Material License No. 20-00302-02 is sustained but modified to the extent only that the payment of the civil penalty amount of \$6,000 may be made in twenty-four (24) consecutive monthly payments of \$250 each, commencing February 1, 1978.

FOR THE NUCLEAR
REGULATORY COMMISSION

Samuel W. Jensch
Administrative Law Judge

Issued:
January 19, 1978
Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of

License No. XSNM-805
Docket No. 70-2071

EDLOW INTERNATIONAL
COMPANY

License No. XSNM-845
Docket No. 70-2131

(Agent for the Government of
India on Application to Export
Special Nuclear Material)

February 3, 1978

CORRECTION

The first sentence of the last paragraph on page 53 of this opinion issued on May 7, 1976, (CLI-76-6, 3 NRC 588, first sentence) should be revised to read as follows:

In making its determination whether a given export pursuant to an Agreement for Cooperation is inimical to the common defense and security of the United States, the Commission must base its decision on whether the safeguards and the assurances given by the recipient government insure that U.S. supplied fuel is not diverted from the use for which it was authorized.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 3rd day of February 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Michael C. Farrar, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket Nos. 50-329
50-330

CONSUMERS POWER COMPANY

(Midland Plant, Units 1 and 2)

February 14, 1978

Upon intervenors' appeal from a Licensing Board decision (LBP-77-57, 6 NRC 482 (1977)) declining to suspend the construction permits pending that Board's consideration of various issues remanded to the Commission by the United States Court of Appeals for the District of Columbia Circuit in *Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976), the Appeal Board determines that suspension is not warranted.

Licensing Board decision affirmed.

RULES OF PRACTICE: SUSPENSION OF PERMITS

Where a litigant who has prevailed on a judicial appeal of an administrative decision seeks to suspend the effect of that decision pending remand, the suspension question is not controlled by the criteria in *Virginia Petroleum Jobbers v. FPC*, 259 F.2d 921, 925 (D.C. Cir. 1958), but rather is governed by a balance of all relevant equitable considerations.

RULES OF PRACTICE: STAY PENDING APPEAL (BURDEN OF PROOF)

Where a successful judicial litigant seeks to stay action authorized by the administrative decision which he challenged, the negative impact of the court's holding places a heavy burden of proof on those opposing the stay.

ATOMIC ENERGY ACT: ALTERNATIVES

The Atomic Energy Act does not make NRC responsible for assessing whether a proposed nuclear plant would be the most financially advantageous way for a utility to satisfy its customers' need for power.

NEPA: CONSIDERATION OF ALTERNATIVES

NEPA requires an agency to consider whether there are environmentally preferable alternatives to a given proposal. If none exist, there need be no cost-benefit balancing of alternatives.

NEPA: CONSIDERATION OF ALTERNATIVES

Nothing in NEPA compels an agency to sift through environmentally inferior alternatives to find a less expensive way of handling the proposal. Where there are no environmentally preferable alternatives, selection of a less expensive alternative lies within the business judgment of the utility and the control of State regulatory agencies.

NEPA: COST-BENEFIT BALANCE

The Commission's interim fuel cycle rule embodies the view that, insofar as particular nuclear plants are concerned, the environmental effects attributable to the existence and need for storage of nuclear waste bring only negligible weight to the NEPA cost-benefit balance.

NEPA: SCOPE OF INFORMATION REQUIRED FOR LICENSING

The fact that certain fuel cycle impacts do not come into play until after plant operation begins does not exclude them from consideration at the construction permit stage, inasmuch as those adverse impacts, small though they may be, will flow inexorably from plant operation. They must be taken into account at whatever point a comparison to other alternatives is being drawn.

NEPA: COST-BENEFIT BALANCE

In terms of the cost-benefit balance, genuinely needed electricity can be viewed as "priceless" or, at least, of increasing value in proportion to the cost of generating it. An increase in monetary costs of a facility may thus not alter that balance.

NEPA: COST-BENEFIT BALANCE

Once it has been determined that a generating facility is needed to meet real demand, that no environmentally preferable type of facility or site exists, and that all cost-beneficial environmentally protective auxiliary equipment has been employed, the final cost-benefit balance will almost always favor the plant, simply because the benefit of meeting real demand is enormous and the adverse consequences of not meeting that demand are serious.

RULES OF PRACTICE: STAY PENDING APPEAL

With respect to whether or not a permit should be suspended, no rule of law or equity forbids taking into account sums invested in a project, where the construction permits were presumptively valid (albeit subject to further review) and where nothing suggests that the NEPA review was lacking in integrity or that the applicant proceeded with the project in bad faith.

NEPA: CONSIDERATION OF ALTERNATIVES

Although an applicant invests in a nuclear project at its own risk, that does not mean that, when the project is compared to possible alternatives, no consideration may be given to work accomplished where the agency and applicant have proceeded in good faith.

NEPA: SCOPE OF REVIEW

A licensing board need not consider the societal value of the end uses of the electricity to be produced by a plant. *Long Island Lighting Company* (Shoreham Station), ALAB-156, 6 AEC 831, 852-54 (1973).

Mr. Michael I. Miller, Chicago, Illinois, with whom **Ms. Caryl A. Bartelman** and **Mr. Ronald G. Zamarin** were on the briefs, for Consumers Power Company.

Mr. Myron M. Cherry, Chicago, Illinois, with whom **Mr. Peter A. Flynn** was on the briefs, for the intervenors Saginaw Valley Nuclear Study Group, *et al.*

Mr. Milton R. Wessel, White Plains, New York, argued the cause for the intervenor Dow Chemical Company.

Mr. Milton J. Grossman, with whom Messrs. William J. Olmstead and Richard K. Hoefling were on the briefs, for the Nuclear Regulatory Commission staff.

DECISION

A. Background and Summary

1. In late 1972, the Licensing Board awarded Consumers Power Company construction permits for the two-unit Midland facility; we affirmed that award several months later.¹ Certain individual citizens and groups who had intervened in our proceeding sought judicial review in the District of Columbia Circuit but did not ask for an interim stay of construction. Consequently, construction of the plant went forward while the court of appeals deliberated.

In mid-1976, that court held that the administrative proceedings had been defective in certain respects.² As a remedial measure, the court remanded the matter to the Commission for further proceedings.³ The Commission in turn assigned the matter to a licensing board, telling it to explore not only the merits of the remanded issues but also whether the construction permits should be suspended in the interim.⁴

2. The court's remand order covered a variety of topics. To begin with, the court found two defects in this agency's appraisal of the environmental impact of constructing and operating the Midland plant. First, that appraisal had failed to take account of the environmental impact of the nuclear fuel cycle.⁵ Second, it had not adequately considered an alternative to incurring the adverse environmental impact attributable to the plant, *i.e.*, the possibility that energy conservation might reduce or eliminate the need for a plant of this size.⁶

¹ALAB-123, 6 AEC 331 (1973), affirming LBP-72-34, 5 AEC 214 (1972). Construction had actually begun in 1970 under a special exemption the applicant had obtained from the Commission.

²*Aeschliman v. Nuclear Regulatory Commission*, 547 F.2d 622 (D.C. Cir. 1976), *certiorari granted sub. nom. Consumers Power Co. v. Aeschliman*, 429 U.S. 1090 (1977).

³547 F.2d at 632.

⁴See CLI-76-11, 4 NRC 65 (1976); CLI-76-14, 4 NRC 163 (1976).

⁵The fuel cycle refers to the gamut of steps—from the mining of uranium ore to the handling of radioactive waste—involved in the creation, use, and disposal of reactor fuel. On this count the court simply incorporated (see 547 F.2d at 632) its decision in *Natural Resources Defense Council v. Nuclear Regulatory Commission*, 547 F.2d 633 (decided the same day), *certiorari granted sub. nom. Vermont Yankee Nuclear Power Corp. v. NRDC*, 429 U.S. 1090 (1977).

⁶547 F.2d at 625-30.

In light of the need for a remand on these two subjects, the court added that it expected us also to consider whether changed circumstances had affected the Dow Chemical Company's need for the process steam which, according to existing contract, it was to receive from one of the units.⁷ This issue is significant in that the applicant originally selected the Midland site and decided to build two units instead of one there because of its plans to supply steam to Dow (which also purchases large amounts of electricity from the applicant).⁸

The court's decision went beyond environmental matters; it also called for further consideration of a safety issue. Specifically, it held that the report the Commission had received from its Advisory Committee on Reactor Safeguards (ACRS)—required by statute for every nuclear power plant⁹—was unacceptably vague in indicating a need to resolve for the Midland facility "other problems" (not there further identified) common to reactors of the Midland type generally.¹⁰

3. After taking evidence for some 30 hearing days (spread over the period from November 1976 to May 1977), the Board below issued a decision on September 23, 1977, declining to suspend the permits pending its decision on the merits.¹¹ That decision is now before us for review, with the intervenors asking us to reverse it and to order the permits suspended.¹²

Having heard oral argument and fully considered the matter, we conclude that the circumstances did not warrant suspension of the permits pending the outcome of the reopened hearing. This conclusion rests mainly on our judgment that the environmental issues being explored on the remand, although important in principle, are proving to be of little practical consequence in this case—particularly as there does not appear to be any environmentally preferable alternative to the proposed Midland project. For that reason and the others set out below, we affirm the Licensing Board's decision not to suspend construction.

B. Applicable Standards

At the outset, we note our agreement with the Licensing Board (6 NRC at 484-85) that the suspension question is not controlled by the familiar criteria

⁷547 F.2d at 632.

⁸547 F.2d at 624; Final Environmental Statement (March 1972), p. XI-3.

⁹42 U.S.C. 2039, 2232(b).

¹⁰547 F.2d at 630-32.

¹¹LBP-77-57, 6 NRC 482 (1977).

¹²The intervenors filed exceptions with us and then sought summary reversal or suspension of the permits pending their appeal from the decision below; they then briefed their appeal, which seeks suspension of the permits pending the outcome of the merits of the remanded hearing. Our decision today disposes of all the matters put before us.

enunciated in *Virginia Petroleum Jobbers v. FPC*.¹³ For example, the first of those criteria, applicable when an unsuccessful litigant seeks a stay of a decision in his opponent's favor, is whether the movants have made a strong showing of their probability of success on the merits. Here, when the intervenors sought relief from the Licensing Board, they were past that point and in a far stronger position—they had already been successful in exposing defects in the prior proceedings, leaving the applicant without presumptively valid permits in hand.

This did not mean, however, as the intervenors would have it, that the relief they sought—suspension of the permits—was required “as a matter of law” by virtue of the court's decision alone. The Commission, in this very case, squarely rejected that approach in favor of requiring that all relevant equitable considerations be taken into account. CLI-76-11, 4 NRC 65 (1976) (referring to the General Statement of Policy, 41 FR 34707, 34709 (August 16, 1976)) and CLI-76-14, 4 NRC 163, 167 (1976).¹⁴ And the Commission's method of analysis seems to have at least the tacit approval of the court of appeals. For if the rule were as inflexible as the intervenors say, that court would hardly have (1) said nothing about a halt to construction in its original decision (it simply remanded the “orders granting construction permits” to the Commission for further proceedings)¹⁵ and (2) denied the intervenors' motion for suspension more than a year later.¹⁶ Indeed, on the latter occasion the court reaffirmed that its mandate “has not itself required a cessation of construction” and that that decision is for this agency to make. The decision whether to suspend thus turns upon the peculiar circumstances of this case.

The first of those circumstances is that the proceedings leading to the award of the permits were defective. But we ought to take into account just how serious those defects are or might prove to be. Many times, such an assessment may involve highly theoretical considerations. In this case, for example, both of the defects the court found involve, on their face, matters that could be extremely serious; and absent any other information, we would view them that way. Indeed, those opposing suspension—on whom the burden of proof rested throughout the construction permit proceeding—must shoulder a doubly heavy burden if they would dispel the negative impact of the court's holding. But we need not operate here on theory alone—

¹³259 F.2d 921, 925 (D.C. Cir. 1958).

¹⁴See also *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), CLI-77-8, 5 NRC 503, 521 (1977), focusing on “(1) traditional balancing of equities and (2) consideration of any likely prejudice to further decisions that might be called for by the remand.”

¹⁵547 F.2d at 632.

¹⁶*Aeschliman v. NRC*, unpublished order of October 27, 1977 (Docket Nos. 73-1776 and 73-1867).

we have the benefit both of supervening events and of the evidence thus far introduced before the Board below.¹⁷ We turn, then, to an analysis of the gravity of the questions being litigated.

C. The Seriousness of the Defects

Although in theory the remand hearings have dealt only with the question of interim suspension, the merits of the remanded issues have naturally received considerable attention. Indeed, there has been no clear demarcation between the evidence relevant to the one and that bearing on the other of these questions—as demonstrated by the fact that, after it issued its order declining to suspend the permits, the Board below suggested that little additional evidence might be necessary on the remanded issues.¹⁸ Because not all the parties accept this assessment, our comments can be only tentative. Although we would certainly prefer not to delve deeply into the merits at this juncture,¹⁹ we must consider in any decision on suspension how the violation that prompted the remand will affect the ultimate outcome of the proceeding; and we should use all the information available to us in making that appraisal.

We approach that information in a different manner than did the Board below. At the suspension hearing and in that Board's decision, extraordinary attention was paid to the relative financial costs of various alternatives. But there was no serious suggestion that any of those alternatives was preferable to Midland from an *environmental* standpoint. In other words, no evidence was adduced discrediting the earlier findings that the Midland project will not degrade any areas that either are particularly attractive or otherwise need to be sheltered from a project such as this; that its overall environmental impact is relatively small; and that, in any event, its impact would not be lessened were the nuclear facility built elsewhere or a coal plant substituted for it.²⁰

¹⁷We do not suggest that a decision on interim suspension can always be postponed long enough to allow the trial board to amass an evidentiary record of the size compiled here. Circumstances will more often demand that at least a tentative decision be made more quickly and that it remain in effect while the full-dress suspension hearing is held (just as the courts must often pass quickly on a request for a temporary restraining order and consider then in less rapid fashion whether a preliminary injunction is in order). At intervals during the suspension hearing, the intervenors complained of the lack of a speedy decision—but when we invited them to detail their complaint (see ALAB-395, 5 NRC 772, 784-86 (1977)), they did not do so.

¹⁸See one of its unpublished orders of November 4, 1977.

¹⁹*Cf. Washington Metropolitan Area Transit Commission v. Holiday Tours*, 559 F.2d 841, 844 (D.C. Cir. 1977), referring, in a somewhat different context, to the desirability of avoiding "an exaggeratedly refined analysis of the merits at an early stage in the litigation."

²⁰5 AEC at 223-28.

This being so, we do not perceive that financial matters are as crucial as the Board below thought they were. Unless the proposed nuclear plant has environmental disadvantages in comparison to possible alternatives, differences in financial cost are of little concern to us. Because a line of our earlier decisions leads us directly to this proposition,²¹ we need record our underlying reasoning only briefly here.

In the Atomic Energy Act, Congress did not make this agency responsible for assessing whether a proposed nuclear plant would be the most financially advantageous way for a utility to satisfy its customers' need for power. Such matters remained the province of the utility and its supervising State regulatory commission. Antitrust issues to one side, our involvement in financial matters was limited to determining whether, if we license the plant, the company will be able to build and then to operate it without compromising safety because of pressing financial needs.²²

The passage of the National Environmental Policy Act increased our concern with the economics of nuclear power plants, but only in a limited way. That Act requires us to consider whether there are *environmentally* preferable alternatives to the proposal before us. If there are, we must take the steps we can to see that they are implemented²³ if that can be accomplished at a reasonable cost; *i.e.*, one not out of proportion to the environmental advantages to be gained. But if there are no preferable environmental alternatives, such cost-benefit balancing does not take place. Manifestly, nothing in NEPA calls upon us to sift through environmentally *inferior* alternatives to find a cheaper (but dirtier) way of handling the matter at hand.²⁴ In the scheme of things, we leave such matters to the business

²¹*Northern States Power Company* (Prairie Island, Units 1 and 2), ALAB-244, 8 AEC 857, 862 (1974); *Illinois Power Company* (Clinton, Units 1 and 2), ALAB-340, 4 NRC 27, 48 (1976); cf. *Tennessee Valley Authority* (Hartsville, Units 1A, 2A, 1B, and 2B), ALAB-367, 5 NRC 92, 102-03 (1977).

²²See *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), CLI-78-1, 7 NRC 1, 20 (1978).

²³If the alternatives involve a different way of constructing a portion of the nuclear plant in order to deal with a particular environmental problem, we can condition the permit to require the optimum alternative. See *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Station), ALAB-179, 7 AEC 159, 175 (1974); *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), CLI-77-8, 5 NRC 503, 528, fn. 25 (1977). If the alternative involves a different site or a nonnuclear facility, we cannot directly require the applicant to adopt that alternative—but we can deny permission to proceed with the proposal submitted to us. See *Seabrook*, CLI-77-8, *supra*, 5 NRC at 529-30.

²⁴Although we have not been directed to, and have not found, any judicial decisions squarely on point, the emphasis in the NEPA cases is invariably upon the need for Federal agencies to investigate and to discuss alternatives which would result in lesser adverse environmental impact than the proposed project. See, *e.g.*, *Sierra Club v. Morton*, 510 F.2d 813, 825 (5th Cir.

(Continued on next page)

judgment of the utility companies and to the wisdom of the State regulatory agencies responsible for scrutinizing the purely economic aspects of proposals to build new generating facilities.²⁵ In short, as far as NEPA is concerned, cost is important only to the extent it results in an environmentally superior alternative. If the "cure" is worse than the disease, that it is cheap is hardly impressive.

With this understanding we have examined the potential significance of the issues being heard on remand. We conclude, on the basis of what was before the Board below, that they are of little practical importance.

1. Fuel Cycle

Developments since the court's decision, culminating in the Commission's promulgation of an interim amended rule on the subject,²⁶ have rendered the fuel cycle issue inconsequential.²⁷ As we have recognized in other cases, the Commission's interim rule embodies the view that, insofar as particular nuclear plants are concerned, the environmental effects attributable to the existence and need for storage of nuclear waste bring only

(Continued from previous page)

1975): "federal exploration would present substantially the same environmental hazards as permitting private developers to explore the tracts sold. *An alternative which would result in similar or greater harm need not to be discussed.*" (Emphasis added.) *NRDC v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972): "We reiterate that the discussion of environmental effects of alternatives need not be exhaustive. What is required is information sufficient to permit a reasoned choice of alternatives so far as environmental aspects are concerned." *State of Alabama ex rel. Baxley v. Corps of Engineers*, 411 F. Supp. 1261, 1274 (N.D. Ala. 1976): NEPA requires an agency to consider "those alternatives reasonably calculated to reduce environmental harm...."

²⁵In other words, neither NEPA nor any other statute gives us the authority to reject an applicant's proposal solely because an alternative might prove less costly financially. Monetary considerations come into play in only the opposite fashion—*i.e.*, if an alternative to the applicant's proposal is environmentally preferable, then we must determine whether the environmental benefits conferred by that alternative are worthwhile enough to outweigh any additional cost needed to achieve them.

²⁶42 FR 13803 (March 14, 1977).

²⁷The initial licensing of Midland was done without any consideration of fuel cycle impacts. After that, but before the court of appeals' remand order, the Commission adopted a fuel cycle rule which was designed to summarize those impacts for use in each licensing proceeding. The court held, however, not only that Midland could not be licensed without consideration of fuel cycle impacts but also that gaps existed in the Commission's original rule. See *Aeschliman*, *supra*, 547 F.2d at 632; *NRDC v. NRC* (*supra*, fn. 5). The interim amended rule adopted since then was meant to fill those gaps. Taken in conjunction with the original rule which it modifies it furnishes a statement of the environmental impacts of the fuel cycle which must be taken into account here.

negligible weight to the cost-benefit balance.²⁸ And in its original rule the Commission had determined that other aspects of the fuel cycle similarly involved little environmental impact.²⁹ Consideration of all the impacts reflected in the amended fuel cycle rule thus does not materially alter the cost-benefit balance originally struck for *Midland* without any such consideration.

Like the Board below, we are bound by and must give effect to the judgments made by the Commission in this regard. Absent any change mandated by either the Commission (as a result of the rulemaking proceeding now underway to formulate a permanent rule) or the courts, the environmental effects of the fuel cycle must be taken as insubstantial.³⁰ Thus, while

²⁸*Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Station), ALAB-421, 6 NRC 25, 30-32 (concurring opinion) (1977); *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), ALAB-422, 6 NRC 33, 102-04 (majority opinion), 113-14 (concurring opinion) (1977); *Public Service Electric & Gas Company* (Salem, Units 1 and 2), ALAB-426, 6 NRC 206 (1977).

²⁹See 39 FR 14188-91 (April 22, 1974); see also *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), ALAB-349, 4 NRC 235, 238-39 (1976).

³⁰There is no merit to the intervenors' complaint that the Board below evaluated the fuel cycle matter without giving them sufficient opportunity to be heard. To be sure, little attention was paid to this topic during the hearing. This was natural because, as circumstances changed, the Commission—which had at first told the Board below to consider fuel cycle matters (CLI-76-11, *supra*, 4 NRC at 65, and CLI-76-14, *supra*, 4 NRC at 167)—directed that Board to “defer its consideration pending anticipated adoption of an interim fuel cycle rule,” which was expected to “be in place by the time the Board is prepared to render a decision on the reopened record.” CLI-76-19, 4 NRC 474, 475 (1976). Once that rule was in place, we (acting for the Commission in the absence of a quorum) told the Board below to take it into account. ALAB-396, 5 NRC 1141 (1977). That Board did so; by the time it rendered its decision, there was nothing raised on which the parties needed to be heard (see the decisions cited in fn. 28, *supra*). In this regard, the intervenors seem to press only two points which they believe should have been considered. As to the first, they are mistaken in asserting (Brief, p. 27) that there is a connection between the values in the fuel cycle rule and the testimony concerning how possible increases in the monetary cost of fuel might affect Dow's interest in adhering to its contract with the applicant. The rule deals with only the *environmental* impacts of the fuel cycle and has nothing to do with the price a utility may have to pay to purchase fuel for a proposed reactor.

The intervenors' second point is also not well taken. They claim (Brief, p. 27) that the rule “rests upon the assumption that plutonium recycling will be available” (which assumption they say has now been discredited). Although we would be bound by the rule in any event, we note that this claim is simply wrong. In adopting the rule, the Commission explained that each of its values reflects the particular recycling assumption—no recycle at all or uranium recycle only—which would lead to the maximum adverse environmental impact. See 42 FR at 13807, fn. 1. The assumption that plutonium as well as uranium would be recycled was therefore not the basis for the rule.

this issue was potentially of crucial importance, it is no longer a significant factor in this proceeding.³¹

2. Conservation

The other environmentally related defect found in the earlier administrative proceedings was the failure to look specifically into the possible effects of conservation, the supposition being that conservation might obviate the need for any plant at all, or at least the need for a plant of the size proposed. Of course, efficacious conservation measures would tend to lower the projected demand figures. But because power demand has historically risen, conservation might reasonably be expected only to increase or delay growth, and not to lead to reductions in absolute demand. Thus its effect could be merely to postpone the time when a generating plant's capacity would be needed to meet energy demand or reserve requirements, rather than to obviate that need entirely. In any event, conservation does not give rise to a separate issue—it is just one factor which must be considered along with many others in connection with need for power projections.

The intervenors tell us that thus far (in the suspension phase of the remand) they have not attempted to present their own need for power projections (although they propose to do so in the next phase, when the merits are addressed). Instead, as their witness put it, he decided to take “most if not all of the Applicant’s information as given and examine it for correctness, accuracy, and suitability to support the position urged by applicant,” rather than to conduct “an independent study.”³² On this basis, he advanced the thesis that, leaving aside the steam and electricity intended for Dow,³³ the applicant could meet anticipated demand with one 800-megawatt facility—which he believed should be coal-fired—in lieu of the two-unit nuclear facility under construction.³⁴ In other words, the intervenors’ witness concluded from the applicant’s own evidence that at least one-quarter of the projected Midland generating capacity is unneeded.

Other evidence points a different way. The staff’s testimony, similar to the material contained in its January 1977 Draft Supplement to the Midland

³¹We hasten to add that, contrary to what the applicant suggests (Brief, p. 53), it is entirely inappropriate to rely for licensing purposes on the fact that “. . . the impacts of fuel cycle issues do not come into play until after plant operation begins. . . .” Those adverse environmental impacts—small though the rule states them to be—will inexorably flow from plant operation. Consequently, they must be taken into account at whatever point a comparison to other alternatives is being drawn to avoid the risk that, by ignoring them until operation begins, other alternatives will be unjustifiably foreclosed.

³²Testimony of Richard J. Timm, p. 14 (fol. Tr. 16A), March 23, 1977.

³³He would have Dow produce its own. But see fn.46, *infra*.

³⁴*Id.* at 83; but see fn. 70, *infra*.

Final Environmental Statement, provides an extensive review of power demand projections for the Consumers Power and Michigan Electric Coordinated System service areas.³⁵ Projections made by several other organizations are compared with those of the applicant, and explicit consideration is given to the effect that conservation might have upon demand projections.

For present purposes we need not engage in an exhaustive recitation of the staff's conclusions. Briefly, however, the staff observes that the applicant's figures are very close to the demand projections of the Michigan Public Service Commission and the Michigan Governor's Advisory Commission on Electric Power Alternatives for the applicant's service area, as well as those of the Federal Energy Administration for the East North Central Region of the United States.³⁶ With respect to conservation, the staff notes that certain measures commonly used to promote conservation, such as advertisements encouraging conservation³⁷ and a flat rate structure,³⁸ are already in effect in the applicant's area. In addition, the staff refers us to an opinion of the Public Service Commission suggesting that the applicant's forecasts have tended, if anything, to overstate the possible effect of conservation on future growth.³⁹ With respect to such forecasts, the staff discusses at length the difficulties of attempting to predict the effect of conservation measures⁴⁰ and the competing effects that might result as users of scarce fossil fuels conserve by switching to electricity to meet their power needs.⁴¹

This material, taken with other portions of the record related to conservation and the need for the Midland units, strongly suggests to us that neglect to identify and consider specifically the effects of conservation in striking the original NEPA balance was an error of small magnitude. The upshot is that, although this NEPA violation, too, was theoretically serious, its actual impact is likely not to be.⁴² Nothing advanced so far indicates that

³⁵The MECS service area consists of that of Consumers Power plus that of Detroit Edison Company.

³⁶Testimony of staff witness Feld (fol. Tr. 4375), pp. 9-23; Draft Supp. FES, pp. 4-15-4-20.

³⁷Feld testimony, p. 23; Draft Supp. FES, p. 4-6.

³⁸Draft Supp. FES, p. 4-8.

³⁹Feld testimony, p. 25; Draft Supp. FES, p. 4-10.

⁴⁰Feld testimony, pp. 23-28; Draft Supp. FES, p. 4-7-4-8.

⁴¹Feld testimony, pp. 29-35; Draft Supp. FES, pp. 4-11-4-13.

⁴²In discussing the extent of the energy conservation NEPA violation, the Board below stated only that "[s]ubstantially less demand could result in the construction of a plant not now needed." 6 NRC at 488, ¶25. We take it that the Board was simply describing the nature of the issue rather than furnishing its view of the evidence thus far adduced.

conservation will so decrease projected demand that any substantial portion of Midland's capacity will be superfluous.⁴³

3. The Dow-Consumers Contract

The current status of the contractual relationship between Dow and the applicant was examined at great length at the suspension hearing. Although this is as it should be, we should repeat that no NEPA violation occurred here; rather, the court suggested that the record be brought up-to-date on this count only because the case was remanded on other grounds.⁴⁴ The evidence adduced thus far, which appears to be unusually comprehensive, can be fairly summarized as follows: some officials in the local Dow management view Midland as a losing proposition and would abandon it, but the senior corporate officers have decided, subject to reconsideration if circumstances change, that Dow will honor the contract to buy steam from Midland, notwithstanding that intervening events have rendered its terms far less attractive to Dow than they originally were.⁴⁵

⁴⁴After reaching and fashioning this conclusion, we received a letter from applicant's counsel, dated January 31, 1978, informing us that the utility had just adopted a "new long-term electric forecast for the years 1978 through 1992." That forecast reflects a downward revision of projected demand, and intervenors' counsel has, by letter of February 2, 1978, argued, *inter alia*, that it "destroys Consumers' entire case."

We do not think so. At the suspension hearing, the applicant relied upon a 5.2% annual growth rate in electric power demand. The annual growth rate contained in the new forecast is as follows: 4.4% for the years 1978-82; 2.8% from 1983-87; and 2.1% for 1988-92. The effect of this, for the years that the Midland units are scheduled to go into operation, is to decrease projected demand 210 megawatts in 1981 (from 5,560 to 5,350 megawatts) and 261 megawatts in 1982 (from 5,841 to 5,580 megawatts). As may be seen, this means that peak demand figures for this period will lag about a year behind what was previously anticipated—instead of a 5,560-megawatt peak in 1981, the projection is for a 5,580 peak in 1982. This error reflects no more than the normal "substantial margin of uncertainty" inherent in any forecast of future electric power demands. See *Niagara Mohawk Power Corporation* (Nine Mile Point, Unit 2), ALAB-264, 1 NRC 347, 365-66 (1975). And it does not give us cause to alter the opinion reflected in the text.

⁴⁵Apparently inadvertently, the Licensing Board referred to this as the "second NEPA violation." 6 NRC at 486, ¶14.

⁴⁶The Board below seemed to share this appraisal, but it concluded by stating that "whether Dow will ever buy steam from that plant is, on the record, speculative." 6 NRC at 488, ¶23. The intervenors make much of this finding. But our judgment is that we must take Dow's present intention as controlling, so long as there has been sufficient probing to determine what that intention truly is.

For our purposes, then, that portion of the demand for Midland power attributable to Dow is a given.⁴⁶ To be sure, financial and other considerations might result in Dow's being unwilling to enter into a similar arrangement if the choice were before it today. But that is true of many contracts viewed in the perspective hindsight affords. Whether or not it is in Dow's best financial interests to honor its contract is not for us but for Dow to determine. And, to repeat, extensive probing on this point at the suspension hearing yielded convincing evidence that Dow's present intention is to adhere to the contract's terms.⁴⁷

4. The ACRS Letter

This topic would ordinarily be thought of as raising safety, rather than environmental, concerns. But the intervenors perceive environmental overtones: they point out that if the "unresolved safety problems" prove sufficiently intractable, other methods of meeting demand will become more desirable than a nuclear plant. In other words, the potential additional financial cost involved in resolving those problems, they say, should be taken into account in considering whether the plant is justified.

This point is not entirely devoid of merit. But absent an environmentally preferable alternative, it overemphasizes the economic cost of the nuclear facility. As we explained earlier, NEPA requires us to look for environmentally preferable alternatives, not cheaper ones. Put another way, once it has been shown that the power to be produced by a plant is needed and that no environmentally preferable way exists of obtaining it, the acceptability of the "cost" of the plant in dollars is a question for the utility and the State regulatory agencies, the true experts in this area.

This principle must be applied here. When the first environmental analysis was done, the plant's cost was projected at \$554 million;⁴⁸ the latest estimate is that it will cost \$1.67 billion. Such a drastic increase might be expected to tip the cost-benefit balance against the plant, but this is not the case. For, as we have said before, genuinely needed electricity can be viewed

⁴⁶Although the intervenors would eliminate that demand by having Dow construct its own fossil-fueled generating facility, we are not told of any environmental advantages that would accrue from Dow's following that course (see pp. 162-163, *supra*).

⁴⁷Thus, the situation here is unlike that presented in *Seabrook*, where two participants in the project had announced they intended to sell their interests in the facility, and there had been no investigation into whether they nonetheless intended to honor their commitment to support the project financially until purchasers were found. See *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), ALAB-422, 6 NRC 33, 80 (majority opinion), 110-11 (dissenting opinion) (1977). Thus, even before the majority's decision was upheld (CLI-78-1, 7 NRC 1, 22-23 (1978)) nothing in the *Seabrook* dissent would aid the intervenors here.

⁴⁸Final Environmental Statement (March 1972), p. XI-6.

as “priceless”⁴⁹—or, at least, of increasing value in proportion to the cost of building the plants and providing the fuel to produce it. Thus, an increase in monetary costs may well not alter the plant’s cost-benefit balance at all, for the benefit side will increase correspondingly. In short, once it has been determined that a generating facility is needed to meet real demand, that no environmentally preferable type of facility or site exists, and that all cost-beneficial environmentally protective auxiliary equipment has been employed, the final cost-benefit balance will almost always favor the plant, simply because the benefit of meeting real demand is enormous⁵⁰—and the adverse consequences of not meeting that demand are serious.⁵¹

The environmental overtones of the issues referred to in the ACRS letter are therefore not of great importance here. We stress, however, that the safety aspects may well be. As far as we can tell, the Board below has been pursuing the right course in that regard.⁵² Nonetheless, it should find our recent *River Bend* decision⁵³—rendered after it completed the suspension hearings and issued its decision—instructive as to what further steps are prerequisite to a final decision on whether, and on what conditions, the applicant is entitled to retain the *Midland* construction permits.⁵⁴

D. Other Equitable Considerations

As the Licensing Board recognized, a number of other equitable considerations come into play in suspension decisions.⁵⁵ What is involved is a “traditional balancing of equities” coupled with consideration of whether

⁴⁹*Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Station), ALAB-179, 7 AEC 159, 173 (1974).

⁵⁰*Id.* at 175-76.

⁵¹See *Nine Mile Point*, *supra*, 1 NRC at 364, fn. 57.

⁵²At one point (January 28, 1977), that Board wrote to the ACRS indicating that the supplemental report from that body had not alleviated all its concerns. We assume that, although its decision did not refer to that letter, the Board will not without explanation drop the concerns it had.

⁵³*Gulf States Utilities Company* (River Bend, Units 1 and 2), ALAB-444, 6 NRC 760 (1977).

⁵⁴We reject outright any suggestion by the parties that once the ACRS identifies the “unresolved safety issues” it had in mind, no more need be done at the hearing. Regardless of how they might think they can parse the court’s opinion, there must be at least an explanation of why—if this is the case—each safety problem is well enough in hand for this plant so that construction should be allowed to continue. See *River Bend*, *supra*; compare Applicant’s Brief, p. 48. (It is, of course, no answer that the problem is “generic.” That a safety problem is common to many reactors furnishes no reason to treat it differently than if it were peculiar to one.) Of course, the intervenors are entitled to question any such explanations, as they would have been able to at the original hearings.

⁵⁵6 NRC at 484-85.

our decision is likely to result in any "prejudice to further decisions."⁵⁶ In most respects, there is no need to repeat what the Board below said about the individual factors it considered.⁵⁷ But two points do deserve further discussion.

1. Applicant's Investment in Midland

Much controversy has centered on the significance of the considerable time and money the applicant had invested in the construction of the facility by the time of the court-ordered remand. Some \$370 million dollars had been put into the plant by then; construction of the units was 16% complete. The Licensing Board believed this to be of overwhelming significance. The intervenors argue, on the other hand, that the investment must be ignored.

Under this agency's rules (10 CFR §2.764), a decision authorizing the issuance of a construction permit is effective when issued, unless stayed.⁵⁸ In this case, neither we nor the court of appeals were asked for a stay pending review.⁵⁹ That review took longer than usual.⁶⁰ Thus, when the court's remand order came down, the applicant had made substantial progress in constructing the facility.

No rule of law or equity of which we are aware forbids taking that fact

⁵⁶See fn. 14, *supra*, and 6 NRC at 484. We have stressed both in this proceeding and in other cases that the "prejudice" factor can be an extremely important one. ALAB-395, 5 NRC 772, 779, 786, fn. 44 (1977); *Public Service Company of Indiana* (Marble Hill, Units 1 and 2), 6 NRC 630, 634 (1977); *Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-404, 5 NRC 1185, 1188-89 (1977).

⁵⁷In light of the balance of its opinion, we do have difficulty with the Board's concluding summary to the effect that "there are substantial equities favoring . . . suspension." 6 NRC at 498, ¶70. As the remainder of its summary, as well as other portions of its opinion, make clear, all that the Board found in the intervenors' favor was that they raised their arguments on the merits in timely fashion and that the defects in the proceedings "were significant enough" to require a remand. (As we have seen, those defects have paled into insignificance.) In the same vein, the intervenors have absolutely no basis for telling us that the Board below found for them on "virtually every contested issue" other than "sunk costs" (Brief, p. 1).

⁵⁸10 CFR §2.788 (as added by 42 FR 22128, May 2, 1977, effective June 1, 1977). The substantive stay provision appeared only recently in the regulations. It merely codifies longstanding agency stay practice which parallels that of the courts. See, e.g., *Northern Indiana Public Service Company* (Bailly, Nuclear-1), ALAB-192, 7 AEC 420 and cases there cited (1974); *Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-415, 5 NRC 1435, 1436 (1977).

⁵⁹See App. Bd. Tr. 30-31; 54-56. At argument, we were initially under the impression that stays had been requested (but denied) pending appeal board and judicial review of the initial licensing decision; as it turns out, no stay was ever requested.

⁶⁰See p. 158, *supra*.

into account.⁶¹ Up to the point of remand, the applicant had invested in the Midland project under the color of construction permits which, though subject to further review, were fully in effect.⁶² Given that background, the length of time it takes to build a major nuclear power plant, and the utility's belief that it would need Midland's output to satisfy power demands including its contractual commitment to Dow, it had little choice other than to proceed with construction while the reviewing tribunals deliberated. Put another way, the utility can hardly be faulted for exercising its rights under presumptively valid construction permits which the opposing parties had not even asked be stayed *pendente lite*.

Nor is there any other reason to say the utility enters the arena with unclean hands. The defects that the court found involved neither a failure of the applicant to disclose relevant information nor any other censurable conduct on its part—thus there is no warrant for us to say that the NEPA review was lacking in integrity⁶³ or that the applicant had proceeded with the

⁶¹Indeed, there are judicial decisions which recognize that, in deciding whether to halt a project pending further NEPA review, it is permissible to consider the amount of construction already undertaken. *Conservation Society of Southern Vermont v. Secretary of Transportation*, 508 F.2d 927, 936-37 (2d Cir. 1974), *vacated on other grounds and remanded*, 423 U.S. 809 (1975); *Sierra Club v. Morton*, 514 F.2d 836, 878, fn. 29 (D.C. Cir. 1975), *reversed on other grounds sub nom. Kleppe v. Sierra Club*, 427 U.S. 390 (1976); *Chick v. Hills*, 528 F.2d 445, 448 (1st Cir. 1976). Moreover, a line of decisions recognizes that additional investment prior to a final decision can tilt the balance against alternatives or against environmental concerns. *Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission*, 449 F.2d 1109, 1128 (D.C. Cir. 1971); *Coalition for Safe Nuclear Power v. Atomic Energy Commission*, 463 F.2d 954, 956 (D.C. Cir. 1972); *Union of Concerned Scientists v. Atomic Energy Commission*, 499 F.2d 1069, 1084, fn. 37 (D.C. Cir. 1974); see ALAB-395, *supra*, 5 NRC at 779. As we explained on another occasion, implicit in these decisions is the principle that if no stay of construction is granted pending a final ruling, the investment made can legitimately be taken into account in determining whether to stop the project at later stages. *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), ALAB-349, 4 NRC 235, 261 (1976).

⁶²The same cannot be said of the investment made since then. By way of information, in a one-year period roughly coinciding with the period between the issuance of the court's mandate and the Licensing Board's decision, the amount expended on Midland went from \$381.6 million (September 30, 1976) to \$593.4 million (September 30, 1977). This investment is projected to reach \$732.1 million by March 31, 1978—putting construction at 42.5% complete. (These figures are from the November 11, 1977, Keeley affidavit, furnished at our request prior to oral argument.)

⁶³See *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), CLI-77-8, 5 NRC 503, 532-33 (1977); *Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-335, 3 NRC 830, 840 (majority opinion), 844-46 (dissenting opinion) (1976), *reversed*, *Hodder v. NRC* (D.C. Cir. No. 76-1709, October 21, 1976) (unpublished).

project in bad faith.⁶⁴ Nothing that occurred prior to the remand suggests that we ought to ignore the applicant's investment in order either to prevent it from taking unfair advantage or to discourage future applicants from engaging in similar conduct.⁶⁵

We recognize that in the final analysis an applicant invests in a nuclear project at its own risk.⁶⁶ What this means is that for any number of reasons a construction permit may be revoked, or an operating license withheld, and the investment lost.⁶⁷ But it does not mean that when it comes to comparing a proposed project with possible alternatives to it, no consideration may be given to the amount of progress made in circumstances where the agency and the applicant have proceeded in good faith.⁶⁸ The only purpose such a rule would serve would be to discourage applicants from beginning work on a project until all administrative and judicial review was exhausted. We do not perceive any reason why that should be the general rule. It certainly is not the policy the Commission has instructed us to implement. To repeat, its rules, like those of the courts, provide for the granting of stays in appropriate cases.⁶⁹ But where a stay is not justified by the particular circumstances, no legitimate purpose is served by delaying the start of construction for several years.

⁶⁴Although the allegedly improper conduct during the course of the suspension hearing (see p. 177, fn. 87, *infra*) must be analyzed further for other purposes, it is immaterial insofar as our treatment of the investment made prior to the court's remand is concerned.

In this same connection, we cannot agree with the intervenors (October 18th "Further Statement. . .," p.4) that it was in any way deserving of condemnation for the applicant to have successfully pressed upon this agency in the initial licensing proceeding legal arguments which the court of appeals later determined to be lacking in merit. Insofar as the integrity of the proceedings or the good faith of the parties is concerned, there is no parallel between zealous advocacy in support of an arguable legal position and, e.g., the withholding of relevant factual information. We note that in the latter regard we fully expect both clients and lawyers to adhere to the highest standards. See, e.g., *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Station), ALAB-138, 6 AEC 520, 533 (1973).

⁶⁵See *Seabrook*, CLI-77-8, *supra*, 5 NRC at 533.

⁶⁶This has been the rule from the beginning. *Power Reactor Company v. Electricians*, 367 U.S. 396, 414-15 (1961); *Coalition for Safe Nuclear Power*, *supra*, 463 F.2d at 956, fn. 1; *Union of Concerned Scientists v. Atomic Energy Commission*, *supra*, 499 F.2d at 1084, fn. 37; *Aeschliman v. AEC*, *supra* (October 27, 1977, order).

⁶⁷This may result, for example, from safety-related defects or from the belated discovery of serious substantive environmental concerns. Or it might be revealed that the environmental analysis was not performed in good faith.

⁶⁸Of course, if the intervenors can make good on their promise to establish that Midland is simply not needed (rather than that another facility should be substituted for it), the cost of abandoning it will not be considered in deciding whether to revoke the permits for one or both units. *Union of Concerned Scientists v. Atomic Energy Commission*, *supra*, 499 F.2d at 1084, fn. 37; *Aeschliman*, *supra*, 547 F.2d at 632, fn. 20.

⁶⁹See fns. 56, 58, and 61, *supra*.

2. Potential for Prejudicing Further Decisions

We have already held that the issues being litigated on remand do not appear to be of large practical significance. And we have observed (p. 161, *supra*) that there is no suggestion—either in the evidence or by way of argument—that there is an environmentally preferable alternative to Midland.⁷⁰ Viewing these circumstances against the background of a nuclear plant that was well on its way to completion at the time of the remand, we are unable to perceive how permitting construction to proceed could prejudice later decisions. In other cases, a need might arise to suspend construction at an early stage to preserve potential options that could prove preferable.⁷¹ But here no such options are in sight. And should one belatedly be discovered, given the minimal adverse environmental impacts attributable to the Midland facility, the environmental advantages of the alternative would have to be substantial to justify adopting it as a substitute for Midland in the circumstances presented.

The short of it is that there are simply no equities favoring suspension. The record in this proceeding, measured against governing legal principles, compels denial of intervenors' requests for relief.

E. Additional Observations

One further topic deserves special attention at this juncture. The intervenors insist that this agency must listen to their complaint that Dow intends to employ steam and electricity from the Midland project to make certain products which the intervenors believe are not in the public interest.⁷² In this connection, they claim that the Board below erred in deciding the suspension question without inquiring into this matter, *i.e.*, without examining the societal value of the end uses to which the applicant's in-

⁷⁰The alternative suggested is the substitution for most of Midland's proposed capacity of a utility-owned coal plant and Dow's own plant for production of the steam and electricity it needs. But there is no evidence even remotely suggesting that this approach is environmentally superior. Early on, this agency looked for better alternatives and found none (see 5 AEC at 226-28). Consequently, that holding, left undisturbed, still guides us.

⁷¹*Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), ALAB-349, 4 NRC 235, 258-62 (1976). We have granted suspension of construction when we thought it appropriate to do so. *Northern Indiana Public Service Company* (Bailly, Nuclear-1), ALAB-192, 7 AEC 420 (1974); *Cleveland Electric Illuminating Company* (Perry, Units 1 and 2), unpublished order of November 6, 1975, explained in ALAB-298, 2 NRC 730 (1975); *Seabrook*, ALAB-349, *supra* (suspending on fuel cycle grounds when that matter was still potentially significant), *vacated*, CLI-76-17, 4 NRC 451 (1976); and ALAB-366, 5 NRC 39 (1977), *affirmed*, CLI-77-8, 5 NRC 503 (1977).

⁷²See, *e.g.*, Brief in Support of Exceptions, p. 34.

dustrial and residential customers will put the plant's output. And they have indicated that they fully intend to pursue this point at the hearing on the merits.⁷³

At an earlier stage of this proceeding, as well as in at least one other case, we have held that this "end-use" argument has no place in our proceedings.⁷⁴ Ordinarily we would therefore simply cite our earlier decisions, particularly in view of the intervenors' failure on their original appeal to the courts to press their claim that our holding was wrong.⁷⁵ We cannot be certain, however, that were the case to come before it again the court of appeals would deem the point to have been waived (see fn. 75, *supra*). Because the intervenors have made it clear they will pursue the matter both at the hearing on the merits and in the courts, lengthier exposition of our views will both avoid wasted time and effort at the Licensing Board level and facilitate Commission and judicial review of our decision.

a. We can perhaps best explain our reasoning by discussing first the class of Dow products that has prompted the intervenors' particular concern, namely, "chlorinated hydrocarbons."⁷⁶ We assume that they refer to pesticide products⁷⁷ and that they believe a thoughtful NEPA analysis would find those products environmentally harmful (with the result, so their argument goes, that any electricity or steam to be used for their production should not be counted on the "need for power" side of the NEPA cost-benefit balance).

We cannot agree with the intervenors on the need or warrant for us to conduct the analysis they want. The sale of pesticide chemicals is regulated by the Environmental Protection Agency under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).⁷⁸ To obtain Federal approval, a pesticide must be found by the EPA Administrator to confer benefits in excess of its risks.⁷⁹ In other words, that official must determine whether, con-

⁷³App. Bd. Tr. 165-67; Additional Brief (postargument), p. 14.

⁷⁴ALAB-123, 6 AEC 331, 351-52 (1973); *Long Island Lighting Company* (Shoreham Station), ALAB-156, 6 AEC 831, 852-54 (1973).

⁷⁵The court of appeals said in its opinion that the end-use argument "is not pressed on appeal." 547 F.2d at 626, fn. 8. This is somewhat different from the intervenors' recollection that the court said it "assumed [they] waived the argument because [they] did not press it in [their] oral argument." App. Bd. Tr. 165. They now say that, "contrary to the Court of Appeals' footnote," they have not abandoned the argument (Additional Brief, p. 14).

⁷⁶See, e.g., 547 F.2d at 626, fn. 8; App. Bd. Tr. 165.

⁷⁷See their February 6, 1972, Statement of Environmental Contentions, ¶34 (referring also to the pesticide chemical known as 2,4,5-T).

⁷⁸7 U.S.C. 135, *et seq.*

⁷⁹*Environmental Defense Fund v. Ruckelshaus*, 439 F.2d 584, 594 (D.C. Cir. 1971) (under FIFRA prior to its 1972 amendment); 7 U.S.C. 136a(c) (5), 136(bb) (under FIFRA as amended by the Federal Environmental Pesticide Control Act of 1972).

sidering all aspects of the product's potential for harm, it is in the public interest that it be marketed.

In short, Dow may produce pesticides for domestic use¹⁰ only if they have already received approval under a comprehensive Federal regulatory scheme. Insofar as pesticides are concerned, then, the intervenors are asking us to inquire into the correctness of EPA decisions—made after full adjudicatory hearings in contested cases¹¹—that it is in the public interest to manufacture particular products. But Congress has charged the Administrator, not us, with the direct and primary responsibility for making those decisions, and has made his decisions subject to judicial review.¹² Therefore, once those decisions have been made with respect to Dow's products and have survived direct attack, they must be taken as embodying a sound Federal judgment that a net societal benefit will flow from Dow's pesticide manufacturing activity. We see nothing in NEPA which gives us a warrant to second-guess that judgment.¹³

Practical considerations reinforce our decision that we have no business intruding into another agency's regulatory realm. A pesticide registration proceeding involving only one product or family of products can involve extraordinarily long hearings because so much highly technical evidence must be adduced.¹⁴ Under the intervenors' proposal, we would have to

¹⁰Exports are essentially unregulated (7 U.S.C. 136(o)), on the theory that the foreign country in which the product will be used should determine whether its particular needs—e.g., control of a disease-bearing pest not present in this country—are such that on balance the product is beneficial there.

¹¹7 U.S.C. 136(d).

¹²7 U.S.C. 136(e).

¹³The cost-benefit test we would apply under NEPA is essentially no different from the test the Administrator applies under FIFRA. See 7 U.S.C. 136a(c) (5), 136(bb). Thus, the situation before us is not similar to that which was presented in *Calvert Cliffs' Coordinating Committee v. AEC*, 449 F.2d 1109, 1124-27 (D.C. Cir. 1971), where the test applied by another agency in administering the then-effective provisions of the Federal water pollution laws differed significantly from our charge under NEPA. Of course, *Calvert Cliffs* has since been legislatively overruled insofar as our water-related duties are concerned. Section 511(c)(2) Federal Water Pollution Control Act, 33 U.S.C. 1371(a) (2). In this connection, the Commission has just recently affirmed our decision that it is now inappropriate for us to review EPA's determinations regarding aquatic impacts. *Public Service Company of New Hampshire* (Seabrook, Units 1 and 2), CLI-78-1, 7 NRC 1, 23-29 (1978), affirming ALAB-422, 6 NRC 33, 69-72 (1977). See also ALAB-366, 5 NRC 39, 48-52 (1977).

¹⁴See, e.g., *Environmental Defense Fund v. Environmental Protection Agency*, 489 F.2d 1247, 1251, fn. 24 (D.C. Cir. 1973) (DDT hearing: 7 months, 125 witnesses, 365 exhibits, over 9,000 pages of transcript); *Environmental Defense Fund v. Environmental Protection Agency*, 510 F.2d 1292, 1297, 1304, 1306 (D.C. Cir. 1975) (aldrin/dieldrin hearing: 12 months into cancellation hearing, a 14-day expedited suspension hearing was held, resulting in a 4,000-page transcript plus the incorporation of 11,000 pages of transcript and 350 exhibits from the cancellation hearing, at which one party had already called 125 witnesses).

duplicate EPA's effort for not just one but many such products. Even so, we would be considering only a relatively few of the products made by only one of many industrial users of the nuclear plant's output. The sheer magnitude of the task the intervenors would assign this agency—threatening to increase many times the already gargantuan size of the records that are being compiled—cautions against our undertaking it.

We are not implying that boards can shrink from inquiry into matters that are directly relevant to licensing decisions simply because the inquiry will be a tedious one. But that is not what is involved here. The intervenors would raise frankly collateral matters and take the proceeding on a lengthy detour for no purpose.

b. To be sure, not all products are, like pesticides, subject to pervasive Federal regulation; those that are not cannot likewise be conclusively presumed beneficial to society. And the fact that there is a demand for these products is not determinative, because the forces of the marketplace are not infallible judges of the public interest. But practical considerations similar to those just mentioned in connection with pesticides preclude us from entertaining the "end-use" argument for other products as well. After all, NEPA does not require us to do more than what is reasonable; and it would be unreasonable even to attempt to ascertain whether each Dow product serves a useful or beneficial purpose, much less to pursue that inquiry into the myriad other uses to which the applicant's residential, commercial, and industrial customers will put the electricity they consume.

In the first place, such an inquiry would be virtually interminable.⁴⁵ And assuming our boards could muster the time, energy, and resources to fill out an environmental report card covering each use, the grades they assigned would be of no practical importance. The Commission cannot ban the offending uses. Moreover, our expertise would in all likelihood be doubted, and our grading system ignored—and not without some justification.⁴⁶ Our judgments, lacking any force, would serve only to let us eliminate from the applicant's projected need for power curve so much of the steam and electricity that would fuel the "undesirable" uses. Using that altered curve for NEPA purposes, we might determine not to license a proposed facility (or agree only to license a smaller facility than the one proposed). But for two reasons this would not achieve the result sought, *i.e.*, the elimination of the uses found wanting. First, the applicant could still use its own demand curve for its own purposes—neither we nor any other Federal agency could prevent it from building coal-fired plants to provide its customers with all

⁴⁵See fn. 84, *supra*, with respect to one family of chemicals alone.

⁴⁶Decisions concerning the legitimacy of particular uses of electricity would be much more suitably made, it seems, by a legislative body than by an agency with our regulatory mission.

the electricity they craved (thus fulfilling the obligation most States place upon public utilities). Second, even if the applicant followed our lead, nothing would insure that, if its customers' full demands were not met, they would use the electricity available to them only for the uses we have found most beneficial. For example, it does not malign Dow to suggest that, faced with a power shortage, it—like other industrial concerns—might choose to produce the most profitable items, rather than those we happen to hold in highest regard. Moreover, as far as residential customers are concerned, any power shortage resulting from not meeting full demand would visit hardship indiscriminately upon all, cutting service not just to those guilty of putting electricity to ill use (as we might have defined it) but also to those who had adopted our decision as a guide.

In short, the intervenor's suggestion that the Licensing Board look into the end uses of the electricity and steam to be produced by the Midland facility is unreasonable, impractical, and unwarranted. The Licensing Board is not required by NEPA to spend vast amounts of time and energy in such a fruitless pursuit.

We conclude that the Board below was correct in declining to order suspension of construction. In light of the absence of any potential environmentally preferable alternatives, the violations being considered on the merits simply do not appear to be of sufficient moment to warrant a halt of further construction pending a decision on the merits.⁴⁷

⁴⁷We have eschewed any comment on the significance of the events which led the Board below to include in paragraphs 9-11 of its decision (6 NRC at 485-86, as amended by order of November 4, 1977) comments relating to an alleged, albeit unsuccessful, attempt by the applicant to prevent full disclosure of the facts relating to Dow's intentions with regard to its contract. That matter was not put to rest by the November 4th order. Nor was it dealt with—indeed it was specifically excluded from consideration—in another order the Board issued that same day, referring certain attorney misconduct charges to a special licensing board pursuant to 10 CFR §2.713(c). That Board has since been told by the Commission to attempt to settle those charges, failing which it will be dissolved (January 30, 1978, letter from the Chairman of the Commission to the Chairman of the Special Licensing Board). The reasons the Commission gave for dissolving the special board do not apply to the entirely different type of charges involved here. And it is important that they be fully aired and resolved. Consequently, we fully expect both that matter and the merits of the ACRS's "unresolved safety issues" to be explored further at future hearings before the Licensing Board. This must be done whether or not the parties are themselves otherwise interested in pursuing these matters.

Affirmed.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Richard S. Salzman, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

Docket Nos. STN 50-546
STN 50-547

PUBLIC SERVICE COMPANY
OF INDIANA, INC.

(Marble Hill Nuclear Generating
Station, Units 1 and 2)

February 16, 1978

The Appeal Board affirms the Licensing Board's authorization (LBP-77-52, 6 NRC 294 (1977)) of a Limited Work Authorization (LWA), rejecting various intervenors' claims relating to (1) the necessity of redrafting the environmental impact statement to reflect changes in ownership of the facility, (2) need for power, and (3) scheduling of hearings. Further, the Board rejects claims of the applicants and affirms the decision below imposing a civil penalty on the applicants for unauthorized pre-LWA activity, and holding that co-owners must be co-applicants. Finally, the Appeal Board orders a reopening of the boundary issue relevant to ascertaining the state from which a water discharge certificate must be obtained but finds no need to suspend the LWA pending resolution of that issue.

LWA: FINANCIAL RESPONSIBILITY

A showing of financial soundness is required not as an environmentally related prerequisite to the issuance of a limited work authorization but rather as a safety-related prerequisite to the issuance of a construction permit.

NEPA: COST-BENEFIT BALANCE

A shift in planned facility ownership does not automatically cast doubt upon the benefit to be derived from the facility and therefore does not

necessitate redrafting and recirculation of the environmental impact statement.

NEED FOR POWER: APPLICABLE STANDARD

Because of the uncertainties of demand forecasting, an applicant meets its burden of proving need for power if it shows "that its projections of demand are reasonable and that additional or replacement generating capacity is needed to meet that demand." *Energy Research and Development Administration* (Clinch River Breeder Reactor Plant), CLI-76-13, 4 NRC 67, 76-77 (1976).

RULES OF PRACTICE: SCHEDULING OF HEARINGS

Because responsibility for the conduct of hearings lies with the officers presiding at trial (5 U.S.C. §556(c); 10 CFR §2.718), an appeal board will generally examine a licensing board's scheduling decision only if it is claimed that the decision constituted an abuse of discretion and a denial of procedural due process.

RULES OF PRACTICE: DUE PROCESS

A party's entitlement to a fair hearing does not relieve it of responsibility to make a reasonable effort to have a procedural error corrected.

RULES OF PRACTICE: EVIDENCE

Nothing can be treated as evidence which is not introduced as such.

STATUTORY INTERPRETATIONS: DEFERENCE

Where senior officials responsible for administering an act have not clarified their construction of a provision of that act and subordinates have taken inconsistent positions, deference need not be given to an interpretation advanced by one such subordinate.

FWPCA: SECTION 401 CERTIFICATION

The apparent Congressional intent behind Section 401 (a) of the Federal Water Pollution Control Act is that certification of effluent discharge be made by the pollution control agency—whether one State's agency or an interstate body—with jurisdiction over waters into which the effluent is directly piped.

LWA: STATUS PENDING PROCEEDINGS ON REMAND

Where no water pollutants will be discharged as a consequence of LWA activity undertaken while an unresolved issue is being decided, and where errors necessitating reconsideration of the issue were the result of positions taken by an intervenor and not by the applicants, it would be inequitable to lift the LWA pending resolution of the issue.

APPEAL BOARD: SCOPE OF REVIEW

The NRC has no authority to decide whether a civil penalty assessed against an applicant should be borne by the applicant's stockholders rather than its ratepayers; the authority to make the decision rests in the State regulatory agencies.

ATOMIC ENERGY ACT: OWNERSHIP

Absent clear evidence of legislative intent to impart a special meaning to the word "possess" in Sections 101 and 103 of the Atomic Energy Act, that word will be given its common meaning, which includes the concept of ownership.

ATOMIC ENERGY ACT: OWNERSHIP OF FACILITIES

Prospective co-owners of nuclear power plants must be co-applicants.

RULES OF PRACTICE: APPELLATE PROCEDURE

Exceptions are neither necessary nor permitted when a party simply wants to defend a favorable decision.

RULES OF PRACTICE: BRIEFS

Exceptions not briefed are waived.

Messrs. Harry H. Voigt, E. David Doane, and Michael F. McBride, Washington, D. C., for the applicant,
Public Service Company of Indiana, Inc.

Mr. Thomas M. Dattilo, Madison, Indiana, for intervenors Save the Valley/Save Marble Hill.

Attorney General **Robert F. Stephens** and Assistant Attorneys General **David C. Short** and **David K. Martin**, Frankfort, Kentucky, for the Commonwealth of Kentucky.

Law Director **Burt Deutsch** and Assistant Law Director **Donald L. Cox**, Louisville, Kentucky, for the city of Louisville, and County Attorney **J. Bruce Miller** and Assistant County Attorneys **Charles D. Kaplan** and **Marvin O'Koon** for Jefferson County, Kentucky.

Messrs. **Lawrence Brenner**, **Jeffrey F. Lawrence**, **Harry H. Glasspiegel**, and **James Lieberman** for the Nuclear Regulatory Commission Staff.

DECISION

The Public Service Company of Indiana and others have applied for a license to construct a nuclear-powered electric generating facility at "Marble Hill," a site in southern Indiana on the Ohio River. Pending its final action on the application, the Licensing Board authorized the Director of Nuclear Reactor Regulation to issue a "Limited Work Authorization." Under that "LWA" the applicants may undertake certain preliminary work at their own risk. LBP-77-52, 6 NRC 294 (1977).

Construction of Marble Hill is opposed by the Commonwealth of Kentucky, the city of Louisville, and Jefferson County, Kentucky, and Save the Valley/Save Marble Hill, a private Indiana-based organization. These intervenors appealed the authorization of the LWA,¹ and Public Service itself objects to aspects of the Board's decision approving its issuance. We affirm.²

1. Louisville and Jefferson County's challenge to the LWA rests on the ground that the ownership of the Marble Hill facility is not settled. They point out that the Marble Hill plant was initially proposed as a joint venture of the Public Service Company of Indiana, the Wabash Valley Power Association, Inc., the East Kentucky Power Cooperative, Inc., and the Northern Indiana Public Service Company, Inc., and that the environ-

¹We previously declined to grant their motion to stay work under the LWA. ALAB-437, 6 NRC 630 (1977).

²On December 9, 1977, the Licensing Board issued a second decision authorizing further preliminary work. LBP-77-67, 6 NRC 1101. We will consider in a subsequent opinion the appeals taken from that decision.

mental impact statement required by the National Environmental Policy Act of 1969 was prepared and circulated for comment on that understanding. Northern Indiana and East Kentucky, however, subsequently dropped out of the venture. The city and county insist that this necessitates reconsideration of the need for power from the plant—on which the impact statement's cost-benefit analysis hinges—and mandates redrafting and recirculating that statement to consider the new development.

The city and county further contend that 10 CFR §50.33, a Commission regulation, "requires that the application demonstrate the ability, financial or otherwise, for the applicants to carry out the project." These intervenors assert that this showing was not made and, they insist, cannot be made because Wabash Valley (a rural electric cooperative) must borrow \$400,000,000 from the Rural Electrification Administration, a loan not yet approved. Citing authority to the effect that environmental impact statements are properly done only on "definite" projects, the city and county argue that the proposal to build Marble Hill is insufficiently firm and, therefore, that the LWA was authorized prematurely. We do not agree.

To begin with, the city and county misread the Commission's regulations. A showing of financial ability to build an entire nuclear power plant is not required for permission to undertake the minor activities permitted under an LWA.³ Financial soundness is not an environmental matter which must be established before an LWA may issue; it is a safety question, one which arises under the Atomic Energy Act.⁴ The Commission has not made its resolution a prerequisite for the issuance of an LWA, but rather for a "construction permit," *i.e.*, for permission to build the entire nuclear facility. 10 CFR §50.33(f). Because the Board below did not grant a construction permit, Section 50.33 did not come into play. Its invocation is therefore unavailing to intervenors.

³The regulation which authorized the LWA in suit, 10 CFR §50.51(e) (1), allows only such activities as:

(i) Preparation of the site for construction of the facility (including such activities as clearing, grading, construction of temporary access roads and borrow areas); (ii) installation of temporary construction support facilities (including such items as warehouse and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and construction support buildings); (iii) excavation for facility structure; (iv) construction of service facilities (including such facilities as roadways, paving, railroad spurs, fencing, exterior utility and lighting systems, transmission lines, and sanitary sewerage treatment facilities); and (v) the construction of structures, systems, and components which are not subject to the provisions of Appendix B [governing all safety-related structures].

⁴*Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-421, 6 NRC 25, 74 ff. (1977), *affirmed*, CLI-78-1, 7 NRC 1 at 17-23 (January 6, 1978).

The proposed shift in ownership of the plant carries with it no modification of the size, location, character, output, or method of constructing the nuclear facility. Intervenor makes no suggestion that it does, nor do they identify any environmental harm which this change might engender. From all that appears—and we have no reason to believe otherwise—the nuclear facility described in the environmental impact statement remains the one that would be built. Intervenor's position thus boils down to the premise that, by itself, withdrawal of two utilities from the joint venture casts doubt on the benefit to be derived from the plant and requires redrafting and recirculating the impact statement. We think not.

For reasons explained in our prior decisions, impact statements need not be recast if a change in plans would be unlikely to increase the possibility of environmental harm or occasion some injury not previously considered.⁵ The authorities on which intervenors rely do not suggest that we were wrong in so ruling on previous occasions.⁶ Moreover, even in the abstract, intervenors' premise does not mandate their conclusion. When the plant was initially planned, four utilities expected to obtain power from it; now two of them will consume its output. It is as logical to infer from that change that the need for its power has increased as that it has decreased. What in fact is the case depends, of course, on the record. But these intervenors made no effort to assess the evidence on the question. They simply relied on a premise they assumed was self-evident but is not. Other intervenors, however, do challenge the Licensing Board's evaluation of the evidence on the "need for power" from this plant. We turn to their arguments.

2. The demand for electricity is the justification for building any new power plant. It is, therefore, the principal beneficial factor in the cost-benefit balance to be struck under NEPA. We have accordingly held that "a determination that there is 'a genuine need for the electricity to be produced' is an essential element in approval of a license for a nuclear facility."⁷ Commission regulations also make that determination a prerequisite for an LWA. 10 CFR §§50.10(e) and 51.52(c).

⁵*Allied General Nuclear Services* (Barnwell Separations Facility), ALAB-296, 2 NRC 671, 680 (1975); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-262, 1 NRC 163, 196-97 (1975).

⁶E.g., *Boston v. Coleman*, 397 F. Supp. 698 (D. Mass. 1975), merely upheld an agency decision that no impact statement was needed in the situation that prevailed there. Obviously, the question of the need for recirculation was never reached by the court. In *Essex City Preservation Ass'n v. Campbell*, 536 F.2d 956 (1st Cir. 1976), a moratorium on future highways clouded the need to enlarge a connecting road previously the subject of a favorable EIS. We have no quarrel with the decision; its circumstances simply are not analogous to those here.

⁷*Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 352 (1975), quoting from *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-179, 7 AEC 159, 175 (1974).

Forecasting that need is not simple. The demand for power varies from hour-to-hour, day-to-day, and year-to-year, and with it the "peakload" which the electrical system must be capable of meeting and the "reserve margin" it must carry to insure that capability.⁹ But peakloads have also been growing, albeit at varying rates in recent years. Parameters determinative of that growth rate are less than fully understood. Consequently, "as with most methods of predicting the future, load forecasting involves at least as much art as science."¹⁰ What we observed in *Catawba*,¹⁰ when faced with assertions similar to those made here, remains pertinent:

The length of time required to construct a modern power plant (nuclear or otherwise)—not to mention the time needed to gain approval—requires the utility to predict peak demands on its system often as much as ten years in advance. Seeing that far into the future with accuracy is not to be expected—not of the applicant, not of the staff and not of the intervenor. It is simply true "that inherent in any forecast of future electric power demands is a substantial margin of uncertainty." Nevertheless, the need to make load forecasts cannot be avoided either as a legal or as a practical matter. It is our obligation, then, to insure that those predictions are as reasonably accurate as circumstances permit.

The applicant bears the burden of proving its need for power. It is not obliged, however, to demonstrate that the new facility will be needed in a specific future year; the uncertainties inherent in demand forecasting simply preclude doing so. Rather, the Commission has instructed that the applicant must show only "that its projections of demand are reasonable and that additional or replacement generating capacity is needed to meet that demand."¹¹ The Licensing Board applied that standard to the record before it; its discussion of the relevant evidence covers more than a dozen pages in the slip opinion. From its analysis (supported by appropriate citations to the record), the Board concluded that the applicants did indeed have a need for Marble Hill, and that power from that facility would be required in the early to mid-1980's.¹²

The Commonwealth of Kentucky and Save the Valley dispute the Board's analysis and challenge its conclusion. Their criticism is, at bottom,

⁹In the electric utility industry, the term "peakload" refers to the highest demand experienced during the year; the "reserve margin" is the difference between the system's total generating capacity and the peakload.

¹⁰*Nine Mile Point, supra*, 1 NRC at 365.

¹¹*Duke Power Co. (Catawba Nuclear Station, Units 1 and 2)*, ALAB-355, 4 NRC 397, 410 (1976).

¹²*Energy Research and Development Administration (Clinch River Breeder Reactor Plant)*, CLI-76-13, 4 NRC 67, 76-77 (1976). See also *Catawba, supra*, ALAB-355, 4 NRC at 407; *Nine Mile Point, supra*, 1 NRC at 366-67.

¹³See in particular 6 NRC at 306-11.

unhappiness that the Board rejected the testimony of their witnesses and credited that presented by the staff and the applicants. The Board explained why it did so.¹³ Having carefully reviewed the record on this question with the intervenors' objections in mind, we find ourselves in agreement with the Licensing Board's conclusion that the burden of proving a need for power from Marble Hill has been satisfied. We do not find it necessary, on this point, to go beyond the opinion below.

One matter merits clarification. Kentucky contends that the Board's findings on need for power rest on a "substitution theory," *i.e.*, that Marble Hill is needed to displace existing generating capacity, not to satisfy increased load demands. Arguing that it was prejudiced because this argument was not timely raised at the trial, and therefore, it had no fair opportunity to refute it, the Commonwealth asserts that the findings on need for power cannot stand under our decision in *Nine Mile Point, supra*, 1 NRC 347. That case holds that where a party prosecutes its case on one theory, a trial board cannot decide it on another without having given the opponents a fair opportunity to rebut the new theory with argument and evidence. 1 NRC at 353-55.

Applicants' prepared testimony of March 18, 1977—a month in advance of the hearing—was to the effect that, without power from Marble Hill by 1982, Public Service would be unable to meet its reserve margin requirements. That testimony noted expressly that some existing plants might have to be retired or operated at reduced capacity by then (if not earlier) because the equipment would not meet new, more stringent pollution standards. The point was made that doing so would exacerbate the anticipated reserve margin deficiencies. That testimony also covered the consequences of Marble Hill coming on line before it was an absolute necessity. In the judgment of these witnesses, Public Services' customers would not be penalized should this occur, because cost escalation would be avoided and applicant:

would be able to displace some of [its] more expensive fossil units which are currently being used as base load. These fossil units would then be used for peaking or mid-range purposes. Due to the savings in incremental plant investment for thirty years and the fuel cost differential over the period of delay, the effect on PSI's customers is approximately the same as if the plant were to come on line two years later.¹⁴

Kentucky therefore cannot claim surprise. It had ample notice and opportunity to challenge this testimony at the hearing below. The Licensing

¹³*Ibid.*

¹⁴See testimony fol. Tr. 4189, pp. 23-29 and *ff.* (The staff's witnesses assumed that all the existing capacity would remain on line in 1982. Tr. 4907-08.)

Board's decision fairly reflects the evidence. We find no discrepancy between the theory of the case advanced by the applicants at the hearing and that adopted by the Board. Thus *Nine Mile Point* does not aid the Commonwealth. The vice in that proceeding was that the intervenors there were given no opportunity to meet the ultimate ground for the Board's decision before it was rendered. 1 NRC at 357. That is not this case.

4. The Commonwealth also takes issue with the Licensing Board's conclusion that the adverse "environmental effects of the proposed [nuclear] facility will be substantially less than the environmental effects of a coal-fired alternative. . . ." 6 NRC at 328.¹⁵ Kentucky asserts that the conclusion rests in significant part on a comparison between the health effects of the coal and nuclear fuel cycles. It does not object to the propriety of that comparison. Rather, the Commonwealth complains that the Board allowed the staff to introduce evidence on this subject without providing adequate time for rebuttal.

Part 9 of the September 1976 environmental impact statement on Marble Hill compared the alternative coal-fired plant with the nuclear facility. The statement concluded, among other things, "that the overall . . . environmental costs of the nuclear alternative are no greater than those for a coal-fired alternative" (page 9-4). That conclusion was challenged by intervenors Louisville and Save the Valley and was specified as a controverted issue by the Board below, which denominated it Contention 9. That contention reads in pertinent part that "[i]nadequate consideration has been given to alternative sources of energy such as coal. . . ."¹⁶

No party filed prepared testimony comparing the public health consequences of coal and nuclear fuel cycles. Prompted by our then recent *Hartsville* decision, which encouraged consideration of that,¹⁷ the staff on March 22, 1977, asked the Licensing Board's permission to introduce evidence of that comparison. Tr. 2556-58. The Board gave all parties until April 8th to file supplemental testimony doing so. The staff filed and served its testimony on March 30th, ahead of the Board's deadline. Kentucky, however, neither filed prepared testimony by that deadline nor attempted to introduce evidence on the subject when the Licensing Board considered that issue at proceedings beginning on April 26th. The gist of the Commonwealth's complaint is that while appearing to allow all parties equal time on this issue, in fact the staff was working on this testimony 2 months before

¹⁵Kentucky also challenges the findings on which that conclusion rests, 6 NRC 322-23, ¶¶95-100.

¹⁶See Tr. 689, December 2, 1976, and the Licensing Board's Third Prehearing Conference Order of December 15, 1976, ¶ 5.

¹⁷*Tennessee Valley Authority* (Hartsville Nuclear Units), ALAB-367, 5 NRC 92, 103 (January 25, 1977).

it sought leave to introduce it. Consequently, although the staff filed 8 days "early," as Kentucky sees it the staff actually had 7 weeks more than the Commonwealth to prepare on this issue.

Responsibility for the conduct of the hearings, including the order of presentation of evidence and the scheduling of witnesses, is committed by law and regulation to the officers presiding at the trial.¹⁸ That delegation carries with it broad discretion to shape the course of the proceedings. We explained in *San Onofre* why this must be so; we also explained at the same time why we are reluctant to interfere with the exercise of that discretion.

A potential for substantial mischief would be created were appellate bodies to make a general practice of Monday morning quarterbacking the disposition of such matters as how evidentiary hearings should be scheduled and the precise stage at which a party should be compelled to present its affirmative evidence on particular issues. Very few of the myriad procedural rulings which inevitably ensue during the progress of a sharply contested case would rest on more than quicksand should the reviewing tribunal regard itself possessed of an open license to substitute its judgment for that of the trial tribunal. Moreover, removed as far as we are from the field of trial battle, there is no certainty that (even with the advantage of hindsight and the opportunity for collegial consultation in a calm and deliberate posttrial atmosphere) we would make a better selection among the possible rulings which had been available to the licensing board.¹⁹

For these reasons we enter the scheduling thicket cautiously. We are inclined to do so only to entertain a claim that a board abused its discretion by setting a hearing schedule that deprives a party of its right to procedural due process.²⁰ In this case we think Kentucky has a point that the staff received an initial time advantage in preparing its testimony comparing the health effects of the alternate fuel cycles.²¹ But we do not think Kentucky was thereafter entitled to stand pat, as it has done, and make no effort at all to prepare a rebuttal in the 4 weeks remaining before the hearing, or the 4 months before the initial decision was rendered, particularly in light of the

¹⁸5 U.S.C. §556(c); 10 CFR §2.718.

¹⁹*Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-212, 7 AEC 986, 991 (1974).

²⁰*Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-295, 2 NRC 668, 670 (1975).

²¹To be sure, our *Hartsville* decision was a matter of public record. Theoretically it alerted intervenors as well as the staff to the significance of this issue. But the staff was a party to the case and received the slip opinion; we doubt that the published version in the NRC advance sheets was generally available before the staff filed its motion.

suggestion in our decision of April 26, 1977—which it chose to ignore—that if formally ask the Board below for additional time to respond. See ALAB-393, 5 NRC 767, 738. A party is entitled to a fair hearing, not a perfect one; it must make a reasonable effort to have a procedural error corrected, not hoard it for use as a ground for reversal in the event it does not like the ultimate decision on the merits. Given these circumstances, we reject as insubstantial Kentucky's claim that it was "fundamentally unfair" for the Licensing Board to have considered the staff's testimony on the point at issue.

5. Section 401 of the Federal Water Pollution Control Act, as amended, requires applicants for a Federal permit that may result in a discharge into navigable waters to obtain "a certification from the state in which the discharge originates or will originate" 33 U.S.C. §1341(a)(1).²² No exemption is afforded those seeking licenses to build nuclear power plants²³ and none is claimed. What is at issue in this case is whether Indiana or Kentucky authorities must issue the "Section 401 certificate."

Applicants obtained such a certificate from the appropriate Indiana State agency on the theory that Marble Hill would be built in that State, and that its effluent would drain into Indiana waters. Kentucky disputes this, stressing that those effluents will be released into the Ohio River below its low-water mark. Because Kentucky claims jurisdiction over the Ohio up to that low-water mark, the Commonwealth insists that only it could make valid certification under Section 401. It has not done so and contends that the authorization of the LWA by the Board below was in error.

Applicants respond that Kentucky's jurisdiction ends at the low-water mark of the Ohio as it stood when Kentucky was admitted to the Union in June 1792. Alleging that the river level has since risen because of damming downstream, the applicants offered to prove that the Marble Hill discharge pipe would be on the Indiana side of the 1792 line.

The Licensing Board mistakenly understood the parties to be in accord "that the Kentucky border along the Ohio River is located at the low-water mark on the Indiana side of the river as it existed on June 1, 1792," and in disagreement only about its precise location. 6 NRC at 337. At Kentucky's urging, however, the Board below excluded applicants' evidence on the issue because it thought itself without jurisdiction to determine the boundary between the two States. Tr. 5293. Nevertheless, the Board went on to hold that the applicants' Indiana certification satisfied the Federal Water

²²See R. Zener, *The Federal Law of Water Pollution Control*, pp. 682-791 of *Federal Environmental Law* (Env. Law Inst. 1974), for a carefully considered review of the workings of (and the problems under) this Act.

²³See *Calvert Cliffs' Coord. Comm. v. AEC*, 449 F.2d 1109, 1122-27 (D.C. Cir. 1971). See also Zener, *supra*, fn. 22, at 733-34.

Pollution Control Act “since the Marble Hill facility will be located in Indiana, [therefore] any discharge from it will originate in Indiana within the meaning of [Section 401] of the FWPCA.” 6 NRC at 337.²⁴

The Commonwealth challenges these rulings. It asserts here (as it did below) that we have no authority to decide its boundary with Indiana; that Supreme Court decisions compel acceptance of the current low-water mark on the Indiana side of the Ohio River as that boundary; and that the applicants’ own evidence shows that the Marble Hill discharge pipe will terminate in Kentucky waters. It therefore contends that only the Commonwealth could issue a Section 401 certification valid to support the issuance of the LWA.

For reasons explained below, in our judgment the record is insufficient to determine whether the Marble Hill discharge pipe will end in Indiana or Kentucky. Accordingly, the Licensing Board’s ruling—that the applicants’ Section 401 certification from Indiana satisfies the FWPCA—will stand only if the Board was correct that, within the meaning of Section 401, “the discharge originates, or will originate” in Indiana because the plant will be built there.

The controlling provision is hardly pellucid. We agree with the staff’s comment in its brief that “[n]either the language of the above provision, the applicable legislative history, nor the case law clearly resolves the question of whether the place for ascertaining the ‘state in which the discharge originates’ is the facility or the point at the end of the discharge pipe.”²⁵ We part company, however, on the suggestion that we accept the location of the facility as controlling on the ground that this is the way the Environmental Protection Agency—the key Federal agency administering the Water Act—applies Section 401.

We are well aware of the canon of statutory construction that the reasonable interpretation of an act by officials charged with its administration is entitled to deference.²⁶ Our difficulty lies in its application to this case. To begin with, the evidence is far from clear that the interpretation ascribed to EPA is in fact the one that agency generally applies. For that proposition,

²⁴The Board below also understood Commonwealth’s counsel to represent that Kentucky did not make Section 401 certifications in any event (see Tr. 5274-75), and held as alternate ground for its decision that the absence of such certification from Kentucky could not therefore preclude issuance of an LWA. 6 NRC at 338. That representation was inadvertent error—counsel meant to refer to Section 402 permits—and later corrected by Kentucky, albeit after the decision below was rendered. Affidavit of W. S. Forester, filed September 12, 1977. See App. Bd. Tr. 84.

²⁵Staff brief, p. 31, fn. 16.

²⁶The staff cites *Train v. NRDC*, 421 U.S. 60, 75 (1975), and *American Meat Institute v. EPA*, 526 F.2d 442, 450 (7th Cir. 1975) as recent applications of the canon.

the staff can point, essentially,²⁷ only to information that it says was garnered "from members of the General Counsel's Office" of EPA who are not further identified and who did not appear at the hearing.²⁸ It should not be necessary to remind counsel that anonymous, off-the-record, *ex parte* communications carry no weight in adjudicatory proceedings. "Nothing can be treated as evidence which is not introduced as such."²⁹ Citations to such "authorities" are so much waste ink.

It is one thing to accept an agency's contemporaneous construction of its enabling legislation when that construction represents the reasoned judgment of responsible officials who have made their views known to the Congress and have applied them consistently.³⁰ It is quite another to defer where "those props that serve to support a disputable administrative construction are absent." *Zuber v. Allen*, 396 U.S. 168, 193 (1969). "Those props" are missing here. Even were we to credit at face value the meager record before us, we find that the interpretation being pressed on us is hardly representative of consistent agency practice. The staff's "sources" themselves acknowledge that "[s]ection 401 has in fact been applied differently in different EPA regions on the issue of which state should certify."³¹ Second, those "sources" are identified as regional officials. We infer from this and the inconsistent positions of the several EPA regions that the responsible senior officials in Washington apparently have not yet defined the agency's position. On a question as important to the States involved as this one, we are disinclined to accept subordinates' rulings—assuming that they warrant that dignity—that have not been and may never be sanctioned by those charged with ultimate responsibility for implementing the Water Act.³² We have previously indicated that, in the absence of compelling reasons why we should not do so, we are prepared to give substantial weight to the interpretation given a statute by the agency Congress entrusted with its administration.³³ In this case, we acknowledge that EPA is that agency with

²⁷The staff also mentions a passing remark by an attorney for officials of the State of Indiana. Tr. 5273. That remark dealt only with Indiana's practices; he was not speaking of EPA's position, much less its legal interpretations, on the matter of interest here.

²⁸No written EPA decisions corroborating that agency's construction of Section 401 were proffered.

²⁹*United States v. Abilene & S. Ry.*, 265 U.S. 274, 288 (1924) (Brandeis, J.).

³⁰See, e.g., *Udall v. Tallman*, 380 U.S. 1, 16 (1965); *Power Reactor Co. v. Electricians*, 367 U.S. 396, 408 (1961).

³¹See fn. 26, *supra*.

³²*Cf. Swift & Co. v. Wickham*, 230 F. Supp. 398, 409 (S.D.N.Y. 1964), *affirmed*, 364 F.2d 241, 245-46 (2nd Cir. 1966), *certiorari denied*, 385 U.S. 1036 (1967).

³³E.g., *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892 at 925 (December 30, 1977). See also, *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CL1-78-1, 7 NRC 1, 23-29 (January 6, 1978); *Safir v. Gibson*, 432 F.2d 137, 143 (2nd Cir.) (per Friendly, Ch.J.), *certiorari denied*, 400 U.S. 942 (1970).

respect to the Water Act.³⁴ But EPA has not specified how Section 401 controls the outcome of the issue before us. We are, therefore, left to do so ourselves.

As a matter of English usage, the phrase in Section 401(a) demanding "a certification from the State in which the discharge originates or will originate," standing alone, might be understood to mean either the location of the facility generating the effluent or the location at which that effluent is physically piped into "the navigable waters." But Section 401(a) goes on to add that this certification must issue from an "interstate water pollution control agency" if one has jurisdiction over those waters "*at the point where the discharge originates or will originate.*" 33 U.S.C. §1341(a)(1) (emphasis added). Such an agency would be unlikely to control the use of intrastate lands abutting a boundary river. Consequently, we harbor no doubt that Congress meant to have that certification made by the pollution control agency that has jurisdiction over waters into which effluent is directly piped. To read the statute any other way makes little sense; it is, after all, a water pollution control act we are construing.

Congress was focusing in Section 401(a) on the body with jurisdiction over the water itself in order to protect that agency's ability to deal with pollution in its bailiwick. In our judgment, it is unlikely that Congress meant to treat the jurisdictional reach of an interstate agency one way and that of a State another in the same section of the same statute. In the absence of any indication why in this case we should not do so, we apply the "settled principle of statutory construction that when the same word or phrase is used in the same section of an act more than once, and the meaning is clear in one place, it will be construed to have the same meaning in the other place."³⁵ We are therefore led to conclude that it is the point of actual discharge into the waters which Congress meant to be controlling under Section 401(a). And when that point lies in waters controlled by one State rather than by an interstate agency, certification by the State is required.

This construction dovetails into the scheme of the Water Act. The certification requirement was intended to strengthen, not dilute, an individual State's authority to control the pollution of its waters. As one authority in this area has explained (Zener, *op.cit.*, *supra*, fn. 22, at 734):

the most significant effect of §401 is to give the states a veto power over issuance of federal discharge permits under §402. Any state which desires to impose more stringent requirements on dischargers within the state than are imposed by the EPA standards, may do so through §401, by either denying certification, in which case the federal permit may not

³⁴*Seabrook, supra*, fn. 34, CLI-78-1, 7 NRC at 24.

³⁵*United States v. Vargas*, 380 F. Supp. 1162, 1166 (E.D.N.Y. 1974).

be issued, or by attaching conditions to the certification, in which case these conditions must be included in the federal permit. In this manner, the states may protect their own system of water quality regulation, which the FWPCA allows to be more stringent than the federal system, from federally licensed encroachments. (Footnotes omitted.)¹⁶

The upshot of our reasoning is that we agree with the Commonwealth of Kentucky; if the Marble Hill discharge pipe terminates in that State's waters, the applicants must furnish a Section 401 certification from the Commonwealth. This does not finish the matter, however. The question remains whether the pipe will end in Kentucky. As there is no controversy over the physical location of the pipe, the answer depends on the location of Kentucky's border with Indiana. On this matter we can go along with the Commonwealth only part way. We agree with it that controlling Supreme Court decisions tell us where to look for that State line. But for reasons which will become apparent, the record is insufficient to establish whether the projected end of the discharge pipe will intrude into Kentucky waters.

As our decision on the motion for stay foreshadowed, we consider ourselves bound on this question by *Indiana v. Kentucky*, 136 U.S. 479 (1890), and 163 U.S. 520 (1896). The case involved the claim of both States to "Green River Island" in the Ohio River which, when Kentucky became a State in 1792, actually was an island. At the time in suit, however, it could be approached "dryshod" from the Indiana side at low water. Indiana invoked the Supreme Court's original jurisdiction to settle the dispute. Although it acknowledged Kentucky's general authority over the Ohio River to the low-water mark on the Indiana shore, it nevertheless claimed Green River Island for itself on the ground that the Ohio had changed course since 1792, leaving the former island an appendage of the Indiana shore. Counsel for Kentucky responded to that claim by insisting that the shift in the river's channel did not affect Kentucky's rights¹⁷ and the Supreme Court agreed with him. The Court held the true boundary line to be the low-water mark on the Indiana side of the Ohio River as it existed on June 1, 1792, when Kentucky was admitted to the Union (136 U.S. at 508, emphasis added):

If when Kentucky became a State on the 1st of June, 1792, the waters of the Ohio River ran between that tract, known as Green River Island, and the main body of the State of Indiana, her right to it follows from the fact that her jurisdiction extended at that time to low-water mark on the northwest side of the river. She succeeded to the ancient right and pos-

¹⁶Mr. Zener was formerly General Counsel of the Environmental Protection Agency. His article has been accepted by the courts as an authoritative discussion of the Water Act. See, e.g., *E. I. duPont v. Train*, 528 F.2d 1136, 1138, fn. 2 (4th Cir. 1975), *affirmed*, 430 U.S. 112 (1977).

¹⁷See 34 L.Ed. at 329-30.

session of Virginia, and they could not be affected by any subsequent change of the Ohio River, or by the fact that the channel in which that river once ran is now filled up from a variety of causes, natural and artificial, so that parties can pass on dry land from the tract in controversy to the State of Indiana. Its waters might so depart from its ancient channel as to leave on the opposite side of the river entire counties of Kentucky, and the principle upon which her jurisdiction would then be determined is precisely that which must control in this case. *Missouri v. Kentucky*, 78 U.S. (11 Wall.) 395, 401. *Her dominion and jurisdiction continue as they existed at the time she was admitted into the Union, unaffected by the action of the forces of nature upon the course of the river.*

The court then appointed commissioners to survey the 1792 low-water mark. Their report of its location was confirmed by the court as the boundary between the two States. 163 U.S. 520.

None of the authorities cited by Kentucky supports its contention that we should ignore the clear ruling of *Indiana v. Kentucky* and accept the present low-water mark as the boundary. The earlier case of *Handly's Lessee v. Anthony*, 18 U.S. (5 Wheat.) 374 (1820), held only that Kentucky's boundary lay at the low-water mark on the north-westerly side of the Ohio. Moreover, the ramifications of Chief Justice Marshall's opinion in that case were fully explored by the court in *Indiana v. Kentucky* with the result just described. Even were the two decisions in conflict (and in our view they are not), the later would control.³³ The case of *Henderson Bridge Co. v. Henderson City*, 173 U.S. 592 (1899), also relied on by Kentucky cuts against the Commonwealth's position. Writing for the court in that case, Justice Harland expressly reaffirmed the conclusion in *Indiana v. Kentucky* that the jurisdiction of Kentucky extends to the low-water mark of the Ohio River "as it was when Kentucky was admitted into the Union." *Id.* at 613.

Unfortunately, our conclusion that Kentucky's jurisdiction ends at the 1792 low-water mark on the Ohio's Indiana shore does not let us resolve the certification question. The record does show that the effluent from the Marble Hill discharge pipe will enter the river at an elevation more than 405 feet above mean sea level, which in the applicant's view puts it on the Indiana side of the line. But the Board below excluded on invalid grounds the evidence the applicant believed would establish the 405-foot contour as the

³³This also disposes of Kentucky's reliance on the court's 1870 decision in *Missouri v. Kentucky*, 78 U.S. 395. In any event, that does not govern Kentucky's jurisdiction over the Ohio River.

location of that boundary line.” To be sure, the prepared testimony of the two witnesses applicants proffered on the question is physically bound in the record. Applicants would have us treat this as an offer of proof. But this is no solution. The Commonwealth objected to receipt of that testimony not only on the untenable jurisdictional ground but also on the ground the two witnesses were not competent to testify on the subject, a ground which the staff expressly supported. See Tr. 5290-94. The Licensing Board did not pass upon that ground. If it is valid, we would have to treat the record as devoid of evidence that the 405-foot contour is the location of the 1792 low-water mark and, therefore, the State line. Tr. 5294.

We cannot pass judgment now on the witnesses’ qualifications, and thus cannot credit the excluded testimony at this juncture. In the first place, the Commonwealth (and the staff) are entitled to explore on cross-examination the witnesses’ competence to attest that the historical low-water mark lies at that contour line. That Kentucky’s motion to exclude their evidence was granted on the wrong ground does not deprive it of the right to have an alternate—and possibly valid—ground for exclusion considered. Second, nothing in the record establishes the witnesses’ qualifications to testify on the subject. We have reviewed their prepared testimony carefully. It contains nothing to indicate that they are specially knowledgeable about the location of the 1792 line, nor does it explain how they arrived at the conclusion that the 405-foot contour represents that line. In short, applicants have not made out a *prima facie* case on the location of the boundary even were we to credit the excluded testimony.⁴⁰

Neither are we persuaded by applicants’ suggestion that we must accept the Section 401 certification from Indiana as presumptively valid. That presumption lasted only so long as there was reason to believe that the discharge from the plant would be in Indiana because the plant was in that State. For reasons previously explained, for purposes of Section 401 that as-

⁴⁰We can see no “jurisdictional” reason why the Board may not decide this point. Suppose, for example, the boundary were in midstream. Obviously the Board would have to find that point to decide in which State the pipe ended. That the point to be ascertained is an historic low-water mark seems to involve no greater obligation than is ordinarily required of a fact-finding tribunal obliged to apply the law to the evidence.

⁴¹See *Lawrence*, fol. Tr. 5225 (at 4); and *Torp-Smith*, fol. Tr. 5225 (at 2). Mr. Lawrence is a mechanical engineer with the firm applicants employ as project engineers. His testimony on the question at issue is limited to the single perfunctory statement that “The Ohio River elevation contour, 405 feet above mean sea level, is the basis of the state line.” Mr. Torp-Smith is employed by the same engineering firm. His testimony is only that one of the criteria taken into consideration in designing the discharge facility was “stay on Indiana side of state boundary.” We have no quarrel with the engineering competence of these witnesses. What their testimony does not show, however, is any reason why 405 feet above sea level is today’s equivalent to the 1792 low-water mark and how they are qualified to make that assertion.

sumption is not a good one, and the support it gave to the Indiana certification has been overcome.

This leaves us no choice but to instruct the Licensing Board to reopen the question, find whether the Marble Hill discharge pipe will end in Indiana or Kentucky waters, and conclude, on the basis of that finding, whether applicants have obtained the certification required under Section 401 of the Water Act.⁴¹ Whether this necessitates further hearings is a question we leave to that Board.⁴²

In the circumstances of this case, however, we will not disturb the LWA while the boundary issue is being decided. Although the Licensing Board erred in excluding evidence of the type we now direct that it consider, it did so at the Commonwealth's insistence. Inasmuch as no effluents will be discharged into the Ohio as a consequence of work done under the LWA, it would be inequitable to penalize the applicants by lifting that permit for errors not of its instigation. On the other hand, the Licensing Board should turn to this question promptly. We remind that Board and the parties that without a proper certification under Section 401 no construction permit may be authorized or issued.⁴³ *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-366, 5 NRC 39, 56 (1977), *affirmed*, CLI-77-8, 5 NRC 503, 505, 546 (1977).

6. The next dispute centers on the widening of a county road leading to the Marble Hill construction site. The Board held Public Service responsible for the widening, concluded that the activity fell within its jurisdiction, ruled that the applicant violated 10 CFR §50.10(c) of the Commission's regulations by having that work started without an LWA or Board approval, and upheld a \$12,500 civil penalty imposed by the staff (the applicant agreed to the amount but reserved its right to contest liability). 6 NRC 301-02.

Save the Valley appeals the fine as too lenient and challenges the propriety of the compromise negotiations between the staff and the applicant which fixed the amount. Public Service contends that the Board erred (1) in finding that it rather than the county governments was responsible for building the road, (2) in exercising jurisdiction over this "offsite" project, and (3) in holding that the road-widening constituted "commencement of

⁴¹If it turns out that the discharge pipe is in Indiana waters, the applicants will have met the certification requirement. In this connection, we cannot entertain Save the Valley's claims that there were deficiencies in the Indiana proceedings which led to that State's issuance of the 401 certificate. By its terms, Section 511(c)(2) of the Federal Water Pollution Control Act precludes us from reviewing "the adequacy of any certification under Section 401 of this Act." 33 U.S.C. 1371 (a) (2).

⁴²See 10 CFR §2.749.

⁴³We suggested to the parties 4 months ago that it might ultimately prove necessary to have evidence on the boundary question in the record. ALAB-437, *supra*, 6 NRC at 636, fn. 16. As far as we can tell, however, none of them asked the Board to consider the matter.

construction" within the meaning of Section 50.10(c). The staff urges affirmation of this part of the Board's decision on all points.

We agree with the staff. The Licensing Board found that Public Service "wanted an improved county road to the proposed site for Marble Hill" and that the "counties would not have improved the roads but for the fact PSI paid for the work."⁴⁴ The evidence amply supports that conclusion. The staff accurately characterizes the record as demonstrating that the utility "actively planned, designed, promoted, scheduled, and paid for the construction work on the road."⁴⁵ Applicant responds with the technical argument that the county governments were not its "agents," and therefore, it may not be held responsible for "their" decision to widen the road. The applicant may well be correct on the agency point. But it by no means follows that it is thereby absolved of responsibility in the circumstances just described. From the standpoint of this Commission's responsibilities, this amounts to an inartful attempt to evade Commission NEPA regulations. The Board below correctly refused to allow it to succeed.

The applicant's more substantial reason for raising this question is candidly acknowledged in its brief. It wants reconsideration of prior rulings that the Commission's NEPA jurisdiction extends to construction work in connection with a nuclear facility but performed away from the immediate plant site. The applicant acknowledges the Commission's recent holding in *Wolf Creek*⁴⁶ that (5 NRC at 8, emphasis added):

There can be no serious dispute that in connection with a ruling on an application for a license (a limited work authorization, construction permit, or operating license), we may consider the environmental impacts of related offsite construction projects—such as connecting roads and railroad spurs—and where necessary impose license conditions to minimize those impacts.

It suggests, however, that this Board is free to ignore that unanimous decision as wrongly decided because the Commission has been reconstituted since it was rendered last year and "[o]nly Commissioner Kennedy remains from amongst the three Commissioners who decided *Wolf Creek*."⁴⁷

The short answer to that suggestion is twofold. *First*, the Commission is a continuing body. The authority of its decisions does not lapse with changes in its membership any more than judicial decisions lose their vitality because judges retire or resign. The proposition that an inferior tribunal

⁴⁴Order of March 1, 1977 (unpublished).

⁴⁵Staff brief, p. 9, giving appropriate record references. Among other things, the evidence also indicates that the utility donated the right-of-way and paid to have the road designed by the engineers it had retained to build Marble Hill.

⁴⁶*Kansas Gas and Electric Co. (Wolf Creek Nuclear Generating Station, Unit No. 1)*, CLI-77-1, 5 NRC 1 (1977), affirming ALAB-321 and ALAB-331, 3 NRC 293 and 771 (1976).

⁴⁷*Applicant's Brief in Support of its Exceptions*, p. 11.

is normally bound by the controlling decisions of a superior one needs no citation of authority to sustain it. *Second*, the majority of this Board remains firmly of the view that *Wolf Creek* was correctly decided.⁴⁸ Accordingly, we hold that the Board below (1) correctly deemed itself empowered to entertain the question of the unauthorized road work, and (2) acted within its jurisdiction in confirming the staff's decision that imposition of a civil penalty was warranted against the applicant for having undertaken work without a limited work authorization.

Save the Valley argues that there should have been an evidentiary hearing on the penalty. There was, however, nothing to hear. The facts of the activities undertaken were not disputed. Only the Commission's authority to impose a penalty and the size of any such penalty were at issue. On the former issue intervenors' arguments were heard and its views prevailed. On the latter, their proposed findings addressed the point and were considered. Given the nature of the violation—the widening of an existing county road—we cannot agree that a larger fine is warranted, much less a refusal to allow the LWA to issue at all. In our judgment, “the punishment fit the crime.” As for the compromise negotiations between the staff and applicant leading to an agreement on the amount of the fine, these are expressly permitted by Commission regulations. 10 CFR §2.203.

Finally, we are not unsympathetic to intervenors' suggestion that the penalty should be borne by Public Service's stockholders rather than its ratepayers. To accomplish this, the payment would have to be excluded from the utility's rate base. But our authority does not extend that far. The right to decide whether an expense is includable in a rate base is a matter which has been placed in the competence of the State public service commission. We are limited, therefore, to referring intervenors to the appropriate Indiana authorities for this relief. *Cf. Virginia Electric and Power Co.* (North Anna Power Station, Units 1 and 2), ALAB-324, 3 NRC 347, 390, fn. 50, *modified and affirmed*, CLI-76-22, 4 NRC 480 (1976) (appeal pending).

7. The Board below by divided vote held that co-owners of a proposed nuclear plant are “*de facto*” co-applicants, deemed the Marble Hill application amended to reflect this, and had the notice of opportunity for public hearing republished accordingly. LBP-77-4, 5 NRC 433 (1977).⁴⁹

⁴⁸See *Detroit Edison Co.* (Greenwood Energy Center), ALAB-247, 8 AEC 936 (1974).

⁴⁹The Board initially sought to refer this interlocutory ruling to us (see 5 NRC at 436), apparently because another Licensing Board had reached the opposite conclusion and had referred its ruling. See *Omaha Public Power District* (Fort Calhoun Station, Unit 2), LBP-77-5, 5 NRC 437 (1977) (Dr. Stober concurring in the result only). Both referrals were eventually declined. See ALAB-371, 5 NRC 409; ALAB-372, 5 NRC 413; ALAB-405, 5 NRC at 1190; and ALAB-406, 5 NRC 1194 (all 1977).

Public Service excepts to these rulings. The company asserts that it has a "right" to a Commission license to build a nuclear power plant without its co-owners as its co-applicants. The utility's thesis rests on its reading of Sections 101 and 103 of the Atomic Energy Act.⁵⁰ Those provisions make it unlawful for any person to "transfer," "acquire," or "possess" a "utilization or production facility" (which includes a nuclear power plant) without a Commission license.

Boiled down, Public Service's argument is that Sections 101 and 103 do not explicitly forbid one to "own" a nuclear plant without a license, only to "possess" it. The company insists that "the class of 'persons' subject to the NRC's licensing authority is defined [by the statute] in terms of possession, not ownership."⁵¹ Pointing out that Congress used "own" in other parts of the Atomic Energy Act,⁵² the utility relies on various canons of statutory construction⁵³ to support its contention that "possess" as used in Sections 101 and 103 therefore does not include "own" and insists accordingly that a mere owner need not be an applicant or hold a Commission license.

Our difficulty with Public Service's argument is that in ordinary parlance an accepted meaning of "possess" is "own."⁵⁴ We do not wish "to make a fortress out of the dictionary."⁵⁵ We are prepared to discount the "plain meaning" of a statute if need be to accommodate some Congressional purpose.⁵⁶ But neither we nor any other tribunal ought to be expected to do so on the basis of a mechanical invocation of the canons of statutory construction. These are not "Commandments," merely aids to ascertaining legislative intent.⁵⁷ Maxims like "the very use of two separate words is an indication that some sort of different meaning is to be ascribed to them"⁵⁸ are neither helpful nor persuasive without an accompanying explanation why Congress elected to use words in other than their ordinary meanings.

⁵⁰42 U.S.C. §§2131 and 2133.

⁵¹*Applicant's Brief in Support of its Right to Secure License Without Addition of Co-Owners and Co-Applicants*, p. 3.

⁵²See Sections 53 and 81, 42 U.S.C. §§2073 and 2111.

⁵³Citing, *inter alia*, 62 Cases, *More or Less, Each Containing Six Jars of Jam v. United States*, 340 U.S. 593, 596 (1951).

⁵⁴See, Webster's *New International Dictionary* (3d Ed. 1971), (Webster III observes that the English "to possess" is derived from the Latin "to own"); *accord*; *American Heritage Dictionary* (New College Ed. 1976); *American College Dictionary* (Random House, 1971); Roget, *International Thesaurus* (Third Ed. 1962), defs. 806 and 807.

⁵⁵*Cabell v. Markham*, 148 F.2d 737, 739 (2d Cir. 1945) (per L. Hand, J.).

⁵⁶See *The Toledo Edison Co. (Davis-Besse Nuclear Power Station, Unit 1)*, ALAB-323, 3 NRC 331, 335-37 (1976), and cases there cited.

⁵⁷*Id.* at 335.

⁵⁸See, *Applicant's Brief in Support of its Right to Secure License Without Addition of Co-Owners and Co-Applicants*, p. 5.

At the minimum, one advocating a departure from common usage bears the burden of demonstrating what the legislature sought to achieve thereby.

It is at precisely this point that Public Service's argument falters. It presents us with no reason why Congress would want to exempt owners of nuclear power plants from Commission regulation. And we can think of none ourselves. To the contrary, it takes little to appreciate that an owner can influence the actions and attitudes of its tenants and agents without technically being in "possession" of the premises. Given the safety considerations with which Congress was primarily concerned in the Atomic Energy Act, it takes much more than bare assertion and imaginative statutory construction to convince us that those who would own a nuclear power plant do not need to apply for a license from the Commission.

Both sides also refer us to legislative "history—some of it postenactment—to bolster their respective readings of the Act. We find it contradictory and inconclusive." But that very absence of evidence of a clear indication that the legislature deliberately meant "possess" to convey some special meaning when it used the word in Sections 101 and 103 serves, in our judgment, to confirm that such usage was not intended.

The staff also contends that distinguishing owners from possessors would have the effect of hampering the Commission's regulatory authority. Public Service disputes this. It argues that the Commission could always exercise its authority effectively if indirectly by actions against licensees. We

"For example, the staff relied (brief, p. 14) on S. Rep. No. 1325, 88th Cong., 2nd Sess., which accompanied certain 1964 amendments, as evidence that Congress assumed that private ownership of utilization facilities was permissible only under license. In pertinent part the report reads (1964 U.S. Code Cong. & Adm. News at 3125):

In order to afford a wider opportunity for private industry to participate in the development of the atom, the Atomic Energy Act of 1954 permitted private persons to possess and use special nuclear materials under license from the Atomic Energy Commission. The legislation also permitted private persons, *under license from the Commission, to own and operate* other facilities intended to produce and utilize special nuclear materials.

Section 5 of the bill which deals with the authority of the Commission to license and distribute special nuclear material domestically amends Section 53 of the Atomic Energy Act of 1954. The amendment clarifies the authority of the Commission to *license ownership*, possession and use of special nuclear material and brings this authority *into conformity with the Commission's authority to license source and byproduct material, and production utilization facilities*. (Emphasis added by staff.)

While the report tends to support the staff's interpretation, it is hardly conclusive. Aside from being primarily concerned with other provisions, Public Service would probably agree that one who would both "*own and operate*" a nuclear facility must have a license even under its reading of the Act.

are not so certain.⁶⁰ But we need not decide that the staff is right in its arguments to be able to agree with it that significant areas of the Commission's regulatory authority could be placed under a cloud by accepting Public Service's reading of the Act. As we have been offered no good reason why we should give the remedial and regulatory provisions of the Atomic Energy Act the crabbed interpretation the company suggests, for this reason, too, we decline to do so.

Finally, we note that Section 184 of the Act, 42 U.S.C. §2234 (dealing with the "Inalienability of Licenses"), like Sections 101 and 103, does not use the term "owner" in forbidding the unapproved transfer of NRC licenses. Yet the Commission has ruled only last month that "[a]ny transfer of *ownership* would require Commission approval" and "the filing of an application for a license amendment" ⁶¹ Thus, in the situation before us, under Public Service's reading of the Act the Wabash Valley Cooperative could become an owner of 17% of the Marble Hill facility with a license, but to sell that share it must have Commission approval in the form of an amended license. The result is awkward, unreasonable, and in our judgment, unintended by Congress.⁶²

Accordingly, for all the foregoing reasons we affirm the ruling below that prospective co-owners of nuclear power plants must be co-applicants.⁶³

⁶⁰For one example, Section 105a of the Act empowers the Commission to suspend, revoke, or modify a license to operate a nuclear power plant on antitrust grounds "in the event a licensee is found by a court" to have violated those laws. 42 U.S.C. §2135(a). The statute does not speak to the situation of co-owners who are not licensees and similarly found guilty. Were the situation to arise, we have no doubt that the Commission's authority to prevent the anti-competitive use of a nuclear power plant by a "mere owner" would be immediately challenged in court.

⁶¹*Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1 at 22 (January 6, 1978).

⁶²It has been suggested by the company that, in some other cases, licenses appear to have been granted to applicants without all co-owners having joined in application. However, the question was not one litigated. We assume that the staff, if it has not already done so, will take whatever steps are needed to correct these situations. We also agree that Section 50.33(d) (4) of the Commission's regulations can be read to countenance the result the utility favors. The staff argues, however, that it applies only to "turnkey" operations. As we cannot assume that the Commission intended its regulations to contradict the governing legislation, we accept the staff's reading of 10 CFR §50.33(d) (4) as the reasonable one.

⁶³We are persuaded by the staff's argument that review of the need for an amended notice of hearing is inappropriate at this juncture. As the staff cogently observes (br. p. 19):

The amended notice was published in the *Federal Register* on February 7, 1977 (42 FR 7181) [T]he question raised by Applicants' appeal of the propriety of the Licensing Board's decision to issue an amended notice of hearing is moot. As it turned out, the issuance of the notice had no effect on the proceeding below and clearly has no remaining effect on the Applicants or any other party at this late date. Nothing "anyone can say or do will run time backwards to erase the fact" that the notice has in fact been given.

8. Public Service prevailed before the Board below on all except two issues: the need for co-owners to be co-applicants and the imposition of a civil penalty for commencing work before receiving an LWA. Regarding these, Public Service filed and briefed appropriate exceptions which we have considered. The utility also excepted to portions of the decision below resolving issues in its favor. It did so either in the belief that this was necessary to defend those aspects of the Licensing Board's decision, or to have that Board's favorable findings (but not the result) modified in some manner.

Filing exceptions for the latter two purposes was inappropriate. We have held that the rule in NRC practice is similar to that applied in the Federal courts: "[T]he successful parties before the Licensing Board... may urge that its decision be sustained on any ground which finds support in the record, even when the ground has been rejected or disregarded below." *Nine Mile Point, supra*, ALAB-264, 1 NRC at 357, citing *Jaffke v. Dunham*, 352 U.S. 280 (1957), and *California Bankers Assn. v. Shultz*, 416 U.S. 21 (1974). In short, exceptions are not necessary to defend a decision in one's favor. Only where a party is aggrieved by, or dissatisfied with, the action taken below and invokes our appellate jurisdiction to change the result need exceptions be filed—or are they permitted. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-282, 2 NRC 9 (1975). The rule precluding appeals from decisions in one's favor is an important and salutary one. Without prejudicing the rights of the prevailing party, it eliminates the need to render purely academic decisions, thereby reducing the burden of unnecessary appellate litigation. As we explained in *Davis-Besse*, where we dismissed "exceptions" by the prevailing party:⁴

It may be that, unlike Federal appellate judges (whose jurisdictions are subject to the limitations inherent in the "case or controversy provisions of Article III, Section 2 of the United States Constitution), we are empowered to entertain, at the behest of a party, a question which arose during the course of proceedings before the trial body but had been stripped of any practical significance by the time the curtain on those proceedings had fallen. We perceive no good reason, however, why our review function should be so exercised here. To the contrary, the husbanding of the resources of this Board (among other considerations) mandates that, as a general rule at least, an appeal from a licensing board ruling be considered only if the appellant can establish that, in the final analysis, some discernible injury to it in the proceeding at bar has been sustained as a consequence of the ruling.

⁴*Toledo Edison Co.* (Davis-Besse Nuclear Power Station), ALAB-157, 6 AEC 858, 859 (1973); see also, *Northern States Power Co.* (Prairie Island Nuclear Generating Plant), ALAB-252, 8 AEC 1175 (1975).

Accordingly, we dismiss those Public Service exceptions⁶⁵ taken from rulings in its favor where it sought no relief in the form of some change in the orders of the Board below.⁶⁶

Affirmed.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

⁶⁵To the extent Public Service's briefs on those exceptions also touched on issues which were raised by intervenors, we have of course considered them as though they were part of the response to the intervenors' exceptions. Our point is, simply, that no exceptions were required to respond to intervenors' arguments.

We have not considered at all PSI's exceptions dealing with alternative sites. These involve issues not pressed by the intervenors on appeal. As questions not timely raised in the course of administrative proceedings normally may not be heard should judicial review later be sought, Public Service need not fear that it will be forced to defend the agency's decision on grounds not to its liking.

⁶⁶Save the Valley did not brief most of its exceptions. See 10 CFR §2.763. Not having been presented with papers containing sufficient information or discussion to allow an intelligent disposition of those issues, we follow the lead of the Federal courts and treat them as waived. *Northern Indiana Public Service Co.* (Bailly Generating Station, Nuclear-1), ALAB-224, 8 AEC 244, 248 (1974), and cases there cited in fn. 10, e.g., *United States v. White*, 454 F.2d 435, 439 (7th Cir. 1971), *certiorari denied*, 406 U.S. 962 (1972).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Jerome E. Sharfman, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket Nos. 50-354
50-355

PUBLIC SERVICE ELECTRIC
AND GAS COMPANY
ATLANTIC CITY ELECTRIC
COMPANY

(Hope Creek Generating Station,
Units 1 and 2)

February 17, 1978

After hearing evidence on the likelihood that an accident involving a liquefied natural gas tanker would affect the hope Creek plant, the Licensing Board ruled that the likelihood was so low that the plant did not have to be designed to withstand it. Based on that conclusion the Board also ruled that construction could continue. The Board was not able to issue its opinion at that time but promised to do so shortly. Upon motion by intervenors for an order requiring the applicant to file monthly reports on the extent of plant construction and its effect on applicant's ability to make certain safety-related changes to provide protection from such accidents, the Appeal Board concludes that information of this type would have to be produced if a stay were requested, that it would be relevant to a stay motion, but it could be better provided through a construction schedule (including relevant expenditures) covering the upcoming 6-month period. The applicant is therefore directed to file that information.

RULES OF PRACTICE: INTERLOCUTORY APPEALS

A motion which is not an appeal from a licensing board ruling and which seeks relief not sought from the licensing board is not an "interlocutory appeal" within the scope of 10 CFR §2.730(f).

RULES OF PRACTICE: AUTHORITY OF APPEAL BOARD

As appeal boards have entertained motions for stays pending appeal prior to the filing of exceptions, see *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-338, 4 NRC 10, 14 (1976), they have jurisdiction to grant intervenors a lesser degree of interim protection from possible prejudicial continued construction.

Mr. Troy B. Conner, Jr., Washington, D. C., for Public Service Electric and Gas Company, applicant.

Messrs. Robert Westreich and Peter A. Buchsbaum, Trenton, New Jersey, for the Concerned Citizens on Logan Township Safety, the Boroughs of Paulsboro and Swedesboro, Stanley C. Van Ness, Public Advocate of the State of New Jersey, and David A. Caccia, intervenors.

Mr. Richard L. Black for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

In ALAB-429,¹ we reversed a determination by the Licensing Board that the probability that a gas cloud fire resulting from an accident involving a liquefied natural gas ("LNG") tanker on the Delaware River would affect the Hope Creek plant is so low that the plant does not have to be designed to withstand it. We found that both the evidentiary record and the analyses made of the problem were insufficient to serve as a basis for deciding the question. We therefore remanded the matter for further evidentiary hearings and analysis by the Board. We permitted construction of the plant to continue under the already issued construction permit during the remand but we directed that the remanded proceeding be expedited, and further, that, if the Licensing Board's decision were not issued within 4 months, the applicant will be required to show cause to the Licensing Board as to why construction should not be suspended pending its issuance. In so doing, applicant will have to make a showing that it will be feasible to adapt the plant design so as to protect against gas cloud fires and that continued construction will not prevent it from doing so or make such adaptation prohibitively expensive.²

¹6 NRC 229 (August 24, 1977).

²*Id.* at 247.

Upon realizing that it would not be able to hand down a decision within the 4-month period, the Licensing Board ordered applicant to make the required showing with respect to the period between December 24, 1977, and January 20, 1978, the latter being the date by which the Board expected to issue its decision.³ The Licensing Board thereafter found that good cause had been shown and ruled that construction could continue until January 20, 1978.⁴ Later finding that it could not meet the January 20th date, the Licensing Board took evidence at a hearing on January 10, 1978, and orally made the findings requisite to permitting construction to continue until January 30, 1978. On January 26th, the Licensing Board announced that it had decided that the probability of a gas cloud fire capable of affecting the plant was so low that the plant need not be designed to protect against such an occurrence and authorized the continuation of construction beyond January 30, 1978. Noting that it was unable to issue an opinion fully explaining the reasons for its decision at that time due to the unavailability of one of its members, the Board promised to issue such an opinion "as soon as circumstances permit." The Board further ordered that the time for filing exceptions to its decision would begin to run after that opinion is served.

On February 3, 1978, intervenors moved before us for an order directing applicant "to serve monthly on the parties affidavits indicating the extent of construction and whether any construction to be performed during the month will prevent the applicant from making changes in the plant to protect it from the hazardous river traffic that has been the subject of these proceedings." Intervenors maintain that their request, if granted, would merely continue the procedure which was in effect during the Licensing Board's consideration of the case on remand. They state in their papers:

The procedure that Joint Intervenors propose has worked efficiently below and has not imposed a burden on any party. All that is required of the Applicant is the preparation and service of an affidavit by one of its employees using information that is readily available to it. The procedure has, however, provided important information that is not otherwise available to the parties. In particular, it has permitted the NRC and the Intervenors to monitor the progress of construction and determine when a stay of additional construction should be considered. That is information that the parties must know to be able to protect the public interest. As the Board said in ALAB-429: "[W]e think it hardly in the public interest to permit construction to proceed to such a stage where changes needed to deal with a safety problem have either been fore-

³Order dated December 6, 1977.

⁴LBP-77-73, 6 NRC 1310 (December 23, 1977).

closed or made prohibitively expensive.” ALAB-429 at 37. The affidavit procedure we propose can protect the public interest by protecting against that contingency, while, at the same time, it protects the applicant’s interest in continuing its project and the interests of the 1,500 workers now involved in construction.

The staff supports the motion to the extent that it requests monthly construction status reports until a formal decision is rendered by the Licensing Board. The applicant opposes the motion, not on its merits but on the ground that it is an interlocutory appeal prohibited by 10 CFR §2.730(f).

Section 2.730(f) prohibits interlocutory appeals “from a ruling of the presiding officer.” Here, intervenors are not appealing from a ruling below with which they disagree; indeed, they did not request the now sought relief from the Licensing Board. Their motion therefore does not come within the scope of §2.730(f). Moreover, we have entertained motions for stays pending appeal before the filing of exceptions in the past. See *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-338, 4 NRC 10, 14 (1976). Surely, then, we also have jurisdiction to grant a much lesser degree of protection before the filing of exceptions.⁵ While it is true that intervenors could have requested the same relief from the Licensing Board, that does not mean that we lack the power to grant it as well.⁶ The premise of the Licensing Board’s January 26th order seems to be that, because the Licensing Board has made up its mind on the merits, the intervenors are not entitled to any further interim protection from possible prejudicial continued construction. They therefore could reasonably have regarded it as futile to make this motion before that Board.⁷

There is some merit to the motion. Clearly, if intervenors moved for a stay, applicant would have to produce information of the type requested. It is a lesser burden on applicant, as well as on the other parties and this Board, if such information is produced without a stay motion, if it turns out that intervenors conclude that a stay is not necessary for their protection. We have therefore decided to grant relief to the intervenors along the lines they have suggested. However, we believe that the submission of monthly status reports is not the mechanism best suited to provide the information that would be useful to the intervenors. The need for a stay may turn on what construction will be carried out during the pendency of the appeal and not on what will be done in the next month.

⁵As in *Seabrook*, it is clear from the motion papers that intervenors intend to file exceptions during the extended period of time allowed for doing so.

⁶See *Seabrook*, *supra*, at 12.

⁷See *id.* at 12-13.

Accordingly, applicant is directed to serve on the parties and file with this Board, within 2 weeks of the date of this order, its construction schedule for the Hope Creek plant for the next 6 months. The schedule should identify major milestones in the construction and discuss those which may be of significance in the event design changes are called for to protect the plant from a methane vapor cloud fire. Applicant is further directed to submit a schedule of construction expenditures for the same period. If there are any significant changes in the construction schedule during the pendency of the appeal, applicant should promptly inform us and the parties of those changes.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Ivan W. Smith, Chairman
Dr. Frank F. Hooper
Gustave A. Linenberger

In the Matter of

Docket No. 50-395

**SOUTH CAROLINA ELECTRIC
AND GAS COMPANY, et al.**

**(Virgil C. Summer Nuclear
Station, Unit 1)**

February 3, 1978

The Licensing Board grants nontimely petition for intervention and orders a hearing to determine whether an operating license should be issued.

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Where a nontimely petitioner for intervention has a marginally good excuse for its late filing, the petitioner has a substantial but not a great burden in justifying intervention on the basis of the other factors in 10 CFR §2.714(a). *Nuclear Fuel Services, Inc.* (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975).

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Where the "interest" requirement of §2.714(a) is satisfied, the test to be applied in determining whether a nontimely petitioner's participation may reasonably be expected to assist in developing a sound record is simply that and not whether the petitioner has some specialized education, relevant experience, or ability to offer qualified experts to develop the record.

MEMORANDUM AND ORDER

On April 18, 1977, the Secretary of the Nuclear Regulatory Commission published in the *Federal Register* Notice of the Receipt of the Application for Facility Operating License from the South Carolina Electric and Gas

Company to possess, use, and operate the Virgil C. Summer Nuclear Station. 42 *Fed. Reg.* 20203. The notice provided that any person whose interest may be affected by the proceeding may file a petition for leave to intervene and a request for a hearing with respect to the issuance of the facility operating license on or before May 18, 1977. This Board has been established to rule upon petitions for leave to intervene and requests for hearings in this proceeding.

Mr. Brett Allen Bursey of Little Mountain, South Carolina, has filed papers. They are Petition to Intervene dated May 27, 1977 ("Petition"); Addendum to Petition for Leave to Intervene received July 14, 1977 ("Addendum"); Clarification to Petition to Intervene dated August 19, 1977 ("Clarification"); and an Amendment to the Clarification to Petition to Intervene dated November 1, 1977 ("Amendment to Clarification"). All of the foregoing documents are regarded collectively as Mr. Bursey's Petition For Leave to Intervene and Request for Hearing.

Both the NRC Staff and the Applicant recommend that the Petition For Leave to Intervene be denied. In our order below the Board grants Mr. Bursey's Petition and orders a hearing on the application for the operating license.

Petitioner's Interests and Contentions

In the affidavit accompanying his Petition, Mr. Bursey states that he lives with his family on a farm only several miles from the proposed Summer Station and is seeking to intervene on behalf of himself, his family, and many of his neighbors. The Board finds that this circumstance considered with his contentions adequately demonstrates that Mr. Bursey's interests and those of his family and neighbors may be affected by this proceeding.¹ The "interest" requirements of 10 CFR §2.714(a) are met.

The Applicant urges that the Petitioner fails to state any allowable contentions.² The NRC Staff believes that Petitioner's Contention 9 is minimally acceptable as an appropriate matter for consideration in this licensing proceeding pointing out that only one such contention is required to grant an intervention petition and order a hearing.³ The Board agrees that Petitioner's Contention 9, set forth on pages 7 and 8 of its Clarification, is acceptable as an issue in this proceeding. In addition, the Board for

¹Mr. Bursey will be required to submit the signed authorization of any neighbor whose interest he undertakes to represent in this proceeding. Any authorization must identify each neighbor by name and address.

²Applicant's Answer to Clarification to Petition to Intervene dated August 31, 1977.

³NRC Staff Response to Clarification to Petition to Intervene dated September 6, 1977.

the reason stated below identifies Petitioner's Contention 14 (*id.* p. 10) as also being an appropriate contention as follows:

14. The Petitioner contends that the quality control of the Summer plant is substantially below NRC standards. Petitioner stands ready to provide direct testimony of consistently substandard workmanship in several aspects of the construction of the Summer plant.

The Board has considered the Applicant's complaint that this contention fails to provide specificity and particulars. The contention, however, is sufficiently specific and the particulars may more appropriately be developed during the discovery phases of an evidentiary hearing. Other contentions may also be acceptable but each of the two contentions named meet the "contentions" requirements of §2.714(a).

Timeliness

Mr. Bursey's petition was dated and presumably filed on May 27, 1977, 9 days late. By order dated July 15, 1977, the Board granted the Petitioner leave until August 15, 1977, to amend his petition observing that he had not stated an acceptable contention or justification why a late petition was filed. Mr. Bursey filed his "Clarification" on August 19, 1977, 4 days late. Subsequently when Mr. Bursey filed his Amendment to Clarification, it was on time. Mr. Bursey explained that the reason for filing late is that he did not learn of the filing date until after it passed. In his Addendum to his Petition he stated that the files in the proceeding had been removed from the public document section of the local library. While the Board recognizes that failure to learn of the Notice of Hearing on time would not always be accepted as good cause for late filing, in this case the Petitioner was not very late, and we believe that Mr. Bursey has made at least a marginal showing of good cause why the late Petition should be accepted, particularly in consideration of the four factors of §2.714(a) which must be applied to non-timely petitions.⁴

⁴Section 10 CFR §2.714(a) provides in pertinent part:

Nontimely filings will not be entertained absent a determination by the Commission, the presiding officer, or the atomic safety and licensing board designated to rule on the petition and/or request that the petitioner has made a substantial showing of good cause for failure to file on time, and with particular reference to the following factors in addition to those set out in paragraph (d) of this section:

- (1) The availability of other means whereby the petitioner's interest will be protected.
- (2) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (3) The extent to which petitioner's interest will be represented by existing parties.
- (4) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.

In *Nuclear Fuel Services, Inc., et al.* (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975), the Commission addressed the standards to be applied in interpreting the four factors of §2.714(a). Observing that licensing boards have broad discretion in the circumstances of individual cases, the Commission stated:

Late petitioners properly have a substantial burden in justifying their tardiness. And the burden of justifying intervention on the basis of other factors in the rule is considerably greater when a latecomer has no good excuse. *Id.*, p. 275.

In this case we have found that Mr. Bursey has a marginally good excuse for the late filing. Therefore we assign a substantial but not great burden to Mr. Bursey in evaluating his Petition on the basis of the four other factors of §2.714(a).

With respect to the first factor, whether other means are available whereby the Petitioner's interests would be protected, the Staff believes that this factor (as well as the third factor) weighs in Petitioner's favor. The Applicant, however, states . . . "[T]here are other forums for certain of his concerns." The Applicant does not, however, purport to say that all of the Petitioner's interests can be protected by other means.⁵ The other agencies cited by Applicant cannot address all of Petitioner's concerns. This is an NRC licensing proceeding and only this Commission can fully ventilate the issues raised by Petitioner, including the two contentions identified above. The Board finds that the first factor favors granting intervention.

Both the Applicant and the Staff take the position that the Petitioner has not demonstrated that his participation may reasonably be expected to assist in developing a sound record. They state that some special expertise must be shown, therefore, the second factor of the rule weighs against granting the Petition. We have carefully examined the Petitioner's papers. He has demonstrated a familiarity with the Commission's regulations, a willingness to comply with them, and an understanding of the issues raised by his contentions. It is premature for the Petitioner to be required to go into the details of how he would present his case in a hearing.

The Staff cites *Public Service Co. of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-397, 5 NRC 1143 (May 9, 1977), and *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), ALAB-363, 4 NRC 631, 633 (1976), in support of its position that Petitioner must demonstrate some specialized education, relevant experience,⁶ or otherwise make a preliminary showing of his ability to offer qualified

⁵Applicant's Answer to Clarification, p. 4.

⁶Staff Response to Clarification dated September 6, 1977, p. 5.

experts.⁷ But the Staff's citations do not support its position nor does the Commission's decision in *Portland General Electric Company, et al.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976), upon which *Black Fox* and *North Anna, supra*, are based. In each of these decisions the Petitioner had failed to demonstrate standing to intervene within the *judicial standing doctrine*, but intervention was allowed as a *matter of discretion* because of the special contribution to be made by the Petitioner.

In the instant case the Board has found and the Staff agrees that the Petitioner has satisfied the "interest" requirement of §2.714(a). Therefore the test we must apply is simply whether the Petitioner may reasonably be expected to assist in developing a sound record. He has made at least a threshold showing of this intent and ability. If it should develop after discovery that this is not so, the Commission's summary disposition procedures under 10 CFR §2.749 may serve to reduce any burden to the other parties. We find the second factor in favor of intervention.

The third factor under §2.714(a) refers to the extent to which the Petitioner's interest will be represented by existing parties. It is not clear to the Board that this factor is applicable in a situation where, as here, no hearing whatever would be held were it not for the Petitioner's request.

Applicant argues that this factor weighs against granting Mr. Bursey's Petition because the NRC Staff always has the obligation of protecting the public health and safety whether a hearing is held or not.⁸ This could be true in a generic consideration covered by regulation or rulemaking, but here we have found specific contentions raised by Petitioner suitable as issues in controversy in this proceeding. We need not dwell upon this point because the Staff itself concedes that the third factor is weighed in Petitioner's favor presumably with full knowledge that Petitioner's individualized interests may better be advanced by him.⁹

Nor is it clear to the Board that factor number 4 is applicable in a situation where the granting of the Petition is the ordering of a hearing. If the Petition is not granted there will be no issues to broaden nor a proceeding to delay. Although the Staff believes that the fourth factor does not weigh in favor of the Petitioner it does not believe that it is a particularly weighty consideration in view of the Applicant's schedule for operation. Applicant states only that if the hearing is held, it raises "the specter of delay in the operation of Summer Station."¹⁰ The Board believes that this factor, if

⁷*Id.* and Staff Response to Amendment to Clarification dated November 14, 1977.

⁸Applicant's Answer to Clarification, p. 5.

⁹Staff response to Clarification, p. 6.

¹⁰Applicant's Answer to Clarification, p. 5.

applicable, is neutral, weighing neither in favor of nor against granting the Petition to Intervene.

Accordingly, considering the contentions, reason for late filing, the amount of delay in filing, and the four factors of §2.714(a) the Board concludes that the Petitioner has carried his burden to demonstrate that the Petition should be granted. In addition, the Board recognizes the importance of Contention 14. If it had been necessary we would have added additional weight because of Contention 14 in favor of granting the Petition as a matter of Board discretion referred to by the Commission in *West Valley*, *supra*.

ORDER

The Petition is granted. The Petitioner is admitted as a party to this proceeding. The Board will conduct a prehearing conference pursuant to 10 CFR §2.751(a) on March 30, 1978, in Columbia, South Carolina, at a time and place to be specified later. A Notice of Hearing reciting these actions will be published forthwith.

BY ORDER OF THE BOARD.

**FOR THE ATOMIC SAFETY
AND LICENSING BOARD**

Ivan W. Smith, Chairman

**Issued at Bethesda, Maryland,
this 3rd day of February 1978.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

John M. Frysiak, Chairman
Lester Kornblith
Oscar H. Paris

In the Matter of

Docket Nos. STN 50-566
STN 50-567

TENNESSEE VALLEY
AUTHORITY

(Yellow Creek Nuclear Plant,
Units 1 and 2)

February 3, 1978

The Licensing Board issues a partial initial decision, making findings of fact and conclusions of law and authorizing the issuance of a limited work authorization pursuant to 10 CFR §50.10(e), subject to certain terms and conditions.

FWPCA: EPA AUTHORITY

Although the staff unquestionably has authority to impose certain monitoring requirements, the authority does not extend to matters within the jurisdiction of the EPA (which has authority over effluent limitations pursuant to the Federal Water Pollution Control Act Amendments of 1972 (FWPCA)).

NEPA: COST-BENEFIT BALANCE

The staff must consider adverse effects on the aquatic environment in its NEPA cost-benefit balance, although it cannot require monitoring which is otherwise within the jurisdiction of the EPA Administrator.

TECHNICAL ISSUES DISCUSSED: Table S-3, radon-222; cooling water intake system; seismology.

PARTIAL INITIAL DECISION **(Limited Work Authorization)**

Appearances

James F. Burger, Esq., W. Walter LaRoche, Esq., and Alvin Gutterman, Esq., for the Applicant.

Aubrey Godwin, Director, Division of Radiological Health, for the State of Alabama Department of Public Health.

Eddie Fuente, Esq., Division of Radiological Health, for the State of Mississippi State Board of Health.

Edward Ketchen, Esq., and Robert Mitchell, Esq., for the U.S. Nuclear Regulatory Commission.

TABLE OF CONTENTS

| | Page |
|--|-------------|
| I. INTRODUCTION | 217 |
| II. ENVIRONMENTAL MATTERS | 219 |
| A. Compliance with 10 CFR Part 51 and the National Environmental Policy Act | 219 |
| (1) Impacts of Construction | 220 |
| (2) Impacts of Operation | 222 |
| (3) Need for Power | 225 |
| (4) Alternatives to the Proposed Plant | 226 |
| (5) Alternate Plant Systems | 228 |
| (6) Alternate Plant Sites | 228 |
| B. Compliance with the Federal Water Pollution Control Act Amendments of 1972 | 229 |
| (1) Construction | 232 |
| (2) Intake Structure | 233 |
| C. Cost-Benefit Analysis | 236 |
| III. SITE SUITABILITY | 238 |
| A. Introduction | 238 |

| | |
|---|-----|
| B. Exclusion Area, Low Population Zone, and Population Center Distance | 239 |
| C. Nearby Industrial, Transportation, and Military Facilities | 241 |
| D. Meteorology | 242 |
| E. Hydrology | 242 |
| F. Geology | 243 |
| G. Seismology | 245 |
| H. Foundations | 247 |
| IV. LIMITED WORK AUTHORIZATION (LWA) ACTIVITIES | 248 |
| V. CONCLUSIONS OF LAW | 251 |
| VI. ORDER | 252 |
| Attachment A - Exhibits | |
| Attachment B - LWA Activities | |

I. INTRODUCTION

1. This is a proceeding on the application of the Tennessee Valley Authority ("TVA or Applicant") for construction permits for the proposed Yellow Creek Nuclear Plant, Units 1 and 2 (the "facility"). This Partial Initial Decision examines Applicant's request for authorization to perform certain limited work activities, pursuant to 10 CFR §50.10(e).¹ A subsequent partial initial decision addressing the remaining radiological health and safety aspects of the construction permit application will be issued by this Board after the conclusion of public hearings on those issues.

2. The facility will consist of two pressurized water reactors, each with a rated core power level of 3,800 megawatts thermal and a net electrical output of 1,300 megawatts electrical.² The Yellow Creek site is located in north-east Mississippi in Tishomingo County about 9 miles north of the town

¹The work items are set forth in "Activities for Which the Tennessee Valley Authority has Requested a Limited Work Authorization" following Tr. 129.

²Staff's Exhibit 3, "Safety Evaluation Report (NUREG-0347), relating to construction of Yellow Creek Nuclear Plant, Units 1 and 2, December 1977, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation" (hereafter "SER") received into evidence at Tr. 520 at p. 1-1.

of Iuka.³ The 1,160-acre site is on a peninsula between the Yellow Creek embayment and the Pickwick Lake.⁴

3. The Commission published a "Notice of Hearing on Application for Construction Permits" on February 10, 1977 (42 *Fed. Reg.* 8441). As a result of this notice, no petitions to intervene were filed, but a number of persons requested permission to make limited appearances pursuant to 10 CFR §2.715(a). Both the Applicant (Tr. 303-309) and the Staff (Tr. 607-616) responded on the record to the statements or questions or both of the limited appearance participants. Although the Staff or the Applicant may elect to respond more specifically in writing to some questions (e.g., limited appearance statements concerning uranium fuel cycle comments of Dr. Jordan, see Tr. 41), we believe the FES, the Safety Evaluation Report, the ER, the PSAR, and the record in this case provide appropriate responses to any general questions, any generic questions and statements, or any specific site-related questions presented by the limited appearance participants. Accordingly, further consideration of the limited appearance statements in this Partial Initial Decision is unnecessary. These were received at the hearing sessions held December 13-15 and at the special session held for limited appearances on December 27, 1977.

4. The record of the hearing includes the testimony of witnesses for the Applicant and the Staff as well as the exhibits offered by the parties and received in evidence.⁵ At the hearing a manuscript entitled "Methods for Calculating Survival Rate, Biomass Production, Growth Rate, and Assessing Entrainment of Lacustrine Ichthyoplankton," by P.A. Hackney (1977), was marked for identification as Applicant's Exhibit #6 without objection, but its receipt into evidence was held up pending delivery of copies to parties and the Board. The requisite copies have been supplied, and Applicant's Exhibit #6 is now received into evidence.

5. The parties to this proceeding are the Applicant, the NRC Staff, and the States of Mississippi, Alabama, and Tennessee.⁶

6. By motion dated January 25, 1978, Applicant moves the Board to reopen the record in this proceeding pursuant to 10 CFR §2.718(j) to receive into evidence the affidavit of one Thomas E. Spink, dated January 25, 1978, together with Attachment A, on the ground that the information contained therein may have a bearing on site suitability issues. Staff does not

³Staff's Exhibit 1, "Final Environmental Statement (NUREG-0365), Yellow Creek Nuclear Plant, Units 1 and 2, November 1977, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation" (hereafter "FES"), received into evidence at Tr. 363.

⁴SER at 1-1.

⁵Exhibits are appended as Attachment A.

⁶The States are participating in the proceeding as "interested States" pursuant to 10 CFR §2.715(c).

object to the motion.⁷ The Board finds the information relevant and grants Applicant's motion to reopen the record for the limited purpose of receiving into evidence the affidavit of Thomas E. Spink, dated January 25, 1978, together with Attachment A. Said affidavit is marked Applicant's Exhibit #8 and is received into evidence. Applicant is authorized to supply and distribute the requisite number of copies of the exhibit.

II. ENVIRONMENTAL MATTERS

A. Compliance with 10 CFR Part 51 and the National Environmental Policy Act

7. This Board is responsible for determining whether the requirements of the National Environmental Policy Act of 1969 (NEPA) §§102(2)(A), (C), and (D) and of 10 CFR Part 51 have been met in this proceeding. We must weigh the environmental, economic, technical, and other benefits against environmental and other costs, and considering available alternatives determine the appropriate action to be taken. We must, in addition, determine whether the NEPA review conducted by the NRC Staff has been adequate. Finally, we must decide those matters in controversy between the parties within the scope of NEPA and 10 CFR Part 51.

8. In accordance with 10 CFR Part 51 the Applicant has submitted an Environmental Report (ER) (Applicant's Exhibit #1) with its application. The NRC Staff circulated its Draft Environmental Statement (DES) in June 1977 and published its Final Environmental Statement (FES) (Staff's Exhibit #1) in November 1977. Our decision is based upon these documents and other evidence relating thereto which is before us.

9. The FES describes the proposed site, the major plant systems, and the environmental impacts of site preparation, plant construction, and plant operation. It contains the Staff's cost-benefit analysis, which considers the environmental effects of the proposed facility and alternatives for avoiding or reducing adverse effects. On the basis of its review, Staff concluded that the action called for under NEPA and 10 CFR Part 51 is issuance of construction permits, subject to certain conditions for protection of the environment. FES at ii.

⁷Immediately prior to issuance of this decision, the Staff's response was received stating *inter alia* that its review of the material was not complete. If the Staff finds design inadequacies at the conclusion of its review, these can be dealt with during the health and safety portion of the hearing.

(1) Impacts of Construction

(a) Land

10. Present land use on the site, primarily forest production and limited agriculture, will terminate. FES §4.1. Less than 500 acres of the 1,160-acre site will be altered by construction activities. FES §4.1; ER §4.3.1.1. Upon conclusion of construction, approximately 200 acres will be permanently committed to plant facilities and access roads. FES §4.1. The remainder will be revegetated by seeding and planting. *Ibid.* The total acreage to be committed to the facility and disturbed during its construction is very small compared to the total land available for forest production and agriculture in the area (Alcorn, Tishomingo, and Hardin Counties). ER §2.1.4. We conclude that the impact of this facility on forest and land resources will be insignificant.

11. Dust, smoke, and noise will be generated during construction. FES §4.3.1.3; ER §4.1.3.1. Appropriate measures will be taken by the Applicant to mitigate the impact of these factors. ER §4.1.3.1. We find these measures to be adequate and the impact acceptably minor.

12. Terrestrial fauna on the site will be adversely impacted by the noise and dust created by construction activities, as well as by habitat destruction and alteration. FES §4.3.1; ER §4.1.1.2. Much of this disturbance will be temporary, associated with construction; some habitat will be permanently lost, of course. Staff estimated that wildlife losses on Yellow Creek peninsula due to construction may amount to 30% of the present populations. FES §4.3.1. We note, however, that the site occupies much less than 1/3 of the peninsula, and less than 1/2 of the site will be disturbed during construction. We consider Staff's estimate to be extremely conservative. We believe that the impact on terrestrial fauna, including wildlife, will be acceptably minor.

(b) Water

13. The principal impact from construction on aquatic systems will be increased turbidity and siltation caused by grading and filling, excavation, dredging, and construction of the barge slip and the intake and discharge structures. FES §4.3.2.1. To minimize the impact of these activities, the Applicant will implement an erosion and sedimentation control program, to include minimizing slope angle and the use of berms, diversion dikes, check dams, stormwater collection, settling ponds, mulches, gravel, sediment basins, fiber mats, grasses, special drains, and netting, as needed. *Ibid.* Point source discharges will comply with requirements of the National

Pollutant Discharge Elimination System (NPDES) discharge permit to be issued by the Environmental Protection Agency (EPA). ER §4.1.2, Appendix A; FES §4.2.1, Appendix C. This permit will require the Applicant to submit to EPA for review and approval a detailed study plan for monitoring aquatic impact upon commencement of construction, as generally outlined in Section 6.2 of the ER. The planned mitigation measures and monitoring program will adequately serve to minimize the impact of construction on aquatic systems.

14. In addition to the short-term increases in turbidity and siltation already mentioned, there will be a long-term loss of small areas of aquatic habitat. This loss will involve Slick Rock Branch, Tacket Branch, Bullard Branch, and portions of Slick Rock Cove. FES §4.3.2; ER §4.1.2. Staff estimates that construction will result in a standing-fish-stock loss of about 0.1% and a spawning-habitat loss of about 1% for the Yellow Creek embayment. FES §4.3.2.1. We consider these losses to constitute a minor impact.

(c) Archeological Sites

15. An archeological survey conducted by the Applicant at the plant site identified numerous archeological sites. FES §2.9.2. A data-recovery and mitigation plan was submitted by TVA to the Advisory Council on Historic Preservation, which subsequently concurred with TVA's proposal. *Ibid.* Staff reports that the function and distribution of these sites is unique; because of their location and importance it recommends that an archeologist must be present when the initial earth-moving activities take place, so that buried sites and sites not located previously can be identified and action taken to collect data. FES §4.4.7. We concur with Staff's conclusion.

(d) Transmission Lines

16. Transmission lines will require an additional commitment of about 2,266 acres. ER §§4.2, 4.3.1. Where they cross forested land, forest habitat will be replaced by low vegetation and edge habitat. Staff Exhibit #2 at i. The lines will also cross numerous streams. FES §4.3.2.2. Staff has identified certain precautions which should be required to keep environmental effects of transmission lines to a minimum practical level. FES §4.5.2.1. We find that with Staff's recommended requirements the impact of transmission line construction will be at an acceptable level.

(e) Socioeconomic Impacts

17. Both Applicant and Staff have analyzed the potential socioeconomic impacts that will result from plant construction. FES §4.4; ER §4.4. During the peak construction period, 30% of the construction force or about 780 workers will move into the area. About 60% of these will bring their families with an average of one school-age child per family (470 children). FES §4.4.1.2; ER at 4-1, 4.4-3. The maximum immigrating population at any one time is expected to be about 1,720 individuals. FES §4.4.1.2. This population increase will affect housing patterns and housing availability and will place additional demand on social organizations and municipal services. FES §4.4.2. The Applicant has proposed a program, summarized in the FES §4.5.1.4 and the ER §4.4.3, which is designed to mitigate these effects. We find the analyses of socioeconomic impacts to be adequate and that the measures proposed to mitigate them are appropriate.

(2) Impacts of Operation

(a) Land

18. The operation of the plant will remove the site from timber and agricultural production, as mentioned *supra*. It will also preclude the use of the site, its shoreline on Yellow Creek embayment, and Goat Island for recreation. FES §§5.1, 11.4.4.6. A replacement of the camping facilities on Goat Island will be provided on the mainland west of Goat Island. FES §11.4.4.6. That portion of the Yellow Creek embayment which falls in the exclusion area will continue to be accessible for fishing and boating. Tr. 523, "Site Suitability Report" (SSR) at 2. We found *supra* that the commitment of land to the plant site would not constitute a significant impact. We find likewise with regard to the impact on recreation.

(b) Water

19. Cooling water for the plant's heat-dissipation system will be drawn from the Yellow Creek embayment of Pickwick Lake. FES §5.2.1. Maximum makeup water requirements will be approximately 146.6 ft³/s, of which about 65.5 ft³/s will be returned to Pickwick Lake as blowdown, and the remainder will be lost to the atmosphere as vapor or drift. Staff Exhibit #2 at i; ER §§3.4.3.3, 3.4.4.3. This consumptive use of water is greater than the monthly average minimum flow of Yellow Creek during fall and summer, but it is only about 1% of the minimum daily average flow of the Tennessee River downstream at Pickwick Landing Dam. FES §5.2.1. Water

availability in Pickwick Lake is the controlling factor, because it regulates pool level in Yellow Creek embayment. *Ibid.* Thus the operation of the plant will have an insignificant impact on water availability.

20. The water discharged from the plant to Pickwick Lake will affect about 2% of the river cross section at discharge location. FES §5.5.2.2. Because the discharge is released offshore in the channel, it will have little or no impact on inshore spawning areas. *Ibid.* Staff believes that under worst-case temperature difference between blowdown and river, fish larvae passing through the mixing zone could experience thermal stress; the small cross section of the plume relative to the total river, however, and the short residence time of the larvae in the plume will result in no unacceptable mortality of fish larvae. *Ibid.* When ambient temperature is 30°C and blowdown water is > 30°C, the discharge would exceed the State of Mississippi's maximum temperature standard. FES §5.3.2.4. TVA has requested and tentatively received from the Regional Administrator of EPA less stringent alternative limitations for the Yellow Creek plant. *Ibid.* Chemicals included in the discharge will not result in a measurable change in the water quality of Pickwick Lake. FES §5.5.2.2. Staff expects that plant chemical discharges will not exceed the water quality standards of the States of Mississippi, Alabama, and Tennessee. FES §5.3.3.2. We conclude from the evidence that the impact of the water discharged into Pickwick Lake by the plant will be acceptably minor.

(c) Cooling Towers

21. Initially Applicant considered using mechanical-draft cooling towers but now intends to use natural-draft cooling towers to discharge most of the plant's waste heat. Staff FES §9.3.1.2. Utilizing information presented to it in early October, Staff expanded its evaluation of this mode of heat dissipation. *Ibid*; see also Supplemental Testimony of the NRC Staff Relating to Natural-Draft Cooling Towers and Other Changes Included in Revision 3 to the Yellow Creek Nuclear Plant, Units 1 and 2, ER following Tr. 360 (herein "Staff Supp. Test.").

22. Two 550-foot natural-draft cooling towers (NDCT) will be used. Staff Supp. Test. at 6. Operation of the cooling towers will cause the formation of a visible cloudlike plume, which will contain soluble chemicals that are present in the circulating water. Tower operation will cause large amounts of heat and water vapor to be added to the atmosphere over a small area, as a result of which local atmospheric changes may occur. *Id.* at 7. The most significant of these changes will be a minor reduction of sunshine reaching the small, shifting area shaded by the plume. *Id.* at 8. Ground-level fogging and icing created downwind of the NDCT would be

confined to the site. *Ibid.* Experience with operating NDCT's indicates that the drift deposition of the cooling water and the solids in the plume are too low to be measured or to create environmental impacts. *Id.* at 9. It is anticipated that the primary adverse impact of the NDCT's will be the visibility of the plume for several miles around the facility, including areas in and around Pickwick Lake and the Yellow Creek embayment. The towers themselves will be visible from many areas in and around the lake and embayment. *Id.* at 10. Staff, while acknowledging that it is difficult to predict the impact of the visibility of the cooling towers and their plumes, does not believe that the recreational use of the area will be significantly affected by the towers. FES §9.1.3.2. We conclude that the ecological impact of the NDCT's will be minor and the visual impact will depend primarily on the eyes of the beholder. Overall we do not find the proposed towers environmentally unacceptable.

(d) Radiological Impact on Man

23. Both Applicant and Staff have evaluated the radiation doses to man at and beyond the side boundary, using conservative assumptions on dilution of effluent gases, dilution of radionuclides in liquid discharge, and use by man of the area surrounding the plant. FES §5.4; ER §5.2. Individual doses are presented in Tables 5.9, 5.12, and 5.14 of the Staff's FES, and population dose commitments are presented in Table 5.10. The calculated doses from liquid effluents are 0.51 millirem per year to the total body and 0.68 millirem per year to any organ. FES Table 5.14. The calculated doses from noble gas effluents are estimated to be 0.21 millirem per year to the total body and 0.62 millirem per year to the skin. The dose to any organ from radioiodine and from particulates is estimated to be 1.4 millirem per year. *Ibid.* These annual individual doses resulting from plant operation are a small fraction of the dose limits specified in 10 CFR Part 20 and 10 CFR §50.34 as defined in Appendix I to 10 CFR Part 50. The estimated population doses resulting from operation of the plant are also small fractions of the annual dose received from natural background radioactivity. FES §5.4.1.6. Consequently Applicant and Staff concluded that there will be no measurable radiological impact upon man from the routine operation of the Yellow Creek plant. FES §§3.5, 5.4.1.6. We concur.⁴

24. Applicant and Staff have analyzed the environmental effects of postulated accidents, using best estimates of probabilities and realistic

⁴At the time it introduced the FES into evidence the Staff excepted from its offer certain portions dealing with health effects of the nuclear fuel cycle. We discuss this in detail in paragraphs 31 and 32, *infra*.

assumptions with regard to fission product release and transport. FES Ch. 7; ER Ch. 7. The radiological effects on the environment were assessed by Staff using the guidance issued as a proposed amendment to 10 CFR Part 50, Appendix D, dated December 1, 1971 (36 *Fed. Reg.* 22851). FES Ch. 7. The results of this analysis show that environmental risks due to postulated accidents are exceedingly small.

(3) Need for Power

25. The TVA system is a winter-peaking system serving a population of about 6.7 million people. It is primarily a wholesaler serving 110 municipal systems, 50 cooperatives, a number of large directly served industries, and several directly served Federal agencies. FES at 8-1. It plans to put the first Yellow Creek unit in commercial service in March 1985 and the second in March 1986. ER, Introduction at II. Unit 1 will thus be available to serve the fiscal 1986 peakload. To support the need for this schedule, TVA has performed a detailed year-by-year forecast of its peakload and energy requirements. ER, §1.1. The Staff has carefully evaluated these forecasts, FES at 8-2—8-18, and has independently assessed the Applicant's need for power. FES at 8-21—8-24. The Staff has concluded that TVA's projections are reasonable and that the Applicant has appropriately planned its system capacity expansion program to meet its projected needs. FES at 8-23.

26. TVA estimates that the peakload in 1986 will be 36,000 MW compared to a 1973 (pre-embargo) peakload of 18,888 MW and a 1977 peak of 21,803 MW. The average growth rates for 1973-1986 and 1977-1986 are 5.1% and 5.7%, respectively. ER at Table 1.1. A more meaningful parameter, however, is the growth rate obtained by subtracting from the actual peakloads the ERDA load (which is predetermined) and normalizing the non-ERDA peaks to a nominal minimum temperature. The 1973, 1977, and 1986 peaks are then 17,421, 19,476, and 31,515 MW, respectively, and the average annual projected growth rates for 1973-1986 and 1977-1986 are 4.7% and 5.7%, respectively. FES at Table 8.4. The historical values of the adjusted peakload growths are 6.3% for the period 1965-1973 and 6.1% from 1965 through 1977. *Ibid.*

27. Looking similarly at energy requirements (exclusive of the Federal component), we find average annual historic growth rates of 7.3% for the 1965-1973 period and 5.7% for 1965-1977. The projected rates are 4.8% for 1973-1986 and 5.8% for 1977-1986. FES at Table 8.1. Thus, projected growth rates for both energy and peak demand are somewhat lower than historic rates. These reductions are due in part to the effects of conservation, which both Staff and Applicant have considered in their projections.

28. Taking into account TVA's firm net purchase of 1,100 MW in 1986,

the peakload responsibility that year will be 34,900 MW. In 1987 and 1988 this is expected to increase to 37,650 MW and 39,400 MW, respectively. Assuming the timely availability of both Yellow Creek units and all units scheduled to be completed earlier, the capacity available will be 43,155 in 1986, 21.6% in 1987, and 16.0% in 1988. If the Yellow Creek units are each delayed 1 year the respective reserve margins will be 20.0%, 18.1%, and 12.7%. If they are delayed by 2 years, the figures will be 20.0%, 14.6%, and 12.7%. FES at Table 8.16. Four nuclear units other than Yellow Creek are scheduled to be put into commercial service during the 2 years immediately prior to the 1986 winter peak. ER at Table 1.1-27. Delay of any of these will further reduce the reserve margin (by about 3.4% per unit delayed). In view of the FPC suggested reserve margin of 15-25%, FES at 8-23, the capacity expansion plans of the Applicant appear to be reasonable. The Board finds that the power to be generated will be needed by TVA at the dates scheduled for plant completion or shortly thereafter.

(4) Alternatives to the Proposed Plant

29. The Applicant and Staff independently evaluated a number of alternatives to the proposed nuclear generating station. These included both alternatives that would not require construction of additional generating capacity, such as purchased power and energy conservation, and alternative methods of generating the necessary power. Purchased power would be a viable alternative only if utilities of another region consistently maintained capacity in excess of needs. This cannot be reliably predicted and, therefore, is not a viable alternative. Other energy sources evaluated included solar, geothermal, hydro, and fossil fuel power sources. The analysis indicates that the only viable alternatives for the needed baseload capacity addition are fossil fuel (in particular coal) and nuclear power. FES at 8-13—8-18, 9-1, 9-2; ER at 9.1-1—9.2-17. Both parties prepared detailed comparisons of these two alternatives, considering both economic and environmental factors. ER at 9.2-7, 9.2-8; FES at 9-2—9-6. The Applicant concluded that the cost advantage of a nuclear plant was 8.0 mills/kWh for high sulfur coal and 8.5 mills/kWh for low sulfur coal, based on a 70% capacity factor. ER at Table 9.2-1. The Staff's analysis was made only for the high sulfur case and indicated a nuclear advantage of 10.0 mills/kWh for the 70% capacity factor case. The cost advantage for the nuclear plant, the Staff found, would be 9.6 mills/kWh and 9.2 mills/kWh for operation of both plants at 60% and 50% capacity factors, respectively. FES at Table 9.1. At 70% capacity factor, each mill per kilowatt-hour difference is equivalent to about \$16,000,000 per year.

30. With respect to the environmental comparison, the Applicant considered air pollution, thermal pollution, radioactive effluents, fuel transportation, waste disposal, land use, noise, and aesthetics. It concluded that the environmental impact of a nuclear plant would be less than that of a coal-fired plant. ER at 9.2-8—9.2-17, Table 9.2-6. The Staff's analysis focussed primarily on health effects, limiting the comparison of other factors to a single table, Table 9.9, in the FES. With respect to the health effects, the FES shows and the Staff concludes, that the nuclear fuel cycle is considerably less harmful to man than the coal fuel cycle. FES at 9-16. The Staff goes on to note that although there are substantial uncertainties in both estimates, the impact of transportation of coal is well known and alone is greater than the Staff's conservative estimate of the effects of the entire uranium fuel cycle. The Staff further emphasizes that the increased risk of health effects for either fuel cycle represents a very small incremental risk to the average public individual. *Id.* at 9-17.

31. Prior to offering the FES into evidence, the Staff counsel asked the Staff Environmental Project Manager whether he adopted the FES as being true and correct and received an affirmative answer. Tr. 317. However, before moving it into evidence, Staff counsel called to the attention of the Board previous correspondence relating to the accuracy of Table S-3 of 10 CFR §51.20 (also presented as Table 5.15 of the FES), Tr. 322, and stated that the matter discussed in that correspondence might, after completion of the Staff's evaluation of it, be significant in this proceeding. Tr. 323. This evaluation was expected to be available "within a couple of weeks," *ibid.*, and he requested that the record be kept open for its receipt. The Board subsequently asked the Staff witness for particularization of the sections of the FES with respect to which he had reservations. He identified two paragraphs in Section 5.7, one entry in Table 9.10-A, and one paragraph in Section 9.1.2.3. Tr. 353-355. During cross-examination by Applicant's counsel, the witness stated that if the value of 74.5 curies for radon-222 effluent in FES Table 5.15 (and 10 CFR §51.2 Table S-3) were correct and if review of that number did not show something else to be in error in Table S-3, he could adopt the FES without reservation. Tr. 370-374. No further evidence on this matter was offered before the record was closed on December 27.

32. The Board has reviewed this question and has determined that it is bound by 10 CFR §51.20 and Table S-3 therein.⁹ The Staff witness has testified that if Table S-3 is correct, the FES is true and correct in its entirety. On this basis, the Board finds that the environmental impact of the

⁹See also *Metropolitan Edison Company, et al.* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-456, 7 NRC 63, 67 (January 27, 1978).

nuclear plant, including health effects, is less than the environmental impact of the coal-fired plant and that, considering both economic and environmental effects, the nuclear plant is the more desirable alternative.¹⁰

(5) Alternate Plant Systems

33. In order to minimize the environmental impact of Yellow Creek, both Staff and Applicant have evaluated alternatives to various plant systems, considering economic costs and operational aspects as well as environmental impacts. Several methods of waste heat dissipation were considered. The Applicant concluded that no alternative system had a clear environmental advantage and that the natural-draft cooling towers should be selected on an economic basis. ER at 10.1-1. The Staff concluded that mechanical-draft towers and fan-assisted natural-draft towers were viable alternatives but that the selected natural-draft towers were a reasonable choice. FES at 9-27. The Board agrees.

34. Various other alternate plant systems, such as makeup water system waste disposal, biocide treatment, sanitary waste treatment, radioactive waste treatment, nonradioactive solid waste treatment, access facilities, and transmission line routes were considered. None of these evaluations reflected economic or environmental advantages that would warrant their selection instead of the systems proposed. FES at 9-28—9-30; ER at §§10.2-10.13. The Board agrees with this conclusion.

(6) Alternate Plant Sites

35. TVA, as a part of its ongoing power program effort, maintains a siting program organized along two functional lines: inventory siting and project siting. The inventory siting process involves long-term planning to identify, investigate, and acquire inventory sites believed suitable for future power facilities. The project siting process is directed towards the identification and investigation of sites believed suitable for specific authorized projects. FES at 9-17; ER at 9.2-17—9.2-19. The size of the TVA service area and the large attendant investments in the transmission system make the geographic relation of generation to load an important siting consideration in determining initially the area in which a new facility is to be located. A balance of engineering, economic, and environmental factors is taken into consideration in determining preferred sites within the desired area for a

¹⁰While this decision was in the final stages of preparation, we received from the Staff supplemental proposed findings on this matter and supporting affidavits supplied for information. The fundamental conclusion of the proposed findings is incorporated herein. To the extent the detailed proposed findings are not adopted, they are not necessary to our decision.

particular facility. Further screening includes an examination of factors such as access, flooding conditions, topography, seismology, and availability of cooling water. *Ibid.* The Staff found and the Board concurs that this is a reasonable approach for preliminary site screening.

36. TVA has divided its system into five areas in order to facilitate studies of energy-load growth and general power flows in the system. TVA studies indicate that a significant deficit of generation will exist in the western portions (areas 1 and 5) of the TVA system unless increased generating capabilities are available in the mid-1980's. FES at 9-17; ER at 9.2-19—9.2-24.

37. TVA identified 15 candidate sites in the two affected areas suitable for power plant siting based on their general characteristics. FES at 9-19; ER at Appendix E. Four of these sites were selected for further studies. Of these four, Saltillo and Yellow Creek were added to TVA's site inventory, based primarily on lower foundation costs and sizes of the sites. *Ibid.* The Staff, in its examination, concluded that the Saltillo site does not offer advantages over the proposed Yellow Creek site and accordingly the choice of Yellow Creek by TVA was considered to be reasonable. FES at 9-21. The Board concurs with the Staff's assessment. None of the identified sites are "obviously superior" to the proposed Yellow Creek site.

B. Compliance with the Federal Water Pollution Control Act Amendments of 1972

38. As required by Section 402 of the Federal Water Pollution Control Act Amendments of 1972 (FWPCA), 33 U.S.C. §1251, *et seq.*, the Applicant must receive a final NPDES permit for the Yellow Creek project from the EPA. In accordance with the Second Memorandum of Understanding between the NRC and EPA with regard to implementation of certain responsibilities (40 *Fed. Reg.* 60117, 60120), the Staff has appended a copy of the proposed NPDES permit and of the public notice to be issued by EPA as Appendix C to the FES.¹¹

39. The Staff seeks to impose on the Applicant several conditions which the Applicant asserts are prohibited by §511(c)(2) of the FWPCA, which states:

(2) Nothing in the National Environmental Policy Act of 1969 [83 Stat. 852] shall be deemed to—

(A) authorize any Federal agency authorized to license or permit the conduct of any activity which may result in the discharge of a pollutant

¹¹We are advised by the Applicant that public notice of the proposed issuance was issued on December 1, 1977. Applicant's Proposed Findings at n. 7, p. 29.

into the navigable waters to review any effluent limitation or other requirement established pursuant to this Act or the adequacy of any certification under section 401 of this Act; or

(B) authorize any such agency to impose, as a condition precedent to the issuance of any license or permit, any effluent limitation other than any such limitation established pursuant to this Act.

The principal matters involved are (1) right of approval of TVA's construction monitoring program, (2) right of approval of changes to the portions of the preoperational monitoring program dealing with the aquatic environment, and (3) right to require that TVA install an impact-mitigating device on the intake screen if necessary.

40. Staff argues that while the EPA has primary jurisdiction over effluent limitations pursuant to the FWPCA, the NRC is required by NEPA to exercise overall environmental responsibility in approving the site and the proposed facility in issuing a limited work authorization and construction permit. Staff Proposed Findings at 17-18. The Staff argues further that the NRC must consider the environmental impacts of the intake system (and monitoring requirements) approved by EPA and factor these into its cost-benefit balancing under NEPA. NRC Staff's Brief in Support of the Commission's Authority to Impose Monitoring Conditions Pursuant to NEPA (hereinafter "Staff's Brief") at 2-3. Applicant, while agreeing with Staff on the basic jurisdictional split and on the need for the NRC to take these matters into account in its cost-benefit balancing, argues the above-cited section of FWPCA clearly prohibits the conditions in contention, basing its interpretation of "other requirements" on §402(a)(2) of FWPCA which specifies that "The Administrator shall prescribe conditions for such [NPDES] permits to assure compliance with Paragraph (1) of this subsection, including conditions on data and information collecting, reporting, and such other requirements as he deems appropriate." Clearly, Applicant argues, monitoring requirements fall within the Administrator's jurisdiction and authority. Applicant's Brief in Support of Its Proposed Findings of Fact and Conclusions of Law at 9-10.

41. The Board agrees that such matters are within the authority of the Administrator and that he has exercised that authority by imposing, with respect to the three matters identified above, the conditions set forth in Sections G and H of Part III of the NPDES permit. FES at p. C-17. We also agree with TVA's interpretation that these conditions are "other requirements" as that term is used in §511(c)(2) cited above. This is also consistent with the Commission's definition of "other requirements" set forth in the Second Memorandum of Understanding, Appendix A, paragraph 2.a. Appendix A goes on to say, in paragraph 3, that:

Except as provided in Paragraph 6 [not relevant here], if and to the extent that there are applicable limitations or other requirements promulgated or imposed pursuant to the FWPCA, different limitations or requirements will not be imposed by the NRC as a condition to any permit or license

42. The Staff's argument that it must consider these matters in its cost-benefit balancing is, of course, beyond dispute. The Staff, however, extends its requirements to include its "authority under NEPA to monitor the actual effects of a licensee's construction and operation under a Commission construction permit or operating license, even after the favorable cost-benefit balance is struck." Staff's Brief at 4. The citations by the Staff to the Commission's rules set forth to support this assertion do not do so. Although the Staff unquestionably has authority to impose certain monitoring requirements (and we do not attempt to define the full scope of that authority here), the authority does not extend to matters within the jurisdiction of the Administrator of EPA. The intent of Congress that the FWPCA would, in limited respects, supersede NEPA is clear in the opening phrase of §511(c)(2) as well as in the legislative history of the Act. The determination by Congress to avoid dual regulation and to lodge the responsibility and authority where the expertise rests is further set forth in §101(f) of FWPCA, where it is stated that:

It is the national policy that to the maximum extent possible the procedures utilized for implementing this Act shall encourage the drastic minimization of paperwork and interagency decision procedures, and make the best use of available manpower and funds, so as to prevent needless duplication and unnecessary delays at all levels of government.

43. Based on these considerations, we have modified some of the conditions sought by the Staff. Principally, these are inherent in proposed Condition 7.b, FES at ii, which states that "[i]n addition to the preoperational monitoring program set forth in Section 6 of the Environmental Report, with amendments, the Staff recomme[n]dations (sic) in Section 6 of this document shall be followed." This condition will be limited to those recommendations not within the jurisdiction of EPA, as we understand it. Lest our position be misunderstood, we want to emphasize that the effects that the Staff wants to have monitored and the alteration that might be necessary to the intake structure are important. Monitoring must take place and future action may be necessary. The EPA, however, has made provisions for this in the NPDES. If the Staff feels that these conditions are not adequate, the route to improvement is through EPA. The Staff states relations between it and EPA are working smoothly. Staff's Brief at 2. We urge the Staff to maintain this close relationship and to exploit it when necessary.

(1) Construction

44. In spite of measures taken to mitigate impacts on aquatic systems (see paragraph 13, *supra*) construction activities will have a major *short-term* effect on Slick Rock Branch, Yellow Creek embayment, and Pickwick Lake as a result of dredging and erosion. FES §4.3.2.1. The more important impacts will involve loss of habitat, reduction of primary productivity (as a result of increased turbidity), mortality of periphyton and macrophytes (as a result of reduction of dissolved oxygen), disruption of benthic communities, and disruption of fish migrations and spawning activities. *Ibid.* These impacts will be temporary, however, and the disturbed areas should recover following cessation of construction activities. Further, the temporary losses from aquatic populations because of construction activities will be insignificant considering the total populations in the embayment and entire lake.

45. The Staff has summarized commitments made by the Applicant to mitigate adverse effects of construction on water quality and aquatic systems. FES §§4.5.1.2, 4.5.1.3. These commitments have been included as conditions which Staff recommends for the limited work authorization and construction permit. FES at ii. We adopt this recommendation as a condition of our authorization.

46. The release of toxic substances associated with resuspension of sediments during in-stream excavation for the intake and discharge structures could result in adverse impacts on water quality and aquatic biota. FES §4.3.2.1. Because of the comparatively small amount of in-stream excavation that will be necessary for installation of the intake and discharge system, no long-term irreparable damage to the aquatic systems of the Yellow Creek embayment is anticipated. Depending on sediment contamination, however, short-term impacts could result from resuspension of mercury or other toxic substances. FES §4.3.2.1. The Staff and the EPA, as part of their independent statutory responsibilities to conduct a NEPA analysis, elected to require the Applicant to perform sediment and elutriate tests (with special attention to mercury) on riverbed deposits at the Yellow Creek site according to promulgated guidelines. The Staff indicated that based on the results of these tests, special conditions for the control of disturbed sediments may be necessary. *Ibid.* The Staff's construction permit condition is contained in FES §4.5.2.2. Staff now says that the Applicant submitted adequate sediment analysis and elutriate test results on riverbed deposits in Revision 3 to the ER. The tests show that resuspension of mercury will not cause a significant impact. Tr. 332. Staff concludes that the condition called for in FES §4.5.2.2, Item 1, is no longer necessary and should not be made a condition of the permit. *Ibid.* We concur.

(2) Intake Structure

(a) Intake System

47. The proposed intake system will be located in Yellow Creek embayment in the vicinity of Slick Rock Branch. ER §3.4.3.2. The pump station will be placed behind a dike in Slick Rock Branch inlet, and the intake will consist of six pipes which penetrate the dike and open above the bottom about 500 feet from the dike, near the center of the embayment. *Ibid.* The pipes have a diameter of 7.5 feet, and their tops will be 12 to 18 feet below the surface, depending on reservoir elevation. *Ibid.* Vertical traveling screens and a trash rack will be installed on the openings at the pump station, but no screens are proposed for the intake pipes. *Ibid.* The potential impact of the intake on fish populations was the subject of much discussion during the evidentiary hearing and is the basis for controversy between Applicant and Staff. We now consider that issue and decide the controversy, pursuant to our responsibility and authority under NEPA.

(b) Alternatives

48. Alternatives to the selected intake Design D included four additional plans for Yellow Creek embayment and three for Pickwick Lake, ER §10.2; FES §9.3.2. The three schemes for placement of the intake on the lake side of the peninsula were rejected because of design, cost, and esthetic considerations, and because of the severe impact on the terrestrial environment that would be associated with placing the intake in Pickwick Lake. *Ibid.* Of the five plans for placing the intake on Yellow Creek embayment, Staff considered two schemes to be environmentally unacceptable because of the high fish mortality they would cause, one to be environmentally less desirable than Design D because it would destroy more cove habitat, and one less desirable because of expense. FES §9.3.2. Thus they concluded that proposed Design D was the preferred alternative, but they recommended that the design not preclude the future installation of an impingement or entrainment mitigation device. *Ibid.*

(c) Design of Intake

49. Prior to reviewing Revision 3 of the ER (dated December 1, 1977), Staff was under the impression that the ends of the intake pipes were to turn downward so that the openings were parallel to and close to the bottom. Tr. 395-6. The EPA was reported to have shared Staff's belief. *Ibid.*, Tr. 407, 603. Staff was under the further impression that there was a thermal

stratification in the embayment which would cause fish population density to be low in the zone where the pipes opened. Tr. 395-6, 467-9. On the basis of this understanding Staff recommended selection of intake Design D (just described) over several alternatives, with the added recommendation that the design not preclude the future installation of an impingement mitigation device. FES §9.3.2; Tr. 405-7.

50. As a result of reviewing Revision 3 of the ER and consulting further with EPA, Staff became aware that the Applicant's proposal in fact called for the openings of the intake pipes to be vertical, perpendicular to the bottom. Tr. 395-6, 407.¹² Also, Staff learned that there is no thermal stratification in Yellow Creek embayment. Tr. 396, 435-36. As a consequence of these discoveries, one of the Staff witnesses, Mr. Stupka, testified initially that the proposed intake Design D was "unacceptable on environmental grounds." Tr. 393. Later, however, he modified that testimony by saying, "And I consider that there will be an unacceptable—pardon me—a needless adverse environmental impact as a result of placing the pipe in the position that they have, the intake structures." Tr. 442. Dr. Sharma, Project Leader for the Staff's team of consulting witnesses, testified that he believed the offshore location of the pipes was the preferred location because it was a region of relatively low density of fish larvae. Tr. 443. He also testified that the panel felt that the new understanding with regard to the intake "in no way shifts the cost-benefit balance of the plant." Tr. 446. Staff witness Mr. Scaletti, Environmental Project Manager for the U.S. NRC, likewise testified that the panel's position was that the cost-benefit balance in the FES was valid in spite of the new understanding with regard to the intake. Tr. 420.

51. In view of the foregoing we find that the location of the intake system is acceptable on environmental grounds. In addition, we find that the design of the intake pipes is adequate on environmental grounds insofar as regards the fact that the ends of the pipes will be vertical rather than horizontal to the bottom. We turn now to consider Staff's recommendations that the design not preclude the future installation of a device to mitigate entrainment and that Applicant monitor entrainment after the plant goes into operation.¹³

(d) Fish Mortality

52. Yellow Creek embayment is a productive nursery for fishes. FES

¹²The evidence shows that Staff's misunderstanding resulted from a misinterpretation of a sentence of p. 3.5-8 of the ER. Tr. 603-4. In fact, the Applicant never proposed that the ends of the intake pipes would turn downward. Tr. 600.

¹³Although the FES refers to "impingement," our interpretation of the problem is that we are concerned primarily with "entrainment" by the intake pipes. FES at ii, §9.3.2; Tr. 488-89.

§5.5.2.1. The relative abundance of juvenile clupeids, catostomids, ictalurids, and sciaenids are much greater in the embayment than in Pickwick Lake. ER Appendix F7. Because of the shallow depth of Yellow Creek embayment, there is no hypolimnion; as a consequence there will be considerable numbers of larvae present near the bottom in the vicinity of the intake, although not as many as there would be near the shoreline. Tr. 230. Applicant has used two methods to estimate the extent of fish larval mortality that will result from entrainment. ER §5.1.3.1. Estimate 1 assumes that fish larvae are distributed homogeneously in the waters of the embayment, while Estimate 2 is based on sample data taken in the area where the intake is to be located. *Ibid.*, Tr. 203-10, 221-30.¹⁴ Estimate 1 predicted an annual mortality of 14.47 percent for *Pomoxis* sp. (crappie) and 19.54 percent for *Morone* sp., with other species expected to suffer similar mortality. ER §5.1.3.1.1. Estimate 2 predicted an annual mortality of 7.18 percent for *Pomoxis* and 9.97 percent for *Morone*, with similar mortality expected for other species. *Ibid.* Applicant contends that Estimate 2 is more realistic, because the assumption that larvae are distributed homogeneously required by Estimate 1 is unrealistic. *Ibid.*, Tr. 210. Applicant concludes that entrainment of this scale could result in reductions of adult standing stock in Yellow Creek embayment during the operating life of the plant. ER at 5.1-11. Applicant and Staff agree, however, that such reductions of fish populations in Yellow Creek embayment will have a negligible effect on fish populations in Pickwick Lake as a whole. *Ibid.*, FES §5.5.2.1. This conclusion is based on the *assumption* that other embayments in Pickwick Reservoir are also important nursery areas. Tr. 239-40.¹⁵

53. Nevertheless, Staff is concerned that the importance of the embayment as a nursery may result in a much higher annual mortality than anticipated. FES. §5.5.2.1. Staff witness Mr. Stupka considers the data used by the Applicant in calculating Estimate 2 to be insufficient to determine relative abundances of larvae in different parts of the embayment. Tr. 427. Consequently, he prefers Estimate 1 because it is more conservative than Estimate 2. Tr. 426-7. He estimated that entrainment could reduce the reservoir-wide larval stock of species which selectively breed in Yellow Creek embayment, specifically *Pomoxis* and *Morone*, by 4 to 5 percent. Tr. 429-30. Applicant witness Dr. Hackney admitted that TVA's biologists had little confidence in the sampling methods used in 1974 and 1975 for estimating the distribution and abundance of fish larvae. Tr. 557. Applicant witness Mr. Gwinner testified that the methods used in those years gave no

¹⁴A homogeneous distribution means that larval density (number per unit volume) is similar throughout the embayment. Tr. 222.

¹⁵In this connection it is appropriate to note that Yellow Creek embayment comprises 25 percent of the total embayment area of Pickwick Lake. Tr. 429.

information about vertical distribution of larvae, and Dr. Hackney said that the nets used at that time were missing smaller fish. Tr. 560-61. In 1976 sampling equipment and method were changed. Tr. 557-8, 562-3. The density estimates based on the 1976 data gave mortality estimates (see paragraph 51, *supra*) which are greater than the 5 to 18 percent estimated on the basis of 1974-1975 data. Tr. 558.¹⁶ Finally, Mr. Stupka testified that 1 year's sampling is insufficient to arrive at conclusions about larval densities, because of year-to-year fluctuations in population numbers. Tr. 433-4, 508-9.

54. The evidence before us indicates that the potential impact of the intake on fish populations in Yellow Creek embayment, and perhaps on Pickwick Lake as a whole, is a matter for concern. Applicant's mortality estimates, based as they are on data taken during a single year and on questionable assumptions, must be accepted with a sense of uncertainty. We believe that Staff's reservations are well founded, and we would concur with their recommendations for conditions relating to the intake had we not found that such conditions are within the jurisdiction of the EPA, not the NRC. In the absence of the authority to impose conditions with regard to the intake, we again urge Staff to work with the EPA on this matter.

55. In conclusion, while we have found the matter of fish mortality to be of concern, we do not find it of sufficient importance to tilt the cost-benefit balance. It is, after all, a matter whose importance may be proved or disproved by experience. And even if it proves to be important, means will be available for mitigating the impact of the plant's operation on fish populations.

C. Cost-Benefit Analysis

56. The Board has weighed the environmental, economic, technical, and other benefits of construction of the proposed plant against environmental and other costs based upon the evidence of record. The principal environmental impacts resulting from the construction and operation of the facility can be summarized as follows:

(1) Land Use

- a. Less than 500 acres of the site will be altered by clearing for construction of plant facilities and rail and road routes. During construction this area of the site will be disturbed, and noise and

¹⁶The estimate of 5 to 18 percent was contained in the Acceptance Revision of the ER and also appears in the FES and in Staff's Proposed Findings.

dust will be created. Additionally, the disturbed area will be subject to some soil erosion and unavoidable soil loss (FES, p. i as corrected by Staff Exhibit 2).

- b. About 200 acres of the 1,160-acre site will be permanently occupied by station structures and will be unavailable for alternate uses (FES, p. i).
- c. Transmission lines will require about 2,266 acres of additional land for new rights-of-way (FES, p. i).
- d. The natural-draft cooling towers will be visible to the surrounding area.

(2) Water

- a. Construction activities will have a short-term impact on Yellow Creek embayment and Pickwick Lake by increasing turbidity and siltation. In addition there will be some destruction of littoral and benthic habitat.
- b. During operation of the plant a maximum of 146.5 ft³/s of makeup water will be withdrawn from the Yellow Creek embayment of which 65.5 ft³/s will be returned to the Pickwick Lake via a pipeline with the dissolved solids concentration increased by a factor of about 2 (FES, p. 1).

(3) Air

Vapor plumes will be visible from the cooling towers. The plumes will reduce the sunlight reaching the ground in the area which they shade. Additionally, possible cloud formation and precipitation may occur under certain conditions (Staff Cooling Tower Testimony at 7).

(4) Biotic Effects (FES, Table 10.9)

a. Terrestrial

- (i) Wildlife will be displaced from the site by construction activities.

b. Aquatic

- (i) A small amount of benthic and fish habitat will be permanently lost by intake discharge installation.

- (ii) Between 7 percent and 20 percent of the larval fish from the Yellow Creek embayment may suffer mortality by entrainment in the intake.
- (iii) The discharge plume will elevate temperatures in a small cross section of Pickwick Lake.

(5) Community Impacts

Hunting, fishing, and other recreational activities on the site will cease. Traffic on local roads will increase substantially due to construction and commuting activities. Influx of workers' families (780 work immigrants) could cause some housing and school problems, although most of the work force is expected to commute from the surrounding areas (FES, p. i).

(6) Radiological Effects

There will be releases of gases and liquid effluents containing small amounts of radioactive materials. The dose estimated to be received by the population within a 50-mile radius of the plant would be less than 8 man-rems per year (FES, p. i).

57. The principal benefit from construction and operation of the plant is an ample supply of electricity to meet the region's needs and allow continued improvement of the quality of life in the region. Indirect benefits include increased regional gross product, recreational benefits, increased employment and employment potential, and educational benefits derived from visits to the plant. These quantifiable benefits are tabulated in TVA's ER, Chapter 8 (*see also* Staff FES, Chapter 10).

58. The Board finds, considering the above, that the benefits to society from licensing the Yellow Creek plant outweigh the costs, and these benefits will be maximized by construction which will allow operation on the projected dates.

III. SITE SUITABILITY

A. Introduction

59. The Board has reviewed the proposed site pursuant to 10 CFR §50.10(e)(2) (1977) to determine whether, based upon the available information and review to date, there is reasonable assurance that the proposed site is a suitable location for nuclear power reactors of the size and type pro-

posed by the Applicant from the standpoint of radiological health and safety considerations under the Atomic Energy Act and rules and regulations promulgated by the Commission pursuant thereto. The Board's review has been guided by the reactor site criteria given in the Commission's regulations on site suitability as related to radiological health and safety (10 CFR Part 100). The factors considered are the population density and land use characteristics of the site environs; the potential influence of nearby industrial, military, and transport facilities; and the physical characteristics of the site, including its meteorological, hydrological, and seismological characteristics.

60. Both Staff and Applicant presented testimony on these subjects. The Staff testimony consisted of the Site Suitability Report.¹⁷ The Applicant's basic testimony consisted of a document entitled "Tennessee Valley Authority Proposed Yellow Creek Nuclear Plant Site Suitability Testimony" (following Tr. 289) (hereinafter "Site Testimony").

61. The Yellow Creek site containing approximately 1,160 acres is located in Tishomingo County, Mississippi. The site is located on the right bank of the Yellow Creek embayment at Yellow Creek Mile 6 and is approximately 17 miles east of Corinth, Mississippi. It is on the western slope of a 2-mile-wide peninsula between Yellow Creek and the Tennessee River near Mile 217. The facility will consist of two identical pressurized water reactors to be supplied by Combustion Engineering, Incorporated. These nuclear steam supply systems (NSSS) are of a size, type, and design similar to the CE system 80 design described in CESSAR for which NRC has issued a Preliminary Design Approval. The NRC has reviewed and approved for construction other nuclear power plants which have referenced the CESSAR design. Each Yellow Creek unit will have an NSSS which will operate at a rated thermal core output of 3,800 megawatts and a turbine generator net electrical output of 1,339 megawatts. The design thermal core output is 4,100 megawatts. Site Testimony at 1-2; SSR at 1.

B. Exclusion Area, Low Population Zone, and Population Center Distance

62. The exclusion area will have a minimum exclusion distance of 695 meters from the edge of the Unit 2 containment structure to the closest site boundary. The Applicant owns all the land, including mineral rights, within

¹⁷The Safety Evaluation Report was also offered and accepted into evidence (Staff Exhibit 3). This report, usually not available at this stage of the proceeding, contains essentially all of the significant information in the SSR as well as additional information relevant to the future phases of this proceeding and to the LWA activities discussed herein.

the exclusion area. A portion of the Yellow Creek embayment is located within the exclusion area and is accessible for fishing and pleasure boating. The Applicant will make appropriate arrangements to control the movement of people in this area as part of its radiological emergency plan. There is reasonable assurance that the Applicant has the authority to determine all activities within the exclusion area, SSR at 2, and can develop an adequate radiological emergency plan. *Id.* at 7. This plan, to be developed in coordination with Mississippi, Tennessee, and Alabama, will also provide for the timely evacuation of the areas in the event of a radiological emergency. Site Testimony at 2-3.

63. An estimated 6,125 people live within 10 miles of the Yellow Creek site. More than 84 percent of this population reside between 5 and 10 miles from the site. Three small towns (Iuka, Burnsville, and Waterloo) are located between 5 and 10 miles from the site. Iuka, the largest, had about 35 percent of its 1970 population of 2,389 persons located within the 10-mile radius to the south. The remainder of the area within 10 miles of the site is sparsely populated. Site Testimony at 4; SSR at 2. Population growth in this area is expected to be small. *Ibid.*

64. The 1970 population estimate for the area within a 50-mile radius of the site is about 350,000. This population is projected by the Staff to grow at a rate of 7% per decade. SSR at 7. By the year 2020 it will still be substantially less than 500 per square mile at all distances out to 50 miles. SSR at 6.

65. The Applicant has specified a low population zone 3 miles in radius. The 1970 population in the low population zone was 475 persons. The Applicant estimates a summer increase of 5,250 persons in the 3-mile low population zone radius of the plant because of water sport recreation on the Tennessee River, including the Pickwick Reservoir and the Yellow Creek embayment. The Staff has concluded that there is reasonable assurance that the definition of the low population zone in 10 CFR Part 100 can be satisfied. Based on the available evidence in their review of the population distribution, road network, and land use factors within the low population zone, it has not identified any factors which would preclude the development of acceptable emergency measures to protect the public within the low population zone. SSR at 7.

66. The nearest population center, as defined in 10 CFR Part 100, of 25,000 persons or more is Florence-Muscle Shoals—Sheffield-Tuscumbia, Alabama, complex, located approximately 35 miles east of the site. This population center had a 1970 population of 62,881. A population center containing more than 25,000 residents is not expected to develop closer to the site. There is little likelihood that the city of Corinth, Mississippi, located about 15 miles west of the site, will have a population in excess of 25,000 persons during the lifetime of the facility, and therefore Corinth

would not become a new population center. Site Testimony at 5; SSR at 7.

67. The Staff concluded, SSR at 7, and we agree, that the exclusion area, low population zone, and population center distance meet the siting guidelines of 10 CFR Part 100 and are acceptable on the basis of the exclusion area and low population zone distances, the specified population center distance, and the estimated potential radiological dose consequences of design basis accidents.

C. Nearby Industrial, Transportation, and Military Facilities

68. No industrial plants are located within 5 miles of the site. It is anticipated that some industrial plants will be located across the Yellow Creek embayment near the Yellow Creek Port which is 1.8 miles northwest of the site. However, there are no firm plans for plant locations in this area at the present time. Site Testimony at 5. No known military facilities are located within 10 miles of the site. *Id.* at 7; SSR at 7.

69. The nearest major land transportation route is Mississippi Highway 25 located about 2 miles west of the site. The plant access road is also utilized by the few residents of the Yellow Creek peninsula who live north of the plant. The nearest major railroad is the Southern Railroad located 9.5 miles south. The Corinth and Counce Railroad is 7 miles to the northwest. The spur track from the Corinth and Counce Railroad serves Yellow Creek Port and lies approximately 1.6 miles to the northwest. SSR at 7; Site Testimony at 5-6. The nearest natural gas transmission line is a 6-inch pipeline 7.5 miles northwest of the site. It poses no potential hazard to the site. SSR at 7; Site Testimony at 6.

70. The main channel of the Tennessee River is located 2 miles east of the proposed site and is a major barge route. This traffic will pose no threat to the safe operation of the proposed nuclear plant on this site because of the separation distances involved. SSR at 7; Site Testimony at 6.

71. The Yellow Creek embayment is not now available to commercial barge traffic south of the Yellow Creek Port in the vicinity of the Yellow Creek facility. However, the embayment will have an estimated yearly shipment of 24 million tons of material past the site when the Tennessee-Tombigbee Waterway is completed in 1986, approximately 0.8 miles west of the site. The commodities and the expected frequency of shipments described will not pose a significant projected hazard by commercial barge shipments past the site in the Yellow Creek embayment. The water intake structure is not safety-related and need not be protected against a barge impact although it is located in the Yellow Creek embayment in the general vicinity of the Tennessee-Tombigbee Waterway. The probability of a significant hazard to the plant due to an accident caused by barge shipments

past the plant site is sufficiently low such that no further consideration is required. SSR at 9; Site Testimony at 6.

72. There are no existing or planned airports within 10 miles of the site. The proposed site will be located near two Federal airways and in the vicinity of a military jet training area. There are no hazards with respect to these airways due to aircraft impacts since the air crash probability analysis indicates that the probability of impact is less than 10^{-7} per year. The Columbus Four Intensive Student Jet Training area is located over the site. However, probability of a crash at the site of the proposed nuclear plant due to jet operations in this area due to jet training is less than 10^{-7} per year and is sufficiently low that an aircraft crash need not be postulated for design purposes. SSR at 9; Site Testimony at 6.

73. The Staff has found that no special design considerations are required for the proposed plant with regard to potential accidents which may occur as a result of nearby industrial, military, or transportation facilities and that in this regard the proposed site is suitable. SSR at 9. We agree.¹¹

D. Meteorology

74. The Applicant has provided meteorological information to support the suitability of the site. PSAR §2.3. The Staff has found that meteorological data obtained provide an adequate meteorological description of the site and the site vicinity for the purposes of assessing postaccident and continuous release atmospheric diffusion conditions and has concluded that the proposed site is suitable for the proposed nuclear plant with regard to the meteorological assessment. SSR at 10-13. The Board concurs with this conclusion.

E. Hydrology

75. Plant grade will be at elevation 520 feet or 74 feet above the peak flood elevation. Flood levels from postulated seismically induced dam failures or other cause will not be as high as the probable maximum flood level. Site Testimony at 10; SSR at 13-15. The Applicant will design the site drainage systems, including the roofs of all safety-related buildings, to accommodate the local probable maximum precipitation. The design basis precipitation proposed by the Applicant is acceptable to the Staff. Site Testimony at 10; SSR at 15. The Staff has found that the facility satisfies the flooding criteria of Regulatory Guides 1.59 and 1.102. SSR at 15, 16.

¹¹In reaching this finding, the Board has taken into account the affidavit and testimony of Thomas E. Spink, Applicant's Exhibit 8. See paragraph 6, *supra*.

76. Low reservoir water levels are not expected to be a problem with operation of this facility. Emergency cooling water will be furnished by the two spray ponds (the ultimate heat sink) that are not dependent upon Pickwick Reservoir water for their safety functions. Stored water at prescribed minimum pool elevational levels at dams upstream of the site are available and could provide more than 1,000 cubic feet per second after more than 2 years of no rainfall. Plant operation will not be significantly affected by low river flow since normal consumptive water use with both units at full power is 64 feet per second. SSR at 16; Site Testimony at 9-10.

77. Location of the intake pipes in the Yellow Creek embayment poses no problem with respect to either normal operation or emergency operation. The normal full pool elevation is 414 mean sea level and the minimum, since the Pickwick Dam was closed, is over 407 feet mean sea level. The top of the intake pipes will be between 392 and 406 feet mean sea level. Site Testimony at 9; SSR at 16.

78. The Staff has evaluated the effect of spills of radioactive liquids on surface waters and has concluded that the radionuclide concentrations at the nearest recipient would be a small fraction of the regulatory limits. SSR at 17-18. There are no ground water users down-gradient from the site. SSR at 17. The design basis ground water level for static and dynamic analysis of 519 feet mean sea level, which is 1 foot below plant grade, is acceptable to the Staff. SSR at 17.

79. We find that the flood analysis for the site satisfies the appropriate regulatory criteria, that acceptable normal and emergency cooling methods can be designed, that the proposed ground water level is acceptable, and that postulated liquid spills will not result in an unacceptable radioactivity hazard. Accordingly, we conclude that the proposed site is hydrologically suitable.

F. Geology

80. Physiographically, the site is located at the irregular eastern margin of the Eastern Gulf Coast Plain section of the Coastal Plain physiographic province near the western edge of the Highland Rim section of the Interior Low Plateaus province. The Yellow Creek site lies within or is immediately adjacent to a flexure zone apparently undeformed since pre-Tertiary time. Faulting, no younger than Tertiary, perhaps older, is known within 25 miles of the site. SSR at 18-20.

81. The uppermost, well consolidated bedrock at the plant site, as well as within the site vicinity (5-mile radius), consists predominantly of the lower portion of the Mississippian Ft. Payne formation. Elsewhere within the site vicinity Paleozoic units, the Chattanooga Shale, and the Devonian

Ross formation (both stratigraphically underlying the lower Ft. Payne) are well exposed at lake level. The lower Ft. Payne is a competent slightly calcareous siltstone (very silty limestone) devoid of cavities and not subject to active solutioning, about 100 to 120 feet thick. This competent unit will serve as a foundation for most of the seismic Category I structures including the reactor, fuel, control, and steam valve vault buildings. Other safety-related structures will be established on either granular backfill or in situ soil. The upper weathered, clayey-cherty facies of the Ft. Payne is approximately 40 feet thick at the plant site. SSR at 22.

82. Several anomalous subsurface conditions were found at locations within the site vicinity. Detailed investigations by the Applicant led it to conclude that these were not of tectonic origin. The Staff concluded that the anomalies described present no hazard to the proposed nuclear facilities, based upon intensive subsurface exploration, detailed surface mapping, and other information which shows that the features, even if they were of fault origin, are quite old (at least prior to the close of the Cretaceous) and non-capable within the meaning of Appendix A to 10 CFR Part 100. SSR at 23-25.

83. A subsurface investigation of a suspected fault was conducted near Savannah, Tennessee. Insufficient direct evidence exists to determine, within reasonable limits, the age of movement of the fault identified by the Applicant's subsurface investigation. Unfaulted organic sediments overlying the fault projection are approximately 20,000 years old. SSR at 27. Based upon available evidence, however, it appears to the Staff that the fault presents no hazard to the proposed Yellow Creek plant because of the following:

1. Remoteness (16 miles) of the fault from the proposed site.
2. The trend and location of the subsurface fault does not seem to be related to the north-south Tennessee River topographic scarp.
3. Rock core taken from the fault zone is well healed, indicating considerable age.
4. Geological mapping in this area shows no faulting. Additionally, it appears that subsurface investigations in the uplands east of the scarp, north and south of the Williams Road Walker Branch area, could demonstrate the continuity of the Cretaceous Paleozoics contact along a north-south section.
5. Geologic mapping to the south of Pickwick Landing Dam, in particular that within 5 miles of the proposed site, indicates no faulting. SSR at 28-29.

84. Based upon the available evidence, we conclude that there is no geologic structure in the vicinity of the proposed site that could cause surface displacement or tend to localize earthquakes at the site. Faults present in the site area are no younger than late Tertiary, and as such are not capable faults within the meaning of 10 CFR Part 100, Appendix A. Therefore, we conclude that in regard to the geologic aspects, the proposed site is suitable for the nuclear power plant of the type and size proposed within the meaning of 10 CFR Part 100, Appendix A.

G. Seismology

85. The Yellow Creek site is located at the boundary between the Central Stable region tectonic province and the Gulf Coastal Plain tectonic province. It is in an area of relatively low seismicity based on the historical record. The nearest historical earthquake activity reported in the vicinity of the site had a Modified Mercalli (MM) intensity of III-IV and occurred 10 miles north of the site near Savannah, Tennessee, in 1895. The largest historical earthquake within approximately 100 miles of the Yellow Creek site had a Modified Mercalli intensity of VIII and occurred near Memphis in 1843, closer to the New Madrid area where numerous earthquakes have been reported in historical records. SSR at 28-29.

86. In determining the safe shutdown earthquake for the Yellow Creek site, the Staff considered earthquake activity in the Central Stable region tectonic province, in the Gulf Coastal Plain tectonic province, and that activity associated with structures in the New Madrid Faulted Belt. SSR at 29. The Anna, Ohio, earthquake of 1937 with a maximum intensity of VII-VIII (MM) is recognized as the largest earthquake which cannot be associated with a specific structure in the Central Stable region tectonic province. This intensity was assumed to occur at the site in establishing the safe shutdown earthquake. *Id.* at 30.

87. Within the Gulf Coastal Plain tectonic province, the largest earthquakes not considered to be associated with structures were evaluated. A typical maximum intensity VI (MM) earthquake was taken to be the largest earthquake associated with the Gulf Coastal Plain tectonic province, and this intensity was assumed to occur at the site in establishing the safe shutdown earthquake. *Ibid.*

88. The proximity of the New Madrid seismic zone is a more significant issue in establishing the seismic design basis for the Yellow Creek site. The 1811 and 1812 earthquakes in this zone, the largest in the recorded history of the eastern United States, had epicentral intensities in the range from X

to XII (MM). SSR at 30. The Yellow Creek site is located 80 miles southeast¹⁹ of the New Madrid Faulted Belt. SSR at 31.

89. Data on the attenuation of intensity with distance for earthquakes in the central United States were considered in assessing the effects of a Modified Mercalli intensity XI-XII earthquake at a distance of 80 miles from the Yellow Creek site. SSR at 31. Although the intensity IX (MM) which would be felt at the site, corresponding to the occurrence of an earthquake of a maximum intensity XI-XII (MM) 80 miles from the Yellow Creek site, is higher than that which would result from the postulated occurrence of lower intensities near the site, the acceleration level would not necessarily be as great for the former event. The Staff cited data showing that accelerations exceeding 0.2g are unlikely at epicentral distances greater than 60 miles. SSR at 32. A relationship has been developed that suggests that the acceleration expected at a distance of 80 miles from an earthquake of maximum intensity XI-XII (MM) would be less than about 0.2g. Furthermore, studies on attenuation and ground motion in the midcontinent indicate that much lower acceleration levels are appropriate. Finally, much of the damage produced by the New Madrid earthquakes may have been the result of soil failure. Soil failure studies indicate that long-duration ground motion with relatively low acceleration can produce such failure. Researchers have indicated that damage produced by earthquakes can be attributed to the level of ground velocity rather than acceleration. *Ibid.* We concur in the Staff's assessment that long-duration ground motion at low acceleration levels is a reasonable explanation for the phenomena observed at large distances from the New Madrid earthquakes. SSR at 32.

90. As stated above, the largest intensity at the site from postulated nearby earthquakes is VII-VIII (MM). The mean acceleration corresponding to a Modified Mercalli intensity of VII-VIII is 0.2g. SSR at 31.

91. Long-duration ground motion at low acceleration levels can produce response spectra in the lower frequency range which are not enveloped by the spectra of Regulatory Guide 1.60 scaled to the corresponding acceleration level. SSR at 32. The Applicant has altered its design response spectra to make them more conservative than the Regulatory Guide 1.60 spectra by adjusting the Regulatory Guide 1.60 spectra levels upwards for frequencies lower than 2.5 hertz. *Id.* at 33. The modified spectra enveloped the spectra from the real earthquake time histories except at a few isolated points in the low frequency range where they are exceeded by small amounts. Applicant proposes to use (1) a modified response spectrum scaled to 0.25g for design of structures supported on rock and (2) a modified response spectrum scaled

¹⁹The SER at 2-33, and SSR at 31, incorrectly indicate that the site is located to the southwest of the New Madrid Faulted Belt. The Staff's request that this typographic error be corrected is granted.

to 0.3g for design for structures supported on soil. For the safe shutdown earthquake the response spectra proposed by the Applicant are considered by the Staff to be adequate to represent the expected effects of an intensity VII-VIII (MM) earthquake postulated to occur near the site and an earthquake of maximum intensity XI-XII (MM) postulated to occur 80 miles from the site. *Id.* at 32-33.

92. Based on our analysis of the record, we make the following conclusions. The Yellow Creek site is situated in an area of relatively low seismicity. No tectonic structures that might localize earthquake activity in the site vicinity have been identified. The earthquakes to be considered in determining the safe shutdown earthquake for use in seismic design of the Yellow Creek plant are (1) an earthquake of maximum intensity VII-VIII (MM) occurring near the site, and (2) an earthquake of maximum intensity XI-XII (MM) occurring 80 miles from the site. The Regulatory Guide 1.60 response spectra, as modified by the Applicant and scaled to 0.25g for rock-supported structures and 0.3g for soil-supported structures, adequately represent the expected effects of the postulated earthquakes.

H. Foundations

93. The topography in the site area is the result of erosional processes which result in a marginally dissected plateau averaging 600 feet above sea level with ridges up to 700 feet above mean sea level. Alluvial surficial soil deposits are unconsolidated sands and clays. SSR at 33. These surficial soils and the underlying Eutaw formation will be almost completely removed due to plant grading at elevation 520. Major seismic Category I structures will be founded on bedrock, which is generally fresh and unweathered. Any weathered areas exposed in the bedrock during construction will be removed and treated with grout or dental concrete. SSR at 33-34. Based on the information presented in the Yellow Creek Preliminary Safety Analysis Report and the Corps of Engineers review of the site and foundation conditions, the Staff concludes that the geotechnical engineering aspects of the proposed site will be adequate to meet the requirements of 10 CFR Part 100. SSR at 35. In this regard, we find that the proposed site is suitable for the proposed nuclear facility.

94. On the basis of the considerations above and our review of the entire record, we find that the proposed Yellow Creek site is a suitable location for the two nuclear reactors and associated facilities of the type and size proposed from the standpoint of radiological health and safety considerations under the Atomic Energy Act of 1954, as amended, and the rules and regulations promulgated by the Nuclear Regulatory Commission in conformance with the Act.

IV. LIMITED WORK AUTHORIZATION (LWA) ACTIVITIES

95. The Applicant has, by letter dated February 4, 1977, requested authorization to perform certain site preparation and clearing activities permitted under 10 CFR §50.10(e)(1). These activities are set forth in the LWA Testimony²⁰ at pages 1 through 4. Subsequently, by letter dated November 23, 1977,²¹ the Applicant amended the request to include certain additional activities permitted by 10 CFR §50.10(e)(3). These activities, which are considered logical extensions of the activities requested earlier, include and are limited to drilling, grouting, placement of fill and dental concrete, or other foundation treatment of rock as described in PSAR §2.5, 4.12 as required under all safety-related structures. LWA Testimony at 4. As a prerequisite for issuance of a Limited Work Authorization by the Director of Nuclear Reactor Regulation, the Board must make the findings required by 10 CFR §51.52(b) and (c) (relating to environmental considerations) and must determine that, based upon the available information and review to date, there is a reasonable assurance and the proposed site is a suitable location for a nuclear power reactor of the general size and type proposed from the standpoint of radiological health and safety considerations. These findings we make in other parts of this decision. In addition, prior to the authorization of the additional work identified in the amended request, we must determine that there are no unresolved safety issues relating to the additional activities that would constitute good cause for withholding authorization. We now address this determination.

96. Safety considerations relating to the additional activities (hereafter referred to as LWA-2 activities) were evaluated by the Staff in its safety review, and a summary of the results of that evaluation is set forth in the SER. The Staff concluded therein that, subject to favorable resolution of identified outstanding items, the issuance of the construction permit for the proposed facility would not be inimical to the common defense and security or to the health and safety of the public. None of the identified outstanding items relates to the requested LWA-2 activities. The pertinent sections of the SER are 2.5.3, 17.2, 17.4, and 17.5. Cox Testimony at 3, 4.

97. The first cited section deals with foundation engineering. The Applicant has also given evidence on this topic.²² The Staff testimony sets forth

²⁰"Activities for Which the Tennessee Valley Authority Has Requested a Limited Work Authorization" following Tr. 129 (hereinafter "LWA Testimony").

²¹This letter appears in the record as "Attachment A" to "Supplemental Testimony of the NRC Staff on LWA-2 Activities" following Tr. 526 (hereinafter "Cox Testimony"), and the list of activities therefrom is attached hereto as Attachment B.

²²TVA's Testimony Regarding Foundation Treatment Practices following Tr. 273 (hereinafter "Foundation Testimony").

the soil conditions in the site area, and more specifically in the area to be excavated, the design of the foundations and considerations of slope stability. SER at 2-36—2-39. The Staff concludes that the Applicant's approach to foundation design is sufficiently conservative, that the foundation materials have been reasonably evaluated, and that they will provide adequate foundation support. *Id.* at 2-39. The Staff further concludes that the geotechnical engineering aspects of the proposed plant will meet the requirements of 10 CFR Part 100. *Id.* at 2-40. The Applicant's testimony addresses site foundation conditions, dental concrete, fill concrete, grouting, and associated quality assurance activities. Foundation Testimony at 1-4.

98. The cited subsections in Section 17 of the SER deal with the Staff evaluation of the Applicant's Quality Assurance Program. Appendix B to 10 CFR Part 50, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, establishes quality assurance requirements for the design, construction, and operation of nuclear power plant structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. The pertinent requirements of Appendix B apply to activities affecting the safety-related functions of those structures, systems, and components of a nuclear power plant. Cox Testimony at 2.

99. The Staff has completed its review of the quality assurance program for construction of the proposed Yellow Creek facility. The Staff concluded in §17.2 of the SER that (1) the TVA quality assurance organization has sufficient independence and reports at a sufficiently high management level to accomplish the quality assurance objectives, and (2) the program, if adequately implemented, will conform to the requirements of Appendix B to 10 CFR Part 50 for the design and construction of the Yellow Creek Nuclear Plant, Units 1 and 2. Cox Testimony at 4. We concur.

100. The Office of Inspection and Enforcement (I&E) has conducted inspections to examine the implementation of the quality assurance program for the Yellow Creek Plant. Based on its inspections and assessment, I&E has concluded that the implementation of the Applicant's commitments in the quality assurance program for the Yellow Creek plant is consistent with the current status of the project. I&E will perform additional inspections to examine the continued implementation of the QA program as it applies to LWA-2 activities, if authorized. Cox Testimony at 5.

101. Since the Yellow Creek quality assurance program and the implementation thereof are acceptable at this time and since I&E will perform additional inspections to provide assurance of continued acceptable implementation, there are no unresolved quality assurance matters that would constitute good cause for withholding the requested LWA-2 activities. *Ibid.* Further, we have examined the LWA-2 activities proposed by the Applicant

and have found that there are no unresolved safety issues related to these activities which would constitute good cause for withholding of a Limited Work Authorization.

102. During the evidentiary hearing the Board inquired into the extent of offsite work to be done under the LWA. Tr. 171-75, 180-88, 256-66, 268-69, 538-39. Although the Board has determined elsewhere in this decision that the environmental impacts of the offsite (as well as the onsite) activities are acceptable in the event that the plant is built, the Board considered that its inquiries were appropriate to assure that the offsite activities did not result, in the event that a construction permit might ultimately be denied, in significant undesirable and unnecessary environmental damage. In forming its decision on this matter, the Board attempted to balance the adverse environmental impacts if the construction permit is denied against the effects of deferring certain activities on the construction schedule and costs in the more likely event that the permit is eventually issued. Our concerns were somewhat alleviated by testimony that, if the construction permit was not delayed to an extent greater than now anticipated, in most cases the necessary preliminary work would automatically delay the start of clearing and earth-moving activities until after the anticipated construction permit issuance date. This is the case, for example, with respect to access roads, Tr. 259, and the plant railroad. Tr. 266. Some other activities, for example construction of the barge facility and associated channel dredging, would be started immediately and would have a serious schedule impact if deferred. Tr. 257-58. The only area in which the Board has remaining reservations is with respect to offsite transmission facilities. The Applicant's position on timing of clearing rights-of-way for these lines was ill defined. The witness at one point said that activity could be delayed "up to a period of perhaps six months" and at another point stated ". . . we could perhaps delay for a few months." Tr. 181. A portion of the proposed construction, that necessary for the line to be used to provide construction power to the site, must clearly be started as soon as possible to avoid undesirable impacts on the schedule. Tr. 180-81. Accordingly, we will require that the LWA be conditioned to prohibit offsite transmission line clearing or earth-moving except for the right-of-way to be occupied by the construction power line. A permanent transmission line is planned for all or part of the construction line right-of-way, and it is not intended by this condition to prohibit the preparation of the full width of the right-of-way for this line where it occupies the same right-of-way as the construction power line. Neither is it intended to prohibit, with respect to the balance of the permanent lines, such preliminary activities as design, surveying, and obtaining right-of-way.

V. CONCLUSIONS OF LAW

103. Based upon a review of the entire record in this proceeding and upon the foregoing findings and in accordance with 10 CFR §50.10(e) and 10 CFR Part 51 of the Commission's regulations, the Board has concluded as follows:

- a. The environmental review performed by the Staff pursuant to the National Environmental Policy Act of 1969 has been adequate.
- b. The requirements of Sections 102(2)(A), (C), and (E) of the National Environmental Policy Act of 1969 and 10 CFR Part 51 have been complied with in this proceeding.
- c. Having given independent consideration of the final balance among conflicting factors set forth in the record of this proceeding with a view to determining the appropriate action to be taken, having weighed the environmental, economic, technical, and other benefits against environmental and other costs, and having considered available alternatives, in accordance with 10 CFR Part 51, the Board has determined that the appropriate action to be taken, after making all of the radiological and health and safety findings required by the Atomic Energy Act of 1954, as amended, and the notice of hearing in this proceeding, is the issuance of construction permits for the Yellow Creek Nuclear Plant. Units 1 and 2, subject to (i) conditions which may hereafter be determined to be warranted with respect to radiological health and safety matters and (ii) the following conditions for the protection of the environment.
 1. The Applicant shall take the necessary mitigating actions during construction and operation of the plant and associated transmission lines to avoid unnecessary adverse environmental impacts. These actions shall include those set forth in the FES at subsections 4.5.1.1, 4.5.1.2, 4.5.1.3, 4.5.1.4, 4.5.1.5, 4.5.2.1, items 2 and 3 of 4.5.2.2, 4.5.2.3 modified to read "All waste from dredging shall be handled and disposed of in accordance with the Corps of Engineers §404 permit," 4.5.2.4, and 4.5.2.5.
 2. The Applicant shall comply with all conditions of the NPDES permit.
 3. In addition to the preoperational monitoring program described in Section 6 of the Environmental Report, with amendments, the Staff recommendations in Section 6 of the FES

document shall be followed except to the extent that they deal with aquatic impacts, which are within the exclusive jurisdiction of EPA and are included within the terms of the NPDES permit.

4. Clearing and earthmoving on offsite portions of the transmission line rights-of-way shall be limited to the right-of-way for the line to be used for construction power. This restriction will terminate upon issuance of the construction permit.
5. The Applicant shall establish a control program that shall include written procedures and instructions to control all construction activities as prescribed herein and shall provide for periodic management audits to determine the adequacy of implementation of environmental conditions. The Applicant shall maintain sufficient records to furnish evidence of compliance with all the environmental conditions herein.
6. Before engaging in a construction activity not evaluated by the Commission, the Applicant will prepare and record an environmental evaluation of such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not evaluated, or that is significantly greater than that evaluated in this Environmental Statement, the Applicant shall provide a written evaluation of such activities and obtain prior approval of the Director of Nuclear Reactor Regulation for the activities.
7. If unexpected harmful effects or evidence of irreversible damage are detected during plant construction, the Applicant shall provide to the Staff an acceptable analysis of the problem and a plan of action to eliminate or significantly reduce the harmful effects or damage.

VI. ORDER

Based upon the foregoing findings and conclusions and pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations, IT IS ORDERED that this Partial Initial Decision shall constitute a portion of the ultimate initial decision to be issued upon the completion of the radiological health and safety phase of this proceeding.

IT IS FURTHER ORDERED, in accordance with Sections 2.760, 2.762, and 2.764 of the Commission's Rules of Practice, 10 CFR Part 2, that this Partial Initial Decision shall be effective immediately and shall constitute the final action of the Commission forty-five (45) days after the date of is-

suance hereof, subject to any review pursuant to the Rules of Practice. Exceptions to this Partial Initial Decision may be filed by any party within seven (7) days after service of this Partial Initial Decision. A brief in support of the exception shall be filed within fifteen (15) days thereafter, twenty (20) days in the case of the Staff. Within fifteen (15) days after the service of the brief of appellant, twenty (20) days in the case of the Staff, any other party may file a brief in support of, or in opposition to, the exceptions.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

John M. Frysiak, Chairman

Lester Kornblith, Jr., Member

Oscar H. Paris, Member

**Dated at Bethesda, Maryland,
this 3rd day of February 1978.**

[Attachments A and B have been omitted from this publication but are available in the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Robert M. Lazo, Chairman
Marvin M. Mann
Donald P. deSylva

In the Matter of

Docket No. 50-513

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM

(WPPSS Nuclear Project No. 4)

February 17, 1978

Upon consideration of additional and updated evidence on matters concerning WPSS Nuclear Project No. 4, the Licensing Board issues a Supplemental Initial Decision authorizing the issuance of a construction permit.

TECHNICAL ISSUES DISCUSSED

Financial qualifications; seismic design criteria; fire protection measures; need for power; uranium fuel cycle (Table S-3; Radon-222); health effects of uranium and coal fuel cycles.

Messrs. Joseph B. Knotts, Jr., and Nicholas S. Reynolds, Washington, D.C., and Mr. Richard Q. Quigley, Richland, Washington, for the Applicant, Washington Public Power Supply System

Mr. Edward G. Ketchen for the United States Nuclear Regulatory Commission

SUPPLEMENTAL INITIAL DECISION (Construction Permit)

I. BACKGROUND

This Supplemental Initial Decision concerns the application to the United States Nuclear Regulatory Commission (NRC or Commission) by the Washington Public Power Supply System (WPPSS or Applicant) for a construction permit for WPPSS Nuclear Project No. 4 (WNP-4). In particular, this Supplemental Initial Decision involves NRC review of certain outstanding or updated matters relating to both radiological health and safety considerations and environmental considerations.

The general background of this proceeding is set forth in detail in the Partial Initial Decision (NEPA and Site Suitability Issues) issued by this Atomic Safety and Licensing Board (Board) on July 30, 1975 (2 NRC 131 (July 30, 1975)), and in our Initial Decision (Construction Permit) issued on December 22, 1975 (2 NRC 922 (December 22, 1975)). These decisions involved the application by WPPSS for construction permits for both WPPSS Nuclear Project No. 1 (WNP-1) and for WNP-4.

In the Partial Initial Decision, the Board held that the appropriate action to be taken is the issuance of construction permits for WNP-1 and WNP-4 subject to certain conditions for the protection of the environment and contingent upon the outcome of the evidentiary hearing on health and safety issues. In the Initial Decision, the Board rendered favorable findings of fact and conclusions of law which were applicable to both WNP-1 and WNP-4, with one exception, viz., the financial qualifications findings and conclusions by the Board which related only to WNP-1 since, at the Applicant's request, the Board deferred consideration of the financial qualifications of the Applicant to design and construct WNP-4 (2 NRC at 927-28, 943, n. 28). The Board rendered favorable findings and conclusions on all issues with respect to WNP-1 and authorized issuance of a construction permit for WNP-1.¹ On December 23, 1975, the NRC Office of Nuclear Reactor Regulation issued Construction Permit No. CPPR-134 to the Applicant authorizing construction of WNP-1.

By letter to the Board dated July 9, 1976, the Applicant advised that it was in a position to demonstrate its financial qualifications to design and construct WNP-4. By memorandum and order dated July 29, 1976, the

¹The Partial Initial Decision and the Initial Decision were reviewed by the Atomic Safety and Licensing Appeal Board *sua sponte*, which, on January 23, 1976, affirmed both decisions (ALAB-309, 3 NRC 31 (January 23, 1976)).

Board called for the submission of pertinent evidence on the financial qualifications issue for WNP-4. On August 5, 1976, the Applicant submitted its evidence on financial qualifications (Applicant's Exhibit 42). In addition, in view of the delays encountered in the issuance of a construction permit for WNP-4, the Applicant also submitted evidence to update the record with respect to need for power considerations (Applicant's Exhibits 43 and 44).² The NRC Staff submitted its evidence on financial qualifications and need for power matters on August 6, 1976 (Staff Exhibits 11 and 12).

Upon its review of the evidence of the parties on financial qualifications, the Board noted in its memorandum and order dated September 7, 1976, that it could make a favorable conclusion of law on the financial qualifications issue. However, the Board withheld rendering that conclusion of law since in its view the record would require further supplementation regarding the requirements of 10 CFR Part 50, Appendix K, seismic design criteria, and 10 CFR Part 51, Table S-3. Accordingly, the Board deferred issuing an initial decision covering the financial qualifications and updated need for power issues.

Thereafter, the Applicant, its consultants, the NRC Staff, and the United States Geological Survey conducted extensive studies relating to tectonic activity in the Pacific Northwest region, with particular emphasis on the North Cascades earthquake which occurred on December 14, 1872. On January 13, 1978, the Applicant submitted its evidence on all outstanding issues, and on January 18, 1978, the Applicant submitted an unopposed motion requesting that their evidence on all outstanding issues be admitted into the record. On January 13, 1978, the Staff furnished the Board and parties copies of supplemental evidence updating the record with respect to quality assurance, the emergency core cooling system performance, and need for power. On January 20, 1978, the Staff moved the admission of the described exhibits. On January 27, 1978, the Staff supplemented the record further with evidence related to the uranium fuel cycle (Staff Exhibits 20, 21, 22, and 24).³

To fulfill its responsibilities in this uncontested proceeding, the Board will make findings of fact relating to the outstanding and updated matters under consideration and will make appropriate conclusions of law. With respect to all other matters involving authorization to construct WNP-4, we

²The Applicant supplemented its evidence on financial qualifications on August 16, 1976 (Applicant's Exhibits 45 and 46).

³The motions of the parties for receipt into evidence of material filed on January 13, 1978, January 20, 1978, and January 27, 1978, respectively, are granted. The decisional record, as supplemented by the recent evidence of the parties, is set forth in the appendix to this decision. The Applicant's motion for receipt into evidence of PSAR Amendments 21, 22, and 23 filed January 23, 1978, also is granted.

hereby incorporate the findings and conclusions in our Partial Initial Decision dated July 30, 1975, and in our Initial Decision dated December 22, 1975. Finally, the Board will set forth an order ruling on issuance of the construction permit for WNP-4.

II. FINDINGS OF FACT—HEALTH AND SAFETY

A. Applicant's Financial Qualifications for WNP-4

1. WPPSS is a municipal corporation and joint operating agency of the State of Washington, organized in January of 1957 pursuant to the laws of the State of Washington. WPPSS is composed of 19 operating public utility districts and the cities of Richland, Seattle, and Tacoma, Washington, each of which operates an electrical distribution system within the State of Washington. WPPSS is empowered to acquire, construct, and operate facilities for the generation and transmission of electric power and energy but does not engage in the distribution of electric power or energy at retail (Applicant's Exhibits 1, 42, and 47; Perko, Tr. following p. 670; Staff Exhibits 8c(§20) and 12).

2. The sources of construction funds for WNP-4 are typical of those for a public agency. The fundamental source of permanent construction financing is issuance of long-term debt securities. WPPSS debt securities are of the revenue bond or revenue note type. WPPSS is authorized by the Washington Revised Code to "issue revenue bonds or warrants payable from the revenues of the utility properties operated by it" (R.C.W. 43.52.3411). The bonds or notes of WPPSS are negotiable instruments and legal securities for deposits of public monies and are legal investments for trustees and other fiduciaries, and for savings and loan associations, banks, and insurance companies.

3. WNP-4 and WPPSS Nuclear Project No. 5 (WNP-5) are financed together as a single system. WNP-4 and the WPPSS share (90%) of WNP-5 will be financed in the same manner as other WPPSS projects, viz., through the issuance of revenue bonds. Under the project financing approach, the WPPSS Board of Directors adopts a resolution describing the proposed plan and system just prior to the issuance of securities. Such resolutions adopted by the Board of Directors serve as the indentures to the buyers of the securities.

4. The securities for WNP-4 and WNP-5 are secured by contractual commitments between WPPSS and 88 public and cooperative utilities (Participants) to purchase the entire electrical capacity of WNP-4 and the WPPSS share (90%) of the capability of WNP-5. Under these "Participants' Agreements," WPPSS receives a promise that the Participants will

pay their respective portions of the costs of acquiring, constructing, and operating the facilities. Each Participant's portion of such costs includes the amount required each year to pay the interest and a portion of the principal on the bonds outstanding plus the Participant's share of the annual operating costs. Under this arrangement the annual project budget (including retirement of debt and associated interest) is paid by the Participants.

5. The first level of security for repayment of bonds is the revenues to be derived from operation of WNP-4 and WNP-5. The second level of security is that the Participants are obligated to make payments whether or not the project is completed, operable, or operating and notwithstanding interruption or curtailment of output. Thus, the source of funds for payment of project costs is not dependent on actual project revenues but is insured on a broad base through the obligations of the public and cooperative entities.

6. This method of financing large electric generating projects has been successfully utilized by WPPSS for several years. Since 1973, WPPSS has sold bonds totaling \$2.28 billion to raise construction capital for its five nuclear projects. To date, WPPSS has sold bonds totaling \$465 million since July of 1975 to finance construction of WNP-4 and WNP-5.

7. Applicant's estimate of the total cost of WNP-4 is \$1,869,982,000. This includes nuclear production plant costs (\$1,650,806,000), transmission and general plant costs (\$25,232,000), and nuclear fuel inventory cost for the first core and first reload (\$193,944,000) (Applicant's Exhibit 47). The Staff has reviewed Applicant's ability to finance the total cost of WNP-4 and concluded that WPPSS has reasonable assurance of obtaining the funds necessary to design and construct WNP-4 and to cover related fuel cycle costs for WNP-4 (Staff Exhibits 12 and 15).

8. Based on information contained in the record and the findings set forth above, the Board finds that the Applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs for WNP-4 and related fuel cycle costs. Accordingly, the Board finds that the Applicant is financially qualified in accordance with 10 CFR §50.33 (f) to carry out the activities for which the construction permit is sought.

B. Quality Assurance

9. The Applicant has updated the record of this proceeding with respect to certain changes in its management organization and the relation of these changes to the Applicant's Quality Assurance Program. The revision in management organization was effected to assure top level guidance and control for all WPPSS nuclear projects (Applicant's Exhibit 48). The NRC Staff has reviewed the organization changes and concluded that the Appli-

cant's Quality Assurance Program for WNP-4 is acceptable and that the program includes an acceptable quality assurance organization with adequate policies and controls to implement the requirements of 10 CFR Part 50, Appendix B (Staff Exhibit 13).

10. The Board concludes that the Applicant's reorganization may enhance the Applicant's ability to implement its Quality Assurance Program. Accordingly, we confirm our previous findings (2 NRC at 575; 2 NRC at 931) that the Applicant's Quality Assurance Program complies with the requirements of Appendix B to 10 CFR Part 50.

C. Geology and Seismology

11. In our Partial Initial Decision (NEPA and Site Suitability Issues) issued on July 30, 1975 (2 NRC 131 (July 30, 1975)), we concluded that the site for WNP-4 was suitable from the standpoint of geology and seismology. Based on the evidence on record at that time, we concluded that horizontal ground acceleration of 0.25g was appropriate for the safe shutdown earthquake (2 NRC at 147). On the basis of these and other findings related to site suitability, we concluded that the site for WNP-4 was suitable for nuclear power reactors of the general size and type proposed from the standpoint of radiological health and safety considerations (2 NRC at 150).

12. In our Initial Decision (Construction Permit) issued on December 22, 1975 (2 NRC 922 (December 22, 1975)), we affirmed our earlier findings and conclusions relating to, *inter alia*, site suitability matters. On the bases of this affirmance and of our findings and conclusions in that decision relating to radiological health and safety matters, we concluded that the appropriate action to be taken was the issuance of construction permits for WNP-1 and WNP-4⁴ subject to certain conditions for the protection of the environment (2 NRC at 943-44).

13. Upon the submission of evidence by the parties relating to Applicant's financial qualifications for WNP-4 in August 1976, it appeared that the record was complete and that the Board would be able to issue its decision authorizing a construction permit for WNP-4. However, the NRC Staff in a letter dated August 27, 1976, advised the Board that it expected to receive shortly further information from the U.S. Geological Survey relating to geological and seismological conditions in the State of Washington

⁴As noted herein, *supra*, at p. 255, the favorable findings of fact and conclusions of law rendered in our Initial Decision were applicable to both WNP-1 and WNP-4 with one exception, *viz.*, the financial qualifications findings and conclusions related only to WNP-1. We have addressed the matter of the Applicant's financial qualifications for WNP-4 in the instant decision (*supra*, Part II.A), where we conclude that the Applicant is financially qualified to design and construct WNP-4.

(primarily related to the North Cascades earthquake which occurred on December 14, 1872) (Staff Exhibit 16) and that after an assessment of this information the Staff would inform the Board whether it has any affect on the seismic design criteria for WNP-4. The Staff implied that the Board should withhold rendering a decision authorizing a construction permit for WNP-4 until the USGS information was available. Accordingly, by memorandum and order of September 7, 1976, the Board deferred issuing the decision on WNP-4.

14. The Applicant (together with the other principal utilities in the Pacific Northwest involved with nuclear projects) commissioned a number of geologists and seismologists to reexamine the available data, including all epicentral area studies, relating to the postulated 1872 earthquake. In the opinion of Applicant's experts, the epicentral location for the 1872 earthquake was within a general region that includes Lake Chelan to the south and extends into southern British Columbia to the north. However, because the evidence gathered by the Applicant and its consultants was not entirely conclusive, additional investigations were required to be conducted by the Applicant to attempt to further define the location of the 1872 earthquake by either identifying the source structure or associating it with a geologic province. The Applicant was also required to investigate and evaluate the possibility of an earthquake similar to the 1872 earthquake occurring in the Columbia Plateau, the tectonic region in which the site for WNP-4 is located. Applicant's investigations included compilation and analysis of all known published and unpublished geological, geophysical, and physiographic data, evaluation of remote sensing imagery data to identify potentially significant structural features, and development of a comprehensive plate tectonic model of the Pacific Northwest. Field reconnaissance and geologic mapping in selected areas were undertaken. The results of these investigations by the Applicant and its consultants were submitted in the form of Amendment 23 to the PSAR (Applicant's Exhibit 52) and were evaluated and reviewed extensively by the NRC Staff and its consultant, the U.S. Geological Survey (Staff Exhibit 16).

15. The epicentral location of the 1872 earthquake was placed within a broad area of the North Cascades-Okanogan region extending from Lake Chelan in the south to southern British Columbia in the north. These data and conclusions were presented to and reviewed by the Advisory Committee on Reactor Safeguards (ACRS), which in a letter to the NRC Staff dated November 15, 1977, concluded that the 1872 earthquake (the 1872 Wenatchee earthquake) should be considered an intensity VIII (MM), and that arbitrary movement over extended distances of a prototype 1872 earthquake for purposes of seismologic design should be reexamined. The ACRS conclusion considered the advice of the U.S. Geological Survey that the

assigned intensity of this earthquake cannot be less than MM intensity VIII and is probably MM intensity IX. The U.S. Geological Survey's consideration was based primarily on application of the Modified Mercalli (MM) criteria to the occurrence of a large landslide at Ribbon Cliffs, believed to have been caused by the earthquake. The Advisory Committee on Reactor Safeguards indicated that the Columbia Plateau on which the WNP-4 site is located appears to be either a different tectonic province than that in which the 1872 earthquake occurred or a region of lower seismic activity with regard to frequency and intensity (Board Exhibit 1). The ACRS letter is included in the record as Board Exhibit 1, pursuant to our general authority to regulate the course and conduct of the proceeding (see *Consumer Power Company* (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 340 (1973)).

16. On December 21, 1977, the USGS transmitted to the Staff a supplement to its review¹ of the geologic and seismologic data for WNP-1 and WNP-4. The USGS concluded that the proposed tectonic boundary forming the north and northwest sides of the Columbia Plateau province and the proposed boundary separating the North and Middle Cascades near Snoqualmie Pass are reasonable and that earthquakes similar to the large 1872 earthquake may be confined reasonably to the North Cascades-Okanogan region. Accordingly, the USGS concluded that an earthquake of a size similar to the 1872 event should be assumed to occur at the point on the boundary of that region with the Columbia Plateau that is closest to the site. Therefore, it is reasonable to assume that such an earthquake will not occur in the Columbia Plateau and that the closest point to the site for WNP-4 where such an event could occur is on the edge of the Plateau, approximately 130 km from the site. The USGS concluded that such an event would not affect the safe shutdown earthquake of intensity VIII (MM) or the design ground acceleration value of 0.25g (Staff Exhibit 16).

17. The Staff concluded that the 1872 earthquake should be considered to be a strong intensity VIII (MM) and that a recurrence of the 1872 event should not be hypothesized near the WNP-1 and WNP-4 sites. The Staff concluded also that the Columbia Plateau structural province should be considered a separate tectonic province within the meaning of 10 CFR Part 100, Appendix A, and that the 1872 earthquake occurred in a separate province north of the Columbia Plateau province. On the basis of these conclusions, the Staff affirmed that a design acceleration value of 0.25g should be applied to the WNP-4 site (Staff Exhibit 16).

18. In its review, the Staff has found that there are no geological

¹The original USGS review for WNP-1 and WNP-4 dated June 19, 1975, is attached to Staff Exhibit 8c.

structures in the immediate site area that could cause surface faulting or localize earthquakes. Therefore, considering the seismicity of the Columbia Plateau structural province and the earthquake potential of the Rattlesnake-Wallula structure, a site intensity of VII-VIII (MM) would appear to be the appropriate intensity for determining the seismic design basis for the WNP-4 site, consistent with the requirements of 10 CFR Part 100, Appendix A. However, based largely on considerations of regional tectonics, it can be argued that an intensity VIII should be postulated (Staff Exhibit 16).

19. The Board has reviewed the extensive new material in the record relevant to the WNP-4 site geology and seismology, and in particular the 1872 earthquake. On the basis of the foregoing and our independent evaluation, the Board finds that there is reasonable assurance that the Columbia Plateau structural province is a separate tectonic province within the meaning of 10 CFR Part 100, Appendix A. The Board further finds that the 1872 earthquake should not be located in the Columbia Plateau province. Finally, the Board finds that a safe shutdown earthquake of intensity VIII (MM) based upon the earthquake potential of the Rattlesnake-Wallula structure is the appropriate event for determining the seismic design basis for WNP-4, and that the design acceleration value of 0.25g for the WNP-4 site is consistent with the requirements of 10 CFR Part 100, Appendix A. Accordingly, the Board affirms its previous finding regarding the suitability of the WNP-4 site.

D. Emergency Core Cooling System

20. On August 27, 1976, the Staff advised the Board by letter as a result of recent reviews of certain previously approved emergency core cooling system (ECCS) evaluation models, it appeared that the use by Babcock & Wilcox (B&W) of a nucleate boiling heat transfer correlation after critical heat flux is first predicted may not conform to the requirements of 10 CFR Part 50, Appendix K. The Board noted in its memorandum and order dated September 7, 1976, that in view of the likelihood that the record in this proceeding would be further supplemented regarding, *inter alia*, the requirements of Appendix K, the Initial Decision for WNP-4 should be deferred.

21. Thereafter, B&W made changes to the ECCS model to resolve the Staff's concern with regard to the return to nucleate boiling and conformance to Appendix K. Subsequently, the Staff reviewed additional analyses by the Applicant to address further revisions made by B&W to the ECCS models and to address the difference between the WNP-4 core power and reactor coolant pump flow and the core power and pump flow used in the generic analysis contained in a B&W topical report (Staff Exhibit 14). The addi-

tional analysis shows that prior conclusions concerning ECCS performance remain applicable. The Board finds that compliance with the acceptance criteria of 10 CFR Part 50, Appendix K, has been demonstrated.

E. Fire Protection System

22. Subsequent to the issuance of the Initial Decision for WNP-4, the Staff requested that the Applicant make a detailed comparison between the Fire Protection Program proposed at that time for WNP-4 and the guidelines contained in Appendix A to the NRC Branch Technical Position (BTP) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." The Staff also requested that the Applicant submit a fire hazards analysis for WNP-4. The Applicant submitted a two-volume report which included the requested comparison with Appendix A to BTP 9.5-1 and the fire hazards analysis.

23. In response to the Staff's request, the Applicant has committed to make provisions to ensure a supply of water to standpipes and hose connections for manual firefighting in areas within hose reach of equipment required for safe plant shutdown in the event of a safe shutdown earthquake (SSE). The standpipe system serving such hose stations will be analyzed for SSE loading and provided with supports to assure system pressure integrity. The piping and valves for the portion of the hose standpipe affected by this functional requirement will satisfy American National Standards Institute Standard B 31.1, "Power Piping." The water supply for this condition will be obtained by manual operator activation of valves in a connection to the hose standpipe header from a seismic Category I system, and the cross connection will be capable of providing 75 gallons per minute flow to each of any two hose stations and will be designed to the same standards as the seismic Category I water system. This design modification meets the guidelines set forth in Section E.3.d of Appendix A to BTP 9.5-1 (Staff Exhibit 17).

24. The Staff has completed a preliminary evaluation of the Applicant's submittal with respect to fire protection and has requested the Applicant to provide additional information needed to complete the Staff review. However, based on its preliminary review of the WNP-4 Fire Protection Program with the existing seismic design, and the Applicant's additional commitments to ensure a supply of water in the event of an SSE, the Staff concluded that the Applicant has provided the Staff with sufficient information to permit the Staff to make the finding pursuant to 10 CFR §50.35(a) that the fire protection system design is adequate for the construction permit stage. In addition, the Staff concluded that the facility has sufficient design flexibility to allow implementation of any design changes which

may be necessary to assure compliance of WNP-4 with Appendix A to BTP 9.5-1 and that there are no safety questions associated with the fire protection system that require any research and development (Staff Exhibit 17).

25. On the basis of the foregoing, the Board finds that there is reasonable assurance that any safety questions regarding the fire protection system will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of WNP-4 and that with respect to the fire protection system (and taking into consideration the site criteria contained in 10 CFR Part 100) WNP-4 can be constructed and operated at the proposed location without undue risk to the health and safety of the public.

III. FINDINGS OF FACT—ENVIRONMENTAL

A. Need for Power

26. When the Applicant submitted its evidence on the financial qualifications issue for WNP-4 on August 5, 1976, it also submitted evidence to update the record on the WNP-4 need for power matter. This evidence consisted of an affidavit of Applicant's expert need for power witness (Applicant's Exhibit 43) and the 1976 West Group Forecast (Applicant's Exhibit 44).

27. On August 6, 1976, the NRC Staff also submitted additional evidence relating to need for power (Staff Exhibit 11) which demonstrated that, at that time, the projected need for WNP-4 was greater than it had been a year previously. This conclusion was based on the assessment that a reduction in forecasted loads for the West Group Area was exceeded by the reduction in the estimated availability of power generating facilities to meet the forecasted loads (Staff Exhibit 11).

28. In order to assure that the final decision in WNP-4 is based on the most current information available, the parties have submitted additional evidence on need for power consisting of an affidavit of the Applicant's expert need for power witness (Applicant's Exhibit 49), to which was attached a copy of the 1977 West Group Forecast and the Staff's analysis and evaluation of Applicant's submittal (Staff Exhibits 18 and 23).

29. In our Partial Initial Decision (2 NRC 131, 140-42 (July 30, 1975)), we concluded that on a regional basis there will be a need for the energy produced by the proposed facility. Based upon our consideration of the then current record, we found that there will be a need for the baseload energy which can be produced from WNP-4 in the time frame in which this plant is anticipated to operate (*ibid.* at 142).

30. The 1977 West Group Forecast contains the information available relating to anticipated energy loads and resources of the West Group area

through July 1988. The 1977 forecast indicates that there has been a decrease in energy loads forecasted for the period 1977-1987 but that this decrease in loads has been more than offset by decrease in energy resources estimated to be available in that period. Likewise, the 1976 West Group Forecast reflected a decrease in energy loads which also was more than offset by a decrease in energy resources. These decreases in estimated generating resources are due to slips in schedules of certain facilities which were credited as resources in the previous West Group Forecast. The slips in schedule were due to a number of factors, including load reductions, labor difficulties, and additional analyses required to meet regulatory criteria.

31. Comparison of the 1977 West Group Forecast with the 1975 West Group Forecast reveals that milestone completion dates have been delayed for all major generating facilities scheduled for completion in 1977 or later. Accordingly, energy from these delayed facilities for which credit was taken for a given year in the 1975 forecast will not be available during the time frame previously anticipated. For example, both WNP-1 and WNP-4 have experienced slips in milestone completion dates since the 1975 forecast of approximately 27 months. Likewise, both units of Puget Sound Power and Light Company's Skagit Nuclear Project have slipped approximately 25 months, and both units of Portland General Electric Company's Pebble Springs Nuclear Project have slipped approximately 36 months. This experience of slippage in schedule of milestone completion dates is not unique to nuclear projects. For example, Units 3 and 4 of the Montana Power Company's Colstrip facility (coal-fired) have slipped approximately 30 months.

32. The Staff reviewed the 1977 West Group Forecast, and based on more recent forecasts of the Pacific Northwest Utilities Conference Committee, the schedule of resource addition changes as well as the information concerning loads and resource availability to meet forecast loads provided by the Applicant in November of 1977 (Applicant's Exhibit 49), the Staff concluded that there is a need for the baseload energy from WNP-4 in the time frame projected by the 1977 forecast (Staff Exhibits 18 and 23). The Staff's analysis updated the need for power information provided in the Pacific Northwest Utilities Conference Committee, West Group Forecast of power loads and resources July 1977-June 1988, dated February 15, 1977 (attached to Applicant's Exhibit 49), to assure that the latest information on need for power supports the present conclusion. Revised load growth estimates have been downward since 1974. Peakload has been forecast to grow at 5.4% (1977-1987) and is now forecast to grow at 4.7%. Average expected load forecasts over the same period have changed from 5.0% to 4.7%. No significant changes in forecasts of hydro resource based planned additions have occurred since 1974 for the period 1977-1987. A modest in-

crease in peak hydro additions increasing at 2.3% per year has been forecast with virtually no change in average load resource additions. New hydro additions are expected to meet peak conditions and will not be able to contribute more to baseload demand than it now contributes. The Staff's analysis reflects recent changes in schedule of resources and load with and without WNP-4. Resources and loads are expected to grow at approximately the same rate with a slight improvement in reserve margin implied in the growth rates. The Staff evaluation of the average demand indicated that the reserve margin is barely adequate under low growth scenarios. The Staff concluded that WNP-4 is needed to generate baseload energy even in the face of a realized low growth energy scenario. The Staff's conclusion is based on an inadequate reserve margin under most growth scenarios (4% or more). A barely adequate reserve margin is obtained under low growth scenarios (2.6% to 3.4% per year), when interruptible load is considered (Staff Exhibits 18 and 23).

33. The Board finds, upon consideration of the entire record, that there is a need for the baseload energy which can be produced from WNP-4 for the energy loads forecast for the period 1977-1987. Thus, we confirm our previous finding in the Partial Initial Decision to this effect.

B. Uranium Fuel Cycle—Table S-3

34. On March 7, 1977, the Commission announced the adoption of a final interim fuel cycle rule (42 Fed. Reg. 13803, March 14, 1977). We have evaluated the added environmental impacts that would be assumed from the use of the value set forth in revised Table S-3 and find that they do not tip the cost-benefit balance against construction and operation of the WNP-4 facility (Staff Exhibit 22).

35. There are insignificant increases in the number of acres of land temporarily committed and in millions of gallons of water used. There are insignificant increases in nonradiological effluents and in radiological releases and dose commitments. The fuel cycle effects presented in the revised Table S-3 are sufficiently small—insignificant—when they are superimposed on the other assessed environmental impacts associated with WNP-4 and clearly do not tilt the cost-benefit balance set forth in the FES. Therefore, the cost-benefit balance favors granting the construction permit for WNP-4 (Staff Exhibit 22).

C. Health Effects

36. On January 25, 1977, the Appeal Board stated in its *Hartsville* deci-

sion⁶ that in consideration of alternative sources of energy, focus should be placed upon environmental factors. The Appeal Board made specific reference to "an estimate of the incremental incidence of various diseases and genetic effects which would be caused by the operation of each type of plant" (see fn. 52, 5 NRC at 102-104). In conformance with the Appeal Board's decision in updating the record, the Staff presented testimony regarding health effects associated with nuclear and coal-fired generation. The Staff stated that the coal fuel cycle alternative may be more harmful to man by factors of 4 to 250 depending on the effect being considered, for an all nuclear economy, or factors of 3 to 22 with the assumption that all of the electricity used by the uranium fuel cycles comes from coal-powered plants (Staff Exhibit 21—NUREG-0332).

37. Staff evidence concludes, among other things, that, "While future technological improvements in both fuel cycles may result in significant reductions in health effects, based on current estimates for present day technology, it must be concluded that the nuclear fuel cycle is considerably less harmful to man than the coal fuel cycle." (Staff Exhibit 21, p. 13.) Subsequent to making that statement, the Staff reevaluated the releases of Radon-222 from the mining and milling operations of the nuclear fuel cycle (Staff Exhibits 20 and 24) in order to respond to questions raised by Dr. Walter Jordan, Atomic Safety and Licensing Board (ASLB) in a September 21, 1977, memorandum to James Yore, Chairman (ASLB). As a result of that reevaluation, the Staff concluded that Dr. Jordan was correct in that the Radon-222 releases and subsequent increase in Radon-222 population doses and health effects per reference reactor year due to mining and milling were larger than what had been estimated at the time of completion of NUREG-0332, *i.e.*, Staff Exhibit 21. The Staff has also concluded that Dr. Jordan was correct when he concluded that this impact is " 'insignificant compared to those due to radon contamination in natural background,' and that the authors of WASH-2148 were correct in their belief that 'population doses from this source cannot be distinguished from background.' " (Affidavit of R. L. Gotchy dated January 25, 1978, p. 15; Staff Exhibit 20; Staff Exhibit 24.) The estimates in the January 25, 1978, affidavit (Staff Exhibit 20) were used as the basis for a revision of the comparison of estimated health effects from the coal and nuclear fuel cycles. While the corrected Radon-222 source term results in a substantial increase in the health impact of the entire uranium fuel cycle, the Staff's conclusion in Staff Exhibit 21 that the nuclear fuel cycle is considerably less harmful to man than is the coal fuel cycle, remains unchanged. The Board concurs with the Staff but notes that the Board's finding concerning health effects is

⁶Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-367, 5 NRC 92 (1977).

based upon Staff evidence utilizing the Radon-222 source term set forth in the Commission's final interim fuel cycle rule (Staff Exhibit 21). See *Metropolitan Edison Company, et al.* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-456, 7 NRC 63 (January 27, 1978).

38. The Board finds that the matter of health effects associated with coal and nuclear generation alternatives have been adequately considered and that such consideration confirms that the cost-benefit balance favors the nuclear alternative of construction and operation of WNP-4. Indeed, based upon the information provided, the cost-benefit analysis originally performed for WNP-4 is further enhanced by a comparison of the health effects of the coal and the nuclear energy alternatives.

IV. CONCLUSIONS OF LAW

1. The Board has reviewed the entire record of this proceeding, including the proposed findings of fact and conclusions of law submitted by the parties. All of the proposed findings and conclusions submitted which are not incorporated directly or inferentially in this Supplemental Initial Decision are hereby rejected as being unnecessary to the rendering of this decision.

2. In the Partial Initial Decision issued on July 30, 1975, the Board made findings of fact and determinations, and reached conclusions of law, regarding environmental and site suitability matters, and certain safety issues. Thereafter, in its memorandum and order issued on September 30, 1975, the Board made additional determinations regarding other safety issues. Finally, in the Initial Decision issued on December 22, 1975, the Board made findings of fact and reached conclusions of law regarding radiological health and safety matters, and certain additional environmental matters. The Board has considered these earlier findings, determinations, and conclusions, as well as the findings of fact set forth in this Supplemental Initial Decision, and the documentary and oral evidence of record in this proceeding. This consideration and a review of the entire record, including that portion of the record created since the issuance of the Initial Decision, have led the Board to the foregoing discussion and findings of fact and to the conclusions of law stated hereinafter. With the exception of the conclusion of law on the Applicant's financial qualifications to design and construct WNP-4 (*infra*, paragraph 3.c), the following conclusions merely restate those conclusions reached in our Initial Decision with respect to WNP-4.

3. The Board concludes that the review of the application by the Staff has been adequate and that the application and the record of the proceeding contain sufficient information to support findings by the duly authorized official of the Regulatory Staff (and the issuance of a construction permit

based thereon for WPPSS Nuclear Project No. 4) to the same effect as the conclusions of law of the Board, as follows:

- a. In accordance with 10 CFR §50.35(a):
 - i. The Applicant has described the proposed design of WNP-4, including but not limited to the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public;
 - ii. Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied in the Final Safety Analysis Report;
 - iii. Safety features and components, if any, which require research and development have been described by the Applicant, and the Applicant has identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components; and
 - iv. On the basis of the foregoing, there is reasonable assurance that (1) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of WNP-4, and (2) taking into consideration the site criteria contained in 10 CFR Part 100, WNP-4 can be constructed and operated at the proposed location without undue risk to the health and safety of the public.
- b. The Applicant is technically qualified to design and construct WNP-4.
- c. The Applicant is financially qualified to design and construct WNP-4.
- d. The issuance of a permit for construction of WNP-4 will not be inimical to the common defense and security or to the health and safety of the public.

4. As we concluded in our Partial Initial Decision dated July 30, 1975, in accordance with 10 CFR Part 51 of the Commission's regulations, the Board concludes:

- a. The environmental review conducted by the Staff pursuant to the National Environmental Policy Act of 1969 (NEPA), as further augmented and modified herein, is adequate.
- b. The requirements of Sections 102(2)(C) and (D) of NEPA and 10 CFR Part 51 of the Commission's regulations have been complied with in this proceeding.

- c. The Board has independently considered the final balance among conflicting factors contained in the record of the proceeding, and has determined that appropriate action to be taken is issuance of a construction permit for WNP-4, subject to the conditions for the protection of the environment recommended by the Staff (FES, p. ii), and set forth in the Partial Initial Decision.

V. ORDER

Based upon the Board's findings and conclusions, and pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations, IT IS ORDERED that the Director of the Division of Project Management, Office of Nuclear Reactor Regulation, is authorized to issue to the Washington Public Power Supply System a permit to construct WPPSS Nuclear Project No. 4, consistent with the terms of the Partial Initial Decision, the Initial Decision, and this Supplemental Initial Decision, substantially in the form of Attachment A hereto.

IT IS FURTHER ORDERED, in accordance with 10 CFR §2.760, §2.762, §2.764, §2.785, and §2.786 that this Supplemental Initial Decision shall become effective immediately and shall constitute with respect to the matters covered therein the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the Commission's Rules of Practice. Exceptions to this Supplemental Initial Decision may be filed by any party within seven (7) days after service of this Supplemental Initial Decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff), any party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (twenty (20) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND LICENSING BOARD

Donald P. deSylva, Member

Marvin M. Mann, Member

Robert M. Lazo, Chairman

Dated at Bethesda, Maryland,
this 17th day of February 1978.

[Appendix A and Attachment A have been omitted from this publication but are available in the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket Nos. STN 50-568
STN 50-569

NEW ENGLAND POWER
COMPANY, et al.

(NEP, Units 1 and 2)

February 21, 1978

Upon motions to postpone or suspend all licensing proceedings (including discovery, evidentiary hearings, NRC staff review, and preparation of the draft environmental statement and other analyses) until the question of site ownership is resolved, the Licensing Board holds that it lacks jurisdiction to order staff performance, *vel non*, of its independent functions, but the Board delays discovery and hearings until both the draft environmental statement and the safety evaluation report have been filed.

ATOMIC ENERGY ACT: OWNERSHIP

No statute or regulation requires an applicant to own a site before an application may be docketed or considered.

LICENSING BOARD: JURISDICTION

The Licensing Board does not have the power under 10 CFR §2.718 or any other regulation to direct performance, *vel non*, of the staff's independent responsibilities.

LICENSING BOARD: DELEGATED AUTHORITY

Licensing boards are delegates of the Commission and exercise only those powers which the Commission has given them. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station), ALAB-316, 3 NRC 167, 170 (1976).

RULES OF PRACTICE: STAFF AUTHORITY

Whether or not an application is acceptable for docketing is a determination to be made only by the staff. 10 CFR §§2.101(a) and 2.102(a).

RULES OF PRACTICE: SCHEDULING

The absence of rigid scheduling criteria established by statute or regulation suggests that adjudicatory boards are to decide for themselves under all the circumstances when hearings should be held on specific issues. *Potomac Electric Power Company* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975).

ORDER CONCERNING MOTIONS TO SUSPEND PROCEEDINGS AND STAFF REVIEW AND COMMENCEMENT OF DISCOVERY

Intervenors Eric D. Schneider and Claudine C. Schneider filed a motion served by mail on November 17, 1977, seeking an order postponing all hearings and ceasing all licensing review with respect to the application for construction permits. The grounds for this motion involved the alleged uncertainty whether the Applicants could ever acquire ownership or control of the proposed site from the General Services Administration, the administrator of the Federally owned land. The Board and the parties were orally advised of this motion at the second special prehearing conference held at Cranston, Rhode Island, on November 15, 1977. Subsequently, other intervenors filed similar or related motions.

By motion dated November 21, 1977, the Concerned Citizens of Rhode Island, *et al.*, (CCRI) requested the Board to suspend all licensing proceedings including discovery and all evidentiary hearings, pending the final resolution of the question of ownership of the proposed site. CCRI also requested the Board to direct the NRC Regulatory Staff to suspend its review of the application or preparation of the draft environmental impact statement (DES) and other analyses until the site ownership question was resolved. Similar or supporting motions were filed by the town of South Kingstown on November 29, by the Conservation Law Foundation on November 30, by the towns of Hopkinton and Richmond on December 2, and by the town of Charlestown on December 13, 1977.

The Applicants filed their answer to the original motions on December 2, 1977, contending that a suspension of proceedings was unnecessary because there are many contested issues that do not depend upon site-specific information, that there is sufficient site-related information available to deal with most of the remaining contested issues, and that discovery procedures

could deal with later developed facts and data. The same reasons were adopted by Applicants as answers to the subsequently filed motions.

On December 16, 1977, Intervenor LAMP, *et al.*, filed an opposition to the motion of CCRI, contending that the Applicants do not have to own the site in order to obtain a construction permit, and that proceeding now will avoid an unwarranted commitment of resources and prevent a NEPA cost-benefit tilt.

The Staff, on December 23, 1977, filed its response to the pending motions urging that they be denied because the circumstances surrounding ownership of the proposed site do not require suspension of all Staff review of the application, or the cessation of the licensing hearing procedure including discovery pending ultimate resolution of the ownership question.

I

The heart of the present controversy involves the status of the proposed site, which is the Naval Auxiliary Landing Field (NALF) located in Charlestown, Rhode Island. This property is owned by the United States and its disposition is being administered by the General Services Administration (GSA) in accordance with the procedures established by the Federal Property and Administrative Services Act, 40 U.S.C. 471, *et seq.* (FPAS). A number of private parties and public agencies, including the Bureau of Sport Fisheries and Wildlife, Department of Interior, and the Environmental Protection agency, have expressed an interest in acquiring this property under the statutory procedures.¹ A purported conditional sale of this land by GSA to the Narragansett Electric Company (a wholly owned subsidiary of the New England Power Company) triggered extensive litigation in the Federal courts. Some understanding of this litigation is necessary in order to evaluate the pending motions.

The Rhode Island Committee on Energy and individuals residing near NALF filed suit in the U. S. District Court in 1974 to block the impending sale of GSA of the "surplus" Navy site to the Narragansett Electric Company (Narragansett). They sought a declaration that the sale to the power company would violate the National Environmental Policy Act (NEPA), the Council on Environmental Quality's guidelines, and GSA's own guidelines for complying with NEPA. The District Court, in its first *RICE* decision, found that after May 1, 1974, formal notices of intent to acquire NALF were received by GSA from a number of public and private entities, including the Fish and Wildlife Service of the Department of Interior, the State of Rhode Island, the town of Charlestown and Providence

¹*Rhode Island Committee on Energy v. General Services Administration (RICE v. GSA)*, 561 F.2d 397, 404 (1st Cir. 1977).

College, and the Narragansett Tribe of Indians through the Department of Health, Education, and Welfare. However, "from the moment Narragansett made its request on May 6, the proposed negotiated sale received top priority in GSA's Washington Office of Real Property."² The Court further found that by the beginning of July, GSA had determined, in principle, the ultimate disposition of NALF, quoting from an August 5, 1974, GSA "Fact Sheet" as follows:

On Wednesday, July 3, 1974, GSA officials met with representatives of the State of Rhode Island and the Electric Company in Central Office to discuss alternative ways of selling the property for use as a nuclear power plant and the legal ramifications of such a transaction. At that meeting, it was agreed that while the property was being appraised the lawyers would start drafting a sale agreement obligating the Government, to be delayed pending licensing of the nuclear power facility. . . . There are also additional expressions of interest in the property from the Narragansett Indian Tribe and Providence College through the Department of Health, Education and Welfare and from the Bureau of Sport Fisheries and Wildlife for transfer of 367 acres for wildlife conservation purposes. *Present planning contemplates that these interests will be rejected in favor of use of the property as a nuclear power plant site.*³ [Emphasis supplied by the Court.]

The Court further stated:

Despite the above-quoted language, GSA continued to reassure interested members of the public and Congress that the FWS interest was being seriously considered in late August and September. (Exh. 46, 48, 51-54.)⁴

[Footnote 14] GSA responses to public inquiry regarding the disposition of the NALF are very disturbing when juxtaposed with its private negotiations with Narragansett. GSA public statements of its intent to give full consideration to the environmental impact and all competing interests are misleading in ascribing to GSA a more searching decision making process than that which the internal GSA documents reveal.⁴

The thrust of the District Court's decision was described by the Court of Appeals, which affirmed the NEPA portion of the case, as follows:

²*Rhode Island Committee on Energy v. General Services Administration (RICE v. GSA)*, 397 F. Supp. 41, 48 (D.R.I. 1975). See also 411 F. Supp. 323 (D.R.I. 1976).

³*Id.* at 48.

⁴*Id.* at 49 and fn. 14.

On July 8, 1975, the district court issued a comprehensive opinion indicating that GSA had been both remiss and extraordinarily cavalier in its handling of the disposal of the property. The court stated that it would enjoin defendants "from taking any further action with regard to the proposed disposal to Narragansett until they have prepared and circulated a draft environmental impact statement and filed a final EIS in accordance with NEPA and applicable regulations."⁵

The Court of Appeals further observed that,

Until the initiation of appellants' suit, GSA was singlemindedly proceeding with preparations for a sale to Narragansett, giving little or no consideration to the legal constraints under which it supposedly operates including its NEPA obligations. The district court praised plaintiffs for bringing this improper conduct into court. . . .⁶

The Court of Appeals also sustained that portion of an unpublished third opinion of the District Court which, *inter alia*, declared that sale of the site to Narragansett without preparation of an EIS constituted a violation of NEPA, but denied a permanent injunction "in view of GSA's clearly expressed intention to prepare an EIS without further delay. . . ."

Finally, in *Concerned Citizens of Rhode Island v. Nuclear Regulatory Commission (CCRI v. NRC)*, 430 F. Supp. 627 (D.R.I. 1977), the plaintiffs contended that NRC was exceeding its authority by docketing and processing the Intervenor-defendant New England Power Company's (NEP) application for a construction permit for nuclear reactors to be built at NALF. The claims were based on the fact NEP does not own or have the legal right to control the NALF site. Upon motion by defendants NRC and NEP, the complaint was dismissed. The Court held that substantial authority indicated that the NRC order docketing NEP's application for further processings, including hearings, was not a "final order" under the Hobbs Act (28 U.S.C. §2342), giving exclusive jurisdiction on appeal of all final orders to the Court of Appeals. The Court assumed *arguendo* that the order was not presently appealable in the Court of Appeals. However, it rejected defendants' contention that any order not "final" under the Hobbs Act was *ipso facto* not "final" for Administrative Procedure Act (APA)

⁵*Rhode Island Committee on Energy v. General Services Administration*, 561 F.2d 397, 400 (1st Cir. 1977).

⁶*Id.* at 404.

⁷*Id.* at 401, 405. By expressly affirming without prejudice to the District Court's right in the future to entertain a prayer for an injunction if GSA did not comply with its obligations under the judgment, the Court of Appeals left at least the moral equivalent of a judicial restraint.

purposes, and held that the District Court had general Federal question jurisdiction over APA claims (28 U.S.C. §1331).⁴

The Court then stated:

However, even though the statutory language placing exclusive jurisdiction over "final orders" of NRC proceedings does not negate the existence of Administrative Procedure Act jurisdiction in this court over other NRC orders, such jurisdiction would exist in this case only if plaintiffs have satisfied two necessary conditions imposed by the APA. First, plaintiffs must have exhausted any nonfutile administrative remedies by demonstrating that the remedy in the NRC, and eventually the Court of Appeals, is inadequate to protect their rights. [Citations omitted.] Second, plaintiffs must allege a violation of a clear, nondiscretionary legal duty breached by the NRC. [Citations omitted.] This rule embodies a functional definition of what is "final" for APA purposes, 5 U.S.C. §704, and ensures that District Court review does not impinge on the jurisdiction of the courts of appeals or unnecessarily divert the parties' attention from the administrative forum.⁹

It was held that the plaintiffs had not satisfied either APA requirement. As to the first condition, the exhaustion of administrative remedies, the Court said:

Plaintiffs have already intervened in the NRC proceeding, and may present all of their claims to the NRC. Regulations ensure that the EIS will be considered in the hearing process, 10 CFR §51.52. *See Calvert Cliffs' Coordinating Committee v. AEC*, 146 U.S. App. D.C. 33, 449 F.2d 1109 (1971). If NEP proves unable to produce the necessary environmental information because of its lack of ownership or control of NALF, plaintiffs have a remedy in the NRC hearing or later in the Court of Appeals. It can hardly be said that plaintiffs suffer present irremediable harm from an inadequate EIS which has not yet been prepared. It appears certain that adequate remedies are available to plaintiffs which preclude this Court's jurisdiction. Plaintiffs have failed to exhaust their administrative remedies.¹⁰

Nor did the plaintiffs successfully allege any violations of clear, non-discretionary legal duties by NRC, which is the second requirement for the

⁴430 F. Supp. at 630.

⁹*Id.* at 630-631.

¹⁰*Id.* at 632.

Court's jurisdiction. No statute or regulation requires an applicant to own a site before an application may be docketed or considered. NRC has a settled practice of permitting docketing and consideration of applications for after-acquired sites, and the Court must accord substantial weight to NRC's interpretation of its regulations permitting this. The real test is the practical one of producing the information required for an effective hearing, and if the applicant can produce it, ownership is irrelevant.¹¹

It was next contended that the application could not be docketed until the required site and environmental documentation was complete. But the Court held that NRC regulations explicitly permit docketing an application prior to the completion of environmental data, 10 CFR §2.101(a), and clearly contemplate that the applicant will be required to flesh out insufficient data in the Environmental Report (ER) subsequent to docketing, 10 CFR §§2.102(a), 2.103(b). As to hearings, the Court observed:

Plaintiffs correctly assert that the construction of nuclear power plants at the NALF is "hypothetical" in the sense that such construction may never take place. Unless the NRC hearings are total sham, presumably all hearings deal with "hypothetical" projects in this sense, and properly so. This is not to say, however, that the NRC hearings will be grappling with a "hypothetical problem" rendering them mere meaningless probing in the air. The focus of the hearings must be on a specific site, but that site is no less specific because NEP does not yet (or may never) own it. At their strongest, plaintiffs are able only to characterize the hearing as "potentially meaningless." This case is therefore not covered by the "possibly over-generous" principle of *Pepsico Inc. v. FTC*, 472 F.2d 179, 187 (2d Cir. 1972) where Judge Friendly asserted that the district courts would have APA jurisdiction over an agency refusal to dismiss proceedings plainly beyond its jurisdiction or which could not possibly result in a valid order.¹²

Under NEPA also there was held to be no clear requirement that NRC delay its preparation of an EIS until the Applicant gained ownership of the NALF. Agencies were held to have great discretion in the timing of EIS preparation, and there was no duty not to prepare an EIS at this time. Nor did the allegations in the complaint show a violation of the Court's holding in *RICE v. GSA*, *supra*. In that case, the Court "had neither power nor intention to preclude NRC from complying with" its legal duty to prepare an EIS.¹³

¹¹*Id.* at 632-633.

¹²*Id.* at 633, fn. 11.

¹³*Id.* at 634.

The status of the various pending proceedings as viewed by the Court was described as follows:

I feel compelled to emphasize the limited nature of this dismissal, which is not meant in any way to place a stamp of approval on the conduct of NEP or GSA. This Court has previously found that GSA has violated federal law in attempting to transfer the NALF to a subsidiary of NEP without preparation of an EIS and in disregard of requests by other federal agencies for the land in question. See *RICE v. GSA*, 397 F. Supp. 41 and 411 F. Supp. at 326. NEP was no idle participant in those events. See *RICE v. GSA*, 397 F. Supp. at 48-51, 54-55, nn. 14, 18; *id.* No. 74-272 (D.R.I. July 22, 1976) (order denying NEP and Narragansett Electric Company leave to intervene). The Court has also expressed deep concern that GSA seemed intent on creating an irretrievable commitment of the NALF to NEP and has noted that this could best be avoided by GSA's preparation of an EIS prior to any EIS which the AEC (NRC) might prepare. See *RICE v. GSA*, 397 F. Supp. 41; *id.* No. 74-272 (D.R.I. August 24, 1976) (final order) . . .

Disturbing as this train of events has been under settled principles, the Court is not empowered to grant the remedy that plaintiffs are now seeking, that is, to derail the NRC proceedings. But dismissal of the instant suit in no way forecloses other remedies that plaintiff may have against GSA in the *RICE* case, or against nuclear power in Rhode Island before the NRC or the court of Appeals.¹⁴

In the instant proceedings, the Staff is preparing a Draft Environmental Statement (DES) which it plans to file in March 1978, and after appropriate circulation and comment, a Final Environmental Statement (FES) will be filed in August 1978. The Staff has also been advised by GSA that the latter anticipates the issuance of its DES in March and an FES in August 1978. This proceeding involves an application for a construction permit, no limited work authorization (LWA) having been sought. In December 1977, Staff counsel was informed by counsel for the Applicants that there has been a 6-month delay in the start of construction to the end of 1979, and a 2-year delay in the in-service date for operation from 1984 to 1986.

II

CCRI in its motion to suspend proceedings has requested the Board to "direct the NRC Regulatory Staff to suspend its review of the NEPCO application, preparation of the draft environmental impact statement, and

¹⁴*Id.* at 635.

any and all work, studies, or analyses being conducted or planned as part of evaluation of NEPCO's proposal" (CCRI Motion, pp. 1-2). Since this request involves jurisdictional questions, it will be dealt with first as a threshold issue. We hold that the Board does not have the power to direct the Staff in the performance of its independent responsibilities, nor would it be appropriate to exercise such supervisory functions if we had the power to do so.

The authority to administer the licensing provisions of the Atomic Energy Act has been vested by Congress in the Nuclear Regulatory Commission (42 U.S.C. §5841(f) and (g)). The Commission is empowered by that Act to appoint Atomic Safety and Licensing Boards to conduct adjudicatory proceedings and "to conduct such hearings as the Commission may direct" (42 U.S.C. §2241). Accordingly, licensing boards are delegates of the Commission and exercise only those powers which the Commission has given them.¹⁵

The Commission has established a carefully articulated regulatory scheme for the processing and adjudication of applications for the licensing of nuclear power plants. The Staff is responsible for an extensive and continuing review of massive amounts of data and plans related to the construction and operation of nuclear plants, including radiological health and safety, environmental aspects, site suitability, and other aspects of the licensing process.¹⁶ The Staff, among other documents, produces the Safety Evaluation Report (SER) and the Draft and Final Environmental Statements (DES and FES). The studies and analyses which result in these reports are made independently by the Staff, and licensing boards have no role or authority in their preparation. The reports themselves are subject to review and amendment by the Board in an adjudicatory setting, in which all parties with a demonstrated interest may participate in evidentiary hearings.¹⁷ Initial decisions on these matters are subject to appeal or *sua sponte* review by the Appeal Board, and by the Commission itself if it so elects. Accordingly, it is apparent that the Board does not have any supervisory authority over that part of the application review process that has been entrusted to the Staff.¹⁸

10 CFR §2.718, cited by CCRI, applies only to the hearing process, in

¹⁵*Public Service Company of Indiana* (Marble Hill Nuclear Generating Station), ALAB-316, 3 NRC 167, 170 (1976).

¹⁶*Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 524, 541 (1977).

¹⁷10 CFR §§2.104, 2.718. *Cf. Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 334 (1973).

¹⁸*Northeast Nuclear Energy Company* (Montague Nuclear Power Station), LBP-75-19, 1 NRC 436, 437 (1975).

conferring all necessary powers upon the presiding officer "to conduct a fair and impartial hearing according to law, to take appropriate action to avoid delay, and to maintain order." This regulation is not an all-purpose delegation of power to licensing boards to control or direct the work of the Staff in carrying out its primary responsibilities.

CCRI has also requested the Board, if it questions its authority to halt the Staff review, to refer the matter to the Appeal Board pursuant to 10 CFR §2.730(f), or to certify the question to the Commission pursuant to 10 CFR §2.718(i). We decline the invitation to issue a call for help. We have no question as to our authority to halt the Staff review; there is no jurisdiction to do so. The fact that issues may be difficult or even unprecedented does not derogate from the competence of licensing boards to resolve them initially. We also observe that both the Appeal Board and the Commission have unquestioned power to intervene in licensing board adjudications when they deem it appropriate to do so.¹⁹

III

Closely allied to the question of suspending the Staff's review is the further assertion of CCRI that the application was defective because it failed to meet NRC requirements for site-specific technical and environmental data when it was docketed. Its continuing insufficiency is attributed to Applicants' lack of site ownership, and CCRI therefore requests that all review concerning the proposal be suspended pending resolution of the land ownership question (CCRI Motion, p. 16).

We concur with the Staff's position that the question of whether or not an application is acceptable for docketing is a determination to be made by the Staff. Congress has directed the Commission to delegate the Director of Nuclear Reactor Regulation (DNRR) to perform, *inter alia*, the principal licensing and regulation of nuclear reactors under the Atomic Energy Act and to review the safety and safeguards of all such facilities and activities (42 U.S.C. §5843(b)(1) and (b)(2)). The regulations promulgated by the Commission pursuant to such authority recognize these Staff functions. 10 CFR §2.101 provides as follows:

(a)(1) An application for a license... shall be filed with the Director of Nuclear Reactor Regulation [DNRR]... (2) ...However, to allow a determination as to whether an application for a construction permit... is complete and acceptable for docketing, it will be initially treated as a tendered application after it is received. (3) If the [DNRR]... determines

¹⁹United States Energy Research and Development Administration (Clinch River Breeder Reactor Plant), CLI-76-13, 4 NRC 67, 75-76 (1976); *Seabrook*, *supra*, 5 NRC 503, 516-517.

that a tendered application for a construction permit...and/or any environmental report required pursuant to Part 51...are complete and acceptable for docketing, a docket number will be assigned...and the applicant will be notified of the determination.

10 CFR §2.102 entitled "Administrative Review of Application," provides in subpart (a) that:

During review of an application by the Staff, an applicant may be required to supply additional information In the case of a docketed application for a construction permit...the staff shall establish a schedule for the review . . . specifying the key intermediate steps from the time of docketing until the completion of its review.

These regulations contemplate Staff determinations of the acceptability of license applications, together with continued Staff review and analysis after docketing. Such Staff review is part of a continuous licensing process, not a single discrete step which requires complete and final design and technical information when an application is tendered.²⁰ As the *CCRI v. NRC* Court, *supra*, held, no statutes or regulations are violated by NRC's announced, longstanding practice of docketing incomplete applications which the applicant is required to flesh out by means of detailed requests for further information and data.²¹ Here, the important question is not whether the application was sufficiently complete when filed (which the Staff determines), but rather whether the Staff's analysis and evaluation is adequately supported by the evidence adduced at the evidentiary hearing in connection with the construction permit proceedings. The moving parties will have full opportunity to address these matters at the hearing.

IV

The motions of CCRI and the Schneiders next request the suspension of all licensing proceedings, including hearings, until the site ownership question is finally determined by GSA. Such a blanket request must be denied.

The Commission's Statement of General Policy describes the procedures to be followed by licensing boards in the conduct of licensing proceedings. Appendix A to 10 CFR Part 2 provides:

The Statement reflects the Commission's intent that such proceedings be

²⁰*Seabrook, supra*, 5 NRC 503, 524, 526; *Gulf States Utilities Company* (River Bend Station, Units 1 and 2), ALAB-444, 6 NRC 760, 765 (1977).

²¹430 F. Supp. 627, 633.

conducted expeditiously and its concern that its procedures maintain sufficient flexibility to accommodate that objective. This position is founded upon the recognition that fairness to all the parties in such cases and the obligation of administrative agencies to conduct their functions with efficiency and economy, require that Commission adjudications be conducted without unnecessary delays. These factors take on added importance in nuclear power reactor licensing proceedings where the growing national need for electric power and the companion need for protecting the quality of the environment call for decision making which is both sound and timely.

In *Koshkonong*, the petitioners claimed that the early issuance of a notice of hearing on an application for a construction permit denied them an adequate opportunity to prepare a petition for intervention with reasonable specificity. They also argued that without the benefit of discovery they could not have basic scientific information necessary to prepare intervention petitions. The Commission held that the large amount of technical and environmental material already available in the record from the voluminous application was sufficient to assist petitioners in formulating contentions, and that modern judicial and administrative practice requires parties to file their basic pleadings before they complete discovery. The Commission further stated:

Petitioners also assert in their petition for reconsideration that the entire application and the licensing proceedings for the two units of the Koshkonong facility is premature because the Wisconsin Department of Natural Resources has not yet issued a water quality certificate. Such a proposal is unreasonable and will result in needless delay. As a general rule it is the practice of the Commission to pursue its administrative procedures while other state and local proceedings are under way. Such a practice is hardly a waste of time; on the contrary, it is the efficient, economical and expeditious course. [Citation omitted.] A ponderous, indeed arbitrary "protocol" for licensing processes among local, state and federal authorities would be irresponsible in view of the enormous economic and social costs necessarily entailed.²²

The Appeal Board considered the question of deferring all evidentiary hearings in *Douglas Point*.²³ The question in that case was whether evidentiary hearings should proceed notwithstanding the applicant's post-

²²*Wisconsin Electric Power Company* (Koshkonong Nuclear Plant, Units 1 and 2), CLI-74-45, 8 AEC 928, 930 (1974).

²³*Potomac Electric Power Company* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975).

ponement of construction and operation of its facility for several years. The Appeal Board held that "no provision of statute or regulation compels the conclusion that evidentiary hearings should be deferred."²⁴ It was further stated:

At this juncture, suffice it to note that we do not believe that it [the Licensing Board's judgment that no early findings would likely withstand the passage of time] has such universal validity that we should imply a legislative or administrative command that, in all cases, the commencement of an evidentiary hearings must await the approach of the time at which the applicant will wish to obtain a limited work authorization or construction permit.²⁵

In light of these precedents, we cannot hold that all review and evidentiary proceedings should be suspended immediately as a matter of law, pending the ultimate resolution by GSA of the land ownership question.

V

We now come to those portions of the pending motions which raise issues within the jurisdiction of this Board, requiring the exercise of a reasoned discretion. A further analysis of the above-cited precedents is necessary in order to delineate the nature and scope of our authority. As the Douglas Point opinion observed, "Licensing boards have, of course, the general authority to '[r]egulate the course of the hearing' (10 CFR 2.718(e))—an authority which we have held encompasses determinations as to when a particular hearing should take place."²⁶ Accordingly, it was held that the absence of any rigid scheduling criteria established by statute or regulation suggests that adjudicatory boards are to decide for themselves under all the circumstances when hearings should be held on specific issues.²⁷

Upon its facts, *Douglas Point* was the reverse of the instant case, because the applicant owned the proposed site, and there was no question of its ability to acquire ownership or control. There was nothing to indicate a probability that many of the ingredients of a safety evaluation of the specific site might change materially over the period of deferred construction. "The physical contours of the site and its setting are, after all, essentially fixed. So are its seismology, meteorology, geology and hydrology—

²⁴*Id.* at 542.

²⁵*Id.* at 545.

²⁶*Id.* at 544.

²⁷*Id.* at 547.

all of which must be examined in order to determine whether a site complies with the criteria set forth in 10 CFR Part 100."²⁸ Likewise, there was available considerable information regarding the site-related environmental issues. The Staff had prepared and circulated a DES, and the FES was to be available shortly. Under all these circumstances, it was felt that holding an early hearing on *site-related issues* might be advantageous. However, it was noted that a quite different conclusion might be reached as to those issues which were not site-related.²⁹ The Appeal Board also stated:

Our prescience is not such that we would be justified in attempting to forecast how great an incremental burden will be imposed upon any particular party if a hearing is—or is not—now held. The most that can be said on that score is that so long as it were *confined to issues as to which there appears to have been a reasonably full development of relevant information*, an early hearing could effect an overall economy of time and resources insofar as all of the parties are concerned.³⁰ [Emphasis supplied.]

There is substantial dispute in the instant case whether there has been such "a reasonably full development of relevant information." Unlike *Douglas Point*, the Staff has not yet issued an SER or a DES. It has stated that a DES will be issued in March and, after appropriate circulation, an FES in August 1978. CCRI has sharply challenged the present availability of sufficient site-specific information to enable it to engage in meaningful discovery, including detailed alleged deficiencies in seismic, hydrological, meteorological, archeological, and environmental data (CCRI Memorandum, pp. 18-25). Although the Staff disputes these assertions in its Brief (pp. 8-9, 13, 16), it concedes that geologic information requested on December 6, 1977, is an exception which will result in the issuance of a partial SER, to be followed by a supplement to the SER after necessary access to the site has been acquired.

Much of the present controversy is caused by the fact that GSA, apparently to avoid any appearance of partiality toward the Applicants while its own EIS is being prepared, has refused significant access to the NALF site to the Applicants or anyone else to obtain necessary site-related data (CCRI Memorandum, pp. 17-25, 28). As a consequence, it appears that much of the impetus for the Applicants and the Staff to urge the commencement of discovery on safety issues involves the consideration of nonsite-related data. However, in assessing the utility of commencing discovery at

²⁸*Id.* at 548.

²⁹*Id.* at 553-554.

³⁰*Id.* at 552.

the present time, we must evaluate the extent of site-specific data not presently available to be discovered. Some clue may be obtained from the Staff's statement, in response to questions from the Board, that "The Staff estimates that its environmental and safety reviews would each require approximately 12 months if the application is amended to relocate the facility" (Staff Response to Motions, p. 17). The proposed nuclear plants may be replication plants as urged by Applicants (Applicants' Answer to Motion, p. 10; Tr. 362), but it appears that they are replication plants plus 12 months as to safety issues if any other site except NALF is involved.

Although the NALF site is just as fixed in its physical contours and its setting as was *Douglas Point*, it involves some legal uncertainties not insubstantial in nature. The *RICE* Court, *supra*, has blocked the transfer of the site to Applicants unless and until GSA has prepared an EIS in compliance with its NEPA requirements. The Court has not purported to rule on the merits of whatever action GSA might take after preparing its EIS. However, the following statement by the *RICE* Court of Appeals suggests some possible consequences of GSA's action in regard to the disposal of the NALF site:

The Government, on the other hand, agrees with the district court's construction of the FPAS and argues further that an additional agency, EPA, has expressed an interest in the same acreage sought by Interior. Thus, GSA argues, an EIS is necessary to enable it to exercise discretion intelligently in choosing between Interior and EPA.³¹

As the Applicants have conceded, there is no assurance that the NALF site will ever be acquired by them from GSA.³² Such assurance is not required, as NRC has the power to permit the docketing and review of after-acquired sites.³³ However, GSA has indicated to the Staff that it plans to issue its own DES in March and its FES in August 1978, pursuant to the *RICE* Court's action. Such GSA documents may well shed some light on the realities of the situation as well as on access to the site to obtain specific data for adjudicatory review.

Both the Applicants³⁴ and the Staff³⁵ argue that the legal and administrative uncertainties surrounding the ability of the former ever to acquire ownership or control of the NALF site are not different than the uncertain-

³¹*Rhode Island Committee on Energy v. General Services Administration*, 561 F.2d 397, 404.

³²Applicants' Answer to Motions, p. 13.

³³*RICE v. GSA*, *supra*, 430 F. Supp. 627, 632-633; *Koshkonong*, *supra*, 8 AEC 928.

³⁴Applicants' Answer to Motions, pp. 24-27, 34.

³⁵Staff Response to Motions, pp. 10-11.

ties involved in obtaining State and local permits in *Koshkonong*, *supra*. This conclusion does not necessarily follow in view of the unusual facts which obtain in this case. The Commission in *Koshkonong* was dealing with petitioners' objections to a notice of hearing issued shortly after the filing of an application, rather than the extensive litigation concerning the disposal of surplus Federal property by GSA described above. It stated that "as a general rule" it was the practice to pursue nuclear licensing procedures while other State and local proceedings were under way, as a ponderous "protocol" for licensing processes by other entities would be irresponsible.¹⁶ There may well be significant qualitative differences between a general rule and the unusual site acquisition problems involved here. Perhaps more significantly, the general "protocol" rationale there involved with multiple other agencies may have been modified by the subsequent specific protocol with EPA which was entered into by NRC under the Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities (40 Fed. Reg. 60115, December 31, 1975).

The Second Memorandum of Understanding was devised to establish a framework to mesh the responsibilities of the two agencies in passing upon an applicant's proposal, under the Congressionally imposed regulatory scheme. By virtue of the Federal Water Pollution Control Act (FWPCA) and the National Environmental Policy Act (NEPA), both NRC and EPA have significant roles to play in the overall effort to regulate the impact of nuclear reactors on the aquatic environment. Under §402 of FWPCA (33 U.S.C. 1342), a permit may be issued by EPA allowing the discharge of effluents, including heated water, if the discharge complies with certain established standards. These discharge permits are known as National Pollutant Discharge Elimination System permits (NPDES).

Generally applicable standards of effluent limitations have been established by EPA for the discharge of heated effluents from steam electric power plants. These established limitations permit essentially no discharge of heat, and therefore require closed-cycle cooling for electric plants. However under §316(a) (33 U.S.C. 1326(a)), EPA may issue an NPDES permit for an alternate cooling system if it finds that the generally applicable thermal limits are "more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife" in the body of water into which the discharge is to be made. The Appeal Board has stated that "... EPA may grant a '316(a) exemption' by setting less stringent limitations on the thermal component of the discharge than would otherwise be required. Because such exemptions

¹⁶*Koshkonong*, *supra*, 8 AEC at 930.

are site specific, the precise location of the discharge structures, as well as the amount of heat to be emitted, can be an important consideration. . . ."³⁷ In this case, the Applicants plan an open-cycle cooling system, and may therefore need to obtain a §316(a) exemption from EPA.

As the proposed plants are a "new source" of water pollution as defined by FWPCA (33 U.S.C. 1316(a)(2)), the issuance of a permit by EPA is a "major Federal action" under NEPA which requires EPA to prepare an environmental impact statement (42 U.S.C. 4332(1)(C)). Congress also pursuant to" the FWPCA or "the adequacy of any certification under (1) "to review any effluent limitation or other requirement established pursuant to" the the FWPCA or "the adequacy of any certification under §401 of" the FWPCA; or (2) "to impose. . .any effluent limitation other than any such limitation established pursuant to" the FWPCA (§511(c)(2), 33 U.S.C. 1371(c)(2)). In describing how the responsibilities of EPA and NRC are to mesh in passing upon an applicant's proposal for a nuclear plant, the Appeal Board has stated:

In other words, this Commission still must consider any adverse environmental impact that would accrue from operation of the facility in compliance with EPA-imposed standards; but it cannot go behind either those standards or the determination by EPA or the state that the facility would comply with them. In order for the system to work to maximum advantage, of course, it is necessary for EPA to have made its determination relative to the plant's cooling system in advance of this Commission's consideration of the matter. Indeed, as the "Second Memorandum of Understanding" between the two agencies indicates, EPA is to make its "best efforts" to have completed the evaluations related to the 402 discharge permit, 316(a) exemption, and 316(b) analysis of intake structures "*as far as possible in advance*" of the NRC Staff's issuance of its Final Environmental Statement."³⁸ [Emphasis in original.]

The Second Memorandum of Understanding was executed in order to provide a coherent and rational administrative process which would recognize and harmonize the respective legal duties of the two regulatory agencies. It provides that EPA and NRC will "work together to identify and consolidate the environmental information needed for early evaluations related to impacts on water quality and biota under the FWPCA," with the objective of having one submission of information satisfy the re-

³⁷Public Service Company of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-366, 5 NRC 39, 50 (1977).

³⁸Id. at 52.

quirements of both agencies (par. 3). In paragraph 4, a procedure is established for the preparation of a single joint EPA-NRC environmental impact statement for all "new sources," and designates NRC as the lead agency. EPA will participate in the preparation of the water quality and related sections of the DES, will review comments after its circulation along with NRC, and will set out its views in the FES, whether they agree or disagree with NRC's views.

On September 28, 1977, the Directory of the Enforcement Division, Region I of EPA, wrote to Mr. Phillip Cota of the NRC Staff, to clarify the pattern of coordination between the two agencies. It was noted that the Second Memorandum of Understanding calls for EPA to assist NRC in preparing the DES and FES on those subjects for which EPA has the principal responsibility and expertise, which it was prepared to do. The letter continues:

The second memorandum also prescribes a coordinated sequence of NRC and EPA decision making. EPA should draft an NPDES permit (*not* including alternative thermal effluent limits) for inclusion in the draft environmental impact statement. After public hearings required by law to consider both the draft impact statement in general and the specific subject of what alternative thermal effluent limits to impose under §316 (a) of the Federal Water Pollution Control Act, EPA will make a determination on a final NPDES permit including thermal effluent limits. This determination should roughly coincide with the filing by NRC of a final environmental impact statement; ideally, the final statement will contain a copy of the final NPDES permit issued by EPA.

When alternative thermal effluent limitations have been requested, the development of a final NPDES permit is a particularly sensitive and intensive process requiring a substantial commitment of personnel on our part. Our project manager, Sandy Gaines, explained to you and Myron Karman in July that we are most reluctant to make that commitment of time and money to the New England Power Company's Charlestown project until we are reasonably assured that the facility will be constructed on the site being evaluated. The litigation about the disposal by the General Services Administration of the Naval Auxiliary Landing Field in Charlestown, the proposed site, creates a significant uncertainty about the company's anticipated ownership of the site. This uncertainty will not be resolved until GSA has prepared and filed a final environmental impact statement of its own that approves the sale of the site to New England Power, and competing claims and legal requirements have been settled.

The opinion of Judge Pettine in *CCRI v. NRC*, with its acerb commentary on GSA's course of conduct in this matter, reinforces our pref-

erence not to proceed with out decision making in advance of GSA. It is true that Judge Pettine could find no legal basis for enjoining NRC from processing the company's application, but he left no room for doubt that he thought the wiser and more legitimate procedure would be for GSA to decide on the sale of the land before NRC and EPA made any public commitments to the project. We agree with the judge's dictum and prefer to abide by his explicit recommendation . . . In our judgment, premature issuance of NRC's impact statement will only invite litigation and the delay and expense that it entails. On the other hand, a delay of a few months now will keep the review of the company's application orderly and legally beyond dispute.

After consideration of these many factors, it is our intention not to make a final decision on New England Power Company's NPDES permit application until after GSA issues a final environmental impact statement sanctioning sale of the Charlestown NALF to the company. We could make the decision approximately six weeks after the GSA statement is filed. We request that you delay filing its final environmental impact statement until that time so as not to disrupt the pattern of coordinated NRC-EPA decision making set up by the Second Memorandum of Understanding.

EPA's position on the scheduling of environmental impact statements was clarified and reconfirmed by the following letter dated November 30, 1977, from EPA enforcement attorney, Sanford E. Gaines, to NEP with a copy to the Staff:

At your request, I am clarifying and reconfirming EPA's position on the scheduling of environmental impact statements that we expressed in our letter to Phillip Cota of NRC dated September 28, 1977, on which you were copied.

EPA intends to contribute to the preparation of the NRC draft environmental impact statement, which will be issued by NRC as soon as it is ready. EPA has retained the services of a consultant to prepare its portion of the draft statement; this should be completed about the beginning of February 1978.

After the NRC draft impact statement is published, EPA will proceed with public hearings on the draft, at which time the public will also be invited to address the issue of §316 alternative thermal limits in the water discharge permit.

EPA will *not* make a determination on the 316 issue and will *not* prepare its portion of a final environmental impact statement until after GSA

issues its own final environmental impact statement and makes a decision on the sale of the Charlestown site.

As it stated at the outset, this is intended to reaffirm and not to modify the position we have previously communicated to NRC.

While the parties disagree as to the impact of EPA's position, it is evident that it concerns the working relationship between the two agencies in this proceeding. Although the legal interpretations and other views of EPA are not binding on NRC, they should be taken into consideration by this Board in exercising its discretion concerning scheduling.

Some guidance may be obtained from the *Seabrook* opinion cited *supra*, involving a contention that there exists an impenetrable legal barrier to issuing an initial decision (and perhaps even to the taking of any evidence on the question of cooling systems), in advance of a final determination by EPA of the nature of the cooling system it would permit to be employed. In that case, the facility was not a "new source" within the meaning of FWPCA, and EPA had informed NRC that it had no problem with the latter going forward. The Appeal Board stated:

There is not an *absolute* bar against the award of NRC construction permits in advance of final EPA action. [Footnote omitted.] Rather, a number of considerations must be carefully evaluated in each case in which EPA's final decision is not in hand to determine whether, on balance, the public interest warrants the Licensing Board in going ahead. *Cf. Potomac Electric Power Co.* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975) . . . In sum, in the absence of a clear mandate that we do so, we are unwilling to erect an absolute bar to NRC action in all circumstances in which EPA's final decision has not been forthcoming. Once again, however, the absence of such a decision is a factor to be weighted in the balance when a Board considers whether it is appropriate to proceed.³⁹ [Emphasis in original.]

The *Douglas Point* criteria to which our attention was directed above are as follows:

These considerations make us most reluctant to ascribe to either Congress or the Commission the unarticulated purpose of requiring, as a matter of law, the deferral of all evidentiary hearings if it should turn out that the applicant will not require the sought permit or license for several more years. Rather, the absence of any rigid scheduling criteria

³⁹5 NRC 39, 58.

established by statute or regulation suggests that the adjudicatory boards were to decide for themselves in such circumstances when hearings should be held on specific issues. It seems to us that a variety of factors appropriately should be taken into account in reaching that decision. Principal among them are: (1) the degree of likelihood that any early finding on the issue(s) would retain their validity; (2) the advantage, if any, to the public interest and to the litigants in having an early, if not necessarily conclusive, resolution of the issues(s); and (3) the extent to which the hearing of the issue(s) at an early stage would, particularly if the issue(s) were later reopened because of supervening developments, occasion prejudice to one or more of the litigants.⁴⁰

There is not enough solid information in the record at this time to enable the Board to exercise a sound discretion in applying these criteria to the question of the timing and pace of scheduling hearings and antecedent discovery. Too much putative information has come to us in an informal, if not casual manner. For example, the EPA letter of September 28, 1977, to the Staff with copies to Applicants, discussed *supra*, was not brought to our attention by either party. We learned of it at a special preconference hearing on November 15, 1977, when it was attached by the Intervenor Eric D. Schneider and Claudine C. Schneider to their motion handed to the Board on that date. There was some discussion of the letter at the conference, and Staff counsel indicated that the letter had not yet been answered, but referred to an expected future meeting "at the highest level within our agency" to "resolve this question" (Tr. 355-356). We have received no further information as to such answer or meeting, although Staff counsel did promptly forward a copy of the subsequent EPA confirming letter dated November 30, 1977.

Attached to the same Schneiders' motion was a newspaper clipping under date of October 18, 1977, which stated that Applicants had arranged the purchase of a 328-acre site at another location as an alternate site if plans to acquire NALF failed. There was a little discussion of this action at the hearing (Tr. 363), but the information was very meager and no further facts have been forthcoming.

On January 6, 1978, Staff counsel by letter promptly informed the Board that on December 30, 1977, he had been advised by telephone by counsel for Applicants that "there has been a six-month delay in the start of construction to the end of 1979 and a two-year delay in the inservice date for operation from 1984 to 1986." However, this bare indirect announcement of a schedule slippage by the Applicants was not even slightly supple-

⁴⁰1 NRC 539, 547.

mented until January 20, 1978, when Applicants' counsel wrote to the Board setting forth arguments in response to a January 16 letter from CCRI counsel commenting on the effect of this delay on the licensing proceedings. The relevance of this information to the Board's exercise of discretion regarding scheduling is illustrated by its possible impact on a position taken in the Staff's Brief of December 23, 1977, wherein it was stated:

Also significant in the instant case is the fact, that contrary to the situation in *Douglas Point*, there has been no deferment in NEPCO's expected plant construction or operation schedule. Thus, this Board need not be concerned here with the degree of likelihood that early findings on particular issues would retain their validity since no early findings are sought (p. 13).

The Staff properly brought these delays and the possibly inconsistent statement in its brief to the Board's attention. Applicants failed to do either directly or promptly and have given no details nor explained the relationship, if any, between a 6-month delay in the start of construction and a 2-year delay in the in-service date for operation. There has also been practically no information from Applicants about the other site apparently recently acquired, nor any indication whether it has been reviewed as a possible alternate site. Newspaper clippings are an unsatisfactory source of information to the Board.

The parties have devoted considerable attention to the amount of information presently available for discovery, or the extent to which there are alleged serious deficiencies in data because of lack of access to the site. What has perhaps been overlooked is the fact that until the DES and the SER are issued, the Intervenors may be lacking significant information as to the Staff's analyses and conclusions regarding environmental and safety matters. As the *CCRI v. NRC* Court pungently observed, "It can hardly be said that plaintiffs suffer present irreparable harm from an inadequate EIS which has not yet been prepared."⁴¹ We are now considering the administrative remedies which that Court held had not been exhausted.

The importance of the DES and the SER in relation to discovery in this case can scarcely be overemphasized. As the Commission has stated, the issuance of a DES

marks the first stage at which the Staff formally indicates its views on the development of the environmental review of the proposal. The DES may indicate Staff doubts about the proposal. Indeed, if the Staff believes that inadequate data about environmental considerations is

⁴¹430 F. Supp. 627, 632. In footnote 8, the Court further stated: "...Should the EIS which NRC will eventually prepare prove deficient, plaintiffs have a remedy in the NRC hearings, 10 CFR §§51.52, 51.5(a)(1), and thereafter in the Court of Appeals."

available or that reasonable alternatives have not been adequately explored, it can and should decline to issue a DES. During the preparation of the DES, the Staff may and should, to the extent appropriate under the circumstances, conduct independent analysis of the environmental questions that arise in connection with the proposed facility.⁴²

Similarly, the SER is a significant document for hearing purposes and antecedent safety discovery. The Appeal Board in *River Bend* has described in some detail the Commission's procedures for the review of safety questions bearing upon a construction permit application.⁴³ It was further stated:

A PSAR is first reviewed by the Staff for completeness and, if complete, the application is formally docketed. 10 CFR 2.101. Thereupon, the safety aspects of the facility are canvassed by the Staff. Invariably, numerous questions will be directed by Staff reviewers to the applicant; the responses normally will take the form of PSAR supplements. The Staff's review is extensive and culminates in a safety evaluation report (SER). . . . The PSAR, SER, and the ACRS report are made part of the record in the adjudicatory proceeding. The participants therein may raise issues on the basis of disclosures in those documents and, under the Rules of Practice, have extensive discovery rights with respect to any such issues.⁴⁴

Many of the contentions and issues sought to be raised by the movants and other intervenors will be dealt with by the DES and the SER. These documents may also shed some light on the movants's assertion that there is insufficient site-related information because of lack of access to the site, resulting from Applicant's lack of ownership or control over it. The DES and SER could also address the question discussed by the *CCRI v. NRC* Court, *supra*, in connection with applications for after-acquired sites:

The real test is a practical one—whether or not the applicant can produce the information required by regulation and necessary for an effective hearing. [See 10 CFR §§51.20, 51.21.] If it can—and there is no *a priori* reason why it cannot—ownership is irrelevant. . . . Plaintiffs will have full opportunity to convince the NRC during the hearing and the Court of Appeals thereafter, that the relevant regulations were not met.⁴⁵

Under the unusual facts in this case, there is no compelling reason why

⁴²*Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CL1-77-8, 5 NRC 503, 525 (1977).

⁴³*Gulf States Utilities Company* (River Bend Station, Units 1 and 2), ALAB-444, 6 NRC 760, 764-768 (1977).

⁴⁴*Id.* at 765-766.

⁴⁵430 F. Supp. 627, 632-633.

discovery must be conducted piecemeal if the Intervenor do not desire to do so. The Applicants have suggested a discovery schedule which contemplates the immediate institution of "Main Round" discovery based on the application (including the PSAR, the ER, G&FI, the RESAR, all as amended), with time limits for completion. "Subsequent Rounds" relate to discoverable matter contained in the subsequently published GSA DES, the GSA FES, the NRC DES, the NRC FES, the SER, and the ACRS letter. However, motions for leave to obtain specified forms of discovery would be required, which among other requirements must state "separately and with particularity. . . (b) the reasons why the proposed discovery was not and could not have been taken during the Main Round, and (c) any facts upon which the movant relies," all verified by affidavit.

We reject both this cumbersome procedure and its underlying assumptions that the Intervenor should be required to accept the current Applicant-generated data as largely sufficient for their discovery purposes, with later documents to be prepared by the Staff and others relegated to motion practice requiring an affirmative showing of good cause why such documents were not anticipated earlier, before they were prepared. Such a schedule might be acceptable in a normal case, but this is not a normal case. It is unrealistic to act as though many of the sharply disputed issues do not exist, including the GSA site litigation, lack of site ownership, control, or access, extent of site-specific data, relationship with other agencies with statutory responsibilities, and the adequacy of safety and environmental statements.

Under the facts in this case, we have concluded that the period for discovery, probably about 90 days, should commence after both the DES and the SER have been issued. The dates of the discovery period will be fixed by the Board after an evidentiary hearing which will consider the facts involved in the *Douglas Point* criteria for the exercise of a sound discretion in deciding whether and when early hearings or discovery should be held on specific issues. A 30-day notice of such hearing will be issued promptly after both the DES and the SER have been filed, the date depending on which document is filed later.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD

Dr. Emmeth A. Luebke, Member

Dr. Oscar H. Paris, Member

Marshall E. Miller, Chairman

Dated at Bethesda, Maryland,
this 21st day of February 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Frederic J. Coufal, Chairman
R. Beecher Briggs
Dr. Paul W. Purdom

In the Matter of

Docket Nos. 50-338 OL
50-339 OL

**VIRGINIA ELECTRIC AND
POWER COMPANY**

**(North Anna Nuclear Power
Station, Units 1 and 2)**

February 27, 1978

Upon consideration at reopened hearing of the circumstances concerning the alleged delay by the applicant in reporting certain events of safety significance, and of the adequacy of applicant's proposed procedures for prompt reporting of events under 10 CFR Part 21, 10 CFR §50.55(e), and the Technical Specifications of the operating license, the Licensing Board reaffirms the findings, conclusions, and authorization of its Initial Decision, LBP-77-68, 6 NRC 1127 (1977).

ATOMIC ENERGY ACT: REPORTING REQUIREMENT

Under an operating license, reporting of events of safety significance is governed by 10 CFR Part 21 and the Technical Specifications of the license.

ATOMIC ENERGY ACT: REPORTING REQUIREMENT

Under a construction permit, reporting of events of safety significance is governed by 10 CFR §50.55 (e) and 10 CFR Part 21.

MEMORANDUM AND ORDER

On December 13, 1977, in an Initial Decision, this Board authorized the Director of Nuclear Reactor Regulation (NRR) to make findings in accord-

ance with 10 CFR Section 50.57(a) and to issue operating licenses for North Anna Nuclear Power Station, Units 1 and 2, for full-term full-power operation.¹ On December 16, 1977, the Staff moved the Board to reopen the record to receive new material on a "hotly contested" issue. The issue is:

Does VEPCO's performance in the operation of Surry, Units 1 and 2, and in the construction of North Anna, Units 1-4, demonstrate that it lacks the commitment or technical qualifications, or both, necessary to operate North Anna, Units 1 and 2, safely and in compliance with all applicable health and safety requirements, including operational quality assurance requirements?

VEPCO's failure to provide the Commission with information on certain safety matters in a timely manner had been much of the basis for this issue. In its motion to reopen the record, the Staff alleged that VEPCO had recently failed to report in a timely manner to the Commission an error in the computer code which was used to calculate stresses in piping of some safety systems of Units 1 and 2 (the computer code event). On December 19, 1977, this motion was supplemented by a Staff request that the Board also receive evidence on the timeliness of VEPCO's reporting of the presence of defective integrated circuit chips in the protection circuits of the control systems (the IC chip event.)

Following a prehearing conference held by telephone, the Board ordered the record reopened and supplemental testimony given. The testimony was received on December 29, 1977, and included testimony by VEPCO and the Staff, and participation by Intervenor Arnold and the Commonwealth of Virginia.

There is little dispute about the sequence of events that took place in both the computer code and the IC chip events, and it will be briefly summarized here.

During late November 1977, Stone and Webster Engineering Company (S&W) was analyzing the as-built piping systems of Unit 2 utilizing a computer program called the "NC CODE." A similar analysis was being done for Unit 1 by an S&W consultant utilizing a different computer code. An S&W engineer, at about Thanksgiving time, while comparing the results of the two sets of calculations, observed that the piping stresses calculated by S&W for Unit 2 were generally lower than the consultant's results for Unit 1. It was not immediately apparent to S&W whether the difference in the results was significant or whether an error existed in either of the codes. The fact of the difference was probably mentioned by Mr. Chamberlain, the S&W Project Manager for North Anna, Units 1 and 2, to Mr. Bayer, the VEPCO Project Manager, on about November 26, 1977, during a telephone

¹This Initial Decision was preceded on November 26, 1977, by a decision authorizing a temporary license to load fuel into Unit 1 and to maintain it in a cold shutdown condition.

call which was primarily concerned with equipment problems in certain safety systems. On December 1 or 2, Mr. Chamberlain called Mr. Spencer, who is VEPCO's Manager-Power Station Engineering, and advised him that there was an error in the NC CODE of unknown magnitude but an error that was unlikely to be large. Mr. Spencer asked to be informed if anything significant was discovered. On December 7 or 8, S&W concluded that the error in the code might be significant, and Mr. Chamberlain advised Mr. Spencer of this by telephone on Friday, December 9. He further stated that S&W did not believe that changes in the piping would be required but that the NRC should be notified of the problem. On the same day, and at Mr. Spencer's request, S&W forwarded its findings by telecopy. Mr. Bayer, in the afternoon of the same day, prepared a Form 883.8B thereby initiating VEPCO's quality assurance procedure QAM 5.13, a procedure which has as its purpose the determination of whether or not an event is of such significance to safety that the NRC rules and regulations require it to be reported. The form then passed through various VEPCO committee members who are required to review such matters. Although there was doubt on the part of some that the matter was reportable, each agreed that it should be reported, and on the morning of December 13 the form was delivered to Mr. Brown, who is VEPCO's Vice-President-Power Station Engineering and Construction, for his final evaluation and sign-off. Mr. Brown signed the form on that day, an act which constituted the determination that the event was reportable. Under VEPCO's practice, the completed form would then be returned to Mr. Spencer who would in turn deliver it to Mr. Perkins, who is VEPCO's Director-Quality Assurance. Mr. Perkins was responsible for reporting the event by telephone to NRC Office of Inspection and Enforcement, Region II. It so happened that Mr. Spencer was out of the office on December 13 and that he and Mr. Perkins were out of their offices on December 14.² Thus, the completed form got to Mr. Perkins on December 15, and he then notified Region II by 9 a.m. on that morning. On the same morning Mr. Perkins also informed Mr. Baum, who is VEPCO's Executive Manager-Licensing and Quality Assurance. Mr. Baum was about to leave for Bethesda in an effort to have the operating license for Unit 1 changed to permit the reactor to be operated at normal operating temperatures but subcritical. On his arrival in Bethesda, Mr. Baum delivered a copy of the form to Mr. Dromerick, the NRC Project Manager for North Anna, Units 1 and 2.

²Brown, Spencer, and Perkins attended a monthly progress meeting at North Anna on December 14. Some time "later in the day" on the 14th, Brown advised Spencer and Perkins that he had signed the Form 883.8B and left it on Spencer's desk on the 13th. Late in the day Perkins unsuccessfully attempted to call the Richmond office in order to direct someone there to report the event to NRC.

At the same time that Mr. Perkins notified Region II by telephone, he was told that his report was proper for Unit 2, which had only a construction permit, but that reporting for Unit 1, which had an operating license, was governed by the Technical Specifications. Mr. Perkins gave this information to Mr. Sylvia, VEPCO's Director-Nuclear Operations, who relayed the information to the Station Manager, Mr. Ahladas, all on December 15. The station staff could not decide whether the event was reportable under the Technical Specifications, but Mr Ahladas did notify Region II of the potentially reportable event early on the working day of December 16, 1977.

The IC chip event began on December 9, 1977, when Mr. Vota of Westinghouse Electric Corporation called Mr. Bennett, VEPCO's Director-Nuclear Licensing, and told him that a problem involving certain integrated circuit chips in printed circuit boards might exist in the North Anna instrumentation systems. He further related that, during manufacture, a condition was created such that vibration could produce a short circuit and disrupt the protective action of any circuit in which chips identified by the symbol RC 747 D were installed.

Responsibility for investigating this potential deficiency was assigned to Mr. Davis, a VEPCO engineer. VEPCO station personnel began the search for faulty chips in the instrumentation circuits on the night of December 9. The inspection of the instrumentation cabinets of Unit 1 was completed on Saturday, December 10, and of Unit 2 by Tuesday morning, December 13. Early on Monday morning, December 12, Mr. Davis was told that RC 747 D chips had been found in three cards in protection circuits and in 21 cards in nonprotection circuits in Unit 1. Also, chips were found bearing the number 747 but with different prefixes or suffixes. Mr. Davis called Mr. Vota, told him that RC 747 D chips had been found in the circuits and asked him to determine whether other 747 numbered chips might be faulty, also.

On Tuesday morning, December 13, Mr. Davis was told by station personnel that RC 747 D chips had been found in one protection circuit and in three nonprotection circuits in Unit 2. He then initiated the procedure for determining whether the event was reportable to the NRC by filling out a single Form 883.8B for Units 1 and 2. Later in the day he was informed by Mr. Vota that all chips containing the number 747 were suspect. Mr. Davis initiated a second Form 883.8B, combined it with the first one, and the two forms circulated among the review committee members together. They arrived on Mr. Brown's desk on December 16, 1977. He concurred in the recommendation that the event was reportable and signed the forms which passed back through channels to Mr. Perkins who notified the Region II office at 9:45 a.m. on that day. The NRC Staff in Bethesda were also notified of the problem on the same day. The North Anna Station Manager, Mr. Ahladas, and the Station Engineering Supervisor were informed of the problem on

December 15. After review by the Station Nuclear Safety and Operating Committee, the Station Manager reported the chip problem with respect to Unit 1 to the Region II office on December 16 on the theory that it was reportable under the requirements of the Technical Specifications.

It is the view of Staff and Applicant that there are two parts of Commission regulations which require the reporting of events of safety significance. The first of these is found in Part 21 of 10 CFR. A copy of pertinent sections of this part appear in Appendix A to this Order. In general it establishes a duty for particular persons within an organization to report certain types of safety-related events to the Commission within 2 days following their receipt of the information. Part 21 relates both to facilities under construction or operating. The second applicable portion of the regulations is found at 10 CFR Section 50.55(e). A copy of the pertinent part of this regulation also appears in Appendix A. It applies to holders of construction permits, and it imposes various duties on such permittees. Included among these duties is a requirement that the permittee shall within 24 hours notify the Commission of each reportable deficiency. This regulation does not apply to the holder of an operating license.

A third source for direction to a licensee for the reporting of safety related events is the Technical Specifications which are a part of an operating license. A copy of the pertinent Technical Specifications for the Unit 1 operating license is also supplied in Appendix A. The Technical Specifications also require that certain types of events be reported to the Commission within 24 hours.

There seems to be present agreement that Unit 1, having received a fuel-loading permit on November 26, 1977, was subject to the reporting requirements of Part 21 of 10 CFR and the Technical Specifications of the operating license, but not to Section 50.55(e) requirements.³ It is further agreed by the Staff and the Applicant that Unit 2, having received only a construction permit, was subject to the reporting requirements of Part 21 and Section 50.55(e) of 10 CFR but not to any Technical Specifications requirements.

The Commission's regulations and the Technical Specifications do not provide precise definitions for events that are reportable, nor do they place limits on the time that may be taken to determine whether an event is reportable. Much is left to the judgment of the licensee's staff and of the NRC Staff. As the Board views the record, the NRC Staff's position is that both events are reportable under the requirements of Part 21 and Section 50.55(e) of 10 CFR and of the Technical Specifications of the operating license for

³Applicant had earlier overlooked the necessity for reporting Unit 1 problems under the Technical Specifications until reminded by the Staff of the necessity to do so.

Unit 1. VEPCO doubts whether reporting of the computer code event is required by the regulations or the Technical Specifications but seems to agree that the IC chip event is reportable, at least for Unit 1, under the requirements of the Technical Specifications. The Board is divided in its conclusions as to whether the reporting of either event is required by Part 21, by Section 50.55(e), or by the Technical Specifications as they apply to the limited operation permitted by the license then in force for Unit 1. Nevertheless, we consider it desirable for events of these types to be reported to the Commission, and the Commission pronouncements encourage licensees to report events when uncertain as to whether reporting is required. VEPCO also concluded that the events should be reported. Having so decided, it was incumbent on VEPCO personnel to be sure that the events were timely reported in accordance with the correct procedures.

We turn now to the timeliness of VEPCO's reporting. According to the testimony of Mr. Case, the NRC's Acting Director of Nuclear Reactor Regulation, 4 working days should be sufficient time to determine whether an item is reportable. VEPCO, knowing on December 1 that there was an error in NC CODE, should, he concludes, have determined by December 6 that the computer code event was reportable and should have reported it to the NRC by December 7. The event was reported on December 13. Likewise, knowing on December 10 that there were suspect chips in cards in the protection circuits of Unit 1, VEPCO should have reported the IC chip event by December 15. This event was reported on December 16.

During this period, VEPCO was urging the Staff to change the temporary license for Unit 1 to authorize operation at normal operating temperature but subcritical and this Board to reach a decision on full-term, full-power operating licenses. On December 7, 1977, an attorney for VEPCO attempted a conference call with members of the Board, attorneys for the NRC Staff, an attorney for the Commonwealth, and Mr. Foster, the attorney for the Intervenor Arnold. The call in fact included all of the persons set fourth above except for Mr. Foster who was unavailable; it included further Mr. Baum, VEPCO's Executive Manager-Licensing and Quality Assurance. The call was cut short because of Mr. Foster's unavailability, but before it was terminated the attorney for the Applicant said that if the Board intended to issue an initial decision authorizing an operating license that it would be of the upmost importance to issue it soon because if North Anna, Unit 1, were permitted to operate before the end of 1977 a significant tax savings might be realized by VEPCO (Board Ex. 1). On December 9, 1977, Mr. W. L. Proffitt, a Senior Vice-President for the Applicant, wrote to Mr. Case, Acting Director, Office of NRR, urging that Mr. Case issue a license to permit North Anna, Unit 1, to be operated in

Mode 3, "subject to an affirmative decision by the Atomic Safety and Licensing Board." The letter asked that the foregoing request "need not be acted upon" if it would cause a delay in conducting certain activities under a full-power license. The letter concludes by stating that VEPCO has reviewed the "matter very carefully and concludes our request involves no unreviewed safety questions" On December 14, 1977, a further letter was written by Mr. Proffitt to Mr. Case urging prompt action on the December 9 request. In neither the telephone call nor the two letters were the matters of the computer code event or the IC chip event mentioned. This omission was explained by VEPCO at the hearing by testimony to the effect that none of the VEPCO representatives who were parties to the phone call or to the letters were aware of either event. The Staff contends that at a time when a license is under consideration by the Staff or a licensing board, an applicant bears a special burden to provide full and timely information on matters of safety concern.

VEPCO challenges the Staff's view that 4 days should have been judged to be the maximum time for evaluation of a potentially reportable event. It points to the absence of such a requirement in the regulations and in guidance on reporting that have been provided by the Commission and to the factual situation surrounding the licensing of Units 1 and 2 at the time the alleged failures to report occurred. While the Board had acted on December 13, 1977, to authorize NRR to issue operating licenses for Units 1 and 2 for full-term and full-power operation and had on November 26, 1977, authorized a license to load fuel in Unit 1, NRR had not issued any license for the operation of Unit 2 and had issued only a fuel-loading license for Unit 1. According to VEPCO and the evidence, there was a significant number of outstanding items to be resolved before NRR would have permitted initial criticality in either unit. VEPCO contends, and there is no doubt, that so long as criticality was not permitted neither the computer code event nor the IC chip event would pose any threat to the health and safety of the public, and thus, VEPCO further contends, there was no particular reason for haste in reporting the events to the Staff.

Supporting VEPCO's view that reporting dates were not late with respect to these two events is Staff evidence that VEPCO neither speeded up nor delayed reporting these events as compared with other recent reports made by the utility. An analysis made by Region II NRC personnel indicates that in nine recent cases of reports by VEPCO under Section 50.55(e) or 10 CFR Part 21, the average reporting time from initial receipt of information by VEPCO was 12.5 days, and of the nine cases five took less time to report than the computer code event, and one took less time than for the IC chip event; four took more time than in the computer code event, and eight took more time than in the IC chip event (Staff Testimony following Tr. 3779). Fur-

thermore, the record shows that the VEPCO procedures for reporting had been reviewed and approved by the Staff.

With regard to the requirements for reporting under Part 21 we find no violation of the letter of the regulations. Section 21.1 of that part requires that a director or responsible officer of a licensee who obtains information regarding a safety problem shall report it. The report, under Section 21.21(b)(2), shall be made within 2 days following receipt of the information. Under VEPCO procedures, the responsible officer was Mr. Brown who received the NC CODE information on December 13 and caused it to be reported on December 15. Mr. Brown's information about the IC chip event was furnished to him on December 16 and was passed along to the NRC on the same day. Thus Part 21 was fulfilled unless one considers that that part of Section 21.21(a)(2) which requires that a licensee adopt provisions to assure that a responsible officer is informed of reportable events implies a time limit on when the information must reach that officer. We think that some time limit is implied and should be incorporated in reporting procedures.

Section 50.55(e) requires that the holder of a construction permit notify the appropriate NRC I&E regional office of each reportable deficiency within 24 hours. Since neither the regulations nor VEPCO's procedures specify how long it may take to conclude whether an event is reportable or not there is no way that one can tell when the 24 hours should begin. According to VEPCO's procedures the 24 hours for reporting the computer code event began when Mr. Brown signed Form 883.8B at 2 p.m. on December 13 and expired at the same time of day on December 14; the report was actually not made until December 15 at 9 a.m. which would be 19 hours late. This however ignores the reasonableness of the evaluation time which could be considered to begin with S&W's first knowledge of the possible reportable event or at some later date which would be determined by the circumstances of the case. It appears to us that the evaluation time was inordinately long and that VEPCO's report was late by several days. The reporting of the IC chip event under §50.55(e), on the other hand, which first was known by VEPCO on December 9 and which was reported under that section to NRC on December 16 is not such a clear-cut situation. The Board finds no reason to conclude that there was any lateness in reporting the IC chip event under Section 50.55(e).

Of more concern to the Board is the fact that VEPCO initially evaluated and reported these events for both Units 1 and 2 in accordance with its procedures for Part 21 and Section 50.55(e) events. Under the operating license for Unit 1 the reporting is governed by the requirements of Part 21 and the Technical Specifications. Although an evaluation must be made of the reportability of events under the Technical Specifications, the reporting and

resolution of safety-related problems is more urgent for an operating reactor than for one under construction. Station operating personnel, who are responsible for evaluating and reporting deviations from Technical Specifications, were not notified of the existence of either of the events until December 15 when Mr. Perkins of VEPCO was reminded by a Region II employee that, for Unit 1, the Technical Specifications required a report. Thus, there was a delay in getting information to the responsible people in VEPCO. After receiving the information, Mr. Ahladas, the Station Manager at North Anna, acted with dispatch and notified Region II of the potentially reportable events on the next morning. However, the Technical Specifications can be interpreted to require these events to have been reported several days earlier, within 24 hours of VEPCO's having knowledge of an error in the computer code and the presence of suspect chips in the protection circuits in Unit 1.

The Board felt that VEPCO's problems in this instance arose because of a lack of definition of a proper length of time between learning of an event and reporting it, because there was a failure of internal communications within VEPCO which resulted in the North Anna Station Manager being ignorant of problems for which he had reporting responsibility, and because VEPCO officers were urging quick licensing action to the Board and the NRC Staff apparently in total ignorance of events which might well bear on licensing. We therefore ordered on January 13, 1978, that VEPCO draft new procedures to alleviate these problems. These procedures have been drafted and submitted to the Board and have met Staff approval.⁴ Intervenor Arnold has declined to comment on the proposed procedures as has the Commonwealth. VEPCO has moved the Board to receive as Exhibits V-23 and V-24 the following items: (1) VEPCO's reporting procedures for nuclear power stations with construction permits, QAM-5.13 Rev. 9, dated February 10, 1978; and (2) VEPCO's reporting procedures for nuclear power stations with operating licenses, NPSQAM-Section 16, pages 567, 7A, 8, 15, 16, 17, 18, and "deviation report" form, dated February 10, 1978.

It is the Staff's belief, enunciated by Mr. Case at the December 29, 1977, hearing, that what the Staff views as untimely reporting of the two events has cast a shadow on VEPCO's technical qualifications and commitment to operate North Anna, Units 1 and 2, safely. The Staff has not suggested that our Initial Decision authorizing operating licenses for North Anna, Units 1 and 2, be revoked but that the Board should find that VEPCO has technical qualifications to operate the units because the Staff will be intensive in inspection and review programs and will see that VEPCO acquires this

⁴Letter, Parr to VEPCO, dated February 16, 1978.

technical qualification. We do not see our duty that way. The regulations require more of us than a determination that the licensee has "shadowed" qualifications but can be licensed because through extraordinary attention the Staff will see that the licensee improves. It is incumbent upon us to either find that VEPCO has the required technical qualifications or to deny the license.

As the Board views the record, VEPCO's actions in the computer code event and the IC chip event at no time compromised the safety of the plant. At most they delayed the Staff's independent review by a few days. The computer code event occurred because an S&W engineer compared the results of similar calculations made by different codes and acted to resolve differences that were not obvious results of error. S&W acted expeditiously to resolve the problem. Calculations made by S&W early in the process indicated that the stresses in the piping as installed were within the requirements of the piping codes. This was confirmed by the corrected calculations, and the Staff has concurred in that conclusion. In IC chip event, VEPCO personnel began investigation promptly and worked over-time to determine whether suspect chips were present in the instrumentation systems in Unit 1. They questioned whether other chips might be suspect and acted promptly to learn that they too should be replaced. Special efforts were made to obtain satisfactory circuit boards so all the suspect chips in the protection circuits of Unit 1 could be replaced in a few days. Under the limitations imposed on operation of the reactor by the temporary license in effect, neither of these events could have created a hazard. These actions and the promptness with which they were taken do not appear to us to reflect unfavorably on the technical qualifications or commitment. Nevertheless, the prompt reporting of certain events is a requirement of the rules under which licensees operate, and in other situations than here a failure to promptly report might be of considerable significance.

The Board has reviewed VEPCO's new procedures provided pursuant to our January 13, 1978, Order and note that a time limit of 5 calendar days has been imposed on the reporting of events whether they have, in that time span, been determined to be reportable or whether no conclusion has been reached. The new procedures also provide for an early dissemination of information to persons who may have a need for it. We find the procedures to be adequate; they resolve the issues between VEPCO and Staff as to the time allotted for the evaluation of a potentially reportable event.

Ms. Arnold has proposed that if we authorize the issuance of full-term, full-power operating licenses for Units 1 and 2 that we require the Staff to provide a resident inspector. We do not believe such a requirement would be appropriate. Since the evidentiary hearing we have observed through the extraordinary amount of documentation provided us by VEPCO and the

Staff that the Staff is carefully monitoring preoperational testing. We have no doubt the Staff will continue to fulfill its function in this regard and will provide, as appropriate, adequate inspectors (full time or otherwise) for the units if they are licensed to operate. We, therefore, are not making the assignment of a resident inspector a condition of the operating licenses.

ORDER

IT IS ORDERED:

(1) That Exhibits V-23 and V-24 are received;

(2) That the findings of fact and conclusions of law contained in the Initial Decision are reaffirmed and, in accordance with the Atomic Energy Act of 1954, as amended, and the Rules of Practice of the Commission, and based on the findings and conclusions set forth herein, that the Director of Nuclear Reactor Regulation is authorized to make findings in accordance with 10 CFR §50.57(a) and to issue operating licenses for the North Anna Power Station, Units 1 and 2, for full-term and full-power operation as sought by the application;

(3) In accordance with Sections 2.760, 2.762, 2.764, 2.785, and 2.786 of the Commission's Rules of Practice, this Order shall be effective immediately and shall constitute the final action of the Commission, subject to review thereof under the above-cited rules. Exceptions to this Order may be filed by any party within 7 days after the service hereof. A brief in support of the exceptions shall be filed within 15 days thereafter (20 days in the case of the Staff). Within 15 days after the service of the brief of appellant (20 days in case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND LICENSING BOARD

R. Beecher Briggs, Member

Dr. Paul W. Purdom, Member

Frederic J. Coufal, Chairman

Dated at Bethesda, Maryland,
this 27th day of February 1978.

[Appendix A has been omitted from this publication but is available at the NRC Public Document Room 1717 H Street, N. W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Victor Gilinsky, Acting Chairman¹
Richard T. Kennedy
Peter A. Bradford

In the Matter of**Docket No. 50-320****METROPOLITAN EDISON
COMPANY, et al.****(Three Mile Island Nuclear
Station, Unit No. 2)****March 2, 1978**

The Commission denies Intervenor's motion for a stay of the Initial Decision authorizing issuance of an operating license, but directs the Appeal Board to consider the environmental effects of radon (Rn-222) release when it decides the merits of Intervenor's appeal.

RULES OF PRACTICE: STAY PENDING APPEAL

A party aggrieved by an Appeal Board denial of a stay should apply to the Commission for a stay under 10 CFR §2.788(a), (h) rather than petition for review under 10 CFR §2.786(b).

RULES OF PRACTICE: FUEL CYCLE RULE

In special circumstances where no apparent dispute exists as to the serious inadequacy of part of the fuel cycle rule, rigid application of the rule would not serve the rule's purpose. 10 CFR §2.758(b).

¹The application for the operating license for Unit 2 of Three Mile Island was filed in 1974 at a time when Chairman Hendrie was serving as an assistant director in the regulatory staff of the Atomic Energy Commission and 3 months before he left the Commission. Chairman Hendrie has found three memoranda that reference the Three Mile Island project. He has recused himself from participating in deciding the motion for a stay. He will decide at a later date, after hearing from the parties, whether his previous involvement was of such a minimal nature as to allow his participation in further proceedings directed to this license.

RULES OF PRACTICE: STAY PENDING APPEAL

Error in fuel cycle rule is not itself sufficient justification for granting stay, absent showing of usual factors necessary for granting stay.

ORDER

On February 9, 1978, Intervenor, Citizens for a Safe Environment and York Committee for a Safe Environment, moved this Commission for a stay of the Licensing Board's Initial Decision of December 19, 1977, to authorize issuance of an operating license for Unit No. 2 of the Three Mile Island Nuclear Station (TMI-2). LBP-77-70, 6 NRC 1185. On January 27, 1978, the Appeal Board denied the Intervenor's motion for a stay of the decision. ALAB-456, 7 NRC 63. The Intervenor now come to us for relief.² Both the applicant and the NRC staff urge the Commission to deny the stay. For the reasons which follow, we deny the Intervenor's motion for a stay, but we direct the Appeal Board to consider the issue of the environmental effects of radon (Rn-222) in deciding the merits of this appeal.

Our regulations require that the following four factors be addressed in consideration of a motion for a stay:

- (1) whether the moving party has made a strong showing that it is likely to prevail on the merits;
- (2) whether the party will be irreparably injured unless a stay is granted;
- (3) whether the granting of a stay would harm other parties; and
- (4) where the public interest lies.

10 CFR §2.788(e) (1977).

In their submission to the Commission, Intervenor have introduced a variety of contentions regarding the merits of their case. Of these, only the issue of the environmental effects of Rn-222 in uranium mining and milling was presented to the Appeal Board and is therefore properly before us. 10 CFR §2.788(f)(1977). However, the other issues have been raised on the merits of Intervenor's appeal from the Licensing Board decision. That appeal has been fully briefed before our Appeal Board, which has scheduled

²The instant proceeding is not an appeal of this denial. In *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CL1-78-1, 7 NRC 1, 30, n.44, (January 6, 1978), the Commission indicated that a party aggrieved by an Appeal Board decision denying a stay should apply to the Commission for a stay under 10 CFR §2.788(a), (h) rather than petition for review under 10 CFR §2.786(b).

argument for March 23. These issues thus will be addressed in the course of that appeal.

The Intervenor claim that releases of Rn-222 associated with the production of the annual fuel requirement for a light-water reactor will be many orders of magnitude larger than the figure of 74.5 curies in Table S-3 of 10 CFR Part 51. They are correct in asserting that Table S-3 understates these radon releases. The Commission has taken under advisement a recommendation by the NRC staff that Table S-3 be amended to remove the value for radon releases and that the subject of radon releases and associated health effects be declared litigable in all individual licensing proceedings. While the Appeal Board decided correctly that the Intervenor's argument was barred by the fuel cycle rule, in these special circumstances in which there is no apparent dispute that part of the rule is seriously inadequate, the purpose of the rule would not be served by its rigid application in this case. 10 CFR §2.758(b).

The Rn-222 release figure in Table S-3, a table which heretofore has been relied on by the Commission and its Boards in their NEPA analyses of the environmental effects of the uranium fuel cycle, is in error. In this particular case, however, the Licensing Board admitted Intervenor's evidence about Rn-222 releases and then undertook a NEPA analysis on the assumption that Intervenor's contentions about Rn-222 releases were correct. The Licensing Board concluded that the substitution of the significantly larger release figures urged by the Intervenor had a negligible effect upon its NEPA analysis. The Intervenor in their motion have challenged the Licensing Board's articulation of its reasoning, but they have not presented the requisite showing that they are likely to prevail in their contention that the Licensing Board's conclusion was wrong. Thus the fact that the Rn-222 release figure in Table S-3 is in error does not justify a stay in the factual circumstances of this particular case.

Nor are we persuaded by the Intervenor's arguments that they will suffer irreparable injury if TMI-2 is allowed to operate pending the Appeal Board's review. Because the fuel for this period of operation has already been mined and fabricated, operation of the plant will make no additional contribution to the radon releases on which the Intervenor base their argument for a stay. The Intervenor point to the costs of decommissioning as an irreparable injury resulting from contamination if operating is not stayed. This contamination is not an irreversible harm, however, because there are methods available to decontaminate a facility and restore the site to unrestricted use. Economic costs of this decommissioning would not fall on the Intervenor.

By contrast, granting a stay could do significant harm to other parties. Applicant's submission on this motion and the Final Supplement to the

Final Environmental Statement indicate that a delay would cost the Applicant's customers some \$8 million per month in added electricity costs. Intervenor's contend that the Applicant had voluntarily delayed this plant and that harm to them offsets harm to the Applicant. This contention is disputed by the NRC staff and in any case is not relevant to the point at issue—whether in the situation as it now exists, the other parties would be harmed by a stay.

Unnecessary delay in operation of TMI-2 could impose substantial costs, even if not precisely the costs outlined above. These costs and any burden of associated energy shortages will be shared by the public.

For the reasons above, we deny Intervenor's motion for a stay.

Since the Rn-222 value in Table S-3 is incorrect, we direct the Appeal Board to review this case as though no Rn-222 release figure had been determined by regulation in Table S-3. The Appeal Board, therefore, should consider the environmental effects of the release of Rn-222 during the front end of the fuel cycle as an open factual issue to be determined on the evidence in this particular case. If the Appeal Board thinks this issue was inadequately explored at the Licensing Board level for any reason, including an assumption by the parties that the S-3 Table was not subject to dispute in an individual licensing proceeding, it should take action as it deems necessary to complete the record.

It is so ORDERED.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 2d day of March 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

Docket No. 70-2485
License No. XSNM-1060

**EDLOW INTERNATIONAL
COMPANY**

Docket No. 70-2738
License No. XSNM-1222

(Agent for the Government of
India on Application to Export
Special Nuclear Materials)

March 6, 1978

After considering petitioners' motion and views of the Department of State and NRC staff, the Commission grants motion to consolidate two export license proceedings but reserves option to act upon the two applications at different times.

RULES OF PRACTICE: CONSOLIDATION

Consolidation is warranted where two export license proceedings involve identical issues and are governed by the same licensing standards and international agreement.

ORDER

On February 13, 1978, the Natural Resources Defense Council, Inc., the Sierra Club, and the Union of Concerned Scientists jointly filed a motion requesting that export application XSNM-1222 be consolidated with consideration of XSNM-1060. Petitioners seek consolidation here because the issues raised in the two proceedings are identical.

In the written responses to Petitioners' motion filed by the Department of State and the NRC Staff, each stated that there was no objection to con-

solidation, provided the Commission retained authority to act upon the two applications separately.

After considering these views, the Commission is ordering consolidation of applications XSNM-1060 and XSNM-1222. The issues in both export license applications appear identical. Both proceedings involve requests to export low-enriched uranium for use at India's Tarapur Atomic Power Station. The same Agreement for Cooperation would govern U.S.-supplied material for the Tarapur facility, and in each case the applicable licensing standards would be same.

Furthermore, procedural issues regarding Petitioners' participation in export license proceedings are *sub judice* in *NRDC v. NRC*, No. 76-1525 (D.C. Cir., filed June 11, 1976). Consolidation of these proceedings avoids any suggestion that the Commission intends to moot that proceeding if circumstances warrant issuance of license no. XSNM-1060. In consolidating we are explicitly reserving the option to act upon these two applications at different times.

Consolidation does not alter the rights of Petitioners nor does it make Petitioners party to either proceeding. *Edlow International*, CLI-77-16, 5 NRC 1327 (1977).

It is so ORDERED.

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 6th day of March 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Richard S. Salzman, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

Docket Nos. STN 50-546
STN 50-547

**PUBLIC SERVICE COMPANY
OF INDIANA, INC.**

**(Marble Hill Nuclear Generating
Station, Units 1 and 2)**

March 1, 1978

Upon exceptions filed by intervenors and applicants, the Appeal Board affirms the Licensing Board's authorization (LBP-77-67, 6 NRC 1101) of a second limited work authorization permitting the applicants, at their own risk, to start work on the foundations of a number of safety-related structures. Further, the Appeal Board (1) amends the decision below to incorporate an omitted portion of an agreement among applicants, staff, and intervenor and (2) determines that the Licensing Board's refusal to authorize construction permits because of unresolved questions was not an abuse of discretion.

Order modified and affirmed.

RULES OF PRACTICE: BRIEFS

Exceptions not briefed are waived.

RULES OF PRACTICE: CROSS-EXAMINATION BY INTERVENORS

The scope of cross-examination and the parties that may engage in it are matters committed to the discretion of the officers presiding at the hearing.

RULES OF PRACTICE: APPELLATE PROCEDURE

The Appeal Board will generally not entertain an appeal by a prevailing party who does not seek modification of the result reached below.

LICENSING BOARD: RESOLUTION OF ISSUES

As a general proposition, significant issues should be resolved by the Board in the hearings, not left for later resolution by the staff.

Messrs. Harry H. Voigt, E. David Doane, and Michael F. McBride, Washington, D.C., for applicant Public Service Company of Indiana, Inc.

Mr. Thomas M. Dattilo, Madison, Indiana, for intervenors Save the Valley/Save Marble Hill.

Messrs. Lawrence Brenner and Jeffrey F. Lawrence for the Nuclear Regulatory Commission Staff.

DECISION

We have set out the background of this case in earlier decisions.¹ For present purposes it is sufficient to state that the Public Service Company of Indiana and the Wabash Valley Power Association are seeking permission to build a nuclear power plant at "Marble Hill" in southern Indiana. While the Licensing Board has not authorized the Director of Nuclear Reactor Regulation to issue the construction permits necessary to build the entire plant, the Board has sanctioned his issuance of two "limited work authorizations" or "LWA's." The first of these (LWA-1), permitting applicants to begin at their own risk limited work not involving safety structures, systems, or components,² we affirmed in ALAB-459.³ The authorization of the second LWA is now before us. It allows the applicants (again at their own risk) to start work on the foundations of a number of safety-related structures, subject to conditions specified in the Board's order.⁴ Save the Valley, one of the intervening parties, and applicant Public Service Company have both excepted to portions of the decision approving the LWA-2. We turn first to the intervenor's exceptions.

¹See ALAB-437, 6 NRC 630 (1977) (denying a stay pending appeal), and ALAB-459, 7 NRC 179 (February 16, 1978) (affirming an award of an earlier limited work authorization).

²LBP-77-52, 6 NRC 294 (1977)

³See fn. 1, *supra*.

⁴LBP-77-67, 6 NRC 1101 (December 9, 1977). The Director issued the LWA-2 on December 13, 1977.

Intervenor Save the Valley/Save Marble Hill timely filed and served more than 20 exceptions to the Licensing Board's decision on the second LWA. Its exceptions conformed to the requirements of the Rules of Practice; that is to say each "state[s] concisely, without supporting argumentation, the single error of fact or law . . . being asserted . . . and identif[ies] with particularity the portion of the decision (or earlier order or ruling) to which the exception is addressed." 10 CFR §2.762(a). That same rule, however, requires those exceptions to be followed by a brief demonstrating their validity and citing the portions of the record supporting the arguments. 10 CFR §2.762(b)-(d). Intervenor is represented by counsel and has on past occasions briefed its exceptions as the rules require. In this instance, however, it has neither filed a brief nor sought more time to do so, and its briefing time has long since expired. The staff urges, therefore, that we dismiss Save the Valley's exceptions as having been waived.

We have observed before that briefs are necessary to "flesh out" the bare bones of the exceptions, not only to give us sufficient information to evaluate the basis of objections to the decision below, but also to provide an opponent with a fair opportunity to come to grips with the appellant's arguments and attempt to rebut them. The absence of a brief not only makes our task difficult but, by not disclosing the authorities and evidence on which the appellant's case rests, it virtually precludes an intelligent response by appellees. For these reasons we generally follow the course charted by the Federal courts⁶ and disregard unbriefed issues as waived.⁶ We do so here.⁷

⁶See, e.g., *Hickman Garment Co. v. NLRB*, 497 F.2d 1339 (6th Cir. 1974); *Jackson v. Hensley*, 484 F.2d 992 (5th Cir. 1973); *United States v. White*, 454 F.2d 435, 439 (7th Cir. 1971), *certiorari denied*, 406 U.S. 962 (1972); *Whitehead v. Salyer*, 346 F.2d 207 (10th Cir. 1965).

⁶See, e.g., *Public Service Electric and Gas Co.* (Hope Creek, Units 1 and 2), ALAB-394, 5 NRC 769 (1977); *Tennessee Valley Authority* (Hartsville, Units 1A, 2A, 1B, and 2B), ALAB-367, 5 NRC 92, 104 at fn. 59 (1977); *Duke Power Co.* (Catawba, Units 1 and 2), ALAB-355, 4 NRC 397, 413 (1976); *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-270, 1 NRC 473 (1975); *Commonwealth Edison Co.* (Zion, Units 1 and 2), ALAB-226, 8 AEC 381, 382-83 (1974); *Northern Indiana Public Service Co.* (Bailly, Nuclear-1), ALAB-224, 8 AEC 244, 248 (1974); *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 832-33 (1973).

⁷A number of Save the Valley's exceptions concern contentions raised or actions taken by other intervenors. For example, its exception No. 4 challenges the right of another intervenor to settle its own contentions. Our disposition of Save the Valley's exceptions renders it unnecessary to decide whether a party may except to matters neither embraced within its own contentions nor directly affecting its own interests.

II

Public Service Company of Indiana has taken four exceptions to the decision below or to rulings subsumed in it. Other than in a very limited fashion, we do not disturb the action taken below.

1. The first exception pertains to the scope of cross-examination allowed by the Licensing Board. Three intervenors, Save the Valley/Save Marble Hill, Louisville, and Jefferson County, were permitted to cross-examine the witnesses PSI proffered in response to inquiries initiated by the Board itself into the technical and financial qualifications of the proposed co-owners of Marble Hill. Public Service contends that the Board erred in allowing that cross-examination because the issues were not within the intervenors' contentions, and they had no "discernible interest" in them.⁸ Anticipating the argument that the issue is moot as disposition of the case did not turn on it, PSI argues that the question remains viable because the proper scope of cross-examination is a matter of recurring importance.⁹

The scope of cross-examination and the parties that may engage in it depend in some measure on the posture of each case. For this reason (among others), such matters are committed to the discretion of the officers presiding at the hearing. The crux of PSI's position is that the Board below abused that discretion. Because the company prevailed on the substantive issues to which the challenged cross-examination was directed, it asks no change in the result below; our jurisdiction is invoked only to prevent recurrence of that "abuse." But as presented here, the question is simply whether existing guidelines were properly applied to the circumstances at bar. Given the press of our other business, we view this problem as one of insufficient general importance to warrant taking up and dismiss it as moot.¹⁰

2. The Licensing Board found that (§ 42, 6 NRC at 1117) "[t]here is no evidence showing that WVPA is technically qualified to design, construct, or operate the proposed facility" but explained that "[t]his fact . . . does not preclude the issuance of appropriate authorization or permits because PSI will be handling the lead responsibility with respect to these technical matters." The Board went on to discuss why, notwithstanding the private relationships between PSI and Wabash Valley, the two had to be co-applicants.

These findings are relevant to whether Wabash Valley is qualified to receive a Commission license. Public Service's objections to them derive

⁸See *Northern States Power Co.* (Prairie Island, Units 1 and 2), ALAB-244, 8 AEC 857, 868 (1974).

⁹Citing, *inter alia*, *Northern States Power Co.* (Prairie Island, Units 1 and 2), ALAB-252, 8 AEC 1175, 1178 (1975).

¹⁰See also ALAB-459, *supra*, 7 NRC at 202 *ff.*

essentially from its legal position that a co-owner of a nuclear facility is not required to be a co-applicant (or a co-licensee). However, we have already upheld the Licensing Board's ruling on this issue.¹¹ We therefore need only note PSI's objections and deny them for the record.

3. Louisville Water Company, the applicants, and the staff settled the Water Company's contention in the proceeding. In addition to substantive commitments, the settlement agreement contained this paragraph numbered 10:

As used herein, the term Applicants shall mean the party or parties determined by a final order (not subject to further Commission or judicial review) to be solely or jointly responsible for carrying out the obligations of this agreement.

The Licensing Board incorporated what it deemed the operative portions of the agreement in its decision and ordered them included as conditions in any construction permits or operating licenses later issued.¹² In so doing, however, the Board omitted paragraph number 10. Public Service excepts to that omission.

The staff defends the Board's action as in accord with the terms of the agreement, which literally call for the incorporation only of "[t]he *requirements* of this agreement" (emphasis added). According to the staff, "paragraph 10 was included . . . at the insistence of Applicants' counsel to explicitly show that the use of the term 'Applicants' in the agreement did not mean that PSI and WVPA were waiving their position that all co-owners do not have to be co-applicants or co-licensees." The staff contends that inserting paragraph 10 in the agreement accomplished that purpose, and nothing would be served by also incorporating the paragraph in the Board's decision and including it in future construction permits or operating licenses.

We incline toward the staff's view ourselves. But the applicants apparently deem the incorporation of paragraph 10 important to protect their legal position, and the Louisville Water Company has not registered any objection to doing so. Inasmuch as it would not run counter to any Commission policy we know of to include the paragraph, we accede to the applicants' request. The decision below is amended to incorporate paragraph 10 of the agreement with the Water Company as a new part "g" to finding 68.

4. Public Service's final exception challenges the Licensing Board's decision to authorize at this juncture only the issuance of an LWA-2. The ap-

¹¹ALAB-459, *supra*, 7 NRC at 198 *ff.*

¹²See finding 68, 6 NRC at 1124-1125.

plicants contend that the Board should have authorized the Director of Nuclear Reactor Regulation to issue them a construction permit also just as soon as they presented him with a loan guarantee to Wabash Valley from the Rural Electrification Administration in the amount and form previously submitted to the Licensing Board. The Board below had declined to do so because, in its judgment, "it has the responsibility to determine whether the Applicants are financially qualified . . . (emphasis added). 6 NRC at 1105. As it viewed the procedure (6 NRC at 1116):

Prior to this Board's being able to authorize the issuance of a construction permit, REA will have to formally issue its loan guarantee to WVPA. In addition, the proposed ownership participation agreement (App. Exh. 13) will have to be formally executed between PSI and WVPA and submitted for review to assure that the major points of the agreements, including the allocation of ownership, do not change from the presently proposed terms. As the Board stated at the close of the hearing, the record will be kept open for the receipt of evidence concerning the execution of the proposed agreement and the REA action on the loan guarantee required by WVPA. Upon receipt of that information from the Applicants, the Board will consider the positions of the parties, at that time, and will determine the appropriate action (Tr. 6540).

The Staff urges that we affirm this ruling. It notes that delegating open matters to the staff for posthearing resolution is a practice frowned upon by both the Commission and this Board and argues that it was within the Board's discretion to adopt the course it did.¹³ We agree.

The Commission stressed in *Indian Point* that, "[a]s a general proposition, issues should be dealt with in the hearings and not left over for later (and possibly more informal) resolution [by the staff]." 7 AEC at 951. "[M]inor procedural deficiencies" may in some circumstances be left to the Director to cure, *ibid.*, but the loan guarantee and Wabash Valley's financial qualifications are not of that genre. Those are controversial questions in this proceeding, and the Licensing Board's caution in reserving them for its own resolution was entirely appropriate. Because open questions under the Water Act must be resolved before construction permits may be authorized

¹³Citing *Consolidated Edison Company of New York* (Indian Point, Unit No. 2), CL1-74-23, 7 AEC 947, 951-52 (1974); *Cleveland Electric Illuminating Company* (Perry, Units 1 and 2), ALAB-298, 2 NRC 730, 736-37 (1975); *Washington Public Power Supply System* (Hanford No. 2) ALAB-113, 6 AEC 251 (1973).

The staff also argues that the issue is in essence an impermissible interlocutory appeal. In light of the Company's claim that it was entitled as a matter of right to a construction permit without further proceedings upon its presentation of the loan guarantee, the Board's decision rejecting that claim was final for purposes of appellate review.

in any event (see ALAB-459, *supra*), the Board's decision to review the REA loan guarantee (we understand this has now been issued) should not impede the timely grant of those permits, assuming they are warranted.

This Board has also completed its regular review *sua sponte* of the portions of the decision below not challenged on appeal. We have found no error warranting corrective action.

The Licensing Board's decision is *modified* as provided in Part 3 and, so modified, is *affirmed*.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

Docket No. STN 50-482

KANSAS GAS AND ELECTRIC
COMPANY
KANSAS CITY POWER AND
LIGHT COMPANY(Wolf Creek Generating Station,
Unit No. 1

March 9, 1978

Upon intervenor's exceptions to the Licensing Board's partial initial decision (LBP-77-3, 5 NRC 301) and initial decision (LBP-77-32, 5 NRC 1251), the Appeal Board concludes that none of the exceptions (which dealt with uranium supply, need for power, environmental costs of water withdrawal, and financial qualifications) is meritorious. The Appeal Board also denies the intervenor's request to reopen the record to consider new evidence on an energy alternative. Further, on *sua sponte* review of several matters, including steam generator tube integrity, the Board finds no error warranting corrective action.

Licensing Board decisions affirmed.

NEED FOR POWER: APPLICABLE STANDARD

Because of the uncertainties inherent in forecasting future electric power demand and the severe consequences which may attend upon a utility's failure to provide at all times adequate, reliable service, need for power projections need only be reasonable in the light of what is ascertainable when they are made. *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 365, 367 (1975); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 407 (1976); *Public Service Co. of Indiana, Inc.* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 185 (February 16, 1978).

FINANCIAL QUALIFICATIONS: APPLICABLE STANDARD

To provide "reasonable assurance" of its ability to obtain funds necessary to construct a nuclear facility, an applicant need not demonstrate a "near certainty" that it "will never be pressed for funds," but need simply show "a reasonable financing plan in the light of relevant circumstances." *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 18 (January 6, 1978).

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

At the construction permit stage, an applicant need not demonstrate its financial ability to handle waste management expenses. That ability must be demonstrated at the operating license stage.

NEPA: LAND USE INQUIRY

The environmental cost of withdrawing farmland from agricultural use is the cost of generating (if necessary) an equal amount of production on other land. *Illinois Power Co.* (Clinton Power Station, Unit Nos. 1 and 2), ALAB-340, 4 NRC 27, 43 (1976).

RULES OF PRACTICE; PETITION TO REOPEN THE RECORD

A motion to reopen the record must be timely presented and addressed to a significant safety or environmental issue. *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523 (1973); *id.*, ALAB-167, 6 AEC 1151-52 (1973); *Georgia Power Co.* (Alvin W. Vogtle Nuclear Plant, Units 1 and 2), ALAB-291, 2 NRC 404, 409 (1975). It also must establish that "a different result would have been reached initially had [the material submitted in support of the motion] been considered." *Northern Indiana Public Service Co.* (Bailly Generating Station, Nuclear-1), ALAB-227, 8 AEC 416, 418 (1974).

TECHNICAL ISSUES DISCUSSED: Uranium availability; need for power; financial qualifications; environmental effect of removing land from agricultural production; steam generator tube integrity; conversion of gas-fired plants to coal as an alternative energy source.

Mr. Jay E. Silberg, Washington, D. C., for the applicants, Kansas Gas and Electric Company and Kansas City Power & Light Company.

Messrs. James T. Wiglesworth, Overland Park, Kansas, and **William H. Ward**, Shawnee Mission, Kansas, for the intervenor, Mid-America Coalition for Energy Alternatives.

Messrs. Stephen H. Lewis, **Michael R. Riddle**, and **James M. Cutchin IV**, for the Nuclear Regulatory Commission staff.

DECISION

Before us for review are two Licensing Board decisions in this construction permit proceeding involving Unit No. 1 of the Wolf Creek Generating Station: the partial initial decision of January 18, 1977, (LBP-77-3, 5 NRC 301) and the initial decision of May 11, 1977 (LBP-77-32, 5 NRC 1251). In the first decision, the Board determined all issues other than that of the financial qualifications of the applicants. By virtue of the findings contained therein, the decision paved the way for the issuance of a limited work authorization subject to certain conditions prescribed by the Board for the protection of the environment.¹ The second decision, which dealt with the applicants' financial qualifications,² authorized the issuance of a construction permit.³

Exceptions to each decision were filed by one of the intervenors, the Mid-America Coalition for Energy Alternatives (Coalition). In their totality, these exceptions were addressed to the resolution below in four areas of inquiry: uranium supply; need for power; the environmental costs attendant upon the transfer of water from a reservoir to the cooling lake for

¹Although the Board Chairman filed a "dissenting opinion" (5 NRC at 400-02), he did not disagree either with the majority's conclusions on any of the issues or with the result. Rather, his objection was directed exclusively to the length and form of the majority opinion. Thus, the Chairman's opinion might more accurately have been denominated as a concurrence.

²The Board Chairman filed a partial dissent from this decision which, *inter alia*, expressed the view that waste management expenses should have been, although they were not, considered in the financial assessment of the applicants. 5 NRC at 1263-64. See fn. 30, *infra*.

³A construction permit was issued on May 17, 1977. See 42 Fed. Reg. 27071 (May 26, 1977).

the facility; and financial qualifications.⁴ The Coalition has also filed a motion to reopen the record to consider assertedly new information on an energy alternative, the conversion of gas-fired plants to coal.⁵ Each of the exceptions, as well as the motion to reopen, has been opposed by the applicants and the NRC staff.

We have considered with care the arguments advanced in the respective briefs, as well as the relevant portions of the record. We conclude that none of the exceptions is meritorious and, further, that there is no warrant for reopening the record. This Board's review *sua sponte* of the unappealed portions of the decisions disclosed one matter upon which further information was requested—that of steam generator tube integrity.⁶ After consideration of the material submitted, together with the remainder of the record, we have found no error warranting corrective action. Accordingly, we affirm.

I. SUFFICIENCY OF URANIUM SUPPLY

In its partial initial decision, the Licensing Board expressly found, following a detailed examination of the evidence bearing on the point, that "a sufficient supply of uranium exists for the lifetime of [the Wolf Creek facility] and that this supply is not dependent on the breeder reactor or on plutonium recycle." 5 NRC at 330. This finding is attacked by the Coalition on essentially two bases: (1) the Board erroneously took into account other than already proven resources for the purpose of fixing the amount of uranium that would be available; and (2) in determining whether the supply would be sufficient, the Board should have proceeded on the basis that at least 625—rather than 236—reactors would have demands upon it.

1. We have had previous occasion to consider in another construction permit proceeding the question of the extent of uranium resources. *Gulf States Utilities Co.* (River Bend Station, Units 1 and 2), ALAB-317, 3 NRC 175 (1976). The dispute there centered upon whether, in determining how much uranium would be available to fuel the River Bend reactors over their projected lifetime, consideration had to be restricted to "already reasonably proven resources." This matter was crucial because there was agreement that the proven resources would not be adequate. 3 NRC at 180.

⁴In its brief on the financial qualifications matter, the Coalition asked for a stay of the effectiveness of the initial decision pending the outcome of its appeal. In ALAB-424, 6 NRC 122 (1977), we denied the stay, as well as certain procedural motions filed by the applicants and NRC staff respectively.

⁵In ALAB-424, *supra*, we reserved ruling on the motion to reopen until we had completed our review of the merits of the Coalition's exceptions.

⁶See our unpublished order of December 1, 1977.

The staff's expert witness was an Energy Research and Development Administration (ERDA) official, John A. Patterson.⁷ He expressed the view that it was appropriate to consider both "established" and "probable" uranium resources. In this connection, he supplied the *River Bend* Licensing Board with an estimate as to how much uranium would be derived from sources which ERDA was then exploring. *Ibid.* That Board accepted the estimate and employed it in determining the likely total available uranium supply. *Id.* at 181. In doing so, the Board rejected the belief of an expert witness appearing for one of the intervenors (the State of Louisiana) that reliance should not be placed upon uranium resources not as yet shown to exist as a matter of virtual certainty. *Id.* at 180-81.

On the State's appeal, we noted our uncertainty regarding the extent to which this result was being challenged. We went on to determine, however, that there was "scant reason" to overturn it:

It is not asserted by the State that there are no potential sources of uranium beyond those now positively identified; rather the claim appears to be simply that their extent cannot be precisely ascertained at this time. Although this is quite true, we are unaware of any authority to support the State's apparent belief that licensing decisions may not be based upon probabilities. As the Licensing Board determined and the State does not question, Mr. Patterson was qualified by education and experience to make an informed, expert judgment on the total amount of uranium which in all likelihood would be available over the next 40 years. *In this circumstance, we think that the estimates he furnished could justifiably be taken as the foundation for findings on projected uranium supply.*

Id. at 181; emphasis supplied.⁸

In the case now at bar, we are once again confronted with the testimony of Mr. Patterson, which does not appear to differ in any significant respect from that which was presented by him in *River Bend*.⁹ And, as was true of Louisiana in that case, the Coalition does not here assert that Mr. Patterson was unqualified "to make an informed, expert judgment on the total amount of uranium which in all likelihood would be available over the next

⁷ERDA no longer exists as a distinct instrumentality; its functions are now discharged by the recently created Department of Energy.

⁸In that opinion, we also pointed out that the question of uranium sufficiency depended upon both the extent of the resources and the efficiency of utilization of the fuel. We found the record inadequate on the latter question and remanded for further hearings. Last November, we affirmed the Licensing Board's decision on the remanded question. ALAB-444, 6 NRC 760(1977.)

⁹The *River Bend* testimony was proffered in May 1975; the testimony in this proceeding some 8 months later.

40 years." Rather, in effect, we are being asked to overrule our *River Bend* holding and to decide now that consideration should have been given only to that uranium which has already been both (1) discovered and (2) evaluated in terms of the economic feasibility of capture.

A reexamination of the matter leaves us unconvinced that there is warrant for accepting that invitation. As the Board below points out (5 NRC at 323), ERDA assigned to the category of "probable resources" those "contained within favorable trends in productive uranium districts"; they are "essentially extensions of known ore reserves where the extensions are known to exist from drilling data or outcroppings and quantitative estimates of the resources can be made by comparisons with the known reserve body. . . ." This being so, we see no cause to disagree with the Board's observation that the reliability of the estimates of probable resources "is quite high"¹⁰ or with its conclusion that "most of the probable resources. . . should be available." *Id.* at 323, 330.

2. Our most recent decision in *River Bend*, ALAB-444, *supra*, fn. 8, is dispositive of the Coalition's second claim—that, in ascertaining the sufficiency of the determined supply of uranium, the Licensing Board should have assumed that at least 625 reactors would have to be fueled out of that supply. That figure was selected by the Coalition because it represented the number of reactors which Mr. Patterson thought might reasonably be expected (given ERDA projections) to be operational in the year 2000. We concluded in ALAB-444, however, that the proper base is the total number of reactors "currently in operation, under construction, and on order." We pointed out that

Insofar as licensing future reactors is concerned, the availability of sufficient uranium to meet their needs will likewise have to be determined on the basis that the satisfaction of the fuel demands of existing reactors over the full span of their projected lifetime will take priority.

6 NRC at 788, fn. 53. In other words, future reactors will not be licensed unless there will be sufficient fuel to operate them, as well as all previously licensed reactors.

In *River Bend*, the record established the number of existing and currently planned reactors to be 236. The evidence in this proceeding being to the same effect, the Licensing Board properly employed that figure.¹¹

¹⁰Among other things, Seymour Jaye, a witness for the applicants with expertise in uranium purchasing by utilities, testified that ERDA premining reserve estimates have in the past proven to be conservative, by a factor of two or three. Tr. 939-44. To the same effect, see Tr. 996 (testimony of Richard H. De Voto, a uranium geologist).

¹¹It might be noted that the Licensing Board found without contradiction that, although planned, 21 of the 236 reactors had not as yet been ordered. 5 NRC at 326-27.

3. It follows from what has been said to this point that the Licensing Board's ultimate finding on uranium supply sufficiency must be allowed to stand. The ERDA estimate (testified to by Mr. Patterson) is that 840,000 tons are clearly available and that the "probable resources" amount to 1,060,000 tons.¹² The resultant total of 1,900,000 tons comfortably exceeds the estimated lifetime fuel requirements for the 236 reactors. In ALAB-444, *supra*, we found those requirements to total (assuming no recycle of spent fuel) 1,577,000 tons. 6 NRC at 793. There is no reason not to accept that generic determination here—particularly since the question of uranium fuel efficiency has not been placed in issue by the Coalition (as it had been by Louisiana in *River Bend*) and, in any event, the 1,577,000-ton figure is considerably greater than the estimate which the Board below had employed based upon Mr. Patterson's testimony in this proceeding. 5 NRC at 329.¹³

II. NEED FOR POWER

The applicants propose to bring the Wolf Creek reactor on line by 1982. The Coalition urged below that the power which that facility is to provide will not be needed prior to 1990. The Licensing Board resolved the disagreement in the applicants' favor. 5 NRC at 359. On the appeal, the Coalition maintains that this was error.

A. 1. We are thus once again confronted with a sharply contested "need for power" issue; *i.e.*, whether an adequate justification for building the Wolf Creek facility at this juncture has been presented. See *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 90 (July 26, 1977)¹⁴ and cases there cited. Here, however, there is a new dimension to this issue which differentiates it to some degree from the "need for power" questions with which we previously have had occasion to deal.

¹²Patterson, fig. 3, fol. Tr. 525.

¹³The 1,577,000-ton figure had been arrived at in *River Bend* following the remand ordered in ALAB-317, *supra*. Mr. Patterson's initial testimony in that proceeding on the issue of fuel utilization efficiency (found in ALAB-317 to lack sufficient supporting empirical data) was to the same general effect as his testimony in this proceeding.

¹⁴In *Seabrook*, we explained that

"Need for power" is a shorthand expression for the "benefit" side of the cost-benefit balance which NEPA mandates for a proceeding considering the licensing of a nuclear power plant. . . . "A nuclear plant's principal 'benefit' is of course the electric power it generates. Hence, absent some 'need for power,' justification for building a facility is problematical." *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 405 (October 29, 1976)(footnote omitted).

The Commission reviewed certain other aspects of ALAB-422 and has affirmed that decision. CLI-78-1, 7 NRC 1 (January 6, 1978).

In prior cases, more often than not the applicant sought to justify the proposed nuclear facility principally on the basis that the demand for energy is increasing and that all or a part of this increased demand must be met through additional electrical generating capacity. See, e.g., *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347 (1975); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397 (1976); *Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-367, 5 NRC 92 (1977); *Public Service Co. of Indiana, Inc.* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179 (February 16, 1978). In some instances, the decision to build a nuclear facility has also been explained in terms of the desirability of obtaining substitutes for existing electric generating plants fired by fuels, such as oil, which are perceived by the utilities to be in present or future short supply. See *Seabrook*, ALAB-422, *supra*;¹⁵ *Marble Hill*, ALAB-459, *supra*.

Although in the present case the applicants offered both of these theses, they also put forth a third one: that the electric power generated by Wolf Creek is needed to replace scarce natural gas as an ultimate energy source (i.e., to satisfy residential and business energy requirements now being directly met by natural gas). On this score, the record reflects that, in 1971, more than 85% of the heating and power requirements in applicants' service areas were fulfilled either directly by natural gas or by electricity generated by facilities fueled by natural gas (Feld, prepared testimony, pp. 10-11, fol. Tr. 1273).¹⁶ Since that time, shortages of natural gas have given rise to substantial curtailments in the use of that resource (Woolery, prepared testimony, pp. 10-14, fol. Tr. 1765; see also data provided by Emerson, pp. 88-90, and Table 44, fol. Tr. 1100). And the applicants perceive such shortages as continuing. Based on present gas supplies, a witness for Kansas Gas & Electric predicted that "on peak days after 1979 all customers using natural gas will need to look for alternate fuel sources" (Woolery, p. 13). Assuming that certain additional sources of supply could be developed, "firm" gas customers would be supplied on peak days (at least through 1982) but "interruptible" service customers would still need to seek other sources (*ibid.*). Further, as a result of the lack of gas availability, customers who otherwise would likely have used that fuel are turning instead to elec-

¹⁵In ALAB-422, we explicitly approved the authorization of the Seabrook facility on the basis of its substitution for oil-fired plants, erroneous evidentiary rulings by the Licensing Board having precluded our relying on evidence supporting a finding of need for the facility for reliability reasons. 6 NRC at 95-99.

¹⁶Kansas Gas & Electric has historically generated most of its electricity by burning natural gas. ER, §9.2.1.1.3.

tricity: the record reflects that 90% of new living units in 1974 and 91% in the first half of 1975 were all-electric and that substantial numbers of older units were being converted to electricity (Woolery, pp. 6-7; Feld, pp. 7-11).

2. Obviously, need for power projections involve attempts to predict the future and "inherent in any forecast of future electric power demands is a substantial margin of uncertainty." *Nine Mile Point*, ALAB-264, *supra*, 1 NRC at 365 (footnote omitted). Moreover, "[a]s with most methods of predicting the future, load forecasting involves at least as much art as science." *Ibid.*¹⁷ And the uncertainties involved in predicting future needs for electrical power are that much greater in circumstances where, as here, the facility assertedly not merely would satisfy growing energy demands but, as well, would provide an alternative means of meeting present demands which are now being fulfilled by other increasingly scarce fuels. This is particularly so if, as also is true here, the extent and timing of the scarcity is somewhat uncertain; the remaining supplies are likely to be allocated by governmental regulation to various types of end uses; and, as of the time the prediction must be made, no long-term allocations have been established (see Tr. 1316-19).

In passing upon the various predictions contained in this record, these considerations must be borne in mind. To be sure, the acceptability of any particular forecast made respecting the future need for the power to be generated by the Wolf Creek facility will hinge to an appreciable extent upon the propriety of the methodology employed in developing that forecast—including underlying data bases and assumptions. But a forecast that such need exists is not to be discarded as fatally flawed simply because the future course of events is sufficiently clouded to give rise to the possibility of a significant margin of error. Given the legal responsibility imposed upon a public utility to provide at all times adequate, reliable service—and the severe consequences which may attend upon a failure to discharge that responsibility—the most that can be required is that the forecast be a reasonable one in the light of what is ascertainable at the time made. *Nine Mile Point*, ALAB-264, *supra*, 1 NRC at 367; *Catawba*, ALAB-355, *supra*, 4 NRC at 407; *Marble Hill*, ALAB-459, *supra*, 7 NRC at 185.

B. In considering the reasonableness of the various need for power projections, the Licensing Board analyzed the three basic elements of those projections: (a) the reserve margin required; (b) the anticipated load capability; and (c) the projected load demand. There was little dispute about the first two elements. The reserve margin is fixed by contractual obligations between the respective applicants and the Southwest and

¹⁷"We left open in *Nine Mile Point* the question whether forecasting had become "a mere craft." *Id.*, fn. 61.

Missouri-Kansas power pools (Tr. 2232-33, 2271-74, 2276-77; ER, pp. 1.1-10, 12-13); as the Licensing Board noted, the 15% reserve "is one of the lowest in the nation." 5 NRC at 350, fn. 67; *id.* at 358. And the load capability of 5,396 MW anticipated by the applicants for 1982 (without the Wolf Creek facility) was unchallenged. 5 NRC at 358.¹⁸

The controversy focused instead on the differing predictions of peak-load demand. The Licensing Board set out in considerable detail the testimony of the various witnesses on this question (5 NRC at 349-57). It need only be summarized here.

1. The applicants utilized two discrete approaches in formulating their need for power forecasts. The first involved resort to the historical record of peakload growth of each of the two applicants, modified to take into account certain contemporary or assertedly predictable circumstances which, in the applicants' judgment, would affect future demand in their service territories.¹⁹ On the basis of the outcome of this analysis, the applicants forecast a growth rate (1974-83) of 5.3% per year and a resultant peak hour demand in 1982 of 4,890 MW (2,130 MW for Kansas Gas & Electric Co., 2,760 MW for Kansas City Power & Light Co.). When a 15% reserve is added to that figure, the resulting requirement of 5,623 MW exceeds the load capability for 1982 of 5,396 MW (Wolf Creek excluded).

The applicants' other approach centered upon an econometric demand analysis²⁰ undertaken by Dr. M. Jarvin Emerson of Kansas State University, which focused on total demand for electricity rather than peakload growth (Emerson, prepared testimony, fol. Tr. 1100). That analysis took into account such factors as the economic structure and performance of the service areas, price elasticity (*i.e.*, the magnitude of the effect of the price of electricity on the quantity of electricity consumed),²¹ the effect of the price of

¹⁸The Board noted that this value of 5,396 MW is "optimistic" for several reasons, including the possible unreliability by 1982 of some of the older units included in the projection. *Ibid.*

¹⁹Inquiry was made into the factors affecting consumption of electricity by five categories of users: residential, commercial, industrial, street and highway lighting, and sales for resale (Woolery, pp. 3-11). The historical peak system demands were then divided into major components—residential and commercial customers' nonweather-sensitive loads, weather-sensitive load, and industrial load—and their performances over a 10-20-year period were used to develop mathematical curves which best fit the historical data. The curves were then extended, and the results were extrapolated. The extrapolated results were refined by factoring in the predicted effects of such matters as weather, air-conditioning saturation, and economic conditions (Lucas, prepared testimony, pp. 7-12, fol. Tr. 1773; Rasmussen, prepared testimony, p. 3, fol. Tr. 3228).

²⁰"Simply described, econometric analysis is a method of estimating mathematically economic relationships among factors on the basis of numerical data." *Nine Mile Point*, ALAB-264, *supra*, 1 NRC at 359.

²¹See Feld, *supra*, p. 1.

competing fuels, and personal income levels. And the conclusion derived therefrom was (*id.* at 90) that the growth in energy demand will lie within the same range as that forecast by the other approach (which had produced estimates of the growth both of peakload and total electrical demand).

2. The Coalition also came forward with an econometric analysis, performed by Dr. Malcolm Burns of the University of Kansas and Dr. Michael A. Viren of the University of Missouri. This analysis produced the conclusion that the combined estimated "high" growth rate for the two applicants would be only 2.6% annually (in contrast to the 5.3% predicted by the applicants). If this be right, the Licensing Board was told, the generating capacity which Wolf Creek would provide would not be needed prior to 1990 (Burns/Viren, prepared testimony, fol. Tr. 4929, at pp. 47-48).

It appears that, as the Coalition asserts, Drs. Burns and Viren placed particularly heavy emphasis on the price elasticity factor. Specifically, they examined, *inter alia*, the extent to which use of electricity had increased in the past as the real (*i.e.*, adjusted for inflation) price of that commodity was falling. They then proceeded on the basis that electrical demand would be correspondingly affected by downward pressures occasioned by future price rises.²² For their part, the applicants' analyses had tempered the effect of price elasticity by attaching greater weight than had Drs. Burns and Viren to such other and offsetting factors as increases in customers' income, the propensity of customers to continue to use capital equipment in which they had already invested, and the expectation that rises in the real price of electricity would materially reduce consumption only if they were significantly greater than the projected price rises with respect to other competing energy sources such as natural gas (a situation no witness suggested would occur) (see, *e.g.*, Lucas, pp. 17-19; Woolery, pp. 8-10; Tr. 2265-67; Rasmussen, Tr. 4095-98; Emerson, p. 43, *et seq.*).

3. The staff's evidence established that the nine regional Electric Reliability Councils²³ have projected average annual summer peakload growth rates for the period 1975-1984 which are in the range of 5.2% to 8.4%. Noting the historical combined annual growth rate of the applicants of

²²There was no disagreement that the cost to the consumer of electricity will increase at least to some extent.

²³In their totality, these regional councils form the National Electric Reliability Council (NERC), established in 1968 for the purpose of augmenting the reliability and adequacy of bulk power supply in the United States and Canada. The applicants' service areas are within the territory covered by the regional council identified as the Southwest Power Pool Agreement. For a fuller discussion of NERC and the regional councils, and the involvement of the former Federal Power Commission in their activities, see Federal Power Commission, *The 1970 National Power Survey*, Part I, p. I-17-14, *et seq.*

6.9%, and taking into account historical national load growth trends and "possible substitutions of electric energy using nuclear and coal fuels for rapidly diminishing supplies of petroleum and natural gas," the staff witness on this point (an employee of the Federal Power Commission)²⁴ opined that the 5.3% annual growth rate projected by the applicants was reasonable (Gekas, prepared testimony, fol. Tr. 4843, at pp. 15-16).

Also testifying on the staff's behalf was Dr. Sidney E. Feld. This witness had reviewed a number of econometric models which had been used by various Government and nongovernment forecasters to predict national load demand growth (Feld, *supra*, Table 2, p. 19). The annual growth rate projected by these forecasters for the period between the mid-1970's and the mid-1980's ranged from 4.8% to 7.6%. Most, and possibly all, of the models appear to have taken some account of price elasticity. Dr. Feld observed that "[t]hese studies once again indicate the lack of consistency presently reflected by econometric modeling." *Id.* at p. 15. But he went on to note that the staff had given considerable weight to the model employed by the Federal Energy Administration (FEA)²⁵ because of its "greater detail and exhaustive treatment of the subject" and because the staff thought the price elasticity factor to have been validly applied therein. *Ibid.* Starting with the FEA prediction of a national annual electrical demand growth rate of 5.4% (*id.* at p. 16, as corrected at Tr. 1275), Dr. Feld then adjusted that figure to allow for the fact that the prospective growth in personal income in the applicants' service areas would exceed the national norm. He concluded that "... a reasonable rate of growth [in the applicants' service areas is] about [5.5] percent per year. . . ." *Ibid.* On that basis, he endorsed as reasonable the applicants' prediction that the plant would be needed in 1982.

C. It is against this evidentiary background that we must consider the Coalition's claim that the Licensing Board erred in determining that the Wolf Creek facility would be needed in 1982. More specifically, the question is whether, as the Coalition would have it, the evidence required the Board to reject the applicants' forecast of a 5.3% annual increase in demand for electric power in favor of the Coalition's much lower (*i.e.*, 2.6%) projection. This is because the record reflects without contradiction that a 5% annual demand increase would necessitate the availability of Wolf Creek-generated power by 1982 (Feld, p. 17).

Given (1) a historical demand growth rate in the applicants' service areas approaching 7% and (2) the fact that, of all of the forecasts of record, only

²⁴The FPC is now known as the Federal Energy Regulatory Commission and is part of the Department of Energy.

²⁵Since the close of the record, this agency has also been absorbed within the Department of Energy.

that of Drs. Burns and Viren projected a future growth rate less than 4.8%, the Coalition has taken on a formidable task. We have already alluded to both the lack of certainty attendant upon any prognostication of future electrical demand and the potentially serious consequences should generating capacity not be available when needed.²⁶ For these reasons, we should be cautious about accepting an isolated demand forecast appreciably lower than all of the others contained in the record. More specifically, we must be satisfied that only that isolated forecast rests on firm ground.

No such indication is present here. As we have noted, the gap between the Burns/Viren result and that of the other forecasters appears attributable to the differing weight placed upon the effect that anticipated future electricity price increases will have upon consumer demand (industrial, commercial, and residential). Thus, to agree with the Coalition that the Licensing Board was obliged to accept the Burns/Viren analysis, we must conclude (as those economists did) that the quantum of the demand for electricity is heavily influenced by the price of that commodity. But there is substantial evidence of record that there are other factors (seemingly given little attention in the Burns/Viren analysis) which significantly reduce the importance of price as a determinant of demand. Among these factors are the increasing scarcity of natural gas (which leads to greater use of electricity (see pp. 327-328, *supra*)) and the impact of increased personal incomes on the ability and willingness of residential consumers to spend additional amounts to retain such conveniences as air-conditioning (a major contributor to peakloads) (see, *e.g.*, ER §1.1.1.2; Woolery, pp. 6, 18-19; Lucas, p. 19). It also appears from the testimony that "[e]lectric power generally does not represent a major cost factor in most industrial plants and commercial establishments" and that, as a consequence, those concerns may not be so ready to alter drastically their mode of operation to accomplish savings in electricity costs (Woolery, p. 18).

We should not be understood as implying a belief that there is no relationship between the price of and the demand for electricity. Obviously, price does have some influence on demand in the electricity, as well as in virtually every other, market. Our point is simply that the record does not establish that the applicants' demand prediction must perforce be discarded as unreasonable—despite its conformity with that of other forecasters—simply because the noneconometric analysis on which it was based did not

²⁶On the other hand, the building of a generating station earlier than needed has only economic implications. Further, Dr. Viren himself acknowledged that, were Wolf Creek to be constructed by 1982 even though (in his view) it was not needed until 1990, there would be a net benefit to consumers (in terms of fuel cost savings minus extra fixed charges) if the plant operated at capacities in excess of 55% (Viren, revised testimony, fol. Tr. 3051, Table V; Tr. 3557-60).

place the same emphasis upon the price elasticity factor as had the Burns/Viren analysis.²⁷ Whether eventually proven right or wrong, that prediction stood on at least equal footing with that produced by the Burns/Viren analysis and, in light of the teachings of our prior decisions (see p. 328, *supra*), the Licensing Board was entitled to accept it.

III. FINANCIAL QUALIFICATIONS

The next issue to which we turn relates to the financial qualifications of the applicants. This issue arises in the context of the requirement that there be "reasonable assurance" that the applicants will be able to obtain the necessary funds to construct the facility. 10 CFR 50.33(f). In its recent *Seabrook* decision,²⁸ the Commission held that the "reasonable assurance" standard does not necessitate "a demonstration of near certainty that an applicant will never be pressed for funds" but rather requires a showing simply that the applicant has "a reasonable financing plan in the light of relevant circumstances." 7 NRC at 18.

In this case, the Licensing Board concluded that the applicants had put forth "reasonable financing plans." 5 NRC at 1261. The Coalition challenges that determination, as well as the Board's ultimate conclusion that the applicants "are financially qualified to design and construct the proposed facility." *Id.* at 1262. Stripped to its essentials, the challenge—which is addressed only to one of the applicants (Kansas City Power & Light)—brings to the fore the question whether, in order to finance construction of the Wolf Creek facility, resort will have to be made to the inclusion of the value of construction work in progress ("CWIP") in the utility's rate base, so that a current cash return can be realized on the investment in the facility.²⁹ The applicants had attempted to obtain State regulatory approval to employ that procedure. But it is now legally foreclosed in Missouri, and at the time the record below was closed, its availability in Kansas had not as yet been definitively determined. See 5 NRC at 1252-53.

²⁷The Licensing Board did not rely on the applicants' econometric analysis but, rather, rejected it along with that of Drs. Burns and Viren. 5 NRC at 359.

²⁸*Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1 (January 6, 1978).

²⁹In the absence of CWIP in the rate base, the applicants will continue to utilize an accounting procedure known as "allowance for funds used during construction" (AFDC). Under that procedure, a utility currently credits a noncash income account in an amount sufficient to offset interest payments and certain other expenses related to construction. That same amount is capitalized, but a return on it is deferred until the plant becomes operational.

There is nothing in the Licensing Board's decision to suggest that its crucial findings rested on the assumption that the applicants could and would include CWIP in their rate bases. Nor, contrary to the insistence of the Coalition, does it appear that the applicants presented their case on the basis that the procedure would be available to them. In any event, the pivotal question is whether the record does or does not establish that inclusion of CWIP in its rate base is a necessary ingredient of the financing by KCPL of its share of the plant.

The evidence bearing on the point is adequately summarized in the Licensing Board's decision (5 NRC at 1254-60) and will not be repeated here. In its totality, we find it to provide more than sufficient support for the Board's conclusions. We need add only this: the most serious ultimate consequence of the unavailability of CWIP appearing on this record is the possible reduction of KCPL's bond rating from AA to A. But, in *Seabrook*, the Commission found financially qualified a company which had had its bonds derated from A to Baa, observing that "there is no evidence that a bond offering at that rating would be unsaleable." 7 NRC at 20. There is a similar lack of evidence here that a KCPL bond offering at the A level would be unsaleable—what appears is simply that the cost of borrowing would be greater than if the AA rating obtained (although not appreciably so). Indeed, there was testimony to the effect that "[a]n A has direct access to the money market as well as AAs" (Tr. 5839).³⁰

IV. ENVIRONMENTAL EFFECTS OF WATER WITHDRAWAL

The Coalition's final appellate point requires little discussion. We are told that the Licensing Board did not deal adequately with the matter of the potential effect upon the downstream users of the Neosho River of withdrawing makeup water from the John Redmond Reservoir located on that river. But, contrary to the Coalition's assertion, the decision refers to and adopts the staff's assessment of that effect during not only the period of the

³⁰Although not endorsed by the Coalition, the dissenting opinion of the Chairman of the Board below warrants brief comment. The view expressed in that dissent—that the applicants should have established their financial ability to handle waste management expenses—is at odds with the Commission's regulations, which require a construction permit applicant to provide information sufficient to demonstrate its financial qualifications "to cover estimated construction costs and *related* fuel cycle costs." 10 CFR 50.33(f) (emphasis supplied). The only specification of the nature of the fuel cycle costs appearing in the regulations is in terms of "[n]uclear fuel inventory cost for first core." 10 CFR Part 50, Appendix C, I.A.1. At the operating license stage, the ability "to cover estimated operating costs" (plus decommissioning costs) must be established. 10 CFR 50.33(f).

postulated severe drought but, as well, for 2 years immediately following such a drought. See discussion, 5 NRC at 315-19, and the evidence there cited. The Coalition does not specifically assert either that the staff's appraisal was in error or that the effects attributed by the staff to the withdrawal of makeup water from the reservoir during or after a severe drought might be significant enough to tip the NEPA balance against the plant. Moreover, no such assertion was advanced by the Coalition in its proposed findings below. In short, the Coalition's attack upon the disposition below of the water withdrawal question is insubstantial.

V. SUA SPONTE REVIEW

As earlier noted, our review of the portions of the decisions below not embraced by the Coalition's appeals has disclosed no reversible error. There are, however, two matters which warrant some discussion.

A. One of the issues litigated before the Licensing Board, primarily at the instance of the State of Kansas, was whether the environmental review of the application had adequately considered the effects of removing from agricultural production the approximately 10,500 acres required for the facility, including its cooling lake (see FES, Table 4.1). The record reflects that 5,211 acres within the site will remain unaffected by lake or station construction, and that the land areas of principal concern are the 5,095 acres to be used for the cooling lake and the 195 acres to be devoted to buildings and other structures (*ibid.*; FES, §5.5.1.1.; Dr. Jerry R. Kline, supplemental testimony, pp. 2-3, fol. Tr. 2486). It also indicates that the portion of the unaffected acreage outside the exclusion area (4,357 acres) will remain suitable (and will continue to be available) for crop production or pasture (Kline, p. 3).

In the partial initial decision, the Licensing Board attached controlling significance to its findings that the site contains "no areas of unique or special importance," that none of the land was considered "prime farmland," that nationally there is an "ample margin for expansion" of cropland, that "[l]oss of production on this land will have a small impact on local production but will be negligible compared to regional and national agricultural production." 5 NRC at 319-20. It is difficult to square total reliance on such findings with our decision in *Illinois Power Co.* (Clinton Power Station, Unit Nos. 1 and 2), ALAB-340, 4 NRC 27, 37-47 (1976). There, following a detailed analysis, we held that the environmental cost attendant upon the withdrawal of the farmland from agricultural use was to be deemed to be the cost of the generation (if necessary) of an equal amount of production on other land. *Id.* at 43. In so holding, we specifi-

cally rejected (as being “an ‘empty ritual’ with a predetermined result”) an approach analytically comparable to that adopted by the Board here, based on a comparison of the lost productivity with available national cropland resources. We observed that “[g]iven the total of more than 470,000,000 acres of cropland in the United States . . . the availability or nonavailability for agricultural pursuits of any individual tract—be it 10,000 acres or even five times that size—will never have a significant impact upon the sum total of food production nationwide.” *Id.* at 40-41, footnote omitted.

True enough, the evidentiary hearing on the land-use question was held, and the parties submitted their proposed findings, prior to our *Clinton* decision. But the Board’s decision followed *Clinton* by almost 6 months. There was thus clearly enough time for the Board to have revised its analysis to bring it into conformity with that decision and, if necessary, to have reopened the record for further evidence on the question.

There are facts of record, however, which strip the Board’s error of crucial significance. Specifically, there would appear to be no viable alternative to the applicants’ proposal which if adopted would occasion a substantially smaller land expenditure. No party, including the State of Kansas, asserted that, to conserve land, consideration should be given to the employment of cooling towers in place of the cooling lake. In this connection, the Wolf Creek site is being developed to accommodate ultimately two units, and according to the Final Environmental Statement, two cooling towers would need to be supplemented by a cooling pond of no less size than the now contemplated cooling lake (FES §§9.2.1.4, 9.2.1.5). the land-use issue was raised by the State instead in the context of its suggestion that the nuclear facility might be placed on a different site (Belvue) already committed to electric power generation.³¹ But that site, located 30 miles west of Topeka, is owned primarily by another utility, the Kansas Power and Light Company.³² That utility is not a participant in the proposed Wolf Creek facility. See also 5 NRC at 342-43.

In view of these factors, and the absence of an appeal on the land-use question, we perceive no compelling need for a remand for the taking of additional evidence on the environmental cost associated with taking portions of the site out of agricultural production.³³ We will, however, expect licensing boards to give full effect to *Clinton* in all future cases in which the matter of the removal of land from agricultural production is placed in issue.

³¹The Belvue site is currently scheduled for four 680 MW coal units but has room for some additional generating capacity.

³²Arterburn/Lucas, prepared testimony, p. 1 (fol. Tr. 2526).

³³The present record is sufficient to allow the conclusion that that cost is not so high that it might tip the ultimate NEPA cost-benefit balance against constructing the facility.

B. In several recent proceedings, this Board has explored *sua sponte* the issue of steam generator tube integrity. That issue was considered at length in the *Prairie Island* operating license proceeding. See *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-343, 4 NRC 169 (1976) and ALAB-427, 6 NRC 212 (1977). Thereafter, we called upon the applicants in the *Seabrook* and *St. Lucie* construction permit proceedings to apprise us of the present status of their decisions and actions on the aspects of steam generator design and construction which we had determined in the two *Prairie Island* decisions to have a possible bearing upon the various problems associated with maintaining tube integrity. See *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-435, 6 NRC 541, 544-46 (1977); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-442, 6 NRC 728 (1977). The same course was followed in the proceeding at bar.

Upon examination of applicants' submission and the staff's memorandum in response thereto, we have reached the identical conclusion arrived at in *Seabrook*, ALAB-442, *supra*.³⁴ Specifically, we are fully satisfied upon analysis both (1) that the applicants are taking positive measures to deal with the problem of maintaining steam generator tube integrity; and (2) that these measures are appropriate ones given the present understanding of the nature and root of the problem.³⁵

VI. MOTION TO REOPEN THE RECORD

In addition to its appeal, the Coalition filed a motion with us seeking a reopening of the record to consider the alternative of converting a portion

³⁴The submissions in the *St. Lucie* proceeding are still under consideration. It should be noted that the St. Lucie steam generators are of Combustion Engineering design. The Prairie Island, Seabrook, and Wolf Creek steam generators are, instead, of Westinghouse design.

³⁵We perceive no necessity to detail those measures in this opinion. They are set forth in the affidavit of Frank Schwoerer, which was appended to the applicants' January 3, 1978, *Memorandum in Response to Atomic Safety and Licensing Appeal Board Order Concerning Steam Generator Tube Integrity*. The memorandum and affidavit are, of course, available for public inspection in both the NRC Public Document Room in Washington, D. C., and the local Public Document Room in Burlington, Kansas.

It need be added only that our conclusions are not affected by the steam generator tube leak which occurred last November at the Prairie Island facility. It appears from the reports of the investigation of the leak which have been supplied to us by the staff that the leak was caused by a random tube wall defect in the region of the crevice between the tube wall and the tube sheet. In the Wolf Creek steam generators, the tubes are expanded into the sheet so as to eliminate such crevices.

of Kansas Gas and Electric Company's existing gas-fired baseload capacity to coal (rather than using the gas units in future for peaking purposes alone). We were pointed to an April 21, 1977, letter from that company to one John A. Gaddis (identified by the Coalition as "one of KG&E's consumers") which indicated that the company is "investigating the practicality" of converting its 380 MWe Evans No. 2 unit to coal in the mid-1980's and that preliminary studies indicate a cost of about \$500/kW to do so. The letter also stated that it would not appear practicable to convert units other than Evans No. 2 to coal because of their age and relatively small size. It appears that the letter has also been furnished to the Federal Energy Administration and that the Department of Energy (which has absorbed FEA) is investigating whether the Evans No. 2 plant should be required to convert to coal.

In ALAB-424, 6 NRC 122, 128 (1977), we noted our tentative belief that the Gaddis letter provided an insufficient foundation for reopening the record. Further consideration of the matter has given us no cause to alter that appraisal.

As is well settled, the proponent of a motion to reopen the record has a heavy burden. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-359, 4 NRC 619, 620 (1976). The motion must be both timely presented and addressed to a significant safety or environmental issue. *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523 (1973); *id.*, ALAB-167, 6 AEC 1151-52 (1973); *Georgia Power Co.* (Alvin W. Vogtle Nuclear Plant, Units 1 and 2), ALAB-291, 2 NRC 404, 409 (1975). Beyond that, it must be established that "a different result would have been reached initially had [the material submitted in support of the motion] been considered." *Northern Indiana Public Service Co.* (Bailly Generating Station, Nuclear-1), ALAB-227, 8 AEC 416, 418 (1974).

The consideration of alternatives to an applicant's proposal is, of course, a significant part of the NEPA review. Indeed, both the Commission and the courts have termed it the "'linchpin' of environmental analysis." *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 522 (1977), citing *Monroe County Conservation Society, Inc. v. Volpe*, 472 F.2d 693, 697-98 (2d Cir. 1972). Further, the Gaddis letter did supplement the disclosures of record (see ER, §9.2.1.1.3, p. 9.2-6; Tr. 2665-66) bearing upon the practicality and cost of conversion. Nonetheless, it does not appear that pursuit of the letter's content conceivably could have any effect upon the outcome of this proceeding.

The Coalition's argument is framed almost exclusively in economic terms. But it cannot obtain much mileage out of the \$500/kW estimate of

the cost of converting Evans No. 2 to coal. For the Licensing Board already has determined that a coal-fired plant constructed at a cost of \$500/kW is an economically less desirable option than the Wolf Creek plant. 5 NRC at 345, 348. The Coalition has not challenged that determination on its appeal, and our independent consideration of the point has given us no reason to question it.³⁶

Moreover, the existing record reflects that, because of the impending gas shortage, KG&E has planned to convert Evans No. 2 from a baseload to a peaking facility (for which adequate gas supplies are expected to be available) (ER, Table 1.1-7a, fn. a, and §9.2.1.1.3, pp. 9.2-5 and 6). This was to be done only after the Wolf Creek baseload capacity came on line (*id.*, Table 1.1-7a, fn. a). Were, however, Evans No. 2 instead to be converted to coal and substituted for a portion of Wolf Creek, and thus to be no longer available as a peaking facility, other facilities for that purpose would have to be developed (*id.*, §§9.1.4, 9.2.1.1.3, p. 9.2-6). That being so, even if upon more detailed analysis the cost of converting Evans No. 2 to coal were established to be \$500/kW, that cost would not represent the entire conversion expense. There would have to be added an allowance for developing additional peaking capacity to replace that which Evans No. 2 would otherwise have provided. Clearly, then, conversion of Evans No. 2 to coal for the purpose of replacing Wolf Creek (in part) would not be cost-effective.³⁷

³⁶Nor, more importantly, does a coal facility appear to be preferable from an environmental standpoint. FES, §9.1.2.1 at p. 9-3. See *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 161-163 (February 14, 1978). The Licensing Board should have discussed the environmental effects of the coal alternative, even though it was not a subject raised by any party. *Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, 2B), ALAB-367, 5 NRC 92, 102-04 (1977). But given the evidence of record on this matter, and the lack of any contest, we need not remand for further findings in this respect. *Cf. Hartsville, id.* at 103-05.

³⁷There is, of course, the possibility—albeit nothing more than that—of a direction by the Department of Energy that Evans No. 2 be converted to coal. But it is highly improbable that such conversion would or could be ordered *prior* to the availability of Wolf Creek capacity. The record reflects that Evans No. 2, KG&E's second largest block of capacity, will be needed for baseload purposes until Wolf Creek comes on line (ER, Table 1.1-7a; Tr. 2666). Thus, to remove it from service prior to that time would adversely affect system reliability. The regulations of the Department of Energy require such considerations to be taken into account in determining whether continued operation of a natural gas-fueled generating station should be foreclosed. 10 CFR 305.3 (b) (4) (1977 ed.).

For the foregoing reasons, the Licensing Board's decisions under review are *affirmed*.³⁸

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

³⁸This affirmance is without prejudice to the filing by the Coalition of a motion to reopen the record for further consideration of the environmental effects of the uranium fuel cycle, should such a motion be thought warranted once the Commission has acted upon the staff recommendation that "Table S-3 [contained in 10 CFR 51.20(e)] be amended to remove the value for radon releases and that the subject of radon releases and associated health effects be declared litigable in all individual licensing proceedings." See *Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 2)*, CLI-78-3, 7 NRC 307, 309 (March 2, 1978). See also our order in the same case, ALAB-456, 7 NRC 63 (January 27, 1978).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Jerome E. Sharfman

In the Matter of

Docket Nos. STN 50-518

STN 50-519

TENNESSEE VALLEY AUTHORITY

STN 50-520

STN 50-521

(Hartsville Nuclear Plant,
Units 1A, 2A, 1B, and 2B)

March 17, 1978

Upon intervenors' appeal from initial decision authorizing issuance of construction permits (LBP-77-28, 5 NRC 1081), the Appeal Board (1) reverses the Licensing Board's conditional approval of an upstream location for the discharge diffuser, (2) reserves decision on the Licensing Board's approval of a downstream location for the discharge diffuser pending the parties' submission of briefs on the precise location of the diffuser and written, sworn testimony on the effects of sedimentation from dredging on an endangered species during periods of reverse or zero riverflow, and (3) affirms the initial decision in all other respects.

ATOMIC ENERGY ACT: APPENDIX I

Regulatory Guide 1.109 does factor in doses of radioactivity resulting from the eating of chicken.

APPEAL BOARD: SCOPE OF REVIEW

The Appeal Board will not ordinarily entertain an issue raised for the first time on appeal.

RULES OF PRACTICE: REQUIREMENTS OF DECISIONS

Neither the Appeal Board nor the Licensing Board may base a decision

on factual material which has not been introduced into evidence. See Administrative Procedure Act §7(d), 5 U.S.C. §556(e); *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 191 (1978).

ATOMIC ENERGY ACT: APPENDIX I

The infant is the critical member of the population for the purpose of estimating the maximum thyroid dose from radioactive iodine releases pursuant to Section II.C of 10 CFR Part 50, Appendix I.

APPEAL BOARD: SCOPE OF REVIEW

Ordinarily, the Appeal Board does not review procedural rulings from which no appeal has been taken. *Boston Edison Co.* (Pilgrim Nuclear Power Station, Unit 1), ALAB-231, 8 AEC 633-34 (1974).

RULES OF PRACTICE: BURDEN OF GOING FORWARD

The Commission's rules do not preclude an intervenor from building its case defensively, on the basis of cross-examination.

APPEAL BOARD: STANDARD OF REVIEW

The Appeal Board cannot affirm an action as within the proper limits of the Licensing Board's discretion when the record does not indicate that the Licensing Board considered any discretionary factors.

RULES OF PRACTICE: CROSS-EXAMINATION BY PARTIES

Denial of motion for production of cesium-137 dose calculations used in a computer model upon which a piece of documentary evidence was based improperly restricted the scope of cross-examination of applicant's witness on compliance with Appendix I to 10 CFR Part 50.

ENDANGERED SPECIES ACT: SECTION 7

Section 7 of the Endangered Species Act requires Federal agencies to take such action necessary to insure that actions authorized by them do not jeopardize the continued existence of endangered species. Radiological releases which will not produce significant adverse effects on an endangered species will not jeopardize its continued existence and hence are not proscribed by the Act.

RULES OF PRACTICE: BURDEN OF PROOF

Absent some special statutory standard of proof, factual issues decided by NRC are determined by a preponderance of the evidence.

ENDANGERED SPECIES ACT: SECTION 7

Section 7 of the Endangered Species Act requires a licensing board to consider all possible adverse effects upon an endangered species stemming from a proposal, whether or not raised by the parties.

ENDANGERED SPECIES ACT: SECTION 7

Section 7 of the Endangered Species Act imposes the same duties upon an agency which authorizes an action as it does upon an agency which carries out an action.

ENDANGERED SPECIES ACT: SECTION 7

If an applicant Federal agency has not consulted with the Department of Interior pursuant to §7 of the Endangered Species Act and obtained its opinion concerning a proposed action, a licensing board is prohibited by the statute from approving that action.

ENDANGERED SPECIES ACT: SECTION 7

Under the Endangered Species Act, a licensing board may not approve an act on condition that it is later approved by the Department of the Interior. After the Department of Interior renders its opinion, this Commission is required, by judicial decision, to make the final decision itself, taking into consideration the views of the Department.

ENDANGERED SPECIES ACT: SECTION 9

As the definition of "harm" in 50 CFR 17.3 is limited to significant effects, the word "harm" in §9 of the Endangered Species Act, 16 U.S.C. §1538 should be similarly limited.

RULES OF PRACTICE: REQUIREMENTS OF DECISIONS

The requirement of 10 CFR 2.760(c) that the initial decision include findings, conclusions, and rulings, with the reasons or basis for them, on all

material issues of fact, law, or discretion presented on the record applies to an uncontested issue left open by a prior appeal board decision, as to which the staff introduced evidence and took a position.

RULES OF PRACTICE: BRIEFS

A mere reference to exceptions does not satisfy the requirement of 10 CFR 2.762(a) that a brief in support of exceptions be filed. *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-461, 7 NRC 313, 315 (1978).

RULES OF PRACTICE: BRIEFS

A mere statement of reliance upon proposed findings and conclusions does not satisfy the requirement for an appellate brief set forth in 10 CFR 2.762(a). *Public Service Electric and Gas Co.* (Hope Creek Generating Station, Units 1 and 2), ALAB-394, 5 NRC 769 (1977).

TECHNICAL ISSUES DISCUSSED: Radionuclide dose calculations; Regulatory Guide 1.109; radionuclide doses in milk produced by commercial dairies; proper age group for calculation of maximum dose of radioactive iodine to the thyroid; runoff pathways; mixing of gaseous effluents with water vapor from cooling towers; endangered species (mussels); expertise of witnesses; need for grid on intake pipes.

Messrs. Herbert J. Sanger, Jr., David G. Powell, and Alvin H. Gutterman, Knoxville, Tennessee, for the Tennessee Valley Authority, applicant.

Messrs. Leroy J. Ellis and Robert B. Pyle, Nashville, Tennessee, for William N. Young, *et al.*, intervenors.

Mr. William D. Paton for the Nuclear Regulatory Commission staff.

DECISION

Before us is the Licensing Board's initial decision authorizing the issuance of construction permits for the Hartsville nuclear power plant.¹ Intervenors William N. Young, *et al.*, have appealed to us from that decision.

¹LBP-77-28, 5 NRC 1081 (1977).

I. COMPLIANCE WITH 10 CFR PART 50, APPENDIX I

In Appendix I to 10 CFR Part 50, the Commission set forth guidelines on design objectives for nuclear power reactors which would keep the doses of radioactivity to people near the reactors within specified limits during normal plant operations. Compliance with these guidelines is to "be deemed a conclusive showing of compliance with the 'as low as is reasonably achievable' requirements of 10 CFR §§50.34a and 50.36a."² However, the Commission stated that different design objectives "may also be used, subject to a case-by-case showing of a sufficient basis for the findings of 'as low as is reasonably achievable' required by §§50.34a and 50.36a."³ Applicant maintained below that the Hartsville plant will meet the Appendix I design objectives. Intervenor took the position, in their contentions 6, 25, 27, 28, 29, and 30, that both applicant and staff substantially underestimated the doses from routine radiological releases and "that further analysis is required in order to determine compliance or noncompliance with Appendix I dose restrictions."⁴

The Licensing Board discussed intervenors' contentions and made findings rejecting them in paragraphs 49 through 100 of its opinion.⁵ Our review of the record leads us to conclude that those findings are supported by the weight of the evidence and that, therefore, the Licensing Board's determination that the Appendix I guidelines have been complied with was correct.

Although there is no necessity to repeat all that the Board said, some further discussion of the intervenors' principal challenges to the staff and applicant dose analyses is appropriate.

A. Concentration of Radionuclides in Certain Tissues, Consumption of Chickens, and Riverflow

We start with a general criticism leveled at the dose calculations, which focuses on the evidence of intervenors' witness, Dr. Rosenthal. Intervenor tells us that Dr. Rosenthal established in his written testimony, following Tr. 7066, that the dose analyses of the applicant and the staff were deficient because they did not (1) "consider the concentration of the different elements in different tissues," (2) "evaluate the entire ecological chain, doses from chickens as well as ducks" and (3) take into account "the effects

²Appendix I, Section I.

³*Ibid.*

⁴Brief, pp. 12-13.

⁵5 NRC at 1095-1103.

on doses of minimal riverflow or reverse flow as well as 'average' flow of the Cumberland River."⁶

Both the staff and the applicant used the methodology described in Regulatory Guide 1.109 (in evidence as Staff Exhibit 3-4)⁷ in making their radiological dose calculations.⁸ Appendices A, B, C, and D of that guide show how the concentrations of various elements in different parts of the human body and the entire ecological chain are taken into account in the guide's model. The appendices to the guide also make clear that radiological doses experienced by people as a result of the consumption of chicken are provided for in the model. Table A-2 at p. 1.109-19 of Appendix A and Table D-1 at p. 1.109-64 of Appendix D set forth rates of meat and poultry consumption which were derived from a published study of the Department of Agriculture.⁹ In the absence of site-specific data, these consumption rates are factored into the model to determine both the maximum individual and whole population doses for the various pathways.¹⁰ Moreover, Table D-2 of Appendix D (at p. 1.109-66), which lists recommended values for the transport times of various foods in the food distribution system (to be used where site-specific data is not available), contains a transport time value for meat and poultry. As it is beyond question that the term "poultry" includes chicken,¹¹ it is clear that doses resulting from eating chicken were included in the dose calculations of the applicant and the staff.

The third point in the Rosenthal testimony which intervenors claim raises doubts as to the conservatism of the dose calculations of the applicant and staff is riverflow. In connection with his point respecting the effect of riverflow on doses, Dr. Rosenthal stated:¹²

⁶Brief, p. 19.

⁷The guide's title is "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I." We address and reject in point B, *infra*, intervenors' challenge to the use of this guide.

⁸Written testimony of applicant's witnesses Belvin, Watson, and Wilkie, following Tr. 6601 at pp. 2-4 and 6; Tr. 6615-16; Supplement No. 1 to the Safety Evaluation Report, pp. 11-1 to 11-2.

⁹The guide states that site-specific data should be used "whenever possible, for parameters such as those included in Table A-2." Paragraph 1.b of App. A at p. 1.109-17.

¹⁰See paragraph 2.d (2) of Appendix A at p. 1.109-35; paragraph 4 of Appendix C at p. 1.109-59 which notes that, for the purpose of calculating the dose resulting from concentrations of airborne radionuclides in foods, the ingestion rate for the various types of food are taken from Table A-2 of Appendix A; paragraph 2.a (2) at p. 1.109-68 of Appendix D. See also the definition of U_{ap} , a term which is factored into the equations on those pages and relates to consumption or exposure rates associated with the different pathways, at p. 1.109-10.

¹¹Dr. Rosenthal himself testified that "American poultry consumption is largely chicken. . . ." Written testimony, p. 5, following Tr. 7066.

¹²*Ibid.*

Although the report calculates radionuclide concentrations in the Cumberland River with an average flow of 17,600 ft³/s and dilution, no calculations are given for minimal riverflow and reversals when concentrations are maximal. Average values may be misleading because low periods of flow and reversals that occur nearly every day would lead to changes in the expected dilution of effluents.

Although not identified in his testimony, the report referred to appears to be applicant's Environmental Report and the specific statement alluded to appears in footnote a to Table 5.2-1 at p. 5.2-9.

That footnote explains that the applicant assumes that the radionuclides mix with only one-half of the riverflow. This is a conservatism of applicant's dose analysis which Dr. Rosenthal apparently did not consider. Moreover, the Hartsville plant will employ a holding pond to limit discharges to the river to periods when there is sufficient riverflow for their proper dilution.¹³ This should ensure that the variations in flow about which Dr. Rosenthal is concerned do not result in unusually high concentrations of radionuclides in the river.¹⁴

B. The Use of Regulatory Guide 1.109

Intervenors claim before us that the staff made its initial dose calculation for the cow-milk-thyroid pathway before the adoption of Appendix I. They then tell us that, after the adoption of Appendix I and the issuance by the staff of Regulatory Guide 1.109 (Staff Exhibit 3-4), the staff made a new calculation based on the model contained in that regulatory guide and came up with a lower thyroid dose. Intervenors state:¹⁵

The question not addressed by the [Licensing] Board is what is the justification for the Staff's substitution of the Reg. Guide 1.109 model for the former more conservative model. The Board erred in not inquiring into this before ruling on compliance with Appendix I.

¹³Final Environmental Statement ("FES") §3.4.6., p. 3-8.

¹⁴While it is true that the holding pond will only detain liquid and not gaseous effluents, by so doing, it should diminish the effect of the deposition on and runoff into the river of radionuclides from gaseous effluents at times of low riverflow. In addition, it must be remembered that extreme variations in flow are caused by the operation of power-producing dams above and below the site. FES, *loc cit.*, *supra*. Therefore, flow conditions will not be the same at all points on the river. Because runoff of gaseous effluents deposited on the land and deposition of gaseous effluents directly from the air to the water will occur throughout the Cumberland watershed, in contrast to the deposition of liquid effluents from the plant which is site-specific, concentration in the river of radionuclides from gaseous effluents is not likely to be significantly affected by temporary low flow conditions in one given sector of the river.

¹⁵Brief, p. 21.

This alleged error was not specified in the intervenors' exceptions to the decision below.¹⁶ Moreover, the validity of the Regulatory Guide 1.109 model was not raised in the proposed findings of fact and conclusions of law submitted to the Licensing Board by intervenors. Intervenors' brief to us does not indicate any other way in which the point was raised below. Now do intervenors suggest any reason as to why the model in Regulatory Guide 1.109 may not be acceptable.

Although we might make an exception in the case of a serious substantive issue as to which a genuine problem has been demonstrated, we ordinarily will not entertain an issue raised for the first time on appeal. As we said in *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-244, 8 AEC 857, 864 (1974):

Failing either to raise satisfactorily a particular factual issue or (once the record has been closed) to express himself in the prescribed manner regarding how that issue should be resolved, [an intervenor] is scarcely in a position, legally or equitably, to protest the determinations made by the Board in connection with it.

Accord, Florida Power and Light Co. (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-280, 2 NRC 3, 4, n. 2 (1975).

C. Consideration of Milk Produced by Commercial Dairies

Intervenors contend that applicant's calculations of radiation doses to the population did not include radionuclides which would be ingested from milk produced commercially. However, data on milk from commercial dairies in the area were included in the Preliminary Safety Analysis Report ("PSAR"),¹⁷ and there was testimony that the applicant's population dose estimates were "based on *total* milk production by counties within a 50-mile radius of the plant." (Emphasis added.)¹⁸ In the absence of contrary evidence, we are compelled to conclude that commercially produced milk was considered in calculating applicant's population doses. Moreover, intervenors do not question the staff's inclusion of commercially processed milk in its population dose calculations, and the staff's dose estimates, found satisfactory by the Licensing Board,¹⁹ indicated that the plant will comply with Appendix I.

¹⁶The filing of exceptions is required by 10 CFR 2.762(a).

¹⁷Appendix C, Table B. 3-5, and Appendix D, Table 4. See also Appendix C, Table C.2, and Appendix D, Table 5, which do not on their face appear to exclude commercial dairies from their data on total milk production in the area. These two appendices constitute Applicant's Exhibit 3-6.

¹⁸Written testimony of Messrs. Belvin, Watson, and Wilkie, following Tr. 6601 at p. 5.

¹⁹Paragraph 89, 5 NRC at 1103.

D. The Proper Age Group for Calculation of Maximum Dose of Radioactive Iodine to the Thyroid

Section II.C of Appendix I to 10 CFR Part 50 provides that the annual amount of radioactive iodine released from a reactor to the atmosphere may not result in a dose to "any individual in an unrestricted area from all pathways of exposure in excess of 15 millirems to any organ." The organ which takes up the most radioactive iodine is the thyroid. Because the regulation prescribes a maximum dose to "any individual," it is necessary to determine that category of individuals which is most vulnerable to the concentration of radioiodine in the thyroid. The parties agreed that the determinative factor is age but disagreed as to which age group is most vulnerable. The staff and the applicant took the position that it was the infant (0 to 1 year of age). The Licensing Board concurred.²⁰ The intervenors appeal from that determination, resting on the testimony of their witness, Dr. Sternglass, that "there is mounting evidence in the literature that the most critical members of the population are the developing infants in the early phases of intra-uterine development, and that their thyroids can receive as much as 10 times the dose calculated for the thyroid of the young child. . . ."²¹

The Licensing Board pointed out that the "mounting evidence" referred to by Dr. Sternglass consisted of a "single datum point," discussed in an article by Dr. Eisenbud.²² The Eisenbud article concluded that the greatest hazard from radioactive iodine is to infants about 8 months old.²³ (Thus, Dr. Sternglass' conclusion is contrary to that reached by Eisenbud himself.) The article then stated:²⁴

One possible qualification of this statement should be pointed out. We know very little about the transfer of I-131 across the placenta and the dose delivered to the fetal thyroid. Thus, during a period when the iodine burden of the thyroids of children did not exceed about 70 picocuries per gram of fresh thyroid tissue, a 20-milligram thyroid from a 12-week fetus was found to contain 630 pCi per gram. The dose rate at the time of observations was thus found to be about 10 times the highest dose found in children.

The quoted passage referenced the published report of a study by Dr. Eisenbud and two colleagues in 1962 and 1963 which was designed to determine

²⁰Paragraph 88, 5 NRC at 1103.

²¹Written testimony fol. Tr. 6841 at p. 18.

²²Intervenors' Exhibit 3-5, Eisenbud, *Sources of Radioactivity in the Environment*, 41 JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS 174 (1968).

²³*Id.* at p. 182 and Figure 7 at p. 183.

²⁴*Id.* at pp. 182-83.

what effect fallout from the nuclear weapons tests conducted by the United States and the U.S.S.R. in the second half of 1962 had upon the amount of iodine-131 present in milk distributed in New York City and concentrated in the thyroids of New York City residents.²⁵ Most of the thyroids examined were obtained by autopsies on people who had died suddenly or suspiciously.²⁶ Five of these individuals were pregnant and Eisenbud examined not only their thyroids but those of their fetuses. Beyond that, he examined a larger number of fetuses not derived from dead women.²⁷ Included among these was the one identified by Dr. Eisenbud as having an unusually high concentration of radioactive iodine in its thyroid.

The primary defect in the Sternglass thesis is that it leaps to a general conclusion on the basis of unusual data from one specimen. But that is not its only defect. By showing that iodine-131 levels in its random sampling of corpses was higher than one might normally expect for the general population, Eisenbud's study may possibly have demonstrated that nuclear weapons testing is dangerous to human health. But it did not provide any scientific basis whatsoever for judging the relative susceptibility of thyroids of different ages to the concentration of radioactive iodine. This is because Eisenbud and his colleagues had no way of knowing how much radioactive iodine had been ingested by either their dead subjects or the formerly pregnant women whose fetuses they examined.²⁸ That is not surprising because, for their purposes, this information was not important. In contrast, the

²⁵Eisenbud, Mochizuki, and Laurer, *I¹³¹ Dose to Human Thyroids in New York City From Nuclear Tests in 1962*, 9 HEALTH PHYSICS 1291 (1963).

²⁶*Id.* at 1297.

²⁷See *id.* at 1294-95.

²⁸We note parenthetically, although we reached our conclusion independently of it, that one of the scientific articles not in the record, which were urged upon us as authority for intervenors' position in their proposed findings and conclusions (referred to at p. 23 of their brief), states:

We are aware of the fact that the I¹³¹ intake from fall-out is not constant . . . ,

* * * * *

It does seem evident, however, that all fetal and maternal factors which might affect the concentration of I¹³¹ by the fetal thyroid gland appear to be dwarfed in their significance by variations in the concentration of I¹³¹ in fall-out.

Beirwaltes, Crane, Wegst, Spafford, and Carr, *Radioactive Iodine Concentration in the Fetal Human Thyroid Gland from Fall-out*, 173 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1895 at 1898 and 1901 (1960).

Moreover, the underlying Eisenbud article, which presents the detailed data of his study (n. 25, *supra*, Figure 1 at 1292), shows that the iodine-131 content of the fresh milk sampled in New York City varied by as much as a factor of four or five on given dates. Such variations, together with variations in the amounts of milk and cottage cheese consumed by the pregnant women, could have produced great variations in the concentrations of iodine-131 in different fetal thyroids.

Evans study (which was tendered by the applicant)²⁹ administered known doses of radioactive iodine to pregnant women and, thereafter, measured the percentage of the iodine's uptake in the fetal thyroid. Thus, unlike that of Eisenbud, this study provides us with appropriate experimental data.

In response, Dr. Sternglass testified that the results of the Evans study support the thesis presented in his testimony.³⁰ That is simply not so. The highest percentage of iodine uptake for a fetus in the Evans study was 8.33% per gram.³¹ Peak radioactive iodine uptake by an infant shown in representative values from eight other studies selected by the Evans group is 25% per gram.³² At birth, it is much higher than that—40% per gram.³³ The Evans study thus supports the Licensing Board's finding that the infant thyroid is the one most susceptible to concentration of radioactive iodine.³⁴

Intervenors assert that the Eisenbud study "is the most probative evidence because based on low-level exposures, rather than higher level therapeutic doses."³⁵ But the Book and Goldman survey (Staff Exhibit 3-9) points out that the data from the scientific literature indicate that fetal/maternal ratios of thyroid iodine-131 concentration are generally higher after administration of a single dose to the mother than they are during chronic exposure.³⁶ Thus, it is conservative to rely on single-dose studies to assess the ability of the fetal thyroid to concentrate iodine-131 received over a long period of time from the routine emissions of a nuclear power plant.

In their proposed findings of fact and conclusions of law submitted below, which, as we have stated,³⁷ are urged upon us on appeal, intervenors

²⁹Applicant's Exhibit 3-10, Evans, Kretzschmar, Hodges, and Song, *Radioiodine Uptake Studies of the Human Fetal Thyroid*, 8 JOURNAL OF NUCLEAR MEDICINE 157 (1967).

³⁰Tr. 7135.

³¹Specifically, fetus number 16, 20 weeks old. This conclusion is derived from our own calculations based upon the data in Table 1 at pp. 162-63 of Applicant's Exhibit 3-10. This peak fetal uptake is inconsistent with the peak fetal uptake of 5% per gram plotted in Figure 2 at p. 161. Since we cannot explain the inconsistency, we have followed the conservative course of taking the higher value.

³²*Id.*, Figure 2 at 161.

³³*Ibid.* The very high rate for the newborn infant lasts for only 3 or 4 days. *Id.* at 160.

³⁴Applicant also placed in evidence a second study. Applicant's Exhibit 3-9, Dyer and Brill, *Fetal Radiation Dose from Maternally Administered ⁵⁹Fe and ¹³¹I*, in SIKOV AND MAHLUM, *RADIATION BIOLOGY OF THE FETAL AND JUVENILE MAMMAL* 73 (AEC Div. of Technical Information 1969). That study, though much more limited and not in itself probative on the issue in question, yields results that are consistent with those reached by Evans.

³⁵Brief, p. 23.

³⁶Book and Goldman, *Thyroidal Radioiodine Exposure of the Fetus*, 29 HEALTH PHYSICS 874, 875 (1975). Compare Figure 1 at 875 with Figure 2 at 876.

³⁷*Supra*, n. 28.

cited a number of scientific articles which were not introduced into evidence. It is clear that neither we nor a licensing board may base a decision on factual material which has not been introduced into evidence. See Administrative Procedure Act §7(d), 5 U.S.C. §556(e); *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179 at 191 (February 16, 1978). This rule is both traditional and just. It would have been unfair to the parties on the opposite side of the case for the Licensing Board to have given probative weight to extra-record material because that would have deprived them of an opportunity to impeach it by cross-examination or to rebut it with other evidence. For the same reason, we may not rely on it.

Nevertheless, because intervenors have raised an issue of possible importance to public health, we examined those articles. Had that examination created a serious doubt in our minds about the correctness of the decision below, we might well have ordered the record reopened for the taking of supplementary evidence. It has turned out, however, that the articles do not support, let alone establish, intervenors' position. The Beierwaltes study³⁹ suffers from the same infirmity as the Eisenbud study—a lack of information as to the amount of iodine-131 ingested. Like Eisenbud, Beierwaltes was trying to measure the effects of fallout on iodine-131 levels in the human thyroid. We have already quoted his own observations as to how variable the intake of iodine-131 from fallout is.⁴⁰

In their proposed findings,⁴¹ intervenors asserted that “the enormously greater radiation dose received by the small embryonic thyroid when large single doses are administered can damage the early fetal thyroid so severely that it leads to an artificially low iodine uptake immediately after the thyroid gland has begun to function as compared with the studies of Eisenbud and Beierwaltes using the very low environmental doses and dose-rates.” As authority for this thesis, they cited a study by two Swedish scientists, Walinder and Sjöden, of the effects on mouse fetal thyroids of the injection of iodine-131 into pregnant mice.⁴²

We are given no reason by either Walinder and Sjöden or intervenors to assume that the results of a thyroid study involving mice has any application to humans. Beyond that, it appears to us that, contrary to intervenors' insistence,⁴² the iodine doses given to the mice were substantially larger

³⁹*Supra*, n. 28.

⁴⁰*Ibid.*

⁴¹Paragraph 66.

⁴²Proposed findings, paragraphs 67 and 68. The article is Walinder and Sjöden, *The Effect of I¹³¹ on Thyroid Growth in Mouse Fetuses*, in SIKOV AND MAHLUM, *RADIATION BIOLOGY OF THE FETAL AND JUVENILE MAMMAL* 365 (AEC Div. of Technical Information 1969).

⁴³Proposed findings, paragraphs 60-66.

(allowing for differences in thyroid mass) than those given human fetuses by Evans. Further, it is not true, as intervenors claimed,⁴⁴ that the Walinder and Sjöden study showed experimentally "[t]hat the normal thyroid function and growth and therefore the ability to take up iodine and produce growth hormone is in fact impaired by such large doses. . . ." In point of fact, although that study does show temporary impairment of growth, it does not show any impairment of function. Indeed, speaking of the 7 days immediately following the injection, the study states:⁴⁵

The cells were able to synthesize colloid more or less to the same extent as the unirradiated cells, which was an indication that the functional activity of the epithelium had not been appreciably affected by the radiation.

For all the above reasons, we find that the Licensing Board was correct in finding (in paragraph 88 of its opinion) that the infant is the critical member of the population for the purpose of estimating the maximum thyroid dose from radioactive iodine releases pursuant to Section II.C of Appendix I.

E. The Runoff Pathways

In paragraphs 80 to 81 of its opinion,⁴⁶ the Licensing Board stated:

80. The intervenor did not perform a complete methodical radiological dose analysis for the gaseous effluent-runoff-water-human pathway. Such calculations were made by both the Applicant and the Staff. The results of the Applicant's calculations* indicate that this pathway would contribute less than one-tenth of one percent to the total body population dose and four-tenths of one percent to the thyroid population dose due to gaseous effluents.

* The Applicant performed several conservative dose calculations. Earlier in response to an interrogatory from the State, the Applicant calculated doses assuming that all of the gaseous effluents deposited within a 50-mile radius of the plant reached the Cumberland River with no radioactive decay. Later after Appendix I was promulgated and Regulatory Guide 1.111 was issued, the Applicant calculated doses assuming that 10% of the gaseous effluents deposited appeared as runoff at one point, *i.e.*, at the plant.

⁴⁴Proposed findings, paragraph 67:

⁴⁵RADIATION BIOLOGY OF THE FETAL AND JUVENILE MAMMAL, *supra*, n. 41 at 368.

⁴⁶5 NRC at 1101-02.

81. The Staff performed even more conservative calculations, assuming that 100 percent of the radioiodines and radioparticulates in the gaseous source term were placed directly into the discharge of the liquid stream at the plant. The resulting 50-mile population dose increased from 0.28 total body man-rem to 1.16 total body man-rem. [Other footnotes omitted.]

It added, in paragraph 89:⁴⁶

Further, the Board finds that the Applicant and Staff have adequately assessed the effect of radiological releases from the plant and are not likely to have significantly underestimated the probable resulting radiological doses to the population within 50 miles of the plant.

The intervenors assert (at pp. 19-20 of their brief) that the record contains "no explanation of the basis or adequacy of the models used by the Applicant or Staff to support their conclusions as to increased doses from the neglected [*i.e.*, the air-water and air-land-surface water] pathways, and the Licensing Board erred in not obtaining such proof before ruling on compliance with Appendix I dose guidelines." We consider these points *seriatim*.⁴⁷

The applicant's assumption that there would be a 10% runoff of gaseous effluents is consistent with the testimony of Dr. Sternglass. The latter's written testimony⁴⁸ was that the runoff would average between 4% and 12% for the Appalachian region in which the plant site is located, and his oral testimony estimated it at 5% to 10%.⁴⁹ As applicant's assumption is at the high end of the range predicted by Dr. Sternglass, intervenors are not in a position to question its conservatism. Another reason to find applicant's calculations conservative is that they took no credit for radioactive decay between the time of deposition and the runoff to the river.⁵⁰

Moreover, there is a great deal of evidence in the record showing the basis for applicant's calculations of radionuclide doses from the runoff

⁴⁶*Id.* at 1103.

⁴⁷Applicant contends that intervenors may not challenge these dose calculations because they filed no exceptions to the findings made in paragraphs 80 and 81 of the Licensing Board's opinion. This argument is frivolous. Paragraphs 80 and 81 merely state that applicant and staff made the calculations and set forth their most crucial results. Intervenors do not disagree that the calculations were made and that they yielded the results indicated. What they do contest is the finding in paragraph 89 of the decision below that the dose calculations are adequate and "are not likely to have significantly underestimated" the probable doses. Intervenors' exceptions 7 and 8 clearly state their position in this regard.

⁴⁸Following Tr. 6841 at p. 2.

⁴⁹Tr. 6848.

⁵⁰Tr. 6686.

pathways. Its witness, Dr. Wilkie, testified that the calculations were made by using a model consistent with Regulatory Guide 1.111.³¹ The amounts of the gaseous releases of radionuclides from the plant which were used by applicant in the calculations were shown in Table D.4-1 of Appendix C to the PSAR, Amendment 27.³² Page D.4.c of Appendix C to the PSAR, Amendment 27, sets forth the basis for the gaseous releases listed in Table D.4.-1. Intervenor's cross-examination and the Board's questioning of Dr. Wilkie on applicant's calculations spans some 130 pages of transcript.³³

There was thus sufficient evidence to enable the Board below to determine the adequacy of the mathematical models used by applicant for calculating the radiological doses from the pathways alleged to be crucial by intervenors. However, there remains the question whether intervenors were afforded enough opportunity to inquire into the components of the model.

In the course of his lengthy cross-examination of Dr. Wilkie, intervenors' counsel asked him if he could produce the calculations underlying his projection of cesium-137 doses.³⁴ Dr. Wilkie replied that it would require a "lot of work" to retrieve those calculations from the computer materials but that it could be done.³⁵ Intervenor's counsel then asked the Board to require the applicant to produce the calculations and to file them as an exhibit. Counsel for applicant objected.³⁶ The Licensing Board denied the motion, subject to the right to renew it after cross-examination of the staff's witnesses on radiological doses.³⁷ At the end of the hearing, the motion was renewed and denied.³⁸ In oral remarks during the hearing, the Licensing Board Chairman suggested two reasons for the denial.

The first reason was that the calculations would not aid intervenors in demonstrating that applicant's dose estimates were erroneous or, stated alternatively, would not "help the Board" in deciding this question.³⁹ This

³¹Tr. 6685, 6686.

³²Tr. 6690-a to 6691, 6695-97.

³³Tr. 6684-6814.

³⁴Tr. 6759-60.

³⁵Tr. 6760.

³⁶Tr. 6759, 6762-63.

³⁷Tr. 6767.

³⁸Tr. 7361. Ordinarily, we do not review procedural rulings from which no appeal has been taken. *Boston Edison Co.* (Pilgrim Nuclear Power Station, Unit 1), ALAB-231, 8 AEC 633-34 (1974). And intervenors did not specifically complain about this ruling in their brief. However, we have decided that we should consider its correctness because of its close relationship to the argument made in intervenors' brief (at pp. 19-20) that the Licensing Board erred in not obtaining proof of the facts or adequacy of the models used by applicant "to support their conclusions as to increased doses from the neglected pathways." It would have been better practice, of course, for intervenors to have made specific complaint about the ruling, and parties to future appeals should not rely on our generosity manifested here in construing an argument broadly.

³⁹Tr. 6761-62, 7361.

makes no sense. It is obvious that calculations may reveal errors in producing a mathematical estimate. And applicant's argument that the calculations would not support the theory advanced by Dr. Sternglass⁶⁰ is completely beside the point. Intervenor had put into issue the validity of the radiological dose estimates of the applicant.⁶¹ And Dr. Sternglass, in his written testimony, "concentrated primarily on cesium-137" to demonstrate the falsity of those estimates.⁶² Whether or not the Board was to accept Dr. Sternglass' own methodology for calculating doses, it had to decide whether the doses calculated by applicant were adequate.⁶³ Thus, applicant's calculations of the cesium-137 dose were unquestionably relevant to intervenors challenge of applicant's dose estimates.

The precise dimensions of the second reason suggested by the Chairman of the Licensing Board for denial of the motion⁶⁴ are not entirely clear to us. As best we can understand it, however, an essential ingredient of that reason was that intervenors had the burden of establishing through their own expert witnesses the validity of their contention that the dose analyses were inadequate. But we long ago held that the Commission's rules do not "preclude an intervenor from *building its case defensively*, on the basis of *cross-examination*." *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 2), ALAB-137, 6 AEC 491, 504-05 (1973); *accord*, *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-226, 8 AEC 381, 389 (1974); see *Maine Yankee Atomic Power Co.* (Maine Yankee Atomic Power Station), ALAB-161, 6 AEC 1003, 1018-19 (1973).

In light of these considerations, it was error for the Licensing Board to have denied intervenors' motion for production of the applicant's cesium-137 dose calculations, thereby unduly limiting the scope of their cross-examination.⁶⁵ It follows that it was error for the Licensing Board to have relied on applicant's dose estimates without first permitting this information to be elicited.

Nevertheless, the Licensing Board's ultimate finding of compliance with Appendix I design objectives⁶⁶ may stand, provided there was sufficient evidence in the record to justify the Board's reliance on the generally higher

⁶⁰Tr. 6764.

⁶¹See paragraph 70 of the decision below, 5 NRC at 1099.

⁶²Tr. 6844.

⁶³See paragraph 89 of the decision below, 5 NRC at 1103.

⁶⁴Tr. 6761-62.

⁶⁵We need not consider whether the Licensing Board might have been justified in denying the motion as a matter of discretion in its role in regulating the course of the hearing. See, e.g., *Illinois Power Co.* (Clinton Power Station, Unit Nos. 1 and 2), ALAB-340, 4 NRC 27, 32-36 (1976). We cannot affirm an action as within the proper limits of the Board's discretion when the record does not indicate that it considered any discretionary factors.

⁶⁶Paragraph 97 of its opinion, 5 NRC at 1105.

and more conservative dose estimates made by the staff.⁶⁷ We hold that there was. The staff's worst-case analysis of radiological doses from gaseous effluents which may find their way into the surface water was explained by staff witness Britz at Tr. 6900-01. The staff's basic methodology is explained in Chapter 11 of Supplement No. 1 to the Safety Evaluation Report. The calculated source terms are set forth in Table 11.2 of that chapter. Our examination of this evidence convinces us that the staff's dose estimates for the runoff pathways were reasonable. In this connection, that portion of intervenors' extensive cross-examination of Mr. Britz⁶⁸ which was directed to those estimates did not disclose any infirmity in them.⁶⁹

II. PROTECTION OF AN ENDANGERED SPECIES OF MUSSEL

In April 1976, the Licensing Board issued a partial initial decision authorizing the issuance of a limited work authorization.⁷⁰ That decision dealt with environmental and site suitability issues. In September 1976, TVA discovered that members of the species *Lampsilis orbiculata*, commonly known as the pink mucket pearly mussel, were living on a bed in the Cumberland River at the originally proposed location of the diffuser for the Hartsville plant.⁷¹ On June 1, 1976, the Director of the Fish and Wildlife Service, acting under a delegation of authority from the Secretary of the

⁶⁷The Board accepted those estimates in paragraph 89 of its opinion. 5 NRC at 1103. That they were higher (except for the estimate of beta radiation dose in the air) can be seen from a comparison of Table 1 of the written testimony of Ernest A. Belvin, Jr., *et al.*, following Tr. 6601, with Table 11.4 of Supplement No. 1 to the Safety Evaluation Report. That they were more conservative is apparent from paragraphs 80 and 81 of the opinion below. 5 NRC at 1101-02, pp. 353-354, *supra*.

⁶⁸Tr. 6912-44.

⁶⁹Dr. Sternglass testified as to his concern that a large deposition of radioactive materials (especially particulates) would occur in the area surrounding the plant because of mixing of the gaseous effluents with the water vapor from the cooling towers. Tr. 6862-64. Intervenors did not press this argument on appeal. Perhaps the reason for that was that staff witness Britz thereafter testified that, because the gaseous releases are at ground level and the water vapors are released at the tops of the towers, intermixture of the two cannot occur until after the large heavy droplets have dropped out of the plume, and there will be much less adhesion of gaseous effluents to the small water droplets due to their individually smaller surface area. Tr. 6904. This testimony accords with our understanding of the physical principles involved.

⁷⁰LBP-76-16, 3 NRC 485, *aff'd in part and rev'd in part*, ALAB-367, 5 NRC 92 (January 25, 1977).

⁷¹P. 1 of *Mussel Fauna of the Cumberland River in Tennessee (September 1976)*, which is attached to TVA's letter to the staff dated November 26, 1976. The letter and enclosures are marked Applicant's Exhibit 3-7. TVA's letter to the staff of February 15, 1977, was erroneously marked with the same exhibit number. Our use of that number will refer to the earlier letter, unless otherwise indicated.

Interior, had designated this species of mussel an endangered species pursuant to Section 4 of the Endangered Species Act, Public Law 93-205, 16 U.S.C. §1533.⁷²

Section 7 of the Endangered Species Act provides:

The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to Section 4 of this Act and by taking such action necessary to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical.

After learning of the presence of the endangered mussel, applicant sought the Interior Department's comments on four alternatives for location of the diffuser.⁷³ Those comments were given in a letter dated February 4, 1977.⁷⁴ One of the alternatives was to build it approximately 600 feet downstream of the mussel bed.⁷⁵ Interior opined that this was the best of the stated alternatives and that, if it were pursued, consultation pursuant to Section 7 of the Act would not be necessary.⁷⁶ Interior's comments with respect to the other three alternatives were tentative but unfavorable, and applicant subsequently abandoned them.⁷⁷

On February 15, 1977, TVA submitted to the staff (with copies to the Interior Department) additional information about the mussel bed and a new alternative proposal for locating the diffuser pipe upstream of the mussel bed in a 300-foot open area between the bed and Dixon Island.⁷⁸ So far as the record indicates, the Interior Department never sent any written comments to TVA on the upstream location, and at least as of February 28,

⁷²41 Fed. Reg. 24062-64.

⁷³See Applicant's Exhibit 3-7.

⁷⁴Applicant's Exhibit 3-8.

⁷⁵*Hartsville Nuclear Plants: Environmental Evaluation—Plant Discharge Diffuser*, which is part of Applicant's Exhibit 3-7, at p. 5.

⁷⁶Applicant's Exhibit 3-8, p. 1.

⁷⁷*Ibid*; paragraph 103 of the opinion below, 5 NRC at 1107.

⁷⁸Letter of February 15, 1977, from TVA to the staff, marked Applicant's Exhibit 3-7. "Diffuser discharge would occur in the deeper area of the river (opposite shore or left bank area) and the mussel bed would be outside the diffuser mixing zone." *Ibid*.

1977, TVA had not made a formal request for consultation with respect to it, under Section 7 of the Act.⁷⁹

In response to our inquiry respecting the status of the submission of the upstream location for approval by the Interior Department, TVA's general counsel advised by letter dated November 23, 1977, that:

The Department of the Interior has not taken a position regarding the location of the plant discharge system. Since the issuance of the initial decision TVA has been preparing a definitive report for use by DOI in its consideration of this matter. The report will be submitted to DOI in the near future. Design and construction effort on the affected parts of the discharge system is being delayed by TVA pending a decision on the location of the discharge system in the river.

There has been no correspondence between TVA and DOI concerning this matter that postdates the hearing on this issue.

By letter dated November 28, 1977, we requested counsel for TVA to provide us with a copy of the report referred to in his letter, "at such time as that report is submitted to the Department of Interior." We also indicated our desire "to be promptly informed of any decision reached by that Department with regard to the location of the discharge system for the Hartsville facility." We have yet to receive either the report or a decision from Interior.

During the course of the hearing, the Licensing Board admitted a new contention submitted by the intervenors which stated that routine releases of radioactivity from normal operation of the Hartsville plant would harm the *Lampsilis orbiculata* found in the area proposed for the diffuser.⁸⁰ After evaluating the evidence, the Board found that these releases "will not produce significant adverse effect on the mussels in the Cumberland River."⁸¹ It added:⁸²

The Board finds that the downstream location is an environmentally acceptable alternative. The record is not complete with respect to the upstream location because the Department of Interior has not

⁷⁹Tr. 6331-33.

⁸⁰Opinion below, paragraph 105, 5 NRC at 1107. The contention also alleged that the releases would endanger other rare species of mussel in that location. However, as these have not been designated as endangered species by the Interior Department, damage to them is not an issue under the Endangered Species Act. To the extent, if any, that intervenors' appeal encompasses the findings as to all the species of mussel under the National Environmental Policy Act (see the extremely sketchy remarks at pp. 24-25 of their brief), we affirm on the basis of Part III. C of the opinion below, 5 NRC at 1106-08.

⁸¹Opinion below, paragraph 110, 5 NRC at 1108.

⁸²*Id.*, paragraph 111, 5 NRC at 1108.

approved the upstream location. If the Department of the Interior had approved the upstream location, the Board would have found it an acceptable location. Hence, the Board finds the upstream location is also acceptable provided that it is approved by the Department of the Interior.

A. The Legal Standard

Intervenors assert that the Licensing Board erred in not applying the correct legal standard which, they say, is that there must be "clear and convincing proof that the actions authorized...do not jeopardize the continued existence of any endangered species." It is beyond dispute that Section 7 of the Endangered Species Act requires Federal agencies to take "such action necessary to insure that actions authorized...by them do not jeopardize the continued existence of such endangered species...." What intervenors have failed to establish is that the Licensing Board's decision is inconsistent with that statutory standard. It seems obvious to us that radiological releases which "will not produce significant adverse effect on the mussels" will not jeopardize their continued existence. The law attaches no magical significance to the incantation of a special phrase. Intervenors' argument that the Act requires a finding that the radiological releases will not have *any* adverse effect on the mussels is without merit. Insignificant effects are not proscribed by the statute.

Moreover, intervenors cite no support (and we find none) for the proposition that evidence of nonjeopardy must be "clear and convincing," whatever that may mean. Absent some special statutory standard of proof, factual issues decided by this or any other Federal agency are determined by a preponderance of the evidence. *Charlton v. FTC*, 543 F.2d 903, 907 (D.C. Cir. 1976); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 405, n. 19 (1976); *Consolidated Edison Co.* (Indian Point Station, Unit No. 2), ALAB-188, 7 AEC 323, 356-57 (1974).

B. The Expertise of Applicant's Witnesses

The Licensing Board found that intervenors' witnesses did not have "expertise in the effects of radiation on mussels."¹³ It implied that applicant's witnesses on that subject did have expertise in the matter.¹⁴ Intervenors explicitly concede "that none of their witnesses were experts [*sic*] in

¹³Paragraph 106, 5 NRC at 1107-08.

¹⁴Paragraph 107, 5 NRC at 1108.

the effects of radiation on mussels."''' They argue, however, that the same may be said of the witnesses for the other parties.

We disagree. Applicant's witness Dr. B. G. Blaylock was an eminently qualified witness. At the time of his testimony, he was with Oak Ridge National Laboratory where he performed and supervised research primarily on the effect of radiation on aquatic organisms.¹⁶ He has also published extensively on this subject.¹⁷ Although he has neither performed nor supervised research on the effects of radiation on mussels (and for all the record shows, it may be that no one has), he has supervised research on the effects of radiation on a species of aquatic snail.¹⁸ Snails, like mussels, are mollusks, and absent any indication that different varieties of mollusks are differently affected by radiation, the Licensing Board was justified in accepting Dr. Blaylock's premise that the effects of low-level radiation on mussels would not be significantly greater than on snails. None of intervenors' expert witnesses on this subject had expertise anywhere near as relevant as that of Dr. Blaylock.¹⁹

C. Nonradiological Effects and Location of the Discharge Diffuser

Intervenors take the position that, even though their contention on mussels only addressed harm that might flow from radiological releases from the plant, the Licensing Board had an independent obligation under Section 7 of the Endangered Species Act to consider all possible adverse effects upon the mussels stemming from the construction or operation of the plant. They are plainly correct. By its express terms, Section 7 obligates the Commission to insure that the actions it authorizes do not jeopardize the continued existence of an endangered species. It does not matter what the source of the jeopardy might be. And the section may not be reasonably interpreted to limit the scope of the Commission's duty to resolving contentions raised by the parties. Once informed that an endangered species lived in the vicinity of the plant, the Licensing Board was obligated to examine all possible adverse effects upon the species which might result from construction or operation of the plant and to make findings with respect to them. Its

¹⁶Brief, p. 28.

¹⁷Tr. 7328.

¹⁸See his qualifications following Tr. 7327.

¹⁹Tr. 7335-38.

²⁰See Biographical Sketch of Dr. Ernest J. Sternglass fol. Tr. 6818; Biographical Data for Dr. Zane Spiegel fol. Tr. 6988; Curriculum Vitae of Dr. Harold Rosenthal fol. Tr. 7056; Curriculum Vitae of Dr. Charles W. Huver fol. Tr. 7156; Tr. 7309-13. See also Tr. 6821-28; *Trustees of Columbia University*, ALAB-50, 4 AEC 849, 859 (1972); *Long Island Lighting Co. (Shoreham Nuclear Power Station)*, ALAB-156, 6 AEC 831, 850 (1973).

failure to do so was error. But that error, as it has turned out, is not fatal. As the Licensing Board did admit evidence offered by the applicant and the staff as to nonradiological effects and as the intervenors were not precluded from submitting evidence on that subject,⁹⁰ we are in a position to evaluate it and to make the findings ourselves.

The expert witnesses testified as to three possible sources of adverse effects on the mussels: chlorine, raising of the water temperature, and sedimentation. As for the first, the uncontradicted testimony was that there would not be enough chlorine in the discharged water to be detrimental to the mussels.⁹¹ Danger from the increase in water temperature is also unlikely. No matter which of the two alternate locations for the diffuser is used, it would be located on the deeper side of the river; as the mussel bed is on the shallower side, it will be outside of the mixing zone for the discharged water.⁹² The average temperature rise outside that zone will be 1.6°F, and the maximum rise will be 3.3°F.⁹³ But because the discharged water will be forced upward by the angle of the pipes and the buoyance of the discharge, these higher temperatures should be found in the upper layers of the water and not on the river bottom where the mussels are.⁹⁴ In any event, *Lampsilis orbiculata* is a warm-water species and the small increase in water temperature, even should it occur at the level of the mussel bed, would not harm it.⁹⁵ For these reasons, we find that the endangered species would not be adversely affected by heat from the water discharged through the diffuser.

⁹⁰At one point, intervenors' counsel did ask his own witnesses about the effect of construction activities on the mussels' breeding cycle (Tr. 7159). The Chairman initially sustained an objection to the question on the ground that it went beyond the scope of intervenors' contention. *Ibid.* During the subsequent argument allowed on this objection, however, intervenors' counsel indicated that their interest in sediment was as a "collecting point" for radioactivity (Tr. 7163). In light of that, the Chairman reversed his ruling and said he would permit questions on sedimentation in relationship to radioactivity (Tr. 7164). Intervenors' counsel seemed to acquiesce in that ruling. *Ibid.* Similarly, when one of intervenors' witnesses later said something about erosion from construction activities affecting the mussels and applicant objected to it as going beyond the scope of the contention, intervenors' counsel stated, "I am primarily concerned with the radiological aspects" and neither the objection nor the testimony was pursued (Tr. 7212-13). If they had wanted to preserve a claim of error on this question, intervenors should have insisted clearly on their right to present evidence as to nonradiological effects of construction. As they did not do so, we cannot find that any evidence was improperly excluded.

⁹¹Tr. 6399; cf. written testimony of Charles W. Billups, fol. Tr. 6562 at p. 3; FES, pp. 5-7 to 5-8.

⁹²Written testimony of Billy G. Isom, fol. Tr. 6315 at p. 4.

⁹³Tr. 6375.

⁹⁴Tr. 6376, 6576-77.

⁹⁵Tr. 6359.

The third source, sedimentation, would be occasioned by dredging activities in the course of construction of the diffuser.⁶⁶ The mussels are filter feeders, and although they can remove and dispose of a limited amount of sediment in the river, too much would cause them problems.⁶⁷ The record is not clear as to how much is too much.⁶⁸ Nonetheless, keeping sediment from dredging away from the mussel bed would clearly be a satisfactory practical solution to the problem. Whether that solution will be achieved is necessarily intertwined with the question of where the diffuser will be. We must therefore consider the sedimentation problem in connection with the two alternative locations proposed by the applicant.

It will be recalled that the Licensing Board (in paragraph 111 of its opinion)⁶⁹ approved the downstream location absolutely and the upstream location on condition that it is approved in the future by the Department of the Interior. We will deal first with the approval of the upstream location.

Section 7 of the Endangered Species Act by its terms imposes the same duties upon an agency which authorizes an action, such as this Commission, as it does upon an agency which carries out an action, such as TVA. Since TVA cannot act with respect to construction of a nuclear power plant without our approval, it is our responsibilities under Section 7 which have critical importance in this proceeding. The relationship between the roles of the Interior Department and the "other Federal departments and agencies" referred to in Section 7 was clearly delineated in *National Wildlife Federation v. Coleman*, 529 F.2d 359, 371 (5th Cir.), cert. denied, 429 U.S. 979 (1976):

Federal agencies are required to consult and obtain the assistance of the Secretary before taking any actions which may affect endangered species or critical habitat. However, once an agency has had meaningful consultation with the Secretary of Interior concerning actions which may affect an endangered species the final decision of whether or not to proceed with the action lies with the agency itself. Section 7 does not give the Department of Interior a veto over the actions of other Federal agencies, provided that the required consultation has occurred. It follows that after consulting with the Secretary the Federal agency involved must determine whether it has taken all necessary action to insure that its actions will not jeopardize the continued existence of an endangered species or destroy or modify habitat critical to the existence of the species.

⁶⁶See written testimony of Billy G. Isom, fol. Tr. 6315 at pp. 3-4; written testimony of Charles W. Billups, fol. Tr. 6562 at pp. 2-3.

⁶⁷Tr. 6353-54; written testimony of Charles W. Billups at pp. 2-3.

⁶⁸Compare written testimony of Dr. Billups at p. 2 with his oral testimony at Tr. 6566, 6568-69, and 6573.

⁶⁹5 NRC at 1108.

Accord, Hill v. TVA, 549 F.2d 1064, 1070 (6th Cir.), *cert. granted*, 54 L. Ed. 2d 312 (1977); *Sierra Club v. Froehlke*, 534 F.2d 1289, 1303-04 (8th Cir. 1976). Since TVA had not consulted with Interior Department and obtained its opinion with respect to the upstream location prior to the issuance of the opinion below, the Licensing Board was prohibited by the statute from approving it.

The Licensing Board's endeavor to skirt this difficulty by making its approval conditional on later Interior Department approval does not pass muster. This approach might have been valid if Interior were vested with exclusive jurisdiction over endangered species questions, rather than merely the primary jurisdiction which the courts have held it has. After the Interior Department renders its opinion on the upstream location this Commission will be required, under the above-cited judicial decisions, to make the final decision itself, taking into consideration the views of Interior.¹⁰⁰ To give advance approval to whatever Interior might decide is to abdicate the Commission's duty under the Act to make its own fully informed decision. The approval of the upstream location was therefore error and cannot stand.¹⁰¹

We are left, then, with the question of whether we can affirm the approval of the downstream location. We have already determined that chlorine and the discharge of warmer water into the river will not jeopardize the mussels. And we agree with the finding below¹⁰² that radiological emissions will not harm them. Accordingly, the only remaining Section 7 question with respect to the downstream location, Interior's approval of it having been obtained, is whether sedimentation from construction at that location would jeopardize the continued existence of the species.

At first blush, the question appears to be insubstantial. One would think that turbidity created downstream of the mussel bed would be carried further downstream and not endanger the mussels at all. While this might be true in a pristine river, it is not necessarily true in the Cumberland River. Riverflow at the plant site is controlled by the operation of three hydroelectric dams, one of which is downstream from the site and two of which are upstream.¹⁰³ When the dams are operated (and the testimony indicates that

¹⁰⁰The Commission should also permit the parties to comment on Interior's recommendation and to offer additional evidence in response to Interior's views, if they so desire.

¹⁰¹Apart from the statutory consideration, staff witness Billups said, with regard to the upstream location: "The final line of my testimony is that we need additional information; we need additional analysis; we need additional consultation with the Department of Interior through their Fish and Wildlife Service, who are responsible for the Endangered Species Act." Tr. 6566.

¹⁰²Paragraph 110, 5 NRC at 1108.

¹⁰³Tr. 6373.

they are operated at times of peak demand which occur only in winter and summer), a reverse riverflow occurs.¹⁰⁴ Unfortunately, the record is bereft of evidence as to what extent, during reverse flow, sedimentation which has been stirred up by dredging downstream would flow back and be deposited on the mussel bed. The record does suggest that the risk of harm from sedimentation, especially at a more problematical location upstream, might be obviated by requiring the dredging to be done in the spring or fall when the dams are closed or by requiring the use of a clamshell or bucket dredge.¹⁰⁵ But we are loath to impose conditions along those lines on a downstream location if they are not necessary. We have therefore decided to allow the parties to submit evidence on this question before deciding whether or not to do so.

A related question is how far downstream the downstream location should be. The Licensing Board's opinion lacks precision in this regard. It identifies the downstream location only as being below Cumberland River Mile 284.1,¹⁰⁶ which is the downstream edge of the mussel bed.¹⁰⁷ As earlier noted (p. 358, *supra*), the downstream location presented by applicant to Interior in November 1976, which the latter approved in February 1977, was described as being "approximately 600 feet downstream from the mussel bed. . . ."¹⁰⁸ However, TVA witness Isom stated that the downstream location would be 150 to 200 feet below the mussel bed.¹⁰⁹ That his testimony as to the downstream location was not the result of momentary confusion or a slip of the tongue is indicated by the testimony of TVA engineer Barnett. Mr. Barnett described the downstream alternative as "*up to* 600 feet below the bed,"¹¹⁰ and in testifying as to the cost of the downstream location, he said that TVA had looked at costs for placing the diffuser at various locations ranging from "right at the end of the mussel bed to 600 feet downstream. . . ."¹¹¹ Thus, TVA seems to take the position that it has the option of building the diffuser at a downstream location substantially closer to the mussel bed than 600 feet.

The merits of the issue of how close to the mussel bed the diffuser should be permitted to be depends, for the most part, on to what extent and

¹⁰⁴Tr. 6373, 6589.

¹⁰⁵See written testimony of Charles W. Billups, following Tr. 6562 at p. 3.

¹⁰⁶Paragraph 102 of its opinion, 5 NRC at 1107.

¹⁰⁷See Applicant's letter to the staff of February 15, 1977, the second exhibit marked Applicant's Exhibit 3-7, at p. 1.

¹⁰⁸*Hartsville Nuclear Plants: Environmental Evaluation—Discharge Diffuser*, which is part of Applicant's Exhibit 3-7, at p. 5.

¹⁰⁹Tr. 6345-46.

¹¹⁰Tr. 6377. (Emphasis added.)

¹¹¹Tr. 6378-79.

from what distance reverse flow of the river might carry sediment stirred up by dredging. But there is also a legal consideration which may limit our present authority to determine it. Section 7 of the Endangered Species Act prohibits us from authorizing the construction of the discharge diffuser at a location as to which the Interior Department has not been consulted and about which the Interior Department has not given its views. *National Wildlife Federation v. Coleman, supra*, 529 F.2d at 371. The question, then, is whether Interior approved a site 600 feet downstream from the mussel bed or, instead, one any distance downstream of the bed. In this connection, alternative four, set forth in TVA's November 23, 1976, letter to the Interior Department, assumed a location for the diffuser "approximately 600 feet downstream from the mussel bed." Interior's responsive letter of February 4, 1977, (Applicant's Exhibit 3-8) stated, in reference to the evaluation of four alternative sites submitted to it by TVA:¹¹²

The evaluation discussed four alternatives for construction which were considered viable. It is our opinion that the best alternative would be the last one discussed which would involve the relocation of the diffuser downstream of the mussel bed. Consultation pursuant to Section 7 of the Endangered Species Act of 1973 would not be necessary if alternative four is pursued.

This might reasonably be interpreted to mean that alternative four, specifying a site approximately 600 feet downstream from the mussel bed, was approved in the form in which it was presented by TVA. On the other hand, the Interior Department's description of the approved alternative as that "which would involve the relocation of the diffuser downstream of the mussel bed" might be taken as an indication that Interior approved of any downstream location and that, for it, the distance from the bed was of no importance. Resolution of the question is not insignificant. Applicant's testimony is that the difference in cost between putting the diffuser just below the mussel bed and 600 feet downstream is a million dollars.¹¹³

Because this issue was not contested but rather reviewed by us on our own motion in order to ensure that the Licensing Board had properly carried out its duties under the Endangered Species Act, the parties have not had an opportunity to brief it. As it is a matter of some consequence, we will refrain from deciding it until they have had that opportunity.¹¹⁴

¹¹²See *Hartsville Nuclear Plants: Environmental Evaluation—Plant Discharge Diffuser*, which is part of Applicant's Exh. 3-7, at p. 5.

¹¹³Tr. 6378-79.

¹¹⁴Intervenors also seem to argue that the Licensing Board's decision either constitutes or permits a violation of Section 9 of the Endangered Species Act, 16 U.S.C. §1538, because

(Continued on next page)

III. THE NEED FOR AN INTAKE GRID

In its partial initial decision of April 20, 1976,¹¹⁵ the Licensing Board conditioned "any limited work authorization or construction permit to be issued upon the installation of appropriate grid structures at the intake structure or other means satisfactory to the Staff of physically preventing the involuntary entrainment of a person." In so doing, the Board accepted the position urged by the staff. In ALAB-367,¹¹⁶ we reviewed this requirement on the exceptions of the applicant. After lengthy discussion of the evidence, we reversed on the ground that the record did not show a need for the grid to protect scuba divers, the class of persons which the staff at that time felt might be endangered by the intake pipes.¹¹⁷ But we added:¹¹⁸

Of course, should the staff obtain evidence before the issuance of the construction permit or the operating license that any scuba diving is done on the Cumberland River in the general vicinity of the site and that an intake of this type and velocity would present a hazard to such a diver, it should bring this to the attention of the Licensing Board and the Board could, at that time, reimpose the condition. Indeed, we think it is the staff's duty to investigate this problem further by obtaining the advice of both someone who knows what activities take place at that part of the river and someone who is an expert on scuba diving.

The staff did investigate the matter further, as we asked it to, and apparently decided that a grid was not necessary. Nevertheless, it produced a witness on the subject, thus electing to place the matter before the Licensing Board for its consideration and decision. In its opinion, that

(Continued from previous page)

construction of the power plant will "harm" the *Lampsilis orbiculata* within the meaning of 50 CFR 17.3. It is clear, however, that if we find, under Section 7 of the Act, that no significant adverse effects will accrue to the mussels, they will not suffer "harm" under Section 9. Indeed, the very definition of "harm" in 50 CFR 17.3 limits it to significant effects.

As seen above, we have deferred final resolution of the issue of whether construction of the diffuser at a downstream location would jeopardize the continued existence of the species. However, we have found that operation of the plant will not cause any significant adverse effects upon the endangered mussels. It follows that operation of the plant would not "harm" the mussels within the meaning of 50 CFR 17.3 and therefore would not effect a taking of them within the meaning of Section 9 of the Act. As for construction effects, we must reserve judgment on Section 9, as we have on Section 7.

¹¹⁵LBP-76-16, 3 NRC 485 at 556.

¹¹⁶5 NRC 92 (1977).

¹¹⁷*Id.* at 119-22.

¹¹⁸*Id.* at 122-23.

Board recited briefly our reversal of its prior decision on the intake grid, our admonition to the staff, and the fact that "the Staff presented a witness who is an expert in scuba diving."¹¹⁹ Its discussion ended abruptly at that point.

We find wholly inadequate the Licensing Board's treatment of this subject on remand. With respect to all other issues as to which it received testimony, the Board discussed the evidence and stated its conclusions. Indeed, that is the normal procedure followed by this Commission's licensing boards. 10 CFR 2.760(c) provides in part that an "initial decision will include: (1) Findings, conclusions and rulings, with the reasons or basis for them on all material issues of fact, law, or discretion presented on the record. . . ." This requirement is rooted in the Administrative Procedure Act. 5 U.S.C. §557(c). While the intake grid issue was no longer a contested one, we had stated that the staff should investigate it further and could bring the new evidence it obtained to the attention of the Licensing Board. Once such evidence was presented to the Board, it was the Board's obligation to make findings with respect to it and to set forth its ruling on the question of whether an intake grid is needed.

In the absence of findings by the Licensing Board, we have evaluated the new evidence on our own.¹²⁰ The staff's new witness (Jeremiah Jackson) was a staff engineer with considerable experience as both a free diver and a scuba diver.¹²¹ He testified that sport divers would not be attracted to the bottom of the Cumberland River near the Hartsville site because of poor visibility (a foot or less) and the absence of any unique underwater features or wildlife.¹²² It was his opinion, based on his diving experience, that a diver would have to be either directly in front of an intake pipe or extremely close to it in order to be drawn into it.¹²³ He further testified that, even if drawn into the pipe, because of its relatively low velocity (1.6 to 1.75 feet

¹¹⁹Paragraph 138 of its opinion, 5 NRC at 1115.

¹²⁰In *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 42 (1977), we endeavored to make clear our disinclination "to search the record to determine whether it included sufficient information to support conclusions for which the Licensing Board itself failed to provide adequate justification." Where, as here, the Board below did not set forth even an ultimate conclusion, there is, of course, still less reason why we should embark upon curing the deficiency ourselves, rather than directing a remand for that purpose. Two considerations have prompted us, however, to take on the fact-finding assignment in this instance: (1) the decision below preceded ALAB-422 and (2) no large expenditure of our time is involved.

¹²¹The difference between the two is that the latter uses underwater breathing equipment while the former does not. Written testimony of Jeremiah D. Jackson, following Tr. 6458, p. 5. Mr. Jackson's qualifications appear in the transcript after his written testimony.

¹²²Written testimony, pp. 2-3.

¹²³*Id.*, pp. 4 and 6.

per second) a diver would easily be able to orient himself and swim against the current and out of the pipe.¹²⁴ His ultimate conclusion was that to require "a screen on the intake for diver-safety purposes" would be "unwarranted."¹²⁵

We find Mr. Jackson's testimony persuasive. It is true that he admitted on cross-examination that he had not been aware that mussel fishermen in the Cumberland River sometimes use divers to harvest mussels.¹²⁶ He therefore apparently made no inquiries as to the frequency or exact location of this practice. A report prepared by TVA's Division of Environmental Planning and Division of Forestry, Fisheries, and Wildlife Development in 1976¹²⁷ stated (at p. 3):

Mussels are harvested commercially from boats with the aid of "Crowfoot brails" and SCUBA or other diving apparatus where diving is legal.

SCUBA is now widely used by musselers for commercial harvesting where the law permits.

On the record as it exists, therefore, we must assume that it is possible that commercial musselers might dive to the mussel beds near the Hartsville site. However, even if this is true, we do not believe that an intake screen is required.

Our reasons are twofold. First, there is no suggestion in the record that the intake pipes will be located in a mussel bed. Due to the presence of the endangered species, applicant would be taking serious risks if it attempted to locate them there without telling the adjudicatory boards of this Commission. Commercial musselers know where the mussel beds are;¹²⁸ thus, it is reasonable to assume that, if there are none at the mouths of the intake pipes, they will not dive there. Secondly, even if an occasional musseler were to do so, Mr. Jackson's testimony, considered together with the earlier testimony taken on this subject in December 1975,¹²⁹ convinces us that they would not be in any serious danger from the pipes. We therefore find that

¹²⁴*Id.*, pp. 5-6.

¹²⁵*Id.* at 6.

¹²⁶Tr. 6460-61.

¹²⁷*Mussel Fauna of the Cumberland River in Tennessee (September 1976)*, which is part of Applicant's Exhibit 3-7.

¹²⁸See Tr. 6338.

¹²⁹See ALAB-367, 5 NRC 92, 121, n. 166, and 122 (1977).

the new evidence confirms our prior view that a screen at the mouth of each intake pipe is not necessary for the protection of divers.

IV. MISCELLANEOUS MATTERS

Intervenors complain that the Licensing Board's conclusions respecting adequacy of the plant's design and completion of the safety review of the application are erroneous because Appendix I has not been complied with. Since we have ruled against intervenors on their Appendix I arguments, this assertion of error must fall as well.

Intervenors assert that the Licensing Board's findings under the National Environmental Policy Act are in error because the cost of compliance with Appendix I and the Endangered Species Act has not as yet been ascertained. Our resolution of the Appendix I and endangered species issues against intervenors makes clear that there are no costs involved in such compliance beyond those known and considered by the Licensing Board.

Intervenors, at pp. 30-31 of their brief, merely advert to their exceptions 15 and 20 through 24 without making any argument in support of them. As we recently stated in *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-461, 7 NRC 313, 315 (March 1, 1978):

We have observed before that briefs are necessary to "flesh out" the bare bones of the exceptions, not only to give us sufficient information to evaluate the basis of objections to the decisions below, but also to provide an opponent with a fair opportunity to come to grips with the appellant's arguments and attempt to rebut them. The absence of a brief not only makes our task difficult, but by not disclosing the authorities and evidence on which the appellant's case rests, it virtually precludes an intelligent response by appellees. For these reasons we generally follow the course charted by the Federal courts and disregard unbriefed issues as waived. We do so here. [Footnotes omitted.]

The fact that intervenors adverted to paragraphs 15-107 of their proposed findings and conclusions in support of exception 24 does not save that exception. We have held that a mere statement of reliance upon proposed findings and conclusions does not satisfy the requirement contained in 10 CFR 2.762(a) that a brief in support of exceptions be filed. *Public Service Electric and Gas Co.* (Hope Creek Generating Station, Units 1 and 2), ALAB-394, 5 NRC 769 (1977).

The Licensing Board's approval of the upstream location for the discharge diffuser, on the condition that it is approved by the Department of the Interior, is *reversed*. If the applicant consults with the Department of the Interior with respect to the upstream location and receives the Department's views with respect to it, applicant may then, if it so desires, petition the Licensing Board for approval of that location. If such a petition is filed, the Licensing Board shall treat it in accordance with the principles enunciated in this opinion but shall take into account any future decisions of the Federal courts under the Endangered Species Act.¹³⁰

We *reserve decision* as to the correctness of the Licensing Board's approval of the downstream location for the discharge diffuser. In accordance with what we have stated above, the parties may submit—

- (1) briefs on the question of how far downstream from the mussel bed the discharge diffuser must be situated; and
- (2) written, sworn testimony on the extent of the danger to the mussels from sedimentation resulting from dredging for construction of the discharge diffuser at possible locations downstream of the mussel bed, during periods of reverse or zero riverflow.

These submissions are to be served and filed by April 17, 1978. Each party will have 10 days from the date of service of the testimony of another party (plus 3 days if service was by mail) in which to request cross-examination. If a party is of the view that a supplemental oral hearing on this issue is not necessary, it may accompany the submission of its written evidence with a motion for summary disposition pursuant to 10 CFR 2.749. If such a motion is made, responses by other parties will be due 21 days thereafter (24 days if service was by mail).

In all other respects, the initial decision is *affirmed*.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹³⁰As noted above, at p. 364, Supreme Court review of *Hill v. TVA*, 549 F.2d 1064 (6th Cir. 1977) is pending.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Richard S. Salzman, Chairman
Michael C. Farrar
Dr. W. Reed Johnson

In the Matter of

Docket No. 50-484

**NORTHERN STATES POWER
COMPANY, et al.**

(Tyrone Energy Park, Unit 1)

March 17, 1978

Upon exceptions to the Licensing Board's partial initial decision on environmental matters (LBP-77-71, 6 NRC 1232 (1977)), and upon review *sua sponte* of the partial initial decision concerning radiological health and safety (LBP-77-30, 5 NRC 1197 (1977)), the Appeal Board affirms, but remands the case to the Licensing Board to determine whether the applicants' financial and technical qualifications were affected by changes in co-applicants' relationships and shifts of their key employees (occurring after the second decision under review).

The staff's motion to withdraw its exception on the effects of radon releases under Table S-3 is granted, subject to the parties' right to move to reopen if the Commission makes the subject of radon releases litigable in individual licensing proceedings.

CONSTRUCTION PERMIT PROCEEDING: EFFECT OF CONCURRENT STATE PROCEEDING

Determination of requirements of State law is a matter for the State regulatory commission and not the NRC. *Cleveland Electric Illuminating Co.* (Perry, Units 1 and 2), ALAB-443, 6 NRC 741-48 (1977).

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL AND TECHNICAL QUALIFICATIONS)

Changes in the legal relationships of co-applicants and shifts in the

responsibilities of key employees bear on the applicants' financial and technical qualifications to build a nuclear plant and warrant consideration by a licensing board. *Public Service Co. of Indiana* (Marble Hill, Units 1 and 2), ALAB-461, 7 NRC 313, 317-319 (1978).

TECHNICAL ISSUES DISCUSSED: Table S-3, Radon-222.

Messrs. Gerald Charnoff, Thomas A. Baxter, and John H. O'Neill, Jr., for the applicants, Northern States Power Co. and others, *appellees*.

Mr. Thomas Galazen, Eau Claire, Wisconsin, for intervenor Northern Thunder, *appellant*.

Messrs. Stephen H. Lewis, Barry H. Smith, and Richard C. Browne for the Nuclear Regulatory Commission staff.

DECISION

1. Northern States Power Company and four other electric utilities¹ jointly applied for leave to build a nuclear-powered generating station of a standardized design² in Dunn County, Wisconsin. The proposed site is near the Minnesota border and is known as the Tyrone Energy Park. The joint application was referred in due course to a licensing board for a hearing. Individuals and organizations opposed to the plant were permitted to in-

¹The other utilities joining in the application are Northern States Power Company of Wisconsin (a subsidiary of Northern States Power Company), Cooperative Power Association, Dairyland Power Cooperative, and Lake Superior District Power Company.

²As described by the Licensing Board (5 NRC at 1023-24):

The application is one of four concurrently filed applications submitted under the Commission's standardization policy by five utilities which have formed for that purpose the Standardized Nuclear Unit Power Plant System ("SNUPPS"). These applications were filed pursuant to the Commission's "Duplicate Plant" concept, whereby one or more utilities may submit individual construction permit applications which reference, for the technical information pertaining to design specified in 10 CFR §50.34, a single document describing the design of the reactors which are to be constructed and operated at the various sites. This concept permits the simultaneous review of the safety-related parameters of the duplicate plants. (Footnotes omitted.)

tervene by the Board below,³ which also granted the State of Wisconsin leave to participate in the proceedings as an "interested State" under 10 CFR §2.715(c).

After completing the hearings, the Licensing Board rendered two decisions. In the first, the Board covered the radiological health and safety questions and reached conclusions favorable to building the plant. LBP-77-30, 5 NRC 1197 (1977). No exceptions to this partial initial decision were filed, and we elected to defer our review of it until the Board had disposed of the whole case. The Board's second decision covered the remaining issues, which were largely environmental. On the basis of the whole record made before it, the Board below concluded that permission to build the plant was warranted and authorized the Director of Nuclear Reactor Regulation to issue a construction permit. LBP-77-71, 6 NRC 1232 (1977). One intervenor, Northern Thunder, challenges aspects of the Board's second decision and the authorization of the construction permit. The staff filed one exception, which it has moved to withdraw.

2. We have scrutinized the Licensing Board's rulings and decisions with the objections of Northern Thunder and the staff in mind. Additionally, we have followed our standard practice and have reviewed the unchallenged portions of those decisions for substantive error. We are satisfied that the Board's comprehensive and reasoned opinions and rulings accord with the weight of the evidence and harmonize with the governing law and regulations. Only two matters merit our brief attention.⁴

3. On March 6, 1978, after the Licensing Board rendered its second decision, the Wisconsin Public Service Commission issued an order prohibiting Northern States Power Company, a Minnesota corporation, and the

³The parties that intervened in opposition to the plant were Citizens for Tomorrow, Minnesota Pollution Control Agency, Mr. Stanley Cider for himself and the Village of Tyrone, Wisconsin, Ms. Helen M. Kees, Citizens Against Unsafe Sources of Energy, and Northern Thunder (formerly Eau Claire Area Ecology Action). Some of these parties did not actually participate and were later dismissed from the proceeding for that reason.

⁴The exceptions not addressed by us are denied for reasons that are explained in the opinion and rulings below and need no enlargement on our part. A brief comment is in order on Northern Thunder's complaint that the Licensing Board erred in not acting on its motion to reopen the environmental hearings. That motion was mailed before but received by the Board after it had rendered its final decision. The Board ruled on January 10, 1978, that it would deny Northern Thunder's motion to reopen but for its belief that it lacked jurisdiction to take any action (see 10 CFR §2.718(j)). In the circumstances, we pass the jurisdictional question (but see 10 CFR §2.712(d)(3)) and turn to the merits. In light of its failure to demonstrate both that the "new" evidence was unavailable before the hearing closed and is of such character that, if considered, would be likely to produce a different result, intervenor presented no reason to reopen the hearings. *Northern Indiana Public Service Co.* (Bailey Generating Station), ALAB-227, 8 AEC 416, 418 (1974).

Cooperative Power Association, also Minnesota based, from constructing the Tyrone facility. In the eyes of the Wisconsin commission, these are "foreign corporations" and may not lawfully undertake such activities in Wisconsin. Applicants' counsel advised us and the other parties by letter dated March 8th that, while he disagrees with the Public Service Commission's reading of Wisconsin law, applicants will not appeal. Instead, they will conform to the State commission's ruling, essentially by transferring legal ownership of the facility to the Wisconsin subsidiary and by adopting such other measures as a shift of certain employees to that company in order to comply with that ruling.

The requirements of State law are beyond our ken; such matters are for the State regulatory commission. See *Cleveland Electric Illuminating Co.* (Perry, Units 1 and 2), ALAB-443, 6 NRC 741-48 (1977). But changes in the legal relationships of co-applicants and shifts in the responsibilities of their key employees bear on the utilities' financial and technical qualifications to build the nuclear plant. These are matters of some importance and warrant the remand of this issue to the Licensing Board for evaluation of the new arrangements. See *Public Service Co. of Indiana* (Marble Hill, Units 1 and 2), ALAB-461, 7 NRC 313 at 317-319 (March 1, 1978) (petitions for Commission review pending on other grounds).

4. The staff initially excepted to the fact that the Licensing Board, in evaluating the environmental consequences of the nuclear fuel cycle, used the radon (Rn-222) radiation release value given in Table S-3 of 10 CFR Part 51. Affidavits accompanying the staff's brief in support of its exception purported to demonstrate that the radon releases attributable to the mining and milling of uranium are greater than given in that table, albeit not significant.

The staff has since moved for leave to withdraw its exception in light of our subsequent holding (in another case) that Commission regulations, which are not open to challenge in individual licensing cases, mandate use of the values in Table S-3.¹ More recently still, the Commission has itself acknowledged that the radon release figure in Table S-3 is too low; it has taken under advisement a staff recommendation that "Table S-3 be amended to remove the value for radon releases and that the subject of radon releases and associated health effects be declared litigable in all individual licensing proceedings." *Metropolitan Edison Co.* (Three Mile Island, Unit 2), CLI-78-3, 7 NRC 307, 309 (March 2, 1978) (on motion for stay). In the circumstances, we grant the staff's motion to withdraw its exception. We affirm the Licensing Board's decision on this point subject, however, to the

¹*Metropolitan Edison Co.* (Three Mile Island, Unit 2), ALAB-456, 7 NRC 63 (January 27, 1978). We note that the Board below took the same position. See 6 NRC at 1305.

parties' right to move to reopen the question before that Board⁶ if the Commission adopts the staff's suggestion and the parties believe such a motion warranted.⁷

The decisions of the Licensing Board are *affirmed* except for the matters described in Part 3, above, which are *remanded* for further consideration. Whether the construction permit need be disturbed pending resolution of the remanded issues is a matter which is appropriately left to the Board's judgment.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

⁶We reserve this right to all parties because it is fair to assume that the Commission rule against challenging its regulations before the Licensing Board inhibited them from raising the issue.

⁷*Cf. Kansas Gas and Electric Co. (Wolf Creek, Unit No. 1)*, ALAB-462, 7 NRC 320, 340 at fn. 38 (March 9, 1978).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matter of

Docket No. 50-320

METROPOLITAN EDISON
COMPANY, et al.

(Three Mile Island Nuclear
Station, Unit No. 2)

March 27, 1978

In response to the Commission direction in CLI-78-3, 7 NRC 307 (1978) that this case be reviewed as though no Rn-222 (radon) release figure had been determined in Table S-3 of 10 CFR Part 51, the Appeal Board remands the radon issue to the Licensing Board with directions to reopen the record to receive such new evidence and to hold such further hearings as may be necessary. The Appeal Board also declines to suspend plant operations pending completion of the further proceedings.

Messrs. George F. Trowbridge and Ernest L. Blake, Jr., Washington, D.C., for the applicants, Metropolitan Edison Company, *et al.*

Mr. Chauncey R. Kepford, State College, Pennsylvania, for the Intervenor, Citizens for a Safe Environment and York Committee for a Safe Environment.

Mr. Stuart A. Treby (Messrs. Henry J. McGurran, Gregory H. Fess, and Lawrence J. Chandler on the brief) for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Opinion of the Board by Messrs. Rosenthal and Sharfman:

In ALAB-456, 7 NRC 63 (January 27, 1978), we denied the intervenors'¹ motion for a stay pending appeal of the December 19, 1977, initial decision of the Licensing Board authorizing the issuance of an operating license for Unit No. 2 of the Three Mile Island Nuclear Station.² The motion was then renewed before the Commission. On March 2, 1978, the Commission entered an order which likewise denied stay relief. CLI-78-3, 7 NRC 307.

The March 2 order went on, however, to address the merits of the claim of the intervenors that Table S-3 of 10 CFR Part 51 understated the amount of radon (Rn-222) that is generated by the mill tailings produced in the course of the mining and milling of uranium. Determining this claim to be meritorious, the Commission directed us

. . . to review this case as though no Rn-222 release figure had been determined by regulation in Table S-3. The Appeal Board, therefore, should consider the environmental effects of the release of Rn-222 during the front end of the fuel cycle as an open factual issue to be determined on the evidence in this particular case. If the Appeal Board thinks this issue was inadequately explored at the Licensing Board level for any reason, including an assumption by the parties that the S-3 Table was not subject to dispute in an individual licensing proceeding, it should take action as it deems necessary to complete the record.

7 NRC at 310.

As the Commission noted, we had already scheduled oral argument on the intervenors' appeal from the initial decision. Upon receipt of the March 2 order, we instructed the parties to provide us at argument with their views regarding the course which should be pursued in carrying out the Commission's direction. The parties did so. We were told by the applicants and the staff that we should reopen the record to receive new evidence which would then be subject to cross-examination at a hearing. The intervenors urged conversely that we should confine our consideration to the evidence already in the record and, on the basis thereof, conclude that the environmental effects of the radon releases associated with the uranium mining and milling process are such as to warrant the withholding of an operating license for Unit No. 2.

Having carefully weighed the competing assertions, we remand the radon issue to the Licensing Board with directions to reopen the record to

¹Citizens for a Safe Environment and York Committee for a Safe Environment.

²LBP-77-70, 6 NRC 1185.

receive new evidence, to hold such further hearings on that evidence as may be required, and to render a supplemental initial decision. This course seems to us plainly appropriate in light of the fact that, in mandating that the radon issue be decided "as though no Rn-222 release figure had been determined by regulation in Table S-3," the Commission brought about a significant change in the ground rules previously in effect. As stressed in ALAB-456, the parties and the Licensing Board had been obliged to consider the issue on the basis of the value assigned to radon in Table S-3.³

We see no occasion to suspend plant operations to await the outcome of the remand. The Licensing Board should be able to complete the further proceedings within a relatively short time. As noted in the Commission's March 2 order (7 NRC at 309), "the fuel for [such a] period of operation has already been mined and fabricated" and thus during the period the plant will make "no additional contribution to the radon releases." The Court of Appeals for the District of Columbia Circuit made precisely the same observation in denying a motion filed with it for emergency injunctive relief against continued plant operation. *Kepford v. NRC* (No. 78-1160, unpublished order dated March 8, 1978). On the other hand, to preclude Unit No. 2 from generating electric power *pendente lite* would obviously occasion serious injury not only to the applicants, but also to those who are dependent upon the availability of that power.⁴

The radon issue is accordingly *remanded* for further proceedings in conformity with the foregoing.⁵ This Board will proceed with its consideration

³It is quite true that, notwithstanding that consideration, the Licensing Board permitted intervenors, over objection, to adduce evidence showing that the appropriate radon value was other than that reflected in Table S-3. But this did not impose any obligation upon the other parties to counter that evidence. Nor do we accept intervenors' insistence that, having failed last year to request the Commission to suspend the effectiveness of the portion of Table S-3 pertaining to radon, the staff should now be deemed foreclosed from offering evidence on the subject. Although, if it then had reason to doubt the correctness of that portion of the table, the staff might well have been advised to pursue that course, it was not legally obliged to do so. In any event, the Commission clearly and understandably desires an ascertainment of the true facts, and it would scarcely assist the achievement of this end were we to disable any party from making available on the record information which it considers relevant.

⁴The Licensing Board determined that "there is a need for the operation of the TMI-2 plant on its current schedule" (paragraph 121, 6 NRC at 1222). No appeal was taken from that determination.

⁵We have carefully considered the suggestion of our colleague that we conduct the further proceedings ourselves. The pressure of our appellate work—to which we necessarily must assign priority—forecloses acceptance of that suggestion. Moreover, although Dr. Johnson is quite right that the radon issue is generic (in the sense that its resolution does not depend upon the facts peculiar to the particular reactor under scrutiny), nonetheless any determination reached in any one individual licensing proceeding would not be binding upon different litigants in other proceedings. In order to achieve a universally applicable result, it would be necessary for the Commission to promulgate a controlling generic regulation.

of all other issues presented by the intervenor's appeal from the initial decision.⁶

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

Opinion of Dr. Johnson, dissenting in part:

Rather than remanding the radon issue to the Licensing Board, I would have us explore this truly generic matter in an evidentiary hearing.

The record developed below reveals that—

1. the annual health effects associated with a realistic value of radon release (*i.e.*, about 5,000 Ci/yr) are small (Gotchy Testimony fol. Tr. 2095, Table 1a, footnote; Tr. 2221);
2. the radon releases due to the coal and nuclear fuel cycles are comparable (Gotchy Testimony, pp. 10 and 11; Tr. 2233-34);
3. the radon emissions from mill tailings will continue into the extreme future (Tr. 2225-26); and
4. the radon releases due to the nuclear fuel cycle are extremely small (less than one part in 100,000 for a single reactor) in relation to the natural emission of radon from the soil (Tr. 2231-32, Tr. 2243, Tr. 2865).

The parties apparently have little disagreement on these factual matters, although quantitative values can be derived only from analytical models which employ speculative, assumed input parameters.

Rather, the dispute on the radon-release issue consists of questions which are essentially judgmental. For instance: What is the environmental significance, within the context of a NEPA evaluation, of a manmade release that is demonstrably a very small fraction of the natural release of the same material? In the event of an action which has long lasting consequences, how far into the future is it reasonable (again in the context of a NEPA evaluation) to sum these consequences?

In my view, an appeal board decision on the radon issue would help to avoid lengthy, repetitious litigation of these matters in individual licensing cases. Because the factual questions at stake are generic, an opinion by this Board on the legal matters would provide valuable precedential guidance to those licensing boards before whom the issue is raised. No such guidance now exists. Our resolution of the radon issue in this case would be the course most likely to reduce delays in the licensing process.

⁶At oral argument, intervenors were granted leave to file motion to reopen the record on the emergency planning issue. Should such a motion be filed, we will, of course, promptly consider it upon the receipt of the responses of the other parties.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Robert M. Lazo, Chairman
Dr. James C. Lamb III
Dr. David L. Hetrick

In the Matter of

Docket No. 50-341

THE DETROIT EDISON
COMPANY

(Amendment to
Construction
Permit CPPR-87)

(Enrico Fermi Atomic Power
Plant, Unit 2)

March 21, 1978

The Licensing Board denies petitions for leave to intervene filed by individual ratepayers, by an equity owner of one of the proposed co-owners of the nuclear unit, by a group of citizens and local units of government, and by an elected representative of individual ratepayers and taxpayers.

RULES OF PRACTICE: STANDING TO INTERVENE

In determining whether a petitioner for intervention in an NRC domestic licensing proceeding has alleged a sufficient interest for purposes of §189a of the Atomic Energy Act and 10 CFR §2.714(a) of the NRC Rules of Practice, contemporaneous judicial concepts of standing should be used. *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

ATOMIC ENERGY ACT: STANDING TO INTERVENE (ZONE OF INTERESTS)

Portland General Electric Co. (Pebble Springs Nuclear Plants, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976), clearly establishes that alleged economic interest as a ratepayer or member of an electric cooperative is not within the zone of interests protected by the Atomic Energy Act of 1954, as amended, and does not give standing to intervene as of right in an NRC proceeding.

NUCLEAR REGULATORY COMMISSION: ENFORCEMENT OF LICENSE CONDITIONS

The responsibility for determining whether a license or permit was

violated rests with the Director of Nuclear Reactor Regulation pursuant to 10 CFR Part 2, Subpart B, of the Commission's regulations, not with a licensing board charged with considering a proposed amendment to a permit.

ATOMIC ENERGY ACT: STANDING TO INTERVENE

As a general rule "a litigant may only assert his own constitutional rights or immunities," and a petitioner cannot assert interest or claim relief on the legal rights of third parties. *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977).

RULES OF PRACTICE: INTERVENTION

Discretionary intervention is more readily granted where petitioners show significant ability to contribute on substantial issues of law or fact which will not otherwise be properly raised or presented, set forth the matters with specificity, and demonstrate their importance and immediacy to justify the time necessary to consider them.

NEPA: COST-BENEFIT BALANCE

NEPA considers the costs and benefits to society in general; it does not isolate costs or benefits to a particular class or group. Even though a particular segment of society may "bear the brunt" of most of the impacts of a proposed project, the action is still considered favorable if the overall benefits exceed the overall costs.

ATOMIC ENERGY ACT: SCOPE OF INFORMATION REQUIRED FOR LICENSING (FINANCIAL QUALIFICATIONS)

The reasonable assurance requirement of 10 CFR §50.33 does not mean a demonstration of near certainty that an applicant will never be pressed for funds in the course of construction. It means that the applicant must have a reasonable financing plan in light of relevant circumstances. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 18 (1978).

ATOMIC ENERGY ACT: STANDING TO INTERVENE

Interest as a taxpayer is an economic interest, similar to that of a ratepayer, that is not within the "zone of interests" to be protected in a proceeding for amendment of a construction permit.

**ORDER DENYING PETITIONS FOR LEAVE TO
INTERVENE OF (1) MARTHA G. DRAKE, (2) CITIZENS FOR
EMPLOYMENT AND ENERGY, AND (3) KEITH STANLEY TITUS**

This proceeding involves consideration of the issuance of an amendment to Construction Permit No. CPPR-87 issued to the Detroit Edison Company (the Applicant) on September 26, 1972, for construction of the Enrico Fermi Atomic Power Plant, Unit 2 (the facility), located in Monroe County, Michigan. The amendment requested by the Applicant would add Northern Michigan Electric Cooperative, Inc., and Wolverine Electric Cooperative, Inc., as 20 percent co-owners of the facility.

Notice of consideration of the issuance of the proposed amendment to Applicant's construction permit was published by the U.S. Nuclear Regulatory Commission (the Commission) on September 22, 1977 (42 *Fed. Reg.* 47894-95). That notice provided, *inter alia*, that any person whose interest may be affected by the proposed amendment might file a petition for leave to intervene by October 25, 1977. The notice also summarized the provisions of 10 CFR §2.714, the Commission's rule which sets forth the required content of petitions for leave to intervene and particularly noted that "[c]ontentions shall be limited to the matters within the scope of the amendment under consideration."

Pursuant to the notice, Mrs. Martha G. Drake of Petoskey, Michigan, and Citizens for Employment and Energy (CEE) filed timely petitions for leave to intervene and affidavits in support of such petitions which set forth statements of interests to be adversely affected. Included among the affidavits filed in support of CEE's petition were three affidavits filed by Mr. Keith Stanley Titus of Alpena County, Michigan. As Mr. Titus did not appear to be a member of CEE, Mr. Titus' pleadings were considered as an individual petition for leave to intervene.

The Applicant on November 7, 1977, filed a consolidated answer to the above petitions requesting that each be denied. The NRC Staff filed an answer dated October 27, 1977, in opposition to Mrs. Drake's intervention petition and on November 15, 1977, also filed an answer requesting that the petitions of CEE and Mr. Titus be denied.

Pursuant to the Board's order of December 22, 1977, published in the *Federal Register* on December 30, 1977 (42 FR 65333), a special prehearing conference was held in Detroit, Michigan, on January 19, 1978. Counsel for the Applicant and counsel for the NRC Staff were present and participated in the conference. Also present and participating were Petitioner Mrs. Martha G. Drake appearing *pro se*, and Messrs. Kim Siegfried and Robert G. Asperger, representing Citizens for Employment and Energy (CEE). Mr.

Keith Stanley Titus did not appear and was represented at the prehearing conference by Mr. Siegfried.¹

The Board heard oral argument by all parties and participants concerning the petitions filed by Mrs. Drake, CEE, and Mr. Titus. During the course of the conference, Mrs. Drake and Mr. Siegfried each requested permission to file amended petitions. These requests were granted by the Board which permitted both petitioners until February 2, 1978, to file amended petitions for leave to intervene. Mr. Siegfried also agreed to contact Mr. Titus and within 5 days advise the Board whether Mr. Titus desired to participate in this proceeding as an individual petitioner or as a member of CEE.²

Both Mrs. Drake and CEE filed timely amended petitions for leave to intervene on February 2, 1978. A second amended petition was filed by Mrs. Drake on February 11, 1978. Mr. Titus has informed Staff counsel that Mr. Siegfried had advised him of the fact that the Board had granted each petitioner additional time in which to file an amended petition. However, no further pleadings have been filed by Mr. Titus. Applicant and Staff have both filed answers to the amended petitions urging the Board that each be denied.

Petitioner Martha G. Drake

The Petitioner is a resident of Petoskey, Michigan, and is a member of the retail rural electric cooperative, Top O'Michigan, Inc., which buys its electrical power from Northern Michigan Electric Cooperative, Inc., one of the proposed co-owners of the Fermi 2 facility. She alleges that she has an interest in this proceeding as a ratepayer and equity owner of the cooperative, and that this interest is affected by the possibility of nuclear wastes being stored in Northern Michigan if the cooperatives buy an interest in Fermi 2. Further, Petitioner contends that the health of her son, who will attend a medical school 30 miles from Fermi 2, will be adversely affected by operation of the facility and that the demand on Consumer Power Company's Big Rock facility (near Petoskey) would be stimulated.

¹It appears that Mr. Titus was not served with direct notice of the prehearing conference that was scheduled and held on January 19, 1978, in Detroit, Michigan. None of Mr. Titus' affidavits attached to the petition filed by CEE set forth a complete address. Consequently, the Docketing and Service Branch of the Office of the Secretary of the Commission could not serve Mr. Titus with direct notice of the conference.

²By letter dated January 25, 1978, Mr. Titus advised counsel for the Staff that he wished to participate as an individual representing himself as a ratepayer, the citizens of Alpena County, and the Alpena County Board of Commissioners.

One seeking to intervene as a matter of right in a licensing proceeding must comply with the applicable interest or standing requirements. The Commission has discussed intervention as a matter of right as follows:

To have "standing" in court, one must satisfy two tests. First, one must allege some injury that has occurred or will probably result from the action involved. Under this "injury in fact test" a mere academic interest in a matter, without any real impact on the person asserting it, will not confer standing. One must, in addition, allege an interest "arguably within the zone of interests" protected by the statute . . . Our administrative process benefits from the concrete adverseness brought to a proceeding by a party who may suffer injury in fact by Commission licensing action, and whose interest is arguably within the "zone of interests" protected by the statutes administered by the Commission. Accordingly, in determining whether a petitioner for intervention in NRC domestic licensing proceedings has alleged an "interest [which] may be affected by the proceeding" within the meaning of Section 189a of the Atomic Energy Act and Section 2.714(a) of NRC's Rules of Practice, contemporaneous judicial concepts of standing should be used.

Portland General Electric Co. (Pebble Springs Nuclear Plant, Units 1 and 2), 4 NRC 610, 613-14 (1976).

All of Petitioner's economic concerns stem from her interest as a member of Top O'Michigan, Inc., the cooperative which buys all of its electricity from Northern Michigan Electric Cooperative, Inc. However, none of these concerns such as "loss of equity," "threat of bankruptcy," "higher rates," "cost of replacement power," or "loss of property taxes" is "arguably within the zone of interests" protected by the Atomic Energy Act of 1954, as amended. The protected interests under the Atomic Energy Act relate to radiological health and safety. The Commission's *Pebble Springs* decision, *supra*, clearly establishes that alleged economic interest, either as a ratepayer or a member of a cooperative, is insufficient to support standing in an NRC proceeding as a matter of right.

We are also not persuaded by the Petitioner's reliance on the District Court's opinion in *Drake v. Detroit Edison Company*, No. G77-364 C.A. (W.D. Mich. January 19, 1978) in which the court found that the plaintiffs " . . . possess interests within the zone of interests protected by the Atomic Energy Act." (Slip op., pp. 8 and 9.) In that decision, the court discussed standing to determine whether there exists a private cause of action under the Atomic Energy Act to seek judicial relief for alleged violations of that Act and concluded that the plaintiffs had such standing. Because the court found that Mrs. Drake had standing and a private cause of action under the

Atomic Energy Act in that case, Mrs. Drake asserts that she has standing in the instant proceeding. That assertion is without merit.

While the District Court found economic injury to a ratepayer to be an "injury in fact" (slip op. at 9, n. 11), it did not find such injury to be within the zone of interests protected by the Atomic Energy Act. The court found only that the public's health and safety interests were within that zone (*id.* at 8). Thus, the District Court did not purport to overrule the Commission's ruling in *Pebble Springs* that a ratepayer's economic interest is not within the zone of interests of the Atomic Energy Act. In discussing Mrs. Drake's standing, the District Court was concerned with whether she had a private cause of action under the Atomic Energy Act, not whether she has a right to intervene in this proceeding. In fact, the court noted that the issues Mrs. Drake sought to raise before it were inappropriate for consideration by this Licensing Board but were cognizable in a §2.206 proceeding (slip op. at 5 and 11-15).

The Petitioner also argues (Second Amended Petition, p. 5) that the Licensing Board has jurisdiction to consider the question of whether the proposed transfer of ownership complied with the Atomic Energy Act and the Commission's regulations. We disagree. If there is a hearing, the scope of the Licensing Board's jurisdiction will be limited to those issues on which it is required to make findings under 10 CFR §2.104 and which are reflected in the notice of the "Consideration of Issuance of Amendment to Construction Permit." Those issues are (1) whether the amendment will be inimical to the common defense and security or would constitute an unreasonable risk to the health and safety of the public, and (2) whether the co-owners are financially qualified for joint participation in the ownership of the facility. These issues do not encompass consideration by the Licensing Board of whether Detroit Edison violated the Commission's regulations or the terms of its construction permit for Fermi 2 by transferring an ownership interest to the cooperatives in advance of Commission action on this amendment. The responsibility for determining whether a license or permit was violated rests with the Director of Nuclear Reactor Regulation pursuant to the provisions of 10 CFR Part 2, Subpart B, of the Commission's regulations. It should be noted that the procedures for determining whether the proposed transfer of ownership violated the Commission's regulations have been properly initiated before the Director of Nuclear Reactor Regulation.³ A determination was issued on March 3, 1978.⁴

Petitioner has provided no support or basis for her contention that if her

³Notice of the initiation of these procedures was published in the *Federal Register* at 42 FR 64159 (December 22, 1977).

⁴Letter dated March 3, 1978, from Edson G. Case to Dr. Robert G. Asperger.

cooperative buys an interest in Fermi 2, the possibility of nuclear wastes being stored in Northern Michigan is greater and the demand on the Big Rock nuclear facility in Northern Michigan will be stimulated. Accordingly, these alleged concerns are too remote and speculative to be considered by the Licensing Board as a possible effect of this construction permit amendment proceeding.

Finally, the Petitioner attempts to support her standing on the interests of her son who will be attending medical school near the site of Fermi 2. The Appeal Board has previously held that as a general rule "a litigant may only assert his own constitutional rights or immunities," and thus a petitioner cannot assert interest or claim relief on the legal rights of third parties (*Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977)). Accordingly, this asserted interest of a third party is legally insufficient to confer standing.

Based on the foregoing discussion, intervention as a matter of right must be denied.

In circumstances where judicial standing is lacking, the Board may consider allowing intervention as a matter of discretion. In *Pebble Springs*, the following guidelines were established for the exercise of discretion:

In determining in a particular case whether or not to permit intervention by petitioners who do not meet the tests for intervention as a matter of right, adjudicatory boards should exercise their discretion based on an assessment of all the facts and circumstances of the particular case. Some factors bearing on the exercise of this discretion are suggested by our regulations, notably those governing the analogous case where the petition for intervention has been filed late, 10 CFR §2.714(a), but also the factors set forth in 10 CFR §2.714(d) governing intervention generally:

(a) Weighing in favor of allowing intervention—

- (1) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (2) The nature and extent of the petitioner's property, financial, or other interest in the proceeding.
- (3) The possible effect of any order which may be entered in the proceeding on the petitioner's interest.

(b) Weighing against allowing intervention—

- (4) The availability of other means whereby petitioner's interest will be protected.
- (5) The extent to which the petitioner's interest will be represented by existing parties..

- (6) The extent to which petitioner's participation will inappropriately broaden or delay the proceeding.

The Appeal Board has also observed that foremost among the factors applied to allowing participation as a matter of discretion is whether such participation would likely produce "a valuable contribution . . . to our decisionmaking process. In the words of the Commission in *Pebble Springs*, 'Permission to intervene should prove more readily available where petitioners show significant ability to contribute on substantial issues of law or fact which will not otherwise be properly raised or presented, set forth these matters with suitable specificity to allow evaluation, and demonstrate their importance and immediacy, justifying the time necessary to consider them.' "

Applying these guidelines to Petitioner's pleadings as fleshed out by the statements made at the special prehearing conference, we find no basis for granting discretionary intervention.

As to the first factor, Petitioner asserts that she can assist in developing a sound record because she has been "involved in this sale" for over a year, has made presentations to the boards of directors and has intervened before the Michigan Public Service Commission and before the District Court. However, Petitioner's filings and oral statements clearly show that her asserted interests have no bearing on this limited amendment proceeding and reveal no special ability to contribute on the narrow issue concerning the financial qualifications of the cooperatives who seek to become co-owners of the facility.

The second factor in favor of intervention is the nature and extent of the Petitioner's property, financial or other interest in the proceeding which, as has been discussed above, is an economic interest. Consequently, even though the Petitioner alleges she may suffer economic injury by reason of an amendment to Applicant's construction permit, the fact that such alleged injury is not within the "zone of interests" to be protected by the Commission makes this consideration negative. Such a result also follows from a consideration of the third factor; namely the possible effect of any order which might be entered on the Petitioner's interest. Petitioner has not specified any sufficient injury which she may suffer which is within the "zone of interests" to be protected by the Commission.

Given Petitioner's insufficient standing to intervene in this proceeding, it is unnecessary to dwell at length on Petitioner's contentions. We note, however, that Contentions A, C-K, and M-N are simply outside the scope of this limited proceeding and are therefore insufficient to support intervention. Contentions B and L, although looking in the direction of financial qualifications, are not pleaded with the required particularity. More impor-

tantly, neither the petition nor the supporting affidavit sets forth any basis for either contention (10 CFR §2.714(a)).

Petitioner has raised no valid contention in her amended petition but instead raised a number of questions. It is evident that none sets forth matters that fall within the limited scope of this proceeding. Questions 1 and 7 are related to Mrs. Drake's November 19, 1977, §2.206 request and are inappropriate to be included in the proceeding. Question 2 relating to the standing of cooperative members has been discussed above. Questions 3, 4, and 6 raise issues of State law and the power of another Federal agency, the REA, and are simply outside the scope of this proceeding.

Finally, Petitioner asserts that a new environmental impact statement must be produced by the Commission in connection with the construction permit amendment (Questions 5 and 8). Related to this assertion is her claim—made in her original petition and amplified at the special prehearing conference, Tr. 19-20, 65-66, 109-110—that Northern Michigan's service area will be adversely affected by *not* constructing a new facility in that area.

The Board concludes that all of Petitioner's contentions either do not meet the requirements of 10 CFR §2.714 or are outside the scope of this limited proceeding. Accordingly, it is concluded that Petitioner can make no genuinely significant contribution to this licensing proceeding and must therefore be denied intervention as a matter of discretion.

The amended petitions for leave to intervene filed by Martha G. Drake are hereby denied.

Petitioner Citizens for Employment and Energy

In its amended petition, CEE states that it is an unincorporated association comprised of citizens and residents of Michigan, organizations whose memberships include residents of Michigan, and local units of government. Its activities are primarily educational and relate to the dissemination of information on nuclear power and alternative power sources.

As was the case in its original petition, CEE asserts a generalized interest by alleging that its members will be adversely affected by the proposed construction permit amendment. In addition, CEE seeks to establish standing through the interest of one of its members, Kim Arthur Siegfried, who is alleged to live within 35 miles of the Fermi 2 site. In an affidavit attached to the amended petition, Mr. Siegfried states that the proposed transfer of 20 percent ownership in Fermi 2 to the cooperatives will adversely affect his interest.

In its original petition, CEE did not allege any facts which would indicate how the generalized interest of its members regarding nuclear power

and alternative energy sources may be affected by the results of this proceeding as required by 10 CFR §2.714(b). CEE's statements of generalized interests in its amended petition do not cure the above-noted deficiency nor do the particularized statements of interest (consisting of Contentions A, B, and C) set forth in the affidavit of Mr. Siegfried establish how he may be "injured" by the outcome of this proceeding (see *Long Island Lighting Company* (Jamesport Nuclear Power Station, Units 1 and 2), ALAB-292, 2 NRC 631 at 636 (1975)).

The only allegations of "injury" contained in Contentions A, B, and C are that Mr. Siegfried will be adversely affected by this proposed sale of 20 percent of Fermi 2 because (1) he will "receive" only 80 percent of the electricity produced by Fermi 2 instead of the 100 percent assumed in the "NEPA balance," and (2) the sale of 20 percent of Fermi 2 by Applicant will require it to provide additional electricity from "polluting fossil fuel plants," the operation of which will adversely affect his health and his property values.

It is manifestly evident that the first alleged injury of receiving less power from Fermi 2 is an economic "injury" which is not within the "zone of interests" protected by the Atomic Energy Act of 1954, as amended (see *Pebble Springs, supra*). Accordingly this alleged interest is insufficient to support standing in a proceeding before the Commission as a matter of right.

The second alleged injury of being adversely affected by pollution from fossil plants is purely speculative. Moreover, it also is an "injury" that is not within the "zone of interests" to be protected by the Atomic Energy Act. Even if additional fossil generation should be needed by Applicant as a result of this proposed sale, any pollution from that fossil generation is not subject to the licensing or regulatory jurisdiction of the Commission. Further, it is noted that CEE has not asserted any facts to establish that additional fossil generation will be needed, that such additional fossil generation will result in "air pollution," or that such "air pollution" will be harmful to any person's health or property values because of his proximity to those fossil plants.

Based on the foregoing, we conclude that CEE should not be allowed to intervene as a matter of right.

The basis for allowing intervention as a matter of discretion has been discussed above in connection with the Board's consideration of the petition for leave to intervene filed by Martha G. Drake, *supra*. The same guidelines applied to the CEE petition lead to the same conclusion here.

Based upon consideration of its original petition for leave to intervene, it was clear that CEE could not be allowed to intervene in this proceeding because its asserted interests had no bearing on this amendment proceeding,

and its contentions either did not meet the specificity and basis requirements of 10 CFR §2.714 or were beyond the scope of this limited proceeding. On the basis of its petition, we could not conclude that CEE would be able to make a valuable contribution to the determination of whether the amendment should be permitted. CEE has since been given additional opportunities to make such a showing, both at the special prehearing conference held for that purpose and by being granted permission to amend its petition to intervene.

However, CEE has not asserted any new interest or specified any new facts in Contentions A, B, and C which would lead us to change our conclusion. We need consider only two issues in determining whether to approve this proposed transfer of ownership: (1) are the cooperatives financially qualified to undertake a 20 percent ownership in Fermi 2; and (2) will the proposed sale be inimical to the common defense and security or jeopardize the public health and safety. In its amended petition, CEE has specified no contentions which are even casually related to the issues which are appropriate for consideration in this limited proceeding. Accordingly, the Board can find no basis for granting intervention as a matter of discretion.

In Contention A, CEE alleges that the NEPA cost-benefit balance will be affected by the sale of 20 percent ownership. CEE contends that Mr. Siegfried and other metropolitan Detroit residents must still "bear the brunt" of all the environmental impacts of the construction and operation of Fermi 2 but will receive only 80 percent of the power generated. However, CEE has not alleged how the NEPA cost-benefit balance would be affected. That NEPA analysis considers the costs and benefits to *society in general* from the proposed action. It does not isolate costs or benefits to a particular class or group—*e.g.*, metropolitan Detroit residents. Thus, even though a particular segment of society may "bear the brunt" of most of the impacts from the proposed project (such as nearby residents), the action is still considered favorable if the overall benefits (in this case electricity) exceed the overall costs.

CEE has not alleged that the electricity from Fermi 2 is not needed nor that the proposed change in ownership will increase the overall costs to society. It merely argues that the costs and benefits will shift to different segments within society in general. But it is clear that the original overall NEPA cost-benefit balance which determined that the construction and operation of Fermi 2 would result in an overall "benefit" to society will not be changed by the proposed action in this proceeding.

Contention A also asserts that Mr. Siegfried will be aggrieved by pollutants created by Fermi 2. However, the appropriate time to consider this contention would be in connection with the operating license review. Amending the construction permit to reflect the cooperatives' ownership in-

terest simply does not change the environmental impact of construction or operation of Fermi 2.

In Contention B, CEE alleges that there is no reasonable assurance that funds will be available to complete construction of Fermi 2 because it speculates that "cost overruns" will occur and that the cooperatives will require additional financing beyond the REA loan guarantee. The Commission has recently noted that the "reasonable assurance" requirement of 10 CFR §50.33 "does not mean a demonstration of near certainty that an applicant will never be pressed for funds in the course of construction. It does mean that the applicant must have a reasonable financing plan in the light of relevant circumstances." *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1 at 18 (January 6, 1978).

CEE's contention does not allege that the financing plan is unreasonable in light of relevant circumstances. Instead, it merely speculates that "cost overruns" will occur, and therefore, reasonable assurance of obtaining additional financing cannot be guaranteed. Such speculation is insufficient to meet the basis and specificity requirements of 10 CFR §2.714, and therefore, this contention is deficient.⁵

CEE's Contention C "adopts" all 156 contentions which were set forth in its original petition to intervene. We would initially note that this original petition for leave to intervene appears to be almost identical to the petition filed by CEE in the construction permit proceeding of *The Detroit Edison Company* (Greenwood Plants, Units 2 and 3), Docket Nos. 50-452 and 50-453. Many of the borrowed contentions are inapplicable to the Fermi 2 reactor or the Monroe site.

Contentions 6-20 relate to nuclear safety. Each is beyond the scope of the narrow issues to be heard in this proceeding and, thus, cannot support intervention. Contentions 21-32 concern the financial qualifications of the Applicant. However, only the financial qualifications of Northern Michigan and Wolverine are at issue in this proceeding. Accordingly, contentions seeking to question the financial qualifications of the Applicant are improper and cannot support intervention in the present proceeding. Contentions 33-39 relate to the technical qualifications of either the Applicant or the cooperatives and similarly are outside the scope of issues that are appropriate to be heard in this proceeding.

⁵We would further note that there is an approximate 20 percent financial "cushion" provided by the REA loan guarantees to the cooperatives. The cost of construction of Fermi 2 is currently estimated to be \$948 million (Environmental Report, Supp. 3, p. 8.1-5, August 1977). The cooperatives' 20 percent ownership would result in their funding \$189.6 million of that cost. The REA loan guarantees to the cooperatives' total \$226,715,000. Thus, there is a \$37,115,000 "cushion" in the financing to cover such contingencies as escalated costs or inflation.

Contentions 40-53 concerning standards for protection against radiation basically challenge the Commission's radioactive emissions standards set forth in 10 CFR Part 20 as inadequate and illegal and are impermissible challenges to Commission regulations which are prohibited by 10 CFR §2.758(a) in the absence of special circumstances. In addition, these contentions are outside the scope of this proceeding.

In Contentions 54-101, CEE seeks to raise environmental considerations that do not relate to this amendment proceeding. These contentions would have been proper only at the construction permit proceeding, and it would be totally improper to reopen these issues in this proceeding. The Appeal Board has stated:

It will not be the Board's function at the supplemental hearing . . . in passing upon the permit amendment applications . . . to embark broadly upon a fresh assessment of the environmental issues which have already been thoroughly considered and which were decided in the initial decision. Rather, the Board's role in the environmental sphere will be limited to assuring itself that the ultimate NEPA conclusions reached in the initial decision are not significantly affected by such new developments⁶

Similarly, Contentions 102-127 relating to the Nuclear Regulatory Commission are totally outside the scope of this proceeding. Contentions 128-156 are miscellaneous contentions. Out of the 28 contentions here collected, only nos. 146-154 mention the cooperatives or the concept of co-ownership. Of these, only Contentions, 150, 151, and (possibly) 153 suggest that the cooperatives lack the necessary financial qualifications. These contentions, however, are only marginally better than Petitioner Drake's. None of them provides sufficient particularity regarding financial qualifications and none has the required evidentiary basis (10 CFR §2.714(a)).

The Board concludes that all of CEE's contentions either do not meet the requirements of 10 CFR §2.714 or are outside the scope of this limited proceeding. Accordingly, it is concluded that Petitioner CEE can make no genuinely significant contribution to this licensing proceeding and must therefore be denied intervention as a matter of discretion.

The amended petition for leave to intervene filed by Citizens for Employment and Energy is hereby denied.

Petitioner Keith Stanley Titus

As previously mentioned, three affidavits by Keith Stanley Titus, 6907

⁶*Georgia Power Company* (Alvin W. Vogtle Nuclear Plant, Units 1 and 2), ALAB-291, 2 NRC 404, 415 (1975).

Cathro Road, Alpena County, Michigan, were included among the supporting affidavits attached to the petition for leave to intervene filed by CEE. Mr. Titus does not allege he is a member of CEE though he adopts all of CEE's contentions.

In Mr. Titus' first and second affidavits, he alleges he is a Commissioner of Alpena County, Michigan. It is apparent that Mr. Titus, as either (1) a representative of the County Commissioners, or (2) a direct representative of his constituents, is seeking to protect the interests of constituents who are ratepayers and taxpayers. As noted in the discussions above related to the petitions filed by Mrs. Drake and CEE, neither a ratepayer nor a taxpayer could assert that interest independently. Accordingly, Mr. Titus may not assert those interests in a representative capacity. To the extent that "protection of the constituents" might include safety issues, the petition is silent as to what those interests are and how those interests may be affected by this proceeding. Moreover, it is not apparent that these residents are significantly closer to the plant site than Mrs. Drake. Accordingly, the petition is subject to the same objection.

The third of the three affidavits is filed to protect Mr. Titus' "individual rights" in the proceeding. This affidavit alleges that his rights are those of a ratepayer of Presque Isle Electric Cooperative, which in turn, is a member of Northern Michigan Electric Cooperative, Inc., one of the proposed co-owners of the Fermi 2 facility.

As already noted, the Commission's *Pebble Springs* decision, *supra*, clearly establishes that the interest of a ratepayer, standing by itself, is not arguably within the "zone of interests" to be protected by the Atomic Energy Act or the National Environmental Policy Act. Consequently, interest as a ratepayer is insufficient to support standing.

In addition, the allegation that an interest will be adversely affected by any tax changes is also insufficient to justify intervention as a matter of right. Interest as a taxpayer is an economic interest, similar to that of a ratepayer, that is not within the "zone of interests" to be protected in these proceedings. Furthermore, this interest is not sufficiently particularized to afford a basis for judicial standing.

Accordingly, intervention as a matter of right must be denied.

In determining whether to grant intervention as a matter of discretion, the Board has considered the facts and circumstances of this particular case and concluded that Mr. Titus should be denied intervention as a matter of discretion because there is nothing in the petition or affidavits which suggests that Mr. Titus possesses an expertise or interest by way of specialized education or pertinent experience in this proceeding which might make a valuable contribution to the determination of whether the amendment should be allowed. Neither the question of "rates" nor "taxes" nor the

generalized interest in nuclear power or its alternatives has any bearing on this proceeding. Moreover, Mr. Titus raises no new contentions, but merely adopts those of CEE which we have concluded are subject to objections and cannot support intervention.

We would also note that a utility's or cooperative's participation in a generating facility and the rate effects of that participation are regulated by the State through its public service commission. Accordingly, Mr. Titus as well as the other petitioners may protect their economic interest in this case by participating in the regulatory functions conducted by the Michigan Public Service Commission.

In summary, Mr. Titus has not alleged an interest sufficient to justify intervention. Further, he has not alleged any contention that both meets the requirements of §2.714 of the Commission's Rules of Practice and raises issues germane to this proceeding. Accordingly, it is concluded that this Petitioner can make no genuinely significant contribution to this licensing proceeding and must therefore be denied intervention as a matter of discretion.

The petition for leave to intervene filed by Keith Stanley Titus is hereby denied.

In accordance with §2.714(a) of the Commission's Rules of Practice (10 CFR §2.714(a)), the foregoing Order may be appealed to the Atomic Safety and Licensing Appeal Board within five (5) days after service of the order. The appeal shall be asserted by the filing of a notice of appeal and accompanying supporting brief. Any other party may file a brief in support of or in opposition to the appeal within five (5) days after service of the appeal. No other appeals from rulings on petitions and/or requests for hearing shall be allowed.

It is so ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD DESIGNATED
TO RULE ON PETITIONS FOR
LEAVE TO INTERVENE

Robert M. Lazo, Chairman

Dated at Bethesda, Maryland,
this 21st day of March 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

Docket Nos. 50-498A
50-499A

HOUSTON LIGHTING &
POWER COMPANY
PUBLIC SERVICE BOARD OF
SAN ANTONIO
CITY OF AUSTIN
CENTRAL POWER AND LIGHT
COMPANY

(South Texas Project, Unit Nos.
1 and 2)

April 5, 1978

Upon applicant's motion for the Commission to "order procedures" to determine whether an operating license antitrust hearing should be convened, the Commission treats the Attorney General's recommendation that such a hearing be conducted as dispositive and directs that antitrust procedures be set in motion in accordance with 10 CFR §2.102(d)(3).

Motion denied.

RULES OF PRACTICE: ANTITRUST HEARINGS

When the Attorney General recommends an antitrust hearing on an operating license for a commercial nuclear facility, the NRC is required to conduct such a hearing.

ORDER

On February 21, 1978, the Attorney General recommended that the Commission conduct an antitrust hearing with respect to the South Texas Project, Unit Nos. 1 and 2. The next day, Houston Lighting & Power Company lodged with the Commission a motion requesting the Commission to "order procedures" to determine whether such a hearing should be convened. The regulatory staff, the Department of Justice, and Central Power and Light Company have filed pleadings in opposition. We deny Houston's motion.

In our last *South Texas* decision¹ we authorized the Director of Nuclear Reactor Regulation to accept an application for the operating license for these plants without submission of the FSAR, which by Commission rules normally must accompany the filing of an application for an operating license. There, in "accepting the substantial agreement among the parties that the circumstances which have developed warrant, at the least, seeking the Attorney General's advice, we [made] the Section 105(c)(2) 'determination' that a further antitrust review is 'advisable' because of 'significant changes' in the licensee's activities occurring subsequent to the antitrust review previously completed at the construction permit stage." 5 NRC at 1319. Upon the receipt of the application, our staff sought the Attorney General's advice on whether the changes warrant the holding of an operating license antitrust hearing. As we noted above, his response recommending that a hearing be conducted was received on February 21.

When the Attorney General recommends an antitrust hearing on a license for a commercial nuclear facility, we are required to conduct one. That is the clear implication of the statutory language and the pertinent legislative history.² Accordingly, we stated in our *South Texas* decision that the Attorney General's advice would be evaluated "in the same manner and following the same procedures as we employ ... at the construction permit stage." 5 NRC at 1319. Having received advice recommending the convening of a hearing, we see no reason to reconsider our *South Texas* instructions, or to

¹*Houston Lighting & Power Company* (South Texas Project, Units 1 and 2), CLI-77-13, 5 NRC 1303 (June 15, 1977).

²"Where the Attorney General advises that there may be adverse antitrust aspects and recommends that there be a hearing, the Attorney General or his designee may participate as a party in the proceedings thereafter held by the Commission on such licensing matters in connection with the subject matter of his advice." Section 105(c)(5). See S. Doc. No. 91-1247 and H.R. Rep. No. 91-1470, 91st Cong., 2nd Sess., p. 30 (1970) (Report by the Joint Committee on Atomic Energy on Amending the Atomic Energy Act of 1954 to provide for Prelicensing Antitrust Review of Production and Utilization Facilities).

deviate from the procedures set forth in our regulations.

For these reasons, the Director of Nuclear Reactor Regulation is directed to set in motion the antitrust hearing procedures, in accordance with 10 CFR §2.102(d)(3).³

IT IS SO ORDERED.

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 5th day of April 1978.

³Upon receipt of advice from the Attorney General recommending a hearing on a reactor application, a notice of hearing is routinely published in the *Federal Register* by the Director of Nuclear Reactor Regulation. By tendering in an attachment to its opposition to Houston's motion a draft *Federal Register* notice, (and subsequently, a revised notice) staff has suggested that in this case the Commission undertake this duty.

The staff's first draft notice could have been read as reopening questions addressed in our last *South Texas* opinion, among them the scope of an operating license antitrust review. That opinion should provide the licensing board with helpful guidance in the upcoming hearing. We do not believe that our prescription of a notice of hearing in the present setting is an appropriate way for us to address such questions further. The Director of Nuclear Reactor Regulation should cause an appropriate notice to be published, guided by our *South Texas* opinion.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

**PETITION FOR EMERGENCY
AND REMEDIAL ACTION**

April 13, 1978

Upon petition by the Union of Concerned Scientists requesting various actions related to fire protection for electrical cables and environmental qualification of electrical components in nuclear power reactors, the Commission (1) directs the staff to review whether the Commission's fire protection research program may be beneficially expedited; (2) affirms the staff's practice of independently reviewing licensee designs and analyses, qualification documentation, and quality assurance programs, rather than certifying particular components as qualified for nuclear service; (3) denies petitioner's request to halt licensing until applicants show compliance with specified regulations; (4) denies petitioner's request to suspend all construction activities involving connectors or relating to electrical cables; and (5) denies petitioner's request to shut down all operating reactors until the operators show compliance with specified regulations.

NRC: HEALTH AND SAFETY RESPONSIBILITIES

Public safety is the first, last, and a permanent consideration in any decision on the issuance of a construction permit or a license to operate a nuclear facility. *Power Reactor Development Corp. v. International Union of Electrical Radio and Machine Workers*, 367 U.S. 396, 402 (1961). The Commission must have reasonable assurance that public health and safety are not endangered by its licensing actions.

ATOMIC ENERGY ACT: RIGHT TO HEARING

While revocation, suspension, or modification of a license must generally be in accord with Administrative Procedure Act procedures of notice and

opportunity to comply, 5 U.S.C. 558(b), if public health or safety requires, such actions may be taken with immediate effect. 5 U.S.C. 558(c), 42 U.S.C. 2236b; 10 CFR §§2.202(f), 2.204.

REGULATIONS: INTERPRETATION

General design criteria (GDC) are intended to provide engineering goals rather than precise tests or methodologies by which reactor safety can be fully and satisfactorily gauged. *Nader v. NRC*, 513 F.2d 1045, 1052 (1975). They are the minimum requirements for the principal design criteria of water-cooled nuclear power plants.

REGULATORY GUIDES: STATUS

Acceptable methods for implementing the general design criteria are found in regulatory guides, standard format and content guides for safety analysis reports, Standard Review Plan provisions, and Branch Technical Positions, but nonconformance with regulatory guides, etc., does not mean that the GDC are not met; applicants are free to select other methods to comply with GDC.

ATOMIC ENERGY ACT: SANCTIONS

Emergency powers which radically and summarily affect the rights and interests of others, including licensees and those who depend on their activities, must be responsibly exercised. *Licensees Authorized to Possess or Transport Strategic Quantities of Special Nuclear Material*, CLI-77-3, 5 NRC 16, 20 (1977). In taking any remedial measures, the Commission must choose action sufficient to deal with the risk involved.

RULES OF PRACTICE: SUSPENSION OF PERMITS

A violation of a regulation does not of itself result in a requirement that a license be suspended. *Petition for Shutdown of Certain Reactors*, CLI-73-31, 6 AEC 1069, 1071 (1973).

ATOMIC ENERGY ACT: SANCTIONS

Both the Atomic Energy Act and the Commission's regulations support the conclusion that the choice of remedy for regulatory violation is within the sound judgment of the Commission and not foreordained. 42 U.S.C. 2236, 2282, 2280; 10 CFR §50.100.

ATOMIC ENERGY ACT: DUTIES OF APPLICANTS/LICENSEES

Licensees provide the first line of defense to ensure the safety of the public, and are obligated to conduct their own detailed safety reviews. NRC is dependent upon licensees for accurate and timely information. NRC's role is primarily one of review and audit of licensee activities.

TECHNICAL ISSUES DISCUSSED: Electrical equipment qualification, 10 CFR §50.55a (h); fire protection measures; General Design Criteria 3 and 4, Appendix A of 10 CFR Part 50; single failure criterion, Appendix A of 10 CFR Part 50.

MEMORANDUM AND ORDER

I. BACKGROUND

On November 4, 1977, the Union of Concerned Scientists (UCS) filed with the Nuclear Regulatory Commission a "Petition for Emergency and Remedial Relief" which requested actions related to fire protection for electrical cables and environmental qualification of electrical components in nuclear power reactors. In particular the UCS sought the following Commission actions:

- a. The Commission shall direct the staff to accelerate a testing program to determine the type of physical separation between electrical cables necessary to maintain independence and to meet the single failure criterion¹ for redundant safety systems.
- b. The Commission shall direct the staff to accelerate a testing program for environmental qualification of connectors.
- c. The Commission shall direct the staff to independently verify the environmental qualifications of all safety-related systems, components, and structures.
- d. All licensing and appeal boards should immediately be notified that

¹The single failure criterion is explained in NRC regulations, 10 CFR Part 50, Appendix A. "A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure. Fluid and electric systems are considered to be designed against an assumed single failure if neither (1) a single failure of any active component (assuming passive components function properly) nor (2) a single failure of a passive component (assuming active components function properly) results in a loss of the capability of the system to perform its safety functions." [Footnote not in petitioner's request.]

no further construction permits or operating licenses can be issued until such time as applicants can demonstrate compliance with the applicable regulations, including specifically General Design Criteria 3 and 4 of Appendix A to 10 CFR Part 50, 10 CFR §50.55a(h), and the single failure criterion of Appendix A to 10 CFR Part 50.

e. All holders of construction permits shall immediately be notified to cease all construction activities involving the connectors identified as defective and all activities relating to electrical cables.

f. All operating reactors shall immediately be ordered to shut down until such time as the operators can demonstrate compliance with the applicable regulations, including specifically General Design Criteria 3 and 4 of Appendix A to 10 CFR Part 50, 10 CFR §50.55a(h), and the single failure criterion of Appendix A to 10 CFR Part 50.

The bases of the UCS petition are results reported August 5, 1977,² from the Qualification Testing Evaluation Programs and Fire Protection Research Programs conducted for NRC at Sandia Laboratories. The results of those tests are alleged to demonstrate that NRC regulations have been violated and that a public health and safety threat exists.

In reviewing this petition, the Commission has had the benefit of, and has fully considered, a number of detailed technical submissions by the staff and by UCS, as well as comments from the public. For clarity, the Commission will treat the legal aspects of the petition before discussing fire protection and electrical equipment qualification.

II. LEGAL CONSIDERATIONS

Before addressing the merits of the various aspects of the petition, three

²The Commission notes with concern the long interval which elapsed from the time connector test results were available ("Quick-look" test reports of January, March, and July 1977) until decisive action was taken to obtain information from licensees (Inspection and Enforcement Bulletin 77-05 dated November 8, 1977). During this time a research staff report of August 5 was transmitted on August 26 to the Offices of Nuclear Reactor Regulation, Standards Development, and Inspection and Enforcement (IE). Not until October 14 did Nuclear Reactor Regulation formally respond, at which time it was indicated that IE would conduct a survey of licensees. However, this survey was not initiated until November 8, 4 days after receipt of the UCS petition.

As a consequence of this long delay, the Commission requests that the staff review the procedures by which the Commission, appropriate staff offices, and licensing boards are notified of research information which is of safety significance, and followup actions are taken with licensees and applicants. The results of this staff review, along with any recommended improvements to existing procedures, are requested within 1 month.

matters of a legal nature raised in the petition and in subsequent filings warrant discussion—the emergency nature of some of the relief sought, the relevance of alleged violations of the Commission’s regulations, and whether such alleged violations have occurred. As a backdrop for this discussion, a brief summary of the Commission’s statutory authority and regulatory responsibility is useful.

The Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011, *et seq.*, and the Energy Reorganization Act of 1974, 42 U.S.C. 5801, *et seq.*, impose on the Commission the responsibility for administering a licensing procedure for, *inter alia*, nuclear power reactors. In large part the licensing procedure is devoted to assuring that the health and safety of the public is adequately protected. See, *e.g.*, 42 U.S.C. 2133, 2134. Thus the Commission has stated that “... public safety is the first, last, and a permanent consideration in any decision on the issuance of a construction permit or a license to operate a nuclear facility.” *Power Reactor Development Corp. v. International Union of Electrical Radio and Machine Workers*, 367 U.S. 396, 402 (1961). The Commission must have “reasonable assurance” that public health and safety are not endangered by its licensing actions. *Id.*

The Commission’s responsibility does not cease with the issuance of a license. If, in the Commission’s judgment, the public health and safety so requires, the Commission may take action to revoke, suspend, or modify licenses, impose civil penalties, or issue cease-and-desist orders. 42 U.S.C. 2236, 2237, 2282; 10 CFR §§2.200-2.205. While revocation, suspension, or modification actions generally must be in accord with Administrative Procedure Act procedures of notice and opportunity to achieve compliance, 5 U.S.C. 558(b), if public health or safety so requires, such actions may be taken with immediate effect. 5 U.S.C. 558(c), 42 U.S.C. 2236b; 10 CFR §§2.202(f), 2.204.

Three actions which the petitioner requests are styled “emergency relief.” The Commission was asked to shut down immediately all operating power reactors, to order immediately cessation of all construction involving connectors and electrical cables conducted under permits previously issued, and to impose immediately a moratorium on all power plant license issuances until licensees and applicants could demonstrate compliance with applicable regulations. Emergency actions, such as those requested, are procedures which obviously “can radically and summarily affect the rights and interests of others, including licensees and those who depend on their activities. Our emergency powers must be responsibly exercised.” *Licensees Authorized to Possess or Transport Strategic Quantities of Special Nuclear Material*, CLI-77-3, 5 NRC 16, 20 (1977).

In determining whether or not to take any or all of the immediate steps requested by the petitioner, the Commission must decide whether the Sandia test results relied upon by the petitioner mandated the requested relief in

order to provide reasonable assurance that the public health and safety are protected. See *Nader v. NRC*, 513 F.2d 1045, 1055 (D.C. Cir. 1975). In particular, the Commission must determine whether information from these tests or the UCS reveals risks in the operation of nuclear power reactors not previously perceived. If such risks are in fact identified, the Commission must determine their magnitude and take appropriate remedial actions. Where the information demonstrates an undue risk to public health and safety, the NRC will, of course, take prompt remedial action, including shutdown of operating facilities, as it has in the past.³ In taking any remedial measures, the Commission must choose actions sufficient to deal with the risk involved.

The second legal matter raised by the petition concerns the relevance of alleged violations of NRC regulations to the relief requested. Petitioner claims that certain of the Commission's regulations are being violated. In enclosure (3) to the staff's filing of November 18, 1977, the Office of the Executive Legal Director (OELD) responded to what it termed the petitioner's argument that the mere existence of a question of full compliance with Commission regulations automatically compels the shutdown of operating nuclear power plants. OELD disagreed with that proposition. Petitioner, on November 23, 1977, responded to OELD's legal position and stated that it "does not allege, nor is it necessary to allege, that *any* violation of the regulations calls for a shutdown of operating reactors." (Emphasis in the original.) Rather, petitioner argued that a shutdown and other relief are required because of both a violation of regulations and a risk to public health and safety. In the December 15 filing, the staff has expressed general agreement with this latter formulation. The staff position is that while a violation of a regulation does not by itself result in a requirement that a license be suspended, if public health and safety is threatened as a result of a discovered violation, prompt remedial action must be taken. The staff submits that a wide range of remedial actions are available to the Commission, including shutdown of reactors.

The Commission agrees with the staff that a violation of a regulation does not of itself result in a requirement that a license be suspended. As the Atomic Energy Commission noted in denying a petition to shut down 20 reactors some years ago:

It goes without saying that a violation posing an undue risk to public health and safety will, of course, result in prompt remedial action, including shutdown if necessary. In other instances, however, the Com-

³As an example, shortly after the NRC succeeded to the regulatory duties of the former Atomic Energy Commission, it ordered the operators of 23 boiling water reactors to shut down within 20 days to inspect for possible cracks in emergency core cooling system piping. See Office of Inspection and Enforcement Bulletin No. 75-01, January 30, 1975, and NRC Press Release No. 75-13, January 29, 1975.

mission has a wide spectrum of remedies for dealing with violations of regulations. These include show cause proceedings and proceedings for civil monetary penalties. The choice of appropriate mechanism for correction of an assumed violation rests within the sound discretion of this agency. In exercising this discretion, our paramount concern is with the public health and safety. *Petition for Shutdown of Certain Reactors*, CLI-73-31, 6 AEC 1069, 1071 (1973).

Both the Atomic Energy Act and NRC regulations support the conclusion that the choice of remedy for regulatory violation is within the sound judgment of the Commission, and not foreordained. See 42 U.S.C. 2236, 2282, 2280; 10 CFR §50.100.

The final legal matter requiring discussion is whether any Commission regulations are violated. If there are violations, consideration of appropriate enforcement actions is required.

Petitioner alleges that the Sandia tests demonstrate that nuclear power plants do not conform to General Design Criterion 3,⁴ which deals with fire protection, General Design Criterion 4,⁵ which deals with environmental qualification, and the single failure criterion. General design criteria (GDC), as their name implies, are "intended to provide engineering goals rather than precise tests or methodologies by which reactor safety [can] be fully and satisfactorily gauged." *Nader v. NRC*, 513 F.2d 1045, 1052 (1975). They are cast in broad, general terms and constitute the minimum requirements for the principal design criteria of water-cooled nuclear power plants. There are a variety of methods for demonstrating compliance with GDC. Through regulatory guides, standard format and content guides for safety analysis reports, Standard Review Plan provisions, and Branch Technical Positions, license applicants are given guidance as to acceptable methods for implementing the general criteria. However, applicants are free to select

⁴Criterion 3—Fire protection. Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.

⁵Criterion 4—Environmental and missile design bases. Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

other methods to achieve the same goal. If there is conformance with regulatory guides, there is likely to be compliance with the GDC. Even if there is nonconformance with the staff's guidance to licensees, the GDC may still be met.

With regard to the single failure criterion (SFC), the requirements of Appendix A to 10 CFR Part 50 and §50.55a(h) applicable to fire protection and environmental qualification do not establish a set of design basis events. Rather, they establish standards for design and performance of electrical systems to assure that such systems are capable of performing as required.

The Commission has determined, based on all the information made available to it in the course of this proceeding, that plants under construction or in operation are in compliance with GDC 3 and 4 and that the Sandia test results do not demonstrate violations of those GDC. In the succeeding portions of this decision, the reasons supporting this determination are set forth in detail.

III. ELECTRICAL EQUIPMENT QUALIFICATION

1. Research Program

The purpose of the NRC Qualification Testing Evaluation Program is to obtain data to examine the validity of methods for environmental testing of safety-related equipment as set forth in current standards and regulatory guides. The Sandia tests were to examine the testing program specified by the Institute of Electrical and Electronic Engineers (IEEE) Standard 323 (1974), endorsed by the NRC Regulatory Guide 1.89 (for qualifying Class IE⁶ equipment for nuclear power generating stations), *i.e.*, these were to be tests of the environmental testing methodology and not tests for component qualification.⁷ The IEEE standard allows the environmental testing to be performed sequentially.⁸ The Sandia tests were to subject qualified electrical

⁶Class IE is the safety classification of electric equipment and systems essential to emergency reactor shutdown, containment isolation, reactor core cooling, and reactor heat removal, or otherwise essential in preventing significant release of radioactive material to the environment.

⁷NRC has not conducted qualification tests of specific components incorporated in nuclear power plants, but rather has reviewed the results of licensees' qualification programs and quality assurance practices. However, the Commission is requesting the staff to provide it with an analysis of alternatives (including estimates of cost and manpower resource requirements along with potential benefits) for conducting independent verification testing of environmentally qualified equipment which is required to operate safety systems.

⁸Environmental testing is testing performed on representative equipment to verify adequacy of design and manufacturing processes and to confirm satisfactory operation under accident conditions. The environmental parameters for sequential testing include separate exposure of

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components to both simultaneous and sequential exposure to environmental conditions, to determine if there were any synergistic effects. (These tests were intended to answer questions such as—would exposure to steam, caustic spray, and nuclear radiation at the same time have a different degrading effect on materials than separate, sequential exposures to each environmental parameter?) Comparison of the test results was intended to assess the adequacy of the sequential testing (specified in the standard) as being representative of actual accident conditions where all environmental parameters exist simultaneously. In three tests conducted on January 21, March 4, and July 12, 1977, all 12 of the connectors⁹ tested eventually failed under either sequentially or simultaneously imposed conditions. The staff subsequently determined that none of these connectors were, in fact qualified to the IEEE standard.¹⁰ As a result, the Commission finds that definitive conclusions pertaining to the test methodology were not obtained. Retesting with qualified connectors under the NRC program has not yet been conducted.¹¹

2. Regulatory Approach

Fundamental to NRC regulation of nuclear power reactors is the principle that safety systems must perform their intended functions in spite of the environment which may result from postulated accidents.¹² For example, if an electrical component is required to function in a safety system which was designed to mitigate the consequences of certain accidents, that component must perform its intended function for postulated accidents such as (a) loss-of-coolant accident (LOCA), (b) main steam line break (MSLB), or (c) failure of any other high-energy confining system. Confirmation of the adequacy of this equipment to remain functional under postulated accident conditions constitutes environmental qualification. Environmental qualifica-

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a component to nuclear radiation, steam at high temperature and pressure, and for pressurized water reactors only, caustic solution spray.

⁹Electrical connectors are devices used in some systems to allow attachment or removal of electric supply to certain components, without requiring cutting of electric cables.

¹⁰The vendor for one set of connectors asserted that it had been qualified to IEEE-323 (1971). However, the test profile used to support the assertion made by the supplier was less severe than that of the IEEE standard. As a result, the staff has concluded that none of the connectors in the Sandia tests were fully qualified to IEEE-323 as required for service in a LOCA environment. See staff memoranda: January 20, 1978, p. 2; November 22, 1977, Enclosure 1, p. 33, and Enclosure 2, pp. 2-3.

¹¹However, the Commission is directing the staff to:

(a) repeat the test program with connectors qualified in accordance with IEEE-323 (1974) and Regulatory Guide 1.89, and (b) provide a plan for a review of the adequacy of the quality assurance practices for NRC-sponsored confirmatory research programs.

¹²The controlling regulation here is 10 CFR Part 50, Appendix A, General Design Criterion 4.

tion may be achieved by actual testing of components, by engineering analysis, or a combination of both.

3. NRC Actions

On November 7, 1977, the Commission directed the NRC staff to report in writing by November 9, 1977, on any matters of safety significance raised by the UCS petition which required immediate Commission action and to discuss the three specific requests for immediate actions set forth above as items d., e., and f.¹³ An order was issued by the Commission on November 9, 1977, which directed the staff to evaluate the entire petition and provide its views on all questions raised therein by November 25, 1977.¹⁴ The views of licensees and the public were also solicited.¹⁵ In an open meeting on November 11, 1977, the Commission received a briefing from the NRC staff on the emergency aspects of the petition, and on the basis of information provided at this briefing and the staff's filing of November 9, 1977, the Commission determined that no immediate actions were required at that time. The staff indicated that it was conducting a telephone survey on the use of connectors inside containment. In addition to the telephone survey, the staff issued two Inspection and Enforcement (IE) Bulletins 77-05¹⁶ and 77-05A¹⁷ which directed licensees and permit holders to provide

¹³While Section 2.206 of the Commission's Rules of Practice, 10 CFR §2.206, provides that petitions such as this should be addressed to the appropriate NRC office director, the Commission does have inherent power to exercise jurisdiction in the first instance. The Commission's election in this case to exercise its prerogative to rule on the petition rather than refer the matter to the Director, Office of Nuclear Reactor Regulation, is not intended to establish a precedent for circumventing the procedure set forth in Section 2.206. Sound allocation of Commission resources dictates that this inherent power be used sparingly.

¹⁴The Commission subsequently granted two staff requests for extensions of time within which to file its response to all questions raised, because the staff's efforts had been directed to evaluation of the emergency aspects of the petition on a priority basis. The staff response was received on December 15, 1977.

¹⁵Forty-six responses were received from licensees (or their representatives), public interest groups, and members of the public. Twenty-five of these commentators urged denial of the petition, 15 supported the petition, four expressed no position, and two requested continuances (and subsequently provided responses which are included in the categories above). These responses were considered by the Commission in reaching its decision in this matter.

¹⁶On November 8, 1977, IE Bulletin 77-05, "Electrical Connector Assemblies," was sent to all licensees and permit holders directing them to provide information on connectors used in safety systems located inside containment, subject to LOCA environment and required to be operable during LOCA. Information was requested within 30 days for operating reactors and 60 days for reactors under construction.

¹⁷On November 14, 1977, supplemental IE Bulletin 77-05A was sent to all licensees and permit holders directing them to provide information on all connectors in safety systems located either inside or outside containment and required to function to mitigate an accident where the accident itself could adversely affect the ability of the system to perform its safety function.

information on connectors used in safety systems inside and outside containment.

Upon completion of the IE bulletin survey of the use of electrical connectors, the staff was directed to prepare a written report containing the results of that survey and the status of the qualification test review, and to address the questions raised in petitioner's letter and supplemental affidavit of November 10, 1977, to the Commissioners. The staff was also requested to provide written answers to questions posed by Commission offices on the subject of the petition. On November 17, 1977, the UCS filed a Second Supplemental Affidavit of Robert D. Pollard, its expert, which responded to the staff's submissions up to that time.

The staff reported the completion of its preliminary survey on the use of electrical connectors in safety systems inside containment in operating plants on November 18, 1977. The staff reaffirmed the conclusion of its report of November 9, 1977, that the immediate Commission actions requested by UCS were not warranted for all operating reactors. However, action was required for D.C. Cook, Unit No. 1. This unit was taken out of service on November 18, by the licensee. This action, confirmed by a staff order issued at the same time, followed a meeting between the licensee and the staff during which the licensee was unable to adequately document the qualification of the electrical connectors used in plant safety systems. The staff also informed the Commission of the actions the staff had taken regarding 12 other plants which had been identified as using connectors in such systems. For these plants the staff had requested licensee submittal of documentation of test procedures and results to demonstrate that connectors used are capable of performing in a LOCA environment by a specified date. If such data were lacking, justification for operating beyond that date was required. The staff also provided a legal analysis of petitioner's arguments regarding enforcement of NRC regulations. UCS subsequently reiterated their legal arguments in a filing dated November 23, 1977, which the staff responded to in its December 15, 1977, report, pg. 78.

On November 22, 1977, the staff filed its response to the UCS letter and supplemental affidavit of November 10, 1977, and the questions posed by Commission offices. It also included copies of letters sent to several licensees requesting further information on electrical connectors in their plants. The staff stated that upon review of the supplemental affidavit its view was that the affidavit contained no new information not previously considered in the staff's report of November 9, 1977, and was essentially a restatement of the concerns raised originally in the UCS petition. In addition, the staff provided its analysis of each of the statements in the supplemental affidavit.

On November 25, 1977, the staff supplemented its reports of November 9, 18, and 22, 1977. In its November 25 memorandum, the staff discussed actions taken regarding the Oyster Creek reactor (which was identified as

having connectors in safety systems within the containment), and reported results of the staff review of the use of connectors inside the containment on Target Rock safety relief valves used on some boiling water reactors (BWR's).¹⁸ The staff also provided a further status report on the D.C. Cook plant, which had been shut down earlier. The staff further reported that work was continuing on another environmental qualification matter cited in the UCS submittal of November 17, concerning electrical penetrations. Office of Inspection and Enforcement (IE) Bulletins 77-06 and 77-07 were issued on November 22 and December 19, respectively, requiring licensees to provide information on the use of certain electrical penetration assemblies. Penetrations of this type at Millstone, Unit No. 2, had experienced electrical shorts.

On December 6, 1977, the staff issued another supplement to its previous reports. It discussed the further results of its preliminary survey of electrical connector use, provided the initial results of the preliminary survey of containment electrical penetrations in operating plants, a review of the petitioner's more recent filings, a summary of activities taken by staff, and future actions under consideration with regard to the environmental qualification of other safety-related electrical equipment in nuclear plants.

The Commission received a second briefing on the emergency aspects of the petition by the staff in an open meeting on December 8, 1977. At his own request, the petitioner's expert, Mr. Pollard, was accorded an opportunity to comment on matters relevant to the UCS petition.¹⁹ Mr. Pollard availed himself of this opportunity to make a presentation and answer questions of the Commissioners.

¹⁸In the course of conducting its preliminary survey the staff thought it had identified additional plants using connectors in safety systems inside the containment. The staff had advised the Commission in its November 22, 1977, filing that they were concerned with connectors associated with Target Rock safety relief valves used on certain BWR systems. The staff noted, at that time, they would continue evaluation of these connectors to determine whether they must function in the event of a LOCA. On November 25, 1977, the staff adequately explained why it had later concluded that these electrical connectors were not required to function in an accident environment, because these connectors did not serve a safety system function.

¹⁹Counsel for petitioner had requested in a letter dated November 17, 1977, that the Commissioners call Mr. Pollard to appear before them if they had any questions and that he be allowed to participate in any further staff briefings of the Commission. At an open meeting on December 7, 1977, the Commission voted to grant petitioner's request. The granting of petitioner's request in this instance, however, is not to be construed as a precedent and the Commission does not intend to make such arrangements a regular feature of Commission practice. An attorney (Mr. Troy Conner), who had provided comments on the petition pursuant to the Commission's order of November 9, 1977, filed an objection to the UCS participation request. In the event that the Commission granted the UCS request, he asked that those opposed to the granting of the petition, himself included, be afforded a similar opportunity. In the interest of fundamental fairness, the Commission accordingly

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Subsequently, on December 15, 1977, the staff submitted its report on the totality of the matters raised by the petition. The staff explained the actions it had taken concerning the qualification of electrical connectors, containment electrical penetrations, and other safety-related electrical equipment in response to the Sandia tests, recent operating experience, and the UCS petition. The Commission met in open session on December 22, 1977, for a briefing on the December 15 report by the staff, including questioning of the staff.

On January 6, 1978, the staff provided a report which updated the status of the investigation of the use of electrical connectors. In particular, the staff had determined that environmental qualification information for the Pilgrim, Unit 1, was incomplete. In meetings with the licensee, the staff determined that additional information was required to permit evaluation regarding safety of extended operation, but that operation until a planned shutdown on January 21 would not endanger public health and safety. Additional qualification testing of electrical connectors would be required prior to resumption of power operations after this planned shutdown.

In a subsequent report of January 13, the staff stated that Pilgrim, Unit 1, was shutdown by the licensee on January 9 as the result of unsatisfactory performance of a typical connector during a preliminary screening test. Inspection of this connector indicated problems associated with the method of installation in the facility. The Pilgrim, Unit 1, was to remain shut down until satisfactory testing was completed, or qualified devices were substituted for these connectors.

In this January 13 report the staff also provided a current status of the review of electrical connectors. Additional qualification testing was to be performed for six reactors²⁰ other than Pilgrim. In addition, the staff stated that the Connecticut Yankee (Haddam Neck) licensee had replaced connectors (for which no adequate qualification documentation existed) with terminal blocks inside sealed junction boxes.

The staff's January 13 report also gave the results of investigations of electrical penetration assemblies. Based on reviews of test results and com-

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scheduled time equal to that afforded the UCS to hear from those opposed to the petition at a subsequent briefing on December 22. Prior to that briefing the Commission was advised that those invited to present their opposition viewpoint did not wish to exercise this opportunity. Even in assessing this request for relief of an emergency nature, the Commission had continued the policy established in its general handling of the petition, of formulating a framework for principled decisionmaking "including the crucible of debate through the clash of informed but opposing scientific and technological viewpoints," as suggested by Chief Judge Bazelon of the United States Court of Appeals for the District of Columbia in *Friends of the Earth v. AEC*, 485 F.2d 1031 (1973).

²⁰Six reactors for which tests of qualification under LOCA radiation exposure conditions were planned (steam and, as appropriate, caustic spray testing have been satisfactorily completed) were Browns Ferry, Units 1, 2, 3; Nine Mile Point; Maine Yankee; and Oyster Creek.

parative design analysis the staff has concluded that penetrations in all operating reactors are environmentally qualified for LOCA conditions. In a later report dated March 23, 1978, the staff indicated that some followup confirmation tests are planned by July 1978 for penetrations used in Connecticut Yankee (Haddam Neck); periodic checks will be made on penetrations at Yankee Rowe. At Millstone, Unit 2, (where the problem was initially identified) penetrations will be replaced prior to resumption of operations.

On January 20, 1978, the staff provided its response to a "Draft Memorandum and Order" filed by UCS on January 9.²¹ The staff's position was that UCS had provided no new facts, but rather the January 9 filing was a restatement of previous UCS positions. In this submission the staff provided responses (or referenced responses in its earlier submission) for each of the UCS contentions. The staff recommended that the Commission not adopt the "Draft Memorandum and Order."

On January 27 the staff reported that the licensee of the Connecticut Yankee Plant had informed them that environmental qualification data did not exist for electrical terminal blocks,²² which had been used as replacements for unqualified connectors. In addition, the staff reported that a large number of similar terminal blocks were in use by this licensee in safety-related systems inside containment. Environmental qualification screening tests were conducted by the licensee in which one type of terminal block failed while two other types passed the tests. The staff concluded that this failure demonstrates that this type of terminal block is not environmentally qualified.

The staff promptly initiated a telephone survey of all operating plants to determine if other plants used any type of terminal block for which there is not complete environmental qualification. An IE Bulletin 78-02 was issued on January 30 requiring all power reactor licensees to provide followup documentation.

On February 3, 1978, the staff provided another report updating that status of both the Pilgrim connectors and the results of the telephone survey on the use of "unprotected" terminal blocks inside containment in safety-

²¹In this filing, UCS requested Commission permission to make reference to the unofficial transcript of the December 22, 1977, Commission meeting. The Commission has decided, as a matter of public convenience, that transcripts of open Commission meetings will be available solely for general informational purposes. These transcripts are not reviewed, corrected, or edited and may contain inaccuracies. They are not part of the formal or informal record of decision of the matters discussed. Expressions of opinion in transcripts do not necessarily reflect final determinations or beliefs. The Commission does not believe in this case it is appropriate, or necessary, to authorize reference to this transcript. However, the Commission does note that the information is included in written staff transmittals.

²²Although not specifically raised by the petitioner, the Commission believes the problems identified with terminal block qualification (which are another means of making connections within electrical systems) are pertinent to the issues raised by the petitioner. Consequently a brief discussion of the use of terminal blocks is considered appropriate here.

related systems (unprotected terminal blocks are those which are not enclosed in metal boxes). In the Pilgrim case, the licensee has replaced all safety-related electrical connectors with fully qualified splices. From the telephone survey on terminal blocks, three facilities (Yankee Rowe, Rancho Seco, and Ginna) in addition to Haddam Neck were identified as using unprotected terminal blocks in safety systems. The staff met with the licensee responsible for each of these facilities.

The staff provided another report on February 10, 1978, which included the status of qualification programs for electrical connectors in use at the previously identified six reactors. Furthermore, additional information was provided in response to issues raised by UCS in a letter dated January 20, 1978.

On February 17, 1978, the staff supplied information which corrected a portion of the February 10 memorandum. In the February 10 report, the staff had indicated that electrical connector qualifications for the Browns Ferry, Units 1, 2, and 3, had been completed. On February 13 the staff reported that although the licensee had earlier informed them that testing was incomplete, due to a misunderstanding within the staff, this led to an error in the February 10 report which indicated that this testing was completed. On that same day, the licensee notified the staff that certain electrical connectors for Unit No. 3 had failed under test. Followup information was provided by the staff in a February 18 memorandum. Failure of the electrical connectors for Browns Ferry 3 had occurred due to excessive temperatures and nonrepresentative environment being applied during an accelerated aging test. The staff reported that the licensee had made a commitment to replace these connectors with environmentally qualified splices at the next refueling (scheduled for September 1978), and for the interim, a detailed test plan was being developed by the licensee to provide the results of environmental qualification testing by March 17, 1978.

In this February 18 memorandum the staff also reported that successful environmental testing had been completed for terminal blocks in use at the Rancho Seco plant. Accordingly, corrective actions have been taken for all four of the identified plants (Haddam Neck,²³ Yankee Rowe, Ginna, and Rancho Seco) either to qualify terminal blocks in use or make a replacement with qualified components.

²³In a staff report of March 23, 1978, the Commission was informed that further testing of terminal blocks being conducted separately for D.C. Cook, Units 1 and 2, and Haddam Neck has raised questions about their environmental qualification. Subsequently, failure of Haddam Neck terminal blocks enclosed in aluminum boxes (which previously had been satisfactorily tested in steel boxes), resulted in plant shutdown and replacement with steel protective boxes. In a report on March 30, the staff confirmed that steel boxes are now in place at Haddam Neck and that other corrective actions have been taken based on testing results. They also reported that all questionable terminal blocks at D.C. Cook, Units 1 and 2, had been replaced with qualified splices.

On March 2, 1978, the staff reported that a detailed test plan had been submitted for electrical connectors used in Browns Ferry, Unit 3, and that testing was planned to be completed March 20, 1978. Also the staff corrected some information regarding the aging tests, which had been given in their earlier memorandum of February 18. The staff concluded that continued operation until completion of the planned tests would not result in an unsafe condition, in light of a successful screening test in November 1977 of unaged connectors and of the short time remaining until properly aged components were tested.

On March 18, 1978, the staff reported that 2 days earlier Browns Ferry, Unit 3, had been taken out of service by the licensee upon failure of several Bendix electrical connectors during qualification tests. In a meeting²⁴ between the licensee and the staff, it was concluded that failures were due to the lack of epoxy potting compound on the outboard end of the connectors. It was further concluded that potting the outboard end would result in qualified connectors, justifying continued operation until the planned shutdown for refueling in September 1978. Potting compound has been added to all connectors in safety systems, and inspections have been made. The licensee has made a commitment to conduct further testing in the interim. In September, the licensee will submit for staff approval a recommendation whether potted connectors are fully qualified for the life of the plant or if replacement of connectors with qualified splices is necessary.

In a staff report dated March 23, 1978, a summary was provided of all actions taken to qualify electrical connectors, terminal blocks, and penetrations. Details on measures taken to meet specific qualification criteria and a current qualification status of each type of electrical component were provided. A number of ongoing tests were discussed, the results of which will be provided to the Commission and the public. In addition, a summary of inspection and enforcement activities was provided.

4. Results of Staff Actions

Responses to IE Bulletins concerning electrical connectors have been received from all licensees for operating reactors, as reported in staff memoranda dated January 13 and March 23, 1978. Of the 67 operating power reactors, 18 were identified as having electrical connectors required to function in the LOCA environment inside the containment structure. A tabulation and summary status of these reactors is given in Appendix I. In cases where connectors are used in safety systems outside the containment structure, the staff has confirmed that these connectors are either adequately

²⁴A representative of UCS attended meetings on Browns Ferry held on February 17 and March 16, 1978. UCS was notified of other meetings but did not attend.

protected from failures of high-energy line breaks or that these connectors will have performed their safety function before being affected by the accident environment.

In addition to the operating plants, 33 plants under construction have been identified (in response to IE Bulletins 77-05 and 77-05A) as having electrical connectors included in the design of safety systems. The licensees of these plants have made a commitment to having environmental qualification for these connectors completed prior to initial operation, and the staff has instructions to specifically review the bases for such qualification.²⁵ As detailed in Appendix I, licensees of operating power plants presented data for staff review to support the qualification of electrical connectors. This data consisted of certified test results or engineering analyses, and was intended to support the conclusion that such equipment is capable of withstanding, with adequate margin, the environmental conditions which are predicted to result from accidents during which the equipment must function.²⁶ The staff review of licensee documentation determined whether that testing was conducted under appropriate conditions (*e.g.*, steam, temperature, pressure, etc.) and whether acceptable engineering practices and data were utilized to review materials and designs used for this equipment. In some cases, comparative analyses were made of equipment where similar materials and designs had been previously demonstrated as being environmentally qualified.

Of 18 plants identified as having electrical connectors in safety systems, 15 of these plants (Appendix I Table, Category A) eventually had documentation which the staff concluded supported environmental qualification for the worst-accident conditions calculated for a LOCA²⁷ (with a conservative margin) of temperature, humidity, steam pressure, caustic spray, flooding, and irradiation. The Commission agrees that the staff's conclusions are based on sound engineering practice. For the remaining three plants, Browns Ferry 3, Nine Mile Point, and Maine Yankee, (Appendix I, Category B)

²⁵D.C. Cook, Unit 2, became operational during the period of review of this petition. (This reactor is counted in the 33 noted above.) As a precondition for initial operation, the staff required the licensee to document adequate environmental qualification of numerous electrical components, including connectors and terminal blocks. (See also footnote 23.)

²⁶Of 18 plants having connectors, nine were determined to be environmentally qualified without any additional testing. However, for the other nine, extensive additional testing and analyses have been carried out by the licensees and reviewed by the staff specifically in response to the questions raised by the petitioner.

²⁷A main steam line break (MSLB) in PWR plants could result in predicted ambient temperatures higher than that of a LOCA, but only for a short period of time (*i.e.*, 60 to 100 seconds). Engineering evaluations of the surface temperature of components inside containment of a MSLB indicate that LOCA conditions would not generally be exceeded (ref. staff filing of December 15, 1977, Appendix B). Additional review of qualification for MSLB's will be undertaken during the first phase of the staff's Systematic Evaluation Program, which is discussed below.

environmental qualification is not yet fully documented. Each of these reactors will be discussed in turn.

For Browns Ferry 3, epoxy potting has been placed in portions of 11 connectors which originally did not have this material (as already discussed, lack of this material was the cause of failures during environmental tests). The staff determined that test results for properly potted connectors justify continued operation until the planned shutdown for refueling in September 1978. The Commission agrees with the staff and finds that this will not constitute an undue risk to the public health and safety. The licensee has made a commitment to further testing in the interim. In September, the licensee will submit for staff approval, a recommendation whether potted connectors are fully qualified for the life of the plant or if replacement of connectors with qualified splices is necessary.

Nine Mile Point and Maine Yankee both employ the same type of electrical connectors. Thus testing for the Nine Mile Point licensee will satisfy requirements for both plants. Testing has been reported by the licensee to have been satisfactorily completed, with preliminary test results reviewed and concurred in by the staff. The Commission agrees that continued operation of both of these plants will not be an undue risk to the public health and safety, in light of the reported successful tests and confirmation of adequacy made by the staff based on review of the preliminary test results.

For each of the above three plants, the Commission and the public will be informed of any subsequent results and staff conclusions.

If, during this interim period, the results of these testing programs or any other information suggests that the public is exposed to undue risks NRC will take prompt remedial action, including power reactor shutdowns if necessary. With issuance of the shutdown order for D.C. Cook, Unit No. 1, reactor, the staff has clearly demonstrated they will, when appropriate, take definitive action.

In the Commission's judgment, the staff's review of the use of electrical connectors in the Pilgrim reactor deserves special mention. In the staff's initial review, reported in its November 18, 1977, memorandum, Pilgrim was not identified as a reactor which used electrical connectors in safety systems. This conclusion was based on information received by the staff from the architect-engineering (A-E) firm for Pilgrim. On December 7, contrary to the information from the A-E, the staff was notified by the nuclear steam supply system vendor that electrical connectors were in use. In the December 15 staff report, Pilgrim was listed for the first time as having connectors, with formal documentation of their qualification being awaited by the staff. When the documentation was finally received on December 27 (3 weeks later than requested in IE Bulletin 77-05, dated November 8) the staff determined that adequate qualification data had not been provided. In lieu of qualification data, the licensee submitted only unsubstantiated letters of certification. A meeting was promptly held between

the staff and licensee, with the conclusion reached that continued operation would be allowed until a planned shutdown scheduled 3 weeks later. This continued operation was determined to afford no undue risk to the public primarily because (a) limited environmental testing had established that the connectors would remain operable during at least the initial period of a LOCA; (b) however, if the connectors failed during a LOCA, then backup systems existed to mitigate accident consequences, which would be less severe because of low power operation; and (c) connectors were protected within steel boxes. Plans were made by the licensee to initiate qualification testing of typical connectors, and restart of the reactor was contingent upon satisfactory qualification. During the course of preliminary qualification testing, a connector failed, resulting in a shutdown by the licensee on January 9, 1978. All connectors were eventually replaced with qualified splices.

The sequence of events in the Pilgrim case is not an acceptable model for regulatory or industry performance. Events moved from failure to identify connectors in use, to plant shutdown due to failure of connectors under test, and finally to replacement with splices. Because NRC is dependent upon information from licensees, the Commission is particularly concerned that at first apparently inaccurate information was forthcoming from the licensee and subsequently complete information was delayed well beyond the requested date for response. With respect to staff actions in the Pilgrim case, the delay in obtaining and reviewing the Pilgrim documentation was not satisfactory.

In order to fulfill its regulatory obligations, NRC is dependent upon all of its licensees for accurate and timely information. Since licensees are directly in control of plant design, construction, operation, and maintenance, they are the first line of defense to ensure the safety of the public. NRC's role is one primarily of review and audit of licensee activities, recognizing that limited resources preclude 100 percent inspection.

As the Commission has stated in the past:

Our inspection system is not designed to and cannot assume such tasks [to provide full inspection of construction activities]. Rather, we require that licensees themselves develop and implement reliable quality assurance programs which can assume the major burden of inspection. *Consumers Power Company* (Midland Plant, Units 1 and 2), CLI-74-3, 7 AEC 7, 11 (1974)

We require instead a regime in which applicants and licensees have every incentive to scrutinize their internal procedures to be as sure as they possibly can that all submissions to this Commission are accurate.

* * * * *

... licensees bear an unavoidable and heavy responsibility for helping insure that nuclear power is utilized safely. *Virginia Electric and Power Company* (North Anna Power Station), CLI-76-22, 4 NRC 480, 486, 487 (1976); affirmed, *Virginia Electric and Power Company v. U.S. Nuclear Regulatory Commission*, ___F.2d___ (4th Cir., February 28, 1978).

Furthermore, the Commission notes that some of the licensees' initial responses indicated a lack on their part of detailed knowledge of the quality of installed plant equipment. Licensees must have this detailed understanding of their own plants in order to meet their obligations for public safety by ensuring a sound basis for making assessments of plant safety. The NRC establishes general safety criteria, sets specific requirements for many aspects of reactor design and operation, and ensures compliance with these criteria and requirements by independent audit. While, in the Commission's view, these activities play a vital role in ensuring safe plant operation, they are not a substitute for licensee safety reviews. The licensees must be knowledgeable and vigilant and must take more initiative in ferreting out details of potential plant weaknesses.

The Commission is requesting that the NRC staff carefully review this matter. This review should consider the need for further regulatory actions to include a possible NRC policy statement to reemphasize the important safety responsibilities of licensees.

In addition, the Commission endorses the staff's planned inspection and enforcement activities, as generally outlined in its March 23, 1978, memorandum. The Commission emphasizes that a comprehensive "lessons learned" evaluation needs to be made, to include (a) review of all licensee responses (with particular attention to the Pilgrim case), to determine conformance to applicable quality assurance documentation requirements, as well as the accuracy and timeliness of information provided (where justified, appropriate enforcement action should be taken); (b) review how electrical equipment, not fully qualified, came to be installed in those plants where found; and (c) review staff actions in the Pilgrim case so that similar delays may be avoided in the future. The staff is requested to provide a report to the Commission which also will be available to the public.

In addition to environmental qualification of electrical connectors, the petitioner in its submittal of November 10, 1977, questioned the qualification of electrical penetrations, because they were "similar in design, materials, and function to electrical connectors." Operating experience from Millstone, Unit 2, also led the staff to question the environmental qualification of the electrical penetrations. As a result, the staff conducted a survey of all power reactors. The information thus provided by operating facilities gave reasonable assurance that their penetrations were capable of performing in the LOCA environment. The Commission agrees with the staff conclusions on electrical penetrations. Qualification of penetrations in service at

operating reactors was established by review of documented testing or by comparative design analysis. One remaining question on penetrations exists. Although penetrations are qualified without nitrogen pressurization, the staff is reviewing whether nitrogen gas pressure should be maintained within these penetrations where design permits to provide additional protection. The Commission is requesting that it be informed by the staff on the outcome of its review. This information will also be made available to the public.

Confirmation of the safety adequacy and environmental qualification of all Class IE electrical equipment (not limited to connectors, penetrations, or terminal blocks) in operating plants will be examined as a first-priority matter in the NRC Systematic Evaluation Program (SEP).²⁸ It is expected that in about 1 month the staff review will be reported to the Commission, and made available to the public. The staff review will be sufficient to assess any safety implications in detail to adequately decide whether or not additional review of plants other than those included in the SEP are required.

IV. FIRE PROTECTION

1. Research Program

The purpose of the Fire Protection Research Program initiated after the 1975 Browns Ferry fire is to provide a data base for evaluation of design standards and regulatory guides for fire protection and control. This program includes, among other research projects, cable fire tests. On July 6, 1977, Sandia conducted a cable fire test with a cable tray configuration consisting of stacked columns of cable trays simulating two safety divisions. These cable tray divisions were arranged in accordance with the minimum separation guidelines of IEEE Standard 384 (1974), endorsed by Regulatory Guide 1.75 for protection against propagation of internally initiated electrical fires: 5 feet vertical and 3 feet horizontal spacing between divisions. The fires were initiated by two different means: one test used internal electrical heating, while the other used external propane burners (exposure fire) to produce a sustained fire.

Fire propagation did not occur for internal electrically initiated fires. However, an exposure fire initiated in one of the bottom cable trays resulted in fire propagation from one division to the other. For these tests an external source was required to achieve the fully developed fire.

The Sandia tests²⁹ serve as confirmation of the conclusions from the

²⁸In the first phase of the SEP review the staff will review a group of 11 reactors, including the oldest operating units. These reactors are Dresden 1 and 2, Yankee Row, Big Rock Point, San Onofre 1, Haddam Neck, LaCrosse, Oyster Creek, Ginna, Millstone 1, and Palisades.

²⁹The results of the Sandia fire tests on electric cables were (1) electrically induced fires in cables in these tests did not spread beyond those separation minima set forth in IEEE-384 and

(Continued on next page.)

review of the Browns Ferry fire. As a result of the Browns Ferry review, the staff had made the assumption that exposure fires may propagate beyond the distances set forth in Regulatory Guide 1.75, and has since required additional fire protection measures for nuclear power plants.

2. Regulatory Approach

NRC regulations call for fire protection in nuclear power plants because damage to electrical cables (as well as other equipment) as a result of fire may result in loss of ability to safely perform plant shutdown functions (GDC-3). The fire protection program is intended to ensure, through the defense-in-depth principle, that a fire will not prevent safe shutdown and will not significantly increase the risk of radioactive releases to the environment. Through the defense-in-depth principle the regulations aim at achieving fire protection through adequate balance by:

1. Preventing fires from starting.
2. Detecting and quickly extinguishing fires and limiting their damage.
3. Designing the plant to minimize the effects of fires on essential safety functions.

The Commission endorses the staff's position that no one level of defense-in-depth can be made invulnerable. Strengthening one of the levels can compensate in some measure for reduced safety margins in the others. Cable separation at nuclear power plants is but one design feature to mitigate the consequences of fires. Other fire protection measures include fire detection and extinguishing systems and equipment, administrative controls and procedures, and trained personnel.

3. NRC Actions

In the staff filings dated November 9, 10, 22, December 15, 1977, and January 20, 1978, and during the open Commission meetings on November 11, and December 8 and 22, the staff set forth the actions already taken or underway in accordance with NRC's Fire Protection Action Plan. The staff presented its conclusion that these actions provide adequate assurance that the safety of the public is protected.

(Continued from previous page.)

Regulatory Guide 1.75; and (2) exposure (*i.e.*, externally initiated) fires under cable trays in these tests did spread, causing the cables to burn and the fire to propagate beyond the distances set forth in Regulatory Guide 1.75. The exposure fire employed in the Sandia test (*i.e.*, 5 minutes burn time for two propane burners at 70,000 Btu/h, the use of heat deflectors to concentrate the heat source, burning of the fire for a period of approximately 30 minutes) may well be in excess of the fire reasonably expected to occur, considering current requirements for elimination of combustible materials from cable area, employment of fire watches, provisions of fire detecting, and firefighting equipment.

Among the staff actions on fire protection are the following:

- (a) issuance of IE Bulletins on March 24, 1975, and April 3, 1975, ordering certain controls over ignition sources, review of procedures for controlling plant maintenance and modifications that might affect safety, review of emergency procedures for alternate shutdown, and cooling methods, and review of flammability of materials;
- (b) inspections of all operating power reactors in April and May 1975 covering the installation of fire stops on electrical cables and penetration seals;
- (c) incorporation in the NRC Operating Reactor Inspection Program more detailed procedures for inspection of fire prevention and protection measures;
- (d) improved inspection of licensee quality assurance practices for fire protection;
- (e) development of new guidelines on fire protection for use in the Standard Review Plan, applicable to all nuclear power plants;
- (f) retention of the Factory Mutual Research Corporation as a technical consultant on fire protection;
- (g) improvement of standards in coordination with the Executive Committee of Nuclear Standards Management Board of the American National Standards Institute (ANSI);
- (h) NRC-sponsored research conducted by Sandia Laboratory, which includes testing of cable separation criteria, as well as other fire protection measures (e.g., barriers, coatings);
- (i) initiation of a fire protection evaluation program for all power reactor licensees and applicants; and
- (j) issuance of interim technical specifications for fire protection of operating power plants to cover the period until a full evaluation of plans to achieve conformance with the Appendix A (to Branch Technical Position 9.5-1) guidance.

4. Results of Staff Actions

The need for emergency action was previously considered in the report of the Special Review Group on the Browns Ferry Fire (NUREG-050) in

February 1976 and discussed in testimony before the Joint Committee on Atomic Energy on September 16, 1975, and on March 2, 1976. The Special Review Group concluded that emergency action was not required. The following quotation from their report summarizes the basis for that recommendation (NUREG-0050, Section 1.3):

A probabilistic assessment of public safety or risk in quantitative terms is given in the Reactor Safety Study [WASH-1400]. As the result of a calculation based on the Browns Ferry fire, the study concludes that the potential for a significant release of radioactivity from such a fire is about 20% of that calculated from all other causes analyzed.³⁰ This indicates that predicted potential accident risks from all causes were not greatly affected by consideration of the Browns Ferry fire. This is one of the reasons that urgent action in regard to reducing risks due to potential fires is not required. The study [WASH-1400] also pointed out that "rather straightforward measures, such as may already exist at other nuclear plants, can improve fire prevention and firefighting capability and can significantly reduce the likelihood of a potential core melt accident that might result from a large fire." The Review Groups agrees.

Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent (see Section 3.3). The Review Group believes that steps already taken since March 1975 (see Section 3.3.2) have reduced this frequency significantly.

* * *

Based on its review of the events transpiring before, during, and after the Browns Ferry fire, the Review Group concludes that the probability of disruptive fires of the magnitude of the Browns Ferry event is small, and that there is no need to restrict operation of nuclear power plants for public safety.

However, the Special Review Group recommended improvements in four broad categories: (1) guidance to applicants and licensees; (2) evaluation, inspection, and enforcement procedures; (3) the fire protection programs at licensed facilities; and (4) local governments' emergency procedures. To implement these recommendations, the NRC established an agencywide action plan called the Fire Protection Action Plan which involves the major program offices, *i.e.*, Nuclear Reactor Regulation, Inspection and Enforcement, Standards Development, Nuclear Regulatory Re-

³⁰In addition, the Commission notes that the report of the Reactor Safety Study (WASH-1400, NUREG-75/0145, Appendix XI, page 3-51) states that this 20% value is within the band of uncertainty of the Reactor Safety Study; *i.e.*, the contribution of a Browns Ferry-type fire to overall risk is not statistically significant.

search, Nuclear Materials Safety and Safeguards, and State Programs. In addition, research laboratories including Brookhaven National Laboratory and Sandia Laboratory have been engaged to provide technical assistance to this program. This action plan brings together all NRC fire protection activities into a single integrated program and is the subject of an agencywide management by objective program (MBO VIII). Periodic reviews of the progress on this MBO and monthly reports are provided to the Commission. In May 1976, as part of this plan, the staff revised Section 9.5.1 of the Standard Review Plan and issued new fire protection guidelines for the implementation of General Design Criterion 3, 10 CFR Part 50, Appendix A.

Progress made since the Browns Ferry fire in reducing the potential severely damaging fires includes:

- a. requiring strict administrative controls over the handling and storage of combustibles and ignition sources in areas containing safety-related systems;
- b. modifications to operating power plants to provide fire-retarding, fire-detecting and firefighting capability (*e.g.*, flame-retardant blankets over cable trays, covered cable trays, line detectors, area smoke detectors, sprinklers, etc.);
- c. operating procedures that have been developed by licensees to assure safe shutdown in the event of fire;
- d. additional modifications³¹ now being made to operating power plants to decrease the severity of a fire and increase the plant's capability to cope with an unmitigated fire; and
- e. issuance³² and implementation of interim fire protection technical specifications covering the availability of existing fire protection systems and administrative controls, including fire brigade strength and training, and control of combustibles and ignition sources.

Since no new information was forthcoming from the Sandia tests beyond confirmation of the current staff assumption for review of fire protection measures, *i.e.*, that exposure fires may propagate beyond the minimum separation distances of Regulatory Guide 1.75, the Commission concludes that no immediate action is necessary as a result of these tests. Furthermore, the Commission reaffirms that the longer-term actions underway by the staff are both necessary and adequate for the present.

³¹These modifications are being made as a result of the staff's plant-by-plant reviews leading to the issuance of staff Safety Evaluation Reports (SER's). To date 11 such SER's have been issued covering 16 operating units.

³²Thus far, the staff has issued technical specifications covering 63 operating units.

CONCLUSIONS

Specific Commission responses to the petitioner's request are as follows:

Petitioner Request

- a. The Commission shall direct the staff to accelerate a testing program to determine the type of physical separation between electrical cables necessary to maintain the independence and to meet the single failure criterion for redundant safety systems.

Commission Response

NRC's Fire Protection Research Program is intended to provide a data base for use in evaluating design standards and regulatory guides for fire protection and control. At the present time, the major emphasis is directed toward the study of the effects of cable tray spacing on fire propagation; however, the program includes other aspects of fire research, such as the effects of materials, coating, barriers, detection, and suppression. We agree with the thrust of the petitioner's contentions that there should be an examination of the fire-testing program to determine if it may be beneficially expedited. This examination, however, should not be limited to the portion of the program sought in the petition. The staff is being asked to review this program and to provide the Commission with advice on how the schedule for this program can be improved along with an estimate of the resource requirements. In addition, we expect that the staff will use its best efforts to maintain current schedules for implementation of the reactor plant backfits required for fire protection. The Commission is to be advised in advance if any slippage is anticipated, along with suggested corrective actions.

Petitioner Requests

- b. The Commission shall direct the staff to accelerate a testing program for environmental qualification of connectors.
- c. The Commission shall direct the staff to independently verify the environmental qualifications of all safety-related systems, components, and structures.

Commission Response

The Commission's Qualification Testing Evaluation Program was specifically developed to obtain data to examine current standards and regulatory guides for the environmental testing of safety-related equipment required to operate in a LOCA environment. The purpose of the Sandia tests was not to

verify the qualifications of any particular electrical component to withstand a LOCA event but rather to evaluate the adequacy of the testing methodology. The environmental qualification of plant-specific electrical equipment is the responsibility of the licensee. One aspect of the NRC role in regulating nuclear power plants is to provide criteria forming the engineering baseline against which licensee system designs, including component specifications, are judged for adequacy. It has not been the staff's practice to certify that any particular components are qualified for nuclear service, but rather the staff independently reviews designs and analyses, qualification documentation, and quality assurance programs of licensees to determine adequacy. The Commission affirms this staff practice as being consistent with NRC's responsibilities for administering a licensing program for reactors under the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011, *et seq.*, and the Energy Reorganization Act of 1974, 42 U.S.C. 5801, *et seq.*

As discussed earlier, expedited NRC and licensee actions have been taken to review, in depth, the environmental qualification of electrical connectors, penetrations, and terminal blocks. UCS has highlighted an area of regulatory review which heretofore had not been adequately addressed. As a result, under the NRC Systematic Evaluation Program (SEP) the staff will be reviewing and evaluating as a first-priority matter the safety adequacy and environmental qualifications of all Class IE electrical equipment. One outcome of this SEP will be recommendations as to whether this review needs to be extended to other plants, beyond those reviewed in the first phase of the SEP.

In addition, because the Sandia tests on environmental qualification were inconclusive, the Commission is directing that this testing be repeated on qualified connectors with the results reported to the Commission and made available to the public. These connectors, qualified in accordance with IEEE-323 (1974), should include a representative sample of those commercially available and in use in nuclear power reactor safety systems.

Finally, the Commission is directing the staff to provide it with an analysis of alternatives (including estimates of resource requirements and potential benefits) for conducting independent verification testing of environmentally qualified equipment which is required to operate in safety systems.

Petitioner Request

- d. All licensing and appeal boards should immediately be notified that no further construction permits or operating licenses can be issued until such time as applicants can demonstrate compliance with applicable regulations, including specifically General Design Criteria 3 and 4 of Appendix A of 10 CFR §50.55a(h) and the single failure criterion of Appendix A to 10 CFR Part 50.

Commission Response

Except insofar as it has already been complied with in particular cases, this portion of the petition is denied. The licensing reviews performed on construction permit and operating license applications ensure that General Design Criteria 3 and 4 of Appendix A of 10 CFR Part 50, §50.55a(h), and the single failure criterion of Appendix A to 10 CFR Part 50 are met. The Commission notes, however, that due to the issues raised by the petitioner, relevant information developed by the staff has been provided to the following licensing boards: McGuire Nuclear Station, Docket Nos. 50-369, 50-370 (under construction—in OL review); Oyster Creek Nuclear Power Plant, Docket No. 50-219 (operating plant); Peach Bottom Atomic Power Station, Docket Nos. 50-277, 59-278 (operating plants); and Ginna Nuclear Power Plant, Docket No. 50-244 (operating plant). Furthermore, in the future, in those instances where items or components are identified for which sufficient basis cannot be demonstrated to assure qualification, the staff is directed to bring this information to the attention of any licensing board considering an application for any facility in which such components are to be used.

The single failure criterion requirements of Appendix A to 10 CFR Part 50 and §50.55a(h) applicable to fire protection and environmental qualification requirements do not establish a set of design basis events. Rather, they establish standards for design and performance of electrical systems to ensure that such systems are capable of performing as required.

The staff reviews, as discussed in Section III of their submittal on December 15, 1977, show that plants meet the requirements and that the Sandia tests do not bear upon consideration of single failure requirements, but rather upon the basic question of conformance with overall design goals.

Petitioner Request

- e. All holders of construction permits shall immediately be notified to cease all construction activities involving the connectors identified as defective and all activities relating to electrical cables.

Commission Response

This request is denied, because (1) the licensees for the 33 plants under construction with electrical connectors in safety systems made a commitment to have full environmental qualification prior to operation; (2) NRC inspectors have specific instructions to review the licensees' bases for such environmental qualification; (3) fire protection reviews for the electrical cables are being conducted (since January 1978) in accordance with the current guidance on the Standard Review Plan prior to issuance of an operating license; and (4) in the normal licensing review both fire protection and environmental qualification reviews are conducted to ensure compliance with General Design Criteria 3 and 4 of Appendix A to 10 CFR Part 50,

§50.55a(h), and the single failure criterion of Appendix A to 10 CFR Part 50.

Petitioner Request

- f. All operating reactors shall immediately be ordered to shut down until such time as the operators can demonstrate compliance with the applicable regulations, including specifically General Design Criteria 3 and 4 of Appendix A to 10 CFR Part 50, 10 CFR §50.55a (h), and the single failure criterion of Appendix A to 10 CFR Part 50.

Commission Response

Although D.C. Cook, Unit 1, Pilgrim 1, Haddam Neck, and Browns Ferry, Unit 3, have been shut down (Ginna and Yankee Rowe were already shut down and experienced a longer outage) as the result of investigations in response to this petition, the Commission denies the requested relief sought by the petitioner as it applies to all other power reactors because (1) in view of the additional improvement of fire safety made in operating power plants since the Browns Ferry fire, coupled with the current Fire Protection Action Plan, those plants can continue to operate without undue risk to the public health and safety; (2) the qualification of electrical penetrations, terminal blocks, and connectors (as detailed earlier) has been demonstrated, or a qualification testing program is underway; and (3) the single failure requirements and GDC, as discussed earlier in the Commission response to request "d" of the petitioner, have been met.

Required Staff Actions

The staff is directed to take certain actions, as detailed in Enclosure II. It is so ORDERED.

By the Commission

Samuel J. Chilk
Secretary to the Commission

Dated at Washington, D.C.,
this 13th day of April 1978.

[Appendixes I and II have been omitted from this publication but are available at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

Appendix I

The following table summarizes the qualification criteria and current status of electrical connectors used in safety systems within containment of eighteen operating power reactors. This table is divided into two categories, viz.:

- Category A -** Plants for which electrical connectors are fully qualified, or replaced, and
- Category B -** Plants for which electrical connectors are currently only partially qualified.

Nine of the plants in Category A were found to be fully qualified based on documentation which predates filing of the UCS petition. The balance of the plants in both categories A and B undertook qualification programs in response to the UCS petition.

N.B.: The Hatch power reactor — Unit 1 was originally identified as having connectors which were in safety systems inside containment. Response to IE Bulletin 77-05 indicated this original identification was in error; no connectors exist which are required to perform in a LOCA environment. This accounts for the difference in the number of affected plants identified by UCS (19) and in this table (18).

Electrical Connectors Used in Safety Systems Within Containment of Operating Power Reactors

| PLANT | ENVIRONMENTAL QUALIFICATION CRITERIA | | | | | | REMARKS |
|--|--------------------------------------|--------------------|---------------------------|-----------------------------------|-------------------------------|---|---|
| | FUNCTIONAL OPERABILITY DURING TEST | STEAM EN-VIRONMENT | CAUSTIC SPRAY DURING TEST | RADIATION (PRE-TEST) (SEE NOTE 4) | AGING (PRE-TEST) (SEE NOTE 2) | TEST PROFILE FOR TEMPERATURE AND PRESSURE | |
| A. Electrical Connectors Fully Qualified or Replaced (15 Plants) | | | | | | | |
| Surry 1 & 2 | Yes | Yes | No* | NA** | None | LOCA (Loss of Coolant Accident) | *Connector assemblies protected from spray — **No long term functional requirements — used only for initial actuation of Safety Injection System Status: Qualified (SEE NOTE 1) |
| Oconee 1/2/3 | Yes | Yes | No* | Yes | Yes | LOCA | *Connector assemblies protected from spray Status: Qualified (SEE NOTE 1) |
| Ft. St. Vrain | No* | NA | NA | NA because of location** | None | Design Basis Accident | *Pre/post functional test performed. ** HTGR — Connector located outside primary enclosure Status: Qualified (SEE NOTE 1) |
| Peach Bottom 2/3 | Yes | Yes | Yes | Yes | Yes | MSLB (Main Steam Line Break) | Status: Qualified (SEE NOTE 1) |
| D.C. Cook 1 | Yes | Yes | Yes | Yes* | Yes* | MSLB | Replaced connectors with qualified splices. *Used Raychem data for separate effects test of radiation & aging. Splices qual. to MSLB profile 340°F (1 hr.), 250°F (5 hr.) Status: Qualification of splices complete (SEE NOTE 5) |

Electrical Connectors Used in Safety Systems Within Containment of Operating Power Reactors

| PLANT | ENVIRONMENTAL QUALIFICATION CRITERIA | | | | | | REMARKS |
|----------------------------------|--------------------------------------|-------------------|---------------------------|-----------------------------------|-------------------------------|---|--|
| | FUNCTIONAL OPERABILITY DURING TEST | STEAM ENVIRONMENT | CAUSTIC SPRAY DURING TEST | RADIATION (PRE-TEST) (SEE NOTE 4) | AGING (PRE-TEST) (SEE NOTE 2) | TEST PROFILE FOR TEMPERATURE AND PRESSURE | |
| Palisades | Yes | Yes | No* | Yes | Yes | LOCA | *License Submittal References response by Duke Power Company (Oconee) Status: Qualified (SEE NOTES 1 and 3) |
| Pilgrim 1 | Yes | Yes | NA | Yes* | Yes* | MSLB | Connectors replaced with qualified splices. *Used Raychem data for separate effects tests of radiation and aging. Status: Qualification completed |
| Browns Ferry 1/2 | Yes | Yes | NA | Yes | Yes | MSLB | Initial test followed by full tests with aging and irradiation Status: Qualification completed |
| Connecticut Yankee (Haddam Neck) | Yes | Yes | No* | By Materials Analyses | None | LOCA | Connectors replaced with 4 terminal blocks. *No automatic spray and protected location. (SEE NOTE 5) |
| Oyster Creek | Yes | Yes | NA | Yes | None | MSLB | Repeated tests to confirm initial reliance on earlier Target — Rock Valve Tests. Status: Qualification Completed |

Electrical Connectors Used in Safety Systems Within Containment of Operating Power Reactors

| PLANT | ENVIRONMENTAL QUALIFICATION CRITERIA | | | | | | REMARKS |
|---|--|-------------------|---------------------------|-----------------------------------|-------------------------------|---|---|
| | FUNCTIONAL OPERABILITY DURING TEST | STEAM ENVIRONMENT | CAUSTIC SPRAY DURING TEST | RADIATION (PRE-TEST) (SEE NOTE 4) | AGING (PRE-TEST) (SEE NOTE 2) | TEST PROFILE FOR TEMPERATURE AND PRESSURE | |
| B. Electrical Connectors Partially Qualified (3 Plants) | | | | | | | |
| Browns Ferry 3 | Yes | Yes | NA | Yes | Yes | MSLB | Some connectors failed under test due to unpotted ends. Epoxy potting completed. Fully potted connectors tested and qualified for operations until September 78 refueling, then connectors to be replaced with splices or long term qualification established by further tests to be completed by September 78. |
| Nine Mile Point | Yes | Yes | NA | Yes | None | LOCA | Tests include radiation (also applies to Maine Yankee). Status: Testing satisfactorily completed. Final report to be completed in Mid-April, 1978. |
| Maine Yankee | Nine Mile Point 1 tests will provide confirmatory information to support previous tests completed by Maine Yankee. | | | | | | See Nine Mile Point Remarks |

- Note 1: Original test and test documentation found acceptable. (Applies to action taken prior to UCS petition of November 4, 1977)
- Note 2: The staff has not required backfit of the aging requirement of IEEE-323-1974 to any of these plants. Instead, these tests served to provide a severe stress condition (pre-conditioning) which provides margin to assure the adequacy of prototype (one of a kind) testing.
- Note 3: The licensee inspected cable connectors during present refueling outage and found a few missing blank inserts (used as seal for unused pins in multi-pin cable connectors). I&E was notified and licensee is in process of sealing back end portion of all safety-related cable connectors with potting compound, using approved procedures.
- Note 4: The radiation exposure levels reported by the licensees are in the range of values routinely accepted by the staff since about 1970. Some more conservative values which flow from some interpretations of Regulatory Guide 1.89 are under active generic consideration in connection with the implementation of the guide and the NRC's environmental qualification research program at Sandia (see discussion in Appendix A, pg. 26, or staff December 15, 1977 report).
- Note 5: Recent tests of terminal blocks inside metal boxes in safety systems in D.C. Cook 1/2 and Connecticut Yankee 1 had raised questions about the adequacy of their environmental qualifications. Staff's report of March 30, 1978, indicated that corrective actions had been taken. D.C. Cook 1/2 replaced all questionable terminal blocks with qualified splices and Connecticut Yankee replaced aluminum enclosures for terminal blocks with steel.

REQUIRED STAFF ACTIONS

Appendix II

The following provides, in one place, a listing of all the actions which the Commission is directing the staff to take as a result of this decision: (All reports to the Commission resulting from these actions will also be made available to the public).

1. Conduct a prompt review of the fire protection testing program to determine if it may beneficially be expedited, including an estimate of additional resources required if any. To be completed within one month.
2. Use best efforts to maintain the current schedules for implementation of Fire Protection Action Plan for operating plants and those under licensing review. The Commission is to be advised in advance if any slippage is anticipated, along with the suggested corrective actions.
3. Arrange for a repeat of the tests to obtain data for verification of current methodology for environmental qualification of electrical components. These tests should be performed with a representative sample of commercially available electrical connectors qualified in accordance with IEEE-323 (1974) and in use in nuclear power reactor safety systems. When available, the test results are to be promptly provided to the Commission.
4. Review the procedures by which the Commission, appropriate staff offices and Licensing Boards are notified of research information which is of safety significance, and follow up actions are taken with licensees and applicants. To be completed within one month.
5. Provide the Commission with an analysis of alternatives (including estimates of resource requirements and potential benefits) for conducting independent verification testing of environmentally qualified equipment which is required to operate in safety systems. Alternatives to be provided for information of the Commission in one month, with the full analysis to be completed one month later.
6. Conduct a comprehensive "lessons learned" evaluation to include the following: (a) review all licensee responses (with particular attention to the Pilgrim case), to determine conformance

to applicable quality assurance documentation requirements, as well as the accuracy and timeliness of information provided. (Where justified, appropriate enforcement actions should be taken.); (b) review how electrical equipment, not fully qualified, came to be installed in those plants where found; (c) review staff actions in the Pilgrim case so that similar delays may be avoided in the future; and (d) review the need for further regulatory actions to include a possible NRC policy statement to re-emphasize the important safety responsibilities of licensees. Evaluation to be completed within two months.

7. Develop a plan to investigate the adequacy of quality assurance practices for NRC-sponsored confirmatory research program and provide recommendations to the Commission. This plan is to be developed as a coordinated effort among appropriate NRC offices to include RES, NRR, IE and SD. Consultation with the Department of Energy and appropriate national laboratories is suggested. The plan is to be completed within six weeks.
8. Inform the Commission of results of the staff review of further qualification testing by licensees for which fully documented test results are not yet available. (Browns Ferry 3, Nine Mile Point, and Maine Yankee.)
9. Inform the Commission of the decision made on the question of whether nitrogen gas will be required for those containment penetrations which can accommodate such pressurization. To be completed within one month.
10. Review the results of the first phase of the Systematic Evaluation Program concentrating on the safety adequacy and environmental qualification of all Class IE electrical equipment. Provide recommendations whether this review needs to be extended to other plants. To be completed within one month.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

Docket No. 50-367

**NORTHERN INDIANA PUBLIC
SERVICE COMPANY**

**(Bailly Generating Station,
Nuclear-1)**

April 20, 1978

The Commission denies petitions to set aside the determinations of the Director of Nuclear Reactor Regulation, denying several petitioners' requests, under 10 CFR §2.206, to initiate a proceeding to suspend and revoke the unit's construction permit.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

The staff's participation in a construction permit proceeding does not render it incapable of disinterested and impartial regulatory action on issues arising after the construction permit has been issued.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

The Administrative Procedure Act, 5 U.S.C. 551, *et seq.*, particularly Section 554, and the Commission's regulations, particularly 10 CFR §2.719, deal specifically with on-the-record adjudications and are designed to assure separation of functions between those charged with investigative and prosecutorial responsibilities and those with ultimate decisionmaking authority. Where no adjudication has been begun, neither the APA nor 10 CFR §2.719 prevent the staff from participating in a suspension proceeding.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

Upon receipt of a request to initiate an enforcement proceeding, the Director of Nuclear Reactor Regulation is required to make an inquiry appro-

priate to the facts asserted. *Consolidated Edison Company of New York* (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 175 (1975). He is not required to accord presumptive validity to every assertion of fact, irrespective of its degree of substantiation, or to convene an adjudicatory proceeding to determine whether an adjudicatory proceeding is warranted.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

Absent an abuse of discretion, the Director of Nuclear Reactor Regulation is free to rely on a variety of sources of information in determining whether to initiate an enforcement proceeding, including staff analyses of generic issues, documents issued by other agencies, and the comments of the licensee on the factual allegations.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

The standard to be applied by the Director of Nuclear Reactor Regulation in determining whether to issue a show-cause order is whether substantial health and safety issues have been raised. A mere dispute over factual issues does not suffice. *Consolidated Edison Company of New York* (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 176 (1975).

RULES OF PRACTICE: STANDARD FOR REVIEW OF SHOW-CAUSE DETERMINATION

Review of a show-cause determination is limited to whether the Director of Nuclear Reactor Regulation has abused his discretion. *Consolidated Edison Company of New York* (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 176 (1975).

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

Parties must be prevented from using 10 CFR §2.206 procedures as a vehicle for reconsideration of issues previously decided. *Consolidated Edison Company of New York* (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 176 (1975).

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

The Director of Nuclear Reactor Regulation has discretion to differentiate between those petitions which indicate substantial issues have been raised warranting a show-cause proceeding and those which seek to reopen issues previously resolved or which merely demonstrate that in hindsight even reasonable forecasts will fall short of absolute prescience.

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

The purpose of 10 CFR §2.206 is fully consistent with the principle that agency decisions must be accorded finality, once all administrative and judicial appeals have been exhausted.

MEMORANDUM AND ORDER

On May 5, 1977, the Porter County Chapter of the Izaak Walton League of America, Inc., *et al.*, petitioned the Commission to review the April 15, 1977, determination by the Director of the Office of Nuclear Reactor Regulation to deny their request under 10 CFR §2.206 for initiation of a proceeding to suspend and revoke the construction permit issued to the Northern Indiana Public Service Company to construct the Bailly Generating Station.¹ Separate but substantially identical petitions were received from the Lake Michigan Federation, the City of Gary, and the State of Illinois, regarding the Director's denials of their requests for initiation of proceedings regarding the Bailly facility. The petitioners requested the Commission to treat the Director's denial as a legal nullity and to undertake *de novo* review of the issues presented in the petition to the Director; alternatively, the petitioners requested the Commission to review and overturn the Director's decision.

The petitioners assert that the Director's decision is void on its face because the NRC staff participated as a party adversary to the petitioners in the proceeding which led to the issuance of the construction permit. The petitions claim that it is "fundamentally unfair and an unlawful combination of functions for the Staff to take part in the decisionmaking" on the petitioners' requests.² It is contended that the staff has previously advocated a position on questions "related" to matters on which, in denying petitioners' request, it has now rendered a decision. These "dual and conflicting roles" are, according to petitioners, prohibited by the Administrative Procedure Act, 5 U.S.C. 551, *et seq.*, particularly §554 thereof; the Commission's regulations, particularly 10 CFR §2.719; and procedural due process guarantees.

These contentions are in error both as a matter of law and of policy. Section 554 of the Administrative Procedure Act deals specifically with on-the-record adjudications, and is designed to assure the separation of functions between those persons with investigative or prosecutorial responsibilities and those with ultimate decisionmaking authority. Section 2.719 of the

¹By a rule change adopted subsequent to the filing of these petitions, the Commission, as of August 15, 1977, no longer entertains petitions for review of a director's denial of an enforcement request. 42 Fed. Reg. 36239 (July 14, 1977).

²Petitions of Porter County Chapter, Izaak Walton League; Lake Michigan Federation; City of Gary; and State of Illinois; at p. 3.

Commission's regulations has the same purpose. Here, however, no adjudication has been commenced, and the Administrative Procedure Act and 10 CFR §2.719 clearly do not apply. Moreover, the apparent premise of the petitioners' contention—that for the staff to have taken positions on issues in the proceeding leading to the issuance of the construction permit renders it inherently incapable of disinterested and impartial regulatory action with respect to related issues that may arise after the construction permit is issued—is contradicted by the structure of nuclear regulation established by the Atomic Energy Act and by 20 years of experience implementing that statute.

Petitioners also raise a series of challenges to the procedural legality of the Director's action. They may be summarized as follows:

1. The Director relied for his decision on reviews by the NRC staff, without any opportunity for petitioners to "comment on, respond to, cross-examine, or otherwise participate in any proceeding or hearing prior to the formulation of the Director's response."³

2. The Director improperly failed to give facts in the Petitioners' requests the prima facie weight to which they were entitled; gave credence to allegations of fact by NIPSCO; relied on such "totally unrelated documents as ERDA and FEA statements and draft environmental impact statements in other NRC proceedings; and made what amounted to findings of fact on disputed issues, "without holding a hearing or any other form of fair procedure."⁴

3. The Director improperly and erroneously treated the requests of the four petitioners "as identical requests, whereas the interests asserted, the parties' participation in prior proceedings, and some of the facts and legal developments alleged in the documents submitted by the separate parties are distinct and require individual review, consideration, and decision."⁵

The claims of procedural illegality are without merit. The Director, upon receipt of a request to initiate an enforcement proceeding, is required to make an "inquiry appropriate to the facts asserted." *Consolidated Edison Company of New York* (Indian Point, Units 1, 2 and 3),¹ CLI-75-8, 2 NRC 173, 175 (1975). Contrary to petitioners' assertions, he is not required to accord presumptive validity to every assertion of fact, irrespective of its degree of substantiation, or to convene an adjudicatory proceeding in order to determine whether an adjudicatory proceeding is warranted. Rather, his role at this preliminary stage is to obtain and assess the informa-

³Petitions at 3.

⁴Petitions at 7.

⁵Petitions at 8.

tion he believes necessary to make that determination. Provided he does not abuse his discretion, he is free to rely on a variety of sources of information, including staff analyses of generic issues, documents issued by other agencies, and the comments of the licensee on the factual allegations. Once that inquiry and assessment have been made, the standard to be applied in determining whether to issue a show-cause order is, as we have said in *Indian Point*, whether "substantial health or safety issues [have] been raised . . . [A] mere dispute over factual issues does not suffice." 2 NRC 173, 176.

The Director was fully within his discretion in consolidating the essentially indistinguishable requests of the four petitioners. The petitioners, who assert in identical language the distinctness of their requests and the impropriety of their joinder by the Director, have demonstrated no prejudice as a result of this consolidation.

In addition, the petitioners enumerate ten areas in which they assert that the Director's response to their allegations was erroneous and contrary to law. Our review of these issues is limited to examining whether the Director abused his discretion, specifically:

(1) whether the statement of reasons given permits rational understanding of the basis for his decision; (2) whether the Director has correctly understood governing law, regulations, and policy; (3) whether all necessary factors have been considered, and extraneous factors excluded, from the decision; (4) whether inquiry appropriate to the facts asserted has been made; and (5) whether the Director's decision is demonstrably untenable on the basis of the information available to him. *Consolidated Edison Company of New York*, CLI-75-8, 2 NRC 173, 176 (1975).

Our review of the Director's denial of the requests and of the petitions and responses filed with the Commission satisfies us that the Director's decision fully meets the *Indian Point* requirements, and that the Director did not abuse his discretion in denying the four petitions.⁶ His decision therefore stands as the final Commission disposition on the contentions raised therein. Petitioners' submissions to the Director and to the Commission indicate some basic misconceptions of the purpose of 10 CFR §2.206 and of the Commission's responsibilities under the National Environmental Policy Act, and some further observations may therefore clarify these issues.

In *Indian Point*, we stated that "parties must be prevented from using

⁶During the pendency of this proceeding, the Commission and its Office of General Counsel have received extensive correspondence from the parties with respect to these petitions. Our consideration of this correspondence does not lead us to alter our view that the Director's denial of enforcement action should be upheld.

10 CFR §2.206 procedures as a vehicle for reconsideration of issues previously decided. . . .” 2 NRC 173, 176. As the Supreme Court has observed in upholding an agency’s refusal to reopen the record on one aspect of a proceeding before it:

Administrative consideration of evidence ... always creates a gap between the time a record is closed and the time the administrative decision is promulgated. If upon the coming down of the order litigants might demand rehearings as a matter of law because some new circumstance has arisen, some new trend has been observed, or some new fact discovered, there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening. *Bowman Transportation v. Arkansas-Best Freight System*, 419 U.S. 281, 295 (1974).

Here, we note that the petitions were filed with the Director in November 1976, before installation of a slurry wall and dewatering began at the Bailly site. The changed circumstances alleged therefore do not include any actual or demonstrated impacts of construction activities on the environment, but rather petitioners’ grounds for believing the Final Environmental Statement to be in error, out of date, or incomplete, and the Licensing Board decision authorizing issuance of the construction permit therefore to be void.

The Director properly has discretion to differentiate between those petitions which, upon examination, indicate that substantial issues have been raised warranting institution of a proceeding, and those which seek to reopen issues previously resolved, or which serve merely to demonstrate that in hindsight, even the most thorough and reasonable of forecasts will prove to fall short of absolute prescience.

In the present case, the validity of the construction permit issuance has been thoroughly litigated. A unanimous Supreme Court upheld the Commission’s action in July 1976, and the Seventh Circuit Court of Appeals resolved remaining issues in favor of the Commission in November of that year.⁷ As we made clear in *Indian Point*, the purpose of Section 2.206 is fully consistent with the principle that agency decisions must be accorded

⁷*Porter County Chapter of Izaak Walton League of America, Inc., et al. v. NRC*, 515 F.2d 513 (7th Cir. 1975); reversed and remanded, 423 U.S. 12 (1975); 533 F.2d 1011 (7th Cir. 1976); cert. denied, _____ U.S. _____, 97 S.Ct. 366 (1976).

finality, once all opportunities for administrative and judicial appeal have been exhausted.

Our refusal to disturb the Director's denial of the four petitions is without prejudice to the right of any person to file a future request pursuant to 10 CFR §2.206 on the basis of facts or circumstances warranting initiation of a proceeding to modify, suspend, or revoke the Bailly construction permit.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 20th day of April 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

Docket No. 70-2485
License No. XSNM-1060

**EDLOW INTERNATIONAL
COMPANY**

Docket No. 70-2738
License No. XSNM-1222

(Agent for the Government of
India on Application to Export
Special Nuclear Materials)

April 24, 1978

Because it is unable to make the statutory determinations required for issuance of an export license (the four Commissioners being equally divided), the Commission submits a license application for export of enriched uranium to India to the President.

DECISION

Pursuant to Section 126b. (2) of the Atomic Energy Act of 1954, the Nuclear Regulatory Commission hereby submits license application XSNM-1060 (requesting the authority to export 156.12 kg of U-235 contained in 7,638 kg of uranium enriched to a maximum of 2.15% U-235 to India for use in the Tarapur Atomic Power Station) to the President because it is unable to make the statutory determinations required for issuance of this license under this Act.

The basis for the Commission's decision to refer this license application to the President is that the four Commissioners are evenly divided on the question of whether or not the license in question meets all of the statutory

criteria that the NRC must apply. Chairman Hendrie and Commissioner Kennedy voted for issuance and Commissioners Gilinsky and Bradford against issuance. The license application and the separate views of Commissioner Kennedy and Commissioners Gilinsky and Bradford are attached to this decision.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 24th day of April 1978.

[The license application has been omitted from this publication but is available at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

SEPARATE VIEWS OF COMMISSIONERS BRADFORD AND GILINSKY ON XSNM-1060:

Background

In 1963, pursuant to the export provisions of the Atomic Energy Act of 1954, as amended, the United States entered into an Agreement for Cooperation and peaceful nuclear assistance with the Government of India covering the construction and operation of the Tarapur Atomic Power Station. In 1969, the two power reactors supplied to India under this Agreement went into operation, fueled by enriched uranium purchased from the United States. Since that time the U.S. has continued to supply the fuel needs of these reactors. Before us is an application for approval of the next proposed shipment, XSNM-1060, involving the export of 7.6 tons of enriched uranium.¹

In January of this year, President Carter visited India and assured that Government the fuel shipment would be forthcoming. Later that month, the Executive Branch, in recommending Nuclear Regulatory Commission

¹The Executive Branch recommendation on this export arrived on January 25, 1978. Further Executive Branch comments in response to a motion for further hearings with regard to this application and XSNM-1222 were forwarded to the Commission on March 6, 4 days before the new law took effect. The additional analysis required by the new law was forwarded March 29 and March 30 and supplemented by materials sent in response to questions on April 7.

approval of the license, stated that "the framework of commitments, assurances, and safeguards is adequate for the purposes of this export."²

On March 10, the Nuclear Non-Proliferation Act of 1978, imposing stricter rules over nuclear exports than the earlier statute, was signed into law. In a statement supplementing its favorable recommendation, the Executive Branch expressed its judgment that the application meets the requirements of the new law, called attention to "the special nature of the assurances," and again stressed the urgency attached to the application.³

Relation to the New Law

Controversy has accompanied all fuel shipments to India since that country's 1974 detonation of a nuclear explosive device, whose production involved equipment and materials supplied by Canada and the United States covered by "peaceful use" restrictions. It is not too much to say that the new legislation controlling U.S. nuclear exports to all nations is a direct result of that explosion. Consequently more than ordinary significance attaches to the Commission's consideration of this particular export so soon after the President signed the bill into law.

The new law's preamble states that "proliferation of nuclear explosive devices or of the direct capability to manufacture or otherwise acquire such devices poses a grave threat to the security interests of the United States and to continued international progress toward world peace and development."⁴ How we dispose of this application for shipment of nuclear fuels will have an important effect on the future administration of this law and the way it is perceived in all nations engaged in nuclear commerce with us.

Applicable Provisions of the Law

The Atomic Energy Act, as amended, requires that any export of enriched uranium be pursuant to an agreement for cooperation.⁵ The Act also

² Attachment to memorandum, Department of State to Lee V. Gossick, Nuclear Regulatory Commission, "License Application Analysis," January 25, 1978.

³ Memorandum, Department of State to James R. Shea, Nuclear Regulatory Commission, March 30, 1978. Executive Branch memoranda of January 25, February 21, March 6, and April 7, 1978, also emphasized the urgent nature of the application.

⁴ Public Law 95-242, Section 2. This section continues, "Recent events emphasize the urgency of this threat and the imperative need to increase the effectiveness of international safeguards and controls on peaceful nuclear activities to prevent proliferation." Section 3 further states the law's purpose as "Establishing a more effective framework for international cooperation . . . to ensure that . . . the export by any nation of nuclear materials and equipment and nuclear technology intended for use in peaceful nuclear activities do not contribute to proliferation" (Section 3c); and "Ensuring effective nuclear materials and equipment and of nuclear technology" (Section 3d): Sections 2 and 3 also contain commitments that the United States will be a reliable supplier "to nations which adhere to effective non-proliferation policies."

⁵ Atomic Energy Act, Sec. 57 (c) (1).

prohibits issuance of a license if the Commission finds that the issuance would be inimical to the common defense and security.⁶ The new Act retains these requirements. In addition, Section 126 of the Atomic Energy Act as amended by the Nuclear Non-Proliferation Act of 1978 requires the Commission, having obtained a favorable Executive Branch judgment, to make a finding, based on a "reasonable judgment" of the assurances provided as well as on any other information available to the Federal Government, that the criteria set forth in Section 127, "or their equivalent"⁷ are met.⁸

Of the six criteria of Section 127, we consider three to present particular difficulties for this license application: the first, that International Atom-

⁶Atomic Energy Act, Sec. 57 (c) (2).

⁷The report accompanying the bill notes that this phrase "is intended to avoid technical disqualification of an export application simply because the phrasing of an assurance is not identical to that of a statutory criterion. this phrase should not be interpreted to allow broad variation between the practical effect of an assurance and the statutory requirement." S. Rpt. 95-467, 95th Cong., 1st Sess., October 3, 1977, p. 13.

⁸Section 127 criteria are:

(1) IAEA safeguards as required by Article III(2) of the [Non-Proliferation] Treaty will be applied with respect to any such material or facilities proposed to be exported, to any such material or facilities previously exported and subject to the applicable agreement for cooperation, and to any special nuclear material used in or produced through the use thereof.

(2) No such material, facilities, or sensitive nuclear technology proposed to be exported or previously exported and subject to the applicable agreement for cooperation, and no special nuclear material produced through the use of such materials, facilities, or sensitive nuclear technology, will be used for any nuclear explosive device or for research on or development of any nuclear explosive device.

(3) Adequate physical security measures will be maintained with respect to such material or facilities proposed to be exported and to any special nuclear material used in or produced through the use thereof. Following the effective date of any regulations promulgated by the Commission pursuant to Section 304(d) of the Nuclear Non-Proliferation Act of 1978, physical security measures shall be deemed adequate if such measures provide a level of protection equivalent to that required by the applicable regulations.

(4) No such materials, facilities, or sensitive nuclear technology proposed to be exported, and no special nuclear material produced through the use of such material, will be retransferred to the jurisdiction of any other nation or group of nations unless the prior approval of the United States is obtained for such retransfer. In addition to other requirements of law, the United States may approve such retransfer only if the nation or group of nations designated to receive such retransfer agrees that it shall be subject to the conditions required by this section.

(5) No such material proposed to be exported and no special nuclear material produced through the use of such material will be reprocessed, and no irradiated fuel elements containing such material removed from a reactor shall be altered in form or content, unless the prior approval of the United States is obtained for such reprocessing or alteration.

(6) No such sensitive nuclear technology shall be exported unless the foregoing conditions shall be applied to any nuclear material or equipment which is produced or constructed under the jurisdiction of the recipient nation or group of nations by or through the use of any such exported sensitive nuclear technology.

ic Energy Agency safeguards will be applied to the past and current exports, reactors as well as nuclear fuel, and to any plutonium derived from these exports; the second, that previously and currently exported reactors and fuel and the plutonium derived from them will not be used for any nuclear explosive device, or for research on or development of any nuclear explosive device; and the fifth, that the exported fuel will not be reprocessed after irradiation in the reactor without prior U.S. approval. In considering these criteria we believe the Commission must make a judgment as to whether current safeguards and assurances will apply in the future.

The Additional Export Criterion: Comprehensive Safeguards

In addition to the Section 127 criteria, the Nuclear Non-Proliferation Act forbids, in Section 128, export approvals to nonnuclear weapon states which have not placed *all* nuclear activities under international safeguards within 18 months of the law's enactment. Thus, the effect of Sections 127 and 128 is to bring the restrictions of the law into full force in two phases, the first imposing the criteria of Section 127 immediately, the second imposing the additional criterion at the end of the 18-month period. This latter grace period is designed to allow the President time to seek adherence to the Nuclear Non-Proliferation Treaty, or, failing that, to the Treaty's central controlling device of comprehensive safeguards over all nuclear activities within the importing country.

In the past years India has refused to accept comprehensive safeguards in the absence of sweeping and universal arms control and disarmament agreements. The Department of State reports that the Prime Minister has taken the "consistent position that India would accept such safeguards when at least the U.S., the U.K., and the USSR agreed to a complete nuclear test ban, agreed not to add further to their nuclear arsenals, and came to an agreement to have a gradual reduction of nuclear stockpiles, with a view to the eventual destruction of such stockpiles."⁹ In short, however affirmatively expressed, the Indian conditions are formidable, and meeting them is, in any case, not entirely within U.S. control. Thus they present a very real prospect that the continued U.S. export of nuclear fuel to India beyond the prescribed period will be forbidden under the new law.

As discussed below, this prospect does not compel the NRC to apply the comprehensive safeguards criterion of Section 128 immediately but it does compel the Commission to consider the impact of the prospective criterion on the Commission's ability to find that the Section 127 criteria will continue to be met. Congress clearly intended the protection of exports covered by these immediately effective criteria to extend beyond the 18-month

⁹Memorandum, Department of State to James R. Shea, Nuclear Regulatory Commission, "XSNM-1060 License Application Analysis," March 30, 1978.

period. What may happen then, for reasons peculiar to the Tarapur Agreement for Cooperation, is critically important to our assessment of this license.

Interpreting the Agreement: Assurances and the Fuel Supply

In considering this application under the new statutory criteria we are obliged to take into account both the unusual nature of the Agreement for Cooperation and also the persistent differences in interpretation of key provisions in the Agreement with India which have characterized its history.

The 1963 Agreement under which nuclear exports to India have taken place in the past is unique among U.S. bilateral agreements in that it provides for the exclusive use of U.S. fuel in the Tarapur reactors and, in exchange, for a U.S. guarantee of its supply.¹⁰ This provision played a central role in securing initial Indian acceptance of safeguards at Tarapur.

From the outset there have been disagreements between the two Governments as to the interpretation of the commitments under the Agreement. In fact, in the safeguards article of the original Agreement India wrote its differences into the terms of the Agreement itself¹¹ by emphasizing that the only basis for its acceptance of safeguards over equipment and devices and for its assurances that they would be used solely for peaceful purposes was the special nuclear fuel arrangement involving the exclusive use and the continuing supply of U.S. fuel. This is contrasted with the U.S. position that the safeguards agreement applies to the facility as well as to the fuel. Thus, from the beginning India seems to have tolerated safeguards on the

¹⁰ Agreement Between the United States of America and India, signed at Washington, D. C., August 8, 1963. Article II. A:

During the period of this Agreement the United States Commission will sell to the Government of India and the Government of India will purchase from the United States Commission, as needed, all requirements of the Government of India for enriched uranium for use as fuel at the Tarapur Atomic Power Station, it being understood that the Tarapur Atomic Power Station shall be operated on no other special nuclear material than that made available by the United States Commission and special nuclear material produced therefrom.

¹¹ Article VI. A, U.S.-India Agreement for Cooperation:

The Parties to this Agreement emphasize their common interest in assuring that any material, equipment, or device made available to the Government of India for use in the Tarapur Atomic Power Station, or in connection therewith, pursuant to this Agreement shall be used solely for peaceful purposes. The Government of India emphasizes, in contrast to the position of the United States, that its agreement to the provisions of this Article in relation to equipment or devices transferred pursuant to this Agreement has been accorded in consideration of the fact that, as provided in this Agreement, the Tarapur Atomic Power Station will be operated on no other special nuclear material than that furnished by the Government of the United States of America and special nuclear material produced therefrom, in consequence of which the provisions of this Article in relation to equipment or devices in any case ensue from the safeguards on fuel.

Tarapur reactors themselves only so long as they were operating on U.S.-supplied fuel.

Our concern about this condition for accepting safeguards is heightened by the Indian Government's response to U.S. requests for clarification and reassurance following the Indian explosion of May 1974. In a letter dated July 10, 1974, India not only reasserted its position with regard to the basis for accepting safeguards on the Tarapur reactors but appeared to tie its acceptance of safeguards on the fuel itself to the continuation of Tarapur's fuel supply.¹² It has therefore never been clear how India regards its obligations to the United States, either as to the previously exported reactors or as to the fresh and irradiated fuel, except under the condition of continued supply of U.S. fuel.

A similar conflict in the respective positions of our two Governments over relevant provisions of the Agreement is reflected elsewhere in the July 10, 1974, letter. The Indian Government said it was "unable to share the understanding of the United States Government . . . (1) that the use in or for any nuclear explosive device of any material or equipment subject to U.S. Agreements for Cooperation in Civil Uses of Atomic Energy is precluded; and (2) that under the safeguards agreement related to such Agreements for Cooperation, the IAEA is responsible for verifying, inter alia, that the safeguarded material is not used in or for any nuclear explosive device..."¹³

Immediately thereafter the United States sought and received written assurances that the U.S.-supplied fuel would "hereafter" be used solely "for the needs of the [Tarapur Atomic Power] Station."¹⁴

Application of the Criteria to XSNM-1060

Three elements have now converged in this application: the prospective U.S. requirement of comprehensive safeguards; India's historic attitude toward such safeguards; and the basis of India's position for its acceptance of safeguards and of other commitments (both under the Agreement and more generally) covering the Tarapur reactors and their fuel. Taken together, they raise serious questions about whether the material covered by this ap-

¹²H. N. Sethna, Chairman, Government of India Atomic Energy Commission, to Dixie Lee Ray, Chairman, United States Atomic Energy Commission, July 10, 1974.

¹³*Ibid.*, H.N. Sethna, July 10, 1974.

¹⁴Letter, H.N. Sethna to Chairman Ray, U.S. Atomic Energy Commission, September 17, 1974: "The Government of India would like to reassure the Government of the United States of America that the special nuclear material that has been or is hereafter made available for, or used, or produced in the Tarapur Atomic Power Station located at Tarapur will be devoted exclusively to the needs of that Station. . . ." The records of the correspondence make it clear that India declined to include explicit language covering nuclear explosives requested by the U.S.

plication (as well as previous exports) will continue to be protected in accordance with the Section 127 criteria of the new Act.

In expressing our concern about the ultimate fate of the fuel proposed to be shipped under this license, we are not concluding that the additional export criterion to go into effect a year and a half from now must be satisfied today. We are saying, rather, that the Commission cannot responsibly ignore the undeniable uncertainties surrounding the U.S.-Indian nuclear supply arrangements and the unique manner in which Indian commitments may be tied to future fuel shipments.¹⁵

In reviewing the present application, the Commission must make a judgment about the relative importance of the uncertainties inherent in an Indian fuel shipment today: After 18 months, will IAEA safeguards continue to apply? Will the produced plutonium be precluded from use in explosives? Will the United States continue to exercise the reprocessing control we have deemed essential to effective safeguarding of U.S.-supplied material?

In view of the Indian position in Article VI of the Agreement and the circumstances already set forth, it is difficult to see how the Commission can make a finding, as required by the first criterion of Section 127, that IAEA safeguards will be applied to the previously exported Tarapur reactors or to plutonium produced in them. Nor can it ignore the uncertainties concerning the application of safeguards to the material proposed to be exported or previously exported.¹⁶

Similar uncertainties extend to the second criterion of Section 127: that no material or reactor to be exported or previously exported and no plutonium produced through the use of such materials or facilities will be used for any nuclear explosive device. As noted, India has disagreed with the U.S. on the extent to which "peaceful" nuclear explosions are precluded by the Agreement for Cooperation, but it has assured the U.S. that U.S.-supplied fuel would "hereafter" be used solely "for the needs of the [Tarapur Atomic Power] Station." But we do not know whether this written assurance is linked to the Agreement for Cooperation and to the eventual fate of that Agreement or whether India regards "hereafter" to mean that the

¹⁵In license applications under agreements for cooperation with other nonsignatories of the Non-Proliferation Treaty there is an authorization, but nothing that can be interpreted as an obligation, to supply nuclear fuel. In all other cases, therefore, the prospective comprehensive safeguards requirement imposed as a condition of supply after 18 months does not appear to threaten the durability of the basic agreement.

¹⁶A further difficulty of undetermined practical significance lies in India's rejection of the U.S. position that under the Agreement for Cooperation and other related safeguards agreements, the IAEA is responsible for verifying that safeguarded material is not used in any nuclear explosive device. See Sethna letter, July 10, 1974. India's position conflicts with the criterion 1 requirement that safeguards as required by the Non-Proliferation Treaty be applied, for NPT safeguards are explicitly designed to preclude any nuclear explosions.

assurances are to continue in perpetuity.¹⁷

Finally, the fifth criterion requires that no special nuclear material produced through the use of U.S.-supplied fuel "will be reprocessed" without prior approval of the United States. How the U.S. rights of approval to reprocess the large stockpile of plutonium-bearing spent fuel at the Tarapur station will be interpreted by the Government of India in the event the Agreement comes to an end is not clear. For here we have been provided with no assurances whatsoever.¹⁸

Our attention has been drawn by the Department of State to the changes in the Indian Government since the 1974 explosion, and to public statements and private comments by the Prime Minister concerning nuclear explosive devices and other matters related to this export. We do not question the sincerity of these assurances. Nevertheless, we do not believe they are sufficient to support a Nuclear Regulatory Commission finding that the new law's criteria governing U.S. nuclear exports are satisfied.

What is missing from the record if NRC is to be able to make the finding that the immediately applicable criteria are met is formal assurances that regardless of the eventual fate of the Agreement itself, both current and previous conditions and restraints placed on U.S.-supplied fuel, and on the Tarapur reactors themselves, will be maintained; otherwise the Congressional intent that no U.S. material or facilities contribute to explosive uses of nuclear energy may be frustrated, if not in this case then in one of the many which will follow it. The consistent and objective administration of the new law by the NRC is directly at issue here.

This is true even though, as we have said, the circumstances of this particular license application are unique. It is unique because of the Agreement governing it; but it is also unique because of the "special nature of the assurances" involved in this case. Were it not for these, and the degree of urgency attached to this application, it might have been possible for the Commission to initiate a process designed to obtain the required assurances through further consultation and negotiation with the Government of India. But the exigencies of time do not appear to allow for this approach.¹⁹

Presidential Action

In enacting the Nuclear Non-Proliferation Act of 1978, the Congress

¹⁷Even if the assurances are in perpetuity, they do not cover the use of the reactors, should the Agreement come to an end, to manufacture nuclear explosive materials with fuel from another source. Such assurance is required by the new law.

¹⁸The Prime Minister's March 23, 1978, response to questions in Parliament on this point are not reassuring. "If they say: 'no' [to the fuel shipment]," he said, "once I hear that then all ways are open to us, even the processing of the used [fuel] will be open to us. Then we are not bound."

¹⁹See Department of State memoranda, January 25, February 21, March 6, March 30, and April 7, 1978.

clearly contemplated that in certain situations strict adherence to the terms of the Act would not serve its larger purpose.²⁰ For this reason, the President is authorized, upon a finding by the Commission that it cannot make the statutory findings required of it, to authorize the shipment himself, subject to Congressional review, upon a finding that "withholding the proposed export would be seriously prejudicial to the achievement of United States non-proliferation objectives, or would otherwise jeopardize the common defense and security. . . ."²¹

This is not an appellate procedure in which the President need overrule the Nuclear Regulatory Commission's interpretation of the statute and of its own obligations thereunder. As we have indicated, the President's obligations are broader and his freedom to act more flexible. It is important to make clear that we are not addressing the question whether it would be unwise or inconsistent with overall non-proliferation goals for the President to authorize this export. Unlike an NRC action, a Presidential decision to issue a particular license on the basis of his assessment of a given case would not affect the consistent application by the NRC of the standards Congress has chosen to apply to export decisions.

Thus, our inability to certify that the statutory criteria are met is not to be read as a statement that the President should not authorize this shipment. That judgment is his to make, based on considerations that are legitimately apart from those imposed on us by the statutes that we administer.

COMMISSIONER KENNEDY'S VIEWS ON ISSUANCE OF XSNM-1060:

In my view, license application XSNM-1060 covering the export of fuel to India's Tarapur Atomic Power Station meets all the applicable criteria set forth by Congress in the newly enacted Nuclear Non-Proliferation Act.¹ Therefore, the license should have been issued. Instead, by a divided vote, the Commission is referring this license application to the President because two members of the Commission found themselves unable to make the statutory determinations required by the Nuclear Non-Proliferation Act of 1978. Thus, the Commission could not achieve the majority vote necessary to authorize issuance of the license.

The divided vote arose, in my view, from differing perceptions as to the application of the six statutory criteria set forth in Section 305 of the Act,²

²⁰S. Report 95-467, p. 14: providing for Presidential review in the event NRC "is unable to make the various determinations required by law."

²¹Sec. 126(b) (2).

¹Public Law 95-242, March 10, 1978.

²Section 305 of the Nuclear Non-Proliferation Act establishes a new Section 127 of the Atomic Energy Act which provides:

(Continued on next page.)

as they are affected by the requirement in Section 306 that “. . . IAEA safeguards are maintained with respect to all peaceful nuclear activities. . . .” This requirement, which becomes effective 18 months after enactment of the Nuclear Non-Proliferation Act, has become known as the “full scope safeguards criterion.”³

(Continued from previous page.)

Sec. 127. Criteria Governing United States Nuclear Exports.—

The United States adopts the following criteria which, in addition to other requirements of law, will govern exports for peaceful nuclear uses from the United States of source material, special nuclear material, production of utilization facilities, and any sensitive nuclear technology:

(1) IAEA safeguards as required by Article III(2) of the Treaty will be applied with respect to any such material or facilities proposed to be exported, to any such material or facilities exported and subject to the applicable agreement for cooperation, and to any special nuclear material used in or produced through the use thereof.

(2) No such material, facilities, or sensitive nuclear technology proposed to be exported or previously exported and subject to the applicable agreement for cooperation, and no special nuclear material produced through the use of such materials, facilities, or sensitive nuclear technology, will be used for any nuclear explosive device or for research on or development of any nuclear explosive device.

(3) Adequate physical security measures will be maintained with respect to such material or facilities proposed to be exported and to any special nuclear material used in or produced through the use thereof. Following the effective date of any regulations promulgated by the Commission pursuant to Section 304(d) of the Nuclear Non-Proliferation Act of 1978, physical security measures shall be deemed adequate if such measures provide a level of protection equivalent to that required by the applicable regulations.

(4) No such materials, facilities, or sensitive nuclear technology proposed to be exported, and no special nuclear material produced through the use of such material, will be retransferred to the jurisdiction of any other nation or group of nations unless the prior approval of the United States is obtained for such retransfer. In addition to other requirements of law, the United States may approve such retransfer only if the nation or group of nations designated to receive such retransfer agrees that it shall be subject to the conditions required by this section.

(5) No such material proposed to be exported and no special nuclear material produced through the use of such material will be reprocessed, and no irradiated fuel elements containing such material removed from a reactor shall be altered in form or content, unless the prior approval of the United States is obtained for such reprocessing or alteration.

(6) No such sensitive nuclear technology shall be exported unless the foregoing conditions shall be applied to any nuclear material or equipment which is produced or constructed under the jurisdiction of the recipient nation or group of nations by or through the use of any such exported sensitive nuclear technology.

³Section 306 of the Nuclear Non-Proliferation Act establishes a new Section 128 of the Atomic Energy act which provides in part:

Sec. 128. Additional Export Criterion and Procedures.—

a. (1) As a condition of continued United States export of source material, special nuclear material, production or utilization facilities, and any sensitive nuclear technology to nonnuclear-weapon states, no such export shall be made unless IAEA safeguards are maintained with respect to all peaceful nuclear activities in, under the jurisdiction of, or carried out under the control of such state at the time of the export.

Background

The material covered by XSNM-1060 would have been the 27th in a series of fuel shipments to supply the Government of India with low-enriched uranium to fuel two reactors at India's Tarapur Atomic Power Station, reactors which were supplied by the United States. Under the Agreement for Cooperation between the United States and India, the Government of India has agreed to fuel the Tarapur reactor only with nuclear material supplied by the United States.⁴

XSNM-1060 is also one of a series of licenses in which the Natural Resources Defense Council, the Sierra Club, and the Union of Concerned Scientists filed motions requesting public hearings on the proposed shipments. Two earlier licenses, XSNM-805 and XSNM-845, were reviewed by the Commission and issued only after the petitioners were assured that their concerns would be addressed as subsequent licenses were considered. XSNM-805 was issued by the Commission on July 1, 1976, after an agreement was reached with the petitioners in the intervention that a hearing would be held in connection with the Commission's consideration of the subsequent license, XSNM-845.⁵ The Commission then held 2 full days of public hearings in July 1976, the transcript of which is available in the NRC's Public Document Room. On June 28, 1977, the Commission issued XSNM-845 accompanied by a detailed opinion addressing the merits of the proposed license.⁶

Review of XSNM-1060

Under export licensing procedures adopted in 1975 by the Commission and recently codified in the Nuclear Non-Proliferation Act, the views of the Executive Branch on XSNM-1060 were sought and received.⁷ The Commission, in its detailed review of this license, went further. It examined several aspects of the United States-India nuclear relationship in order to assure

⁴Agreement Between the United States of America and India, signed at Washington, D.C., August 8, 1963. Article II. A:

During the period of this Agreement the United States Commission will sell to the Government of India and the Government of India will purchase from the United States Commission, as needed, all requirements of the Government of India for enriched uranium for use as fuel at the Tarapur Atomic Power Station, it being understood that the Tarapur Atomic Power Station shall be operated on no other special nuclear material than that made available by the United States Commission and special nuclear material produced therefrom. . . .

⁵In connection with the issuance of XSNM-805, the Commission released an opinion detailing the procedural history of the case. *Edlow International Company*, CLI-76-6, 3 NRC 563 (1976).

⁶*Edlow International Company*, CLI-77-20, 5 NRC 1358 (1977).

⁷Memorandum for Lee V. Gossick, Nuclear Regulatory Commission, from Peter Tarnoff, Executive Secretary, Department of State, January 25, 1978.

itself of the adequacy of the assurances and safeguards applicable to the proposed export.⁸ Additional submissions were requested from the Executive Branch to address the impact of the new Nuclear Non-Proliferation Act on the proposed shipment,⁹ the criteria contained in the Act,¹⁰ and the issue of perpetuity of safeguards over U.S.-supplied material in India.¹¹ The Commission also received a regular and continuing flow of information on political developments in India regarding nuclear supply including news reports, descriptions of Indian parliamentary debates, and accounts of ongoing United States-India discussions on non-proliferation matters.

All of the facts and circumstances surrounding this export were examined at length by the Executive Branch and by the appropriate Commission staff offices. All reached the same conclusions. The Executive Branch found that the criteria were met and recommended that the license be issued.¹² The Commission's own staff reached the same conclusion.¹³ The NRC's Office of the Executive Legal Director, when asked by Commissioner Bradford to review the license application in light of the six criteria, also reached the judgment that the criteria or their equivalent were met.¹⁴

Not only were the requirements of the Nuclear Non-Proliferation Act met but this license application became a key factor in broader foreign policy initiatives of the United States. The Executive Branch stressed that not only was the license urgently needed for India's nuclear power pro-

⁸For example, the Commission had before it the following memoranda from its staff:

Memorandum from Carlton R. Stoiber, Assistant General Counsel to Commissioner Gilinsky, subject: Nuclear Non-Proliferation Act Provisions on Explosive Devices, March 30, 1978.

Memorandum from Ken Pedersen to Commissioner Gilinsky, subject: U.S.-India Agreement for Cooperation, March 31, 1978.

Memorandum from Ken Pedersen to Commissioners Gilinsky and Bradford, subject: U.S.-India Agreement for Cooperation, April 3, 1978.

Memorandum from Ken Pedersen to Commissioner Gilinsky, subject: Fuel Requirements for Tarapur Reactors, April 3, 1978.

⁹Memorandum for James R. Shea, Nuclear Regulatory Commission, from Louis V. Nosenzo, Deputy Assistant Secretary, Department of State, March 29, 1978.

¹⁰Memorandum for James R. Shea, Nuclear Regulatory Commission, from Louis V. Nosenzo, Deputy Assistant Secretary, Department of State, March 30, 1978.

¹¹Memorandum for James R. Shea, Nuclear Regulatory Commission, from Louis V. Nosenzo, Deputy Assistant Secretary, Department of State, April 7, 1978 (Classified-Confidential).

¹²See note 7, *supra*.

¹³Memorandum from James R. Shea, Director, Office of International Programs, to the Commission, February 22, 1978, SECY-78-105.

Memorandum from Ken Pedersen to the Commission, subject: LEU Export to India (XSNM-1060) and Related NRDC Petition, March 13, 1978.

¹⁴Memorandum from Lee V. Gossick, Executive Director for Operations, to the Commission, April 6, 1978, subject: Export of Tarapur Fuel—Fulfillment of Criteria of Nuclear Non-Proliferation Act.

gram, but that it was needed to facilitate the continuation of ongoing U.S. non-proliferation initiatives with the Government of India.¹⁵ Indian supply concerns, in fact, were well known by the Commission. It was no secret that the Government of India was becoming more than a little concerned about the continuation of its nuclear fuel supply relationship with the United States and about the reliability of the United States as the exclusive supplier of nuclear fuel under the Agreement for Cooperation.

More directly pertinent to the Commission's responsibilities, however, is the need to assure proper safeguards for exports, and to achieve United States non-proliferation objectives. The Commission's action on XSNM-1060 may well have made more difficult the achievement of the full scope safeguards regime which all agree must be the objective.

The Proper Application of the Nuclear Non-Proliferation Act

As I have indicated, the analyses and recommendations provided to the Commission by the Executive Branch and the Commission's own staff have been unanimous in stating that the six criteria are presently met by this export license application. I agree fully with that conclusion. But what then is the issue which divides the Commission?

The principal issue regarding the issuance of XSNM-1060 arises from the effect of the additional export criterion, *i.e.*, full scope safeguards, which is to be applied to license applications filed 18 months after enactment of the statute.¹⁶ My colleagues state that "Congress clearly intended the protection of exports covered by the criteria to extend beyond the 18-month period."¹⁷ They argue that the Commission cannot properly find that three of the statutory criteria (IAEA safeguards, peaceful use assurances, and reprocessing controls) will prospectively be met.

They point to the fact that the application of the full scope safeguards requirement in 18 months may compel the United States to terminate its fuel supply relationship with the Government of India, thereby calling into question the entire regime of safeguards and assurances contained in the United States-India Agreement for Cooperation. This doubt as to what will occur at the end of the 18-month period leads them to find that adequate assurances are "missing from the record." They state that what is needed are "formal assurances that regardless of the eventual fate of the Agreement itself, both current and previous conditions and restraints placed on

¹⁵Memorandum for Lee V. Gossick, Nuclear Regulatory Commission, from Peter Tarnoff, Executive Secretary, Department of State, March 6, 1978.

See also memorandum for James Shea from Louis V. Nosenzo, note 10, *supra*.

¹⁶See note 3, *supra*.

¹⁷Memorandum Defining the Views of Commissioners Bradford and Gilinsky, April 20, 1978, page 440, *supra*.

U.S.-supplied fuel, and on the Tarapur reactors themselves, will be maintained."¹⁸ In other words, they argue that the Commission can consider the criteria met only if it can find that "assurances are to continue in perpetuity."¹⁹

I believe this line of reasoning is fundamentally unsound. First, with respect to the difficult issue of maintaining safeguards in perpetuity, the Congress established in Section 404 of the Nuclear Non-Proliferation Act a precise statutory mechanism for achieving this desirable policy objective by calling for a process of renegotiating all existing United States agreements for cooperation with foreign nations.²⁰ If the Congress had intended that a guarantee of perpetual safeguards should be an immediately applicable requirement for United States nuclear exports, it hardly would have made it a negotiating objective to be sought in the form of amendments to existing agreements for cooperation. Instead, Congress was explicit in stating that, though changes were to be sought in present agreements through negotiations to this end, this fact "shall not affect the authority to continue cooperation pursuant to agreements entered into prior to the date of enactment of this Act."²¹

There is no room for doubt, therefore, that the Commission is required only to find that safeguards as provided by present agreements will be applicable. As earlier noted, Congress clearly laid out a specific and different method for obtaining assurances of safeguards to apply beyond the term of existing agreements for cooperation. Thus it is clear that the Act does not contemplate the termination of nuclear cooperation by the NRC in a case such as this in which the renegotiation process has not been completed in the first 40 days following its enactment.

Moreover, I believe that the legislative history of the Nuclear Non-Proliferation Act amply demonstrates that Congress clearly intended that commerce with our current nuclear trading partners should continue during the 18-month period which was provided for negotiating full scope safeguards arrangements. There were frequent expressions of concern during Congressional deliberation of the proposed legislation as to the possible impacts of the six immediately applicable criteria on the ability of the United States to maintain nuclear commerce with nations already covered by existing cooperative agreements. On each occasion the Congress was assured that appli-

¹⁸*Ibid.*, page 444.

¹⁹*Ibid.*, page 444.

²⁰Section 404 of the Act mandates that "The President shall initiate a program immediately to renegotiate agreements for cooperation in effect on the date of enactment of this Act. . . ." Section 401 sets out the terms which, at a minimum, the President is directed to obtain through renegotiation of existing agreements. It is notable that the first item mentioned is the need to ensure that safeguards are unrelated to the duration of the applicable agreement of cooperation, but will be maintained in perpetuity.

²¹P.L. 95-242, Section 405(a).

cation of the criteria would not create a moratorium on United States nuclear exports. The Senate Report on the Act reflected this Congressional understanding, as follows: "As currently drafted, these 'Phase I' export criteria will not result in an immediate moratorium on U.S. nuclear exports. Although the actual language in our existing agreements for cooperation varies, and seldom corresponds precisely to the language of these criteria, it is our understanding that each of these basic requirements and rights are contained in those agreements noted below."²²

Moreover, in introducing the non-proliferation legislation, Senator John Glenn, the floor manager of the bill, stated: "The criteria which go into effect immediately upon passage of this bill represent nothing more than a common-sense codification of existing policy regarding nuclear exports to nonweapon states."²³

This view is consistent with the position which President Carter expressed when the Administration's non-proliferation bill was transmitted to the Congress,²⁴ with testimony repeatedly offered by Executive Branch officials during Congressional deliberations on the Act,²⁵ and with testimony by members of the Commission itself.²⁶

Yet the arguments expressed in my colleagues' memorandum center on the fact that the United States-India Agreement for Cooperation does not provide now for the more stringent safeguards assurances which Congress requires be put in place for the future. They note, for example, not only India's hesitation to adopt full scope safeguards, but also India's cautious insistence that safeguards themselves are a quid pro quo for an assured fuel supply for the Tarapur reactors. Further, the argument hinges directly on the reasonable concern that safeguards should be applied beyond the term of any agreement for cooperation. Indeed, these are points of concern which must be reconciled in future negotiations with India. The Congress itself required that all such problems be resolved through the renegotiation process which it directed the President to undertake. But at the same time, Congress clearly intended that nuclear supply continue under present agreements while negotiations proceed.

But the argument is made that we cannot continue cooperation at this time under these circumstances. And the argument is couched in language which suggests that the present criteria are not met and therefore coopera-

²²Senate Report No. 95-467, October 3, 1977, page 16.

²³124 Congressional Record, February 2, 1978, S. 1065.

²⁴White House transmittal letter to Congress on S. 1432, the Nuclear Non-Proliferation Policy Act of 1977 (April 27, 1977).

²⁵Statement of Joseph S. Nye, Deputy to the Under Secretary of State for Security Assistance, before the Energy, Nuclear Proliferation, and Government Services Subcommittee of the Senate Government Affairs Committee (May 6, 1977).

²⁶Statement of Chairman Marcus Rowden to the Senate Foreign Relations Committee (May 23, 1977).

tion must cease, or at least that the Commission itself cannot approve shipments. But Congress intended no such result. As earlier described, the Nuclear Non-Proliferation Act and its legislative history make clear that Congress intended to achieve perpetual safeguards through renegotiation of present agreements, not through interpretation of the six immediately applicable criteria. Congress further intended that those six criteria would not lead to a moratorium against any of our nuclear trading partners.

It is argued further that the United States-India Agreement for Cooperation is unique because, as my colleagues' memorandum states, "the only basis for its [India's] acceptance of safeguards over equipment and devices and for its assurances of their use solely for peaceful purposes was the special nuclear fuel arrangement involving the exclusive use and the continuing supply of U.S. fuel."²⁷ My colleagues memorandum further states that "serious questions" are raised "about whether the material covered by this application (as well as previous exports) will continue to be protected in accordance with the Section 127 criteria of the new Act."²⁸

It is true that the United States-India Agreement for Cooperation differs from others in the respect noted. However, a number of factors are relevant in this regard.

First, the United States-India Agreement for Cooperation explicitly provides for the return of all U.S.-supplied special nuclear material in the event of termination of the Agreement by either party.²⁹ Second, India has repeatedly informed the United States of its willingness, indeed, its desire, to return to the United States the spent fuel which was generated in the Tarapur Atomic Power Station. Third, it must be emphasized that the nuclear material covered by XSNM-1060 represents only the latest in a long series of shipments to India. No Tarapur fuel has ever been diverted to unauthorized uses by the Government of India. There is no evidence available to me that such a diversion is likely in the future; and the Commission is neither required nor empowered to act on mere presumption as to the course of future events. Instead, as the Nuclear Non-Proliferation Act states in Section 304(a), our decisions are to be based on a "reasonable judgment of the assurances provided and other information available to the Federal Government, including the Commission, that the criteria in Section 127 of this Act or their equivalent, and any other applicable statutory requirements are met."

²⁷Memorandum Defining the Views of Commissioners Bradford and Gilinsky, April 20, 1978, page 441, *supra*.

²⁸*Ibid.*, pages 442-443.

²⁹Article VIII. c. of the United States-India Agreement for Cooperation provides in part:

In the event of termination by either Party, the Government of India shall, at the request of the Government of the United States of America, return to the Government of the United States of America all special nuclear materials received pursuant to this Agreement and in its possession or in the possession of persons under its jurisdiction.

Finally, our foremost objective should be to obtain the non-proliferation goals which are set out in the Nuclear Non-Proliferation Act, including full scope safeguards. Consequently, our actions should be aimed at continuing the present high level discussions with the Government of India on this subject and at avoiding actions which would lead to discontinuation of the cooperation which helps facilitate those discussions and may well contribute much to the likelihood of their success.

Achieving Full Scope Safeguards

Full scope safeguards is an objective which, as all have acknowledged, will require careful negotiation to achieve. It is well understood that India sees full scope safeguards as controversial and is apparently not yet convinced that their adoption would be in its own interests. It considers a number of other conditions as desirable accompaniments to such a regime. But the fact that negotiations may be complex and difficult does not argue against engaging in them. Nor does it justify a presumption that there is no real chance that they will succeed. There simply is no basis for the Commission to conclude that the ultimate outcome of such negotiations which are to be conducted by the appropriate Executive Branch agencies on behalf of the United States will be failure. The President himself has raised the issue with the Prime Minister of India, and those responsible for such negotiations within the Executive Branch have maintained a continuing dialogue with India on this subject. There is every evidence that India's attitude has not been intransigent but indeed has evidenced a willingness to pursue these issues with us seriously. I have no reason to believe that efforts will not continue in diplomatic channels and at the highest governmental levels on both sides. For after all, the supply relationship with India is a continuing one under the very terms of our Agreement for Cooperation. If India is to observe the terms of our Agreement, as it has in the past, it must rely on the United States for fuel for the Tarapur reactor. And indeed there is still another license pending with the Commission, XSNM-1222, now under consideration in the Executive Branch.

XSNM-1060 and Future Licenses

Finally, I believe it should be noted that the Commission's action on XSNM-1060 may impact subsequent license applications made pursuant to the U.S.-India Agreement for Cooperation. There was, I thought, no doubt whatsoever that Congress had delayed the effective date of the full scope safeguards criterion for 18 months in order to permit the necessary period of time for sensitive negotiations. The Congress also directed that cooperation would continue under present arrangements. It did so because it was continually led to believe that the six immediately applicable criteria would not

lead to a moratorium on exports and it so stated its belief with regard to the Act.

But the Commission has now refused a fuel shipment—the 27th under present arrangements. To do so, the criteria adopted by the Congress were interpreted in such a way as to achieve a result different from that intended by the statute. In short, the full scope safeguards criterion is now being interpreted in a way which may give the appearance of a potential moratorium on fuel shipments to India.

If nuclear supply cooperation is to continue with India then the issues which now divide the Commission must be resolved. As I have indicated, adoption of full scope safeguards is a matter for the 18-month negotiation period specifically provided by Congress; and provision of perpetual safeguards assurances is unambiguously a matter for the Section 404 renegotiation process.³⁰ In my view, for the Commission to demand either at this time by holding licenses hostage to these requirements is to thwart the will of Congress and to make more difficult the very negotiating process which Congress in its wisdom foresaw as the approach most likely to achieve United States non-proliferation objectives.

³⁰My colleagues apparently take a different view not only as to how the Congress intended perpetual safeguards assurances should be sought, but as to who should seek them as well. Section 404(a) of the Nuclear Non-Proliferation Act specifically places responsibility on the President to "initiate a program immediately to renegotiate agreements for cooperation in effect on the date of enactment of this Act. . . ."

On the other hand, it states on page 444 of my colleagues' memorandum:

Were it not for . . . the degree of urgency attached to this application it might have been possible for the Commission to initiate a process designed to obtain the required assurances through further consultation and negotiation with the Government of India. But the exigencies of time do not appear to allow for this approach.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy
Peter A. Bradford

In the Matter of

Docket No. 70-2485
License No. XSNM-1060

**EDLOW INTERNATIONAL
COMPANY**

Docket No. 70-2738
License No. XSNM-1222

(Agent for the Government of
India on Application to Export
Special Nuclear Materials)

April 24, 1978

The Commission denies a motion to hold a public hearing on an application for a license to export low-enriched uranium to India and defers decision on a public hearing on another such application pending receipt of an Executive Branch judgment on the merits of that application.

ORDER

On February 13, 1978, the Natural Resources Defense Council, Inc., the Sierra Club, and the Union of Concerned Scientists filed two motions with the Commission. The first requested the Commission to resume the hearings the Commission held in July 1976 on exports of low-enriched uranium to India. The second requested that the Commission consolidate consideration of applications XSNM-1060 and XSNM-1222, two applications for low-enriched uranium to be used at the Tarapur Atomic Power Station, India. On March 6, the Commission granted Petitioners' request that license application XSNM-1222 be consolidated with XSNM-1060. CLI-78-4, 7 NRC 311.

At a public meeting held on April 20, 1978, the Commission voted

3-1 to deny the motion requesting a further public hearing on XSNM-1060.' The Commission did not believe that further public participation with respect to that license application would generate relevant information or analysis and therefore concluded that written or oral hearings would not be in the public interest or assist the Commission in making the statutory determinations required by the Atomic Energy Act, 42 U.S.C. 2155(a).

The Commission has not yet received an Executive Branch judgment on XSNM-1222 and therefore does not feel it appropriate to address at this time whether a public hearing should be held on XSNM-1222. We will address that issue at a later date.

It is so ORDERED.

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 24th day of April 1978.

¹Commissioner Kennedy voted for a public hearing; Chairman Hendrie and Commissioners Gilinsky and Bradford voted against a hearing.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket No. 50-341

DETROIT EDISON
COMPANY

(Enrico Fermi Atomic
Power Plant, Unit 2)

April 7, 1978

The Appeal Board dismisses for lack of jurisdiction a motion filed by an individual (a member of an organization that unsuccessfully sought to intervene) requesting issuance of a new notice of hearing on application to amend construction permit.

RULES OF PRACTICE: JURISDICTION OF APPEAL BOARD

The appeal board normally lacks jurisdiction to entertain motions seeking review only of actions of the Director of Nuclear Reactor Regulation; the Commission itself is the forum for such review. See 10 CFR 2.206(c).

Dr. Robert G. Asperger, Midland, Michigan, for the
Citizens for Employment and Energy

Mr. Richard L. Black for the Nuclear Regulatory Com-
mission staff.

MEMORANDUM AND ORDER

On March 21, 1978, the Licensing Board entered an order which, *inter alia*, denied the amended petitions of Martha G. Drake and Citizens for Employment and Energy (CEE) for leave to intervene in this construction permit amendment proceeding involving Unit 2 of the Fermi nuclear facility. LBP-78-11, 7 NRC 381. Although Mrs. Drake has filed a timely appeal

under 10 CFR 2.714a, no notice of appeal has been received from CEE. On March 23, 1978, however, Dr. Robert G. Asperger, a CEE member, filed a motion with both this Board and the Commission seeking the issuance of a "new, timely, and nondefective notice of hearing" on the construction permit amendment application.

Even treating the motion as having been filed on CEE's behalf (though it does not say so), we must agree with the NRC staff that we are not empowered to entertain it on the merits. The motion plainly does not constitute an appeal by CEE from the denial of its intervention petition; nor does it purport to seek review, pursuant to 10 CFR 2.762(a), of an initial decision of the Licensing Board. Dr. Asperger is not represented by counsel and is manifestly unfamiliar with the Rules of Practice. As we read his papers, he appears to be complaining about actions which the Director of Nuclear Reactor Regulation has refused to take, including an asserted unwillingness on the Director's part to institute proceedings against the licensee for selling 20 percent of Fermi 2 without prior Commission approval. Under the Commission's regulations, the Director's actions are not normally subject to our review; relief (if warranted) must come from the Commission itself. See 10 CFR 2.206(c).

Insofar as addressed to this Board, the motion therefore must be *dismissed* for want of jurisdiction.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Jerome E. Sharfman

In the Matter of

Docket Nos. STN 50-518
STN 50-519
STN 50-520
STN 50-521

TENNESSEE VALLEY
AUTHORITY

(Hartsville Nuclear
Plants, Units 1A, 2A,
1B, and 2B)

April 19, 1978

Upon intervenors' petition for reconsideration of ALAB-463, 7 NRC 341 (1978), the Appeal Board denies the petition in all respects but remands to the Licensing Board to consider the environmental impact of radon releases pursuant to the Commission's order of April 11, 1978, 43 Fed. Reg. 15613 (April 14, 1978).

RULES OF PRACTICE: AUTHORITY OF APPEAL BOARD

An appeal board has the authority to take evidence. *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), ALAB-443, 6 NRC 741, 757, n. 53 (1977).

RULES OF PRACTICE: APPELLATE REVIEW

There is no right to an administrative appeal as of right on every factual finding.

MOTION FOR RECONSIDERATION: RAISING MATTERS FOR THE FIRST TIME

On a motion for reconsideration of an appeal board decision, a party cannot raise for the first time, as of right, matters not placed in contest before the licensing board or the appeal board.

ATOMIC ENERGY ACT: FINAL ORDER

As a general rule, the appeal board does not characterize its decisions as final or not final for the purposes of judicial review. Its opinion on that subject would only be advisory.

APPEAL BOARD: ADVISORY OPINIONS

The appeal board does not engage in the rendition of advisory opinions in the absence of the most compelling considerations. *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41, 54 (1978).

REGULATIONS: INTERPRETATION

One of the functions of the Commission's Office of the General Counsel is to provide official written interpretations of the Commission's rules. 10 CFR 1.32(f), 42 Fed. Reg. 36797, 36799 (July 18, 1977). If a party desires an official Commission interpretation of a regulation, it is free to request one from the General Counsel.

NEPA: SCOPE OF INFORMATION REQUIRED FOR LICENSING

By order dated April 11, 1978 (43 Fed. Reg. 15616 (April 14, 1978)), the Commission directed that the value of radon-222 emissions be litigable in all licensing proceedings pending before licensing or appeal boards whether or not it was previously in issue or whether a party desired to raise it. In such cases, the record must be supplemented to receive evidence on radon releases and the health effects resulting therefrom.

Messrs. Herbert J. Sanger, Jr., David G. Powell, and Alvin H. Gutterman, Knoxville, Tennessee, for the Tennessee Valley Authority, applicant.

Messrs. Leroy J. Ellis III and Robert B. Pyle, Nashville, Tennessee, for William N. Young, *et al.*, intervenors.

Mr. William D. Paton for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Intervenors William N. Young, *et al.*, have moved for reconsideration of ALAB-463, 7 NRC 341 (March 17, 1978). Their motion raises three separate points. We will deal with each in turn.

I. OUR POWER TO TAKE EVIDENCE

In ALAB-463¹ we reserved decision as to the correctness of the Licensing Board's approval of the downstream location for the discharge diffuser and afforded the parties an opportunity to submit briefs and written testimony on specified matters which might have a crucial bearing on this issue.² Intervenors assert "that it was error to provide for the submission of evidence to the Appeal Board."³

Their main ground for this assertion is that we do not have the authority to take evidence. But, as we recently stated in *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2). ALAB-443, 6 NRC 741, 757, n. 53 (1977):

This authority is well established. See *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-284, 2 NRC 197 (1975); *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-194, 7 AEC 431, 448 (1974); *Trustees of Columbia University*, 4 AEC 680, 681-82 (1971), *aff'd sub nom. Morningside Renewal Council v. AEC*, 482 F.2d 234, 239 (2d Cir. 1973), *cert. denied*, 417 U.S. 951 (1974).

In this case, our request for evidence went to a very limited matter, as to which the record was incomplete.⁴ It did not seem worthwhile to make the parties incur the expense and delay of a remand for such a limited matter.⁵

¹7 NRC at 371.

²In an unpublished order dated March 29, 1978, we granted applicant's motion to defer the submission of the briefs and testimony called for in ALAB-463 to the thirtieth day following the rendition of the Licensing Board's decision on applicant's promised petition for approval of the upstream location.

³Petition for reconsideration, p. 3.

⁴See ALAB-463, 7 NRC at 365, 371.

⁵Intervenors' other grounds of objection, that this procedure deprives them of an administrative appeal on the downstream location and violates the original notice of hearing in this case, are frivolous. If dissatisfied with our eventual decision on the downstream location, they may petition the Commission for review of it (see §2.786(b) of our Rules of Practice, 42 Fed. Reg. 22130 (May 2, 1977)) and, if that remedy fails, may seek review by a court of appeals. There is no right to an administrative appeal as of right on every factual finding. Besides, intervenors have already had both a hearing before the Licensing Board on the downstream location (provided for by the notice of hearing) and an appeal as of right to us from its approval of that location.

II. THE NEED FOR AN INTAKE GRID

In ALAB-463,⁶ we found that the new evidence in the record confirmed our prior view “that a screen at the mouth of each intake pipe is not necessary for the protection of divers.” One of the reasons for that determination was that “there is no suggestion in the record that the intake pipes will be located in a mussel bed.” Since “[c]ommercial musselers know where the mussel beds are,” we concluded that they will not dive near the mouths of the intake pipes.⁷ Intervenor now argue that this assumption was unwarranted because we “misconstrued the evidence relating to the location of the endangered species of mussel as establishing the location of mussel beds generally.”⁸ They say that there is no basis in the record “for assuming the absence of a mussel bed in the intake pipe area.”⁹ They therefore ask that the intake grid issue “be remanded for further evidence.”¹⁰

At the outset, we observe that the intake grid matter was not placed in contest by the intervenors either before the Licensing Board or on their appeal to us. Therefore, intervenors have no right to raise it for the first time at this juncture. However, because we are concerned with the substance of the matter, we have reconsidered that aspect of it as to which intervenors claim we erred.

The evidence of record shows that the mussel bed below Dixon Island, at the originally proposed location of the discharge diffuser, was “found to be the only mussel bed in the area of potential impacts from the construction and operation of the Hartsville Nuclear Plants.”¹¹ It seems clear that applicant located and surveyed all of the mussel beds in those portions of the river near the Hartsville plant site, not merely those beds containing the endangered species.¹² It was logical for this to be done because it could not be then foretold which beds would contain the endangered species.¹³ Moreover, comparison of a map of mussel beds on the Cumberland River

⁶7 NRC at 369-370.

⁷*Id.* at 369.

⁸*Id.* at 369.

⁹Petition for reconsideration, p. 6.

¹⁰*Id.* at p. 7.

¹¹*Ibid.*

¹²Written testimony of Billy G. Isom, following Tr. 6315, p. 2. *Accord*, p. 6 of *Mussel Fauna of the Cumberland River in Tennessee* (September 1976), attached to Applicant's Exhibit 3-7, which is identified in footnote 71 of ALAB-463.

¹³*Id.* at pp. 6-9.

¹⁴Indeed, the tables attached to the September 1976 report show that *Lampsilis orbiculata* was not present in all of the beds sampled.

prepared by the Army Corps of Engineers¹³ with a map of the Hartsville site layout¹⁶ shows that there are no mussel beds at the site of the intake pipes. Thus, there is no reason for reopening the intake grid issue.

III. THE REQUEST FOR CLARIFICATION OF ALAB-463

Intervenors correctly state that we did not indicate in ALAB-463 whether or not it was a "final decision" within the meaning of 10 CFR 2.770 and 2.771. They assert that the ambiguity caused by this omission makes them uncertain as to whether they are entitled to seek judicial review of ALAB-463 pursuant to §189 of the Atomic Energy Act, 42 U.S.C. 2239. Consequently, they seek "a clarifying order" from us.

We are not in the habit of characterizing our own decisions as final or not final for the purpose of judicial review. This is a question which counsel for a party desiring to appeal must decide for himself in the first instance. Ultimately, of course, it may have to be decided by the court to which the appeal is taken. Our opinion on the question would only be advisory in any case, and we do not engage in the rendition of advisory opinions in the absence of the most compelling considerations. *Northern States Power Co. (Prairie Island Nuclear Generating Plant, Units 1 and 2)*, ALAB-455, 7 NRC 41, 54 (January 27, 1978).

Nevertheless, we do note that one of the functions of the Commission's Office of the General Counsel is to provide "Official written interpretations of the Commission's rules." 10 CFR 1.32(f), 42 Fed. Reg. 36797 at 36799 (July 18, 1977). If intervenors desire an official Commission interpretation of Sections 2.770 and 2.771 of its regulations, they are free to request one from the General Counsel.

IV. RADON RELEASES

In a rulemaking decision dated April 11, 1978,¹⁷ the Commission amended Table S-3 of 10 CFR Part 51, entitled "Summary of Environmental Considerations for Uranium Fuel Cycle," to delete the value previously listed for emissions of radon-222 and to indicate that the question of what the value should be is "[p]resently under reconsideration by the Commission."¹⁸ The Commission declined to institute a rulemaking proceeding on radon emissions at this time but stated that the matter "can be considered in

¹³May 2, Chart No. 36, attached to *Mussel Fauna of the Cumberland River in Tennessee*, *supra*.

¹⁴Figure 2.1-18(T), as revised by Amendment 25 to the Preliminary Safety Analysis Report.

¹⁵43 Fed. Reg. 15613 (April 14, 1978).

¹⁶*Id.* at 15616.

individual [licensing] proceedings.”¹⁹ The Commission directed that the radon question be entertained not only in proceedings where it was previously in issue or where a party desired to raise it, but also in all licensing proceedings “still pending before Licensing or Appeal Boards”²⁰ It stated: “Where cases are pending before Appeal Boards, the Appeal Boards are also directed to reopen the records to receive new evidence on radon releases and on health effects resulting from radon releases.”²¹

This case was pending before us on April 11, 1978—both on the motion for reconsideration and with respect to approval of the downstream location for the discharge diffuser, an issue which had been deferred at applicant’s request by our March 29th order. The record therefore must be reopened on the radon question. Because the Licensing Board will shortly be called upon to decide whether the proposed upstream location of the discharge diffuser should be approved,²² we think it should deal with the radon question as well. More specifically, it should receive written evidence on radon releases and the health effects resulting therefrom. Whether or not a hearing is required in connection with that evidence will be for the Licensing Board to determine in the first instance.

CONCLUSION

For the reasons stated, the motion for reconsideration, including the request for a clarifying order, is *denied* in all respects. The case is *remanded* to the Licensing Board to consider the environmental impact of radon releases, in accordance with the Commission’s order of April 11, 1978.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹⁹*Id.* at 15615.

²⁰*Id.* at 15616.

²¹*Ibid.*

²²See fn. 2, *supra*.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman

Michael C. Farrar

Richard S. Salzman

In the Matter of

Docket Nos. 50-329A
50-330A

CONSUMERS POWER COMPANY

(Midland Plant,
Units 1 and 2)

April 19, 1978

Upon joint petition of all parties for directed certification under 10 CFR 2.718(i) of the Licensing Board's oral ruling scheduling a prehearing conference and hearing on antitrust remedy (in purported compliance with ALAB-452, 6 NRC 892, and notwithstanding the parties expressed desire to attempt to achieve a settlement), the Appeal Board vacates the schedule and instructs the Licensing Board to take those steps which it believes appropriate to encourage the parties to settle and thus to avoid unnecessary litigation.

APPEAL BOARD: SCOPE OF REVIEW

Absent special considerations, the appeal board reviews licensing board scheduling determinations cautiously and, in general, only where confronted with a claim of deprivation of due process. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 188 (1978).

LICENSING BOARD: DISCRETION IN MANAGING PROCEEDINGS

The responsibility for the conduct of hearings has been delegated to licensing boards and that delegation must be thought to carry with it broad discretion to shape the course of the proceedings.

Messrs. William Warfield Ross and Keith S. Watson,
Washington, D.C., for the applicant Consumers Power
Company.

Mr. Robert A. Jablon, Washington, D.C., for the intervening Michigan municipalities and cooperatives.

Messrs. Donald L. Flexner, Melvin G. Berger, and John D. Whitler, Washington, D.C., for the Attorney General of the United States.

Mr. Fredric D. Chanania for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

1. In ALAB-452, 6 NRC 892 (December 30, 1977), we determined that the operation of the Midland nuclear generating facility would "maintain a situation inconsistent with the antitrust laws" within the meaning of Section 105c(5) of the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2135(c)(5). On the basis of that determination, we remanded the cause to the Licensing Board with instructions to fashion an appropriate remedy. By order of February 17, 1978, the Commission announced that it would defer a decision on whether to review ALAB-452 (either on its own motion or on a petition for review filed by a party) until after "completion of the contemplated Licensing Board remand proceedings, and Appeal Board review of those proceedings."

On March 2, 1978, the Licensing Board held a conference with counsel for all of the parties, "to discuss the issues appropriate to be taken up at an evidentiary hearing, and to consider scheduling and other procedural subjects necessary for an expeditious hearing and disposition of the remanded matters." At that conference, the Board was informed that the parties were embarking upon "renewed and serious" settlement negotiations. Counsel for the NRC staff suggested that "the next 30-day period be devoted to" these negotiations and that at the end of the period the parties and the staff report to the Board respecting the likelihood that a settlement would be reached (Tr. 7). This suggestion was endorsed by the other parties (Tr. 13, 26-29, 31). The following day, the Board entered an order in which, "in order to comply with" ALAB-452, it scheduled a pre-hearing conference for April 13, 1978, and directed that an evidentiary hearing commence on May 8, 1978.²

On March 23, all of the parties jointly moved the Board to suspend the schedule established in that order. The motion represented (at pp. 1-3) that two meetings had been held to discuss settlement and that "it now appears that there is a reasonable probability of settlement, not merely of

²See Licensing Board order (unpublished) of March 3, 1978.

³*Ibid.* The order went on to specify that the parties were to make certain written submissions to the Board by April 7.

the license conditions but of the entire case." The Board was further told that

Although it is too soon to estimate with precision how long it will take to complete settlement negotiations, experience suggests that at least several months of effort is required. The time and effort required to accomplish settlement expeditiously does not permit simultaneous preparation of testimony and pleadings since the same individuals are essential to both processes. Thus, it is not possible, practically speaking, to proceed with settlement and to meet the deadlines established in the Board's March 3 order.

Id. at p. 3 (footnote omitted). On March 28, the Board granted the motion but indicated that it would nonetheless confer with counsel on April 13, at which time it would receive reports respecting the progress of the negotiations and would also discuss the rescheduling of the suspended proceedings. In this connection, the Board stated that it was "desirous of providing the parties a reasonable opportunity to reach agreement on proposed license conditions but [was] not now prepared to postpone indefinitely the prehearing conference and the evidentiary hearings."

At the April 13 conference, the parties informed the Board that several additional meetings had taken place and that counsel still believed that a settlement was achievable. Accordingly, the parties requested the Board further to defer prehearing filings and the hearing itself for a reasonable period while the negotiations moved forward. In support of the request, the staff reiterated the point previously made that it would be a practical impossibility to carry on the negotiations and to prepare for trial simultaneously (Tr. 50-51).

After hearing from all of the parties, the Board orally announced that it would "proceed with the performance of its duties without waiting for the negotiations of the signed agreements"; adding that "we owe our duty to the appeal board to proceed expeditiously, and we plan to do so" (Tr. 96). Accordingly, it rescheduled the prehearing conference for May 12, 1978, and the commencement of the hearing for June 6, 1978 (Tr. 98). On behalf of all of the parties, the applicant then moved that this ruling be referred to us (Tr. 98-99). The motion was denied, with the observation by the Licensing Board Chairman that the parties could call upon us to review it (Tr. 100).

The parties have now taken that step. In a joint petition signed by counsel for each of them, we are asked to direct certification of the April 13 oral ruling under the authority of 10 CFR 2.718(i), as construed in *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-271, 1 NRC 478 (1975). Alternatively, the parties would

have us clarify our mandate in ALAB-452 to reflect that it does not impose an obstacle to deferring the remanded proceedings for an additional period pending the further pursuit of settlement negotiations.

2. We have recently had occasion to emphasize that "we enter the scheduling thicket cautiously" and, as a general rule, only where confronted with a claim of deprivation of due process. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 188 (February 16, 1978). As there observed, the responsibility for the conduct of hearings has been delegated to the licensing boards and that delegation must be thought to carry with it broad discretion to shape the course of the proceedings. In this instance, however, special considerations are present which appear to warrant our intercession.

A close reading of the transcript of the April 13 conference strongly suggests to us that the Licensing Board is forging ahead with the hearing on license conditions not because that is its own best judgment on how to proceed, but because it thinks our mandate requires it. To be sure, the Board quite properly evinced—at not only that conference but the earlier one as well—its own concern that the proceedings not be unduly delayed. At the same time, however, it did not take issue with the uniform view of the parties that a negotiated compromise (at least if acceptable to the Board) would be superior to an imposed solution. Nor did it express a belief that the negotiations now in progress are unlikely to produce agreement. Moreover, it did not disparage the representations of the parties that those negotiations would be seriously impeded if they had to take on simultaneously the obligations associated with pretrial preparation and the hearing itself. Rather, it would seem that the Board has taken ALAB-452 as a direction—overriding all other considerations—that the hearing on the license conditions be started and completed at the earliest possible date.

That is not the message we intended to convey, and we regret that our opinion did not make this clear. We did anticipate that any renewed endeavors to reach a settlement would be instituted with reasonable expedition and that the Licensing Board would monitor their progress because the road to settlement is rarely marked plainly. The best route is often overlooked at first glance; experience teaches, however, that when parties know that judgment will be visited upon them unless they focus on the problem at hand promptly, "it concentrates [the] mind wonderfully." Nonetheless, no public or private interest would have been properly served by any direction on our part which went beyond insuring that settlement efforts were pursued diligently. We certainly did not mean to impose a regime which severely impairs the chances that an acceptable settlement might be achieved.

In the circumstances, we are constrained to *vacate* the schedule estab-

lished by the Licensing Board in its April 13 oral ruling and to instruct that Board to reconsider the matter in accordance with what we have just said. More particularly, the Board should now take those steps which it believes appropriate to encourage a settlement and thus to avoid unnecessary litigation. In this regard, we assume that the Board will wish to obtain progress reports from the parties at regular intervals both (1) to satisfy itself that the negotiations are being diligently carried on; and (2) to insure that, should settlement become unlikely, the evidentiary hearing will then take place with no unnecessary further delay.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket No. 50-341

THE DETROIT EDISON
COMPANY

(Amendment to
Construction Permit
CPPR-87)

(Enrico Fermi Atomic
Plant, Unit 2)

April 26, 1978

Upon consideration of petitioner's reply to staff's answer to petitioner's motion for issuance of a new notice of hearing, the Appeal Board adheres to its decision in ALAB-466, 7 NRC 457 (April 7, 1978), to dismiss petitioner's motion for want of jurisdiction.

RULES OF PRACTICE: MOTIONS

Motion practice before the Commission involves only a motion and an answer; parties who do not seek leave to file a reply are expressly denied the right to do so. 10 CFR 2.730(c).

RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES

Although laymen's filings need not be as precise as lawyers' (*Public Service Electric and Gas Company* (Salem Nuclear Generating Station, Units 1 and 2), ALAB-136, 6 AEC 487, 489 (1973); *Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559, 576-77 (1975)), any party wishing to challenge a particular licensing board action must at least identify the order in question, indicate that he is appealing from it, and give some reason for thinking it erroneous.

Mr. Eugene B. Thomas, Jr., Washington, D.C., for
the applicant Detroit Edison Company

Dr. Robert G. Asperger, Midland, Michigan, for the
Citizens for Employment and Energy

MEMORANDUM AND ORDER

In ALAB-466, 7 NRC 457 (April 7, 1978), we dismissed for want of jurisdiction a motion filed by Dr. Robert G. Asperger. That motion sought the issuance of a new notice of hearing in this proceeding, which concerns a proposal to amend the outstanding construction permit for Unit No. 2 of the Fermi nuclear facility to add new owner-participants. Apparently before receiving the copy of ALAB-466 served upon him, Dr. Asperger replied to the staff's answer to his motion. The reply took issue with the staff's assertion that "Dr. Asperger filed this motion as an individual rather than as a member of" Citizens for Employment and Energy (CEE). Dr. Asperger further claimed that, by the motion, CEE was "in effect" appealing from the Licensing Board's denial of that organization's petition for leave to intervene in the proceeding. LBP-78-11, 7 NRC 381 (March 21, 1978).

We might simply disregard Dr. Asperger's submission as being an unauthorized filing. Motion practice before this Commission involves only a motion and an answer; the rules provide expressly that the moving party shall have no right to reply to an answer in opposition to his motion. 10 CFR 2.730(c). A party may of course seek leave to file a reply, *ibid.*, but Dr. Asperger did not do so. (This explains why we ruled on Dr. Asperger's motion without waiting for his "reply.")

Dr. Asperger is not a lawyer and apparently is unfamiliar with our practice. We have therefore examined his "reply" nonetheless to determine whether it establishes cause to reexamine ALAB-466. We conclude that it does not. In the first place, in ALAB-466 we did treat his motion "as having been filed on CEE's behalf (though it does not say so)." 7 NRC at 458. Secondly, there was nothing in the motion which might even remotely have suggested to the reader that it was "in effect" an appeal from the Licensing Board's denial of CEE's intervention petition. Indeed, the motion made no mention whatever of that petition, let alone of the Board's March 21 order acting upon it. We do not require the same precision in the filings of laymen that is demanded of lawyers.¹ But any party wishing to challenge some particular licensing board action must at least identify the order in question, indicate that he is appealing from it, and give some reason why he thinks it is erroneous.

¹*Public Service Electric and Gas Company* (Salem Nuclear Generating Station, Units 1 and 2), ALAB-136, 6 AEC 487, 489 (1973); *Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559, 576-77 (1975).

We need only add that in neither his motion nor his reply did Dr. Asperger endeavor to establish that the Licensing Board erred in rejecting the CEE petition.² And our independent examination of the reasons assigned by the Board for denying the petition (7 NRC at 389-393) indicates that none was committed.

There thus being no cause to disturb the result we reached in ALAB-466, we *adhere* to that decision.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

²10 CFR 2.714a, governing appeals from denials of intervention petitions, specifically requires that the notice of appeal be accompanied by a "supporting brief."

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket No. 50-341

THE DETROIT EDISON COMPANY

(Enrico Fermi Atomic
Power Plant, Unit No. 2)

(Amendment to
Construction Permit
CPPR-87)

April 26, 1978

The Appeal Board affirms the Licensing Board's denial (LBP-78-11, 7 NRC 381 (1978)) of intervention petition, concluding that petitioner lacks standing since her asserted economic concerns are beyond the "zone of interests" of the Atomic Energy Act and the National Environmental Policy Act, that intervention as a matter of discretion was also unwarranted, and that a recent related district court decision does not affect the Licensing Board's holding.

RULES OF PRACTICE: STANDING TO INTERVENE

Petitioner who resides far from a facility cannot acquire standing to intervene by asserting interest of a third party who will be near the facility but who is not "a minor or otherwise under a legal disability which would preclude" his own participation. *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977).

RULES OF PRACTICE: STANDING TO INTERVENE

Antitrust considerations to one side, neither the Atomic Energy Act nor the National Environmental Policy Act includes in its "zone of interests" the purely economic personal concerns of a member/ratepayer of a cooperative that purchases power from a prospective facility co-owner. *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976); *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1420-21 (1977).

RULES OF PRACTICE: INTERVENTION

The principal factor in determining whether to allow intervention as a matter of discretion to a person lacking standing to intervene as of right is petitioner's demonstrated ability to contribute substantially to the development of a sound record. *Public Service Company of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-397, 5 NRC 1143 (1977).

RULES OF PRACTICE: SHOW-CAUSE PROCEEDING

Only the Commission may review a decision by the Director of Nuclear Reactor Regulation against administrative prosecution of an alleged violation of NRC rules. See 10 CFR 2.206(c), 42 FR 36239 (July 14, 1977); *Detroit Edison Company* (Fermi, Unit 2), ALAB-466, 7 NRC 457 (April 7, 1978).

ATOMIC ENERGY ACT: SCOPE OF INTERESTS PROTECTED

Under the Atomic Energy Act, the Commission's responsibility in fashioning terms and conditions under which a plant is to be built and operated is to protect the public health and safety, not the pocketbooks of owners or customers of the electric utilities involved.

DECISION

The Licensing Board has before it an application to amend the outstanding construction permit for Unit 2 of the Fermi nuclear facility to allow two rural electric cooperatives to acquire a 20% undivided interest in that facility. (The acquisition is contingent on Commission approval.) One of them, Northern Michigan Electric Cooperative, Inc., supplies power to a third which distributes electricity on the retail level (Top O'Michigan, Inc.). Mrs. Martha G. Drake is a member—and thus both an equity owner and ratepayer—of Top O'Michigan. Asserting that Northern Michigan's participation in the project would cause her economic harm, she petitioned to intervene in the proceeding. The Licensing Board denied the petition. LBP-78-11, 7 NRC 381 (March 21, 1978). Relying on the Commission's decision in *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976), the Board first concluded that Mrs. Drake's purely economic personal interest did not confer standing to intervene as a matter of right.¹ Then, applying further criteria

¹Mrs. Drake had also asserted that the health of her son, who will attend a medical school 30 miles distant from the facility, would be adversely affected by plant operation. On the
(Continued on next page.)

from *Pebble Springs*, the Board ruled that her intervention as a matter of discretion was also unwarranted.

Mrs. Drake appeals under 10 CFR 2.714a. We would ordinarily have been inclined simply to affirm on the opinion below (7 NRC at 384-389), which seems to us a correct application of the teachings of *Pebble Springs*, CLI-76-27, *supra*, and of our own decisions in its wake. See, e.g., *Watts Bar*, ALAB-413, *supra*, fn. 1, 5 NRC at 1420-21. The short of the matter is that, antitrust considerations to one side, neither the Atomic Energy Act nor the National Environmental Policy Act embraces within its "zone of interests" economic concerns even remotely akin to those which Mrs. Drake would press as a member and ratepayer of a cooperative that purchases power from a proposed Fermi co-owner.²

We must explore the matter further, however, in view of a January 19, 1978, decision of the District Court for Western District of Michigan. In *Drake v. Detroit Edison Company*, 443 F. Supp. 833, the court held that Mrs. Drake (among others) had standing under the Atomic Energy Act to challenge the legality of the contingent sale (in advance of the receipt of Commission approval) of a portion of the Fermi plant to the cooperatives. Although further determining that it had jurisdiction to entertain that challenge, the court stayed the proceeding before it on the ground that primary jurisdiction over this matter lay with the Commission. In so ruling, the court made clear that it was asserting jurisdiction only over "past violations." Such jurisdiction, the court said, "would not interfere with the licensing functions of the NRC since objections to proposed projects—as opposed to past violations—must be made within the framework of administrative proceedings, not in the Federal courts." *Id.* at 839. Alluding to what it deemed to be the Commission's concurrent authority, the court indicated that it would defer opening the judicial route until the Commission (acting through the Director of Nuclear Reactor Regulation under the authority given him by 10 CFR 2.206) determined whether to pursue those

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strength of *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977), the Board held that she could not acquire standing to intervene on the basis of the interests of a third party. It not appearing that her son is either "a minor or otherwise under a legal disability which would preclude his assertion on his own behalf of whatever interest he might consider himself to possess" in the proceeding (*ibid.*), that holding was plainly correct. Mrs. Drake's personal residence is in northern Michigan—hundreds of miles from the Fermi site.

²It likewise does not appear that Mrs. Drake is equipped to make a substantial contribution to the development of a sound record—the principal factor in determining whether to allow intervention as a matter of discretion. *Public Service Company of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-397, 5 NRC 1143 (1977).

alleged violations administratively. *Id.* at 842.³ As we understand its opinion, the court took some care to stress that it was neither instructing the Commission how to conduct its licensing proceedings nor deciding who must be allowed to participate in them and on what terms. These are matters, as the Supreme Court has recently observed, that Congress committed to the agency under the Administrative Procedure and Atomic Energy Acts. See *Vermont Yankee Nuclear Power Corp. v. NRDC*, _____ U.S._____, 46 U.S.L.W. 4301, 4308-11 (April 3, 1978).

The district court was thus not concerned with Mrs. Drake's standing to intervene as of right in an administrative licensing proceeding convened to determine whether an existing construction permit should be amended to allow the addition of new project owners. It therefore had no need to, and did not, address whether the Atomic Energy Act confers a right to challenge such an amendment on the ground that it would impose economic harm. The court confronted and decided a markedly different question: whether the Act entitles a member of the public to seek judicial redress—in the form of compensation—for “wrongdoing” alleged to be “both a statutory violation and a common law tort.” 443 F.Supp. at 839.

It is, of course, not for us to say whether the court was correct in holding that such judicial remedy exists. Be that as it may, we reiterate that the court's decision neither holds nor purports to hold that Mrs. Drake has standing as a matter of right to intervene in administrative proceedings before this Commission involving the terms and conditions under which the Fermi nuclear power plant is to be built and operated. Under the Atomic Energy Act, in fashioning such terms and conditions this Commission's responsibility is to protect the public health and safety—not the pocketbooks of owners or customers of the electric utilities involved. *Cf. Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162 (February 14, 1978). Interests of the latter type are the appropriate concern of State public utility commissions or similar bodies. See, *Vermont Yankee Nuclear Power Corp. v. NRDC*, *supra*, 46 U.S.L.W. at 4309.

*Affirmed.*⁴

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

³A decision by the Director not to prosecute administratively an alleged violator is subject to review only by the Commission itself. See 10 CFR 2.206(c), 42 FR 36239 (July 14, 1977); *Detroit Edison Company* (Fermi, Unit 2), ALAB-466, 7 NRC 457 (April 7, 1978).

⁴The Licensing Board's March 21 order also denied two other petitions for intervention. Those denials are not now before us.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

**Docket Nos. 50-443
50-444**

**PUBLIC SERVICE COMPANY
OF NEW HAMPSHIRE, et. al.**

**(Seabrook Station,
Units 1 and 2)**

April 28, 1978

Upon appeals from two Licensing Board supplemental initial decisions (LBP-77-43, 6 NRC 134; LBP-77-65, 6 NRC 816), the Appeal Board determines that both decisions lack adequate findings, as well as support in the record, for their conclusion that suggested alternative sites are not "obviously superior" to the Seabrook site. The Appeal Board therefore reverses the decisions and remands them for further proceedings. By a different majority, the Board allows the construction permits to remain in effect pending the outcome of those proceedings.

RULES OF PRACTICE: BURDEN OF PROOF

In accordance with the general rule applicable to alternate site questions which have been placed before licensing boards for resolution, the burden of proof on all issues of fact is on the proponent of the licensing proposal.

NEPA: CONSIDERATION OF ALTERNATIVES

A licensing board determination that none of the potential alternative sites surpasses a proposed site in terms of providing new generation for areas most in need of new capacity cannot of itself serve to justify a generic rejection of all those alternative sites on institutional, legal, or economic grounds.

NEPA: AGENCY RESPONSIBILITIES

In carrying out its NEPA responsibilities, a Federal agency "must go beyond mere assertions and indicate its basis for them" so that the end product is "an informed and adequately explained judgment." *Silva v. Lynn*, 482 F.2d 1282, 1287 (1st Cir. 1973).

NEPA: CONSIDERATION OF ALTERNATIVES

That a potential alternative site has not yet been found acceptable by a licensing board can serve as a basis neither for automatic rejection of the alternative as unacceptable for the siting of particular reactors nor for comparison of the alternative with an applicant's proposed site.

NEPA: CONSIDERATION OF ALTERNATIVES

It is not enough for rejection of all alternative sites to show that a proposed site is a rational selection from the standpoint solely of system reliability and stability. For the comparison to rest on this limited factor, it would also have to be shown that the alternative sites suffer so badly on this limited comparison that no need existed to compare the sites from other standpoints.

NEPA: CONSIDERATION OF ALTERNATIVES

To establish that no suggested alternative sites are "obviously superior" to its own proposed site, an applicant must either (1) make an adequate evidentiary showing that the alternative sites should be generically rejected or (2) provide sufficient evidence for informed comparisons between the proposed site and individual alternatives.

EVIDENCE: INFERENCES

A party's failure to produce relevant evidence within his control gives rise to an inference that the evidence is unfavorable to him. See *International Union (UAW) v. NLRB*, 459 F.2d 1329, 1336 (D.C. Cir. 1972).

NEPA: CONSIDERATION OF ALTERNATIVES

Alternative sites will not be evaluated as rigorously as an applicant's proposed site, but such analysis of them as is practicable may not be conducted indifferently; under NEPA, "perhaps the most important en-

vironmentally related task the staff has is to determine whether an application should be turned down because there is some other site at which the plant ought to be located." *Florida Power and Light Company* (St. Lucie, Unit 2), ALAB-435, 6 NRC 541, 543 (1977).

NEPA: COST-BENEFIT BALANCE

Increased employment and tax revenues accruing to a locality from a proposed plant cannot be included on the benefit side in striking the ultimate NEPA cost-benefit balance for the plant. But the presence of such factors can be taken into account in weighing the potential extent of the socioeconomic impact which the plant might have upon local communities.

NEPA: CONSIDERATION OF ALTERNATIVES

Because population is only one of the factors to be considered in evaluating possible alternative sites, the Commission's population siting criteria (which are not regulations) may not serve as the sole basis for dismissing such sites which meet the Commission's regulations.

NRC: ENVIRONMENTAL RESPONSIBILITIES

A "hard look for a superior alternative" is a condition precedent to a licensing board determination that an applicant's proposal is acceptable under NEPA.

TECHNICAL ISSUES DISCUSSED: Consideration of alternative sites; transmission lines; cooling systems; site-related impacts (towers); population concentrations; site meteorology.

Mr. Thomas G. Dignan, Jr., Boston, Massachusetts, with whom **Messrs. John A. Ritscher** and **R.K. Gad III** were on the briefs), for the applicants, Public Service Company of New Hampshire, *et al.*

Mr. Anthony Z. Roisman, Washington, D.C. (with whom **Ms. Karin P. Sheldon** was on the brief), for the intervenor New England Coalition on Nuclear Pollution.

Mr. Robert A. Backus, Manchester, New Hampshire, for the intervenors Seacost Anti-Pollution League and Audubon Society of New Hampshire.

Ms. Ellyn R. Weiss, Washington, D.C., Special Assistant Attorney General of Massachusetts (with whom **Ms. Laurie Burt**, Assistant Attorney General of Massachusetts, was on the brief), for the Commonwealth of Massachusetts.

Mr. Richard C. Browne (with whom **Ms. Marsha E. Mulkey** and **Mr. James M. Cutchin IV** were on the briefs), for the Nuclear Regulatory Commission staff.

DECISION

Opinion of the Board by Messrs. Rosenthal and Farrar:¹

Once again we have before us the request of a group of New England utility companies, headed by Public Service Company of New Hampshire, for permission to construct the two-unit Seabrook nuclear power facility on the New Hampshire seacoast. This time, the intervenors challenge two supplemental decisions of the Licensing Board dealing with the selection of the Seabrook site over other potential sites. They also urge that we must halt plant construction in light of a recent judicial decision that set aside, at least temporarily, the Environmental Protection Agency's ruling on the cooling system for the plant. EPA had decided that the Seabrook facility would be permitted to discharge heated water directly into the ocean—that is, use “once-through” or “open-cycle” cooling as proposed by the applicant—rather than be required to use evaporative towers to cool the water.

The proceedings before both this Commission and EPA have been extraordinarily complex. The Licensing Board originally authorized the applicants to start construction in June 1976. Since that time, this Board, the Commission, and the Court of Appeals for the First Circuit have had to face various questions on appeal; a similarly lengthy, but less fragmented, progression of appeals has been taken in the EPA proceeding. We chronicle in the margin the key decisions and other steps which have led us to where we are now.² Only a careful reading of that history will provide a full

¹Being in agreement on a vast majority of the issues before the Board, Messrs. Rosenthal and Farrar prepared this opinion jointly. Where there is disagreement, the opinion sets forth the views of each author separately.

²(1) The Licensing Board's initial decision authorizing the issuance of construction permits was rendered in June 1976. LBP-76-26, 3 NRC 857. Prior to that time, a Regional Administrator of EPA had tentatively approved the once-through cooling system proposed for the Seabrook station. The Licensing Board explicitly conditioned its authorization of permit is-

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understanding of what is before us, and why we are still considering questions of alternative sites nearly 2 years after construction first began. Nonetheless, at the risk of oversimplification, we can attempt to place the matters now at hand in some perspective with the following summary.

At the outset, we should explain that the Commission has an "immediate effectiveness" rule which permits—but does not require—an applicant to begin plant construction immediately upon receipt of a permit authorized by a licensing board, even though appeals from the board's decision are pending. 10 CFR 2.764. On two prior occasions we have ordered construction suspended. When not under permit suspension, the applicants have put their permits to use notwithstanding the continual uncertainty over the validity of the decisions authorizing those permits.

In two decisions rendered last year, we passed upon most of the questions that had been raised about the validity of the Licensing Board's basic decision. In doing so, we upheld that Board's ruling that none of the 19 relatively nearby sites suggested as alternatives was preferable to a plant at Seabrook operating without cooling towers. But because, at one stage of its appellate process, EPA was in effect calling for the use of cooling towers, we early on directed the Licensing Board also to compare "Seabrook with towers"—which would have attendant adverse environmental impacts not accompanying open-cycle cooling—to alternative sites. The Commission approved of that action, but added that the Board should also look at several sites in southern New England which already housed nuclear plants

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suance upon that approval remaining in effect. Concluding "that the Seabrook site is unsuitable for a closed-cycle cooling system," the Board ruled that, were EPA ultimately to require such a system (*i.e.*, cooling towers), the authorization was to be regarded as withdrawn. 3 NRC at 897, 915. [There is no dispute that, by reason of the Federal Water Pollution Control Act Amendments of 1972, it is EPA's responsibility to determine the acceptability of the proposed once-through cooling system. See ALAB-366, 5 NRC 39, 42, 48-55 (1977).]

(2) In November 1976 (at which time the several appeals from the initial decision awaited oral argument before us), the EPA Regional Administrator withdrew his tentative approval of the facility's once-through cooling system. The basis for this action was his conclusion that the record before him contained insufficient information to permit judgment on whether an open-cycle cooling system should be allowed. [The November decision, unlike the Regional Administrator's earlier tentative approval of the once-through cooling system, was based on a record developed at an adjudicatory hearing.]

(3) Two months later, we ordered the Seabrook construction permits suspended by reason of the Regional Administrator's decision. ALAB-366, 5 NRC 39 (1977). In the same opinion we held erroneous, as a matter of both law and fact, the analysis in the Licensing Board's initial decision which had led that Board to conclude that the Seabrook site would be unacceptable if cooling towers were required by EPA. The Board was instructed to explore further the question of how, from an environmental standpoint, the Seabrook site with cooling towers might

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or which utility companies had at some time proposed as plant sites. The Commission then established a standard for site comparison: the Seabrook site—operating open-cycle or with cooling towers—was not to be rejected unless an alternative site was found “obviously superior.”

At a hearing last May, the Board below took up both the question of the southern New England sites and that of how “Seabrook with towers” stacked up against all the alternative sites. Its decision on the former question, eliminating the southern sites from consideration if Seabrook operated open-cycle, was issued last July. In view of the then-current EPA decision that cooling towers were not required, this Board (over Mr. Farrar’s dissent) let that ruling pave the way for the resumption of construction, which had been suspended for several months.

Notwithstanding that construction was moving forward, the intervenors asked that their appeals from the July supplemental decision be deferred for possible consolidation with any appeals they might take from the Board’s “cooling tower” decision, which they anticipated would be issued in short order. That decision—holding that no potential sites anywhere in New England were “obviously superior” to Seabrook with cooling

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compare with certain alternate sites in New Hampshire and southern Maine which that Board had previously considered.

(4) Upon its review of ALAB-366, the Commission left standing both the suspension of the Seabrook permits and the remand. CLI-77-8, 5 NRC 503 (March 31, 1977). It directed, however, that on the remand the Licensing Board also compare the Seabrook site (assuming successively the use of once-through cooling and cooling towers) with possible alternate sites in southern New England. *Id.* at 536-41. This direction constituted a modification of ALAB-366, in which we had endorsed the action of the Licensing Board in confining its consideration to sites in New Hampshire and southern Maine. 5 NRC at 65-67. And, in addition to thus broadening the geographical scope of the alternate site inquiry, CLI-77-8 adopted a new standard of comparison: “whether [the considered] alternate site is *obviously superior* to the site which the applicant ha[s] proposed.” 5 NRC at 526 (emphasis supplied).

(5) On June 17, 1977 (less than a month after the completion of the evidentiary hearing on the remand), the national EPA Administrator reversed the November 1976 decision of his Regional Administrator and reinstated the approval of the once-through cooling system. *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), Case No. 76-7, 10 ERC 1257.

(6) On the basis of the Administrator’s decision, the applicants moved before us for an immediate reinstatement of the construction permits. In ALAB-416, 5 NRC 1438, 1440 (June 29, 1977), we ruled that in no circumstances could the motion be granted prior to Licensing Board “resolution of the alternate site question involving the Seabrook site with once-through cooling and the southern New England sites.”

(7) On July 7, 1977, the Licensing Board issued a supplemental initial decision addressed to that question. LBP-77-43, 6 NRC 134. The Board concluded that “[n]o alternative site where nuclear units currently exist or have been planned is obviously superior to Seabrook.” *Id.* at 139.

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towers—came down last November. The second round of appeals materialized as expected, the last brief was filed in February, and we heard argument in mid-March. Just before that, the First Circuit overturned on procedural grounds EPA's approval of once-through cooling for Seabrook. The ramifications of that decision were also explored at the oral argument before us.

The intervenors have advanced a wide range of arguments in support of their claims that both supplemental initial decisions are infirm. They have also insisted that in all events the construction permits cannot remain in effect in the face of the First Circuit's decision in the EPA proceeding. For the reasons which follow, we conclude that (1) the findings and the record provide insufficient support for the result arrived at by the Board in the July decision (rejection of southern New England sites); and (2) the November decision (approving Seabrook with cooling towers) is also infected with serious error. As will also appear, however, we are in significant—albeit not total—disagreement with respect to the appropriate relief in light of these conclusions. As a consequence, the important question of whether the construction permits should now remain in effect must be left to resolution by the Commission itself.

I. SOUTHERN NEW ENGLAND SITE INQUIRY

A. 1. As the chronology in footnote 2 shows, the southern New England alternate site inquiry had its genesis in the Commission's March 1977 deci-

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(8) Less than 3 weeks thereafter, we rendered two simultaneous decisions. In the first, we determined all of the remaining issues presented by the appeals from the Licensing Board's initial decision; insofar as they had a bearing upon the restoration of the construction permits those issuances were resolved in the applicants' favor. ALAB-422, 6 NRC 33 (July 26, 1977). In the second, we reinstated the construction permits on the basis of (a) the EPA Administrator's decision; (b) the Licensing Board's supplemental initial decision; and (c) ALAB-422 and the conclusions reached therein. ALAB-423, 6 NRC 115.

(9) Exceptions to the July 7 supplemental initial decision of the Licensing Board were filed by intervenors New England Coalition on Nuclear Pollution and the Commonwealth of Massachusetts. Two other intervenors, the Seacost Anti-Pollution League and the Audubon Society of New Hampshire (SAPL-Audubon), advised us that they joined in the Coalition's exceptions. On the joint motion of the Coalition and the Commonwealth, however, the briefing of the exceptions was deferred to await the Licensing Board's disposition of the remaining issues before it on remand.

(10) In a second supplemental decision, handed down on November 30, 1977, the Licensing Board reached the remaining issues of the remand to it and concluded that none of the considered northern or southern New England sites was obviously superior to the Seabrook site *with cooling towers*. LBP-77-65, 6 NRC 816. Appeals from that decision were prosecuted by the Coalition, Massachusetts, and SAPL-Audubon.

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sion on review of ALAB-366. CLI-77-8, 5 NRC 503. We had thought such an inquiry unnecessary because the intervenors' suggestion that it be undertaken did not surface until the closing stage of the evidentiary hearing conducted by the Licensing Board in 1975. ALAB-366, 5 NRC 39, 65-67. In our view, this was plainly too late. The Coalition and SAPL-Audubon should have included the assertion in their comments (more than a year earlier) on the Seabrook Draft Environmental Statement, which clearly indicated that the staff had restricted its alternate site analysis to northern New England sites. *Ibid.* In this connection, we observed that, for reasons including those previously outlined in our *Bailly* decision,³ "[n]ormally, [such an] analysis rightly focuses upon territory within or in the vicinity of the service area of the utility which is to build and operate the plant." *Id.* at 66.⁴

Although dissenting from the ultimate result in ALAB-366 on other and unrelated grounds, our colleague Dr. Buck endorsed this line of reasoning. *Id.* at 82. Beyond that, he perceived in the record already adduced "a most persuasive reason why consideration of [southern New England sites] would here have been inappropriate." *Ibid.* By way of elaboration, our colleague said:

. . . As the Licensing Board found, the Seabrook facility will be owned by several New England utilities, each of which is a participant in the New England Power Pool (NEPOOL). The need for Seabrook is related to the requirements both of NEPOOL and of the lead applicant, Public Service Company (NRCI-76/6 at 899). A NEPOOL witness testified

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(11) On January 6, 1978, the Commission rendered its decision on those rulings in ALAB-422 and ALAB-423 which it had earlier determined it would review. The rulings were affirmed. CLI-78-1, 7 NRC 1.

(12) On February 15, 1978, the Court of Appeals for the First Circuit overturned on procedural grounds the EPA Administrator's June 17, 1977, decision and remanded to him for further proceedings. *Seacoast Anti-Pollution League v. Costle* (No. 77-1284). The applicants' motion to stay the issuance of the court's mandate was subsequently denied.

(13) Shortly after the issuance of the First Circuit's decision, and based thereon, SAPL-Audubon and the Coalition moved, respectively, to declare invalid and to suspend the Seabrook construction permits. By unpublished order of February 27, 1978, we calendared the two motions for oral argument on March 16 along with the appeals from the July and November 1977 supplemental initial decisions of the Licensing Board.

³*Northern Indiana Public Service Company* (Bailly Generating Station, Nuclear-1), ALAB-224, 8 AEC 244, 268 (1974) reversed on other grounds, sub nom. *Porter County Chapter, etc. v. AEC*, 515 F.2d 513 (7th Cir.), reversed and remanded, sub nom. *Northern Indiana Public Service Company v. Porter County Chapter, etc.*, 423 U.S. 12 (1975), affirmed on remand, 533 F.2d 1011 (7th Cir. 1976).

⁴We noted that, in this case, that utility is the Public Service Company of New Hampshire which is to own 50% of the facility. Its service area includes most of New Hampshire, and in addition, the company supplies electricity to several Vermont and Maine communities near the borders of that State. 5 NRC at 66, fn. 44.

that NEPOOL views it as important, for technical reasons that the generation and load be fairly evenly distributed so as to minimize the very heavy flows from one end of the grid to another, and to enhance the reliability system by reducing the dependence on long transmission lines which will have the greatest exposure to the kind of problems that led to, for example the 1965 blackout [Tr. 10166].

Accordingly, NEPOOL has divided the New England area into eight sub-areas (Tr. 10168). New Hampshire is one of those sub-areas, and the record indicates that by 1982 it will be deficient in generating capacity absent a new facility such as Seabrook (Applicants' Direct Testimony No. 14, fol. Tr. 10162, pp. 20-23). Furthermore, no nuclear capacity other than Seabrook is planned for that sub-area (*Id.* at 23).

The NEPOOL witness clearly summed up the reasons for limiting the search for sites to locations in the New Hampshire area

It's clear that where we really needed the capacity was in this area north to Boston and up in New Hampshire, and so we were definitely encouraging locations in the Seabrook area.

Tr. 10184. Even discounting the accuracy of the need-for-power figures advanced by the applicants, it appears that the limitation of the area for examination of sites in this case is technically well founded and should be accepted by us as dispositive of the general claim that southern New England sites should have been explored.

Id. at 82-83.

In coming to grips itself with the southern New England site question, the Commission not merely took note of our citation of *Bailly*, but also quoted extensively Dr. Buck's views as set forth above. CLI-77-8, 5 NRC at 537, fn. 39, 538, fn. 42. Further, the Commission found our untimeliness determination to have "support in the record." *Id.* at 539. Nonetheless, it neither accepted that determination as dispositive nor adopted the NRC staff's suggestion that "the matter be disposed of on the basis of the record, as referenced by Dr. Buck in his dissent." *Id.* at 538-39. Rather, to repeat, it ruled that the Licensing Board should tack on the southern New England alternate site inquiry to its exploration of the issues which we had remanded in ALAB-366. *Id.* at 539. The Commission added that, in so ruling, it was not excluding

the possibility that the Licensing Board will find, on the basis of evidence already in the record and other relevant factors, that a limit on alternate site consideration to the area in or near the lead applicant's ser-

vice area is appropriate in the context of this application. Careful examination of the substance of the intervenors' claims about southern New England sites indicates that a large part of their argument deals with ways in which the applicant might satisfy its power requirements without being lead applicant for a power facility. For when the applicant indicates legal and technical barriers to its obtaining sites outside the 19 that were considered in the FES, the intervenor suggests that the plant might be built elsewhere by another utility, in which case applicant presumably may buy a share of that other plant, or purchase power from it. But this Commission sits to license, or not to license, a nuclear power plant proposed by a particular applicant. It is not within our power to order that a different plant be built by another utility. The fact that a possible alternative is beyond this Commission's power to implement, does not absolve us of any duty to consider it, but our duty is subject to a "rule of reason," *NRDC v. Morton*, 458 F.2d 827 (D.C. Cir. 1972); *Concerned About Trident v. Rumsfeld*, _____ F.2d _____, 9 ERC 1370, 1380 (D.C. Cir. 1976). And NEPA does not require that we reformulate a discrete licensing question in terms as broadly as intervenors suggest.

Application of the "rule of reason" here may well justify exclusion or but limited treatment of the suggested sites. We leave this decision in the first instance, to the Licensing Board, but note the several factors which bear on it.

First, alternative sites in or near the load centers to be served by the facility have obvious practical advantages for the applicant and its rate-payers. Construction at a relatively distant site—here, a southern New England site—may necessitate longer transmission lines, with consequent greater expense, aesthetic affront, and loss of power. *See Northern Indiana Public Service Company* (Bailly Generating Station), ALAB-224, 8 AEC 244, 267-268 (1974). We note that the 19 sites already considered cover a broad geographic area including sites on the southern Maine coastline, and that the general area of northern Massachusetts along the Merrimack River and the Commonwealth's northeast corner had also been considered at an earlier stage in the alternate site exploration. FES 9.1.2; ASLB Tr. 2935. It is also appropriate for the Board, in applying the "rule of reason," to consider the possible institutional and legal obstacles associated with construction at an alternate site, such as the lack of franchise privileges and eminent domain powers and the need to restructure existing financial and business arrangements. The record indicates that while the Massachusetts area, where the lead applicant enjoyed neither franchise privileges nor eminent domain powers, was elim-

inated as offering no advantage over New Hampshire, some consideration was nevertheless given it. See FES at 9-5, 9-7. Finally, as the Appeal Board dissent noted, if Seabrook is needed primarily for power in New Hampshire and northern Massachusetts, and usefully balances NEPOOL's transmission system, those factors, and other technical considerations such as system reliability, may also limit the "reasonableness" of considering sites in southern New England. The Licensing Board may conclude that these factors make consideration of any existing or planned unit sites "unreasonable," or it may reach particular sites and compare them with Seabrook, *depending on the record made before it*. Should the Licensing Board conclude that an individual comparison of Seabrook with one or more of these sites is called for in the present circumstances, that comparison should be undertaken whether closed-cycle or once-through cooling is to be employed at Seabrook.

Id. at 539-41; footnote omitted; emphasis supplied.

2. At the time of the rendition of ALAB-366 in January 1977 and CLI-77-8 some 2 months later, this Commission and its adjudicatory boards were bound to apply the teachings of the decision of the Court of Appeals for the District of Columbia Circuit in *Aeschliman v. NRC*, 547 F.2d 622 (1976). In that decision, the court held that, if an intervenor's comments on the draft environmental statement raise a "colorable alternative not presently considered therein" in a manner which brings "sufficient attention to the issue to stimulate the Commission's consideration of it," the Commission must "undertake its own preliminary investigation of the proffered alternative sufficient to reach a rational judgment whether it is worthy of detailed consideration in the" Final Environmental Statement. 547 F.2d at 628. In so holding, the court rejected the Commission's "threshold test" first alluded to in *Nine Mile Point 2*¹ and then elaborated upon in *Midland*,² the very decision under review in *Aeschliman*. As explained in *Midland*, where applicable the "threshold test" requires that the intervenor make a preliminary affirmative showing respecting the asserted alternative which, although not necessarily establishing a *prima facie* case on the preferability of the alternative, is "sufficient to require reasonable minds to inquire further." 7 AEC at 32, fn. 27 and accompanying text.

In ALAB-366, we took note of the *Aeschliman* decision but found it not helpful to the intervenors on the question of the need to consider southern New England site alternatives (for the reason that the intervenors here had

¹*Niagara Mohawk Power Corp.* (Nine Mile Point, Unit No. 2), CLI-73-28, 6 AEC 995 (1973).

²*Consumers Power Company* (Midland Plant, Units 1 and 2), CLI-74-5, 7 AEC 19 (1974).

not raised those alternatives in their comments on the Seabrook Draft Environmental Statement). 5 NRC at 66. For its part, in CLI-77-8 the Commission agreed that *Aeschliman* implied that "the stage at which intervenors must raise additional alternatives is the DES comment period." But, as we have seen, it nonetheless determined that the southern New England site inquiry should be undertaken on the remand. 5 NRC at 539.

None of this would be of any present importance were it not for the Supreme Court's decision earlier this month reversing *Aeschliman* and, in the process, expressly approving the "threshold test." *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council*, _____ U.S. _____, 46 U.S.L.W. 4301, 4308-10 (April 3, 1978).⁷ In view of this development, it may be quite significant whether the Commission ordered the southern New England site inquiry only to comply with the now-repudiated *Aeschliman* standard or instead because there were other reasons to initiate that inquiry that would have been sufficient even under the "threshold test."

What was said in CLI-77-8 does not directly address this question. Beyond that, the two authors of this opinion disagree between themselves as to the probable answer. The issue in both *Nine Mile Point* and *Midland* was the necessity to consider the alternative of energy conservation. The "threshold test" was enunciated in that context and Mr. Farrar deems it improbable that the Commission intended that test to apply to all contentions; in particular, it seems highly unlikely it was to govern whether identified alternative sites should be explored. In his judgment, in instituting the southern New England site inquiry, the Commission was not responding to the District of Columbia Circuit's substitution of a more relaxed standard in place of the "threshold test." Rather, he believes that, no matter what an intervenor must do to place the energy conservation alternative in issue, the Commission directed the inquiry here because it thought it appropriate to appraise, rather than to reject out of hand, those alternate sites in the general region which either now have nuclear plants on them or have been proposed for reactor construction. Thus, as Mr. Farrar sees it, the *Vermont Yankee* restoration of the "threshold test" does not in any way call into question the need to pursue the southern New England site inquiry.

Mr. Rosenthal thinks otherwise. He finds no basis either in the Commission's pronouncements or in the *Aeschliman* or *Vermont Yankee* decisions for restricting the "threshold test" to the energy conservation area. Further, he thinks there to be a very good cause why the Commission would have invoked the test with respect to the southern New England site inquiry

⁷Although reported under that lead caption, the decision also embraced *Consumers Power Company v. Aeschliman*, before the Court on certiorari from the District of Columbia Circuit's *Aeschliman* decision.

had it been free to do so in March 1977. Because "normally [the alternate site] analysis rightly focuses upon territory within or in the vicinity of the service area of the utility which is to build and operate the plant" (see p. 484, *supra*), it is not at all unreasonable to expect an intervenor desiring to expand the geographical bounds of the analysis to make a threshold affirmative showing that there are special considerations justifying it.

In this instance, also in disagreement with Mr. Farrar, Mr. Rosenthal does not think that an adequate showing along that line was made by the Coalition or SAPL-Audubon. For these reasons, Mr. Rosenthal's judgment is that the *Vermont Yankee* decision does come into play here, although he recognizes that the Commission might well conclude that, once having been commenced, the southern New England site inquiry should not be now abandoned.

We thus must leave it to the Commission to provide the answer to whether, in light of the Supreme Court's recent action, it still regards the southern New England site inquiry to be an appropriate one. We might, of course, halt our consideration of the appeal from the July supplemental initial decision at this juncture and ask the Commission to enlighten us. But two factors appear to commend a different course. When the Supreme Court handed down *Vermont Yankee*, we not merely had completed our scrutiny of the July decision and the underlying record but also had drafted that portion of our opinion dealing with the intervenors' attack upon the Licensing Board's findings and conclusions. In the interest of obviating undue delay in the eventual disposition of the proceeding, a prompt announcement of the results of the review seems warranted. Additionally, *Vermont Yankee* has no discernible bearing upon the several issues before us which are unrelated to the southern New England site inquiry. Those issues are now ripe for resolution and we think it highly desirable to avoid, to the extent possible, further piecemeal decisionmaking in a proceeding which has already produced a plethora of decisions.

Accordingly, we move forward at once in this opinion to the merits of the Licensing Board's disposition of the southern New England site inquiry. For these purposes, we shall assume no alteration in the Commission's direction that this inquiry be undertaken and carried to a proper conclusion. In addition, we will proceed on the basis that, in accordance with the general rule applicable to alternate site questions which have been placed before licensing boards for resolution, the burden of proof on all issues of fact was on the proponents of the Seabrook proposal.⁴

⁴As we understand it, the "threshold test" goes only to the matter of the showing necessary to initiate an inquiry into a specific alternative which an intervenor (or prospective intervenor) thinks should be explored, and not to the placement of the burden of proof once such an inquiry has been actually undertaken in an adjudicatory context. For this reason, Mr. Rosenthal

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B. 1. In the July decision, the Board below made a few cursory findings with respect to each of nine possible alternate sites beyond the 19 New Hampshire and southern Maine sites previously considered.⁹ But its ultimate conclusion was that "an individual comparison of Seabrook with one or more of [the nine] sites is unnecessary" because of "the institutional and legal obstacles and the economic disadvantages associated with [those] sites as well as the uncontroverted superiority of the Seabrook location for system reliability." Paragraph 35, 6 NRC at 139. The Board based this conclusion on the following four subsidiary findings:

30. The number of power plant sites, nuclear or otherwise, in New England is limited. Some southern utilities had to build baseload generation outside of their service territory (*e.g.*, Boston Edison) because of lack of available sites in their own territory (App. Dir. 27 at 46). In view of the scarcity of available power plant sites, it appears unlikely that any of the New England companies would voluntarily part with a site it now holds for future use.¹⁰

31. It had been testified earlier that the Seabrook location is ideally suited to provide new generation for those areas in New England which would otherwise be the most deficient, from the viewpoint of load and capacity (App. Dir. 24, post Tr. 10162 at 20). This testimony remains uncontroverted. None of the alternate sites surpass Seabrook in this advantage.

32. Construction of generating capacity by an applicant at alternative sites outside his State invariably involves serious economic and scheduling disadvantages, as well as institutional and legal uncertainties about the applicant's ability to acquire control of the necessary exclusion area, transmission rights-of-way, permits, taxes, and possible surcharges since most of the power generated would effectively leave the State (Staff No. 2 at 2).

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regards his conclusion that the "threshold test" was not met by either the Coalition or SAPL-Audubon to be perfectly consistent with our jointly held view that, the southern New England site inquiry having been directed by the Commission, it then became incumbent upon the applicants and/or the staff to adduce evidence sufficient to enable the question to be decided in favor of the Seabrook site.

*These findings will be considered later in this opinion, *infra*, pp. 492-494. For the present it is sufficient to note that six of the nine are in southern New England: Montague, Pilgrim, and Rowe in Massachusetts; Charlestown in Rhode Island; and Millstone and Connecticut Yankee in Connecticut. See paragraph 19, 6 NRC at 138.

¹⁰In paragraph 20, 6 NRC at 138, the Board had found that none of the nine sites was owned by the Public Service Company of New Hampshire, the lead applicant here.

33. A relocation of the Seabrook units to any of the sites listed above at paragraph #19 would meet with institutional and legal impediments as well as economic and scheduling disadvantages (Tr. 13331-34; Staff No. 2 at 2; App. Dir. 27 at 45-46).

5 NRC at 139.

Measured by any objective standard, these findings—both individually and collectively—are patently insufficient justification for the Board's result. To begin with, absent some concrete evidence that the owners of the examined alternate sites would not make those sites available for the construction of the Seabrook units, the Licensing Board's conjecture on the point in paragraph 30 carries no weight. The Licensing Board referred to no such evidence, and as will be later seen, none exists in this record. Yet, if the utilities owning the sites would in fact refuse to part with even a portion of the sites in question (for the reason assigned by the Board or for other reasons), it should have been easy enough for the applicants to have so established through the testimony of officials of those companies. In this connection, both the Montague and Millstone sites are owned by Northeast Utilities (or subsidiaries thereof), and a subsidiary of that holding company has an approximately 12% interest in Seabrook. That circumstance, and the close alliance of the site owners as members of the New England Power Pool (NEPOOL), together compel the inference that the applicants failed to adduce direct evidence on this important question for reasons other than a lack of ready access to it.¹¹

The basic findings in paragraph 31—that none of the alternative sites *surpasses* Seabrook from the standpoint of providing new generation for those New England areas in greatest need—may have been well-founded. But whatever the significance of such a factor in the making of individual site comparisons, it obviously could not serve of itself to justify a *generic* rejection on institutional, legal, or economic grounds of all of the southern New England sites. Moreover, nothing said in paragraph 31 lends support to the Board's conclusion in paragraph 35 respecting the "uncontroverted superiority of the Seabrook location for system reliability." See p. 490, *supra*. That the Seabrook site may be "ideally suited" to furnish electricity to areas in particular need does not prove that locating the plant elsewhere would materially affect system reliability. On that question, the Board's decision is entirely, and significantly, silent.

¹¹We shall touch later upon the significance which attaches as a matter of law to an absence of evidence on a particular issue in circumstances where the evidence, if it existed at all, was accessible to the litigant who would be favored by it. See p. 498, *infra*.

The third and fourth findings (paragraphs 32 and 33) stand on scarcely better footing. In neither findings does the Board attempt to identify the nature and extent of the "serious economic and scheduling disadvantages, as well as institutional and legal uncertainties" to which it alluded. The bare statement that an attempt to locate a nuclear generating station outside the lead applicant's home State will cause such consequences—without at least some specification of their shape and size¹²—merits little respect. As the Court of Appeals for the First Circuit has emphasized, in carrying out its NEPA responsibilities an agency "must go beyond mere assertions and indicate its basis for them" so that the end product is "an informed and adequately explained judgment." *Silva v. Lynn*, 482 F.2d 1282, 1287 (1973).

In sum, the decision below falls well short of establishing the existence of generic factors which, to use the Commission's words of last March, would "make consideration of any existing or planned unit sites [in southern New England] 'unreasonable' and consequently render unnecessary a NEPA comparison of Seabrook with specific sites."¹³

2. Although, as earlier noted, the Licensing Board also made findings specifically related to one or another of the nine sites, there is no room for a serious claim that the Board might have pinned its rejection of the Millstone, Montague, or Pilgrim sites on those findings.¹⁴

Regarding the Millstone site, the Board found merely that that site "now has three reactors on it"; "there is no evidence there exists room for two more"; and "its population densities are higher than Seabrook's." Paragraph 21, 6 NRC at 138. Standing alone, these considerations do not come close to demonstrating that that site is not "obviously superior" to the Seabrook site. For one thing, the absence of evidence that the Millstone site *will* accommodate additional units does not permit the assumption that it *will not*—especially as the applicants and the staff (rather than the in-

¹²The closest that the Licensing Board came to providing necessary detail was its reference to "possible surcharges since most of the power generated would effectively leave the State." Such a consideration apparently did not preclude the proposal to build the Montague Nuclear Generating Station in Massachusetts despite the fact that, under that proposal, 60.75% of that facility was to be owned by the Connecticut Light and Power Company and the Hartford Electric Light Company.

¹³See p. 486, *supra*.

¹⁴For its part, the staff has eschewed any substantial reliance upon them. Responding to Massachusetts' critical analysis, the staff's brief to us stated (at p. 13)

None of these findings is essential to the Board's decision, which held that no site-specific examination of these alternatives is warranted. They simply represent additional reasons why the sites are not obviously superior. *To the extent that the record supports them*, they simply provide an additional basis for the Board's decision over and above the fundamental finding that individual consideration of them is unnecessary.

Emphasis supplied.

tervenors) had the burden of persuasion on that question.¹⁵ For another, the Board understandably did not find that the population density in the vicinity of the Millstone site was great enough to rule out the site absolutely under the criteria established in 10 CFR Part 100. Rather than being dispositive, therefore, the population factor was merely one among many factors bearing on the relative desirability of the Seabrook and Millstone sites from a NEPA standpoint. See further discussion, *infra*, pp. 508-510.

With respect to the Pilgrim site, the Licensing Board made essentially identical findings. Paragraph 23, 6 NRC at 138. As to that site, however, they are of even less significance because, as the applicants and staff were compelled to concede in their appellate briefs (at p. 15 and p. 13, respectively), the Board below erred in finding that the population density at Pilgrim is higher than that at Seabrook.¹⁶

The totality of the findings pertaining to the Montague site were that that site

ha[d] not yet been found to be acceptable and is, at best, a marginal site to place additional units. There is a question about the availability of sufficient cooling water for additional units. A special arrangement was necessary to assure a minimum flow from an upstream dam. Furthermore, State limits on noise may be exceeded by any type of cooling tower (Staff No. 2 at 6-7).

Paragraph 22, 6 NRC at 138. These findings reflect, virtually verbatim, the Staff's entire prepared testimony addressed to Montague specifically.¹⁷ *NRC Staff Supplemental Testimony, Comparison of Seabrook with Alternative Sites* (hereafter Staff Testimony No. 2), fol. Tr. 13223 at pp. 6-7. Although the staff did not elaborate on the first point, it clearly meant only that Montague had not as yet been found acceptable *by a licensing board*.¹⁸

¹⁵The staff (if not the applicants) must be aware of the capacity of the site from its investigation in connection with the Millstone applications. Consequently, if the site is incapable of housing additional units, the staff should have encountered little difficulty in discharging that burden.

¹⁶The staff had appended to its proposed findings the affidavit of Robert P. Geckler, its principal witness. In that affidavit, Dr. Geckler called attention to the fact that his previously submitted testimony respecting relative population densities in the Seabrook and Pilgrim areas had been founded upon a mathematical miscalculation. That testimony was corrected to reflect an estimated 1980 population density for *each* area (out to 10 miles from the site) of "near 300 persons per square mile." Quite apparently, the Licensing Board overlooked this correction.

¹⁷The only portion of that testimony which the Licensing Board did not incorporate in paragraph 22 was the acknowledgement that there is sufficient room on the Montague site for additional units.

¹⁸See the staff's proposed findings submitted on July 5, 1977, at p. 8. The staff itself had concluded in a Final Environmental Statement issued in February 1977 (NUREG-0084) that

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That is, of course, true. But it does not follow that the site is unacceptable for the siting of the reactors hereininvolved; nor is any light shed thereby on how Montague might compare with Seabrook. We also learn little from the reference to the "special arrangement" necessary to assure sufficient water flow; for all we know (or have been told by the staff), this or some other feasible arrangement might fulfill the water needs if four units were placed on the site. The fleeting mention of a possibility that State noise limits might be exceeded by cooling towers of any type is likewise unrevealing. The then-recent Montague FES (see fn. 18, *supra*) had endorsed the placement on the site of two units which would employ natural-draft towers. In this circumstance, the staff was under a plain obligation to develop the point in considerably greater detail if it were pressing the Licensing Board to reject Montague as an "obviously superior" alternative to Seabrook on grounds of State noise regulations.

C. Having determined that the Licensing Board's findings do not provide sufficient support for its ultimate conclusion, we might well be justified in going no further. We have nonetheless delved into the record in quest of evidence which—though not reflected in the findings—might clearly establish the validity of the generic rejection of southern New England sites on one or more of the grounds suggested by the Commission in CLI-77-8 (or on some other ground).¹⁹ Our power to do so is, of course, beyond serious question. ALAB-422, *supra*, 6 NRC at 42. And, although we pointed in ALAB-422 to our general disinclination "to search [a] record to determine whether it include[s] sufficient information to support conclusions for which the Licensing Board itself [has] failed to provide adequate justification" (*ibid.*), two reasons prompted us to put that reluctance aside in this instance. First, the July supplemental initial decision was issued before the rendition of ALAB-422. Second, inasmuch as the consequences which might flow from a reversal of that decision are very severe, we should not take that step without assurance that the state of the record requires it.

Because the proposed findings of neither the applicants nor the staff brought the Licensing Board's attention to any decisive evidence, we had cause to believe that the search would prove unrewarding. And so it did.

The applicants' affirmative evidence on the remand (insofar as particularly directed to the southern New England alternate site inquiry) was contained in Section III. G of their Direct Testimony No. 27, introduced

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the Montague site was an acceptable location for the placement of at least the two reactors then proposed for the site.

¹⁹We have also scrutinized the evidence which related to the examined sites individually. Suffice it to say that it adds nothing of significance to what was recited in the Licensing Board's findings.

following Tr. 12782. Extending over a total of less than three pages, that testimony made specific reference to four sites: Millstone, Pilgrim, Montague, and Charlestown.²⁰ The Licensing Board fairly summarized the substance of that testimony, which was merely that (1) the scarcity of power plant sites in New England makes it "simply unrealistic to assume that any [utility in that region] will voluntarily part with any viable power plant site that it now owns," and (2) Seabrook's location is excellent from the point of view of balancing NEPOOL generation (*id.* at 46).

Strikingly absent from the applicants' testimony was any direct mention of the possible need for longer transmission lines, let alone an analysis of any technical problems which such lines might occasion in terms of maintaining the reliability and stability of the applicants' systems. (Nor, for that matter, did the testimony appraise relevant environmental factors.) The proposed findings submitted by the applicants were likewise silent on the subject.

On the other hand, the staff based its affirmative case for rejection (as Seabrook alternatives) of all of the examined southern New England sites largely on transmission line considerations. Staff Testimony No. 2, pp. 3-4, 5, 7, 8, fig. 1, tables 1-4. But the meat of its transmission line testimony was struck by the Licensing Board on motion of counsel for the Attorney General of New Hampshire (Tr. 13294).²¹ Not having then seen fit to attempt to adduce new transmission line evidence, the staff thus was left with nothing more than its few glittering generalities respecting the "serious economic and scheduling disadvantages, as well as institutional and legal uncertainties," which purportedly inhere in siting a reactor outside of the State in which the applicant is located. Staff Testimony No. 2, p. 2. Plainly, in posing the question whether such disadvantages and uncertainties existed, the Commission must have expected that the staff would provide more than a simple "yes" response; *i.e.*, the anticipation must have been much greater detail than is contained in paragraph 32 of the decision below (see p. 490, *supra*)—a faithful reproduction of the staff's prepared testimony on the point. In this regard, on cross-examination the principal staff witness summed up the uncertainties in terms of an applicant encountering "more hassle" if it is dealing with State regulators in other than its own jurisdiction (Tr. 13333-34). Surely, it takes more than that to rule

²⁰The Charlestown site is in Rhode Island and is the proposed location for the NEP reactors. The site is owned at present by the United States and we can take official notice that there exists at least substantial doubt that it will be made available for electric power generation purposes. In those circumstances, we think that the site warranted no further consideration as a possible alternative to Seabrook.

²¹The staff has not complained to us of this action, and for reasons which therefore need not be explicated, any such complaint would have been unavailing.

out all out-of-State sites without regard to any environmental or other considerations.

D. In its March 1977 decision, CLI-77-8, *supra*, the Commission indicated that, in determining whether "a limit on alternate site consideration to the area in or near the lead applicant's service area is appropriate in the context of this application," the Licensing Board could rely on "evidence [then] already in the record." See p. 485, *supra*. As we have seen, however, the only reference made by the Board to the earlier record was with regard to the Seabrook location being "ideally suited" to provide new generation—a factor which we have determined did not of itself permit a generic rejection of all southern New England sites. See p. 491, *supra*. Beyond that, as also seen, on the remand neither the applicants nor the staff based their case on any other purportedly significant disclosures in the earlier record; similarly, their proposed findings did not bring into play any such disclosures. Still further, before us those parties did not seek to justify the Licensing Board's result on the basis of the contents of the earlier record.

There is room for doubt whether it would accord with due process for us now to uphold the decision below on evidence adduced during the original hearings which at no time during the course of the remanded proceedings was referred to by the applicants (let alone relied upon by them). See *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 354-55 (1975). But we need not pursue that question to a definitive conclusion. In our view, nothing in the earlier record would have permitted the Licensing Board to conclude that placing the Seabrook reactors at any of the southern New England sites in question would inevitably create significant problems—either in the realm of assuring system stability and reliability or otherwise. For all of the explanation in the earlier record regarding why NEPOOL and other planners thought Seabrook a sound choice for the location of this facility, we have not been alerted to (nor have we uncovered on our own) any evidence which identifies problems at any southern New England site—let alone illumines their nature and dimensions.²² To the contrary, what we have discerned is that the earlier record simply does not address the possible southern New England siting alternatives to any meaningful extent. This is not too suprising, for that record was developed at a time when the applicants, staff, and the Licensing Board had thought it unnecessary to compare the Seabrook site with southern New England sites and, thus, had perceived no occasion to focus upon any difficulties in relocating the reactors in Massachusetts, Connecticut, or Rhode Island.

²²Under interrogation during oral argument, applicants' counsel did not claim the existence of evidence establishing the degree of any stability or reliability difficulties (App. Bd. Tr. 129-33).

With all due respect to our dissenting colleague, the disclosures in the earlier record emphasized in his opinion do not counter these conclusions. Stretching their impact to the outermost limit, they establish no more than what no one appears seriously to dispute: that, viewed *solely* from the standpoint of system reliability and stability, the Seabrook site was a rational selection. What those disclosures do not show—any more than does the other evidence of record—is that the southern New England sites suffer so badly on this limited comparison that no need existed to compare the sites from other standpoints (e.g., relative environmental impacts). An essential ingredient of such a showing necessarily would have been an analysis of the specific reliability and stability problems attendant upon southern New England siting.²³ To repeat, the earlier record does not contain that analysis. And although the staff's transmission line evidence on the remand may have been intended to fill the gap, because that evidence was stricken it cannot be relied upon for that purpose. In the totality of these circumstances, it is readily understandable why neither the applicants nor the staff put forward our dissenting colleague's approach to the issue—either in their proposed findings below or in their briefs and arguments to us. In this connection, we may presume that their experienced counsel were just as familiar with the contents of the earlier record as are the members of this Board. This being so, it is reasonable to suppose that, had they thought it would be of assistance to their cause, they would have relied before both the Licensing Board and ourselves on the matters of record which our dissenting colleague considers not merely significant but dispositive.²⁴

E. For all of the foregoing reasons, we are compelled to hold that neither the findings contained in the July 7 supplemental initial decision nor

²³In this connection, one of the maps appended to the dissenting opinion shows the transmission grid as it presently exists in New England. Neither that map nor any other evidence, however, even purports to show what it would take, and what it would cost, to feed electricity into the grid from the alternate sites in question here. This being so, the dissent's analysis is based in good measure on speculation rather than on hard evidence of record.

²⁴Only one specific point in the dissenting opinion would appear to require direct response. The suggestion is made (pp. 532-533, *infra*) that the intervenors have abandoned their claim that the southern New England sites warranted further investigation. Although we do not believe that the quotation from the transcript of our oral argument establishes this assertion even as applied to the Coalition, the fact remains that Coalition counsel was not purporting to speak for SAPL-Audubon. Those parties, which also had urged an exploration of southern New England sites, were represented by their own counsel at argument.

Moreover, even though we think the matter of little importance, we do not agree with our dissenting colleague that the Coalition eschewed any "substantive" cross-examination of the staff's witnesses. See, e.g., Tr. 13268-74. Beyond that, he has apparently given insufficient regard to the fact that, as was its right, the Coalition chose to leave the major portion of the cross-examination of the applicants' witnesses to the other intervenors (Tr. 12925-26). For such cross-examination by SAPL-Audubon, see e.g., Tr. 13025, *et seq.*

the record on which those findings were based supports the Licensing Board's conclusion that, because of generic factors, none of the southern New England sites it considered is "obviously superior" to the Seabrook site. Although it is equally true that the findings and record do not demonstrate that one of those sites is "obviously superior," that consideration is of no aid to the applicants. If, as the Commission thought possible, reasons exist which would serve to rule out southern New England sites generically, the applicants had the burden to put forth an adequate evidentiary showing on them. As the applicants did not successfully discharge that burden, it was incumbent upon them (in conjunction with the staff) to put before the Licensing Board information sufficient to enable an informed individual comparison of the Seabrook site with at least Millstone, Pilgrim, and Montague—the three sites in southern New England appearing to have the greatest potential as alternatives to Seabrook. This obligation also not having been satisfactorily fulfilled, the Licensing Board's decision must be reversed and the cause remanded for further proceedings.²³

The question remains as to the appropriate scope of those proceedings. In this regard, we see no reason to give the applicants and the staff a second opportunity to attempt to avoid an individual comparison of the Seabrook site with the Millstone, Pilgrim, and Montague sites on the basis that institutional, legal, or economic obstacles or disadvantages rule out the relocation of Seabrook at *any* of the southern New England sites. It is a settled rule "that when a party has relevant evidence within his control which he fails to produce, that failure gives rise to an inference that the evidence is unfavorable to him." *International Union (UAW) v. NLRB*, 459 F.2d 1329, 1336 (D.C. Cir. 1972). Applying this rule here, we think it reasonable to infer that the evidence put forth by the applicants and the staff reflected the very most that could be said in favor of their position on the issue of the propriety of rejecting generically the southern New England sites—*i.e.*, that were there any additional favorable evidence, it would have been produced.

A similar inference does not come into play, however, with respect to the comparison of the sites individually. Apparently, the applicants and the staff failed to present significant evidence bearing upon how the Millstone, Pilgrim, and Montague sites might compare with the Seabrook site because their view of the matter obviated the need to present such evidence. But now that we have determined that individual comparisons must be made in order to ascertain whether an "obviously superior" southern New England site exists, it is entirely fitting that the record be reopened to permit the introduction of such information as is required for an intelligent resolution of that question.

²³We reiterate that our premise is that the Commission will not choose now to terminate the southern New England site inquiry because of the Supreme Court decision in *Vermont Yankee*.

II. COOLING TOWER INQUIRY

We next consider the Licensing Board's November decision. As already noted, it there held that none of the New England sites (including those in the southern portion) being considered as possible alternatives would be "obviously superior" to the Seabrook site even were the applicants required to use cooling towers there.²⁶

The need for an analysis and comparison of Seabrook with towers stands on a different footing than does the need for proper examination of the southern New England sites. The tower inquiry is necessary only because a plant at the Seabrook site may be required to utilize cooling towers to pass EPA's scrutiny. If the applicants were sure ultimately to obtain EPA's approval of an open-cycle cooling system, we would not have to ascertain whether other alternatives for providing power are "obviously superior" to Seabrook with cooling towers.²⁷ Essentially, then, we are performing this inquiry at the applicants' behest—*i.e.*, only because they suggested that they could rely on Seabrook with towers as a backup to their primary proposal and thus not await EPA's final determination. For the reasons set forth below, we hold that the analysis of that backup proposal has not been adequate.

A. At the initial hearing in 1975, there was only sparse evidence adduced on the impact of cooling towers at Seabrook.²⁸ What there was came in for the purpose of comparing Seabrook with towers and Seabrook without towers,²⁹ and was inadequate for any comparison with other sites.³⁰ Only in connection with last May's hearing on remand (which we directed in ALAB-366) was there any attempt to do a thorough analysis of the environmental effects of cooling towers at Seabrook for the purpose of comparing "Seabrook with towers" with a nuclear facility at other potential sites.³¹ The approach the Board below took in its decision may be sum-

²⁶As earlier seen, the Board's July decision had assumed that, in accordance with the EPA Administrator's determination the prior month, Seabrook would not employ towers.

²⁷Had the statutory scheme worked ideally, the type of cooling system permitted or required at Seabrook would have been decided upon long before this. See ALAB-366, *supra*, 5 NRC at 52.

²⁸See ALAB-366, *supra*, 5 NRC at 59-60.

²⁹This was done because EPA's Regional Administrator had not yet rendered his final decision on the preferred cooling mode. Given the terms of the governing statute and the present status of EPA's involvement in the matter, this Commission is no longer to be concerned with attempting to say which cooling system is better for the Seabrook site. See ALAB-366, *supra*, 5 NRC at 48-58.

³⁰ALAB-366, *supra*, 5 NRC at 60.

³¹We should note that the applicants do not appear to claim that even that analysis would be sufficient to obtain this Commission's full approval of Seabrook with towers. Rather, they

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marized as follows.³²

After discussing cost differentials, the Board analyzed the environmental effects that would attend the use of two "natural-draft" cooling towers, the type which would be employed at Seabrook. As far as aquatic impacts are concerned, it found that operation of the towers would have no significant effect; on that score, the towers proved to be better than open-cycle cooling. 6 NRC at 823-24.

The Board then evaluated the two principal varieties of environmental impacts that would be attributable to natural-draft towers at Seabrook. The first derives from the towers' very existence—they would be 590 feet tall.³³ This concededly has an aesthetic impact on humans³⁴ and was claimed also to constitute a hazard to migrating birds.³⁵ The second type of impact stems from their operation. They emit a vapor plume which sometimes becomes a visible cloud, which always carries with it water droplets that deposit large amounts of salt on the surrounding territory, and which has the potential to cause additional fog and precipitation.³⁶

We need not now repeat the Board's findings concerning the en-

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contemplate that such approval could come only if—and after—they revise their application to include precise plans for the towers and formally submit it for review. But they claim that any fine tuning that might then remain would be sufficiently minor to let us rule out other sites on the basis of what is before us now. Direct Testimony No. 27, pp. 2, 9; Tr. 13075-76.

³²The hearing below closed in May of 1977. Because in June the EPA Administrator approved open-cycle cooling, the Board did not expedite its decision on the towers; that decision was issued on November 30, 1977. By the time we held oral argument, the EPA Administrator's decision had been set aside by the First Circuit, thus making the tower inquiry again a significant one.

³³The twin towers would each be of that height, with diameters at the base of 490 feet, at the throat of 295 feet, and at the top of 320 feet. To put these dimensions in more recognizable terms, as the electric utility industry itself did in its main brief (pp. 8-9) in *Appalachian Power Company v. Train* (see p. 508, *infra*), each tower would be as tall as a 50 to 60-story building and have a base covering an area larger than three football fields.

Put another way, each towers covers more than 4 acres of ground. Specifically, a circle of diameter 490 feet, or radius 245 feet, has an area of approximately 188,600 square feet, while 4 acres consists of only 174,280 square feet, about the same as the 172,800 square feet covered by three football fields. (A football field, including end zones, is 360 feet long by 160 feet wide.)

³⁴The intervenors alleged that the presence of the towers would constitute an eyesore that would not only be unappealing in itself but would also result in a decrease in tourism in the area. The Board rejected the tourism claim and it is not pressed on appeal.

³⁵This claim too was rejected below and has not been renewed on appeal.

³⁶Dissipation of heat takes place inside the tower as a result of evaporation of the ocean water used for condenser cooling. The resulting water vapor—which contains no salt—picks up droplets of unevaporated salt water as it passes through the tower. To the extent these droplets elude the mechanical drift eliminators, the salt they contain is carried away from the towers in the plume. The vapor plume is invisible, but depending on the weather conditions can condense and become visible.

vironmental impacts of the closed-cycle system or its other costs (money and delay).³⁷ It suffices to note here that the Board concluded that the use of the site with towers was "acceptable" and that "the benefits from the project outweigh the cost thereof." 6 NRC at 828. It then compared Seabrook using cooling towers with a nuclear plant at alternative sites.³⁸ For purposes of comparison, the Board grouped the other sites into seven categories: (1) estuarine sites in New Hampshire; (2) seacoast sites in New Hampshire; (3) seacoast sites in Maine; (4) inland sites in northern New Hampshire; (5) inland sites (other than Litchfield) on the upper Merrimack River watershed; (6) Litchfield; and (7) the southern New England sites mentioned in Part I of this opinion. It concluded that at none of the first six categories of sites, including what it thought to be the best one, Litchfield, would a nuclear plant be "obviously superior" to a nuclear plant at Seabrook using cooling towers. 6 NRC at 830-33. It disposed of the southern New England sites in the following terms (*id.* at 834):

109. In our Supplemental Initial Decision of July 7, 1977, LBP-77-43, 6 NRC at 134, in considering these sites in comparison with Seabrook with once-through cooling, we concluded that none of these sites is obviously superior to Seabrook and that an individual comparison of Seabrook with one or more of these sites is unnecessary. *Id.*, 6 NRC at 139.

110. We make the same analysis in comparing these nine alternative southern New England sites with Seabrook with cooling towers. We conclude that the findings that we made in our July 7, 1977, Supplemental Initial Decision apply equally as well to Seabrook with cooling towers. Accordingly, we adopt those findings (paragraphs 19 through 34) and make them a part of this Decision.

³⁷The findings appear in 6 NRC at 824-28. To the extent necessary, we set them forth later in the course of developing our own conclusions.

³⁸Although the matter is not crucial to our decision, it might have been better had the comparison with alternative sites preceded any attempt at an ultimate cost-benefit balancing for the project as a whole. See *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Station), ALAB-179, 7 AEC 159, 175-76 (1974). Only after it is known whether the goal sought to be accomplished by the project can be achieved in some other manner can a true evaluation of the project's "benefit" be made. An analogy from another area of environmental law, the regulation of pesticides, can help demonstrate this point. An insecticide might kill crop-destroying bugs effectively but at a substantial cost in human safety. Viewed in isolation, that chemical might be thought to confer a significant "benefit." But whether that benefit is a real one, and thus whether it outweighs the costs, may well depend upon whether the same result can be accomplished by another product or by another means entirely. If it can, then the "benefit" of having available the product in question is reduced accordingly. If, on the other hand, only that product is adequate to the task, the benefit it confers is all the more important. In short, only *after* alternatives are considered can a true cost-benefit balance be struck.

Dr. Salo, the Board member with particular training and experience in environmentally related sciences, dissented in part. Because the alternate sites had not been analyzed as extensively as Seabrook had, he was unable to say that any other site was "obviously superior" to Seabrook with towers. *Id.* at 835-36. For this reason, he agreed with his colleagues that "the other sites, including Litchfield, which is considered a suitable site, do not have an obvious superiority (by the definition of the Commission) to the Seabrook site." *Id.* at 836. But he went on to express this opinion (*id.* at 836-38; footnotes omitted):

6. Considering only environmental matters, Litchfield appears to be superior to Seabrook. Although data were not presented, and I assume they are not available, on the effects of water consumption during low-water years, my opinion is that the impact on the aquatic environment would be significantly less at Litchfield than at Seabrook. The Applicants' Direct Testimony, pp. 42-44 (Tr. 12782) leaves one with the impression that Litchfield is a distant possibility but the closing statement claims that Litchfield is not obviously superior. A comprehensive analysis has not been made on the aesthetics of cooling towers at Litchfield (they are described merely as significant, high, or the same as Seabrook) but one assumes after listening to, seeing, and reviewing the testimony of NECNP witness Ms. Barbara Yeaman (Tr. 13497) that the aesthetic impact of cooling towers at Litchfield may not be significant when compared to Seabrook. Thus, my opinion is that cooling towers at Litchfield are superior to open-cycle cooling at Seabrook, and my opinion (paragraph 9 below) is that cooling towers at Seabrook are unacceptable.

7. The minor use of agriculture land taken up by the plant located at Litchfield would not be significant, the costs of building the plant above the flood plain do not appear to be restrictive, and the actual aesthetic costs of transmission lines are less than those at Seabrook.

8. The Staff (Staff Direct on Alternate Sites, Table 6) mentions that Litchfield is closer to a population center, but in my opinion this is not a fact to be given weight as it still meets the requirements (10 CFR Part 100). Furthermore, it is my opinion, not only at Litchfield but generically, that, in most cases, nuclear plants should be located as near as possible to population centers and areas of energy demand. In other words, a nuclear plant should not be forced into environmentally attractive and ecologically important areas because of the confusion generated over safety issues.

9. As to the issue of cooling towers at Seabrook, I am in dissent with the opinion of the majority of the Board that cooling towers are acceptable at Seabrook.

10. Cooling towers at Seabrook are the ultimate in backfitting of a site that has developed through the unfortunate and unplanned sequence of (a) once-through cooling with water drawn from within the harbor to (b) water drawn from the open sea by means of long and expensive tunnels to (c) final correction of aquatic impacts by means of cooling towers.

11. If cooling towers are acceptable at Seabrook, aesthetically they are acceptable "anywhere" and aesthetics become a nonissue. The tremendous impact of cooling towers at Seabrook is more than enough to tip the cost-benefit balance of the Seabrook plant regardless of expended costs.

12. In my opinion the licensing procedure has been abused when the sequence of events allows a location such as Seabrook on New Hampshire's 18 miles of coastline, to be considered for a nuclear power plant with cooling towers when obviously other sites are available. It is at this point that the policy "the Applicant has proceeded to this point at his own risk" must be adhered to.

B. We find it unnecessary to explore each of the multifaceted attacks which the intervenors level against the Board's cooling tower decision. In the hearing below, the intervenors attempted to demonstrate, not only through cross-examination of opposing witnesses but also through testimony which they sponsored, that the adverse environmental impacts of cooling towers at Seabrook would be greater than the applicants and staff forecasted. On appeal, the intervenors pursue many of the same points. Without regard to whether all of their complaints have merit, we are persuaded that, for the following reasons, the decision cannot stand:

(1) In comparing Seabrook with cooling towers to potential nuclear plants at inland sites, the Board relied on evidence which assumed—incorrectly—that the inland sites necessarily would utilize the same type of towers as would Seabrook; beyond that, in most respects the Board did not consider how topography and other site-specific attributes could make the impacts of towers at other sites vastly different from those at Seabrook.³⁹

(2) The Board employed for inconsistent purposes the evidence relating to differences in surrounding population concentrations: at the staff's in-

³⁹The Board did recognize that the number of people exposed to the aesthetic impact would vary depending upon population concentrations. 6 NRC at 833.

stance, and without adequate explanation, the Board rejected some alternative sites because of comparatively high population densities and others because the precise opposite was the case.⁴⁰

A remand to reconsider the cooling tower matter with these shortcomings corrected is thus obligatory. After we had reached this conclusion and set it down in a draft version of this opinion, staff counsel informed us that its analysis of potential cooling tower drift may have been faulty. By letter of March 30, it told us that the Argonne National Laboratory has recently opined that the computer program employed may be "in effect, useless." Prior to learning that, we were prepared to decide that the question of the meteorologically related environmental impacts had received adequate treatment in the evidence and the decision below. But, as we will explain, if that treatment was adequate, it was only marginally so. In light of that and the new development, which the staff is investigating further, we think it appropriate to have the Board below—which will once again have other aspects of the cooling tower inquiry before it—look more closely at meteorological factors.

Before exploring these various matters in detail, one other preliminary observation is in order. Our unwillingness to sanction "Seabrook with towers" on what is now before us finds added support in the applicants' own refusal to state that they would indeed build such a facility if EPA or the courts were to reject their open-cycle cooling proposal.⁴¹ This suggests to us that the applicants themselves question the wisdom of building and operating towers at Seabrook as compared to locating the plant elsewhere.⁴²

1. Varying Impacts of Towers

A careful examination of the entire record underlying the November decision leaves us with the firm conviction that the inadequacies in the alternative site analysis stemmed from its having been performed in a perfunctory manner. We recognize that, as the Commission has explained, alter-

⁴⁰There was no suggestion that the resident and transient population near Seabrook presented an ideal situation. Consequently, it could not have been assumed that other potential sites would necessarily suffer by comparison, whether the population concentrations in their vicinity were higher or lower.

⁴¹Tr. 12878-79, 13019.

⁴²In this regard, we do not understand our dissenting colleague's assertion (p. 562, *infra*) that "it would be the height of folly for the applicants . . . to make a commitment to complete the plant with closed-cycle cooling if the [EPA] exemption were denied" in that "[s]uch a commitment would undercut the whole reason for their request for an exemption." Nothing we perceive in such a commitment would be inconsistent with their continuing to press for open-cycle cooling in the belief that it is not only environmentally sound but also a far better approach.

native sites will not be—and cannot be expected to be—evaluated as rigorously as an applicant's proposed site. But that furnishes no excuse for the indifferent pursuit of such inquiry as is practicable. In this connection, what we recently had to say in *St. Lucie* bears repetition:⁴³

The National Environmental Policy Act requires the staff to examine a wide range of possible impacts of a nuclear facility and, in that regard, to inquire into whether there exist alternatives of one kind or another that would mitigate those impacts. In that connection, we said earlier in this case that perhaps the most important environmentally related task the staff has is to determine whether an application should be turned down because there is some other site at which the plant ought to be located. No other environmental question is both so significant in terms of the ultimate outcome and so dependent upon facts particular to the application under scrutiny. Consequently, we would expect the staff to take unusual care in performing its analysis and in disclosing the results of its work to the public.

We regret the necessity of having to state that the record of this case does not instill confidence in us that the staff always acts with that degree of care which would demonstrate its commitment to the vigorous enforcement of NEPA's commands regarding alternate site inquiries. At different times in this proceeding, the staff appeared to treat compliance with NEPA as a hurdle in the path of, rather than a prerequisite to, the issuance of a nuclear power plant license. Manifestly, the staff's attitude toward environmental questions should be parallel to its generally commendable stance in the safety area. There, the staff quite properly treats an applicant's statements as those of a decidedly interested party. Accordingly, the staff reviews them with a trained, dispassionate, and skeptical eye. Where the environment is concerned, the same sort of review should be the norm.

Lest we be misunderstood, we harbor no bias for or against any particular outcome of the staff's review of environmental matters. But a staff conclusion that an applicant's proposal passes muster is valuable only to the extent it represents the results of vigorous probing for possible shortcomings. Where that has been done, there is much more reason to trust the validity of the conclusion.

Here, the characteristics of the cooling systems at alternative sites were evaluated on the basis of broad and unfavorable assumptions. Although the

⁴³*Florida Power and Light Company* (St. Lucie, Unit 2), ALAB-435, 6 NRC 541, 543-44 (1977) (footnotes omitted).

staff eventually conceded that certain of these assumptions were demonstrably inaccurate, the proponents of Seabrook never filled the gaps left by the elimination of that flawed evidence.

More particularly, the evidence on the alternative inland sites began with the noncontroversial premise that all such sites would require cooling towers. See 6 NRC at 832-33. But it also proceeded on the assumption (1) that the type of tower at every other location would be the same as that planned for Seabrook;⁴⁴ and (2) that the environmental impact of such towers would be roughly equivalent at each site.⁴⁵ Obviously, these assumptions turn a major factor in the environmental analysis into a wash item—under these assumptions, the Seabrook site with towers does not suffer by comparison to other sites.

But the intervenors demonstrated, both through their own uncontroverted evidence and by cross-examination, that neither of these assumptions was valid. We need not belabor the point. With respect to the first assumption, a staff witness conceded that the type of tower to be installed could vary from site to site,⁴⁶ and that there is a wide variation in aesthetic impact from one type to another.⁴⁷

Beyond that, and whether or not the first assumption had a basis in fact, the record establishes affirmatively that the second one did not. Specifically, witnesses for both the applicants and the staff in effect acknowledged that, even if all the sites had the same type of tower, the aesthetic and meteorologically dependent consequences would be markedly different at each location.⁴⁸ In the same vein, a witness for the intervenors drew an uncontradicted contrast between towers at Seabrook—where the site is a flat plane—and towers at some other site where they might be shielded from view by trees or terrain, look far less massive against a mountainous backdrop, or otherwise fit in more comfortably with their surroundings.⁴⁹

⁴⁴Applicants' Direct Testimony No. 27 at p. 37 and Tr. 12923-24; Tr. 13281-82, 13322-25 (staff).

⁴⁵Applicants' Direct Testimony No. 27 at pp. 37-38; Staff Testimony No. 2 at p. 11 (*cf.* Tr. 13281, 13355).

⁴⁶Tr. 13323.

⁴⁷Tr. 13324.

⁴⁸Tr. 13021-23; 13092-93; 13185-86; 13281; but see Tr. 13091. This points up the significance of having and properly analyzing meteorological data for the site in question (see pp. 510-513, *infra*).

⁴⁹Tr. 13497-98; 13509-10. In this connection, we do not think that the evidence upon which Dr. Buck relies (p. 553, *infra*), much less the record as a whole, will bear the interpretation he puts on it, *i.e.*, that "a view of the towers from the west is limited to about 2 miles from the site." The statement of witness Geckler that he quotes (at Tr. 13252) was made in response to a question about what the staff meant when it said "the towers will constitute the dominant

(Continued on next page.)

Another site-related variable, of course, is the number of residents and tourists to whom the towers or their plumes would be visible.⁵⁰ But none of this was properly taken into account.⁵¹

In a word, alternative sites were evaluated perfunctorily and on the basis of damaging—but invalid—assumptions concerning the environmental consequences of putting a nuclear plant on them.⁵² The result in this instance was an appraisal unjustifiably slanted in favor of Seabrook. And our con-

(Continued from previous page.)

features of the landscape" that (see Tr. 13253) "may be visible for long distances." Dr. Geckler, who had not authored that statement (Tr. 13253), said first that "the towers are visible, essentially, from all angles" (Tr. 13252). He then went on to say that the terrain built up to 600 feet altitude 2 miles to the west. In context, his next remark, about not being able to see the towers from behind such terrain, was nothing more than a truism. That is, it does not appear that he meant to indicate that the terrain in fact dropped off in such a manner that nowhere to the west would the towers be visible. And, had that been a fact, it is unlikely that the author of the staff's written testimony, Dr. Zittel, would have put it this way when asked what he meant by his reference to the "long distances" at which the towers might be visible (Tr. 13253-54):

As far as I am concerned, I think I have looked at cooling towers as far as 20 miles away, and have seen them very clearly, so I would suppose that I would consider that 20 miles is a long distance.

However, the long distance that is referred to here is very unspecific, and I think that it is purely comparative; certainly, in the area of Seabrook, I would expect the cooling towers to be very visible from all of the beach area. I would expect it to be very visible from portions of the major highways in the area.

In other words, the cooling towers themselves are of such a nature that they are going to be a dominant feature on the landscape. There is no doubt in my mind about that.

⁵⁰Our dissenting colleague has put forth population figures for the Seabrook area for the apparent purpose of proving that fewer than 3,200 residents will see the towers (p. 553, *infra*). We note that the figures he employs are those for *year-round* residents located within 2 miles of the plant in 1970 (see PSAR Table 2.1-1, Sheet 1). Within 5 miles, however, the *total* residential population in 1980 (comparable figures for 1970 were not furnished) is projected to be over 20 times higher than that, *i.e.*, 28,897 year-round residents and 42,381 summer residents and overnight transients (not including daily transients) (PSAR Tables S13.9-1 and S13.9-2). And, to repeat, the staff says the towers may be visible for 20 miles (fn. 49, *supra*). Within 20 miles, there were in 1970 over 290,000 permanent residents (PSAR Table 2.1-2, Sheet 1). How many of them could see the towers is unknown, just as it is at other sites. See fn. 51, *infra*.

⁵¹Tr. 13088, 13282-83. Massachusetts sought to introduce the Montague FES for the purpose of showing that the effects of topography are subject to far more assessment than was done here. Tr. 13325-27. The Board declined to permit its introduction for that purpose. Tr. 13327-29. The correctness of that action is dubious.

⁵²That the environmental impact of cooling towers is site-dependent is confirmed by Dr. Buck's dissenting opinion, which goes to great lengths to attempt to establish that, *because of site-dependent factors*, towers at Seabrook are not so bad after all. While we disagree with much of what he says (see fns. 49 and 50, *supra*) we note that his whole approach shows that he too agrees that it cannot be assumed—as the staff and Board below did here—that the adverse impact of towers will be the same at every site.

clusion that this consideration may not be treated lightly is buttressed by the position espoused by two of the applicants here—Public Service Company of New Hampshire and New England Power Company—in *Appalachian Power Company v. Train*, 545 F.2d 1351 (4th Cir. 1976). That case involved an attack by a number of electric utilities upon certain EPA regulations governing heat discharge into bodies of water.³³ In an additional brief filed by Public Service, New England Power, and five other utilities serving coastal areas, the environmental problems attendant upon the use of seawater cooling towers received specific attention. The final point made was that “[t]his nation’s coastlines are a precious heritage—a scarce and diminishing natural resource that should not be devoted to *huge aesthetically unpleasing and environmentally harmful* seawater towers when once-through cooling in the ocean is available and not demonstrably harmful.”³⁴

If this be true, and we think it is,³⁵ there would appear to be equal reason why, should once-through cooling possibly not be “available,” other alternatives to the use of seawater towers—including the relocation of the facility elsewhere—be given full and fair evaluation. This has not been done here.

2. Population Concentrations

The treatment given the evidence on population concentrations was no more satisfactory. Indeed, two major—and paradoxical—deficiencies taint that analysis. On the one hand, one of the Board’s principal negative comments on two of the southern New England sites (Pilgrim and Millstone) was that their surrounding population was greater than Seabrook’s. 6 NRC at 834, adopting the discussion at 6 NRC at 138.³⁶ Similarly, the Board’s sole reason for rejecting one inland site (Garvins Falls) was its location “within the city limits of Concord, the State capitol.” *Id.* at 832. Although the Board did not explain why this fact *per se* ruled out that site, we assume it meant to imply that the nearby population was excessive.

In this connection, we agree with Dr. Salo that there has been “confusion generated” by the staff’s use of high population data to disqualify a site that plainly complies with the Commission’s regulations on population concentrations. See p. 502, *supra*. We discuss this point in more detail below.

What troubles us even more is turning around and relying on precisely

³³See discussion in ALAB-366, *supra*, 5 NRC at 50-51, 54.

³⁴Addendum Brief for Petitioners, Boston Edison Company, *et al.*, *Appalachian Power Company v. Train*, *supra*, at p. 10 (emphasis supplied).

³⁵So long, that is, as the word “when” in the quote is understood to mean “if.”

³⁶As it turned out, in the case of Pilgrim the factual premise was in error. See fn. 16, *supra*.

the opposite reason to disqualify other sites, when that reason is likewise not supported by any analysis in the record. Specifically, the staff said, and the Board found, that sites in northern New Hampshire were disadvantaged because of the socioeconomic impacts attendant upon locating plants in such sparsely populated areas. But the staff did no work to establish whether this negative factor was indeed a valid one.⁵⁷ To be sure, a large influx of workers and their families might impose a greater burden upon some small communities. But other such towns might consider themselves advantaged by such an influx. Although, for example, their governmental services—fire, police, education—might be strained at first, there could also be a boost to a sagging local economy and additional tax revenues which might constitute a more than offsetting advantage.⁵⁸

Of course, we do not know that this would be the case. We cannot be certain that such advantages would follow—and that is precisely the point. For without examining into the particular facts of each community's situation, no one can be any more certain that disadvantages will accrue. In short, some study is necessary before it can be said that a particular sparsely populated area will necessarily suffer adverse socioeconomic impact sufficient of itself to justify rejecting it as an alternative site.⁵⁹ To do so is particularly inappropriate when, similarly without any supportive reasoning, other sites are disqualified because neighboring population densities are too high.

On this score, we have taken great pains, in a number of decisions in which we were called upon to apply the Commission's population siting criteria, to explain the purpose behind those regulations and how they operate to assure safety.⁶⁰ And we have rejected attempts by intervenors to disqualify an applicant's proposed site on the grounds that, while it met Commission regulations, it was not in compliance with "guidelines" set

⁵⁷See, e.g., Tr. 13277-79.

⁵⁸Increased employment and tax revenues cannot be included on the benefit side in striking the ultimate NEPA cost-benefit balance for a particular plant. *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Station), ALAB-179, 7 AEC 159, 177 (1974). But the presence of such factors can certainly be taken into account in weighing the potential extent of the socioeconomic impact which the plant might have upon local communities. *Indeed, the Board below recognized this in discounting the socioeconomic impact of plant construction upon the town of Seabrook.* LBP-76-26 (initial decision), 3 NRC at 913.

⁵⁹For this reason, Dr. Buck's speculation on this score (*infra*, p. 561) is worth no more than the staff's. In particular, his suggestion that the localities do not benefit from any additional tax revenues until operation of the plant commences seems devoid of any support.

⁶⁰See *Seabrook*, ALAB-422, *supra*, 6 NRC at 43-44; *Southern California Edison Company* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-248, 8 AEC 957, 961-66 (1974); *id.*, ALAB-268, 1 NRC 383 (1975); *id.*, ALAB-308, 3 NRC 20 (1976); *New England Power Company* (NEP, Units 1 and 2), ALAB-390, 5 NRC 733, 736-41 (1977).

forth in staff position papers.⁶¹ Nonetheless, the staff has persisted in urging licensing boards to dismiss possible alternative sites whose surrounding population exceed the "trip levels" adopted by the staff.

We must therefore say even more forcefully than before that this approach is illegal, that it undermines the Commission's regulations, and that we will not countenance it. To be sure, as earlier stressed (see p. 493, *supra*), population is one—but only one—factor to be considered in evaluating alternative sites: *all other things being equal*, it is better to place a plant farther from, rather than nearer to, population concentrations.⁶² But as all other things rarely are equal—and cannot be taken as equal without far more explanation than exists here—the population factor alone cannot justify dismissing alternative sites which meet the Commission's regulations. This is particularly true in this case, where the nearby concentration of transient population at Seabrook is itself so high.⁶³

3. Meteorological Considerations

As long as the proceeding must go back on other aspects of the cooling tower inquiry, we believe it justified to order a further inquiry in the meteorological area. We would not have done this in the absence of the present uncertainty concerning the usefulness of the computer program the staff employed—but that problem, added to the other difficulties we have encountered, makes further inquiry essential. We need not go into those other difficulties in detail; an outline will suffice to guide the Board below.

In order to put the matter in context, we recognize that obtaining the best basic meteorological data is not an end in itself—the purpose of acquiring it is to determine just how severe the meteorologically dependent environmental impacts of the towers will be. What is of concern in this regard is, of course, the extent to which salt will be deposited on nearby land and structures; the extent to which the vapor plume will be visible—*i.e.*, will

⁶¹See, e.g., *Duke Power Company* (Catawba, Units 1 and 2), ALAB-355, 4 NRC 397, 416 (1976) and the decisions cited there in fns. 60 and 61. See also *Porter County Chapter v. AEC*, 533 F.2d 1011, 1016 (7th Cir. 1976), *certiorari denied*, 429 U.S. 945 (1976).

⁶²See also *Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-335, 3 NRC 830, 833 (1976).

⁶³To highlight the essential arbitrariness of the staff's treatment of comparative population densities, we note that the staff ignored Seabrook's concentration of transients. The density figures it used on remand to compare the population at Seabrook with that at other sites include only *permanent* population. See Staff Testimony No. 2, Table 6, which gives a 1970 population of 72,000 within 10 miles. That was evidently derived from PSAR Table 2.1-2, which gives figures for 1970 *resident* population within 10 miles which add up to 72,107. By ignoring transients, it gave Seabrook (where transients are a major factor) an unfair advantage in comparison to sites where transients are of lesser significance.

form a white cloud; and the extent to which additional precipitation or fog will be created.

In order to predict these impacts, it would ordinarily be necessary to have a year or more of meteorological data taken on the site. Indeed, applications for nuclear power plants are almost invariably accompanied by such data, for it is needed not only where cooling towers are to be employed but in all events to analyze what will happen to any radioactive material that might be released to the atmosphere.

The applicants here did not, however, present meteorological data from the site to support their cooling tower analysis. They did not think they had sufficient site-specific data available, apparently not having gathered it because they never intended to employ cooling towers (their proposal has consistently been for once-through cooling). Instead, seemingly on the theory that seacoast weather is not substantially different in different locales, they used ground-level data from Logan Airport in Boston and data from Portland, Maine on how measurements of various meteorological factors change with height there.⁶⁴ Their witnesses furnished an explanation of why they believed that in some respects at least the data from these other sites were representative of Seabrook; it suffices to say that some doubt over the sufficiency of the correlation remained.⁶⁵ Yet the doubt was not so substantial as necessarily to invalidate the general conclusions the applicants came to concerning what would happen to, or result from, the emissions from the towers.

With respect to salt, the applicants employed a drift rate of 0.01%.⁶⁶ Given the salinity of the ocean water and the flow of water required to cool the condensers, this means that nearly 28 million pounds of salt per year will be carried away from the towers.⁶⁷ The environmental impact this will have is left somewhat uncertain by the record in this case. First, the natural deposition on the countryside of salt from the ocean can only be approximated; no data have been collected at Seabrook, but based on the literature regarding other locations, the applicants' witnesses believe it to be in the

⁶⁴In order to predict plume behavior, both ground-level and upper-air data are required. Lacking either from the site, the applicants applied the rate of change with height found at Portland to the surface data taken at Logan. Tr. 12958.

⁶⁵Compare Applicant's Direct Testimony No. 27, p. 3, and Tr. 12787 and 13021-23, listing the types of meteorological data needed to predict plume behavior, with Tr. 12789-91, 12826-30, and 12960 expressing the extent to which the offsite data being used had been compared to data of the same type from Seabrook.

⁶⁶Direct Testimony No. 27 at 13.

⁶⁷*Ibid.* The applicants expressed the amount of salt drift in scientific notation, *i.e.*, 1.39×10^4 tons per year. Our dissenting colleague prefers understatement; he says "some" salt will be deposited on the surrounding area (*infra*, p. 555).

range of 100-300 pounds per acre per year.⁶⁸ Second, they estimate that in the areas most affected, the towers will deposit close to 50-60 pounds of salt per acre per year.⁶⁹ In light of the uncertainty of the applicants' meteorological data and of the validity of the computer program which the staff used to analyze its (different) data,⁷⁰ the margin of error in this figure is unknown. Finally, even if the precise levels of both natural salt deposition and cooling tower drift could be accurately predicted, it would remain to be determined what effect the increase brought about by tower operation would have on the vegetation and structures upon which they fall. The applicants and staff attempted to show that the effect on vegetation would not be serious, given that the existing plant life has proven able to withstand a relatively large amount of natural salt deposition.⁷¹ At best, though, the studies upon which the witnesses relied could not be said to constitute a full analysis of the problem—the work which would be necessary to assure that their conclusions are accurate simply has not been done.⁷²

We were, however, willing to overlook all those potential problems on the theory that the state of the art was simply not adequate to provide any better answers—and that while the analysis had not been perfect, it was as good as could be expected and did not portend any alarming results. The disclosure from the staff that places additional doubt upon its conclusions—which were similar to those of the applicants⁷³—leads us to the view

⁶⁸*Id.* at 31; see also Tr. 12792 and 12966. Natural background could be as low as 30-50 pounds per acre per year. Tr. 12792. Although the staff's direct testimony (fol. Tr. 13220, pp. 13-14) is written in a manner that sometimes conveys the impression that the staff knows with some precision the actual natural deposition rates near Seabrook at differing distances from the shore (*e.g.*, p. 14, lines 1-7), the staff conceded that, as the references it cites make clear, it had no data from near Seabrook. Tr. 13352.

⁶⁹Applicant's Direct Testimony No. 27, p. 31.

⁷⁰There are other computer programs involved. We discuss them below (fn. 73, *infra*).

⁷¹With respect to structures, the applicants said that the increase over natural fallout "cannot avoid having some impact"—*i.e.*, it "may not cause an identifiably increased degradation but it surely will not benefit those structures or vehicles regularly parked in the area." Direct Testimony No. 27 at 33.

⁷²See, *e.g.*, Applicant's Direct Testimony No. 27, p. 14 (referring to their deposition rates as being "only rough, order-of-magnitude estimates") and pp. 24-26; Tr. 12792, 12800-03, 12810-11, 12967-68, 12971-78, 13116.

⁷³Staff witnesses testified that they used the "ORFAD" computer code to analyze such meteorological data as there was from the Seabrook site for the purpose of predicting the behavior of the cooling tower plume. Argonne National Laboratory has reported to the staff that it has found that ORFAD "does not give acceptable results and is, in effect, useless." But Argonne says that the "KUMULUS" program is acceptable; in comparing KUMULUS as run by another consultant with ORFAD as run by the staff, the staff finds that they "agree reasonably well."

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that more caution is required, and that the matter should be looked at further.

In sum, we cannot accept the Licensing Board's conclusion that no alternative site passes muster when compared to Seabrook with cooling towers. Lest we be misunderstood, we are not holding that any of the alternative sites would be better, much less "obviously superior," to Seabrook were EPA to require that cooling mode. We are saying only that, from all that appears in this record, no legitimate comparison has yet been made. We thus have no basis for a conclusion one way or the other.

We must therefore also reverse the November decision and instruct the Licensing Board to look again at how alternative sites compare with Seabrook using cooling towers. The deficiencies in both approach and content that pervaded the previous comparative analysis were sufficiently fundamental to suggest the need for a thoughtful reanalysis.⁷⁴ We leave it to the Board below to determine the course of the further proceedings. We content ourselves with the observation that the Board should not reinstate the conclusion reached in the November decision unless it is entirely satisfied that a hard look for a superior alternative has been taken. To repeat what we said in *St. Lucie* (see p. 505, *supra*), such scrutiny is a condition precedent to a determination that the applicants' proposal—in this context a Seabrook facility with cooling towers—would be acceptable in light of the dictates of NEPA.⁷⁵

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For their part, the applicants used the "FOG" computer code. Their input was different from the staff's—as already noted, they used surface data from Logan Airport and upper-air data from Portland, Maine, rather than any data from Seabrook itself.

"It should go without saying that the requirements of a thoughtful analysis are not met by the mere listing of possible disadvantages to a particular site without any indication of their gravity or relative weight. The Licensing Board did this in its decision. We do not find its catalogue any more impressive for having been repeated in Dr. Buck's dissent (pp. 557-559, *infra*).

"In this regard, this alternative site comparison, under the assumption that the Seabrook site would require cooling towers, involves quite different environmental, economic, and temporal considerations than those which allowed us last year to uphold the comparison of Seabrook operating without towers with all alternative sites except those in southern New England.

III. PERMIT SUSPENSION

The question remains whether, by reason of the reversal of both supplemental decisions, suspension of the construction permits should be ordered by us at this time. On this question we are divided. For the reasons set forth in Section A below, Mr. Rosenthal believes that the matter of suspension should be left for resolution by the Commission. For the reasons set forth in Section B below, Mr. Farrar would have this Board itself suspend the permits now.

As will be seen from his dissenting opinion, Dr. Buck shares Mr. Rosenthal's belief that we should not ourselves suspend the permits. Although Dr. Buck reaches this conclusion by a markedly different route, he thus joins Mr. Rosenthal to form a majority on this limited aspect of the question of relief.

A. Mr. Rosenthal's Views

My views respecting permit suspension may be briefly stated. Starting with the southern New England site inquiry, for reasons already assigned (pp. 488-489, *supra*) I think it doubtful that the Commission would have initiated the inquiry in March 1977 had it then been free to apply the "threshold test." And I believe there to be room for equal doubt that, the Supreme Court having reinstated that test in *Vermont Yankee*, the Commission will now wish the inquiry to be continued. To date, the intervenors have provided not the slightest cause to think that a further pursuit of the inquiry might uncover an "obviously superior" site in southern New England. In this connection, our reversal of the Licensing Board's July decision rests wholly upon inadequacies in the applicants' and the staff's evidentiary presentations; for their part, the intervenors put before that Board nothing to suggest that, in fact, Millstone, Montague, or Pilgrim enjoys *any*—let alone a substantial—measure of superiority over Seabrook.⁷⁶ Consequent-

⁷⁶Notwithstanding that the burden of persuasion may have been on the applicants and staff, there assuredly was nothing which would have precluded the intervenors from bringing to the surface—in the course of cross-examination of witnesses presented by their adversaries if not through affirmative evidence—any substantial advantages which might adhere to substitution of a southern New England site. Assuming that such advantages actually exist, I find it surprising that the intervenors did not call them to the Board's attention. It is not customary practice for experienced counsel to withhold information supporting his client's position on a heavily contested issue simply because the burden of persuasion on that issue may lie elsewhere.

These observations should not, however, be taken as implying agreement with Dr. Buck that the intervenors have chosen to abandon their claim that the southern New England sites warranted further investigation. As already seen (fn. 24, *supra*), I join Mr. Farrar in the belief that there has been no such abandonment (either expressly or implicitly).

ly, the Commission could rationally now decide that the southern New England site inquiry was improvidently ordered—and thus should now be discontinued—without turning its back on some concrete indication that an “obviously superior” site does exist in southern New England.

Whether the Commission will so decide remains to be seen. It would, however, be rash indeed for us to suspend the permits on the basis of the reversal of the July decision prior to according the Commission a reasonable opportunity to reevaluate, in the light of the teachings of *Vermont Yankee* applied to the existing record, the warrant for continuing the pursuit of the southern New England site inquiry. This conclusion is reinforced by the fact that construction activities over the course of the next several months are not likely to produce a significant—if any—additional environmental impact.” It is true that there would be an additional monetary investment in the facility. But I perceive no compelling reason why any such investment occurring subsequent to the date of this decision need be taken into account in any further proceedings involving a comparison of the Seabrook site with southern New England sites. *cf. Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 170-171 (February 14, 1978). In short, precipitate action on our part does not appear required to preserve either environmental values or the integrity of the administrative process.

The cooling tower inquiry stands on a quite different footing and manifestly is not affected by *Vermont Yankee*. Nonetheless, I am likewise unpersuaded that we should halt construction on its account. The only possible justification for doing so would be that any additional construction activities will prove to have been for naught if *both* (1) the EPA Administrator reverses his prior determination that Seabrook need not employ cooling towers” and (2) the Licensing Board concludes on the new remand

”In a recent filing with us, SAPL-Audubon assert that water consumption associated with facility construction is “threatening irreparable harm to freshwater supplies in the Town of Seabrook.” The assertion is footless. The town is apparently under no continuing obligation to furnish water for the project and indeed, according to SAPL-Audubon themselves, proposed to cease doing so on April 10, 1978. In sum, it is entirely within the town’s control whether and to what extent it would incur any detriment which might result from selling its water to the applicants.

”It cannot be properly suggested that permit suspension should be decreed simply to obviate any chance that, in reaching his new decision, the EPA Administrator might be unduly influenced by a further investment in the facility. So long as this Commission is prepared as a general matter to proceed on the basis that appellate review of Licensing Board initial decisions will not be improperly influenced by such a factor, it ill-behooves us to apply a different assumption in the case of the ranking official of another Federal agency. Beyond that, such excursions in the realm of amateur psychology are fraught with sufficient peril to provide for me a manifestly inadequate basis for taking a step which necessarily will visit severe harm upon not merely the applicants but others as well.

that the Seabrook site should be disapproved if cooling towers must be employed. But what harm will have been done to any interests which this agency is responsible for protecting? The short answer is: none. Once again, nothing before us indicates that additional construction activities in the near term might pose any real threat to the environment. And, as we recently had occasion to stress, this Commission is not charged with the duty of insuring that utilities expend their funds wisely—"[s]uch matters [remain] the province of the utility and its supervising State regulatory commission." *Midland*, ALAB-458, *supra*, 7 NRC at 162.

It need be added only that nothing contained in any prior opinion of either the Commission or ourselves in this proceeding convinces me that we are forbidden to give effect to these factors. To say the least, we are confronted with a dynamic situation; the passage of time thus works many changes. Although past pronouncements are entitled to receive close scrutiny and consideration, in the final analysis the decision whether *now* to suspend the permits must be founded on our best judgment respecting what is demanded by the state of affairs which obtains *now*. Stated otherwise, if (as I am persuaded is so) no public or private interest within our domain would be vindicated by halting construction at this juncture, we should not think ourselves obliged nonetheless to take that step in slavish, literal obedience to what may have been said on another day and in a different context.¹⁹

I thus cast my vote in favor of leaving the construction permits undisturbed for the time being. It must be repeated that I do so on my understanding that the sunk costs associated with further construction activities will *not* be taken into account in any future comparison between the Seabrook site (with or without cooling towers) and other sites in New England. As applied to the exceptional situation presented here, I do not read the discussion of sunk costs in the Commission's March 1977 decision (CLI-77-8, *supra*) as prohibiting effectuation of that understanding.²⁰ If I

¹⁹The situation at bar in *Hodder v. NRC* (D.C. Cir. No. 76-1709), discussed in both ALAB-366 (5 NRC at 69-70) and CLI-77-8 (5 NRC at 520-21) cannot be analogized to the *present* situation in this case.

²⁰In this regard, no judicial ruling of which I am aware *mandates* that an administrative agency take sunk costs into account in striking NEPA cost-benefit balances. Nor is there anything in prior decisions of the Commission or this Board which suggests a belief that this must be done no matter what the attendant circumstances. Moreover, any such absolute requirement would be so devoid of reason as to bar its being imported by implication into one or more of those decisions. This case aptly illustrates the point. Presumably, the applicants would regard an *inability* to rely on future increased investment in the plant as a fair trade-off for the *ability* to continue construction at this juncture. yet, as Mr. Farrar apparently sees it, the applicants would have to be given credit for future sunk costs whether they pressed for such credit or not—therefore, they must now lose the use of their permits. This line of thought may make sense to others; it certainly does not to me.

be wrong about this, the Commission no doubt will so indicate and, additionally, take such action as it may deem appropriate in that circumstance."¹

B. Mr. Farrar's Views

1. Chairman Rosenthal and I are in full agreement on the inadequacy of the Licensing Board's two supplemental decisions. We both see the need to set them aside and send them back for further consideration. But we disagree almost completely about what else we must do."²

The Chairman would let construction proceed unabated during the remand. I cannot. Our remand order tells the Licensing Board to decide the crucial factual question of whether this plant is being built in the right location. This is no small matter, even though Dr. Buck believes it involves only "technical errors" or "minor legal technicalities" (p. 531, *infra*). Rather, as we have said before, we are dealing with "one of the most important questions which NEPA requires to be considered," *i.e.*, "whether an application should be turned down because there is some other site at which the plant ought to be located."³ In this connection, I have stressed that "the parties are entitled to a reasoned decision *before*, not *after*," a plant is built."⁴ This is particularly true when the question is whether it ought to be built elsewhere.

But no such decision has been made in this proceeding. Instead, superficial and incomplete Licensing Board decisions—built in the latest instance on hurried, careless analyses furnished by the staff—have paved the way for construction. The Chairman recognizes the glaring defects, but he will not call a halt."⁵

"Beyond what is covered in the above discussion, there is no occasion to respond directly to Mr. Farrar's points. As is readily apparent, our variance on the suspension question stems from differing perceptions regarding both the possible impact of *Vermont Yankee* on this case and what are the most important factors to be taken into account. The Commission will have our respective thinking—as well as that of Dr. Buck—before it and can make its own choice.

"Originally, we agreed that our decision to set aside both decisions below meant that no more work could now be done on the plant. The Chairman changed his mind after *Vermont Yankee* came down. He thus has not set forth his earlier reasons for favoring suspension of the permits.

"*Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-335, 3 NRC 830, 840 (1976) and ALAB-435, 6 NRC 541, 543 (1977). Earlier in this proceeding, the Commission itself emphasized our "undoubted obligation to consider possible alternative sites for proposed nuclear reactors." CLI-77-8, *supra*, 5 NRC at 522.

"*Seabrook*, ALAB-423, *supra*, 6 NRC at 121, fn. 2 (dissenting opinion).

"Although the staff and the applicants failed to defend adequately the selection of the Seabrook site, they nonetheless managed to prevail upon the Licensing Board to approve their presentations. When its southern New England site decision of last June initially came before

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I will demonstrate that we must suspend construction now to insure a fair and sound decision on the merits. But suspension will also have a beneficial side effect. As long as we continue to follow a pattern of allowing construction to proceed after setting aside unsupported decisions, the quality of the decisionmaking process—including the staff's contribution to it—will not improve. Our insistence that important questions be carefully considered and fairly decided will be taken as empty rhetoric if we allow Seabrook to be built while the merits of other sites are debated. The staff and the Boards below will continue to act on the knowledge that (1) lip service to serious questions will be enough to get work started and (2) once work begins and the initial environmental damage is done, momentum—and concern for sums already invested—will propel the project after the defects are discovered.

Put another way, what we *say* about the need for sound decisions is naturally disregarded when our *actions* allay any fear that our words have force.⁶⁶ Conscientious workers in subsequent proceedings will have no defense against inordinate pressure to complete work hurriedly, without regard to its thoroughness. The result my colleagues reach today will but strengthen the hand of those who sent the staff to last May's hearing so unprepared.

2. I would have no quarrel with letting work continue if there remained only narrow questions not affecting or affected by the early stages of construction activity, or otherwise fairly severable from the question of whether construction should proceed.⁶⁷ But the gap in this case is fundamental—three major questions are unsettled:

(1) We do not know that Seabrook, whatever its cooling system, is preferable to sites in southern New England.

(2) We do not know whether EPA will give final approval to Seabrook without cooling towers.

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us, I said I was unwilling to let construction resume on the basis of it. 6 NRC at 121 (dissenting opinion). Instead, I suggested, the poor quality of the Board's first decision a year earlier required that we take at least a quick look at its supplemental decision before authorizing more construction. *Ibid.* My colleagues disagreed. 6 NRC at 119, fn. 6. Now the Chairman and I have found that that decision is at least as bad as I feared. But he perpetuates last year's mistake by letting construction continue.

““We give cause to doubt the strength of our commitment where, when occasion arises to implement those policies, we speak—but do not act—forcefully.” *St. Lucie, supra*, 3 NRC at 846 (Mr. Salzman dissenting).

“In no case in this Board's history have we properly let construction proceed pending the outcome of a remand when there remained a serious alternative site question in the case. See ALAB-366, *supra*, 5 NRC at 72. The one time we did not follow this rule we were unceremoniously reversed. See *Hodder v. NRC* (discussed *infra*, p. 521).

(3) We do not know that Seabrook with towers is preferable to building a plant at other New England sites in, near to, or far from the lead applicant's service area.

With such issues still in doubt, it is more uncertain than ever that Seabrook is the place for this plant. But allowing construction to continue helps tip the scales in favor of Seabrook—and against a fair answer to any of the unresolved questions. The continuing commitment of resources at Seabrook daily makes it more difficult to weigh the matter dispassionately. The attractiveness of the alternate sites cannot but suffer by comparison.

The force of these considerations is to me both obvious and compelling. In the past they have received recognition not merely in our opinions, but in those of the Commission and the courts. If my colleagues agreed with me, we would do little more than note that fact to justify our action. But the extent of our disagreement and the importance of the matter compel elaboration of my views. I will explain why our reversal of either of the Licensing Board's two supplemental decisions—and we have reversed them both—calls for a suspension of construction," and why, contrary to the Chairman's view, the Supreme Court's recent decision in *Vermont Yankee* has no bearing on the issues presented in this case and should not influence our action.

3. Although I discuss each of the two reversals separately, in both instances the general—and controlling—principle is the same. The serious defects which exist in the NEPA analysis could affect the ultimate outcome of this proceeding. Both the courts and the Commission have made plain that a principal consideration in this circumstance is whether continued construction will foreclose reasonable alternatives or otherwise prejudice the additional NEPA review yet to be conducted and the further decisions still to be made.⁹ We have frequently endorsed the principle that continued commitment of resources to a project unfairly tilts the scale against poten-

⁹In this connection, I disagree with Chairman Rosenthal that we need further word from the Commission on the southern New England site issue. I explain my views later (pp. 526-528), *infra*. I simply emphasize here that, even were he right, suspension would be called for by our reversal of the cooling tower decision alone (coupled, as it is, with the First Circuit's reversal of the EPA ruling)(see pp. 523-526, *infra*).

¹⁰Compare *Consumers Power Company* (Midland, Units 1 and 2), ALAB-458, 7 NRC 155 at 173 (February 14, 1978), where we declined to suspend construction because "the environmental issues being explored on the remand . . . [were] proving to be of little practical consequence . . .," no "environmentally preferable alternative to the proposed . . . project" had even been suggested, and that project was substantially along the way to completion. In these circumstances, we were unable to see how future decisions could be prejudiced by further construction.

tial alternatives; I have collected our decisions, along with a few of the judicial decisions upon which they rely, in the margin.⁹⁰

I found this principle controlling last year when we halted construction in analogous circumstances.⁹¹ The Chairman and I said then that "it makes no sense for construction now to proceed at Seabrook when there remains not just a theoretical but a manifestly real possibility that the site will be ultimately rejected in favor of some alternative to it." ALAB-366, *supra*, 5

⁹⁰*Allied-General Nuclear Services* (Barnwell Facility), ALAB-296, 2 NRC 671, 678, 679 (1975). There we referred to the line of judicial decisions involving the question of whether "work . . . should be enjoined lest . . . by virtue of the increasing commitment of funds and resources, [it] prejudice the outcome of pending NEPA reviews." We then expressed our view that those decisions "reflect understandable reluctance to allow further substantial undertakings in advance of a decision that the projects were environmentally justifiable." Put another way, we said the courts were "interested in halting any additional commitment of resources in circumstances where . . . increased expenditures might prejudice the decision-makers."

Consumers Power Company (Midland, Units 1 and 2), ALAB-395, 5 NRC 772, 779 (1977). "The more that is expended, the less likely it is that, on account of environmental considerations . . . potential alternatives will remain feasible."

Florida Power & Light Company (St. Lucie, Unit 2), ALAB-404, 5 NRC 1185, 1188 (1977). With respect to a stay pending appeal, we opined that "the decisionmaking process can be prejudiced by a commitment of resources to a project. Particularly where, as here, an alternative site contention is being vigorously pursued, permitting construction to go forward could, at least theoretically, alter the outcome."

Public Service Company of Indiana (Marble Hill, Units 1 and 2), ALAB-437, 6 NRC 630, 634 (1977). Again passing on a stay pending appeal, we said that the claim "that allowing work to continue will prejudice the ultimate outcome . . . must likewise be taken seriously. This factor is most crucial when there is a serious alternative site contention being pressed and there is substantial doubt about its resolution."

Consumers Power Company (Midland, Units 1 and 2), ALAB-458, 7 NRC 155 at 173 (February 14, 1978): "In other cases, a need might arise to suspend construction at an early stage to preserve potential options that could prove preferable." In that same decision (7 NRC at 171, fn. 61) we cited "a line of [judicial] decisions recogniz[ing] that additional investment prior to a final decision can tilt the balance against alternatives or against environmental concerns," e.g., *Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission*, 449 F.2d 1109, 1128 (D.C. Cir. 1971); *Coalition for Safe Nuclear Power v. Atomic Energy Commission*, 463 F.2d 954, 956 (D.C. Cir. 1972); *Union of Concerned Scientists v. Atomic Energy Commission*, 499 F.2d 1069, 1084, fn. 37 (D.C. Cir. 1974).

⁹¹Contrary to the view of the Chairman, I do not think that anything we said then should be considered inoperative in the situation we now face. To be sure, as he says (p. 516, *supra*), "the passage of time . . . works many changes." But he does not identify those changes. And time certainly has not changed the key fact—then, as now, we did not know where this plant should be built.

If anything, the situation is worse now than it was then, for there was less uncertainty then. At that time, we had not yet found any fault with the Board's comparison of Seabrook open-

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NRC at 72.²² See also *Seabrook*, ALAB-349, *supra*, 4 NRC at 260-62.

At that time, we relied in large measure on the similar sentiments the District of Columbia Circuit had expressed in reviewing, and reversing, our denial of a stay in *St. Lucie*.²³ That court, in adopting the result Mr. Salzman had urged in dissent, had found it "anomalous that construction can be taking place at one site while the [Licensing Board] has been directed by the Appeal Board to hold further proceedings concerning alternative sites." *Hodder v. NRC* (D.C. Cir. No. 76-1709, October 21, 1976) (unpublished; quoted and discussed, 5 NRC at 68-71). We also emphasized the warning sounded by the First Circuit in this very proceeding that continuing to build poses a threat to "the integrity of the final governmental decision" because it creates "the risk of public agencies and courts accepting less desirable and limited options or, worse, countenancing a *fait accompli*." *Audubon Society of New Hampshire v. United States* (No. 76-1347, December 17, 1976).

As I have explained in the margin (fns. 91 and 92, *supra*), the Commission agreed with us that suspension was in order when there was less doubt than now that Seabrook was the preferable site. *A fortiori*, we should have no hesitancy in again applying the sound and unexceptional principle that a finding of serious defects in the NEPA analysis which could lead to the re-

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cycle against alternative sites. Only later did the Commission institute the southern New England site inquiry, and only now have we found it defective. In other words, there at least existed then a presumptively valid decision by this agency that Seabrook open-cycle was preferable to plants at other sites. That is not the case now, so in this respect the applicants are worse off.

This means more doubt exists now, for there has been no gain in the cooling tower situation: (1) it was uncertain then—as now—that the use of cooling towers could be avoided, EPA's latest word (from the Regional Administrator) then being that open-cycle cooling would not be permitted and (2) then—as now—there had not as yet been a valid decision rendered within this Commission on whether other alternatives were preferable to Seabrook with cooling towers; *i.e.*, it was uncertain that Seabrook with towers would pass muster.

"When the Commission reviewed our decision to halt construction, it affirmed without either endorsing or rejecting our rationale. Instead, it said it would reach the same result whether it followed our reasoning or adopted a standard pressed by the staff. It did, however, emphasize the factor I rely upon when, in summary, it said it "suffices to agree with the view, implicit in" our opinion, "that the question of suspension of the permits herein must at least be decided on the basis of (1) traditional balancing of equities and (2) consideration of any likely prejudice to further decisions that might be called for by the remand." CLI-77-8, *supra*, 5 NRC at 521. In the connection, I discuss the equities below, pp. 528-529, *infra*.

"The Chairman now makes the curious suggestion (p. 516, fn. 79, *supra*) that the *Hodder* situation is not analogous to that presented here. His view a year ago, with me, was that the then-extant Seabrook situation—which has since deteriorated (see fn. 91, *supra*)—called for suspension *even more so* than did *Hodder*. 5 NRC at 70. The thorough analysis he wrote then deserves careful reading. 5 NRC at 68-71.

jection of the site on a comparative basis calls for a halt of construction absent good reasons not to do so. No such good reasons exist here.

4. My colleagues accept in principle the idea that the decisionmaking process must be protected from the premature commitment of resources which can unfairly influence it. But Dr. Buck says once again that the small expense associated with continuing construction for a few more months will not affect the ultimate decision.⁹⁴ With all deference, that appears to rest on his conclusion that the proposed plant should be built (see, e.g., Parts I and II of his dissenting opinion here). Of course in that circumstance he can accurately state that additional construction will not alter the decision.

The Chairman, on the other hand, agrees that it remains an open question whether Seabrook should be built. And he concedes that further construction might well unfairly tip the balance against the yet unexamined alternatives. He also says he would vote for suspension if that prejudicial impact could not be avoided (pp. 516-517, *supra*). But he votes against suspension on the theory that the weight of further construction can be avoided simply by disregarding it in future decisions (p. 515, *supra*).

This is no answer. A logician might think this a perfect way around the problem. But we live in a real world, and that which is done cannot be undone by pretending it never happened. With all deference to the Chairman's views, it is simply not possible to forget the looming presence of a partially built nuclear power plant.⁹⁵

Moreover, one need look no further than the Chairman's own holdings in this case for authority invalidating the principle he now espouses. On two prior occasions, he joined me in stressing judicial decisions recognizing that incremental expenditures can tip the scales and thus should not be permitted when the ultimate decision is in doubt.⁹⁶ He would avoid the force of his own reasoning with the observation that no judicial decisions *order* us to

⁹⁴See p. 568, *infra*; compare *Seabrook*, ALAB-349, *supra*, 4 NRC at 285, 287-88 (Dr. Buck dissenting, 1976); ALAB-366, *supra*, 5 NRC at 89 (Dr. Buck dissenting, 1977).

⁹⁵One observation related to our *Midland* decision (see fn. 89, *supra*), bears mention here. Substantial work had been done at Midland between the time of the court-ordered remand and our decision on suspension (which followed a lengthy Licensing Board proceeding). In our opinion, we said that the work up to the time of remand had been done under the aegis of presumptively valid construction permits which had never even been the subject of a stay request, while the same could not be said about the subsequent work. Although he points to that discussion here (p. 515, *supra*) nothing said there was intended to give support to the Chairman's view that it is possible to lay down a rule that work done and money spent from this day forward will simply not be counted in any future comparisons.

⁹⁶Specifically, in ALAB-349, where the question of suspension stemmed from judicial invalidation of the fuel cycle rule, and the question of alternatives involved building nonnuclear facilities, he joined me in saying (4 NRC at 260-61, footnotes omitted):

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take past expenditures into account when it comes time to consider alternatives." If that is true, it is because the decisions recognize that work done is naturally and automatically given weight—so no such directive is necessary.

5. Against this background, I consider the significance of our conclusions that neither supplemental decision can stand. Taken together, and coupled with the invalidation of EPA's ruling, those conclusions cry out for suspension—the uncertainty left in their wake is, beyond peradventure, too much to let construction proceed. But in my view, stopping work is required by each of our decisions standing alone. That is, even if a superior tribunal concludes that one of the Licensing Board's decisions should have been affirmed, the fact that the other would remain defective is sufficient reason to halt construction.

a. This is easy to see with respect to the southern New England site decision. As long as those sites cannot be ruled out (and the Board below gave no new reasons for rejecting them in its cooling tower decision), then Seabrook cannot lay claim to a valid permit because those sites stand as potential alternatives to Seabrook under any mode of cooling. Thus, the entire cooling tower inquiry—in this agency or at EPA—is not crucial for this purpose. Prevailing on that inquiry in both forums would not alone avail

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We have seen that the obligation to consider "the possibility that the cost-benefit balance will be tilted through increased investment" is rooted in the District of Columbia Circuit's decision in *Coalition for Safe Nuclear Power v. AEC*, *supra*. As the court there held, the degree to which an "additional irretrievable commitment of substantial resources might affect the eventual decision reached on the NEPA review" should be "a paramount consideration" in determining whether to halt construction to await the outcome of the completion of that review. . . . [J]ust as the applicants have relied upon the monetary and environmental expenditures involved in construction activities to date in arguing that the balance of convenience requires that construction now be allowed to proceed, so too they well could be expected to stress any additional incremental expenditures along that line when the time comes to rebalance (in light of the new rule) the benefits and costs of continuing with Seabrook instead of pursuing some other alternative.

Again, in ALAB-366, where suspension arose as a result of the inadequate comparison of "Seabrook with towers" and alternative sites, he again wrote with me (5 NRC at 72, footnote omitted):

We have previously made reference to the line of judicial decisions reflecting the reluctance of the courts to give license to the commitment of substantial additional funds and resources to an as yet unapproved project lest the consequence of such commitment be prejudice to the outcome of still pending NEPA reviews. *Allied-General Nuclear Services* (Barnwell Nuclear Fuel Plant Separations Facility), ALAB-296, 2 NRC 671, 678, 679 (1975).

"See p. 516, fn. 80, *supra*. I take it he means to limit this sweeping statement to decisions—if any exist—where the proponent of a project asked that he be given no credit for his past work.

the applicants, for whichever way those decisions come out, Seabrook will not have a green light unless it receives a favorable decision in comparison to the southern New England sites. And that decision could plainly be prejudiced by further construction at Seabrook.

b. Looking at it the other way (*i.e.*, assuming the applicants get past southern New England sites but still have to face the cooling tower inquiries), the cooling tower uncertainty would of itself still require suspension. As it stands now, the record bears out what I have said before—compared to other locations, Seabrook with towers is a much more dubious proposition than Seabrook without towers. ALAB-423, *supra*, 6 NRC at 120 (dissenting opinion). Even the applicants think so: they twice sedulously declined to say that they would build at Seabrook if EPA refuses to exempt them from the closed-cycle cooling requirement.”

EPA may well rule against the applicants and, in effect, require towers.” That possibility increases still further the likelihood that continued construction will serve to promote Seabrook over otherwise preferable alternatives.

Even were the southern New England site inquiry properly conducted, we could allow construction to go forward now only on the assumption that EPA will rule in the applicants’ favor. This we cannot fairly do.¹⁰⁰ And in the absence of such an assumption, the fear of prejudicing further decisions becomes doubly significant; both EPA’s and this agency’s decisions stand to be influenced by continued building at Seabrook.

We should not lightly force that situation on the EPA Administrator. And if we do, it can come back to affect us. For were that official to reject open-cycle cooling some months from now, this Commission’s analysis of “Seabrook with towers” would become vital to the plant’s survival. But the

⁹⁹See p. 504, *supra*, fn. 41 and accompanying text. In this connection, the delay involved in adding cooling towers is nearly as great as that involved in switching to another site. Compare Applicants’ Direct Testimony No. 27, p. 8 with p. 36.

¹⁰⁰This, of course, was the Regional Administrator’s ruling.

¹⁰¹Although Dr. Buck describes the First Circuit’s decision as “based solely on procedural deficiencies,” the defects found go to whether the proceeding was fairly conducted; procedural errors, of course, can affect substantive results. Moreover, the EPA Administrator has announced that he will not exercise the option of simply trying to reach a new decision on the old record, absent the report of his technical panel. Instead, he is going to hold a supplementary hearing at which the panel will be cross-examined and all parties may introduce not just new evidence but also “any evidence which they elected not to introduce at the original hearing.” See EPA’s March 21, 1978, order. There is, then, no basis for any prediction of the ultimate result, and we are unlikely to know the outcome for some time.

I do not mean to take issue with the general practice which permits Commission licensing proceedings to move forward in advance of an applicant’s obtaining other necessary governmental approvals. What faces us here is far from the routine situation in which the applicants can readily be expected to obtain such approvals in due course.

plant would be even closer to completion then. This Commission's adjudicators would have to decide whether to approve the construction and operation of this enormous project with cooling towers—*an option nobody likes*—or to abandon it. That decision will be difficult enough without additional expenditures thrown onto the scale in the interim. Sites that otherwise might have provided palatable alternatives become more unsavory with every dollar expended at Seabrook.

The result I would reach is not a novel one. It finds direct support in a prior Commission ruling in this very case.

Specifically, as already noted, a year ago the Commission upheld a prior suspension of construction ordered by this Board (over Dr. Buck's dissent). It there discussed the rules which would govern any future resumption of construction (5 NRC at 542-47). But the Commission first said unequivocally that, because this agency had not approved towers and EPA's final ruling was in doubt, "we cannot permit construction to continue when use of . . . [cooling towers] which could render the site unacceptable may be required." 5 NRC at 521.¹⁰¹ Immediately thereafter, it ruled that if the Board below found closed-cycle cooling (*i.e.*, cooling towers) unacceptable at Seabrook, "construction of the facility could continue only if and when final EPA approval to proceed with once-through cooling had been obtained."¹⁰²

This Commission directive should control our action here. For, far from having given final approval to open-cycle cooling, EPA has reopened its hearing record to receive any evidence the parties wish to adduce (see fn.

¹⁰¹The Commission was then confronting a situation that, for present purposes, precisely paralleled the one before us now. In the first place, "neither this Commission, nor any of its subordinate tribunals, has yet determined that Seabrook is an acceptable site for construction of a facility employing a closed-cycle cooling system." 5 NRC at 521. Secondly, the applicants had not obtained "final EPA approval to proceed with once-through cooling." *Ibid.* See also fn. 103, *infra*.

I might add that even were this agency to approve "Seabrook with towers" in advance of an EPA ruling, the applicants would not have blanket permission to proceed. For, as the staff stressed repeatedly in its papers to us, the Commission last year dealt explicitly with what should occur in that situation. It indicated that in no event could the applicant "construct any portion of the cooling system at all until after final EPA action." 5 NRC at 545.

¹⁰²The Commission also indicated that if towers at Seabrook were found by this agency to be "environmentally acceptable" in and of themselves, "this will give rise to the need to reassess the attractiveness of the site with this added burden, in comparison to other possible locations for nuclear facilities." 5 NRC at 521-22. In that connection, it went on to discuss whether construction could resume once that were done. The Commission never suggested that construction could resume while the applicants were still awaiting *both* a final EPA decision and a ruling from this agency that "Seabrook with towers" passed muster on a comparative basis with other sites. Its opinion was directly to the contrary—either an EPA decision allowing open-cycle cooling, or this agency's decision approving towers, was necessary.

100, *supra*).¹⁰³ And, while this agency has not ruled out closed-cycle cooling, we have before us no valid ruling that, in light of the alternatives, it is acceptable—a ruling the Commission ordained a prerequisite to resuming construction.

Of course, the Commission's decision last year was in the context of permitting construction that had been halted to start up again. But nothing it said can be fairly read as inapplicable to the present situation, where construction was allowed to resume, the decisions allowing it have been found defective, and the question is whether construction must be halted again. The Commission's opinion appears on point and requires suspension.

The Chairman, however, hesitates to place too much emphasis on what the Commission said "on another day and in a different context" (p. 516, *supra*). He does not explain the inconsistency between his disdain on this score and his dedication to a Supreme Court decision that has no perceptible connection to this case. I discuss that point now.

6. With all due respect to the Chairman's contrary view, the Supreme Court's *Vermont Yankee* decision (which, *inter alia*, reversed the Court of Appeals' *Aeschliman* decision) is irrelevant to any question pending before us. To be sure, when we decided that the intervenors were too late in raising the southern New England site contention, we mentioned *Aeschliman*. But we did so only to say that it did not assist them on the untimeliness point. 5 NRC at 66. The Commission too took note of *Aeschliman*, but only to observe that we had distinguished it. 5 NRC at 536-37, 539. Then, *for reasons independent of anything we or it had said about Aeschliman*, the Commission in effect gave the intervenors the benefit of the doubt about being late and ordered that the southern site inquiry be pursued. 5 NRC at 539. Nothing the Commission there said suggests that it pondered the legal standard that determines whether a contention warrants attention; its discussion went off on different grounds.

This is not surprising. At each adjudicatory level in the cases where the threshold test was a matter of importance, the debate concerned a contention—relating to energy conservation—which, as the Commission and the Supreme Court saw it, was sufficiently novel and complex in 1972 to require a fuller explanation from the intervenors before it could be entertained.¹⁰⁴

¹⁰³The Commission last year did reject the suggestion that not only EPA but judicial approval had to be awaited. 5 NRC at 521, fn. 20. In that respect, it was prepared to rely upon a presumption of administrative regularity. This does not aid the applicants here. It is one thing to allow them to rely on an unreviewed EPA decision and quite another to allow them to ignore judicial review that has taken place and has resulted in the administrative decision being found unacceptable. In that circumstance, there is no "final EPA approval" in any sense of the term.

¹⁰⁴The Supreme Court explained that the Court of Appeals had displayed "a lack of understanding of the historical setting within which the agency action took place and of the

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The southern New England site contention is an entirely different story. It was never vague or confusing, and the applicants and staff should have known precisely how to deal with it on the merits. The reference to sites outside the applicants' service area is hardly novel.¹⁰⁵ But even if it were, the Commission and the Supreme Court focused on novelty in rejecting the energy conservation contention only insofar as it was accompanied by uncertainty or confusion.¹⁰⁶ Indeed, in explaining that "the concept of 'alternatives' is an evolving one," the Court said that an agency is required "to explore more or fewer alternatives *as they become better known and understood.*" 46 U.S.L.W. at 4309 (emphasis added). The staff's and applicants' failure to address this issue soundly cannot be attributed to a failure to understand the contention.¹⁰⁷

The upshot is this. I doubt that, had the threshold test then been in effect, the Commission would have thought it applicable to a contention of this nature. The Chairman sees it otherwise; he thinks the Commission might have felt itself precluded from applying the test because of the then-controlling court of appeals decision. But if the Commission had thought the contention should not pass the threshold, and warranted no investiga-

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nature of the [threshold] test itself." 46 U.S.L.W. at 4309. It emphasized that it was incumbent upon intervenors "to structure their participation . . . so that it alerts the agency to [their] position and contentions. This is especially true when the intervenors are requesting the agency to embark upon an exploration of uncharted territory, as was the question of energy conservation in the late '60's and early '70's." *Id.* at 4309. It then criticized the intervenors for, *inter alia*, "declin[ing] to further focus [their] contentions." *Id.* at 4310.

¹⁰⁵We said 4 years ago that "There may well be occasions when the search for an acceptable nuclear plant site must go far outside a utility's service area, particularly in heavily populated regions." *Bailly*, ALAB-224, *supra*, 8 AEC at 268 (1974).

¹⁰⁶Specifically, the Commission said in *Midland* that "energy conservation is a novel and evolving concept. NEPA does not require a crystal ball inquiry. . . . At this emergent stage of energy conservation principles, intervenors also have their responsibilities. They must state clear and reasonably specific energy conservation contentions in a timely fashion." 7 AEC at 31-32. The Commission had earlier explained that "the phrase 'energy conservation' has a deceptively simple ring Taken literally, the phrase suggests a virtually limitless range of possible actions and developments. . . ." 7 AEC at 23.

In conclusion, the Commission recognized that once experience was gained with energy conservation issues and feasible techniques emerged, there would be an obligation "to develop an adequate record on these issues in appropriate cases, whether or not they are raised by intervenors." 7 AEC at 32. I believe that the Commission's decision to launch the southern New England site inquiry was prompted by its view of just such an obligation to develop an adequate record on a clearly understood issue.

¹⁰⁷Some may argue that under my appreciation of the threshold test, an intervenor can suggest a site on the West Coast as an alternative to a plant proposed for New England. Perhaps so. A contention like that will not succeed, not because it does not meet our standards for precision and clarity, but because the opponents can show—presumably with very little effort—that it lacks merit. It bears repetition that in this case the proponents of Seabrook failed to show at the hearing that the southern New England site contention lacked merit.

tion, it could easily have rejected it on the untimeliness ground. By instead directing that the inquiry be undertaken, it indicated a desire to learn whether sites outside the service area are legitimate alternatives.

In short, nothing in the Supreme Court's reinstatement of the threshold test in *Vermont Yankee*, in the rest of its opinion there, or in anything the Commission has said should give us pause in our review of the southern New England site decision. And the result of that review is that we should suspend the permits. It is neither in our province nor in our competence to second-guess the Commission's reasons for freely instituting that inquiry. We do the Commission no service by ducking the issue and staying our hand.¹⁰⁸ The question whether to halt construction is before us for decision. We should decide it, not pass it along to the Commission unanswered.¹⁰⁹

7. What remains for consideration is whether any equities in the applicants' favor override the need to preserve the integrity of the decision-making process. On this score, I do not write on a clean slate. When my colleagues restored the construction permits last July (over my dissent), they held the decisions on which they based that action entitled to "full recognition" until "overturned by appropriate authority"; in that connection, they recognized that "further administrative or judicial scrutiny" could "once again place the construction permits in jeopardy."¹¹⁰ Indeed, they expressly warned the applicants that "the reinstatement of the construction permits might be short lived."¹¹¹ Thus, my colleagues proclaimed, the applicants themselves had "to weigh the risk of another permit suspension in terms of the consequences" that would follow.¹¹²

¹⁰⁸None of the parties has suggested that the Supreme Court decision has any effect at all on this case, much less the dramatic implications that the Chairman reads into it. Ordinarily, lawyers waste no time in bringing to a tribunal's attention a decision that aids their cause. Their silence points up just how strained is the Chairman's reliance on *Vermont Yankee*.

¹⁰⁹As we did before, I would allow the applicants some time to effect an orderly shutdown of activity. They could use this same period to seek relief from the Commission; the Commission would then have the opportunity to step in if it wished to. See ALAB-349, *supra*, 4 NRC at 272; ALAB-366, *supra*, 5 NRC at 73.

¹¹⁰See ALAB-423, *supra*, 6 NRC at 115, 116-19; compare *id.* at 121 (dissenting opinion of Mr. Farrar). My colleagues relied there in part on the (presumed) strength of the Licensing Board's July decision and the operation of the "immediate effectiveness" rule. Had they not allowed construction to resume then, they would certainly not do so now after finding that the July decision gave the issues only superficial treatment. To keep the permits functional now pushes the "immediate effectiveness" rule too far: that construction was wrongly allowed to proceed last year is no justification for letting it continue once the "immediately effective" decision has proven irreparably defective.

¹¹¹*Id.* at 119.

¹¹²*Ibid.* Expressed more fully, their warning went like this:

In light of what is involved in recommencing and then halting anew construction ac-

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My colleagues now treat this warning as meaningless. The decisions which allowed construction to go ahead have now been overturned. Yet the Board does nothing. In short, construction goes ahead whether decisions are valid or invalid.

As I see it, however, the forewarning given the applicants means something. Having chosen to go ahead in the face of such uncertainty, they cannot now take credit for resultant "equities" that might assist them in other circumstances.

Perhaps the strongest argument against stopping work is that it would cost a large number of construction laborers their jobs. It is no answer to say they will be no worse off than if the project had never been started; many of them may have moved their homes and families in response to the promise of employment at Seabrook. But this factor will be present in every case and cannot outweigh the need to reach a fair decision on the siting question—which is far more important to the public welfare.

The applicants also argue that relatively little more money will be spent if construction continues over the next few months than if it is halted. I find little merit in this, and the Chairman shares my view. The applicants cannot take credit for continuing to spend money voluntarily.

Similarly unpersuasive is their assertion that they will make relatively small additions to the project in the next few months. This is always the case. At each stage, they can say, "Let us do a little more." And at each stage some find this argument compelling. To be swayed by it is to indulge in precisely the sort of incremental decisionmaking that NEPA was intended to foreclose.

Nor am I influenced by the additional costs that the applicants must bear when construction is allowed to begin and is then halted. Startup and shutdown costs, interest on money already expended, and other such charges can indeed be substantial. But, to repeat, the applicants were forewarned about this and they cannot now complain of the consequences of their own decision to resume construction.

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tivities—not only for the applicants but also for the workmen—another pull on the yo-yo string to which this facility has been tied for the last year would be unfortunate. [But, because] . . . the applicants are legally entitled to the reinstatement of their permits . . . it must be left to the applicants themselves to weigh the risk of another permit suspension in terms of the consequences that would flow from such a suspension.

In sum, we have the obligation to suspend the permits ourselves now and we err in not doing so. I therefore respectfully must note my dissent on this point.

IV. CONCLUSION

On the basis of the foregoing, the Licensing Board's supplemental initial decisions of July 7 and November 30, 1977, are both *reversed* and the cause is *remanded* to that Board for further proceedings consistent with this opinion.¹¹³ The construction permits shall remain in full force and effect pending the outcome of the further proceedings unless, upon its own consideration of the matter, the Commission should order otherwise.¹¹⁴

It is so ORDERED.

FOR THE APPEAL BOARD

Romayne M. Skrutski
Secretary to the Appeal Board

Opinion of Dr. Buck, dissenting (except with respect to the question of permit suspension):

My colleagues have written a majority decision, yet on the most important conclusion they disagree. Mr. Farrar calls for immediate suspension of the construction permits. Mr. Rosenthal finds that the Commission itself should decide on the suspension question.

My review of the record convinces me that there *is* support in the record for the Licensing Board's ultimate conclusion that none of the alternative sites proposed (including the southern New England sites) is obviously superior to the Seabrook site using either once-through or closed-cycle cooling. Therefore, I would affirm the Licensing Board and deny the existing motions for invalidation or suspension of the permits.

¹¹³In this connection, the proceedings on the remand shall embrace the southern New England site inquiry in the absence of a contrary Commission instruction.

¹¹⁴The various pending motions of SAPL-Audubon and the Coalition asking this Board either to invalidate or to suspend the construction permits are, accordingly, not granted. Although Mr. Farrar would suspend the permits, he believes that course warranted by our reversal of the supplemental initial decisions rather than by additional considerations set forth in the motions.

Since Mr. Rosenthal and I are in agreement that there should be no suspension now, we form a majority of the Board in that respect.

As will be seen in my decision I disagree with all but one of my colleagues' conclusions because, to me, the facts revealed in the record are more significant than the alleged technical errors of the staff and Licensing Board by which my colleagues are swayed. I frankly believe that my colleagues have allowed their concern over legal errors to obscure the quantity and quality of the engineering and scientific facts presented in this record. This does not mean that I sanction all aspects of the staff's review or the Licensing Board's decisions, or that I condone any errors that may have been committed—I merely find no error that has done violence to the rights of any participant nor would the correction of any of the suggested errors by further hearings be likely to change the ultimate conclusion.

Under such circumstances it is my view that the public interest calls for me to make my decision on the merits and not to enshrine minor legal technicalities.

I. SOUTHERN NEW ENGLAND SITE INQUIRY

In their consideration of the southern New England site alternatives, my colleagues have quoted extensively (pp. 485-487, *supra*) from the Commission's decision following its review of ALAB-366 (CLI-77-8, 5 NRC 503 (March 31, 1977)). While I do not wish to burden the record unnecessarily with quotations from the Commission's decision, I feel it necessary to quote the first four sentences of the paragraph immediately preceding the one quoted by my colleagues. There the Commission stated:

Our necessarily limited review of the facts indicates that the Appeal Board majority's determination of untimeliness has support in the record. Normally, as *Aeschliman* implies, 547 F.2d at 627-28, the stage at which intervenors must raise additional alternatives is the DES comment period. See ALAB-366 at 66-67, nn. 46 and 47. The early opportunities afforded the public to participate in siting considerations, as we have noted, make appropriate what is in practical effect an increasing burden of justification for forcing consideration of new site alternatives. However, the fact is that this case must be remanded to the Licensing Board on other grounds for a new comparison of Seabrook with possible alternate sites, on the assumption of closed-cycle cooling.

5 NRC at 539.

From the two quotations taken together, it appears evident that remand on this issue was ordered by the Commission only because a hearing had to

be held in any case and the Licensing Board was instructed to consider the site issue in the light of a "rule of reason" and "reasonableness." This is the context in which the matter was discussed at the remand hearing. While I will show that my colleagues are completely incorrect on the merits of the case, I will first discuss my belief that at the remand hearing the intervenors themselves made the matter of the southern New England sites a nonissue.

A. The Southern New England Sites Issue is a "Nonissue"

It is apparent that, as reflected in the order remanding the southern New England sites issue for further hearings, the Commission expected at least some substantive contribution from the parties raising that issue. The Commission acknowledged the broad spectrum of sites which had already been looked at, and it remarked that "NEPA does not require that we reformulate a discrete licensing question in terms as broadly as intervenors suggest" (5 NRC at 540). Not only did it imply that the intervenors should attempt to narrow the issue they had raised, but it expressly stated that "[t]he early opportunities afforded the public to participate in siting considerations. . . make appropriate what is in practical effect *an increasing burden of justification for forcing consideration of new site alternatives*" (*id.* at 539, emphasis added; see also p. 531, *supra*).

Under these circumstances one would have expected at the very least that some substantive, probing cross-examination on the environmental implications of locating a facility at any of the southern New England sites would have been conducted by NECNP¹ counsel of both the staff and applicant witnesses. However, my review of the remand record fails to disclose any substantive cross-examination of either of these parties by NECNP or SAPL-Audubon. The only significant cross-examination connected with the issue was conducted by counsel for the State of New Hampshire and concerned only the staff's evidence on additional transmission lines.² This

¹NECNP is the originator of the southern site issue. SAPL-Audubon expressed interest later.

²The cross-examination by NECNP to which my colleagues refer (Tr. 13268-74, referred to at fn. 24, p. 497, *supra*) consists of a total of six pages, starting with some questions about the meaning of NEPOOL, whether the owners of the Baily reactor (which had been alluded to by the staff in its analysis) belonged to a similar pool, whether the staff had examined the transmission system in New England, and then finally more discussion of NEPOOL. This questioning ended with a stipulation by applicants' counsel with respect to the relationship of the New England Generation Task Force to NEPOOL (Tr. 13273). As I have stated in the text, the probing questions on transmission lines arose in the questioning of the NRC staff by counsel for the State of New Hampshire.

The second reference given by my colleagues (Tr. 13025, *et seq.*) was to the cross-examination of applicants witnesses by counsel for SAPL-Audubon. The questioning on

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cross-examination resulted in the justifiable striking of the staff's transmission line testimony on the basis that it lacked reality.

The reason for this lack of interest on the part of NECNP became obvious at the oral argument held by this Board on March 16, 1978. During that argument Mr. Roisman, representing NECNP, emphatically stated:

Don't beg off on us and say we should take advantage of the stupidity of the system and urge you to put it [the Seabrook reactors] in Pilgrim. No sites are acceptable for nuclear power in New England. That is my client's position. (App. Bd. Tr. 84.)

It appears from this that the intervenors have dropped their claim that the southern New England sites may be environmentally sufficiently superior to Seabrook to warrant further investigation. I also note that in the oral argument before this Board on March 16, 1978, the counsel for the Commonwealth of Massachusetts side-stepped any statement of the desirability of other sites in Massachusetts (Pilgrim and Montague) by saying that "... the Commonwealth is not the party that brought up the 19 southern New England sites in the Seabrook case for what it is worth" (App. Bd. Tr. 49).³

I recognize, however, that the intervenors may have viewed this approach as legally permissible under a then-applicable judicial holding—namely, *Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976). As my colleagues have indicated (*supra*, p. 487), in that decision the court rejected the Commission's "threshold test" for initiating a licensing board inquiry on a NEPA issue and instead held that, "if an intervenor's com-

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southern New England sites began with questions about existing or approved New England plants that might be for sale by one or more of their owners. This was followed by questions about a nonbinding referendum concerning the possible building of another Pilgrim plant and whether this was an important factor in siting a nuclear plant. (The witness said it was not. Tr. 13028.) The questioning then went on to other matters—Rollins Farm site, hardening of containments, Maine sites, Seabrook tunnels, Moore Pond site, etc., finally returning briefly to the southern New England sites (Tr. 13037 and 13038). The few questions on these pages concerned the possible voluntary giving up (sale of lease) of a viable reactor site owned by one company to another within the pool. End of questioning on southern New England site.

I do not consider this cross-examination to be either substantive, probing, or representative of the depth of questioning these lawyers used in other phases of this proceeding with which they were seriously concerned. In particular no questions at all were asked about the environmental implications of utilizing any of the southern sites.

³In this regard, however, I note that Ms. Weiss also told this Board during the oral argument, "[t]here are problems with that site [Montague] that have to do with the Endangered Species Act" (App. Bd. Tr. 53). If that be true, it is difficult to understand how Montague could be considered "obviously superior" to the Seabrook site.

ments on the draft environmental statement raise a 'colorable alternative not presently considered therein' in a manner which brings 'sufficient attention to the issue to stimulate the Commission's consideration of it,'" the Commission is responsible for undertaking further investigation of that question. In CLI-77-8, *supra*, the Commission in effect held that the intervenors had set forth enough at least to stimulate that inquiry when they named certain southern New England sites on which other nuclear plants existed or were planned. And while I firmly believe, for reasons outlined earlier, that the Commission's order anticipated that the intervenors would contribute substantively to the site inquiry, the intervenors could have read *Aeschliman* as relieving them of anything more than pointing to asserted defects in a NEPA review (which in effect was all they did).

Whatever their belief in this regard, its legal foundation was seriously eroded (if not completely undermined) by the Supreme Court's recent reversal of *Aeschliman*. *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, _____ U.S. _____, 46 U.S.L.W. 4301 (April 3, 1978). There, the Court made it clear not only that the Commission's "threshold test" was appropriate (*id.* at 4309-10) but that "it is still incumbent upon intervenors who wish to participate [in the environmental review of a project] to structure their participation so that it is meaningful, so that it alerts the agency to the intervenors' position and contentions" (*id.* at 4309). Clearly, the intervenors here have fallen far short of meeting any "threshold test"—indeed, as I have shown, they have neither produced nor attempted to produce any information which could lead us to the conclusion that *any* southern New England site has even a potential for being "obviously superior" to Seabrook. The remarks of the Supreme Court are apropos in this respect:

. . . administrative proceedings should not be a game or a forum to engage in unjustified obstructionism by making cryptic and obscure reference to matters that "ought to be" considered and then, after failing to do more to bring the matter to the agency's attention, seeking to have that agency determination vacated on the ground that the agency failed to consider matters "forcefully presented."

Id. at 4309-10.⁴

I had prepared most of this portion of my opinion prior to the Supreme Court ruling. As I will detail in the forthcoming sections, I consider the present record adequate to sustain the Licensing Board's southern New

⁴In another context, the Court noted that "a single alleged oversight on a peripheral issue, urged by parties who never fully cooperated or indeed raised the issue below, must not be made the basis for overturning a decision properly made after an otherwise exhaustive proceeding." *Id.* at 4311.

England sites decision and, accordingly, do not perceive any need for further hearings on this matter. However, if the institutional and legal obstacles discussed in Section B, *infra*, are not found to be dispositive, I would allow the intervenors an opportunity to demonstrate (through affidavits) that one or more of the southern New England sites might be "obviously superior" to Seabrook. Because of the *Aeschliman* standard, they might previously have believed themselves relieved of any responsibility to meet such a threshold requirement. Only if they succeeded in doing so would I institute further hearings.³

B. Institutional and Legal Obstacles Associated with the Southern New England Sites as Alternatives to Seabrook

1. Discussion of the Majority Reasoning

As I have noted, my colleagues have quoted extensively (pp. 485-487, *supra*) from the Commission's decision (CLI-77-8). The first sentence of this quotation states that the Commission added that, in ruling on the southern New England alternate sites, it was not excluding:

the possibility that the Licensing Board will find, on the basis of evidence already in the record and other relevant factors, that a limit on alternate site consideration to the area in or near the lead applicant's service area is appropriate in the context of this application. [5 NRC at 539.]

The Licensing Board reached such a conclusion in paragraph 34 of its decision, LBP-77-43, 6 NRC at 139, which was based on findings 30, 31, 32, and 33 which my colleagues quote at pp. 490-491, *supra*. These findings and conclusions are summarily dismissed by my colleagues because, they claim:

- (1) Finding 31 which states that none of the alternative sites surpasses Seabrook from the standpoint of providing new generation for those New England areas in greatest need "... could not serve of itself to justify a *generic* rejection on institutional, legal or economic grounds of all of the southern New England sites" (p. 491, *supra*).
- (2) Finding 31 lends little support to the Board's conclusion

³As should be apparent, I consider the "threshold test" to be applicable in far more circumstances than does Mr. Farrar. Without attempting precisely to delimit its scope, I can state that it clearly covers the situation here at hand—*i.e.*, where numerous sites in or near the lead applicant's service area had already been examined and the question arose as to whether to expand the fringe areas of that examination.

respecting the "uncontroverted superiority of the Seabrook location for system reliability" (p. 491, *supra*).

- (3) In Findings 32 and 33 the Board made no effort "to identify the nature and extent of the 'serious economic and scheduling disadvantages as well as institutional and legal uncertainties' to which it alluded" (p. 492, *supra*).
- (4) "[T]he only reference made by the Board to the earlier record was with regard to the Seabrook location being 'ideally suited' to provide new generation [for those areas in New England which would otherwise be the most deficient, from the viewpoint of load and capacity] Beyond that, as also seen, on the remand neither the applicants nor staff based their case on any other purportedly significant disclosures in the earlier record; similarly, their proposed findings did not bring into play such disclosures" (p. 496, *supra*).⁶ (The statement in brackets is from the Licensing Board's July 7, 1977, decision, LBP-77-43, 6 NRC at p. 139.)

As I point out later, these assertions are not justified; but assuming, *arguendo*, that they are correct, I question their use as bases for asserting that a licensing board—having lived through the whole Seabrook campaign—can ignore evidence it has received in earlier segments of the proceeding which bears directly on the remand hearing. Nor should we in our review ignore such evidence.⁷

⁶My colleagues use this assertion to express doubt, despite the Commission's expression to the contrary, that it would accord with due process to uphold the decision below on evidence adduced during the original hearings. They support this concern by reference to *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 354-55 (1975). That case is inapposite, however, since the evidence there being discussed was not offered to develop the area being challenged (*id.* at 356). In this case the evidence in the earlier record with regard to the NEPOOL planning function is directly related to the selection of the Seabrook site (*cf.* App. Dir. Test. No. 14, fol. Tr. 10162 and subsequent cross-examination at Tr. 10163-270).

⁷Mr. Roisman, counsel for NECNP, even urged this Board to consider its special role in this regard as part of the "administrative decisionmaking" process when he observed:

[I]hat gives you special responsibilities and special powers. You do *de novo* reviews of the record. The Court of Appeals cannot.

App. Bd. Tr. 90. Mr. Roisman expressly approved the Appeal Board action, in a previous round of this proceeding, in analyzing the testimony beyond that which was pointed out by staff and applicant attorneys. At the March 16 oral argument, Mr. Roisman stated:

I am saying look at what Dr. Buck—and I think it was primarily his work, with all due respect to your technical abilities, Messrs. Farrar and Rosenthal—did with the issue of seismicity in your original opinion. That represented the kind of inquiring, deep probing into the record that ought to happen on issues.

(Continued on next page.)

In their dismissal of the Licensing Board's findings and conclusions my colleagues have given little or no weight to:

- (1) The Licensing Board's specific reference to Applicants' Direct Testimony No. 24 [sic] fol. Tr. 10162. (Reference is actually to App. Dir. Test. No. 14.) See 6 NRC at 139.
- (2) The staff's testimony at the remand hearing (fol. Tr. 13223) is specifically entitled "NRC Staff Supplemental Testimony" and makes repeated references to the FES, to the guidelines it follows for its independent analysis of the applicants' submittals (testimony introduction), and to the New England Generation Task Force study of locations for baseload nuclear power stations. (See, for example, FES, p. 9-5.)
- (3) The applicants' direct statement on what "has been set forth already in the record [concerning] certain basic planning with respect to generation in New England . . ." (App. Direct Test. No. 27, fol. Tr. 12782, p. 45; see also *id.*, p. 38).
- (4) The fact that both the applicants and the staff referred the Board back to the evidence contained in the existing record regarding the desirability of the Seabrook site in terms of regional load demands and institutional planning requirements.*

As I have pointed out, the proposed findings of both the applicants and staff do refer us back to the existing record. In any event it appears to me that reference by sworn witnesses to previous testimony is more important to finding the truth than is lack of mention of such testimony in a lawyer's findings of fact (particularly when technical issues are involved). In this case we have references in both sworn testimony and proposed findings of fact.

(Continued from previous page.)

He went beyond what Mr. Dignan pointed him to. He went beyond what was pointed out to him by the staff.

I am not happy with the result, but I can't fault Dr. Buck for the quality of the work.

App. Bd. Tr. 83.

*Applicants Proposed Findings and Conclusions with Respect to Remanded Matters in the Form of an Initial Decision, June 13, 1977, pp. 28-31, see especially p. 31; NRC Staff Proposed Findings of Fact and Conclusions of Law with Respect to the Issue of Consideration of Additional Alternative Sites in New England where Nuclear Units Currently Exist or Have Been Planned in the Form of a Partial Initial Decision, July 5, 1977, pp. 6-9, see especially p. 7.

The earlier record contains a substantial amount of probative information regarding the desirability of the Seabrook site in this regard (see, for example, the cross-examination of the Applicants' Direct Testimony 14, fol. Tr. 10162; also see discussion pp. 545-547, *infra*).

As we shall see, I accord far more weight to the evidence revealed by searching through these references than do my colleagues. I shall now discuss what is in the record concerning the institutional and legal aspects which have a bearing on the alternate site requirements of NEPA.

2. Discussion of Evidence in the Record

It is clear to me that the record provides a substantial amount of evidence regarding the reasons for choosing the Seabrook site rather than one of the southern New England sites. I believe this was just as clear to the parties. Considered within the context of the Commission's directive (see p. 532, *supra*), this explains the lack of any special emphasis on this matter by either the applicants, staff, or intervenors at the remand. Rather, reliance was placed on the existing uncontroverted record. A large part of that record concerns the regional and institutional arrangements which exist within the New England electric utility industry. The record also reflects the many engineering and economic penalties that would ensue from selection of a site more remote from the southeastern New Hampshire-northeastern Massachusetts load center. I turn first to the regional-institutional arrangements.

a. In the beginning (some 60 months ago) the applicants filed a license application together with their Preliminary Safety Analysis Report (PSAR) and an Environmental Report (ER).⁹ The ER was reviewed by the staff which in turn issued its Draft Environmental Statement and later its Final Environmental Statement (FES) (as required by the NEPA).

In their application the applicants point out that the Seabrook units are to be constructed "as part of the regional construction program for generation facilities for utilities participating in the New England Power Pool and other New England utilities" (Lic. App., Vol. I, General and Financial Information, Section I, p. 1). It is important at this point to describe the various regional planning and reliability organizations that play a role in the generation and transmission of bulk power in the United States, especially in the northeast. Documents in this record disclose the following facts.

Two months after the 1965 northeast power failure the major utilities in that region, encouraged by the FPC¹⁰ (see discussion, *infra*), formed the Northeast Power Coordinating Council (NPCC) which was "primarily

⁹These documents were received in evidence collectively as App. Ex. 1 on May 28, 1975, at Tr. 1170. The first documents were filed on March 30, 1973.

¹⁰The Federal Power Commission (FPC) is now the Federal Energy Regulatory Commission (FERC), a part of the Department of Energy (DOE).

concerned with improving the adequacy and reliability of bulk power supply" (1970 Power Survey, Part I, p. 1-17-14).¹¹ According to the chronology given in the FPC's 1970 Power Survey we are told that 1 year later:

...the Federal Power Commission's Industry Advisory Committee on Reliability of Bulk Power Supply singled out regional coordination as "the most effective and economical means for assuring bulk power supply reliability for the nation." Concurring with this view, the Commission recommended that "...strong regional organizations need to be established through the nation for coordinating the planning, construction, operation, and maintenance of bulk power supply."

Ibid.

The National Electric Reliability Council (NERC) was voluntarily formed by the industry in 1968 to "encourage improvement of coordination at both the regional and national levels" (*ibid.*). The FPC's position regarding the NERC and the various regional councils is given in the 1970 Power Survey where it is stated:

The Commission's Statement of Policy on Reliability and Adequacy of Electric Service, Order No. 383-2 (Docket No. R-362), issued April 10, 1970, is intended to implement fully the voluntary aspects of Section 202(a) of the Federal Power Act,⁹ and to encourage utilities throughout the nation to continue to strengthen the reliability councils and develop more effective bulk power supply programs. The Commission order requested participation by the staffs of the Commission and appropriate State commissions as nonvoting participants in the principal meetings of NERC and the regional councils, and requested regional councils to report the projection of loads and coordinated bulk power supply programs on a 10-year basis.

⁹Section 202(a) of the Federal Power Act states that for the purpose of assuring an abundant supply of electric energy throughout the United States with the greatest possible economy and with regard to the proper utilization and conservation of natural resources, the Commission is empowered and directed to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric energy. Further, it shall be the duty of the Commission to promote and encourage such interconnection and coordination within each such district and between such districts.

¹¹The 1970 National Power Survey, Federal Power Commission, A Report by the Federal Power Commission, December 1971. This report provided the basis for much of the staff's information on regional planning aspects of power demands and reliability requirements (FES, pp. 8-1 through 8-4; see also p. 541, *infra*). The applicants also used the results of this survey to provide power growth rate data (ER, p. 1.1-8).

1970 Power Survey, Part I, p. I-17-17.

Returning now to the specific case at hand, in their ER the applicants tell us that:

Coordinated power planning in New England has been an evolving process over the past two decades. Over the past 5 years, a concerted effort has been underway to formalize a regional New England power pool, commonly referred to as "NEPOOL." This goal was achieved in November 1971 with the implementation of the New England Power Pool Agreement. This agreement superseded earlier interim agreements, and is now fully effective following its recent acceptance as an effective rate schedule by the Federal Power Commission under Docket No. E-7690. All major generating utilities in the New England region are participants.

ER, p. 1.1-1. They go on to explain:

Power planning is the responsibility of the NEPOOL Planning Committee, under the direction of the managing committees of the pool organization. The Planning Committee consists of the planning engineers of the member companies, and is backed by full-time professional support. *Load and capacity forecasting are directed to total pool requirements, and new generating units are designed to meet poolwide power requirements. Planning on a pool basis achieves reliability with a minimum of generation reserve and the location of units to minimize transmission requirements.*

Ibid. (emphasis added).

The applicants present a reasonably complete discussion of the regional site selection process in their Environmental Report where they tell us that:

. . . each company was asked to supply a list of generation sites in its territory, the type of generation each site would accommodate and the earliest date that generation could be brought on line at each site. New England was divided into areas as shown in Figure 9.2-2 and the balance between load and generation in each area was examined. A review of the available sites and area load and generation by the NEPOOL Planning Committee resulted in the following proposal for generation additions from 1978 through 1982:

| | |
|------|------------------|
| 1978 | Pilgrim No. 2 |
| 1979 | Millstone No. 3 |
| 1979 | Seabrook No. 1 |
| 1980 | Pilgrim No. 3 |
| 1980 | Rome Point No. 1 |

| | |
|------|--------------------------|
| 1981 | Northeast Utilities Unit |
| 1981 | Seabrook No. 2 |
| 1982 | Rome Point No. 2 |

These additions do as good a job as possible in balancing area load and generation and result in a minimum of transmission expansion.

ER, Vol. II, pp. 9-1, 9-2.¹² The applicants further assert that:

The New England (later NEPOOL) Generation Task Force . . . have recommended the generation mix for New England which is principally a nuclear expansion for the period 1978-1982. In the studies to determine general locations for those nuclear units, New England was divided into eight load and capacity subareas. These areas closely followed State boundaries except for Massachusetts which was divided into three areas. Figure 9.2-2 shows the geographical location of these areas.

Id. at p. 9.2-3.¹³ The applicants go on to explain that:

[t]he principal reason for splitting New England into these eight areas was an effort to match load with generation in the areas, realizing that *this matching of area load with generation minimizes the number and length of transmission lines, the amount of right-of-way required, transmission losses, and environmental impact*, and at the same maximizes the reliability of the resulting power supply system.

ER, Vol. II, p. 9.2-4 (emphasis added).

Thus the applicants have clearly shown, in this record, the important role that regional planning for bulk electric energy production and transmission plays in the consideration of power plant siting alternatives.

b. Following its review of the Environmental Report the staff expressed its understanding of the regional nature of power plant siting when it stated:

The New England Power Pool (NEPOOL) is one of the three power pool areas in the northeastern United States; the other two areas are the New York Power Pool (NYPP) and the Pennsylvania-New Jersey-Maryland Interconnection (PJM). Together, these three areas formed, for the Federal Power Commission's 1970 National Power Survey, the Northeast Region Advisory Committee (Fig. 8.1). All the members of

¹²Figures 9.2-2 and 9.2-3 (at pp. 548, 549, *infra*) are attached for reference. Both figures are from the Applicants' ER.

¹³Also see Figure 8.2 (referred to at fn. 14, p. 542, *infra*) for an illustration of the load concentration distribution in the New England area.

the NEPOOL and the NYPP are further associated with the Northeast Power Coordinating Council and make up the majority of its membership. In general, the power pools are mostly concerned with economical planning and operation (see below), whereas *the coordinating organizations are concerned with long-range plans for bulk power supply system reliability and security*. The Northeast Power Coordinating Council also furnishes a mechanism whereby the NEPOOL and the NYPP can cooperate and coordinate their activities with Canadian electric systems through the Canada-Eastern United States Connection.

The Northeast Power Coordinating Council has established areawide (New England, New York, New Brunswick, and Ontario) requirements related to bulk power supply reliability. The Council has determined that each area's generation capacity should be such that its generating supply will equal or exceed area load at least 99.9615% of the time (ER, Sec. 1.1, p. 1.1-13). This is equivalent to a loss of load probability of 1 day in 10 years (based on a 260-day year; that is, the load model excludes weekends since the load is usually depressed on these days, and therefore, their inclusion does not contribute measurably to the annual risk of load loss). This probability has therefore been used by the New England Power Pool in determining its reserve requirements. . . .

The region encompassed by the NEPOOL and the areas of load concentration within this power pool are shown in Fig. 8.2.

FES Section 8.1, p. 8-1¹⁴ (emphasis added).

As the staff points out in the above quotation, the NEPOOL organization to which the applicants belong is responsible to the NPCC and must follow its reliability and reserve margin guidelines. In addition, under the New England Power Pool Agreement (App. Ex. No. 6), each member utility is responsible for providing, in a prescribed way, a certain share of NEPOOL capacity (*id.*, Section 9). The agreement also spells out rules for use of the members' transmission facilities (*id.*, Sections 10, 12, 13). As noted by the staff, these facilities must be provided by member utilities in a manner consistent with the reserve and reliability requirements established by the NPCC. Thus timing, choice of generation source, siting

¹⁴Figures 8.1 and 8.2 are attached for reference (at pp. 550, 551, *infra*). The title in Fig. 8.1 refers to the FPC's Northeast Regional Advisory Committee (NERAC) which is currently made up of the three major utility pools in the northeast, NEPOOL, NYPP, and the PJM. The regional advisory committees were formed by the FPC in 1965 (The 1970 Power Survey, Vol. II, p. II-1-i). Note in Fig. 8.2 the location of Seabrook relative to the northern Massachusetts and southern New Hampshire coastal load centers it is designed to serve.

and allocation of energy and transmission line usage are determined through contractual agreements on a regional basis.

The staff acknowledges the desirability of locating power stations near major load centers where it states, "[t]he requirements of transmission lines to integrate the station's output into NEPOOL's grid are also important factors. Thus, proximity to load centers (southern New Hampshire) is significant" (FES, p. 9-5).

As we have seen the NRC staff is, and has been, fully aware of the role of the FPC, the NPCC, and NEPOOL in site selection.¹⁴ Regarding the role of regional planning in the site selection process the staff goes on to tell us that:

The New England Generation Task Force, the predecessor of NEPOOL, in considering where baseload nuclear power stations should be located within New England, divided the New England region into eight load and capacity subareas. The Task Force attempted to match load with generation in these eight areas, to minimize transmission requirements, and maximize the reliability of the power supply. One of the subareas was New Hampshire; the study indicated that southern or southeastern New Hampshire was the preferred location for a large, baseload nuclear power station to begin operation in the late 1970's. This section includes the major centers of New Hampshire and, in addition, is near areas in other States which will also be deficient in power in the late 1970's and early 1980's. Transmission grid requirements also indicated that southern New Hampshire was the preferred location, since the existing 345 kV system in this area of the State could readily integrate two 1,200 MW units into the grid, whereas the 115 kV grid in northern New Hampshire would not be adequate.

Another subarea considered by the applicant was northeastern Massachusetts. Inland locations in this subarea would probably be confined to sites along the Merrimack River, since this is the only river in the area with a flow sufficient to accommodate a nuclear plant. Siting problems along the seacoast of northeastern Massachusetts would be similar to those in New Hampshire. Since locations in this subarea offered no apparent advantages as compared with New Hampshire

¹⁴The staff's proposed findings 13 and 14 pointed to these considerations, specifically mentioning the App. Direct Testimony Nos. 27, fol. Tr. 12782, and 14, fol. Tr. 10162. These matters were also considered extensively in the cross-examination following App. Direct Testimony 14 at Tr. pp. 10163-10270. In proposed finding 14 the staff concluded that—*since the intervenors had put forth no testimony on the southern New England sites, and had given no reason for rejecting "the staff's general policy of considering sites within, or as near as possible, to the applicants' service area and State"—individual comparison of Seabrook with these sites was not called for.* (Emphasis added. The staff's proposed findings are referred to at p. 537, *supra*, fn. 8.)

locations, and since the applicant has neither franchise nor eminent domain rights in Massachusetts, the applicant considered that a New Hampshire site was preferred over a northeastern Massachusetts site (ER, Sec. 9.2.1).

Ibid.

c. I believe that the record described in the foregoing sections makes it obvious that *site selection for a major power plant does not come at the whim of a utility but through careful long-range regional planning* under the auspices of a Federal agency (FPC, now FERC) which is empowered to act under Section 202(a) of the Federal Power Act.¹⁶ The intervenor, NECNP, is evidently a strong proponent of regional power planning as was evidenced by Mr. Roisman's remarks at the March 16, 1978, oral argument where he stated:

[y]ou need a regional analysis in New England of need; you need a regional analysis of site, regional analysis of power, and ways to meet those needs. That hasn't occurred.

App. Bd. Tr. p. 83. Although Mr. Roisman apparently believes this has not occurred, the record contains abundant evidence that such analysis has indeed been taking place for some time now through the joint efforts of the FPC, its regional advisory group, the NPCC, and NEPOOL.

Under these circumstances it appears that, if an environmentally satisfactory site for a power plant can be found in an area selected under the FPC guidelines, it is beyond the rule of reason for alternative sites outside this area to be considered.¹⁷

On this basis alone I would affirm the Licensing Board's conclusion in paragraph 34 of its July decision. However, there is further evidence in the record regarding the engineering difficulties and economic penalties that would result if the units were to be located some distance away from the load centers for which they were planned.

My colleagues assert (fn. 23, p. 497, *supra*), that nothing in the record shows "what it would cost to feed electricity into the grid from the alternate sites"; hence, according to them, my dissent is based "in good measure on speculation rather than on hard evidence of record." I must first point out that the cost we are concerned with here is not just that of

¹⁶See reference to FPC policy statement at p. 539, *supra*. Clearly this aspect of the record is not speculation as might be inferred from my colleagues' comments in fn. 23, p. 497, *supra*.

¹⁷The Licensing Board earlier found that the Seabrook site is environmentally acceptable with once-through cooling. The issue of acceptability of operation with cooling towers is discussed in the subsequent section of my dissent.

feeding electricity into "the grid" as my colleagues put it. Rather, the cost involves the entire process of transferring bulk electric power from the source of production to the load demand centers. The loads which will consume the 1,100 MW allocated to PSNH from the Seabrook units are located primarily in southeastern New Hampshire and northeastern Massachusetts.¹⁴ Thus, what we must consider is the transmission cost (environmental as well as economic) involved in generating the bulk power at any of the proposed southern New England sites with eventual delivery of the allocated amount of power to the PSNH consumer. I note that there are no other large plants in the PSNH service area which can provide the 1,100 MW projected for consumption there. Hence the 1,100 MW would have to be obtained from the Seabrook addition (wherever it may be sited) via the NEPOOL system by other arrangements, perhaps through the imposition of some sort of NEPOOL dispatching requirements, providing the existing transmission lines are capable of performing this function.

The testimony on alternate sites presented by the applicant (App. Dir. Test. No. 14, fol. Tr. 10162 and Tr. 10163-270) establishes the desirability of the Seabrook site, from the point of view of regional planning, to balance load demand and generation capacity within the NEPOOL system. What I provide next are some illustrative examples of the potential economic and environmental impacts that would occur if the Seabrook units were located much farther from the major PSNH coastal load centers.

C. Engineering, Economic, and Environmental Penalties Incurred by Moving the Seabrook Units to any of the Southern New England Sites

A great deal of evidence on transmission lines was provided by direct testimony and through questioning of the witnesses during 8 days of hearings on various alternate transmission line routes from Seabrook (Tr. 7914-8174; 8270-8676; 8763-9350). I will frequently refer to this part of the record to provide quantitative estimates of the potential economic and environmental impacts from relocating the plant with particular reference to the Montague site.¹⁵

¹⁴PSNH intends to use 50% of the 2,200 MW available from the Seabrook units (FES, p. 8-1).

¹⁵The Montague site is the most attractive of the southern New England sites in that it is linked directly to the PSNH coastal load centers by an existing 345 kV transmission line. As I will show, this is not an overwhelming advantage. In fact I will note in passing that the added transmission line losses incurred by remote siting away from heavy load centers is contrary to the national goal of energy conservation.

First it is important to recognize that existing power transmission lines are obviously there for some purpose, e.g., to transfer bulk electric power from existing generating plants to existing load demand centers. Applicants' witness Barbour tells us that the utilities do not have the "luxury" of overbuilding their 345 kV systems (Tr. 8820). This clearly refers to the expense of such an undertaking. Various estimates of costs for construction of overhead 345 kV transmission lines are given in this record. They range from \$150,000 per mile to \$327,000 per mile, without right-of-way costs, depending on the particular design of the line (Tr. 8806, 9297, 9323).

Mr. Barbour also testified that transmission lines are operated at or below 45% of their capacity only about 24%-31% of the time (Tr. 8921-22) with the average load level running about 60% (Tr. 8314). If we examine Figure S8.14-1 (PSAR, App. A8.14-1, fol. p. S8-23), we see that the line from Scobie to Vermont Yankee²⁰ is rated at 1,000 MVA nominal power (about 1,000 MW). Running at 60% of this capability (600 MW) would be consistent with expected load flows predicted in the NEPOOL stability study results given in Figure S8.14-13 (PSAR, pp. S8-24, *et seq.*). Thus, for this particular case, one must conclude that the existing line between Scobie and Vermont Yankee (hence to the Montague site) could not carry the additional 1,100 MW of power which is scheduled for consumption by PSNH customers alone. Thus—even if the majority here were to insist that NEPOOL, NPCC, and NERC readjust their planning to accommodate its siting concerns (and the FPC and these organizations were to acquiesce)²¹—it is clear that the existing 345 kV line, even if totally dedicated to serving only this increase in demand for the SE New Hampshire-NE Massachusetts coastal load centers, could not handle the anticipated load demand for that area.²² Indeed, applicants' witness

²⁰This line is a major link in the NEPOOL loop (see the 1970 Power Survey, pp. II-1-63 through II-1-65; also see App. Bd. Tr. 130) and, at present, the only 345 kV line between the proposed Montague site and the Scobie substation. It also provides a direct link for the northern coastal load centers to the NYPP interconnection (*ibid.*; see also PSAR, Vol. IV, p. 8.1-1).

²¹As I have earlier pointed out in another case (*Detroit Edison Company* (Greenwood Energy Center, Units 2 and 3), ALAB-247, 8 AEC 936, 948-49 (1974) (dissenting opinion)), there is no question that the FPC (FERC) and/or State agencies have jurisdiction over major transmission systems. The Atomic Energy Act acknowledges this explicitly (§271, 42 U.S.C. 2018).

²²If the existing line were totally dedicated to bringing the added 1,100 MW of power from the Montague site to the coastal load center its current role would have to be modified. Furthermore, it would have to run at more than 100 percent nominal which is not an acceptable practice economically (Tr. 8809-10). To add some perspective to power line capabilities I note that during cross-examination applicants' witness Bigelow testified that to add another

(Continued on next page.)

Robert O. Bigelow stated quite explicitly that, "[o]bviously the load center is on that north shore area of Massachusetts and heavily populated southeastern New Hampshire, and we will have to provide more transmission to get from there [the Vermont Yankee-Montague area] to Seabrook" (Tr. 10195).

An additional line between Montague and the coastal load centers (the existing line is about 60 miles long as estimated from the transmission line map, Figure 9.2-3, see p. 549, *infra*) requires either new or expanded right-of-way which would involve considerable expense both economically and environmentally.²³ Consideration of the transmission grid map of New England (*ibid.*) reveals that even greater problems would attend the location of the Seabrook units at Pilgrim or Millstone since there are no 345 kV lines connecting either of these sites with the Massachusetts and New Hampshire coastal load centers in any direct way. It is also obvious from Figure 9.2-3 that transmission line distances are greater between northeastern Massachusetts and either Millstone or Pilgrim than they are from Montague. In addition, any new transmission lines required would pass through more heavily populated areas and therefore impose even greater environmental impact.

In summary it is my considered opinion that the testimony in this record establishes beyond reasonable doubt that to move the Seabrook reactors to any of the southern New England sites would certainly have a significant impact on:

1. The long-range planning with regard to the New England electric power supplies and the linkage of this area with other areas of the United States and Canada.
2. The reliability of the electric power supply in New Hampshire and northeast Massachusetts.

(Continued from previous page.)

800-900 MW unit at Maine Yankee would probably require an additional transmission line to bring the power south even though two lines already exist (Tr. 10199). Note also that the FPC shows the approximate power-carrying capability of long 345 kV lines as less than 500 MW (The 1970 National Power Survey, p. I-13-6) and that resistance losses would be more than 30 MW in transmitting 1,000 MW via 100 miles of 345 kV transmission lines (*id.*, Fig. 13-7, p. I-13-8).

²³Applicants' witness Nichols testified that an additional 85 feet right-of-way would be required to locate another 345 kV line parallel to an existing 345 kV line (Tr. 8633). By my rough estimate this would amount to more than 600 acres of additional land use.

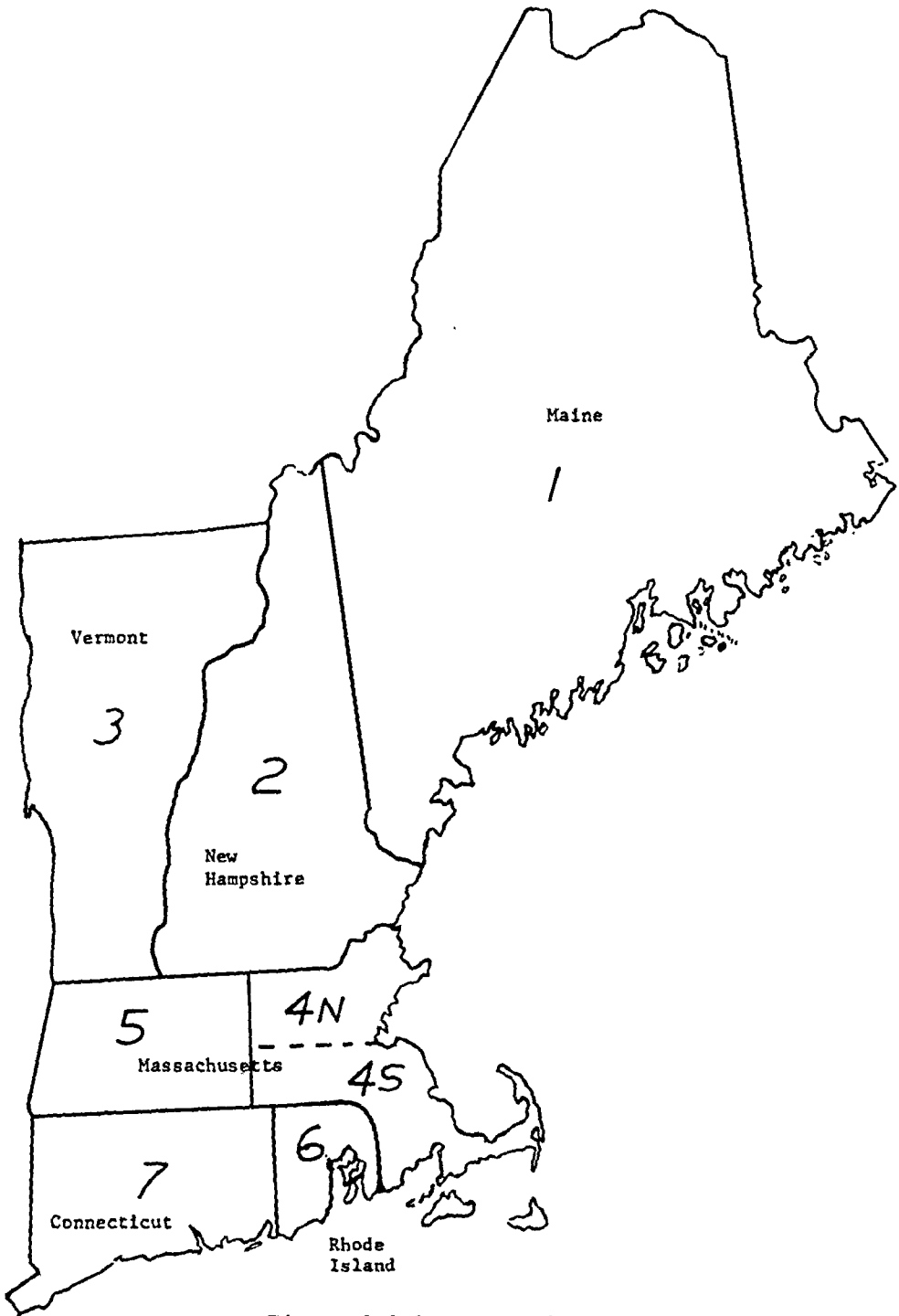


Figure 9.2-2 New England Load Areas

NOTE: SEABROOK TRANSMISSION ADDED

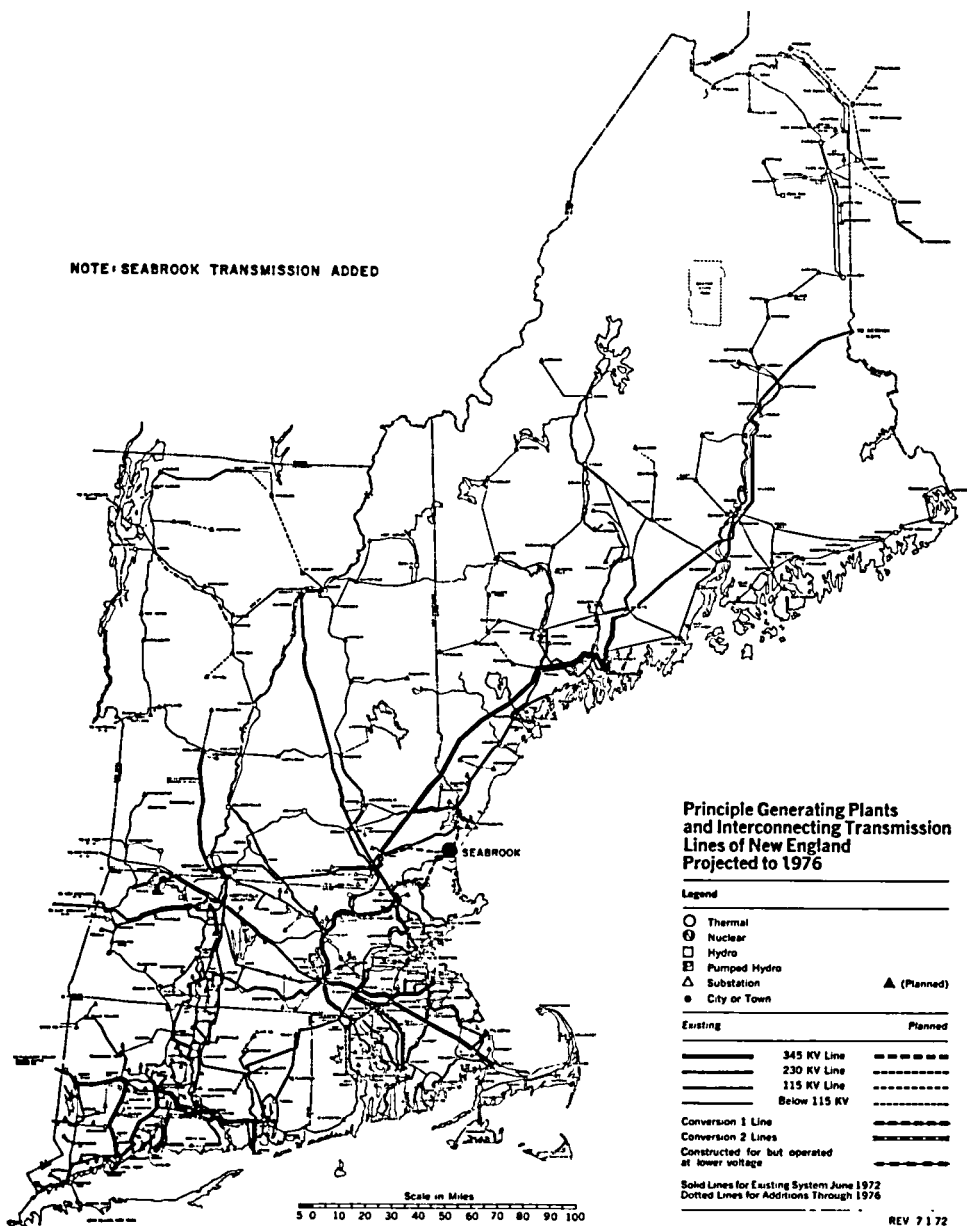


Figure 9.2-3

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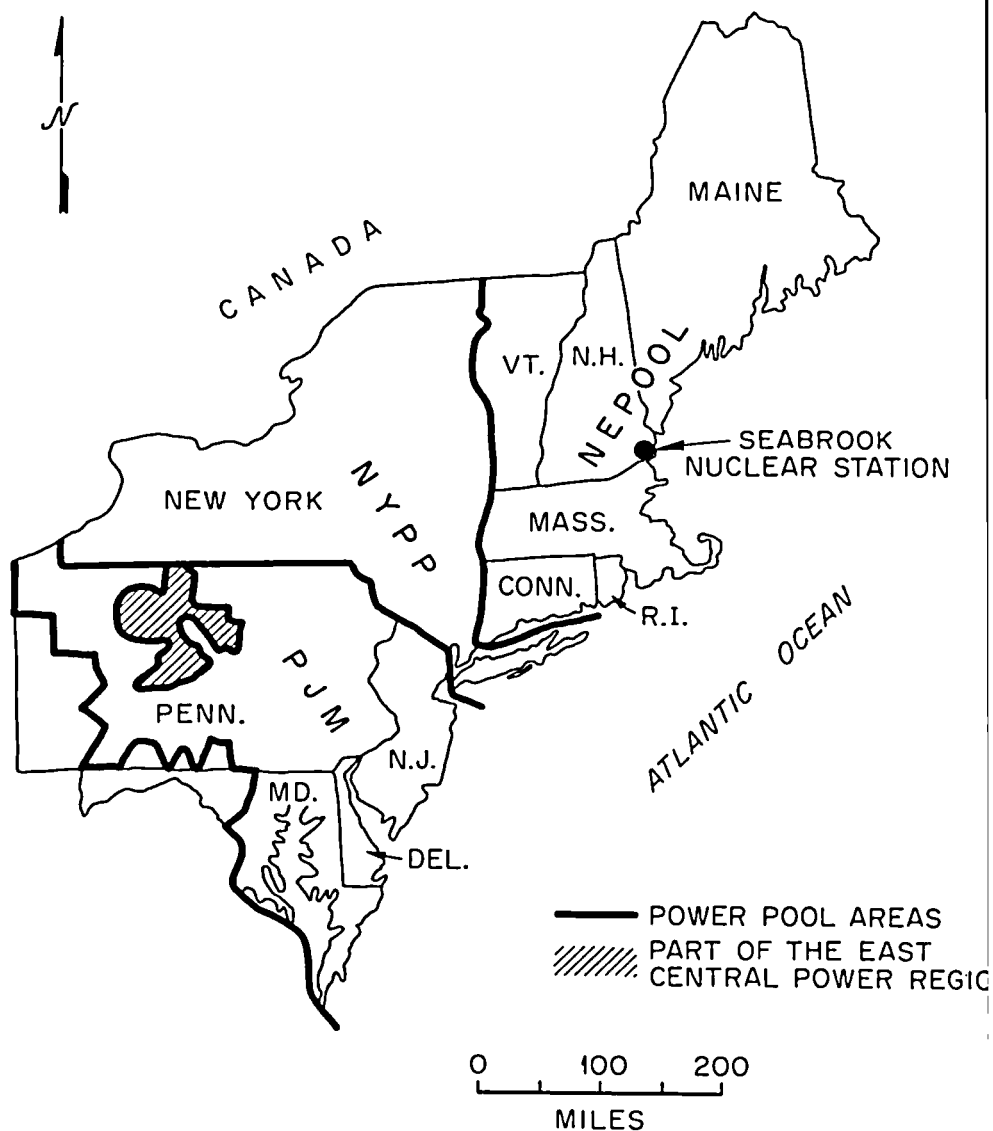


Fig. 8.1. Federal Power Commission's Northeast Regional Advisory Committee.

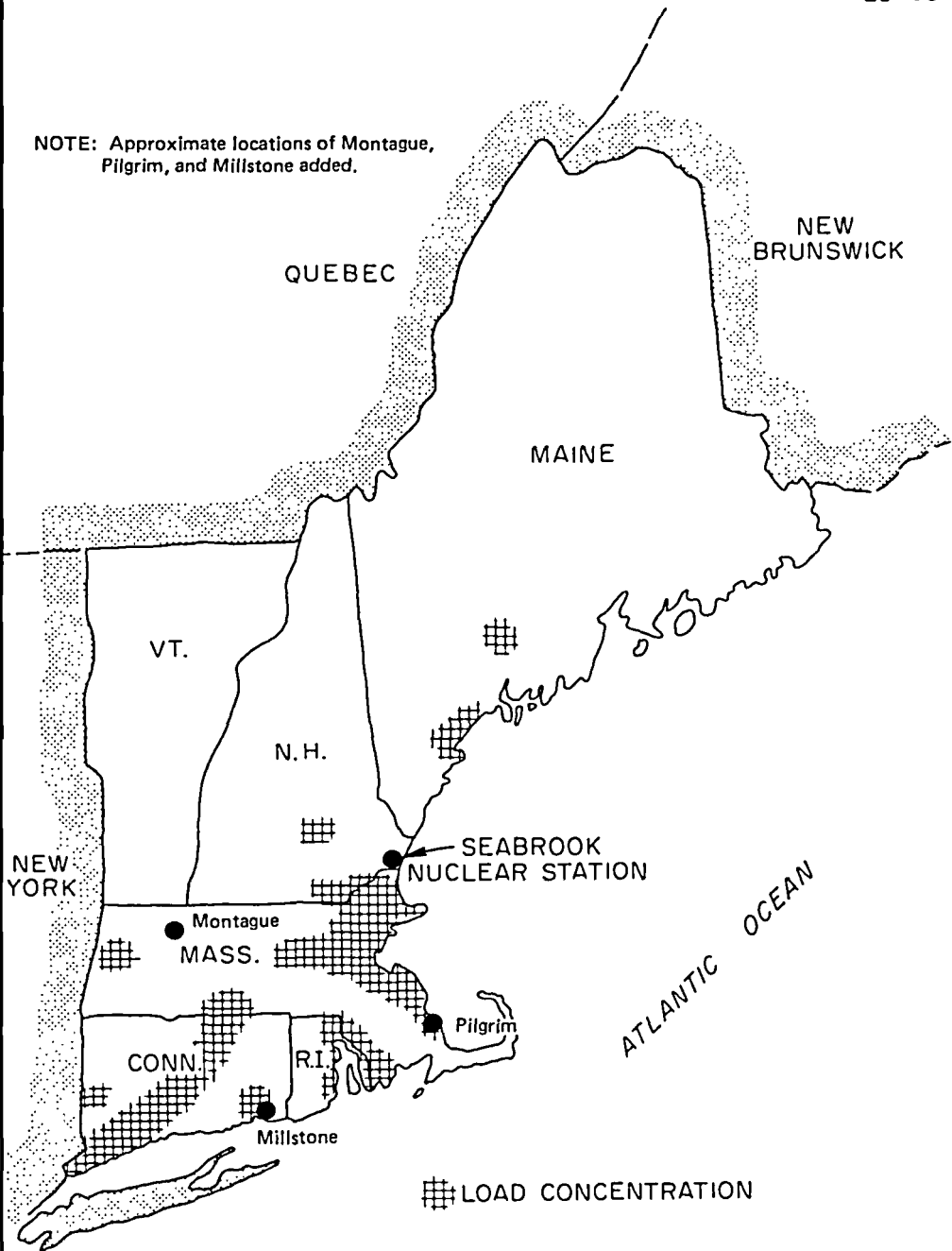


Fig. 8.2. Areas of load concentration in the New England Power Pool (NEPOOL).

3. The environment of portions of New England due to land use for, and construction of, major new transmission lines.

4. The cost of power to New Hampshire and northeast Massachusetts ratepayers due to extra costs involved in replanning of the present NEPOOL power supply system and for the design and construction of new transmission facilities.

Clearly the regional planning considerations required to provide reliable electric energy are important aspects of site selection and should be weighed in the evaluation of alternate sites. It is just as clear that the applicants, staff, and Licensing Board did consider these factors in their evaluation of the southern New England sites.

Additionally, I emphasize again that no one has presented any statement of benefits for a move to any of the southern New England sites. As the Court of Appeals for the Ninth Circuit has pointed out, "[c]ertainly, the statute [NEPA] should not be employed as a crutch for chronic fault-finding."²⁴

All circumstances considered, it is in the public interest to affirm the Licensing Board's decision in this regard.

II. COOLING TOWER INQUIRY

My colleagues have written extensively on the aesthetic effects of cooling towers at Seabrook and alternative sites and the alleged "errors" made by the Licensing Board in comparing the various sites on the assumption that closed-cycle cooling is used. I agree with only one of their conclusions—that the staff was incorrect in using its high population criterion summarily to reject certain sites. (See further discussion of this in Section III, *infra*.) As will be seen, I strongly disagree with the remainder of their discussion. At the outset, however, I feel that it is necessary to put the environmental impacts of the cooling towers at Seabrook into proper perspective.

A. Environmental Impacts of Cooling Towers at Seabrook.

1. Will the cooling towers have a significant impact on the enjoyment of Seabrook's sun, sand, surf, and seashore sights?

For reasons given below my answer to this question must be an emphatic no.

²⁴*Life of the Land v. Brinegar*, 485 F.2d 460, 472 (9th Cir. 1973), *certiorari denied*, 416 U.S. 961 (1974).

a. As my colleagues acknowledge, p. 500, *supra*, a principal impact of the towers stems from their existence as two 590-foot-tall structures. However, contrary to the impression left by their accompanying footnote (fn. 33), one sees the height and width of the tower, not the number of football fields, or hundred of thousands of square feet of ground, which the bases of the towers will cover.²⁵ The intervenors have made much about the view of these towers from the beaches and the impact that view will have on the vacationers. Let us look at the facts.

The record reveals that a view of the towers from the west is limited to about 2 miles from the site. Specifically, staff witness Dr. Geckler stated, "[t]he area around Seabrook is fairly level and it isn't until you get inland a couple of miles that you get an altitude of as much as 600 feet, behind which you would not be able to see the towers" (Tr. 13252). This statement stands uncontroverted in the record.²⁶ Because the Seabrook site is located on what used to be the city dump, very few people reside near the building location. The 1970 census reveals that only 473 people live within 1 mile of the site and only 3,183 within 2 miles of the site (some 2,300 of these living to the west) (PSAR, Table 2.1-1).

It is no wonder, therefore, that the intervenors stress the view of the towers from the beaches that they claim would be seen by perhaps some 75,000 people spread out over 10 miles or more of beach on a hot summer day. I must note, however, that the nearest beach is some 2 miles from the towers, that most of those 75,000 are much farther away, and on a hot summer's day the beach view of the towers would normally be a back-of-the-head view.

Suppose, however, a vacationer looking westward stands on the beach closest to the Seabrook site. From that viewing location the towers are approximately 2 miles away, *i.e.*, at approximately 10,500 feet distance.²⁷

²⁵My colleagues seem to be enamored by the number of football fields which, if located on the dump site, would be covered by the towers' bases. These figures are irrelevant to the subject under discussion, *i.e.*, visual impact of the towers, and seem to be presented only for the impact of large numbers on the reader. This smacks of inflammatory rhetoric.

²⁶My learned colleagues dispute Dr. Geckler's statement even though none of the intervenors did so. A glance at Figure 2.1-1 of the PSAR shows a series of relatively high hills beyond the 2-mile radius from Seabrook which runs from the southwest to the northwest of the Seabrook site.

The majority's claim (fn. 50, p. 507, *supra*) that the staff indicated that "the [Seabrook] towers may be visible for 20 miles" does not accurately reflect the statements of the staff witness, who was not referring to Seabrook in making that statement. See quotation of Dr. Zittel in fn. 49, p. 506, *supra*.

²⁷Some idea of this distance can be gauged by noting that if one were able to walk directly to the towers from the nearest beach it would take about 45 minutes to traverse that distance at an average walking speed (2.5 to 3 miles per hour).

If the towers are 500 feet apart the distance across the top of the two towers will be about 1,150 feet. At worst, then, the viewer sees an essentially rectangular block 590 feet high and 1,150 feet wide at a distance of 2 miles. Simple geometry shows that the solid angle subtended by this block will be filled by a building 32 feet wide and 16 feet high placed a distance of 300 feet from the viewer. In other words a normal two-story beach house at a distance of one city block will cut out as much landward view as the towers. At 50 yards distance from the viewer a 16-foot by 8-foot hamburger stand would completely eliminate the sight of the towers.²⁸ On our site visit I noted that the beach area least far from the towers has many houses and store structures so that a bather will have to deliberately seek out a view of the towers between buildings.²⁹

I must emphasize again, however, that when bathers are on the beach they are there for relaxation and enjoyment of the ocean—their interest is the beach and ocean, not the beach cottages, cars, or distant views behind them. The fact that they are not interested in shoreward structures is illustrated by the millions of people who, at great expense, annually trek to the East Coast beaches of Florida, most of which are now lined by high-rise apartments and condominiums located a few yards from the beach.

b. The other aesthetic impact of the towers at Seabrook that has been mentioned are the visible plumes from the towers when the plants are operating.³⁰ In less contentious times such plumes would be described as fluffy white clouds against an azure sky—now some appear to view them as something sinister which may provide a “shadowing” effect on the beaches. Let us look at the meteorological facts presented in this proceeding about the visible plumes.

The applicants have stated that no significant impact from shadowing is expected (Tr. 12857). And in their direct testimony, they refer us to the “study by other applicants and the NRC reported in Docket 50-247” (*Indian Point 2*).³¹ The Environmental Statement Related to Selection of the Preferred Closed-Cycle Cooling System at Indian Point, Unit No. 2

²⁸I assume here that the viewer is 6'5" tall (eye level 6") standing on the beach at high-water mark and that the beach rises another 6 feet to building ground level.

²⁹It appears that the intervenors implicitly agree with this analysis since all their photographs and so-called “perspective” drawings assumed that the observer was standing on the harbor side of the peninsula, i.e., behind the seashore cottages and stores. I also note that the intervenors do not discuss the view of the towers from the permanent residential areas. From such areas (mostly over 2 miles from the site) a view of the towers will be largely obscured by trees (of which there are many in this part of New Hampshire) and by buildings.

³⁰The salt deposition from either the visible or invisible plumes is discussed at pp. 555-556, *infra*.

³¹App. Dir. Test. No. 27, fol. Tr. 12782, p. 34.

(NUREG-0042, August 1976, pp. 6-37 through 6-50) summarizes that study on plumes and points out that under dry atmospheric conditions the visible plumes disappear close to the towers and only under very moist atmospheric conditions do they extend to any great distance. Thus one would expect that on sunny summer days when the beaches are being extensively used no plume shadow would come near the beaches or, for that matter, the marshlands. It should also be noted that, on warm summer days, a sea breeze takes over from the normal westerly winds, thus blowing any plume away from the beach.³²

For the above reasons I must conclude that two towers 2 miles from the beach will have essentially zero impact on the beach population. I cannot help but be reminded at this point that the Seabrook innovative design using tunnels under the beach area for either open or closed-cycle cooling will likely have the least environmental effect on a beach area of any coastal reactor built to this date.

2. Will the towers have serious effects on migrating birds?

I have studied the record thoroughly on this point and on the basis of that study I must agree with the Licensing Board (6 NRC at 826) that the weight of the evidence shows that the impact of the towers on wild fowl will be insignificant.

3. Are the atmospheric and terrestrial impacts of closed-cycle cooling with natural-draft towers significant?

This question arises because the Seabrook towers would use seawater, and as my colleagues describe (fn. 36, p. 500), the vapor plume contains saltwater droplets, which result in some salt being deposited on the surrounding area. Both the applicants and the staff conclude that the amount of salt deposited will be insufficient to harm the vegetation in the area.³³ I particularly note that the applicants' results are very conservative due to recent improvements in drift eliminators developed subsequent to the gathering of that data (see Tr. 12846).

However, the applicants' conclusions³⁴ are challenged by the inter-

³²See Applicants testimony "An Evaluation of Loss-of-Coolant Accident" by Peter S. Littlefield and Robert J. Merlino, following Tr. 3367 at p. 22. See also intervenor witness Betsy W. Proudfit at Tr. 13453.

³³Applicant Direct Test. No. 27, fol. Tr. 12782, pp. 24-34, and Staff Supplemental Test., fol. Tr. 13220, pp. 12-15. My colleagues state (p. 511, *supra*) that the towers emit 28 million pounds of salt per year. I note, however, that such figures can be misleading. The applicants' testimony indicates that the maximum salt deposition from the towers occurs on the ocean (due to prevailing winds from the northwest) and is about 66 pounds per acre per year (App. Dir. Test. No. 27, Table 5, p. 75). This amounts to 64×10^{-6} ounces per square foot per day.

³⁴The Staff conclusions are similar to those of the applicants, but one of the models used
(Continued on next page.)

venors and my colleagues on the basis that the salt deposition will depend on the height to which the nonvisible plume³⁵ rises. The plume rise depends on the meteorology of the area, including the temperature and humidity of the upper air, wind velocity, and direction. In the case of Seabrook, where the possibility of towers arose recently, surface meteorology data are available because of reactor safety requirements and have been compared with data taken on a daily basis at Logan Airport at Boston. For upper-air data, lacking a closer meteorological station, the applicants used the data from Portland, Maine, to extrapolate the Boston and Seabrook data to higher altitudes.

Applicants' witness Fisher points out that this procedure is a logical one under the conditions prevailing in this case.³⁶ First he agrees with other investigators that probably the principal condition that causes plume rise predictions to vary is the presence of a large body of water. In the presence of the ocean the effect of the sea breeze must be considered and variations of the plume caused by these wind variations can be averaged out over the 24-hour day-night period. By choosing meteorological data from stations similarly located on the east coast, subject to the ocean variations and generally showing the same seasonal meteorological characteristics,³⁷ extrapolations of data from two of these stations to a third can safely be made. These statements, made under cross-examination by an expert witness, were not controverted by the intervenors nor do my colleagues challenge them.

I must also note that the applicants' models predict a salt deposition level almost an order of magnitude less than a deposition that is likely to be harmful to the most sensitive plants in the area.³⁸ Additionally, Ms. Proudfit, the intervenor SAPL-Audubon's witness, admitted that the models used by the applicants generally have predicted plume heights lower than actually experienced in operating towers.³⁹ It is therefore almost inconceivable that any local meteorological variation would cause an increase in salt deposition of such a magnitude as to produce damage to the flora.

(Continued from previous page.)

by the staff has been questioned by Argonne National Laboratory. See letter from staff to Appeal Board, dated March 30, 1978. While the staff's second model gave similar results, I am basing my conclusions on the work and models of the applicants.

³⁵The nonvisible "plume" carries the large droplets and this separates out from the visible plume of water vapor as the large drops fall toward the ground. See Tr. 12836-37.

³⁶Tr. 12833-36.

³⁷See Applicants' Environmental Report, Section 2.6, in particular pp. 2.6-1 and 2.6-2; also the comparative data for Seabrook, Boston, and Portland at pp. 2.6-7 and 2.6-9 and Tables 2.6-1, 2.6-3, and 2.6-4.

³⁸Applicants Direct Test. No. 27, Section I.D.2 (Terrestrial Effects), particularly pp. 29-30.

³⁹Tr. 13471-73.

In my opinion the meteorological study is adequate to support the applicants' and the Licensing Board's conclusion that the environmental impact of salt deposition from the towers will be insignificant.

4. Did the licensing board properly compare alternative sites with Seabrook using closed-cycle cooling?

My colleagues claim that the Licensing Board should not have accepted evidence which assumed that inland sites would necessarily use natural-draft cooling towers but should have considered other types of towers, topography, and other site attributes.

In making this claim my colleagues for some reason have completely ignored the reasons for which the staff, the applicants, and the Licensing Board reject the 19 alternate sites.⁴⁰ Following the Licensing Board's format I will summarize the reasons for rejecting the various sites in comparison with Seabrook with closed-cycle cooling.⁴¹ The Board finds that these alternative sites are not obviously superior for the following reasons:

(a) Estuarine sites—Rollins Farm, Fox Point, and Dover Point.

(1) These sites are too small and could not be used without serious disruption of other facilities and communications routes.

(2) Closed-cycle saltwater cooling would probably be required, and salt drift would fall primarily on upland vegetation.

(3) If natural-draft towers are precluded due to proximity of Pease Air Force Base, mechanical-draft cooling would increase fogging and icing on highways, and proximity to the air base would require hardening of site beyond that of Seabrook.

(b) Seacoast sites in New Hampshire other than Seabrook—Odiornes Point, Philbrick Pond, Lamprey Pond, Isle of Shoals, and a floating plant.

(1) Odiornes Point is now a State park. It is small and its use for a power plant would require alteration of nearby salt marshes.

(2) Philbrick and Lamprey Pond sites are located in residential areas, and these areas would have to be disrupted to obtain proper exclusion areas.

(3) Isle of Shoals. The only island in the group large enough to take a plant the size of Seabrook is located in Maine, where applicants

⁴⁰Their comparison of the site analysis here with that which we found inadequate in *Florida Power and Light Company* (St. Lucie, Unit 2), ALAB-435, 6 NRC 541, 543-44 (1977) is inapposite. The defect there was that the chosen site was not compared with any other actual site but only with a hypothetical one. That the situations are not comparable was recognized by the Commission in CLI-77-8, 5 NRC at 521, n. 19.

⁴¹In general references are omitted since they can be found in the supplemental decision, LBP-77-65, 6 NRC 816 at pp. 830-33.

have no power of eminent domain. The area has sensitive historical, religious, and ecological aspects. It would also require underwater 345 kV transmission.

(4) The floating power plant is not available at this time and hence is obviously an unrealistic substitute for Seabrook.

(c) Seacoast sites in Maine—Gerrish Island, Raynes Neck, Argo Point, Phillips Cove, and Elms.

(1) The applicants have no right of eminent domain in the State of Maine.

(2) All sites have poor transportation access and would require higher transmission and transportation costs than Seabrook.

(3) Since they are seacoast sites it is assumed that if Seabrook must use closed-cycle cooling some form of closed-cycle cooling would be required at those sites. (Note—the Licensing Board specifies closed-cycle cooling, not natural-draft towers or mechanical-draft towers.)

(d) Inland sites in northern New Hampshire—Moore Pond, Shelburn, and Dummer.

(1) Each, as a freshwater site, would require *evaporative* cooling towers. (Note—the Licensing Board uses the term *evaporative* tower which covers either natural draft or mechanical draft.)

(2) In low-flow periods replacement water would have to be drawn from Lake Francis or Richardson Lakes.

(3) Construction costs at these sites would be far greater than for Seabrook.

For these three sites the staff⁴² and applicants⁴³ have also supplied more detailed information than given in the Licensing Board's summary. The staff states that it estimates that about 454 miles of new 765 kV transmission lines would be required from the Moore Pond Station at over five times the cost for transmission lines from Seabrook, to say nothing of the environmental impact on largely virgin territory. Additionally, transmission line power losses would be about 3% of the power per 100 miles, using 345 kV line and 0.5% using 765 kV line. The FES also notes the Shelburn and Dummer sites are even more remote, requiring 30 to 50 miles more transmission lines unless they were to be routed through the White Mountain National Forest. Finally, the Moore Pond site would have serious socioeconomic impacts from construction activities which I will discuss in Section III, *infra*.

(e) Inland sites on the upper Merrimack River, other than Litchfield—Garvins Falls and Jackman Reservoir.

⁴²FES, p. 9-9.

⁴³Applicants Direct Testimony No. 27 at pp. 41-42 and Table 6.

(1) Jackman Reservoir is without sufficient water to supply the necessary makeup water for two facilities similar to Seabrook (App. Dir. Test. No. 27 at p. 42 and Tr. 10242-43).

(2) Garvins Falls is a small site within the city limits of Concord and within 1-1/2 miles of the airport (App. Dir. Test. No. 27 at p. 42, FES 9-9, and Tr. 10251).

Despite my colleagues' assumptions, it is obvious from the foregoing summary that the rejection of the above sites in comparison to Seabrook with towers does not rest on the type of cooling to be utilized. Other factors in each case, to which my colleagues apparently accord no weight (fn. 74, p. 513, *supra*), operated to rule out the obvious superiority of any of them. This leaves only one site, Litchfield, to be considered.

(f) Litchfield, on the Merrimack River, has been considered the prime alternative to Seabrook with once-through cooling. The Licensing Board discussed the original comparison in its initial decision (LBP-76-26, 3 NRC 857, 907-08). And in ALAB-422, although criticizing the Licensing Board's analysis of the alternate sites, we found sufficient record information to rule out the obvious superiority of any of those sites, including Litchfield. 6 NRC at 66, 72. In the present comparison the Licensing Board notes that the advantages of Seabrook would be lessened but not eliminated. However, my colleagues zero in on the statement that both sites would now have cooling towers with similar aesthetic impacts, and therefore, they say, the Licensing Board considered only natural-draft cooling towers for Litchfield, which would have, according to them, a greater environmental impact than mechanical-draft towers.

While it is perhaps unfortunate that the Board did not state its precise reason for looking at only natural-draft towers at Litchfield, the answer is in the record. The applicants in their consideration of design alternatives for the Seabrook facility looked at closed-cycle systems and, as the result of that study, chose natural-draft towers as the primary alternate despite their greater aesthetic impact. The reasons are that both mechanical-draft towers and spray channels [or canals] cause serious safety problems due to icing and fogging of nearby roads (ER Table 10.1-7). The staff concurred in this evaluation (FES Section 9.2.1.2, p. 9-11).

The icing and fogging problem at Litchfield will obviously be worse than at Seabrook since the major New Hampshire traffic route 3A would pass just outside the exclusion area to the east of the plant. Route 3A will in fact have to be relocated to place it outside the exclusion area (App. Dir. Test No. 27 at 43). It is apparent on the record, then, that the Licensing Board, on the basis of traffic safety, had to conclude that natural-draft towers would have to be used at Litchfield.

I note in this connection, however, that in comparison to Seabrook, the Litchfield site has a serious environmental problem which seems to have completely escaped the notice of my colleagues: before Litchfield can be used as a site, a clear exclusion area must be obtained (10 CFR 100.3(a)); and this means acquiring and destroying 21 homes with resulting impact on at least 21 families and the removal of more than 300 acres of agricultural land from productive use.⁴⁴ This would be in addition to moving route 3A. This environmental and social impact alone in my mind removes any possibility that Litchfield could be found to be an obviously superior site to Seabrook. Additionally, Litchfield would be sited on flood-plain farmland approximately halfway between the New Hampshire cities of Manchester and Nashua (1970 populations of about 88,000 and 56,000 respectively). Within a 10-mile radius of the site the 1970 population (ER, p. 9.2-22) was approximately 157,000 people. In this flood-plain situation it would appear that the visibility of the Litchfield towers to the 157,000 people within 10 miles would be at least as great as that presented by Seabrook (see my colleagues fn. 50, p. 507, *supra*).

In my opinion the Licensing Board committed no error in its alternate site comparison with closed-cycle cooling, and I would affirm its decision that the Seabrook site is environmentally acceptable using natural-draft towers and that none of the alternative sites is obviously superior. However, I feel constrained to say that in my opinion the environmental impacts and economic costs will be much less if once-through cooling is permitted.

III. OTHER QUESTIONS RAISED IN THE MAJORITY DECISION

A. Population Concentration

My colleagues state (pp. 503-504, *supra*) that [t]he Board employed for inconsistent purposes the evidence relating to differences in surrounding population concentrations: at the staff's instance, and without adequate explanation, the Board rejected some alternative sites because of comparatively high population densities and others because the precise opposite was the case (footnote omitted).

I find no problem *per se* in the staff's rejection of sites because of either low or high population levels if it does so for proper reasons. I now turn to a discussion of the two situations.

⁴⁴App. Dir. Test. No. 27, p. 43.

1. High Population

I am in full agreement with my colleagues that the staff's use of its population guidelines in summarily rejecting certain sites which otherwise comply with applicable regulations is improper. Furthermore, the Board appears to have accepted this approach for at least two of the southern sites. As the majority opinion notes, we have previously rejected the reliance by the staff on guidelines which are inconsistent with Commission regulations (see note 60, p. 509, *supra*).

However, this does not alter my consideration of the various alternatives discounted by the Board and/or staff because of high population, since my rejection of the southern sites and Garvins Falls (the sites so affected) rests on other factors. (See Section I, *supra*, for southern sites and Section II, *supra*, for the Garvins Falls site.)

2. Low Population

First of all I note that the rejection by the Licensing Board and staff of the northern New Hampshire sites did not depend in major part on socioeconomic factors (see my discussion, p. 558, *supra*). However, the staff is quite correct in pointing out that small isolated communities face a serious problem when a large influx of construction workers occurs for perhaps a 5-year period. The community must supply school, medical, water, and sewage facilities for the construction project long before it receives any taxes from the operation of the plant. After construction is completed, it is left with a much lower population and a surplus of the various facilities. Such a situation, as the staff points out, can be traumatic (see Staff Supp. Test., fol. Tr. 13223 at p. 8 and Tr. 13275-78) and could weigh heavily against use of such a site. The staff specifically considered Moore Pond as representing just such a situation, but the impact of construction on a low population area was not crucial since other weighty reasons for rejecting this site existed.⁴³

B. Applicants' Intention to Build Seabrook with Towers

My colleagues' remaining observation concerns their view that Our unwillingness to sanction "Seabrook with towers" on what is now before us finds added support in the applicants' own refusal to state

⁴³Contrary to the impression created by fn. 59, p. 509 of my colleagues' opinion, I have not relied on the impact of construction on a low population area to reject any site, since other factors compelled that result. All I am saying is that such effects should be taken into account, along with other factors, in the evaluation of alternative sites.

that they would indeed build such a facility if EPA or the courts were to reject their open-cycle cooling proposal (footnote omitted).

P. 504, *supra*.

This statement, in my opinion, completely ignores the realities of the present Seabrook situation. The applicants have received from this Commission a construction permit for two reactors using once-through cooling. The permit was authorized on the theory that EPA would grant an exemption from its normal requirement for closed-cycle cooling, and eventually it did so. The EPA decision is now on remand solely for procedural reasons.

It has been made very clear on this record that the applicants strongly prefer once-through cooling and are going to seek such operation to the bitter end. To my mind it would be the height of folly for the applicants, under these circumstances, to make a commitment to complete the plant with closed-cycle cooling if the exemption were denied. Such a commitment would undercut the whole reason for their request for an exemption. A determination whether to go forward with construction, in the face of the large extra expense of closed-cycle cooling, should be made by the applicants as a business decision only after final rejection of their request for a once-through cooling exemption, if such a rejection in actuality should occur.

IV. CONTINUATION OF CONSTRUCTION DURING REMAND

I am strongly of the view that both Licensing Board supplemental decisions should be affirmed without the necessity of further development of the record.⁴⁶ But since the majority is presently requiring additional hearings on both alternate southern New England sites and cooling towers, it is necessary for me to turn to the question of the status of the construction permits during the remand period. My colleagues are split on this question, with Mr. Farrar opting for suspension and Mr. Rosenthal, while not espousing immediate suspension, in effect leaving the question to the Commission to decide. In my view, however, the Commission need not be so burdened, since the record points convincingly to only one result: no suspension.

1. In the first place, I begin by observing that nothing in *Seacoast Anti-Pollution League v. Costle*, _____ F.2d _____ (1st Cir., No. 77-

⁴⁶As indicated earlier (p. 535, *supra*), under certain conditions I would entertain a motion for a further hearing on southern New England sites but would authorize such a hearing only if the proponents thereof should file affidavits suggesting the viability of any such site for serving the power needs to be fulfilled by Seabrook.

1284, February 15, 1978), the recent judicial reversal of the EPA Administrator's approval of once-through cooling, requires suspension at this time. That decision was based solely on procedural deficiencies in the EPA proceeding and meticulously avoided taking any position on the merits of once-through or closed-cycle cooling. It is true that our approval of once-through cooling in ALAB-422 (and the Commission's acceptance of that analysis in CLI-78-1) assumed environmental impacts as set forth in the EPA decision. Those findings technically are no longer operative because of the procedural deficiencies. But the reversal neither signifies that the EPA-described impacts are understated or that a closed-cycle system will be required. All it means is that EPA must make a new determination based on an expanded record.⁴⁷

The current situation with respect to EPA is little different than if that agency had never acted: EPA is just one of many Federal, State, or local agencies with "regulatory jurisdiction over at least some aspects of nuclear power projects" (*Southern California Edison Company* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-171, 7 AEC 37, 39 (1974)) which are called upon, by virtue of that authority, to consider the issuance of permits for a facility. When asked to suspend construction in the absence of such permits, we have routinely found no occasion to do so "on the strength of nothing more than a potentiality of action adverse to the facility being taken by another agency." *San Onofre*, ALAB-189, 7 AEC 410, 412 (1974). To the same effect, see *Cleveland Electric Illuminating Company* (Perry Nuclear Power Plant, Units 1 and 2), ALAB-443, 6 NRC 741, 747-48 (1977). We have pointed out that, in the absence of a negative State or local determination which would preclude construction of the planned facility, "...it would be productive of little more than untoward delay were each regulatory agency to stay its hand simply because of the contingency that one of the others might eventually choose to withhold a necessary permit or approval." *San Onofre*, ALAB-171, *supra*, 7 AEC at 39. See also *Wisconsin Electric Power Company*. (Koshkonong Nuclear Power Plant, Units 1 and 2), CLI-74-45, 8 AEC 928, 930 (1974).

These principles are fully applicable here. In that regard, I note that Mr. Farrar has placed great reliance on language of the Commission in CLI-77-8 to the effect that, absent a determination by an NRC adjudicatory tribunal that the Seabrook site with closed-cycle cooling is acceptable, "we cannot permit construction to continue when use of such a system which could render the site unacceptable may be required [by

⁴⁷Because of underlying statutory requirements of Section 316(a) of the FWPCA, 33 U.S.C. 1326(a), if open-cycle cooling is approved, the water impacts must necessarily be of small dimensions and could scarcely tip the balance against the plant.

EPA].” 5 NRC at 521. The Commission concluded that “construction activities . . . must remain suspended pending the resolution of that question, and the further issues of comparison.” *Ibid.* These statements, however, cannot be divorced from the context in which they were made: the EPA ruling which disapproved of the cooling system proposed by the applicants was still extant, and NRC had never approved any alternate closed-cycle system. Indeed, the Licensing Board had expressly disapproved of Seabrook with towers, a determination we reversed in ALAB-366 on both legal and factual grounds. The situation was analytically comparable to that which prompted us to defer our review in *San Onofre* (see ALAB-171, *supra*).

Here, circumstances are quite different. It is true that, on the basis of my colleagues’ determination, the cooling-tower decision is being overturned and hence will no longer remain effective. But EPA’s last word was that the proposed open-cycle cooling system is satisfactory.⁴⁴ The Commission’s rulings in CLI-77-8 are therefore not controlling with respect to the suspension question we now face. That being so, we should not regard them as mandating a suspension because of the technical lack of finality to the EPA proceeding. Again, I stress that the situation is comparable to one in which there is no more than a “potentiality of action adverse to the facility” and where we traditionally have declined to grant stays for that reason.⁴⁵

2. Nor is suspension called for by reason of the remand which my colleagues deem to be necessary on both alternate southern New England sites and cooling towers. I reach this result whether I apply the four *Virginia Petroleum Jobbers*’ criteria,⁴⁶ as spelled out in 10 CFR 2.788(e), or whether I merely balance all of the “relevant equitable considerations” reflected on this record. See *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 159-160 (February 14, 1978). In sum, I view the following facts and circumstances as significant:

(1) Little, if any, adverse environmental effects will occur as a result of construction carried on during the remand period. For analysis purposes, I will assume that the hearings could be completed in as few as 3 months—particularly insofar as the southern New England site issue is concerned—but that they most likely will extend for as much as 6 months

⁴⁴As I previously pointed out, the court reversed EPA solely on procedural grounds and took no position on the substance of EPA’s findings.

⁴⁵By the same token, the possible need for a new certificate of site and facility for Seabrook with closed-cycle cooling from the New Hampshire Public Utilities Commission, raised by SAPL-Audubon at oral argument before us (App. Bd. Tr. pp. 21-22), would not constitute a sufficient ground for granting a stay at this time.

⁴⁶*Virginia Petroleum Jobbers’ Ass’n v. FPC*, 259 F.2d 921, 925 (D.C. Cir. 1958).

and could continue even longer. An affidavit by the project's director of construction filed by the applicants last month indicates that "excavation is complete and building work is in progress" for Unit 1 and that excavation is "about 90% complete" for Unit 2; that, with a single exception, none of the work proposed for the 9 months beginning March 1, 1978, will affect any new area (since the work will be below grade); and that the exception mentioned will be the offshore marine work, which will affect a new area each time a new shaft is started but where the impact is "localized to the bottom where the drilling is taking place" and "is being minimized by onshore disposal of drillings and recycling the water used for drilling" (March 4, 1978, affidavit of Thomas M. Sherry, pars. 4, 6). The staff endorses the position that the environmental effects of continued construction will not be a decisive factor. I fully agree.

One further element of asserted impact of continued construction is encompassed by a suspension motion filed on April 4, 1978, by SAPL-Audubon. That motion claims that construction is "threatening irreparable harm to freshwater supplies in the Town of Seabrook." It goes on to assert that Seabrook voters "overwhelmingly voted not to sell freshwater supplies" to the applicants, but adds that "should water not be cut off, further diversion of freshwater will cause the water supply to reach 'critical levels.' "

I cannot tell from the papers submitted in support of the motion whether the Seabrook project is indeed the source of some adverse effect on the town's water supply. The "critical water supply situation" referred to by the affidavit of the town's engineers may or may not be attributable to the Seabrook project. But, in any event, the town presumably has full authority to cut off the water supply if it deemed it adversely affected by the project. Moreover, the newspaper article submitted by SAPL-Audubon (Exhibit B to the motion) suggests that, if the water were cut off, the applicants would have an alternate source of water. That being so, the environmental effects referred to can be fully remedied, if necessary, through local action. Since the effects apparently can be foreclosed even when construction is continuing, the drastic remedy of suspension (with its many attendant ill effects) would be a peculiarly inappropriate means of achieving that result.

(2) Also relevant to the equities bearing upon suspension in the context of a NEPA review is the magnitude of the NEPA violation. Both the Commission and we have recognized the importance to an environmental review of the analysis of alternatives, particularly sites. CLI-77-8, 5 NRC at 522; *Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-462, 7 NRC 320, 338 (March 9, 1978). But the mere significance of this aspect of the environmental

review process does not portend that every deficiency in the conduct of that review need result in an automatic erasure of all action authorized as a result of that review. If there be such a deficiency, it is necessary additionally to consider "how the violation that prompted the remand *will affect* the ultimate outcome of the proceeding." *Midland*, ALAB-458, *supra*, 7 NRC at 161 (emphasis supplied).

To make that appraisal, we must look at all the evidence available. Assuming, *arguendo*, that the supplemental decisions are defective in the manner described by my colleagues—a proposition with which I reiterate my emphatic disagreement—those defects stem not from any showing on the record that some other alternative sites might be "obviously superior" or even marginally better than the Seabrook proposal (either open or closed-cycle). Nor do they stem from any "cavalier and misleading" site comparison, as existed in *Hodder v. NRC* (No. 76-1709, D.C. Cir. 1976). See CLI-77-8, 5 NRC at 521, n. 19. Rather, the defects arise from a perceived inadequacy of the hearing record to support the result reached: that no southern New England site is a viable alternative to Seabrook and that none of the other sites is "obviously superior" to Seabrook, with or without cooling towers.

Common sense dictates that, if the record were rehabilitated to include more information on the environmental effects of transmission lines, the likelihood that *any* southern site would turn out to be "obviously superior" to Seabrook is scant. And the aesthetic effects of cooling towers—the area of the Licensing Board's analysis with which my colleagues appear to have the most trouble—could not in my view operate to tip the balance against Seabrook, given the rather small impact at that site of those towers (both aesthetically and otherwise). As I have emphatically stated, I believe that the comparisons of other sites with Seabrook using closed-cycle cooling have been adequately performed. But let us assume (*arguendo*) that these comparisons are inadequate and that the adverse impacts of towers at other sites would be less than at Seabrook—the degree of improvement over the small Seabrook impact which I have described could not be enough (given other advantages of Seabrook reflected by the record) to enable the Commission to reach the conclusion that any one of the other sites was "obviously superior."

In short, I consider it unlikely that the hearings contemplated by my colleagues will change the results already reached. I strongly believe that a plethora of facts exist to support the Licensing Board's conclusions and that incorporating more of these facts into the record can only lead to conclusions even more favorable to Seabrook. The defect, if there be one, in effect boils down to little more than a technical failing in the NEPA review. The further proceedings may thus be viewed as just another pull

on the Seabrook yo-yo string.¹¹ In such circumstances, whether one considers the forthcoming evaluation in terms of "probability of success on the merits" or in terms of the substantiality of the NEPA violation, or only in terms of a "traditional balancing of equities" (see CLI-77-8, 5 NRC at 521), it is clear that this factor clearly suggests the inappropriateness of suspension. See also *Essex County Preservation Association v. Campbell*, 536 F. 2d 956 (1st Cir. 1976).

(3) There appears to be little doubt that suspension will result in substantial increased costs to the applicants (and hence very probably to its customers). This assumes—and there is no evidence now which would undercut this assumption—that the end result of the remand will not produce anything other than another approval of Seabrook. The record reflects the costs of a 6-month delay to be \$14.8 million per month if all nonmanual construction management and engineering personnel are retained on the payroll to assure a rapid restart of the project, substantially more if technical personnel are laid off and thereafter rehired. App. Dir. Test. No. 27, fol. Tr. 12782, p. 47. While those costs may now be out-of-date, I scarcely would expect them to have diminished. See Sherry affidavit, par. 9. In any event, they are substantial. If incurring those costs produced any significant environmental benefit, it might be warranted (absent other countervailing circumstances). In the absence of any such benefit, it would be dubious at best to impose such costs on the applicants or the consuming public.

(4) Earlier in this proceeding, in ALAB-349, both my colleagues and I recognized (in our separate opinions) that while the impact on construction workers cannot be accorded significant weight in determining the cost-benefit balance for an entire project, it is "manifestly relevant and significant to the short-term balance" which must be reached in evaluating the factors bearing on suspension *vel non*. 4 NRC 235, 286 (dissenting opinion); *id.* at 269 (majority opinion). Suspension here would produce a significant impact on workers. The applicants indicate that over 1,800 persons are employed at the site (Sherry affidavit, par. 2). Information provided by the staff (derived from a letter to it from the applicants responding to staff inquiries) indicates that, by early June, 2,250 workers will be employed and, assuming suspension, up to 1,250 of those workers could be discharged, with a loss in wages to the area of up to \$29.3 million over a 9-month period and an additional loss to the area of up to \$9 million in other construction-related expenses. Although these figures have not been subject to cross-examination, I believe it fair to conclude

¹¹Pulling a yo-yo string expends energy to produce rapid spinning but yields no productive results.

that the impact of suspension on both the workers and the area will be substantial.

(5) The Commission has also inquired, in considering the necessity for suspension during remand, into the likely prejudice to further decisions that might be called for by the remand. CLI-77-8, 5 NRC at 521. One still-open decision, of course, is the type of cooling system. The applicants assure us that none of the work which they contemplate during the remand period "will foreclose a shift to the utilization of cooling towers," although a small amount of it (\$1,660,000 in 3 months, \$3,759,000 in 6 months, and \$4,910,000 in 9 months) would become "valueless" if cooling towers were required (Sherry affidavit, par. 8). These expenditures are at the applicants' risk, and as we have said before, "we leave such matters to the business judgment of the utility companies and to the wisdom of the State regulatory agencies responsible for scrutinizing the purely economic aspects of proposals to build new generating facilities." *Midland*, ALAB-458, *supra*, 7 NRC at 162-163 (footnote omitted).

(6) Probably the most important consideration raised by the suspension question before us is the extent to which the further dollars spent during the remand period might skew the further comparison of alternative sites which my colleagues advocate. Compared to the better than \$2 billion cost of the facility, the dollars to be spent during the remand period are relatively insignificant: the difference between the amount which would be spent absent any suspension and that which would be spent assuming an orderly shutdown of the project is \$9,200,000 for 3 months, \$36,500,000 for 6 months, and \$68,000,000 for 9 months (Sherry affidavit, par. 7). In CLI-77-8, the Commission suggested that dollars of this type should be taken into account in determining whether another site is "obviously superior." 5 NRC at 532-34. If they are, I do not view them as substantial enough to "tip the balance" in favor of the Seabrook site. Moreover, they will be spent at the applicants' risk. However, I fully agree with Mr. Rosenthal that, in the present circumstances, there is "no compelling reason why any such investment occurring subsequent to the date of this decision need be taken into account" in the site comparisons called for by the remand. See pp. 515, 516, *supra*.

I conclude this section on continued construction by reiterating what I have previously stressed: that the remand is unlikely to produce a difference in result, and the public interest calls for no cessation of construction. As recently stated by the Court of Appeals for the District of Columbia

Circuit, in a case involving a remand to consider additional alternatives to a proposed action:

. . . the purpose of equitable relief, in a NEPA case as in any other, is to *remedy* the particular violations that have taken place; accordingly, where an injunction is not required to preserve the decisionmaker's opportunity to choose, an ongoing project should obviously not be enjoined, especially where, as here, there are substantial public interests in the project's continuation.

Alaska v. Andrus, _____ F.2d _____, _____, 11 E.R.C. 1321, 1337 (February 24, 1978).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Richard S. Salzman

In the Matter of

Docket Nos. 50-452
50-453

THE DETROIT EDISON COMPANY

(Greenwood Energy Center,
Units 2 and 3)

April 28, 1978

Concluding that the Licensing Board's order concerning an intervention petition was not a final order granting the petition, the Appeal Board dismisses without prejudice applicant's appeal under 10 CFR 2.714a.

RULES OF PRACTICE: INTERVENTION

Pursuant to 10 CFR 2.714a, an appeal concerning an intervention petition must await the ultimate grant or denial of that petition.

RULES OF PRACTICE: INTERVENTION

A licensing board order which determines that petitioner has met the "interest" requirement for intervention and that mitigating factors out-balance the untimeliness of the petition but does not rule on whether petitioner has met the "contentions" requirement is not a final disposition of the petition seeking leave to intervene. See 10 CFR 2.714a.

Mr. Harry H. Voigt, Washington, D.C., for the applicant the Detroit Edison Company.

Mr. David A. Kubichek for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

On April 3, 1978, the Licensing Board entered an order in which it addressed the petition of Citizens for Employment and Energy (CEE) for leave to intervene in this construction permit proceeding involving Units 2 and 3 of the Greenwood nuclear facility. The Board held that CEE had established its "interest" in the proceeding within the meaning of 10 CFR 2.714(a). It further ruled that "mitigating factors warrant[ed] the acceptance of" the petition notwithstanding that it had been untimely filed. At the same time, however, the Board did not pass upon whether CEE had fulfilled the additional requirement in 10 CFR 2.714(a) that a petitioner for intervention set forth satisfactory contentions. Rather, on that matter, the Board had this to say (order, p. 2):

Other than the Staff's reference to one contention, the Board has not had the benefits of the other parties' position on the proposed contentions. In order for the Board and the petitioners to have the position of Applicant and Staff on each contention (as amended), the parties are requested to have the filings in the hands of the Board and petitioner not later than April 21, 1978. The contentions are to be considered *seriatim*.

Electing to treat the April 3 order as having granted the CEE petition, the applicant has appealed to us under 10 CFR 2.714a. The NRC staff's response is that the order had no such effect; that a final disposition by the Board below of the CEE petition must abide the event of a ruling on whether CEE has met the contentions requirement; and that the appeal therefore should be dismissed as premature. In this connection, the staff calls our attention to a subsequent order entered on April 18 in which the Board below specifically noted (at p. 2) that the April 3 order "did not admit CEE as a party to this proceeding but did state its position on 'interest' and out-of-time filing"

We agree with the staff's position. Accordingly, we dismiss the appeal without prejudice to its renewal should, following its consideration of CEE's contentions, the Licensing Board in fact grant the petition. It is plain from the terms of 10 CFR 2.714a that an appeal thereunder must await the ultimate grant or denial of the intervention petition in question.¹ The applicant seemingly does not suggest the contrary; instead, to repeat, it took the April 8 order as constituting such action.

Although the applicant was wrong about that, we must note that the April 3 order was not a model of clarity. More particularly, the applicant

¹Any subsidiary rulings earlier made in connection with the petition can, of course, be then challenged along with the final result.

might have been misled by the Board's statement that "mitigating factors warrant the acceptance of the nontimely petition." It would appear that all the Board meant to say was that it was not going to deny the petition simply because it was late. Had that thought been more precisely formulated (or alternatively had the order explicitly indicated that the Board was reserving judgment on whether to grant the petition), the abortive appeal likely would not have been forthcoming.

Appeal dismissed.
It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Elizabeth S. Bowers, Chairman
Gustave A. Linenberger
Dr. Quentin J. Stober

In the Matter of

Docket Nos. 50-546
50-547

PUBLIC SERVICE COMPANY
OF INDIANA, INC.

(Marble Hill Nuclear Generating
Station, Units 1 and 2)

April 4, 1978

Upon consideration of an issue left open in an earlier partial initial decision, the Licensing Board determines that a co-owner meets the financial qualifications requirements of 10 CFR §50.33(f). Upon consideration of an issue remanded by ALAB-459, 7 NRC 179 (1978), the Licensing Board further determines that the facility discharge lies within the State of Indiana and that the §401 certification issued by that State conforms to the requirements of the FWPCA Amendments of 1972.

INITIAL DECISION
(Construction Permit)

Appearances

Harry H. Voigt, Esq., E. David Doane, Esq., and Michael F. McBride, Esq., LeBoeuf, Lamb, Leiby, and MacRae, 1757 N Street, N.W., Washington, D.C. 20036; Charles W. Campbell, Esq., General Counsel, Jim Pope, Esq., Associate Counsel, and Greg Kimberlin, Esq., Assistant Counsel, from Public Service Company of Indiana; on behalf of the Applicant, Public Service Company of Indiana.

Bill V. Seiller, Esq., 2100 Commonwealth Building, Louisville, Kentucky 40202; on behalf of the Joint Intervenors, Sassafras Audubon Society, Knob and Valley Audubon Society, and Citizens' Coalition.

Thomas M. Dattilo, Esq., 404 East Main Street, Madison, Indiana 47450; on behalf of Save the Valley/Save Marble Hill.

George A. Leininger, Jr., Esq., P.O. Box 826, Madison, Indiana; on behalf of the City of Madison.

Walker C. Cunningham, Esq., Stuart L. Adams, Esq., and Marvin R. O'Koon, Esq., 1112 Kentucky Home Life Building, Louisville, Kentucky 40202; on behalf of Jefferson County, Kentucky. At the health and safety phase of the proceeding the county's counsel was **Charles Kaplan, Esq.**, who formerly appeared on behalf of the City of Louisville.

Charles Kaplan, Esq., Lynch, Sherman, Cox, and Fowler, City Hall, Louisville, Kentucky 40202; on behalf of the City of Louisville. At the health and safety phase of the proceeding the City of Louisville's counsel was **Michael Greene, Esq.**, 730 West Main Street, Louisville, Kentucky 40202.

Joseph B. Helm, Esq., and Mark B. Davis, Jr., Esq., 1600 Citizens Plaza, Louisville, Kentucky 40202; on behalf of Louisville Water Company.

David K. Martin, Esq., and David C. Short, Esq., Room 34, State Capitol Building, Frankfort, Kentucky 40601; **George L. Seay, Jr., Esq.**, Fifth Floor, Capital Plaza Tower, Frankfort, Kentucky 40601; on behalf of the Commonwealth of Kentucky.

Robert G. Grant, Esq., 1330 W. Michigan Street, Indianapolis, Indiana; on behalf of the Indiana Environmental Management Board.

Ted R. Todd, Esq., P.O. Box 407, Madison, Indiana 47250; on behalf of the Board of Commissioners for the County of Jefferson, Indiana.

Michael J. Walro, Esq., 427 East Main Street, Madison, Indiana 47450; on behalf of the Plan Commission and Board of Zoning Appeals of Jefferson County, Indiana.

John Ready O'Connor, Esq., Suite 15, K of P Building, Madison, Indiana 47250; on behalf of Saluda Township.

Lawrence Brenner, Esq., Harry H. Glasspiegel, Esq., Lawrence J. Chandler, Esq., Bernard M. Bordenick, Esq., and Richard J. Goddard, Esq., Office of the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555; on behalf of the NRC Staff. **Mr. Jeffrey F. Lawrence** was associated with counsel.

GENERAL STATEMENT

Public Service of Indiana, Inc., (PSI or Applicant) filed an application on July 1, 1975, to construct two pressurized water reactors to be known as the Marble Hill Generating Station, Units 1 and 2, in Saluda Township, Jefferson County, Indiana, on the Ohio River, approximately 10 miles south and slightly west of Madison, Indiana. The proposed site is approximately 30 miles upstream from Louisville, Kentucky.

On August 22, 1977, the Licensing Board issued a "Partial Initial Decision—Limited Work Authorization" (LBP-77-52, 6 NRC 294). The decision authorized a Limited Work Authorization (LWA-1) permitted by 10 CFR §50.10(e)(1). On December 9, 1977, the Licensing Board issued a "Partial Initial Decision—Limited Work Authorization-2" (LBP-77-67, 6 NRC 1101) pursuant to 10 CFR §50.10 (e)(3)—known as an LWA-2.

This Initial Decision pertains to two issues pending before the Atomic Safety and Licensing Board. In the Board's Partial Initial Decision pertaining to the LWA-2, the Board referred to the fact that the record was kept open on the question of Wabash Valley Power Association's (WVPA) financial qualifications since a contract would not be signed with the Appli-

cant for 17% of the plant until the Rural Electrification Administration (REA) guarantees a loan (6 NRC at 1116). The second matter is a remand from the Atomic Safety and Licensing Appeal Board in ALAB-459 (7 NRC 179), dated February 16, 1978, to "find whether the Marble Hill discharge pipe will end in Indiana or Kentucky waters, and conclude, on the basis of that finding, whether Applicants have obtained the certification required under Section 401 of the Water Act." (*Id.* at 196.)

Financial Qualifications

In the LWA-2 decision, the Board found that PSI is financially qualified to finance 83% of the proposed project. The Board also found that WVPA had not provided sufficient evidence to be found financially qualified to participate in its proposed 17% share of the facility.

The WVPA general manager had testified that WVPA was still in the process of applying for the REA loan guarantee. The Board determined that it could not authorize the issuance of a construction permit until REA issues the loan guarantee to WVPA and the proposed ownership participation agreement is executed. The Board also stated that it would consider the positions of the parties, relative to the documents, and then determine the appropriate action (Tr. 6540, PID-LWA-2, 6 NRC at 1116).

On January 24, 1978, the Applicant moved for a Board order to establish procedures for the prompt review of the loan guarantee and contract. The NRC Staff supported the motion. Save the Valley/Save Marble Hill (STV/SMH) protested against granting PSI's motion and by letter of January 19, 1978, requested that sworn statements be obtained from REA officials in order to disclose conflicting positions. The Board's order of February 2, 1978, set a schedule to be followed after the documents were issued and denied STV/SMH request for discovery of REA officials on the basis that internal REA matters were not before this Board.

On February 6, 1978, PSI served the executed contract between PSI and WVPA pointing out corrections and word changes made to the previously introduced, unsigned draft contract (PSI Exhibit 19). On February 15, 1978, PSI served the REA Loan Guarantee Commitment for \$360,684,000 with the proviso that the proceeds of the guaranteed loan are to be used to acquire 17% undivided ownership in Marble Hill Generating Station, Units 1 and 2 (PSI Exhibit 20).

By mailgram March 2, 1978, STV/SMH protested that there was no necessity for the Board to rule immediately on the REA matter due to the remand of the Appeal Board relative to the State boundary line. STV/SMH also requested that the Board require REA administrators "to state under oath in oral discovery proceedings in Madison" the bases for the REA

determination. STV/SMH also scolded the Board for not responding to its February 14, 1978, motion and stated that "consistency and fundamental fairness are lacking in this proceeding." The Board had not been served the motion of February 14, 1978, but after receipt of the mailgram, obtained a copy of same.

The February 14, 1978, letter protested the Board's order of February 2, 1978, in which it was determined that REA internal matters were not before this Board. STV/SMH also protested that it needed more than fifteen (15) days to examine whichever was the later filing of the contract or REA loan guarantee. The Board's order of March 10, 1978, affirmed its February 2, 1978, order relative to internal considerations of REA and the schedule.

The only other party to respond to the executed contract and REA loan guarantee was the NRC Staff. By letter dated March 1, 1978, the Staff stated that it believed that both documents were satisfactory, and the Board could now find WVPA has provided reasonable assurance it will be financially qualified to finance 17% of Marble Hill and that the requirements of 10 CFR §50.33(f) have been met. The Staff suggested "Out of an abundance of caution, the Licensing Board might consider including in its order a requirement that the Applicant inform the NRC if REA ever attempts to take any action, under color of authority under the loan contract, which the Applicants deem to be at variance either with PSI's technical judgment or any NRC regulations or requirements."

The Board has considered the executed contract and the REA loan guarantee documents and finds that they satisfy the requirements of 10 CFR §50.33(f). The Board, also out of an abundance of caution, has determined that it will condition the construction permit to require the notice requirement recommended by the Staff.

Compliance with the Federal Water Pollution Control Act

The Atomic Safety and Licensing Appeal Board in ALAB-459 (7 NRC 179), dated February 16, 1978, instructed the Licensing Board to reopen the record in order to determine whether the Marble Hill discharge pipe will end in Indiana or Kentucky waters, and to conclude, on the basis of that finding, whether Applicants have obtained the certification required under Section 401 of the Water Act (the 401 certificate in evidence is from the State of Indiana). The Appeal Board stated that it would be up to the Licensing Board to determine whether a hearing would be required, citing 10 CFR §2.749 (Summary Disposition on Pleadings).

On February 21, 1978, PSI filed a motion for summary disposition concerning the location of the Kentucky-Indiana State line. PSI requested a

conference call to discuss scheduling. A conference call was arranged on February 22, 1978, with PSI, Kentucky, Indiana, the Staff, and the Board. PSI wanted no more than eight (8) days for the parties to respond to the motion and eight (8) days for the Board's ruling. Both Kentucky and the Staff argued for discovery, so a schedule was set for a reasonable time for discovery, response to the motion, and the Board's ruling by April 7, 1978. This is reflected in the Board's order of February 23, 1978. At PSI's request a second conference call was held on March 1, 1978. PSI volunteered to have a courier pick up and deliver all discovery requests thereby eliminating several days mail time. A new schedule was set which moved the Board's ruling to March 31, 1978. The new schedule was recited in the Board's order of March 1, 1978.

On February 27, 1978, Indiana filed a document supporting the motion for summary disposition. On March 24, 1978, the Board received the Staff's response which concluded that the end of the discharge pipe is within Indiana but the opinion was based on evidence differing from the PSI evidence. The Staff stated that it did not wish to cross-examine the PSI witnesses. The Staff requested that the Board not grant the motion but issue a decision based on the filed documents if no other party requested a hearing for the purpose of cross-examination. Although Kentucky's response to the motion was to be served by March 17, 1978, no such filing was received by the Board.

A conference call was arranged on March 29, 1978. Kentucky stated it was still very interested but did not file since it had determined that it would not submit evidentiary affidavits. The Board informed Kentucky that it should have responded but would not be dismissed from the proceeding for failing to do so.

None of the parties wished to cross-examine another party's witnesses, and the Board stated it did not have questions for the witnesses. The parties agreed that an evidentiary hearing would, therefore, not be necessary and the Board concurred.

The evidence submitted by the parties consists of the affidavits of (1) Applicants' consultants Clifford R. Norton, Jr., Robert E. Torp-Smith, and Lang L. Lawrence; (2) Indiana's Ralph C. Pickard; and (3) the NRC Staff's William E. Kreisle and Gary B. Staley. While it is not formally before us, in response to discovery requests from the parties, certain information was furnished. The Board has informally reviewed this information and has determined that it does not affect our conclusion. Indiana charged that Intervenor's were untimely in challenging the §401 certificate issued by Indiana. Indiana has no maps, surveys, or other documents which question the authenticity of the PSI affidavits and exhibits (Pickard Affidavit).

It its February 16, 1978, decision (ALAB-459), The Appeal Board found that:

The record does show that the effluent from the Marble Hill discharge pipe will enter the river at an elevation more than 405 feet above mean sea level, which in the applicant's view puts it on the Indiana side of the line.

7 NRC at 194.

Specifically, then, the issue before us is whether the Applicant was correct in determining that the boundary line in the portion of the Ohio River adjacent to the Marble Hill site is the contour line at an elevation of 405 feet above mean sea level. Since the Appeal Board concluded that the Kentucky-Indiana boundary line is the June 1, 1792, low-water mark on the Indiana side of the Ohio River, the Licensing Board must first determine the location of this boundary in terms of present day contours; then it is in position to:

find whether the Marble Hill discharge pipe will end in Indiana or Kentucky waters, and conclude, on the basis of that finding, whether applicants have obtained the certification required under Section 401 of the Water Act.

Id. at 195-196.

The Applicants state the following:

- In the absence of a June 1, 1792, survey, the best data available to determine the border location as of that date are the results of a U.S. Army Corps of Engineers survey conducted in the period 1896-1906.
- Said survey results establish that the low-water mark in the vicinity of the site—River Mile 570—on the Indiana side was 405 feet above mean sea level, as of the survey period.
- No data have been found to establish the low-water mark at an earlier date (Norton Affidavit).
- Applicants' surveyor has established the location of the riverbank in the vicinity of River Mile 570 as of 1807 and has found the present riverbank to be further inshore, indicating (to Applicants) a westerly erosion between then and now (Norton Affidavit).

From the foregoing, Applicants conclude that it is reasonable and conservative to find that the low-water mark on the Indiana side of the Ohio River in the vicinity of River Mile 570 on June 1, 1792, was located at 405

feet above mean sea level, if not further out from the Indiana riverbank.

The Staff, in its affidavits filed in opposition to the Applicants' motion, concludes as follows:

- The Applicants have shed no light on the obvious questions regarding the relationship of the 1896-1906 survey low-water mark datum to either the elevation datum for the low-water mark in prior years or to the horizontal location of the northwest 405-foot contour line in prior or subsequent years, so that this referenced survey cannot in itself be used to determine whether the cooling system structures are on the Indiana side of the 1792 low-water mark.
- The 1896-1906 survey and river gage data (1856-1941) establish the elevation of the low-water mark to have been 404.4 feet Ohio River Datum (ORD) at the Marble Hill site (Staley Affidavit).
- The question of where this contour lay in 1792 and the extent to which it has moved during the interval between the referenced survey and the present is answered from a consideration of a variety of sources not mentioned by the Applicants (prior surveys, annual river gage records, effects of construction of dams on the river, geometry, and bank structure of the bend at River Mile 570, etc.), to wit: the bend of the river is quite stable with respect to erosion effects, the low-water profile determined during the survey of 1896-1906 was not significantly different from the low-water profiles of preceding years, and little change in the channel configuration at River Mile 570 since 1906 has been noted (Kreisle Affidavit).
- Converting the lowest, low-water contour of 404.4 feet ORD to mean sea level, for comparison with proposed facility design elevations, requires subtracting 0.76 feet from the ORD elevation, and gives 403.64 feet MSL (conservative, since a lower historical (1792) low-water mark would have established the common boundary as being farther east).
- Since the opening of the proposed Marble Hill intake pipe is at an elevation of 407.4 feet MSL and the opening of the proposed discharge pipe is at an elevation 411.5 feet MSL, both pipe openings will be located west of the lowest low-water contour.
- Since the river channel location has remained stable or has moved—if at all—toward Indiana since 1792, it is apparent that the river end opening of each structure, as proposed, will lie on the Indiana side of any of the suggested historical low-water marks (Staley Affidavit).

The Board has carefully reviewed all of the filed material from which the above summaries have been derived. Although the Applicants and the Staff have arrived at the same ultimate conclusion, we find the Staff's analysis to

be more conservative, complete, and persuasive. From it we find that the proposed intake and discharge structures are located within the State of Indiana and that the Applicants possess a valid 401 certification.

CONCLUSIONS OF LAW

The Board reached Conclusions of Law in the LWA-1 decision of August 22, 1977, and in the LWA-2 decision of December 9, 1977. Those Findings of Fact and Conclusions of Law are affirmed as modified by the Conclusions of Law as follows:

1. The co-Applicants are financially qualified to design and construct the proposed facility. However, PSI is required to inform the NRC if REA ever attempts to take any action, under color of authority under the loan contract, which the Applicants deem to be at variance either with PSI's technical judgment or any NRC regulations or requirements.

2. The certification from the State of Indiana issued to the Applicants on January 30, 1976, ("Section 401 Certification") (following Tr. 5403) meets with the requirement of Section 401(a)(1) of the Federal Water Pollution Control Act Amendment of 1972 (FWPCA) under the criteria of the Atomic Safety and Licensing Appeal Board Decision, ALAB-459, dated February 16, 1978.

ORDER

Based on the Board's findings and conclusions and pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's rules and regulations, it is:

ORDERED that the Director of Nuclear Reactor Regulation is authorized to issue to Applicants a permit to construct Marble Hill Generating Station, Units 1 and 2, consistent with the terms and conditions of all decisions issued.

IT IS FURTHER ORDERED, in accordance with 10 CFR §§2.760, 2.762, and 2.764, that this Initial Decision shall be effective immediately and shall constitute the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the above-cited rules. Exceptions to this Initial Decision must be filed within seven (7) days after service of the decision. A brief in support of the exceptions must be filed within fifteen (15) days thereafter (twenty (20) days in the case of the NRC Staff). Within fifteen (15) days of the filing and service of the brief by the appellant (twenty (20) days in the case of the NRC Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Quentin J. Stober, Member

Gustave A. Linenberger, Member

Elizabeth S. Bowers, Chairman

Dated at Bethesda, Maryland,
this 4th day of April 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Marshall E. Miller, Chairman
Hugh K. Clark
James R. Yore

In the Matter of

Docket No. 50-341A

THE DETROIT EDISON
COMPANY

(Enrico Fermi Atomic Power
Plant, Unit No. 2)

April 7, 1978

The Licensing Board denies petition for leave to intervene and request for antitrust hearing filed by member/ratepayer of distribution cooperative that purchases all of its electric power from generation and transmission cooperative which would, under amendment to construction permit, become co-owner of power plant unit. The Board also denies licensee's motion to dismiss proceeding for lack of jurisdiction.

ATOMIC ENERGY ACT: ANTITRUST JURISDICTION

An application for a construction permit amendment that would add new co-owners to a plant is within the scope of the phrase in §105c(1) of the Atomic Energy Act requiring antitrust review of "any license application"; as such, it triggers an opportunity for intervention based on antitrust aspects of adding new co-owners.

ATOMIC ENERGY ACT: SCOPE OF ANTITRUST REVIEW

To insulate from preclicensing antitrust review, those applicants who come in by way of amendments to existing construction permits would subvert the Congressional intent and purpose behind §105c and would be inconsistent with Commission decisions and regulations. See *Houston Lighting and Power Company* (South Texas Project, Units No. 1 and 2), CLI-77-13, 5 NRC 1303 (1977); 10 CFR §§50.80(b) and 50.91.

ATOMIC ENERGY ACT: ANTITRUST JURISDICTION

Because a joint venture might raise antitrust problems that would not exist if the joint applicants were considered individually, the Licensing Board has jurisdiction to consider intervention petition and antitrust issues filed in connection with new application for joint ownership. Compare *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892 at 1085, *et seq.* (1977).

ATOMIC ENERGY ACT: STANDING TO INTERVENE (INJURY IN FACT)

For purposes of NRC consideration, no cognizable "injury in fact" arises from remote and tenuous connection between activities under license and possible rate increases to member/ratepayer of distribution cooperative that has requirements contract with generation and transmission cooperative, proposed new co-owner of plant.

ATOMIC ENERGY ACT: OWNERSHIP

A utility's determination whether or not to purchase an ownership interest in a nuclear facility is one of the matters that NRC leaves to the business judgment of utility companies and to the scrutiny of State regulatory agencies. See *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-163 (1978).

ATOMIC ENERGY ACT: STANDING TO INTERVENE (INJURY IN FACT)

Petitioner who has not pleaded existing or potential antitrust considerations involved in small utility's acquisition of access to nuclear facilities has failed to satisfy "injury in fact" aspect of judicial standing test for intervention as a matter of right.

ATOMIC ENERGY ACT: STANDING TO INTERVENE (ZONE OF INTEREST)

The interest of a ratepayer or consumer of electricity is not necessarily beyond the scope of interests protected by §105 of the Atomic Energy Act.

RULES OF PRACTICE: INTERVENTION

According to guidelines established in *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC

610, 617, discretionary intervention should be "more readily available where petitioners show significant ability to contribute on substantial issues of law or fact which will not otherwise be properly raised or presented, set forth these matters with suitable specificity to allow evaluation, and demonstrate their importance and immediacy, justifying the time necessary to consider them."

RULES OF PRACTICE: INTERVENTION PETITION (ANTITRUST)

Petitioner seeking leave to intervene who lacks "specialized education or pertinent experience" relevant to handling *pro se* antitrust litigation has not demonstrated ability to make a "valuable contribution to the decision-making process in an antitrust context." See *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977).

ATOMIC ENERGY ACT: CRITERIA FOR ANTITRUST REVIEW

Where neither Attorney General nor NRC staff has discerned antitrust problems warranting review under §105c, potential antitrust problems must be shown with reasonable clarity to justify granting a petition that would lead to protracted antitrust litigation involving a *pro se* petitioner.

RULES OF PRACTICE: INTERVENTION PETITION (ANTITRUST)

In addition to meeting the requirements of Section 2.714 of the Commission's Rules of Practice applicable to all intervention petitions, a petition that seeks to invoke antitrust jurisdiction must describe (1) the relevant situation allegedly inconsistent with the antitrust laws, (2) how that situation conflicts with the policies underlying the applicable laws, and (3) how activities under the license would create or maintain the situation; and it must identify the relief sought. See, e.g., *Kansas City Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559 (1975).

ATOMIC ENERGY ACT: ANTITRUST RELIEF

Where a license is found to create or maintain a situation inconsistent with the antitrust laws, the Commission may impose corrective conditions on the license rather than withhold it.

ORDER DENYING INTERVENTION PETITION AND REQUEST FOR ANTITRUST HEARING OF MARTHA G. DRAKE

The Detroit Edison Company (Licensee) filed an application on May 6, 1977, for an amendment to its construction permit for Enrico Fermi Atomic Power Plant, Unit No. 2. The amendment would add Northern Michigan Electric Cooperative, Inc., (Northern Michigan) as an 11.22% co-owner of the unit, and Wolverine Electric Cooperative, Inc., as an 8.78% co-owner. The Attorney General's advice letter disclosing no antitrust problem which would require a hearing was published in the *Federal Register* (42 Fed. Reg. 54894) on October 11, 1977, and persons whose interest may be affected were directed to file intervention petitions by November 10, 1977. A timely intervention petition dated October 13, 1977, was filed *pro se* by Martha G. Drake of Petoskey, Michigan.

In her petition, Ms. Drake alleges, *inter alia*, that she is a member and ratepayer of Top O'Michigan Electric Cooperative, Inc., (Top O'Michigan) and that Top O'Michigan purchases all of its electric power from Northern Michigan. Ms. Drake alleges that the contract between Top O'Michigan and Northern Michigan "violates the antitrust laws." Northern Michigan is a generation and transmission cooperative, whereas Top O'Michigan is solely a distribution cooperative. Ms. Drake further alleges that her interests are affected since she must purchase all of her electricity from Top O'Michigan, that Top O'Michigan must purchase all of its power from Northern Michigan, and that Northern Michigan's contract with Detroit Edison commits them to pay 11% of the costs and expenses of Fermi 2, "which may be very expensive."

On November 21, 1977, Licensee filed a motion to dismiss on the grounds that the Board has no jurisdiction to conduct such an antitrust review in connection with the proposed amendment to the construction permit. It also filed an answer contending that Ms. Drake has no standing to intervene as a matter of right, that there is no justification for intervention as a matter of discretion, that no valid contentions have been raised, and that there is no pleading with the specificity required for antitrust issues.

The Staff filed a reply in opposition to the intervention petition on November 28, 1977, opposing standing as a matter of right for lack of a cognizable injury in fact and as being outside the zone of interests protected by §105 of the Atomic Energy Act (42 U.S.C. §2135). It also urged that there was no basis for discretionary intervention, and that the petition did not meet the requirements for intervention under 10 CFR §2.714.

On December 5, 1977, the Staff also filed a reply in opposition to the Licensee's motion to dismiss for lack of jurisdiction. A brief in reply to the Staff's opposition to intervention was filed by Ms. Drake on December 11,

1977, to which the Staff responded on December 23, 1977. A special pre-hearing conference was held in Detroit, Michigan, on January 18, 1978, at which the parties appeared and were heard by the Board.

I

The Licensee's motion to dismiss this proceeding for lack of jurisdiction over the subject matter will be considered first as a threshold matter. It contends that an antitrust review of the proposed change in ownership is only appropriate in conjunction with a future operating license proceeding, citing in support the language of the statute itself, its legislative history, and the Commission's recent decision in *South Texas*.¹ This motion will be denied.

Licensee first argues that where a plant has been subject to antitrust review at the construction permit stage, as was the case with Fermi 2, a second antitrust review will not be held at the operating license stage under §105c(2)

. . . unless the Commission determines such review is advisable on the ground that significant changes in the licensee's activities or proposed activities have occurred subsequent to the previous review by the Attorney General and the Commission under this subsection in connection with the construction permit for the facility.

However, this reference to the "significant changes" procedure in connection with the operating license does not answer the question as to the effect of a proposed amendment to an original construction permit to add new co-owners. Detroit Edison is currently the sole holder of construction permit CPPR-87, issued on September 26, 1972, for Fermi 2. Section 105c of the Act states:

c. (1) The Commission shall promptly transmit to the Attorney General a copy of *any license application* provided for in paragraph 2 of this subsection. . . . (2) Paragraph (1) of this subsection shall apply to an application for a license to construct or operate a utilization or production facility under section 103. . . . [Emphasis supplied.]

As to the two cooperatives, the present application for an amendment to add them as co-owners of Fermi 2 must be approved by the Commission before an ownership interest is acquired, and the cooperatives will be required to submit applications to become co-licensees of the facility prior to the

¹*Houston Lighting and Power Company* (South Texas Project, Unit Nos. 1 and 2), CLI-77-13, 5 NRC 1303 (1977).

issuance of an amendment allowing change in ownership.² Without exalting form over substance, it is clear that these applications are within the scope of the phrase "any license application" for antitrust review purposes within the meaning of §105c(1), *supra*, and trigger an opportunity for intervention raising antitrust issues as to the two cooperatives. To construe the statute otherwise would permit a utility with no antitrust problems to undergo an antitrust review and obtain an unconditioned construction permit, and then sell an ownership interest to another monopolizing utility. Under the Licensee's argument, there could then be no antitrust review until the later operating license stage, which itself could be a more limited review than the normal preclicensing antitrust review contemplated by the statute. Such an unequal treatment of applicants, insulating from preclicensing antitrust review those who came in later by way of amendments to construction permits, would subvert the Congressional intent and purpose of §105c.

The legislative history of the statute is consistent with this interpretation. The House Report states:

The Committee recognizes that applications may be amended from time to time, that there may be applications to extend or review a license, and also that the form of an application for a construction permit may be such that, from the applicant's standpoint, it ultimately ripens into an application for an operating license. The phrases "*any license application*," "an application for a license," "any application" as used in the clarified and revised subsection 105c *refer to the initial application* for a construction permit.³ [Emphasis supplied.]

Since the two cooperatives in this case are required to submit an application to become co-licensees, these constitute *their* "initial application for a construction permit." Under the circumstances of this case, it would be unrealistic to look solely at the original applicant which later sought ownership amendments, and ignore later applicants for a co-license to avoid a preclicensing antitrust review of the latter. The Commission's decision in *South Texas, supra*, also stresses the importance of a "thorough" and "in-depth" antitrust review at the construction permit stage, so that "once an initial, full antitrust review has been performed, only 'significant changes' warrant reopening."⁴ The regulations pertaining to the transfer⁵ or amend-

²Letter dated March 3, 1978, from Edson G. Case, Acting Director, Office of Nuclear Reactor Regulation, to Dr. Robert G. Asperger.

³H. R. Rep. No. 91-1470, 91st Cong., 2d Sess., reprinted in U.S. Code Cong. Serv. 4981, 5010 (1970).

⁴5 NRC at 1310, 1312, 1317.

⁵10 CFR §50.80(b).

ment⁶ of a license or construction permit are likewise in harmony with these concepts. Moreover, even though each of the joint applicants, considered alone, might be free of antitrust problems, the joint venture *per se* could conceivably raise antitrust problems. Compare *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, Part VII.F., 6 NRC 892 at 1085, *et seq.* (1977). Accordingly, the Board has jurisdiction to consider the petition to intervene and raise antitrust issues filed by Ms. Drake.

II

Intervention as a matter of right is governed by judicial standing doctrines, which require the petitioner to allege both (1) some injury that has occurred or will probably result from the action involved ("injury in fact" test), and (2) an interest arguably within the zone of interest protected by the statute ("zone of interest" test).⁷

The Petitioner alleges that she is a member and ratepayer of Top O'Michigan, a distribution cooperative. She further alleges that her interests are affected because, by contract, she must purchase all of her electricity from Top O'Michigan, which, by contract, must purchase all of its power from Northern Michigan, and that Northern Michigan's contract with Detroit Edison requires it to pay 11% of the costs and expenses of Fermi 2, "which may be very expensive." Petitioner contends that these contractual provisions for the exclusive purchase of electricity violate the antitrust laws.

Petitioner is not a ratepayer of the present Licensee (Detroit Edison) or the potential licensee (Northern Michigan). Her rates will not be affected by any action of these utilities, but only by the actions of Top O'Michigan, and then only as a direct result of rate-setting proceedings before the Michigan Public Utilities Commission. (Petitioner alleges that she has been allowed intervenor status before the latter commission in two cases involving the same sale.) The causal connection between the activities under the license and any purported increase in rates to the Petitioner is too remote and tenuous to constitute a cognizable "injury in fact" before the NRC.

The thrust of Petitioner's complaints is an attack on the business judgment of the generation and transmission cooperative (Northern Michigan) in buying an ownership interest in the Fermi 2 facility. As the Appeal Board has noted in another context (an environmental cost-benefit balance, "In the scheme of things, we leave such matters to the business judgment of the

⁶10 CFR §50.91.

⁷*Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976); *Virginia Electric and Power Company* (North Anna Power Station, Units 1 and 2), ALAB-363, 4 NRC 631, 632 (1976).

utility companies and to the wisdom of the State regulatory agencies responsible for scrutinizing the purely economic aspects of proposals to build new generating facilities."⁸

An asserted injury in fact cannot exist in a vacuum, but must be analyzed in connection with all of the circumstances involved in a particular case. By definition, a potential "intervenor as a matter of right" must allege some injury that has occurred or will probably result from the action involved. Here the action involved is the prospective amendment of a construction permit to allow Northern Michigan to become a co-owner and co-licensee of the facility. The question under §105c is whether the activities under the license would create or maintain a situation inconsistent with the antitrust laws. Petitioner makes no attempt to plead any antitrust basis for her apprehensions as a ratepayer once removed from Northern Michigan. In fact, access to a nuclear facility is usually sought by smaller utilities such as Northern Michigan in order to obtain a mix of baseload electric power at a lower cost than most other sources of bulk power. In any event, the acquisition (as opposed to the denial) of such access to nuclear facilities does not even purport to involve antitrust considerations, which are the focus of the Board's responsibilities.⁹

The Petitioner has not demonstrated the necessary "injury in fact" required to satisfy the first aspect of the judicial standing test for intervention as a matter of right.

One seeking intervention as a matter of right must also allege an interest "arguably within the zone of interest" to be protected or regulated by the statute sought to be invoked. The Staff contends that "Not only is her [Petitioner's] status as a ratepayer beyond the scope of interests protected by Section 105, but also there is no connection between the 'zone of interests' protected by Section 105 and the injury in fact which Ms. Drake alleges, *i.e.* higher electric rates" (Staff Brief, p. 6). We disagree with the first principle thus stated, but concur with the second.

It is now settled that ratepayer petitioners do not have standing to intervene in construction permit proceedings, nor such status as will entitle them to raise National Environmental Policy Act (NEPA) issues in an NRC licensing proceeding. In *Pebble Springs*, the Commission stated:

With respect to the "zone of interest" requirement, these ratepayer petitioners seek a complete economic analysis of nuclear power as part of the licensing proceeding in order to avoid even the possibility of increased future electric rates. While this "interest" is understandable, it

⁸*Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-163 (1978).

⁹*Northwestern Public Service Company v. FPC*, 520 F.2d 454, 459 (D.C. Cir. 1975).

does not come within the "zone of interest" protected by the Atomic Energy Act.¹⁰

As the Appeal Board has put it, "The Commission has squarely held that status as a ratepayer of an applicant for a nuclear license does not bring one within the 'zone of interests' protected by the Atomic Energy Act (except perhaps in the antitrust sphere)."¹¹ However, it must be noted that in those cases both the Commission and the Appeal Board expressly reserved the question of ratepayer status for antitrust intervention purposes. Accordingly, it is an open question at this time.

The antitrust laws specifically involved in a §105c antitrust review include §5 of the Federal Trade Commission Act, which declares unlawful "unfair methods of competition in commerce, and unfair or deceptive acts or practices in commerce."¹² The Congressional intent in this regard is described in the Joint Committee report as follows:

It important to note that the antitrust laws within the ambit of subsection 105c of the bill are all the laws specified in subsection 105a. These include the statutory provisions pertaining to the Federal Trade Commission, *which normally are not identified as antitrust law*. Accordingly, the focus for the Commission's finding will, for example, include consideration of the admonition in Section 5 of the Federal Trade Commission Act, as amended, that "Unfair methods of competition in commerce, and unfair or deceptive acts or practices in commerce are declared unlawful."¹³ [Emphasis supplied.]

The sweep of §5 of the FTC Act includes not only all violations of the Sherman or Clayton Acts, but also incipient and other trade restraints contrary to their underlying policies which are not outright violations of the antitrust laws.¹⁴ It is clear that FTC Act §5 jurisprudence is to be used as a guide in our antitrust review under §105c of the Atomic Energy Act.¹⁵

In *Sperry and Hutchinson*, the Supreme Court held that consumers, as well as competitors, are within the ambit of §5 of the FTC Act, stating:

In reality, the question is a double one: First, does §5 empower the

¹⁰*Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 614 (1976).

¹¹*Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1420 (1977).

¹²15 U.S.C. 45(a)(1).

¹³H. R. Rep. No. 91-1470, reprinted in U.S. Code Cong. Serv. 4994-95 (1970).

¹⁴*Atlantic Refining Company v. FTC*, 381 U.S. 357 (1965); *FTC v. Brown Shoe Company*, 384 U.S. 316 (1966); *FTC v. Motion Picture Advertising Service Company*, 344 and S. 392 (1953).

¹⁵*Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892, 907-912 (1977).

Commission to define and proscribe an unfair competitive practice, even though the practice does not infringe either the letter or the spirit of the antitrust laws? Second, does §5 empower the Commission to proscribe practices as unfair or deceptive in their effect upon consumers regardless of their nature or quality as competitive practices or their effect on competition? We think the statute, its legislative history, and prior cases compel an affirmative answer to both questions. . . . Thenceforth, unfair competitive practices were not limited to those likely to have anticompetitive consequences after the manner of the antitrust laws; nor were unfair practices in commerce confined to purely competitive behavior.¹⁶

Consumers have also been held to be within the scope of standing for injunctive relief sought under §16 of the Clayton Act, which has no business or property requirement as in the case of treble damage actions under §4 (15 U.S.C. §§15, 26).¹⁷ For example, in *City of Fairfax v. Fairfax Hospital Association*, 562 F.2d 280 (4th Cir. 1977), there were only two private hospitals in the county. One sought to take over the other by having the Industrial Development Authority of the county purchase the latter's assets and then lease them to the first hospital. The plaintiffs (physicians and the city for its inhabitants) alleged that the leasing would eliminate competition between the hospitals in violation of §1 of the Sherman Act, monopolize interstate commerce contrary to §2, and constitute a contract in restraint of trade under §3. In an opinion reversing summary judgment for the defendants, Judge Wyzanski (Senior District Judge sitting by designation) stated that under §16 of the Clayton Act "any person" is entitled to an injunction on general equitable principles against threatened loss or damage by a violation of the antitrust laws. The plaintiffs were held to have standing to complain of the alleged violations of the antitrust laws. As to those parties, some of whom were consumers, it was held that they were entitled to present evidence ". . . as to whether there are adverse economic effects upon patients, doctors, and the city when, instead of having a choice between two local hospitals, the sick and their physicians are remitted to a Hobson's choice." (562 F.2d at 283.)

Accordingly, it cannot be held that the Petitioner's status as a ratepayer or consumer of electricity is necessarily beyond the scope of interests protected by §105.¹⁸ However, in this case, the Petitioner has not shown that

¹⁶*FTC v. Sperry and Hutchinson Company*, 405 U.S. 233, 239, 246 (1972).

¹⁷*Hawaii v. Standard Oil Company* 405 U.S. 251, 262-63, 266 (1972); *In Re Multidistrict Vehicle Air Pollution M.D.L. No. 31*, 481 F.2d 122, 130 (9th Cir. 1973). Cf. *City of Lafayette v. Louisiana Power & Light Company*, _____ U.S. _____, 46 U.S.L.W. 4265, 4269 (1978).

¹⁸*Union Electric Company* (Callaway Plants, Units 1 and 2), LBP-75-20, 1 NRC 438, 441-443 (1975).

any injury to her economic interests as a ratepayer would be the proximate result of anticompetitive activities by the added licensees.¹⁹ The petition is defective, not because a ratepayer cannot come within the zone of interest of §105c, but because this particular ratepayer has not alleged injury arguably related to any activities under the license, which would create or maintain a situation inconsistent with the specified antitrust laws.²⁰

III

In addition to standing as a matter of right, the Commission has determined that discretionary intervention may be permitted in some circumstances where judicial standing is lacking. In *Pebble Springs, supra*, the guidelines for the exercise of such discretion were thus described:

In determining in a particular case whether or not to permit intervention by petitioners who do not meet the tests for intervention as a matter of right, adjudicatory boards should exercise their discretion based on an assessment of all the facts and circumstances of the particular case. Some factors bearing on the exercise of this discretion are suggested by our regulations, notably those governing the analogous case where the petition for intervention has been filed late, 10 CFR 2.714(a), but also the factors set forth in 10 CFR 2.714(d), governing intervention generally:

(a) Weighing in favor of allowing intervention—

- (1) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (2) The nature and extent of the petitioner's property, financial, or other interest in the proceeding.
- (3) The possible effect of any order which may be entered in the proceeding on the petitioner's interest.

(b) Weighing against allowing intervention—

- (4) The availability of other means whereby petitioner's interest will be protected.
- (5) The extent to which the petitioner's interest will be represented by existing parties.
- (6) The extent to which petitioner's participation will inappropriately broaden or delay the proceeding."²¹

¹⁹Cf. *Jeffrey v. Southwestern Bell*, 518 F.2d 1129, 1132; *Commonwealth Edison Company v. Allis-Chalmers Manufacturing Company*, 315 F.2d 564, 567 (7th Cir. 1963).

²⁰*Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559 (1975) (*Wolf Creek I*).

²¹4 NRC at 616.

As the Commission summed it up, "[p]ermission to intervene should prove more readily available where petitioners show significant ability to contribute on substantial issues of law or fact which will not otherwise be properly raised or presented, set forth these matters with suitable specificity to allow evaluation, and demonstrate their importance and immediacy, justifying the time necessary to consider them." (*Id.* at 617.)

The Appeal Board has observed that in weighing the factors bearing upon discretionary intervention, "foremost among them is whether the petitioners 'participation would likely produce a valuable contribution. . . to our decisionmaking process.' Indeed. . . 'in the vast majority of instances the pivotal factor in determining whether to grant discretionary intervention will be that of the ability of the petitioner to make a valuable contribution to the development of a sound record on a safety or environmental issue which is raised by him and appears to be of enough importance to call for Board consideration.'" ²²

In this case, the record is bare as to any significant ability of the Petitioner to produce a valuable contribution to the decisionmaking process in an antitrust context. Ms. Drake is an intelligent and well-educated person who holds an accounting degree from Northwestern University and an M.S. degree from Michigan State University, and she has testified on utility rates in other cases. However, she does not profess to have any antitrust expertise, training, or experience. Neither does her colleague, Dr. Robert G. Asperger, who though not seeking to intervene was permitted to sit at counsel table with the Petitioner as her adviser and to address the Board. ²³ The pleadings filed by the Petitioner and her inability to brief or argue the various antitrust issues raised by the motions and replies of counsel for the Licensee and the Staff, sufficiently demonstrate her inability to handle *pro se* complex and protracted antitrust litigation. This is certainly understandable when we consider the antitrust law and practice is a specialty within the legal profession, and that neither Ms. Drake nor Dr. Asperger is a lawyer, and they do not purport to have any legal or antitrust training, experience, or background. As the Appeal Board stated in another context, "[t]here is nothing before us which might suggest that this petitioner is qualified by either specialized education or pertinent experience to make a substantial contribution on one or more of the contentions which she seeks to have litigated." ²⁴

²²*Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977). See also *Virginia Electric and Power Company* (North Anna Power Station, Units 1 and 2), ALAB-363, 4 NRC 631, 633 (1976); *Public Service Company of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-397, 5 NRC 1143, 1145 (1977).

²³Tr. 52-55, 134-36.

²⁴*Watts Bar*, *supra*, 5 NRC at 1422.

Inasmuch as neither the Attorney General nor the Staff has discerned any antitrust problems which would warrant a review under §105c, there would be no party or counsel to conduct protracted litigation other than the Petitioner *pro se*. Typically, such antitrust reviews under §105c have required substantial legal and expert resources necessary for evidentiary hearings covering many months, involving thousands of documents produced during discovery, hundreds of exhibits introduced into evidence, and up to 28,000 pages of transcripts of testimony.²⁵ Since no preclearing antitrust review will be required unless this intervention petition is allowed, before such extended litigation is thus triggered it should be reasonably clear that there are potential antitrust issues cognizable under §105c.

One of the prime purposes of the statute has been thus described by the Commission:

As stated in [*Louisiana Power and Light Company* (Waterford Steam Electric Generating Station, Unit 3), CLI-73-7, 6 AEC 48 (1973)(*Waterford I*)], the requirement in §105 for preclearing antitrust review reflects a basic Congressional concern over access to power produced by nuclear facilities. The Commission's antitrust responsibilities represent *inter alia* a Congressional recognition that the nuclear industry originated as a Government monopoly and is in great measure the product of public funds. It was the intent of Congress that the original public control should not be permitted to develop into a private monopoly via the AEC licensing process, and that access to nuclear facilities be as widespread as possible.²⁶

As a result, in most cases smaller utilities such as cooperatives and municipals seek access to nuclear facilities in order to have the benefits of large units generating baseload power and to share in the resulting economies of scale. However, the result sought by the Petitioner in this case is just the reverse. Rather than seeking access to the nuclear facilities by a smaller cooperative, she seeks to deny it such access. That result would stand on its head the intent and purpose of Congress in enacting the statute.

The only references in the petition to a situation allegedly inconsistent with the antitrust laws relate to contracts between Petitioner and Top

²⁵*Midland*, *supra*, 6 NRC at 898, *et seq.*; *Alabama Power Company* (Joseph M. Farley Nuclear Power Plant, Units 1 and 2), LBP-77-24, 5 NRC 804 (1977); *Toledo Edison Company* (Davis-Besse Nuclear Power Station, Units 1, 2, and 3), LBP-77-1, 5 NRC 133 (1977).

²⁶*Louisiana Power and Light Company* (Waterford Steam Electric Generating Station, Unit 3), CLI-73-25, 6 AEC 619, 620 (1973) (*Waterford II*). *Accord*, *Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559, 564-65 (1975) (*Wolf Creek I*); *Midland*, *supra*, 6 NRC at 1079-1085.

O'Michigan and between the latter and Northern Michigan, which "prohibit purchase of electricity from any other source and thereby violate anti-trust laws." In its *Midland* decision, *supra*, the Appeal Board identified (without comment) these very contracts between Northern Michigan as a generation and transmission cooperative and Top O'Michigan as one of the three distribution cooperatives which formed it. It was stated that the "member distribution cooperatives are bound by long-term contracts to obtain all their bulk power requirements from these two generation and transmission cooperatives." (6 NRC at 930, 939.) It was further noted that these cooperatives have financed construction of their electrical plants in part with low-interest loans under the Rural Electrification Act of 1936, 7 U.S.C. §901 (*id.* at 937-939).

In *Alabama Power Company v. Alabama Electric Cooperative, Inc.*, all-requirements electric power contracts between cooperatives were challenged as violative of the antitrust laws. The court held that such contracts were the result of valid Governmental action and hence not contrary to the anti-trust laws (§§1 and 2 of the Sherman Act and §3 of the Clayton Act, 15 U.S.C. §§1, 2, and 14). The court stated:

The REA Act, 7 U.S.C.A. §904, commits to the discretion of the Administrator the making of loans for rural electrification, including the adequacy of the security for such loans. . . . Further, it is settled that neither the Sherman Act nor the Clayton Act was intended to authorize restraint of Governmental action. . . . Thus in requiring AEC to obtain 35-year all-requirements contracts with its electric distribution cooperatives, the Administrator was doing nothing unusual, but was simply following customary and long-established REA practice, clearly not beyond the "outer perimeter" of his statutory authority to determine the security for the loan.²⁷

Section 2.714 of the Rules of Practice requires that a petition to intervene in a Commission proceeding set forth:

The interest of the petitioner in the proceeding; how that interest may be affected by the proceeding; the specific aspects of the subject matter of the proceeding as to which intervention is sought; and a petitioner's contentions with regard to each of those aspects.

In order for intervention to be granted, the Board designated to rule on the petitions to intervene must find that the petition and its contentions satisfy these requirements. *Mississippi Power and Light Company* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423 (1973); *Pacific Gas and*

²⁷*Alabama Power Company v. Alabama Electric Cooperative, Inc.*, 394 F.2d 672, 675-76 (5th Cir. 1968), *cert. denied*, 393 U.S. 488 (1968).

Electric Company (Stanislaus Nuclear Project, Unit 1), 5 NRC 1017, 1021-1025 (1977).

In addition, in determining whether a petition to intervene is sufficient to invoke antitrust jurisdiction, a petition to intervene must:

- (1) describe the situation allegedly inconsistent with the antitrust laws which is the basis for intervention;
- (2) describe how that situation conflicts with the policies underlying the Sherman Act, Clayton Act, or Federal Trade Commission Acts;
- (3) describe how the situation allegedly inconsistent with the antitrust laws would be created or maintained by activities under the license; and
- (4) identify the specific relief sought.²⁸

The instant petition wholly fails to set forth with particularity any viable §105c antitrust contentions as required by paragraphs (1)-(3), for the reasons discussed above. As for describing the specific relief sought, the petition is similarly deficient. A license need not be withheld where it is determined that a situation inconsistent with the antitrust laws would be created or maintained, but the Commission may place conditions on the license designed to correct the anticompetitive situation.²⁹ However, the petition fails to identify any specific relief sought or even to hint at any type of remedy which might be imposed if relief were warranted. This is contrary to the purpose of prelicensing antitrust review under §105c, and cannot be granted.

The petition for leave to intervene and request for an antitrust hearing filed by Martha G. Drake is denied.

In accordance with §2.714(a) of the Commission's Rules of Practice (10 CFR §2.714(a)), the foregoing Order may be appealed to the Atomic Safety and Licensing Appeal Board within five (5) days after service of the Order. The appeal shall be asserted by the filing of a notice of appeal and accompanying supporting brief. Any other party may file a brief in support of or in opposition to the appeal within five (5) days after service of the appeal. No other appeals from rulings on petitions and/or requests for hearing shall be allowed.

IT IS SO ORDERED.

²⁸*Kansas City Gas and Electric Company, et al.* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559 (1975) (*Wolf Creek I*); *Louisiana Power and Light Company* (Waterford Steam Generating Station, Unit 3), CLI-73-7, 6 AEC 48 (1973) (*Waterford I*); *Louisiana Power & Light Company* (Waterford Steam Generating Station, Unit 3), CLI-73-25, 6 AEC 619 (1973) (*Waterford II*); *Pacific Gas and Electric Company* (Stanislaus Nuclear Project, Unit 1), *supra*.

²⁹*Wolf Creek I, supra*, 1 NRC at 564.

**THE ATOMIC SAFETY AND LICENSING
BOARD DESIGNATED TO RULE ON
PETITIONS FOR LEAVE TO
INTERVENE**

Hugh K. Clark, Member

James R. Yore, Member

Marshall E. Miller, Chairman

**Dated at Bethesda, Maryland,
this 7th day of April 1978.**

Cite as 7 NRC 599 (1978)
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-78-14

ATOMIC SAFETY AND LICENSING BOARD

**Robert M. Lazo, Chairman
David R. Schink
Emmeth A. Luebke**

In the Matter of

**Docket Nos. STN 50-508
STN 50-509**

**WASHINGTON PUBLIC POWER
SUPPLY SYSTEM, et al.**

**(WPPSS Nuclear Project, Nos. 3
and 5)**

April 10, 1978

Upon consideration of radiological health and safety issues (as well as environmental material updating that considered in earlier partial initial decisions) in uncontested proceeding, the Licensing Board authorizes the Director of Nuclear Reactor Regulation to issue construction permits for WPPSS Nuclear Projects 3 and 5.

ATOMIC ENERGY ACT: SAFETY FINDINGS

The Commission may issue construction permits for nuclear power reactors in the face of ongoing generic reviews, leaving final design considerations for the time when operating licenses are issued for the reactors.

TECHNICAL ISSUES DISCUSSED: Seismic design criteria; capability of faults; 10 CFR Part 50, Appendix I; component cooling water system; fire protection measures; financial qualifications; Radon-222 releases.

Messrs. Joseph B. Knotts, Jr., and Nicholas S. Reynolds, Washington, D.C., and Mr. Richard Q. Quigley, Richland, Washington, for the Applicants, Washington Public Power Supply System

Messrs. Daniel T. Swanson and Henry J. McGurren
for the Nuclear Regulatory Commission Staff

INITIAL DECISION (Construction Permits)

I. INTRODUCTION

This Initial Decision concerns the application filed with the Commission¹ by the Washington Public Power Supply System (WPPSS), for itself and four investor-owned electric utilities (Applicants),² for construction permits for WPPSS Nuclear Projects, No. 3 and No. 5 (WNP-3 and WNP-5, respectively). Each of these two units is a pressurized water nuclear reactor which will be designed for operation at approximately 3,800 thermal megawatts with a net electrical output of approximately 1,240 megawatts. The facilities proposed would be located in Grays Harbor County, Washington, about 26 miles west of Olympia. In particular, this decision involves the Commission's review of the radiological health and safety considerations specified in the notices of hearing published in the Federal Register on August 23, 1974, (39 Fed. Reg. 30535) and on October 4, 1974 (39 Fed. Reg. 35835).

The general background of this proceeding is set forth in detail in the Partial Initial Decision Authorizing Limited Work Authorization issued by this Atomic Safety and Licensing Board (Board) on April 8, 1977 (*Washington Public Power Supply System* (WPPSS Nuclear Projects, Nos. 3 and 5), 5 NRC 964 (1977)). In that decision the Board held that the appropriate action to be taken is the issuance of construction permits for WNP-3 and WNP-5 subject to certain conditions for the protection of the environment and contingent upon the outcome of the radiological health and safety phase of the proceeding. That Partial Initial Decision is incorporated herein by reference.

¹The application was originally filed with the Atomic Energy Commission. Since the date of filing, the Atomic Energy Commission has been abolished, and its regulatory responsibilities have been transferred to the Nuclear Regulatory Commission in accordance with the Energy Reorganization Act of 1974, 42 U.S.C. 5801. All references in this decision to the "Commission" shall mean the Nuclear Regulatory Commission, unless otherwise stated.

²WNP-3 will be owned as tenants in common by WPPSS (70%), Pacific Power and Light Company (10%), Portland General Electric Company (10%), Puget Sound Power and Light Company (5%), and the Washington Water Power Company (5%). WNP-5 will be owned as tenants in common by WPPSS (90%) and Pacific Power and Light Company (10%). WPPSS as agent for the other co-owners will be responsible for the design, construction, and operation of WNP-3 and WNP-5.

Subsequent to the issuance of the Partial Initial Decision, and based upon the Board's favorable findings and determinations therein regarding environmental and site suitability matters, the Commission's Office of Nuclear Reactor Regulation by letter dated April 8, 1977, authorized the Applicants to conduct certain limited work activities at the site pursuant to 10 CFR §50.10(e)(1). Notice of the issuance of this limited work authorization (LWA) was published in the Federal Register (42 Fed. Reg. 20202) on April 18, 1977.

On May 3, 1977, the Board issued a notice of resumption of hearing in which it noted that the public evidentiary hearing would be resumed on May 24, 1977, to receive all evidence concerning radiological health and safety matters. The notice was published in the Federal Register (42 Fed. Reg. 23571) on May 9, 1977.

Upon the submission of affidavits by the Applicants and the Staff of the Nuclear Regulatory Commission (Staff), on May 10, 1977, the Board issued a Supplemental Partial Initial Decision Authorizing Issuance of a Limited Work Authorization Amendment³ in which it made favorable findings regarding certain additional activities at the site.⁴ By letter dated May 24, 1977, the Commission's Office of Nuclear Reactor Regulation amended the LWA for WNP-3 and WNP-5 to authorize these additional activities pursuant to 10 CFR §50.10(e)(1).

The evidentiary hearing on radiological health and safety issues was conducted by the Board on May 24-25, 1977, in Olympia, Washington. Both the Applicants and the Staff presented evidence at the hearing. By letter to the Board dated May 24, 1977, the Office of the Attorney General of the State of Washington as representative of the Washington Energy Facility Site Evaluation Council (EFSEC) notified the Board that active participation in this proceeding by EFSEC was unwarranted in view of the execution of a site certification agreement for WNP-3 and WNP-5 by WPPSS and the State of Washington and that EFSEC accordingly would remain a nominal party only.

Proposed findings of fact and conclusions of law were submitted to the Board by the Applicants on June 17, 1977, and by the Staff on July 1, 1977. However, in its letter transmitting its proposed findings to the Board, the Staff noted that it would require additional information from the Applicants regarding the matter of financial qualifications. On August 2, 1977, the Staff supplemented the evidentiary record and submitted supplemental proposed findings on the financial qualifications matter.

³5 NRC 1247 (1977).

⁴The Atomic Safety and Licensing Appeal Board issued a decision on May 26, 1977, in which it affirmed both decisions (ALAB-403, 5 NRC 1184 (1977)).

However, prior to submitting the material relating to financial qualifications on August 2, 1977, the Staff provided the Board by letter dated July 26, 1977, with the report of the United States Geological Survey (USGS) relating to USGS review of the geologic and seismologic data relevant to the Skagit nuclear facilities proposed by Puget Sound Power & Light Company (NRC Docket Nos. 50-522 and 50-523), to be located approximately 120 miles northeast of the WNP-3 and WNP-5 site. The Staff noted it had not completed its evaluation of the USGS report and that the Board would be kept advised by the Staff.

In addition, by memorandum and order dated August 1, 1977, the Board posed certain questions to the parties regarding the fire protection system design for WNP-3 and WNP-5 and called for responses thereto by August 17, 1977. The Applicants responded to the Board's inquiries on August 17, 1977 (Applicants' Exhibit 56). However, the Staff stated that the results of its reevaluation of the seismic aspects of the site might affect its evaluation of the fire protection system and that, consequently, it could not respond to the Board's inquiries at that time. In these circumstances, the Board postponed issuance of the Initial Decision.

The parties supplemented the evidentiary record over the ensuing 6 months regarding both seismology and fire protection. In addition, as is common when complex cases such as nuclear licensing cases are delayed, additional matters arose in the interim which required the submission of updated or supplemental evidence. Finally, on March 30, 1978, the evidentiary record was completed, and the Board proceeded to prepare and issue this Initial Decision.

The decisional record in this proceeding includes the transcripts from prehearing conferences held on November 19, 1974, and June 24, 1975, transcripts of 2 days of evidentiary hearings on environmental and site suitability matters held on June 24 and 25, 1975, and transcripts of evidentiary hearings on radiological health and safety matters held on May 24 and 25, 1977. The decisional record also includes the exhibits identified and received into evidence by the Board. A listing of exhibits is set forth in Appendix A to this Initial Decision.⁵ The documents received into evidence as exhibits either will be cited herein by exhibit number or will be referred to by abbreviations of the titles, such as PSAR, SER, and SER Supp. 1. The transcript will be cited as "Tr."

As the Board noted in its Partial Initial Decision, this proceeding is not a contested proceeding as defined in 10 CFR §2.4(n) since no inter-

⁵The parties have filed several motions since hearings ended requesting that various evidentiary material be received into evidence. These motions are hereby granted, and this documentary evidence also is set forth in Appendix A hereto.

vention petitions were granted and since there are no contentions in issue between the NRC Staff and the Applicants, the only parties to the proceeding. To fulfill its responsibilities in this uncontested proceeding, the Board has made both findings of fact relating to the radiological health and safety issues specified in the notice of hearing and appropriate conclusions of law, as set out below, along with our order ruling on the matter of issuance of construction permits for WNP-3 and WNP-5.

In making the following findings and conclusions, the Board reviewed and considered the entire record of the proceeding and all of the proposed findings of fact and conclusions of law submitted by the parties. All such proposed findings of fact and conclusions of law which are not incorporated directly or inferentially in this Initial Decision are hereby rejected as being unsupported in law or in fact, or as being unnecessary to the rendering of this Initial Decision.

II. FINDINGS OF FACT ON RADIOLOGICAL HEALTH AND SAFETY MATTERS

1. The Initial Decision which we issue today involves a review of the radiological health and safety considerations specified in the August 23, 1974, "Notice of Hearing on Application for Construction Permits."

2. The application and Preliminary Safety Analysis Report (PSAR),⁶ as amended, contain technical information relative to radiological health and safety matters. This information contains a description of the plant design, including the general design criteria by which compliance with Appendix A of 10 CFR Part 50 would be achieved; an analysis of the safety-related structures, systems, and components; an analysis of postulated accidents and the engineered safety features provided to limit their potential effect; a summary of the WPPSS's quality assurance program; the technical qualifications of WPPSS; the financial qualifications of each participant in the WNP-3 and WNP-5 project; and considerations relating to the common defense and security of the United States. The Board finds that the application, consisting of the formal application and PSAR with amendments, properly describes the facility in accordance with the Commission's regulations and the notice of hearing.

3. The Staff reviewed this material and, in February 1976, issued its Safety Evaluation Report (SER) related to construction of WNP-3 and

⁶The PSAR (with Amendments 1 through 17 thereto) was received into evidence as Applicants' Exhibit 1 at the hearing held on June 24, 1975. Subsequently, Amendments 18 through 41 were received into evidence in the order and with exhibit designations set forth in the List of Exhibits which is attached to this Initial Decision as Appendix A.

WNP-5. Thereafter, the SER was supplemented by the Staff's Supplement Nos. 1-3. In the SER and the supplements thereto, the Staff analyzed and evaluated the distribution of population and land use near the site and evaluated physical characteristics of the site including seismology, geology, hydrology, and meteorology. The Staff analyzed and evaluated the design, fabrication, construction, testing, and expected performance of the plant structures, systems, and components important to safety and analyzed and evaluated the response of these facilities to various operating transients and to a spectrum of postulated accidents, including design basis accidents. The Staff also analyzed and evaluated the Applicants' plans for the conduct of plant operations; plans for actions to be taken in the event of an accident which might affect the general public; Applicants' organizational structure; the technical qualifications of operating and technical support personnel; and measures to be taken for industrial security. The SER and supplements thereto also contain an analysis and evaluation of the design of the several systems provided for control of radioactive effluents from the plant and evaluation of financial qualifications of the Applicants to design and construct the facilities.

4. Independent of Staff action, the Advisory Committee on Reactor Safeguards (ACRS) reviewed the PSAR in accordance with the directive of the Atomic Energy Act, as amended, 42 U.S.C. §2232. As a result of this review, the ACRS concluded in its letter to Chairman Rowden dated April 16, 1976, that, subject to the resolution of certain items, "the Washington Public Power Supply System Nuclear Projects, No. 3 and No. 5, can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public" (Staff Exh. 16, Appendix B, p. 3).

5. This Board finds that the Applicants have provided sufficient information relative to the radiological health and safety of the proposed facility and that the Staff's consideration, review, and evaluation of that information has been satisfactorily performed.

A. The Plant Site

6. This Board has made detailed findings of fact describing and evaluating the WNP-3 and WNP-5 site in its Partial Initial Decision. The facilities are to be located on a 2,450-acre site in southeastern Grays Harbor County, Washington, 1 mile southeast of the confluence of the Satsop and Chehalis Rivers, and approximately 26 miles west-southwest of Olympia, Washington. The exclusion area is approximately circular in shape with a minimum boundary distance of 4,300 feet (1,310 meters)

measured approximately from the center of either reactor building. The Applicants currently own all portions of the exclusion area required for plant construction activities. Further, the Applicants have obtained by easement the authority to determine all activities within the exclusion area, including exclusion or removal of personnel and property, with the exception of two parcels. Negotiations are ongoing between the Applicants and the owners of these parcels for easements similar to those obtained by the Applicants from other landowners in the exclusion area. In the event that these negotiations are not successful, the Applicants will either purchase this land outright or institute condemnation proceedings.⁷ Finally, the Applicants have purchased the mineral rights on all lands which they have acquired in fee.

7. The exclusion area will not be traversed by any public waterways or railroads. A Grays Harbor County road, an extension of Keyes Road, will provide vehicular access to the exclusion area. A Bonneville Power Administration (BPA) transmission corridor also crosses the exclusion area.⁸ The Staff concluded that these routes are not so close to the proposed facilities as to interfere with their normal operation and that appropriate arrangements can be made, as provided in 10 CFR §100.3(a), so that no significant hazards to the public health and safety will result from use of these routes.

8. Based upon the foregoing, the Board reaffirms its finding in the Partial Initial Decision that there is reasonable assurance that the Applicants can comply with the requirements of 10 CFR Part 100, including the control requirement in 10 CFR §100.3(a).

9. In the Partial Initial Decision issued on April 8, 1977, the Board concluded on the basis of its analysis and evaluation that the proposed site for WNP-3 and WNP-5 is a suitable location for two nuclear power reactors of the general type and size proposed from the standpoint of radiological health and safety considerations under the Atomic Energy Act of 1954, as amended, and the rules and regulations of the Commission. This site suitability determination included favorable findings regarding geological and seismological aspects of the site.

10. The proposed WNP-3 and WNP-5 site is located in the Pacific Border Physiographic Province of Washington State. Specifically, the site lies on a ridge at the northern edge of the Willapa Hills in the Chehalis Lowlands which comprise a physiographic zone separating the northern

⁷The Applicants have the authority to condemn this land pursuant to R.C.W. §43.52.391. See Applicants' Exhibit 16.

⁸U.S. NRC Report on the Site Suitability of the Proposed WPPSS Nuclear Projects, No. 3 and No. 5, following Tr. 189 (hereinafter referred to as Staff Report), p. 5.

termination of the Oregon Coast Range from the Olympic Mountains.

11. Surface and subsurface investigations by the Applicants included geological mapping, drilling, trenching, geophysical surveys, remote sensing techniques, aerial photography, comprehensive literature search, as well as extensive laboratory and field testing. The site and its environs are largely underlain by Cenozoic strata. Lithologically, these Cenozoic strata consist predominately of marine clastic sediments deposited on a basement of Eocene oceanic basalts.

12. Tectonic activities in this region before the Cenozoic era were quite complex, and activity has continued through the Cenozoic (Tertiary plus Quaternary). During the Tertiary, several orogenic periods caused folding and faulting of the older rocks and general uplift of the region. The structural features formed by these orogenies were subsequently eroded during the Quaternary to produce the present topography. The last major deformation in this region appears to have ended in the late Tertiary (Pliocene). However, evidence from the Quaternary (Pleistocene) deposits in the coastal areas west of the site, plus the fact that faulting in the Puget Sound area has been dated at 1,100 years before present, and the fact that three stratovolcanoes in the central part of the State remain active today, all indicate that some tectonism has continued through the Pleistocene and into the present.

13. Numerous faults of a generally northwest or northeast trend occur throughout the basaltic rocks of the region. Some of these faults displace Tertiary strata in the region. Several significant faults (some with several thousand feet of displacement) in the site area can be associated by various means with deformations no younger in age than late Tertiary, and thus they are not capable faults within the meaning of Appendix A to 10 CFR Part 100.

14. At the hearings held on May 24-25, 1977, the Board examined the expert witnesses of the Applicants and Staff to confirm the previous findings on seismology. The Staff's witnesses summarized the major considerations involved in the Staff's assessment of the safe shutdown earthquake (SSE) as defined in 10 CFR Part 100, Appendix A, and the seismic design basis ground motion for the WNP-3 and WNP-5 site, *viz.*, earthquake sources, the size of a maximum earthquake which could reasonably be expected to occur, and the ground motion which the maximum earthquake would produce at the site. Probable earthquake sources are determined from seismic records and other geologic and geophysical evidence.

15. The greatest concentration of earthquake activity within the site region is in the Puget Trough which, at its closest approach, is approximately 22-25 miles away from the site. This earthquake activity is

outside the tectonic province in which the site is located. The largest historic earthquakes in the region occurred in 1872, 1949, and 1965 and reached intensity VIII(MM). The latter two earthquakes occurred north-east of Olympia (37 miles from the site) in 1949 and between Seattle and Tacoma (58 miles from the site) in 1965 and reached intensity VIII(MM).

16. The Applicants and the Staff investigated the earthquake which occurred on December 14, 1872, in the North Cascades; this was possibly the largest recorded earthquake in the Pacific Northwest (Staff Exh. 1, §2.4.2 and Staff Exh. 12). This investigation resulted in Amendment 37 to the PSAR (App. Exh. 36) and the report of an expert review panel established by several Pacific Northwest utilities.

17. The Staff by letter dated July 26, 1977, transmitted to the Board a copy of a report prepared by the USGS on the status of review of the geologic and seismologic data relevant to the Skagit nuclear facility. The Staff stated that the report contained new information regarding the 1872 earthquake, and that in light of this new information, the Staff would reanalyze its assessment of the 1872 earthquake. Thereafter, on November 8, 1977, the Staff and Applicants met to discuss, *inter alia*, the impact of the USGS report on the Staff's and Applicant's determination of the maximum intensity of the 1872 earthquake. On December 2, 1977, the Applicants submitted to the Board additional evidence on the 1872 earthquake which demonstrated that the epicentral location of the 1872 earthquake is within a broad area of the North Cascade-Okanogan region, that the maximum intensity of the earthquake was VIII(MM), and that an earthquake of this type at the proposed site of WNP-3 and WNP-5 is highly unlikely. The 1872 earthquake originated in the North American Plate whereas the proposed site is on a remnant of the Oceanic plate (Applicants' Exh. 57).

18. Since the May 24 and 25, 1977, hearing, the Board has reviewed affidavits by David Tillson (App. Exh. 57) and John Kelleher (Staff Exh. 23) addressing, respectively, the Applicants' and the Staff's review of information more recently obtained regarding the 1872 earthquake. The Board agrees with the Staff conclusion that the 1872 earthquake should not be the controlling event in determining the seismic design for WNP-3 and WNP-5. Even assuming that an 1872-type earthquake with a magnitude of 7.5 were to occur on a capable structure within the region of the proposed WNP-3 and WNP-5 site, the conservative seismic design of these plants would remain adequate.

19. Witnesses for the Applicants reported the Olympic lineament to be the structure capable of producing the highest ground motions at the site. Applicants surveyed the published geological and geophysical information and undertook substantial mapping in an effort to identify structures

which might be capable. These produced a considerable amount of information, but nothing to indicate the presence of any structure comparable to the Olympic lineament in its capability to produce the strongest ground accelerations at the site. The largest recorded earthquake affecting the WNP-3 and WNP-5 site occurred in 1949 northeast of Olympia (37 miles from the site). In the epicentral area, this earthquake reached intensity VIII (MM) and had a magnitude of 7.1. The maximum acceleration induced at the site due to this earthquake is estimated to have been 0.11g.

20. The Staff confirmed that the Olympic lineament represents the largest potentially capable structure in the site region. The Staff based its conservative estimate of magnitude 7.5 for the maximum earthquake on the Olympic lineament upon considerations of historic seismicity in the Puget Sound region and upon experience in similar tectonic regions in other parts of the world.

21. To establish the safe shutdown earthquake, the Applicants made use of complex seismological considerations that required a determination of the relationship between earthquake source dimension and magnitude and the use of appropriate acceleration attenuation relations. It was further assumed that the major gravity lineaments in the southern Puget Sound are caused by major deep-seated faults, which are capable within the meaning of 10 CFR Part 100, Appendix A. This final assumption has subsequently been confirmed in the case of the Olympic lineament (see the Skagit Nuclear Power Project PSAR, Docket Nos. 50-522 and 50-523) by use of seismic reflection data. In the case of fault length versus earthquake magnitude, the Staff considered the Applicants' assumptions to be conservative with respect to the available data, also, with respect to historical experience in the Puget Sound area. Forecasting ground motion at the site, due to an earthquake approximately 22-25 miles from the site, involves computation of ground motion attenuation with distance for different earthquake magnitudes. With respect to attenuation, the Applicants made a thorough analysis of both the theoretical results and the available observational data. The analysis included the available data from deeper earthquakes in Japan and Peru, in addition to that from the 1949 and 1965 earthquakes in the southern Puget Sound. The Applicants' results conservatively represent the available data.

22. The SSE for the WNP-3 and WNP-5 site is the earthquake which occurred in 1949 northeast of Olympia (37 miles from the site) which reached intensity VIII (MM). Normally the Staff accepts a design basis ground motion value of 0.25g combined with a Regulatory Guide 1.60 spectrum as appropriate for a SSE of intensity VIII(MM). The design basis ground motion value for WNP-3 and WNP-5 is 0.32g, which is con-

servative relative to NRC regulatory requirements. Thus, the Staff concluded that the design basis ground motion value (0.32g) incorporated into the design for WNP-3 and WNP-5 is acceptable. The Staff established the maximum acceleration associated with the operational basis earthquake as 0.16g.

23. On the basis of the foregoing and the entire record in this proceeding, the Board concluded that acceleration of 0.32g represents an acceptable design basis value for ground motion during the safe shutdown earthquake and that 0.16g represents an acceptable design basis for accelerations which may occur during the operation of the plant.

24. On October 20, 1977, the NRC Staff notified the Board that the Applicants had discovered three distinct faults during the excavation of WNP-3. The Staff also notified the ACRS and the Washington State Department of Natural Resources of the features and that the Staff had scheduled a site visit. Following the site visit by the Staff and ACRS consultants, the Applicants and their consultants conducted further investigations relating to the geological characteristics of the proposed site, and provided additional evidence on the features uncovered in the WNP-3 excavation (Applicants' Exhibits 58 and 59). Based upon its evaluation of this evidence, the Applicants determined (1) that the faults were formed and moved during a period of late Tertiary deformation and that this deformation ceased by the early Pleistocene time; (2) that the area in and around the faults has been tectonically stable since early Pleistocene time; (3) that individual faults within the area underlie, but do not deform, early Pleistocene deposits; and (4) that the faults have not moved during Holocene or Pleistocene time. These findings are consistent with the conclusions reached previously in the WNP-3 and WNP-5 PSAR. Thus, the Applicants concluded that the features uncovered in the WNP-3 excavation are not capable within the meaning of Appendix A, 10 CFR Part 100.

25. The Staff, after examining the uncovered geologic features and the Applicants' findings, concluded that faults in two of the areas were not capable faults within the meaning of Appendix A to 10 CFR Part 100, but that further confirmatory investigations were necessary to assure the Staff that faults in the third area, the Helm Creek deposits, were of landslide origin (Staff Exh. 24).

26. By letter dated January 11, 1978, the Applicants advised the Board of the discovery (as anticipated) in the area of the WNP-5 excavation of features apparently similar to the features discovered during the excavation of WNP-3.⁹ Thereafter, the Applicants provided additional evidence

⁹Excavation activities for WNP-5 have not yet commenced.

(Applicants' Exhibits 61, 62, and 64) that the features identified at WNP-3 and the similar features identified in the site vicinity, including the immediate area of the WNP-5 excavation, have not been active since the late Tertiary deformation of the region. The Applicants therefore concluded that the faults are not capable of producing vibratory ground motion or differential ground displacement within the meaning of Appendix A, 10 CFR Part 100. The Staff investigated the new faulting and, based on this investigation and its independent review of the Applicants' reports, concluded that the newly discovered faults, as well as the Helm Creek features, were not capable faults within the meaning of Appendix A, 10 CFR Part 100 (Staff Exh. 27).

27. Both parties anticipate that additional faults and features which are part of the same local geological system will be identified as excavation and site preparation activities continue and as new rock exposures become available during these activities (Applicants' Exh. 61; Staff Exh. 24). The Applicants have committed to submit periodic reports to the Staff as new data in this regard becomes available (Applicants' Exh. 61). The Board approves of this commitment.

28. The Board concludes that there is reasonable assurance that the features uncovered during the excavation of the WNP-3 site and in the area of the proposed excavation site for WNP-5 are not capable faults within the meaning of 10 CFR Part 100, Appendix A.

29. The geological conditions of the proposed WNP-3 and WNP-5 site and its surrounding environs are complex and the area still has some tectonic activity, but no known geological features in the immediate vicinity of the site would localize earthquakes in the power block area; no known foundation hazards at the proposed WNP-3 and WNP-5 site or immediate vicinity present a risk to the proposed facilities; and no known seismological considerations preclude the acceptability of this site for these nuclear power reactors.

30. On the basis of our detailed site-related findings (Partial Initial Decision, 5 NRC 1001-1011), as supplemented by the evidence now presented to us, and with particular regard to the criteria set forth in 10 CFR Part 100 concerning population and land use, and concerning the physical characteristics of the site, including seismology, meteorology, geology, and hydrology, the Board finds that the site proposed for WNP-3 and WNP-5 is a suitable location for the facility from the standpoint of radiological health and safety considerations under the Atomic Energy Act of 1954, as amended, and the rules and regulations promulgated by the Commission pursuant thereto.

B. Design of the Plant

31. Applicants, in their PSAR, have described in detail the proposed design of WNP-3 and WNP-5. Both units incorporate nuclear system supply systems consisting of pressurized water reactors supplied by Combustion Engineering Incorporated (CE) and designated as their System 80 design. On September 17, 1973, CE filed with the Atomic Energy Commission a proposed preliminary reference system design for System 80. A standard safety analysis report entitled "Combustion Engineering Standard Safety Analysis Report" (CESSAR) was also supplemented through December 31, 1975, with 44 amendments. On that date the NRC Staff issued a Safety Evaluation Report (SER) which summarized the results of the Staff's technical evaluation of the System 80 design and which delineated the scope of the technical matters considered in evaluating the radiological safety aspects of the System 80 design. Based upon its evaluation of CESSAR, the Staff concluded that the System 80 design can be incorporated by reference in applications for construction permits and can be constructed without endangering the health and safety of the public.¹⁰ The SER for the System 80 design is attached as Exhibit E to the WNP-3 and WNP-5 SER (Staff Exh. 15).

32. WNP-3 and WNP-5 each will be designed for a core power level of approximately 3,800 megawatts thermal and a net electrical output of 1,240 megawatts electric. Water will serve as both moderator and coolant and will be circulated through each reactor vessel and core by four reactor coolant pumps. Each reactor has 241 fuel assemblies in its core with a 16 x 16 fuel rod array. Fuel pellets of 95% dense uranium dioxide will be sealed in Zircaloy-4 tubing and pressurized with helium to form the fuel rods. Neutron absorber rods (boron carbide) will be provided in place of fuel rods at selected locations in the fuel assemblies. Each fuel assembly will be fitted to allow replacement of individual fuel rods.

33. Each reactor will be housed in a steel containment vessel surrounded by a seismic Category I reinforced concrete shield building. The vessel and shield building will be separated by an annular air space. The containment will house the reactor, steam generators, reactor coolant pumps, pressurizer, and certain components of the engineered safety feature systems for the facilities. It will be designed for an internal pressure of 44 pounds per square inch gauge (psig), or about 12% above the

¹⁰We note that the CE System 80 design was utilized in the Palo Verde Nuclear Generating Station, for which construction permits were authorized in *Arizona Public Service Company* (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), 3 NRC 662 (May 24, 1976), *aff'd.*, ALAB-336, 4 NRC 3 (July 1, 1976).

peak pressure expected for the most severe design basis accident and will be designed to withstand a temperature of 257° F. The Staff has concluded that the containment design pressure is adequate and that the containment will be designed to assure that a design basis accident will not result in doses in excess of the guidelines set forth in 10 CFR Part 100.

34. A reactor auxiliary building encompassing each reactor building houses the emergency core cooling systems and auxiliary systems equipment, the standby diesel generator, the control room, the computer facility, the access control area, fuel-handling and storage area, and radioactive waste treatment equipment. Other major structures include the turbine building, the dry cooling towers (the ultimate heat sink), and the plant warehouses and support facilities. The steam and power conversion system for each unit will be designed to remove heat energy from the nuclear steam supply and convert it into electrical energy by means of a steam turbine generator. Waste heat rejected to turbine condensers will be discharged from the closed-cycle circulating water system to the atmosphere through natural-draft evaporative cooling towers.

35. WNP-3 and WNP-5 will have a number of engineered safety features designed for limiting the consequences of postulated accidents. The principal engineered safety features include the emergency core cooling systems, the reactor containment systems (including the containment heat removal system), the control room filtration systems, the ultimate heat sinks, the hydrogen control system, and the redundant onsite power systems. These systems and components will be designed to be capable of assuring safe shutdown of the reactor under the adverse conditions of the various design basis accidents. They will be designed to seismic Category I requirements and must function even with complete loss of offsite power. Redundant engineered safety feature components and systems will be provided so that a single failure of any of these components or systems will not result in loss of the capability to achieve safe shutdown of the reactor. These design requirements are in accordance with the General Design Criteria, 10 CFR Part 50, Appendix A.

36. While no new research and development programs are necessary to support issuance of construction permits for WNP-3 and WNP-5, the Applicants have identified the research and development programs necessary to demonstrate the safety of the System 80 design. Section 1.5 of CESSAR describes test programs which Combustion Engineering Incorporated will conduct for this purpose. Among the test programs to be conducted by CE are programs intended to verify the suitability of the 16 x 16 fuel assembly design and to confirm the design margins of the nuclear steam supply system. Principal elements of the CE research and develop-

ment programs are an upper guide structure and control element assembly buffer test, components proof test, spacer grid test, fuel assembly static and dynamic tests, reactor flow model test, departure from nucleate boiling improvement test, and an incore flow mixing test. Additional test programs involve a fuel densification test, loss-of-coolant accident refill test, blowdown heat transfer test, verification of reflood heat transfer coefficients, verification of assumed iodine partition factors, development of a realistic and conservative model for the iodine spiking phenomenon, verification models used to predict transient and accident loads on the steam generator, and demonstration of performance of the proposed core protection calculator system software and hardware. In addition, the Staff's generic evaluation of anticipated transients without scram is not yet completed. The Staff has evaluated all requirements to complete the safety analysis and concluded there is reasonable assurance that they will be resolved and the final design will be acceptable (SER App. E, §§1.4, 1.6).

37. The Advisory Committee on Reactor Safeguards has also concluded that items left to be accomplished can be resolved during construction and when resolved will allow WNP-3 and WNP-5 to be operated without undue risk to health and safety of the public (Staff Exh. 16, App. B).

38. The Board finds that the Staff has made an adequate analysis of the research and development requirements that remain to be done prior to the operation of the WNP-3 and WNP-5 facilities, and the Applicants have identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions in accordance with 10 CFR §50.35 (a)(3).

39. WNP-3 and WNP-5 will each have its own completely independent radioactive waste management system designed to provide for controlled handling and treatment of liquid, gaseous, and solid wastes. Each liquid waste system will process wastes from equipment and floor drains, decontamination and laboratory wastes, and laundry and shower wastes. Each gaseous waste system will provide holdup capacity to decay short-lived noble gases that are stripped from the primary coolant and will treat ventilation exhausts by passage through high efficiency particulate air filters and charcoal absorbers. These waste treatment systems will be designed to reduce releases of radioactive materials in effluents to levels as low as practicable in accordance with Section 50.34 and 10 CFR Part 50. Each solid waste system will provide for the solidification, packaging, and storage of radioactive wastes generated during facility operation prior to shipment offsite for burial. Solid packaged wastes will be shipped to a licensed facility for burial (SER, p. 11-1).

40. The Staff, in its evaluation of the liquid and gaseous rad-waste systems, considered (1) the capability of the systems to keep radioactivity in effluents at a level "as low as practicable," based on expected rad-waste inputs over the life of the plant; (2) the capability of the systems to maintain releases below the limits in 10 CFR Part 20, Appendix B, Table 11, Columns 1 and 2, during periods of fission product leakage at design levels from the fuel; (3) the capability of the systems to meet the processing demands of the station during anticipated operational occurrences; (4) the quality group and seismic design classification applied to the system design; (5) the design features that will be incorporated to control the releases of radioactive materials in accordance with Criterion 60 of the General Design Criteria; and (6) the potential for gaseous release due to hydrogen explosions in the gaseous rad-waste system.

41. In its evaluation of the solid rad-waste treatment systems, the Staff considered (1) system design objectives in terms of expected types, volumes, and activities of waste processed for offsite shipment; (2) waste packaging and conformance to applicable Federal packaging regulations, and provisions for controlling potentially radioactive airborne dusts during baling operations; and (3) provisions for onsite storage prior to shipping.

42. In its evaluation of the process and effluent radiological monitoring and sampling systems, the Staff considered the system's capability (1) to monitor all normal and potential pathways for release of radioactive materials to the environment; (2) to control the release of radioactive materials to the environment; and (3) to monitor the performance of process equipment and detect radioactive leakage between systems.

43. In the Final Environmental Statement for WNP-3 and WNP-5, issued June 1975 (Staff Exh. 1), the Staff performed an evaluation to determine the quantities and activities of material that will be released in liquid and gaseous waste, or shipped offsite as solid waste for burial. In that evaluation, the Staff considered waste flows, waste activities, and equipment operating performance, including anticipated operational occurrences, that are consistent with an assumed 30 years of normal operation. The liquid and gaseous source terms listed in Tables 3.4 and 3.5 of the Final Environmental Statement (FES) were calculated using the PWR-GALE code described in the section, "Calculation of Releases of Radioactive Materials in Liquid and Gaseous Effluents from Pressurized Water Reactors (PWR's)" from the "Attachment to Concluding Statement of the Position of the Regulatory Staff," Docket No. RM-50-2, February 20, 1974. The principal parameters used in these calculations, along with their bases, are given in Appendix B to that section.

44. Based on its evaluation, the Staff found the proposed liquid, gaseous, and solid rad-waste systems and associated process and effluent

radiological monitoring and sampling systems to be acceptable. The Board concurs.

45. On April 30, 1975, the Commission adopted Appendix I to 10 CFR Part 50, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Reasonably Achievable for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor-Effluents' " To implement the requirements of Appendix I, the Staff reassessed the parameters and mathematical models used in calculating releases of radioactive materials in liquid and gaseous effluents in order to comply with the Commission's guidance. This guidance directed that current operating data, applicable to proposed rad-waste treatment and effluent control systems for a facility, be considered in the assessment of the input parameters. The input parameters, models, and their bases are given in Regulatory Guide 1.BB, "Calculation of Releases of Radioactive Materials in Liquid and Gaseous Effluents from Pressurized Water Reactors (PWR's)," September 9, 1975. (Also see Regulatory Guide 1.112, April 1976.)

46. By letter from Daniel R. Muller to J. J. Stein, dated September 12, 1975, the Staff requested the Applicants to submit additional information on how the Applicants proposed to keep radioactive materials in effluents to unrestricted areas from WNP-3 and WNP-5 at levels "as low as reasonably achievable" in accordance with Appendix I guidelines. In a letter dated October 17, 1975, the Applicants chose to perform the cost-benefit analysis required by Section II.D of Appendix I to 10 CFR Part 50.

47. The Staff performed an independent evaluation of the Applicants' proposed methods to meet the requirements of Appendix I as documented in Supplement 6 to the Environmental Report (Applicants' Exh. 26). This evaluation consisted of (1) a review of the information provided by the Applicants in response to the letter of September 12, 1975; (2) a review of the Applicants' proposed rad-waste treatment and effluent control systems as described in the PSAR as amended through Amendment 27 and in the Environmental Report as amended through Amendment 5; (3) the calculation of new source terms based on models and parameters as given in Regulatory Guide 1.BB; and (4) the calculation of the cost-benefit of potential rad-waste treatment augments, using doses based on the source terms calculated in (3) above and guidance as given in Regulatory Guide 1.110, "Cost-Benefit Analysis for Rad-Waste Systems for Light-Water-Cooled Nuclear Power Reactors" (March 1976).

48. The individual and population doses were calculated using the guidance in Regulatory Guide 1.109, "Calculation of Annual Average Doses to Man from Routine Releases of Reactor Effluents for the

Purpose of Evaluating compliance with 10 CFR Part 50, Appendix I" (March 1976). Meteorologic and hydrologic factors in the dose calculations were determined using the guidance in Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents from Routine Releases from Light-Water-Cooled Reactors" (March 1976), and in Regulatory Guide 1.EE, "Analytical Models for Estimating Radioisotope Concentration in Different Water Bodies" (September 1975). (Also see Regulatory Guide 1.113, Revision 1, April 1977.)

49. The Staff determined the quantities of radioactive materials that will be released in the liquid and gaseous effluent streams during normal operation including anticipated operational occurrences. In its evaluation, the Staff determined that for each reactor on the WNP-3 and WNP-5 site (1) the release of all radioactive materials above background in liquid effluents will not result in an annual dose or dose commitment to any individual in an unrestricted area from all pathways of exposure in excess of 3 millirems to the total body and 10 millirems to any organ; (2) the release of all radioactive materials above background in gaseous effluents will not result in an estimated annual dose at any location near ground level which could be occupied by individuals in unrestricted areas in excess of 10 millirads for gamma radiation or 20 millirads for beta radiation; and (3) the release of all radioactive iodine and radioactive material in particulate form above background will not result in an annual dose or dose commitment to any individual in an unrestricted area from all pathways of exposure in excess of 15 millirems to any organ.

50. For the cost-benefit analyses, the Staff considered the potential effectiveness of augmenting the proposed liquid and gaseous rad-waste treatment systems using items of reasonably demonstrated technology. The Staff further considered whether additional augmentation would effectively reduce the cumulative population dose reasonably expected within a 50-mile radius of the reactors.

51. The Staff evaluated the potential rad-waste system augments based (1) on a study of the design of the Applicants' systems; (2) on the dose information provided in Tables 11.4 and 11.5 of Staff Exhibit 16, on the basis of an interim value of \$1,000 per man-rem to the total body and \$1,000 per man-rem to the thyroid for reductions in dose by the application of augments; and (3) on the cost of potential rad-waste system augments as presented in Regulatory Guide 1.110.

52. For the 20 augments evaluated, the Staff found that the total annual cost for each augment exceeded the \$1,000 per man-rem to the total body or \$1,000 per man-rem to the thyroid cost-benefit ratio. The

Staff concluded, therefore, that there were no cost-effective augments to reduce the cumulative population dose at a favorable cost-benefit ratio.

53. Based on its evaluation, the Staff concluded that, without augments, the liquid and gaseous rad-waste treatment systems described in the PSAR are capable of reducing releases of radioactive materials in liquid and gaseous effluents to levels "as low as reasonably achievable" in conformance with 10 CFR Section 50.34a. The systems described meet the requirements of Appendix I to CFR Part 50 and are therefore acceptable. The Board agrees with this analysis.

54. The Board asked that the parties address the component cooling water system and the proposed design basis for continuous cooling during operation. Both the Applicants (Sorenson, Raney, and Goldberg, Tr. 638) and the Staff (Bournia following Tr. 659) offered testimony and were examined by the Board. The Board is satisfied with the Staff's and Applicants' responses.

55. The component cooling water system (CCWS) is designed to remove heat from reactor auxiliary systems during normal, abnormal, and accident plant conditions. The CCWS also is designed to remove reactor decay heat from reactor auxiliary systems following normal and emergency shutdown. This heat is ultimately dissipated to the atmosphere through the dry cooling towers (the ultimate heat sink) and, if necessary, to the plant service water system via the component cooling water system heat exchangers. The CCWS for each reactor will consist of two independent and redundant cooling trains, both of which will incorporate two 50% capacity pumps, a heat exchanger, a 100% capacity dry cooling tower, and a surge tank. Each cooling train will be capable of providing the required cooling for safe shutdown of the reactor following a loss-of-coolant accident. A seismic Category I makeup water supply will be connected to both cooling trains. All other safety-related components of the CCWS also will be designed and installed to meet seismic Category I requirements. Upon the loss of offsite power, each cooling train will be switched automatically to independent diesel generators.

56. The design of the CCWS is not actually within the scope of CESSAR. Rather, certain interface specifications for the design which are set forth in CESSAR provide one method of meeting the design bases and regulatory requirements (including General Design Criteria 34, 10 CFR Part 50, Appendix A) for the residual heat removal system. The Applicants have proposed a modified balance-of-plant design which is capable of bringing the reactor to a cold shutdown condition within a reasonable period of time following shutdown, assuming the most limiting single failure. The proposed design also is capable of accomplishing necessary

long-term recirculation cooling. For normal cooldown the removal of the reactor core energy will be accomplished in two distinct phases. The first phase will be to bring the reactor coolant temperature to 350° F and pressure to 400 psi absolute by utilizing the main condenser through the main steam turbine bypass or, if the turbine condenser is not available, by utilizing the auxiliary feedwater system and the atmospheric steam dump valves. The second phase will be to bring the reactor coolant temperature from 350° F to approximately 200° F by utilizing the shutdown cooling system in conjunction with the CCWS. The largest heat load on the CCWS will be imposed by the shutdown heat exchangers in the shutdown cooling system. The shutdown heat exchangers are part of the CESSAR scope and as such involve interfaces with the balance-of-plant design. These interface specifications for the shutdown cooling heat exchangers specify a tube side (primary coolant) flow of 5,000 gallons per minute and a shell side (component cooling water) flow of 11,000 gallons per minute at a maximum inlet temperature of 120° F. The Applicants' design provides for the operation of these units with the same tube side flow and with a shell side flow of 3,500 gallons per minute at 95° F inlet temperature for normal shutdown with both trains in service. For an emergency shutdown and for conditions which involve sump water cooling after a loss-of-coolant accident, the design allows increases in the shell side flow to 6,000 gallons per minute by removing nonessential services.

57. The Applicants attained the objectives of reactor shutdown by making two design modifications. First, the Applicants proposed to install smaller capacity atmospheric steam dump valves than those specified by the CESSAR interface and to increase the condensate storage tank capacity from 250,000 gallons (specified by CESSAR) to 350,000 gallons. As a result of these changes, the duration of the first phase of the cooldown will be prolonged from the 3.5 hours achievable by the CESSAR system to 9.5 hours in the Applicants' design. Since the total energy required to be removed is the same, the Applicants increased the heat dissipation in the first phase and designed the shutdown cooling system (second phase) to dissipate heat loss. The second design modification involves decreasing the maximum inlet temperature of the component cooling water system into the shutdown heat exchangers. The Applicants' design decreases the maximum inlet temperature from 120° F (specified by CESSAR) to 95° F. This change decreases the required amount of flow for dissipating the same amount of heat. As a consequence of these design changes, the Applicants' design requires less flow for the shutdown cooling heat exchangers to accomplish the shutdown within a reasonable period of time.

58. For the emergency shutdown conditions, the Applicants' design accomplishes an orderly shutdown with 6,000 gallons per minute instead

of the 11,000 gallons per minute specified in the CESSAR interface. The CESSAR interface specifications assume that the total heat removal is rejected by one train of the shutdown heat exchanger and do not take into account the containment internal structures which would initially absorb heat from the containment volume. The Applicants' design includes consideration of both the heat rejected to the containment structures and the shutdown exchanger. Accordingly, the shutdown heat exchanger is required to remove less heat, and the CCWS requires less flow to accomplish safe shutdown. The Board has analyzed and compared the Applicants' modified balance-of-plant design (including the design for the CCWS and related components) with the CESSAR interface specifications and finds that the modified balance-of-plant design is acceptable.

59. The fire protection system will provide fire protection capability in areas of the plant where a fire hazard may exist. The system will be designed to (1) provide a reliable and adequate water supply through strategically located yard fire hydrants and plant hose connections; (2) provide portable fire extinguishers throughout the plant; (3) provide fixed automatic sprinkler, water-spray, or deluge systems in areas of fire potential greater than can be extinguished with portable or manual equipment; (4) provide fire and smoke detection and monitor concentrations of combustible materials; and (5) provide chemical extinguishing systems where automatic sprinkler, water-spray, or deluge systems are not appropriate. The Applicants' preliminary design requires that portable fire extinguishers will be used in control room cabinets and computer room cabinets, and that portable extinguishers will be located directly outside the battery rooms and emergency switchgear rooms. The dry cooling tower electrical rooms and the diesel fuel oil storage tanks will be closed in barriers with a minimum fire rating of 3 hours. Preaction sprinklers with heat and ionization detectors and alarms will be provided in electrical penetration areas, as will manual fire hoses. For those components of the fire protection system which utilize water, supplies will be provided by two 300,000-gallon onsite ground level water storage tanks. These tanks provide redundant water supplies so that an adequate volume of water is available with one tank out of service.

60. Based upon its review of the proposed fire protection system for WNP-3 and WNP-5, the Staff concluded at the hearing that the design criteria and bases meet the requirements of Criterion 3 of the General Design Criteria regarding design of structures and systems and provision of fire detection and fighting systems of appropriate capacity and capability to minimize the probability and effect of fires. Accordingly, the Staff concluded that the design criteria and bases for the fire protection system were acceptable.

61. As a result of certain generic investigations subsequently conducted by the Staff, additional fire protection requirements may be proposed by the Staff if the Staff perceives a need to modify the fire protection system. At the Staff's request, the Applicants have reevaluated their fire protection system and performed a fire hazards analysis under the direction of a qualified fire hazards engineer who is familiar with pertinent fire protection codes and standards. The Applicants committed to utilize the services of a qualified fire protection hazards engineer to design and select equipment for the fire protection system. Further, Applicants have committed to the installation of a fire protection system which will be installed in compliance with codes, standards, and regulations of local requirements, State of Washington requirements, and applicable standards of the National Fire Protection Association. The objective of the Applicants' overall fire protection program is to assure that a single credible fire cannot prevent the operator from safely shutting down the reactor. Design fires are postulated based upon identification of fire hazards, and fire areas are established to assure that postulated fires would not affect redundant trains of safe shutdown equipment, the gas decay tanks, or spent fuel pool cooling pumps.

62. The Staff is reviewing the Applicants' reevaluation of the fire protection system and fire hazards analysis for WNP-3 and WNP-5. This Staff action is part of a comprehensive review and evaluation of nuclear power plants based on newly developed guidelines for fire protection systems. The guidelines reflect experience gained from the fire experienced at the Tennessee Valley Authority's Browns Ferry Nuclear Plant, as well as recommendations from the Nuclear Energy Liability-Property Insurance Association and other qualified fire protection consulting agencies. The Staff states that the fire protection system for WNP-3 and WNP-5 may be modified if necessary as a result of the Staff's evaluation (SER Supp. 1, §18; Tr. 710-14). The Staff indicated that it is treating the revisions in fire protection as a postconstruction permit matter in current construction permit cases, including the instant case (Tr. 710-14).

63. However, by memorandum and order dated August 1, 1977, the Board indicated that it considered a certain aspect of the fire protection design (the ability of that system to minimize the effect of fires following a safe shutdown earthquake) to be "too important to leave for postconstruction permit discussion," and accordingly sought additional information from the Applicants and Staff on this matter. Based upon an evaluation of the costs and delays which would be experienced were the Applicants to attempt to demonstrate compliance of the then-existing fire protection design with Criterion 3 of 10 CFR Part 50, Appendix A, to the Board and Staff, the Applicants determined that it would incur less expense if it committed to

hardware changes to comply with the Staff's recommendation in NRC Branch Technical Position 9.5-1. This requires that Applicants provide a fire protection system designed to withstand a safe shutdown earthquake in areas containing seismic Category I equipment. To expedite issuance of this Initial Decision, the Applicants committed to implement certain design modifications in the fire protection system for WNP-3 and WNP-5 (Applicants' Exh. 56). These design modifications include (1) provisions to supply water to standpipes and hose connections for manual firefighting in areas within hose reach of equipment required for safe plant shutdown in the event of a safe shutdown earthquake; (2) provision that water supply for this condition will be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a seismic Category I water system; and (3) provision that the cross connection will be capable of providing 75 gal/min flow to each of any two hose stations and will be designed to the same standards as the seismic Category I water system.

64. The standpipe systems serving such hose stations will be analyzed by the Staff for SSE loading and provided with supports to assure system pressure integrity. The Staff has concluded that piping and valves for the portion of the hose standpipe system affected by this functional requirement will satisfy ANSI Standard B 31.1, "Power Piping," and that this design modification of fire protection system meets the guidelines set forth in Section E.3.d of Appendix A to its Branch Technical Position APCSB 9.5-1 (Board Exh. 1).¹¹

65. The Applicants have not yet submitted all information needed by the Staff to complete its review of the WNP-3 and WNP-5 fire protection system design conformance to Appendix A to the Branch Technical Position APCSB 9.5-1. Nevertheless, the Applicants have supplied sufficient information to convince the Staff that the fire protection system design is adequate for the level of review necessary at the construction permit stage, and the final design will conform to 10 CFR §50.35(a).

66. In view of the separation of Category I equipment from potential fire hazards such that no fire in Category I areas should result due to the occurrence of the safe shutdown earthquake, and in view of the fire protection system design (as modified in Applicants' Exhibit 56), the Board finds that the Applicants' preliminary design for the fire protection system for WNP-3 and WNP-5 provides "defense in depth" in the event of a fire following a safe shutdown earthquake, and that the design criteria and bases for the fire protection system are acceptable. Possible additional design modifications

¹¹The Staff's conclusions of fire protection are contained in the supplemental testimony of Messrs. Liang and Behn, which was provided to the Board attached to the Staff's September 2, 1977, letter. In order to assure that this testimony is a part of the formal decisional record herein, the Board has included it in Appendix A to this decision as Board Exhibit 1.

which may result upon completion of the Staff's postconstruction permit analysis may properly await review at the operating license stage. It is long settled that the Commission may issue construction permits for nuclear power reactors in the face of ongoing generic reviews, leaving final design considerations for the time when operating licenses are issued for the reactors (*Power Reactor Development Co. v. Electrical Union*, 367 U.S. 396 (1961); *Georgia Power Company* (Alvin W. Vogtle Nuclear Plant, Units 1 and 2), 2 NRC 404, 412 (September 24, 1975); 10 CFR §50.35(a)).

67. In view of the foregoing, the Board finds that the Applicants' preliminary design for the fire protection system for WNP-3 and WNP-5 as set forth in the PSAR (§§9.5.1, 15.2.12) is acceptable.

68. The Board also asked the Applicants to address the matter of the production of hydrogen in the containment and the function of the hydrogen recombiners. The Applicants addressed these matters to the satisfaction of the Board.

69. Based on a review of the documentation related to the design of WNP-3 and WNP-5 facilities, the Board finds that the Staff's technical review and safety evaluation has been adequate and comprehensive and that the proposed WNP-3 and WNP-5 facilities conform to the General Design Criteria set forth in 10 CFR Part 50, Appendix A.

C. Organization and Management

70. Recently WPPSS reorganized top management responsibilities. Prior organization consisted of Managers for the Divisions of Finance, Administration, Operations, Technical, Projects, and Construction. All Division Managers reported to the Deputy Managing Director in the office of the Managing Director. This structure was established at a time when WPPSS was engaged in a single nuclear project (WNP-2). WPPSS is now constructing three nuclear projects (WNP-1, WNP-2, and WNP-4) and is also engaged in limited work at two other nuclear sites (WNP-3 and WNP-5). With this expanded program, WPPSS determined that a revision in organization would improve guidance and control overall their nuclear projects (Renberger, Tr. following p. 477).

71. Accordingly, WPPSS revised its top management organization. The position of Deputy Managing Director was eliminated. WPPSS distributed the duties of the Deputy Managing Director to three Assistant Directors. In turn, these Assistant Directors have responsibility for certain Divisions. The Assistant Director for Projects has responsibility for each of the Projects Divisions and for construction activities (including cost and schedule responsibilities). The Assistant Director for Generation and Technology has responsibility for Technical (including quality assurance), Engineering,

and Operations Divisions. The Assistant Director for Finance and Administration has responsibility for Finance, Administration, and a new Materials Management Division. The organization scheme set forth in the PSAR was essentially unchanged by this new distribution of functions among three Assistant Directors. The separation of responsibility between quality assurance and project cost and schedule has been maintained. Matters of cost and schedule, and matters of quality assurance, now meet at the Managing Director, rather than at the Deputy Managing Director.

72. Safe operation of a nuclear plant depends not only on the technical and operational groups at the plant but also on the continual attention by management and headquarters technical and operational groups, all involving appropriate checks and balances. The Staff reviewed the organization changes and concluded that WPPSS has an organization suitable for the design and construction of WNP-3 and WNP-5 (Staff Exh. 20). The Board finds that WPPSS's management is properly structured to design, construct, and operate WNP-3 and WNP-5.

D. Financial Qualifications

73. Washington Public Power Supply System is a municipal corporation and joint operating agency of the State of Washington, organized in January 1957 pursuant to the laws of the State of Washington. WPPSS is composed of 19 operating public utility districts and the cities of Richland, Seattle, and Tacoma, Washington, each of which operates an electrical distribution system within the State of Washington. WPPSS is empowered to acquire, construct, and operate facilities for the generation and transmission of electric power and energy, but does not engage in the distribution of electric energy at retail.

74. WPPSS does not have rates and is not subject to the jurisdiction of any regulatory agency having control over rates. Rather, WPPSS is reimbursed for the cost of each project, including debt service, by the purchasers of the capability of that project. WPPSS will own 70% of WNP-3. One hundred and three publicly and cooperatively owned utilities (participants), all statutory preference customers of the Bonneville Power Administration (BPA), have purchased the entire WPPSS ownership share of WNP-3 electric capability. The respective portions are set forth in the formal application (Applicants' Exh. 1). By a "Power Sale Agreement," a portion of this 70% share in the output will be sold to 15 industrial customers of the BPA from the date of first commercial operation through June 30, 1984.

75. The participants have executed "Net Billing Agreements" with WPPSS and BPA. A form of Net Billing Agreement is set forth in Exhibit A to WPPSS's formal application (Applicants' Exh. 1). By these

agreements the participants assign to BPA the capability which they have purchased. Each participant pays WPPSS for its proportionate share of WNP-3 costs (including debt service); then BPA will credit those payments made to WPPSS against billings by BPA to the participants for power and service delivered.

76. By the Net Billing Agreement all participants are obligated to pay their proportionate share to WPPSS whether or not WNP-3 is complete, operable, or operating, and notwithstanding the suspension, interruption, interference with, reduction, or curtailment of WNP-3. Further, BPA will credit all payments made to WPPSS by the participants irrespective of energy actually received by BPA. Thus, there is assurance that the participants will possess the necessary funds to bear their share of costs for WNP-3 irrespective of operation of that project. In the event of a default by a participant, the remaining participants are obligated to automatic step-ups in their billings (by as much as 25%) to satisfy the total obligations of the participants. Thus, there are three levels of security for repayment of bonds and notes issued by WPPSS to finance its 70% share of WNP-3. Revenues to be derived from operation of WNP-3 represent the first level of security. Net Billing Agreements offer the second level, in that the payments for project costs do not depend on project revenues. Finally, the United States Government (through BPA) is obligated to provide power and credits to the participants irrespective of operation of WNP-3 (Applicants' Exhs. 1 and 54; Staff Exh. 16, Perko, Tr. following p. 598).

77. Initially WPPSS estimated its total cost for WNP-3 to be \$970 million. This estimate included total nuclear production plant costs (\$910,536,000), transmission and general plant costs (\$14,989,000), and nuclear fuel inventory cost for the first core (\$44,475,000). On August 12, 1977, WPPSS submitted Amendment 41 to the WPPSS Nuclear Projects 3 and 5 License Application, wherein they estimated that total plant capital investment will be \$1,386,000,000 for WNP-3 and the first core nuclear fuel cost will be \$63,537,000. Amendment 40 and Amendment 41 are admitted into evidence as Applicants' Exhibit Nos. 65 and 66, respectively.

78. Permanent financing of WPPSS's 70% ownership share of WNP-3 is effected by issuance of long-term debt securities of the revenue bond variety. State of Washington law (R.C.W. §43.52.3411) provides that WPPSS may issue revenue bonds payable from the revenues of the utility properties operated by it. WPPSS's Board of Directors has adopted a project plan and system resolution for WNP-3, as well as plan and system resolutions for issuance of revenue bonds for WNP-3. These resolutions serve as the indentures to the buyers of the securities in which certain covenants are made to such buyers. The bonds or notes of WPPSS are negotiable instruments and legal securities for deposits of public monies,

are legal investments for trustees and other fiduciaries, and for savings and loan associations, banks, and insurance companies.

79. WPPSS has a record of successful financing of generation projects. WPPSS began construction in 1962 and is now operating the Packwood Lake Hydroelectric Project (27,000 kW). Construction costs of this project were financed by the sale of revenue bonds in the amount of \$13,700,000. All costs, including debt service, have been paid on a current basis; and excess construction funds have been applied to retire \$519,000 par value of bonds ahead of schedule. In addition, \$415,000 bonds have been retired according to the original retirement schedule. The project output is sold to 12 public utility districts. Operating revenues for fiscal year 1976 totaled \$782,259.

80. WPPSS also successfully financed and constructed, and is now operating, the Hanford Generating Project (860,000 kW), which utilizes byproduct steam produced in the dual purpose N-Reactor of the United States Department of Energy on the Hanford Reservation. Construction costs were financed by the sale of revenue bonds in 1963 in the total amount of \$122,000,000. All costs, including debt service, have been paid on a current basis and excess construction funds have been applied to retire \$34,825,000 par value of bonds ahead of schedule. In addition, \$28,265,000 bonds have been retired according to the original debt retirement schedule. The project output is sold to 76 power purchasers, including public utility districts, municipalities, rural electric cooperatives, and investor-owned utilities in the northwest region. Operating revenues for fiscal year 1976 totaled \$29,690,579.

81. WPPSS is currently constructing its Nuclear Project No. 1 (WNP-1) (1,250 MW) located on the Hanford Reservation near Richland, Washington. WNP-1 is being financed according to Net Billing Agreements similar to those executed for WNP-3. In September of 1975, WPPSS issued the first long-term revenue bonds to finance WNP-1. A total of \$535,000,000 in long-term debts has been issued to date. These securities were rated Aaa by Moody's Investor Service, Inc., and AAA by Standard and Poor's Corporation.¹² Commercial operation is scheduled for January 1982.

82. WPPSS is also constructing WPPSS Nuclear Project No. 2 (WNP-2) (formerly Hanford No. 2) (1,110 MW) on the Hanford Reservation. WNP-2 is being financed in the same manner as WNP-1 and WNP-3, with the entire capability being sold to public and cooperatively owned utilities

¹²The Atomic Safety and Licensing Board in *Washington Public Power Supply System* (WPPSS Nuclear Projects, Nos. 1 and 4), 2 NRC 922, 927 (December 22, 1975), concluded that WPPSS possessed or had reasonable assurance of obtaining the funds necessary to cover estimated construction costs of WNP-1 and related fuel cycle costs.

under similar Net Billing Agreements. In July of 1973, WPPSS issued the first long-term revenue bonds to finance WNP-2; a total of \$800,000,000 in long-term debts has been issued to date. These securities were rated Aaa by Moody's Investor Service, Inc., and AAA by Standard and Poor's Corporation. Commercial operation is scheduled for September 1980.¹³

83. WPPSS has issued \$250 million of long-term revenue bonds for WNP-3. These long-term securities were rated Aaa by Moody's Investor Service, Inc., and AAA by Standard and Poor's Corporation. These and all subsequent issues are earmarked as being for WNP-3 and proceeds of the sale of securities may be expended for that project only. Correspondingly, revenues associated with contracts for the sale and purchase of the output of WNP-3 may be applied only to WNP-3 costs, including debt service. To continue financing WNP-3, in addition to the \$250 million revenue bonds already sold, WPPSS will issue approximately \$720 million dollars of its tax exempt revenue bonds in series from time to time during the period of construction. Each series of bonds issued will be on a parity with other bonds issued. Based upon the foregoing, the Board finds that WPPSS is financially qualified in terms of 10 CFR §50.33(f) and Appendix C to 10 CFR Part 50 to design and construct WNP-3 in that WPPSS possesses or has reasonable assurance of obtaining the funds necessary to finance its share (70%) of those activities and related fuel cycle costs.

84. The remaining 30% ownership share of WNP-3 has been purchased by four investor-owned utilities (companies) in the following undivided portions: Pacific Power and Light Company (10%), Portland General Electric Company (10%), the Washington Water Power Company (5%), and Puget Sound Power and Light Company (5%) (Applicants' Exhs. 1 and 54; Staff Exh. 16, §20.11). The companies have executed "Ownership Agreements" with WPPSS which provide that each of the companies will pay its respective portion of the costs of acquiring, constructing, and operating WNP-3, as well as its portion of WNP-3 annual operating costs. A form of Ownership's Agreement is set forth in Exhibit A to WPPSS's formal application (Applicants' Exh. 1). By the Ownership Agreements, the companies, like the participants, are obligated to make payments whether or not WNP-3 is complete, operable, or operating, and notwithstanding interruption or curtailment of output of WNP-3. The companies are financing their respective shares individually in the same manner as the balance of their respective construction programs, viz., short-term borrowing, sale of equity securities, proceeds from first mortgage bonds, internally generated funds (including

¹³The Atomic Safety and Licensing Board in *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), 6 AEC 197 (March 15, 1973), concluded that the record was adequate to support findings subsequently made by the then Director of Regulation that WPPSS was financially qualified to construct WNP-2.

retained earnings, depreciation, and deferred taxes), leases or other executory arrangements, and other secured and unsecured transactions or construction financing. Annual reports for the companies are set forth in PSAR Amendment 39 (Applicants' Exh. 54).

85. Pacific Power & Light Company is an investor-owned electric utility operating in six States in the west and the Pacific Northwest. It serves approximately 540,000 residential, commercial, and industrial customers, and it sells power at wholesale to consumer-owned utilities. Pacific Power & Light Company's operating revenues increased from \$254.2 million for the 12 months ended February 28, 1975, to \$309.4 million for the 12 months ended February 29, 1976, and net income increased from \$56.1 million to \$72.7 million over the same period. Invested capital on December 31, 1975, amounted to \$1,542.6 million and consisted of 53.5% long-term debt, 10.2% preferred stock, and 36.3% common equity. The company's first mortgage bonds are rated "Baa" by Moody's and "A-" by Standard and Poor's.

86. Pacific Power & Light Company plans to finance its 10% portion of the WNP-3 design and construction costs as part of its overall construction program. The funds will be provided from a combination of internally generated sources (including retained earnings, depreciation, and deferred taxes) and from the issuance of securities including long-term debt, preferred stock, and common stock. Interim funding requirements will be met with short-term borrowing.

87. Pacific Power & Light Company is subject to regulatory jurisdiction by State commissions in Oregon, Idaho, Washington, California, Montana, and Wyoming. Since December 31, 1974, Pacific Power & Light Company has been granted seven rate increases in five of the jurisdictions totaling \$55.9 million on an annualized basis. The allowed rates of return on common equity ranged from 11.25% to 13.5%. The company has four rate increases pending which request an average 15.0% return on common equity and a total annual revenue increase of \$35.0 million.

88. Portland General Electric Company is an investor-owned electric utility operating in northwest Oregon. It serves approximately 390,000 residential and industrial customers as well as selling power at wholesale to other utilities. Portland General Electric Company's operating revenues increased from \$146.8 million for the 12 months ended January 31, 1975, to \$184.8 million for the 12 months ended January 31, 1976, and net income increased from \$30.3 million to \$51.2 million over the same period. Invested capital on December 31, 1975, amounted to \$837.4 million and consisted of 53.1% long-term debt, 13.0% preferred stock, and 33.9% common equity. The company's first mortgage bonds are rated "Baa" by Moody's and "BBB" by Standard and Poor's.

89. Portland General Electric Company plans to finance its 10% portion of the WNP-3 design and construction costs as part of its overall construction program. The funds will be provided from a combination of internally generated sources (including retained earnings, depreciation, and deferred taxes) and from the issuance of securities including long-term debt, preferred stock, and common stock. Interim funding requirements will be met with short-term borrowing.

90. Portland General Electric Company is subject to the regulatory jurisdiction of the Public Utility Commission of Oregon. The company's most recent retail rate action, effective September 26, 1975, was a 24.7% increase amounting to \$39.6 million on an annual basis. A 13.3% rate of return on common equity was allowed in the case. Portland General Electric Company has requested a further 20% increase amounting to \$42.2 million on an annual basis. A 13.3% rate of return on common equity has been requested.

91. Puget Sound Power & Light Company is an investor-owned electric utility operating in northern and central Washington State. It serves approximately 410,000 residential, commercial, and industrial customers. Puget Sound Power & Light Company's operating revenues increased from \$149.7 million for the 12 months ended March 31, 1975, to \$169.6 million for the 12 months ended March 31, 1976, and net income increased from \$19.6 million to \$24.7 million over the same period. Invested capital on December 31, 1975, amounted to \$622.9 million and consisted of 57.8% long-term debt, 10.7% preferred stock, and 31.5% common equity. The company's first mortgage bonds are rated "Baa" by Moody's and "BBB" by Standard and Poor's.

92. Puget Sound Power & Light Company plans to finance its 5% portion of the WNP-3 design and construction costs as part of its overall construction program. The funds will be provided from a combination of internally generated sources (including retained earnings, depreciation, and deferred taxes) and from the issuance of securities including long-term, preferred stock, and common stock. Interim funding requirements will be met with short-term borrowing.

93. Puget Sound Power & Light Company is subject to regulatory jurisdiction by the Washington Utilities and Transportation Commission. Its most recent rate increase amounted to \$22.9 million or 19.9% on an annual basis and was effective November 1, 1974. The company has filed an additional \$36.5 million rate increase request which would allow a 13.0% rate of return on common equity.

94. The Washington Water Power Company is an investor-owned electric and gas utility operating in the States of Washington and Idaho. It serves approximately 190,000 residential, commercial, and industrial

customers as well as selling power at wholesale to consumer-owned utilities. The Washington Water Power Company's operating revenues increased from \$117.4 million for the 12 months ended March 31, 1975, to \$142.5 million for the 12 months ended March 31, 1976, and net income increased from \$14.6 million to \$19.1 million over the same period. Invested capital on December 31, 1975, amounted to \$409.7 million and consisted of 63.2% long-term debt and 36.8% common equity. The company's first mortgage bonds are rated "A" by Moody's and Standard and Poor's.

95. The Washington Water Power Company plans to finance its 5% portion of the WNP-3 design and construction costs as part of its overall construction program. The funds will be provided from a combination of internally generated sources (including retained earnings and depreciation) and from the issuance of securities including long-term debt, preferred stock, and common stock. Interim funding requirements will be met with short-term borrowing.

96. The Washington Water Power Company is subject to regulatory jurisdiction by the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission. In August 1975, the Washington Commission authorized electric and gas increases totaling \$3.6 million on an annual basis and allowed a 12.75% return on common equity. Also in August 1975, the Idaho Commission authorized electric and gas increases totaling \$1.2 million on an annual basis and allowed a 12.75% return on common equity. The company had no rate requests pending as indicated in Amendment 32 to the PSAR.

97. With respect to WNP-5, WPPSS owns a 90% undivided interest as a tenant in common with Pacific Power and Light Company, which owns the remaining 10% undivided interest. WPPSS has executed "Participants Agreements" with 88 public and cooperative utilities (participants). These participants will purchase the entire capability of WPPSS's ownership share (90%) of WNP-5. A form of Participants Agreements and the respective portions purchased by each participant are set forth in PSAR Amendment 39 (Applicants' Exh. 54).

98. Every previous project undertaken by WPPSS has been financed separately. However, WNP-5 and WPPSS Nuclear Project 4 (WNP-4) are being financed together as one system. WNP-4 is a duplicate of WNP-1 and is located on the Hanford Reservation. WNP-4 is wholly owned by WPPSS, and the entire capability of WNP-4 will be sold to the 88 participants in this project. Ownership shares in WNP-4 (100%) and WNP-5 (90%) will be financed in the same manner as WNP-1, WNP-2, and WNP-3, viz., through issuance of revenue bonds. Financing WPPSS ownership interests in WNP-4 and WNP-5 together as one system will not alter the approach used for WNP-1, WNP-2, and WNP-3 although there are some differences

in the underlying contractual arrangements. Net Billing Agreements, Participants Agreements, and Ownership Agreements will be used as described above (Applicants' Exh. 54; Perko, Tr. following p. 598).

99. Initially, WPPSS estimated the total cost of WNP-5 to be \$1,718,661,000. This estimate included total nuclear production plant costs (\$1,539,207,000), transmission and general plant costs (\$19,271,000), and nuclear fuel inventory for the first core and reload fuel (\$160,183,000). In August 1977, the total cost was revised to \$1,909,626,000 (Applicants' Exh. 66).

100. Under the Participants Agreements, WPPSS receives a promise from the participants that each will pay a portion of the costs of acquiring, constructing, and operating the project (WNP-4 and WNP-5). Each participants' portion of such costs includes the amount required each year to pay the interest and a portion of the principal on the bonds outstanding, plus the participants' share of the annual operating costs. As in the case of WNP-3, payment of project costs on WNP-4 and WNP-5 does not depend on actual project revenues but is insured on a broad base through the obligation of the public and cooperative entities. Assurance that such obligations can be met is provided in that the participants covenant to increase rates to the level necessary to meet their obligations to WPPSS set forth in the Participants Agreements. These rates are not subject to review or approval by any State agency. In the case of default by a participant, each other participant in its class (*i.e.*, cooperative or public agencies) promises to step up its respective obligations by as much as 25%.

101. To finance WNP-4 and WNP-5, revenue notes in the amount of \$15,000,000 were sold in August of 1974 for the preliminary planning and progress payments. These notes matured and were retired on June 15, 1976. In addition, short-term revenue bonds in the amount of \$100 million were sold in July of 1975, and long-term revenue bonds in the amount of \$145 million were sold in February of 1977. Most recently, on May 24, 1977, long-term bonds in the amount of \$90 million were sold by WPPSS. These bonds were rated A-1 by Moody's and A+ by Standard and Poor's. In addition to the \$335 million revenue bonds already sold, WPPSS will issue approximately \$3.1 billion of its tax-exempt revenue bonds in series from time to time during the period of construction in order to continue financing WNP-4 and its share of WNP-5. Based upon the foregoing, the Board finds that WPPSS is financially qualified in terms of 10 CFR §50.33(f) and Appendix C to 10 CFR Part 50 to design and construct WNP-5 in that WPPSS possesses or has reasonable assurance of obtaining the funds necessary to finance its share (90%) of those activities and related fuel cycle costs.¹⁴

¹⁴The Board takes official notice of the Supplemental Initial Decision issued on February 17, 1978, by the Atomic Safety and Licensing Board in *Washington Public Power Supply System* (Continued on next page.)

102. Pacific Power and Light Company (PP&L) has executed an "Ownership Agreement" with WPPSS to purchase 10% of WNP-5.¹³ PP&L will finance its ownership share of WNP-5 in the same manner as WNP-3 and the balance of its respective construction programs, viz., short-term borrowing, sale of equity securities, proceeds from first mortgage bonds, internally generated funds (including retained earnings, depreciation, and deferred taxes), leases or other executory arrangements, and other secured and unsecured transactions or construction financing. The Board finds that PP&L is financially qualified in terms of 10 CFR §50.33(f) and Appendix C to 10 CFR Part 50 in that it possesses or has reasonable assurance of obtaining the funds necessary to finance its share (10%) of design and construction costs for WNP-5, including related fuel cycle costs.

103. Based on its analysis, the Staff concluded that Washington Public Power Supply System, Portland General Electric Company, Puget Sound Power and Light Company, Pacific Power & Light Company, and the Washington Water Power Company are financially qualified to design and construct WNP-3 and WNP-5 in proportion to their respective undivided ownership interests, based on cost estimates that were available at the time of issuance of the SER, Supplement No. 1. Subsequently, the Applicants updated their estimated costs of designing and constructing WNP-3 and WNP-5 (Testimony of James D. Perko Regarding Financial Qualifications, following Tr. 598, and Applicants' Exh. 55). The Staff reviewed the updated projected costs of financing WNP-3 and WNP-5 and reaffirmed that the Applicants were financially qualified to design and construct WNP-3 and WNP-5 in proportion to their respective undivided ownership interests (Staff Exh. 21). The Board agrees with these conclusions.

E. Quality Assurance

104. The Applicants have formulated a comprehensive quality assurance program which the Staff has reviewed for compliance with Appendix B of 10 CFR Part 50, applicable Regulatory Guides, and industry standards. WPPSS is responsible for the total WNP-3 and WNP-5 quality assurance program and is organized to control and verify the quality assurance programs of its principal contractors. The WPPSS quality

(Continued from previous page.)

(WPPSS Nuclear Project No. 4), 7 NRC 254 (NRC Docket No. 50-513), in which that Board concluded that WPPSS possesses or has reasonable assurance of obtaining the funds necessary to construct WNP-4 (which, as noted, is financed with WNP-5 as a single project).

¹³A copy of the Ownership Agreement between PP&L and WPPSS is set forth in Exhibit H to WPPSS's formal application, as amended by PSAR Amendment 39 (Applicants' Exh. 54).

assurance program has undergone a continuing process of evolution and refinement since 1971 as work has proceeded on three separate WPPSS nuclear projects (WNP-2, WNP-1, and WNP-4). Recent inspections by the Commission's Office of Inspection and Enforcement, Region V (IE), have demonstrated that there is uniform implementation of the Quality Assurance program on these WPPSS projects with the exception of some minor variations. Where deficiencies have been noted, WPPSS management has been responsive to NRC concerns and has taken corrective action promptly. In no instance has WPPSS management failed to act immediately when notified by IE of the need to do so (Vorderbrueggen, Tr. following p. 609; Tr. 611-20).

105. As previously noted, WPPSS has recently reorganized its management structure. Under the reorganization, the Manager, Quality Assurance, reports directly to the Manager, Technical Division, who in turn, reports to the Assistant Director for Generation and Technology. This Assistant Director reports directly to the Managing Director of WPPSS. However, the Manager, Quality Assurance, has direct access to the Managing Director of WPPSS as needed to resolve a quality assurance problem (Tr. 633-34). The elimination of the Deputy Managing Director in the chain of command is viewed as enhancing the authority of the Manager, Quality Assurance, by eliminating a possible dilution of the Managing Director's authority and by facilitating the direct access of the Manager, Quality Assurance, to the Managing Director (Tr. 571). The reorganization was effected in a manner which assures the separation of cost and schedule responsibilities (which are placed in the Projects Division) from technical and quality assurance responsibilities (which are placed in the Generation and Technology Division). The functions of cost, schedule, and quality assurance meet at the Managing Director of WPPSS. The Manager, Quality Assurance, retains his authority to initiate a stop-work action (Tr. 558-59).

106. The Staff found the reorganization will meet the criteria established for an acceptable quality assurance program and that no commitments to establish and implement a quality assurance program have been changed.¹⁶ Review of the quality assurance program of WPPSS (and those of Ebasco Services, Inc., and Combustion Engineering Incorporated) for WNP-3 and WNP-5 showed that the program complies with Appendix B to 10 CFR Part 50, and applicable Regulatory Guides and industry standards. The Staff concluded that the quality assurance program is acceptable for the design, procurement, and construction of WNP-3 and WNP-5. Further, the Office of Inspection and Enforcement concluded that implementation of the

¹⁶On June 15, 1977, the Staff moved the receipt into evidence of the affidavit of John R. Costello regarding the Staff's evaluation of the quality assurance aspects of the WPPSS reorganization. The affidavit has been received into evidence as Staff Exhibit 19.

quality assurance program is consistent with the status of the projects, and is therefore acceptable. The Board finds that the Staff's review of the WPPSS's quality assurance program has been adequate and that the quality assurance program complies with the requirements of the Commission's regulations including the requirements of Appendix B to 10 CFR Part 50.

F. Technical Qualifications

107. WPPSS is a municipal corporation and joint operating agency of the State of Washington. Currently it operates one hydroelectric project and the Hanford Generating Project, which utilizes byproduct steam energy produced by the N-Reactor on the Hanford Reservation. WPPSS also is constructing WNP-1, WNP-2, and WNP-4 on the Hanford Reservation pursuant to construction permits issued by the Commission.

108. WPPSS is responsible for the design, construction, quality assurance, testing, and operation of WNP-3 and WNP-5. These responsibilities are performed or, as appropriate, supervised by WPPSS's Projects and Generation and Technology organizations. The Generation and Technology organization consists of the Technical (including Quality Assurance and Engineering) and Operations Divisions. The Projects organization consists of project divisions for each application (WNP-2, WNP-1, and WNP-4, WNP-3, and WNP-5). The experience of key members of these divisions is summarized in the record (PSAR §13.1; Renberger, Tr. following p. 477). WPPSS has employed Ebasco Services, Incorporated (Ebasco), to provide engineering and design, and to manage construction for WNP-3 and WNP-5. The nuclear steam supply systems for WNP-3 and WNP-5 will be supplied by Combustion Engineering (CE) which will coordinate with Ebasco, under the direction of WPPSS, to provide integration of CE-supplied systems and components into the total facilities. Additional technical support is provided to the Applicants by various independent consulting firms, including Woodward-Clyde Consultants (foundation and seismic aspects). The plant staff for WNP-3 and WNP-5 will consist of a technical staff of approximately 94 persons for one-unit operation and 167 persons for two-unit operation under the direction of the Plant Superintendent and the Assistant Plant Superintendent. The Applicants' qualification requirements for plant personnel will meet or exceed the guidelines of the Staff contained in Regulatory Guide 1.8. Appropriate training programs for WPPSS personnel will be provided at existing reactors, on the site, and during preoperational testing of WNP-3 and WNP-5.

109. Based on information in the record regarding the collective experience of WPPSS and its principal contractors, Ebasco and CE, the WPPSS organization and personnel, and the WPPSS quality assurance

program, the Board finds that WPPSS is technically qualified to design and construct WNP-3 and WNP-5.

G. Common Defense and Security

110. The activities to be conducted under the construction permits will be within the jurisdiction of the United States. All of Applicants' directors and principal staff members are citizens of the United States; and the Applicants are not owned, dominated, or controlled by an alien, foreign corporation, or a foreign government (Applicants' Exh. 1, page 4 (d.(3)(ii) and page 13 (d.(3)(iii)). The activities to be conducted do not involve any restricted data, but Applicants have agreed to safeguard any such data which might become involved in accordance with the Commission's regulations. The Applicants will rely on obtaining fuel from sources of supply available for civilian purposes. Thus, no diversion of special nuclear material from military purposes is involved. The Board finds that the issuance of construction permits for WNP-3 and 5 will not be inimical to the common defense and security.

H. Industrial Security

111. The Applicants have provided a general description of preliminary plans for protecting the plant against potential acts of industrial sabotage. Provisions for the screening of employees at the plant and for design phase review of plant layout and protection of vital equipment have been described. The Staff found that these provisions conform to Regulatory Guide 1.17, "Protection of Nuclear Power Plants Against Industrial Sabotage." Based on its review, the Staff concluded that the Applicants' arrangements for protection of the plant against acts of industrial sabotage are acceptable for the construction permit stage of review.

112. The Board finds that an acceptable security program for the WNP-3 and WNP-5 facilities can and will be implemented by the Applicants. As required by the Commission's regulations, a detailed security plan will be submitted for review as part of the operating license application (10 CFR §50.34(c)).

I. Emergency Plans

113. The Applicants have described the preliminary plans for coping with emergencies in accordance with applicable regulations, including 10 CFR Part 50, Appendix E, Part II. These preliminary plans describe the Applicants' protective measures for accidents affecting both onsite and off-

site areas and identify local and State agencies and organizations which may be required to assist in coping with emergencies occurring at WNP-3 and WNP-5 site. As prescribed in the regulations, a final emergency plan will be presented in the Final Safety Analysis Report for review during the operating license phase of this application, and detailed emergency procedures will be developed to implement the final plan.

114. The onsite shift supervisor will have the authority to initiate the emergency plan in accordance with detailed written procedures. Offsite emergency operations and support effort will be under the control of an emergency coordinator. Applicants have indicated that backup or redundant communication systems will be provided to ensure prompt and effective communications during emergencies.

115. The Staff made an independent assessment of the population distribution and evacuation routes in the area of the proposed site and determined that it is feasible and practicable to take protective measures, including evacuation on a timely basis within and beyond the site boundary in the event of a serious accident. The Staff further determined that appropriate criteria have been identified for the design of an acceptable emergency plan. The Staff concluded, and the Board so finds, that Applicants' preliminary plans for coping with emergencies meet the requirements of 10 CFR Part 50, Appendix E, Part II, and are acceptable.

III. FINDINGS OF FACT ON UPDATED ENVIRONMENTAL MATTERS

A. Need for Power Update

116. In the Partial Initial Decision issued on April 8, 1977, the Board reviewed the evidence relating to anticipated energy loads and resources of the West Group Area to determine the need for WNP-3 and WNP-5. Based on this evidence, the Board concluded that there would be a need for the baseload energy produced by WNP-3 and WNP-5 during the time frame then projected (5 NRC at 990-96).

117. In August 1977, the earliest (and latest) completion dates were revised to January 1, 1983, and (January 1, 1985) for WNP-3 and to July 1, 1984, (and July 1, 1986) for WNP-5 (Applicants' Exh. 66). In order to assure that the Initial Decision authorizing issuance of construction permits is based upon appropriate starting dates and current information on demand, the parties have continued to update the record on need for power (Applicants' Exh. 63). The new information included the 1978 West Group Forecast of Power Loads and Resources issued on March 1, 1978, by Pacific Northwest Utilities Conference Committee and an analysis of the

forecast. Forecasts of power demand during the 1978-1988 period were significantly reduced, but this reduction was more than offset by the decrease in estimated energy resources (Applicants' Exh. 63, p. 2). The Staff reviewed the 1978 forecast and the Applicants' assessment thereof, in addition to other pertinent data, and concluded that a need exists for WNP-3 and WNP-5 (Staff Exh. 28, p. 7).

118. The Board confirms its finding in the Partial Initial Decision that there will be a need for the baseload energy which can be produced by WNP-3 and WNP-5 during the period of their operation.

B. Modifications of Environmental Conditions

119. In the Partial Initial Decision of April 8, 1977, the Board made certain findings regarding the environmental effects of construction of WNP-3 and WNP-5, including findings regarding the impact of spillage of oil and gasoline from construction machinery and the disposal of construction personnel sanitary wastes. In that decision, the Board concluded that the environmental effects of construction would be at the minimum practicable level, but nevertheless ordered that certain environmental conditions applicable to construction-related activities be included in any construction permits for WNP-3 and WNP-5. Conditions 7 and 9 specified maintenance area requirements to control spillage of gasoline and oil from construction personnel sanitary wastes, respectively (5 NRC at 1013-14). These conditions were included in the limited work authorization issued on April 8, 1977.

120. On January 10, 1978, the Applicants submitted an affidavit describing proposed modifications to the maintenance area and the sanitary waste treatment facilities for construction personnel (Applicants' Exhibit 60), and requested that Conditions 7 and 9 be modified accordingly. With regard to the maintenance area for the control of spillage of gasoline and oil from construction machinery,¹⁷ the Applicants requested that the reference to a specific size area be deleted to provide greater flexibility without compromising the objective of the condition. With regard to the sanitary waste treatment facilities for construction personnel, the Applicants proposed a greater utilization of permanent facilities, in addition to portable toilets. On January 23, 1978, the Staff advised the Board that it had completed its review of the Applicants' proposal to modify the maintenance area and

¹⁷The Board assumes that the term "gasoline" in the condition should be interpreted to include any fuel for construction machinery, e.g., gasoline, diesel fuel, etc. Accordingly, in order to assure that any spillage of diesel and any other fuel also will be controlled in accordance with Condition 7, we direct the substitution of the word "fuel" for the word "gasoline" in Condition 7.

sanitary waste treatment facilities and that the Staff supported modification of the proposed construction permit conditions to incorporate the Applicants' proposals (Staff Exh. 22). Based on the foregoing and the entire record in this proceeding, the Board concludes that the modifications to the maintenance area and sanitary waste treatment facilities described in Applicants' Exhibit 60 can be accomplished consistent with the Board's findings in the Partial Initial Decision. Accordingly, the Board authorizes the requested modifications to Conditions 7 and 9. In addition, the Board reaffirms its previous conclusion that the environmental effects of construction of WNP-3 and WNP-5 will be at the minimum practicable level.

C. Health Effects of Coal and Nuclear Fuel Cycles

121. In the Partial Initial Decision of April 8, 1977, the Board also reviewed the incremental environmental impacts of the uranium fuel cycle which are attributable to WNP-3 and WNP-5 and concluded that those impacts are not significant and do not tip the cost-benefit balance against licensing of these projects (5 NRC 989). We compared the health effects attributable to the entire fuel cycles for both the coal alternative and the nuclear alternative and concluded that the nuclear fuel cycle is considerably less harmful to man than the coal fuel cycle (5 NRC 996-97).

122. Thereafter, the Staff reevaluated the releases of Radon-222 from the mining and milling operations of the nuclear fuel cycle (Staff Exhibit 25) in order to respond to questions raised by Dr. Walter Jordan, Atomic Safety and Licensing Board Panel (ASLBP). As a result of that reevaluation, the Staff concluded that Dr. Jordan was correct and that the Radon-222 releases and subsequent increase in Radon-222 population doses and health effects per reference reactor year due to mining and milling were, in fact, larger than had been estimated. Based on the revised radon dose estimates (Staff Exhibit 25), the estimated health effects from the coal and nuclear fuel cycles were again compared and the results tabulated (Staff Exh. 26). Copies of the revised tables are attached to Staff Exhibit 25 and have been considered by the Board. The revised tables show that the corrected Radon-222 source term results in a substantial increase in the health impact of the entire uranium fuel cycle when compared with the original Table S-3 data. The Staff also has concluded that Dr. Jordan was correct when he stated that this impact is " 'insignificant compared to those due to radon contamination in natural background,' and that the authors of WASH-2148 were correct in their belief that 'population doses from this source cannot be distinguished from background' " (Affidavit of R. L. Gotchy dated January 25, 1978, (Staff Exh. 25) p. 15). The conclusion based upon Staff Exhibit 13 that "the nuclear fuel cycle is considerably less

harmful to man than is the coal fuel cycle" remains unchanged (Staff Exh. 26).

123. The Board notes that the Commission, in its March 2, 1978, Order *Metropolitan Edison Company, et al.* (Three Mile Island Nuclear Station, Unit No. 2), CLI-78-3, 7 NRC 307, determined that consideration of the accuracy of the radon release values in Table S-3 of 10 CFR Part 51 by an ASLB is barred by the fuel cycle rule. This Board must abide by the radon release values that are stated in Table S-3, and accordingly, it reaffirms the findings contained in its Partial Initial Decision regarding the extent of the environmental impacts of the uranium fuel cycle on the WNP-3 and WNP-5 cost-benefit balance and the comparative health effects of the nuclear and coal alternatives. Nevertheless, the Board is mindful of the Commission's statement in the *Three Mile Island Order (supra)*, that "[The Intervenor] are correct in asserting that Table S-3 understates these radon releases" (*id.* at 3). The Commission recognized that reopening of the records in individual licensing proceedings might be necessary in the future to consider the proper impact of radon on cost-benefit balances. To eliminate the possible need for a future reopened record in this proceeding to consider the Radon-222 matter, the Board has reviewed Staff Exhibits 25 and 26 with respect to the effects of Radon-222¹⁴ and finds that even if the corrected Radon-222 releases were used to replace the value assigned to radon in Table S-3, 10 CFR Part 51, the environmental impacts of the uranium fuel cycle would not be significantly increased. The cost-benefit balance in favor of the licensing of these projects remains unchanged.

D. Errata to Proposed Construction Permits

124. On April 7, 1978, counsel for the NRC Staff filed a motion requesting the Board to receive an "Errata to NRC Staff Proposed Construction Permits for WNP-3 and WNP-5." The errata correct an inadvertent omission from the proposed construction permits and conform a condition in the proposed construction permits to a commitment made by the Applicants as specified in the Staff's Final Environmental Statement (Staff Exh. 1), §4.5.1, paragraph number 1. The motion which Applicants do not oppose is hereby granted.

IV. CONCLUSIONS OF LAW

In the Partial Initial Decision issued on April 8, 1977, the Board made findings of fact and determinations and reached conclusions of law re-

¹⁴Applicants have not objected to the receipt into evidence of Staff Exhibits 25 and 26. See *Metropolitan Edison Company, et al.* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-465, 7 NRC 377, (March 27, 1978).

garding environmental and site suitability matters. Thereafter in its Supplemental Partial Initial Decision issued on May 10, 1977, the Board made additional findings regarding certain additional activities at the site. The Board has considered these earlier findings, determinations, and conclusions, as well as all of the documentary and oral evidence of record in this proceeding. This consideration and a review of the entire record, including that portion of the record created since the issuance of the Partial Initial Decision and Supplemental Partial Initial Decision, have led the Board to the foregoing discussion and findings of fact, and to the conclusions of law stated hereinafter.

The Board concludes that the review of the application by the Staff has been adequate and that the application and the record of the proceeding contain sufficient information to support the foregoing findings of fact and the conclusions of law and the order of the Board that follow:

A. In accordance with 10 CFR §50.35(a):

(1) The Applicants have described the proposed design of the facilities, including but not limited to the principal architectural and engineering criteria for the design, and have identified the major features or components incorporated therein for the protection of the health and safety of the public.

(2) Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied in the Final Safety Analysis Report.

(3) Safety features and components, if any, which require research and development have been described by the Applicants and the Applicants have identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components.

(4) On the basis of the foregoing, there is reasonable assurance that (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of the proposed facilities, and (ii) taking into consideration the site criteria contained in 10 CFR Part 100, the proposed facilities can be constructed and operated at the proposed location without undue risk to the health and safety of the public.

B. Washington Public Power Supply System is technically qualified to design and construct the proposed facilities.

C. Washington Public Power Supply System, Pacific Power and Light Company, Portland General Electric Company, Puget Sound Power and Light Company, and the Washington Water Power Company are qualified to finance their respective shares of the design and construction costs of the proposed facilities.

D. The issuance of permits for construction of the facilities will not be inimical to the common defense and security or to the health and safety of the public.

E. As we concluded in our Partial Initial Decision dated April 8, 1977, in accordance with 10 CFR Part 51 of the Commission's regulations, the Board concludes:

(1) The environmental review conducted by the Staff pursuant to the National Environmental Policy Act of 1969 (NEPA) as further augmented and modified herein is adequate.

(2) The requirements of Sections 102(2)(C) and (D) of NEPA and 10 CFR Part 51 of the Commission's regulations have been complied with in this proceeding.

(3) The Board has independently considered the final balance among conflicting factors contained in the record of the proceeding and has determined that appropriate action to be taken is issuance of construction permits for WNP-3 and WNP-5, subject to the conditions for the protection of the environment set forth in the Partial Initial Decision, and as modified in this Initial Decision.

V. ORDER

Based upon the Board's findings and conclusions, and pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations, IT IS ORDERED that the Director, Office of Nuclear Reactor Regulation, is authorized to issue to the Washington Public Power Supply System, Pacific Power and Light Company, Portland General Electric Company, Puget Sound Power and Light Company, and the Washington Water Power Company a permit to construct WPPSS Nuclear Project No. 3, and to the Washington Public Power Supply System and the Pacific Power and Light Company a permit to construct WPPSS Nuclear Project No. 5, consistent with the terms of the Initial Decision, substantially in the form of Attachments A and B hereto.

IT IS FURTHER ORDERED, in accordance with 10 CFR §2.760, §2.762, §2.764, §2.785, and §2.786 that this Initial Decision shall become effective immediately and shall constitute with respect to the matters covered therein the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the Commission's Rules of Practice. Exceptions to this Initial Decision may be filed by any party within seven (7) days after service of this Initial Decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff), any

party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (twenty (20) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND
LICENSING BOARD

Emmeth A. Luebke, Member

David R. Schink, Member

Robert M. Lazo, Chairman

Dated at Bethesda, Maryland,
this 10th day of April 1978.

[Appendix A and Attachments A and B have been omitted from this publication but are available in the Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Edward Luton, Chairman
Ernest E. Hill
Oscar H. Paris

In the Matter of

Docket Nos. 50-354
50-355

PUBLIC SERVICE ELECTRIC AND
GAS COMPANY

ATLANTIC CITY ELECTRIC
COMPANY

(Hope Creek Generating Station,
Units 1 and 2)

April 13, 1978

Upon reconsidering whether Hope Creek, Units 1 and 2, need be designed to protect against flammable gas cloud accidents (see ALAB-429, 6 NRC 229 (1977), where the Appeal Board reversed and remanded LBP-77-22, 5 NRC 694 (1977), on this issue), the Licensing Board concludes, on the basis of probability values it has calculated from figures in the record, that the plant need not be so designed. It further reiterates its earlier conclusion that the environmental impacts of such accidents that might affect the plant are so remote and speculative as to obviate the need for a supplemental environmental impact statement.

RULES OF PRACTICE: EXPERT WITNESSES

The testimony and opinion of a witness who claims no personal knowledge of or expertise in a particular aspect of the subject matter of his testimony will not be accorded the weight given testimony on that question from an expert reporting results of careful and deliberate measurements.

TECHNICAL ISSUES DISCUSSED: Probability of postulated flammable gas cloud accidents caused by LNG and LPG tankers, which could affect plant; use of regulatory guide (NUREG-75/087).

SECOND SUPPLEMENTAL INITIAL DECISION

Appearances

Troy B. Conner, Esq., and Richard Fryling, Jr., Esq.,
for Public Service Electric and Gas Company and
Atlantic City Electric Company, Applicants

Peter A. Buchsbaum, Esq., and Robert Westreich,
Esq., for the Joint Intervenors

Richard L. Black, Esq., for the Nuclear Regulatory
Commission Staff

Introduction

In accordance with ALAB-429 (August 24, 1977), this Second Supplemental Initial Decision reexamines the question of whether the Hope Creek Generating Station, Units 1 and 2, need be designed so as to protect against flammable gas cloud accidents.¹ Our order of January 26, 1978, stated our conclusion² on this issue, and promised a statement of the reasons for it in the form of an initial decision which would be issued at a later time. This Second Supplemental Initial Decision accomplishes that purpose.

I. LNG TRAFFIC

A. Ships Per Year

1. Taking note of differences in the estimates by the parties of the number of LNG tankers that would pass the plant each year, the Appeal Board directed the Licensing Board to look again at this matter on remand

¹New evidence concerning this matter was received by the Board at hearings held on November 1-4, 1977, and January 10, 1978.

²On the basis of the evidence, we calculate a conservative probability of 2.4×10^{-7} per year as the probability that a flammable gas cloud accident could affect the Hope Creek plant. This value is smaller than the 1×10^{-6} (for a conservative calculation) probability figure stated in NUREG-75/087, which contemplates disregard of accident events having such low probabilities of occurrence. We therefore conclude that the plant need not be designed so as to protect against flammable gas cloud accidents.

Order, January 26, 1978.

(ALAB-429, 6 NRC 229 at 235-236). The Applicants assume that 292 tankers would pass the plant each year if the West Deptford LNG terminal is approved, constructed, and goes into operation. This figure is derived from the Draft Environmental Impact Statement (DEIS) prepared for the West Deptford facility by the Federal Power Commission (FPC) (Kalelkar Supplemental Testimony at 4). This estimate of fleet size is based on an assumed length of trade route and the daily gas output of the West Deptford terminal (Board Ex. 2, p. 2).

2. The Regulatory Staff initially estimated that 360 LNG tankers would pass the plant each year.³ This estimate was based on the assumption that the Raccoon Island as well as the West Deptford terminal would go into operation, and on the rationalization that traffic and safety constraints on the Delaware River would limit LNG traffic to an average of one tanker per day, allowing 5 days per year when inclement weather would prohibit LNG tankers on the river (Read Supplemental Testimony at 6-8). In support of its estimate, Staff offered several alternative methods of estimating future LNG traffic. The only one of these which we consider to be of particular use is the estimate that the West Deptford facility would be served by 390 tankers per year if it operated at 100 percent capacity 100 percent of the time. The figure 292 used by the FPC and adopted by the Applicants is based on the reasonable assumption that the facility would operate at 75 percent of maximum capacity because of seasonal demand (*ibid.*). Lieutenant Stanton, U.S. Coast Guard, testified that while he could not estimate how many LNG/LPG transits could be accommodated on the Delaware per year, he would agree that one every day of the entire year was probably impossible (Tr. 3442). Because of the cancellation of the Raccoon Island application, Staff ultimately concluded that its estimate of 360 tankers per year was overstated, and it adopted the figure of 292 as being more reasonable (Staff Proposed Findings at 6).⁴

3. We find the estimate of 292 LNG tankers per year to be reasonable and Staff's original estimate of 360 to be both reasonable and conservative.

³The Appeal Board stated that it failed to understand why the Staff used the figure 360 when its report stated that LNG traffic would be about 400 tankers per year (ALAB-429, 6 NRC at 232). Staff witness Read testified that the figure of 400 was obtained by rounding 360 to one significant figure (Staff Supplemental Testimony at 8).

⁴The Tenneco application for the West Deptford facility is still pending before the Federal Energy Regulatory Commission (FERC), the successor agency to the FPC. An FEIS for West Deptford was expected to be circulated by FERC in January 1978 (Arvedlund Prepared Testimony at 3). In the DEIS, the FPC staff recommended that the application be denied; this recommendation may or may not be adopted by the FERC commissioners (Tr. 3368). Staff witness Zerby, from FERC, testified that the "trend" was not to approve applications for LNG terminals in populated areas on inland waterways, but he could not say that disapproval would be the result in every such case (Tr. 3366).

All estimates greater than 360 are, we believe, unreasonable. In reaching our decision, therefore, we have relied on the conservative estimate of 360 LNG tankers passing the plant each year.³

B. Accidents Per Mile

4. The Appeal Board was unable to accept the estimate of collision rate applicable to LNG tankers, which was derived by the Applicants and found reasonable by the Staff and the Licensing Board, for a number of reasons (ALAB-429, 6 NRC at 236-239). On the remand, the Applicants and the Staff independently derived accident rates and provided this Board with the bases for those estimates (Kalelkar Supplemental Testimony at 9-21; Staff Supplemental Testimony at 12-21). We shall now consider these new estimates and in the course of this review address the questions and concerns raised by the Appeal Board.

5. Since data on actual LNG traffic on the Delaware is lacking and oceanic LNG traffic is not representative of conditions on a river waterway, both Applicants and Staff calculated accident rates using historical data on large conventional vessels on the Delaware (Kalelkar Supplemental Testimony at 4; Read Supplemental Testimony at 14-17). The Applicants' accident data were taken from the U.S. Coast Guard's casualty reports updated from fiscal years 1969-1973 to fiscal years 1969-1975 (Kalelkar Supplemental Testimony at 5, 18-19). The Staff obtained accident data from the annotated accident narrative of the Captain of the Port of Philadelphia, U.S. Coast Guard (Staff Supplemental Testimony at 14). Both relied on the U.S. Corps of Engineers' *Waterbone Commerce of the U.S.* for their data on the traffic at risk (*id.*, Kalelkar Supplemental Testimony at 8).

6. It was demonstrated previously, and accepted by the Appeal Board, that the flammability range ("catchment distance") of an LNG vapor cloud generated by the maximum credible spill volume of one cargo tank is 12 nautical miles (ALAB-429, 6 NRC at 242). Consequently, only accidents that can occur within a 24-mile section of the river (*i.e.*, 12 miles on either side of the plant) are considered to be relevant to the analysis (Kalelkar Supplemental Testimony at 9-10).

7. Once the historical data were obtained, they were analyzed for their applicability to the LNG tanker problem under consideration here. While Applicants and Staff agree in their general approach, they differ in the criteria used to screen the casualties in order to determine which are relevant.

³Our decision rests on probability values calculated by us, using figures from the record which we consider to be reasonable or both reasonable and conservative.

8. Because of the physical characteristics of this 24-mile section of the river, and the fact that LNG tankers must operate in compliance with an order of the Captain of the Port of Philadelphia (COTP),⁶ LNG vessels in this section of the river:

- will not be moored;
- will not be in an area of industrial docks or piers;
- will not encounter any area of hard or rock river bottom, even if the vessels should go out of the channel;
- will not overtake or be overtaken by other ships;
- will not meet other ships at bends;
- will not meet oncoming ships at a relative speed of greater than 12 knots;
- will only transit during daylight hours;
- will only transit if visibility is 2 miles or greater;
- will only transit with tug escort;
- will be in continuous communication on two radio channels; and
- will be supervised by a U.S. Coast Guard escort vessel.

Given the mode of operation of LNG tankers in the river section of interest, the Applicants determined that the only accident which could produce an LNG spill was a collision (the striking of one vessel by another vessel) between an LNG tanker and another large vessel (draft of over 18 feet) (Kalelkar Supplemental Testimony at 10, 14; Tr. 3103).

9. Accidents which result from groundings were excluded from the data base by the Applicants because LNG tankers are double bottomed and would not lose cargo in a grounding within the 24-mile section of river in question (Kalelkar Supplemental Testimony at 11 and Appendix A). This section of the river does not have rocky ledges nor hard protrusions which could penetrate the hull (Tr. 3075-76, 3064-66, 3476-80). Consequently, Applicants concluded that only soft-bottomed groundings could occur, which would result in lifting the tanker slightly, thus dissipating most of the kinetic energy (Kalelkar Supplemental Testimony at 11 and Appendix A). Board witness Commander Henn, U.S. Coast Guard, testified that there would be no loss of cargo from an LNG vessel running aground in the river section of interest (Tr. 3476-80).

10. The Staff's selection criteria to determine relevant accidents included any casualty which might cause hull damage (Read Supplemental Testimony at 20). Thus, its casualty data base included one grounding incident which resulted in hull penetration. However, Staff acknowledged that

⁶Lt. Stanton, U.S. Coast Guard, testified that the order of the Captain of the Port would be in effect whenever an LNG or LPG vessel transits the river (Tr. 3438-3439; also see Appendix B to Kalelkar's Supplemental Testimony).

the grounding in its data base might not be relevant because the accident contained conditions that would not be expected on the section of the Delaware River being considered (Read Supplemental Testimony at 19).

11. Joint Intervenor contend that groundings should not be eliminated from the data base for several reasons. They allege that there are indeed hard areas on the river bottom in the 24-mile river section of interest, notably in the vicinity of Pea Patch Island (Tr. 3075-76). These hard spots are not rock ledges, however, which could cause penetration of the tanks of an LNG vessel (Tr. 3076, 3480). Commander Henn testified that while it is possible that there are uncharted rocks in the main channel of the Delaware River, their presence is not likely (Tr. 3486, 3494). He testified further that he could not envision the failure of both the primary and secondary barriers of an LNG tank resulting from the grounding of an LNG vessel on an uncharted rock in the river section of interest (Tr. 3480).

12. Intervenor contend also that a grounding accident could distort the double bottom of an LNG tanker, which in turn might result in distortion of the cryogenic tank's foundation. This distortion of the foundation could produce stress on the cryogenic containment barrier which might be relieved by failure of the barrier (Fisher Testimony at 21). Commander Henn, on the other hand, testified that the LNG vessels are designed to withstand such an accident without loss of cargo; consequently, he could not envision a failure of both primary and secondary barriers as a result of a grounding in the river section of interest, even at a speed of 15 knots (Tr. 3476-80).⁷ Intervenor point out that under cross-examination Commander Henn testified that it was *possible* for a force that causes failure of the primary barrier to also cause failure of the secondary barrier (Intervenor's Proposed Findings, paragraph 37). The record makes it clear, however, that the witness meant "possible" in the sense that almost *anything* can be considered to be possible (Tr. 3492-94). Finally, we note that Intervenor David A. Caccia rejects Commander Henn's "opinion" that grounding on a rock in the river section of interest would not cause cargo loss from an LNG tanker; Mr. Caccia offers his own opinion, asserting that "a 15-knot grounding on rocks could cause a[n] LNG cargo loss" (Caccia Proposed Findings at 1).⁸

13. The Appeal Board noted that the FPC, in its environmental statements for the Raccoon Island and West Deptford facilities, included

⁷For a description of primary and secondary barriers, see Commander Henn's testimony at Tr. 3455-56, 3467-69, 3478-79.

⁸Mr. Caccia, whose participation in these proceedings was ordered by the Appeal Board in ALAB-429 (6 NRC at 233), has claimed no expertise in the area of flammable gas tanker traffic. We do not, therefore, accord the weight to his opinion that we do to the opinion of Commander Henn.

groundings as having the potential for causing a loss of cargo from an LNG tanker (ALAB-429, 6 NRC at 240). That Board also expressed concern that a grounded LNG vessel might have to off-load some of its cargo while grounded or might become more susceptible to collision as a result of being aground (*ibid*). Staff Witness Arvedlund, one of the authors of the FPC's environmental statements for the Raccoon Island and West Deptford LNG terminals, indicated that the accident rate developed in those documents was relevant to LNG traffic over the entire reach of the Delaware River, rather than the 24-mile segment of interest here (Arvedlund Testimony at 3-4). Consequently the FPC analysis of groundings is not directly comparable to the one we are considering. With regard to a grounded LNG vessel off-loading cargo, the cargo tanks of such vessels are capable of containing the cargo indefinitely, although periodic venting or burning of vapor from the tanks might be required (Kalelkar Supplemental Testimony at 48). When vented from tanks in this manner, methane mixes well with air, and the flammable vapor hazard extends only a few hundred feet (*ibid*).⁹ Such a grounded LNG tanker would either be floated off with tug assistance at high tide, or the cargo might be off-loaded to another tanker or to tank trucks on barges (*ibid*).

14. While a tanker was grounded, the Coast Guard would take appropriate action to minimize the threat under the Port and Waterways Safety Act (Tr. 3083). Be that as it may, however, a possible collision of a moving vessel with a grounded tanker is already reflected in the data bases of Applicants and Staff as a "collision" (Staff Proposed Findings at 12).

15. The evidence before us concerning grounding accidents causes us to find (1) the river bottom in the catchment distance contains no rocks or other objects that the Coast Guard considers to be a hazard to navigation; (2) should an LNG vessel ground in this section of the river, most of the energy would be dissipated in lifting the vessel; (3) if the hull of an LNG ship were distorted in a grounding accident, it would not lead to loss of cargo; (4) if an LNG vessel grounded on uncharted rocks in the river section of interest, even at speeds up to 15 knots, it would not result in cargo loss; (5) the fact that the FPC included cargo loss in grounding accidents in its risk analysis for LNG traffic on the Delaware is not relevant to the analysis here; (6) a grounded LNG ship poses no unusual threat of producing a flammable cloud of methane sufficient to endanger the Hope Creek plant; and (7) the risk of another vessel colliding with a grounded LNG ship has been adequately considered. We conclude, therefore, that it was appropriate for

⁹We note, however, that the Captain of the Port order, which is in effect when an LNG or LPG ship transits the Delaware River, prohibits venting of vapors and requires that the vessel "demonstrate the ability to contain or consume boil-off vapors for a minimum of 21 days" (Kalelkar Supplemental Testimony, Exhibit B, p. 4).

the Applicants to eliminate groundings from their accident data base.

16. Ramming accidents were initially eliminated from the casualty data base by both Applicants and Staff, because they believed that there were no objects in the river section of interest which could be rammed by an LNG tanker (Applicants' Proposed Findings, paragraphs 28-28A; Staff's Proposed Findings, paragraphs 24-25).¹⁰ Intervenor witness Dr. Fisher testified, however, that he had observed concrete based pylons for transmission towers being constructed on either side of the channel 7 or 8 miles north of the Hope Creek site (Tr. 3621-22, 3634). Lieutenant Stanton confirmed this observation and indicated that while the pylons were not on the most recent nautical chart for the area, the maritime public had been notified about them by the Commander of the Third Coast Guard District in a local Notice to Mariners (Tr. 3686-87). The presence of the pylons will be indicated on future charts (Tr. 3687). Lieutenant Stanton was unable to testify as to the depth of the water at the pylons, but at the Board's request he agreed that the Coast Guard would provide the Board with this and other relevant information about the pylons (*ibid*).

17. Subsequently, the Board received a letter from Captain K.G. Wiman, U.S. Coast Guard, Captain of the Port of Philadelphia, giving us the location of the towers and water depth at one of them.¹¹ Tower 97 is located about 800 feet west of the shipping channel and tower 98 is about 800 feet east of the channel. The water depth at tower 98 is 12 feet (mean low water), but at tower 97 the depth was known only to be at least 18 feet. In a later letter, dated December 19, 1977, Captain Wiman informed us that he had learned that the water depth at tower 97 was 34 feet at mean low water. With this indication that an obstacle exists in the catchment distance which an LNG vessel might, indeed, be able to ram, the Board reconvened the hearing to take evidence concerning the probability that an LNG vessel would ram tower 97. The evidence relating to this particular ramming accident will be considered *infra*.¹² We continue, now, with our consideration of the other parameters associated with the accident per mile problem.

18. Joint Intervenors and Mr. Caccia argue that the catchment zone cannot be assumed to be safer than the rest of the river with regard to ramming, because it cannot be assumed that docks or piers will not be constructed within the 24-mile river section of interest during the life of the Hope Creek Plant (Intervenors' Proposed Findings, paragraph 48; Caccia

¹⁰A ramming involves a vessel striking a fixed and immovable object such as a dock or pier.

¹¹All parties were provided copies of this correspondence between the U.S. Coast Guard and the Board.

¹²The Applicant has considered the scenario of an LNG vessel ramming a pier of the bridge located 15 miles north of the plant (Applicants' Proposed Findings at 41). Because this bridge is outside the catchment distance, it is not necessary for us to examine this scenario.

Proposed Findings at 1). Both Applicants' witness Dr. Kalelkar, and Staff's witness Dr. Read, testified that they knew of nothing that would prohibit the construction of port facilities within the 24-mile catchment zone during the lifetime of the plant (Tr. 3052, 3121). But Dr. Read testified that a facility to accommodate vessels having a draft of over 18 feet would be a deep-water port, that all deepwater ports on the Delaware had been found and already had cities on them, and that to dredge and construct a new port would be a multibillion dollar development (Tr. 3234, 3258-59). He could see no need for new port facilities in the catchment zone (Tr. 3233). No evidence was introduced to indicate any likelihood that such port facilities might be developed. In the absence of such evidence, and in view of evidence indicating that such a development is not likely, we reject the Intervenor's speculative argument that future docks or piers should be accounted for in the accident analysis.

19. The Applicants and the Staff excluded collisions between a large ship and a tug or barge, because such an accident would not cause a cargo spill from an LNG vessel (Applicants' Proposed Findings at 43; Staff's Proposed Findings at 15-16). Collisions between a large ship and a tug or barge often result in great damage to the smaller vessel but little damage to the ship (Kalelkar Supplemental Testimony at 14; Staff Supplemental Testimony at 17; Tr. 3103). Thus, while the Applicants initially reviewed all collisions involving at least one vessel having a draft of over 18 feet, those accidents in which the smaller vessel was a tug or barge were discounted (Kalelkar Supplemental Testimony at 14). Staff likewise excluded accidents in which ships collided with barges or tugboats (Read Supplemental Testimony at 17). Joint Intervenor's say that they do not consider this argument persuasive, but they acknowledge that "it may . . . be true"; their own argument on the point begs the question (Intervenor's Proposed Findings, paragraph 45). We find that the evidence supports the determination that a collision between an LNG vessel and a tug or barge would not cause sufficient damage to an LNG ship to result in a spill. Consequently, it was appropriate to drop such accidents from the data base.

20. Accidents involving anchored or docked vessels, or vessels in the process of anchoring or docking, were excluded by Applicants and Staff because these situations and activities will not be found in the 24-mile river section of interest (Kalelkar Supplemental Testimony at 15-16; Read Supplemental Testimony at 17-18). Applicants, however, did include three accidents in which a vessel lost power or steerage, or both, and struck an anchored or moored ship; the rationale for including these incidents was that it is conceivable that an LNG ship might be struck by a vessel which loses power or steerage (Kalelkar Supplemental Testimony at 16). As we indicated, *supra*, LNG vessels will be underway at all times in the segment of

the river in question here, and there are no docks or anchorages there that might be used by other ships (Kalelkar Supplemental Testimony at 10-12, 15-16, Appendix B). Joint Intervenor maintain that collisions with anchored vessels should be included because of the possibility that an LNG ship will lose power within the catchment distance and be forced to anchor (Fisher Prepared Testimony at 25; Intervenor's Proposed Findings, paragraph 46). We believe that such an event has been taken into account by the Applicants through the inclusion of the three incidents in which anchored or moored ships were struck by a ship that had lost power or steerage. We also note that should an LNG vessel be forced to anchor during transit of the Delaware River, it would do so under Coast Guard direction and control, and the Coast Guard's escort vessel would remain with the LNG ship to supervise it and to alert other traffic that the LNG vessel was at anchor (Tr. 3449, 3461). Commander Henn testified that the Coast Guard anchors LPG vessels in the river at the Port of Philadelphia and said, "we have had no problems" (Tr. 3461). The evidence, we find, justifies the exclusion of accidents associated with anchored or docked ships, except to the extent that Applicants have included three such accidents in their data base.

21. Intervenor's witness Dr. Fisher initially testified that the Applicants had excluded accidents in fog because Coast Guard regulations prohibit the entry of an LNG ship into the Delaware River if visibility is less than 2 miles (Fisher Prepared Testimony at 25; Kalelkar Supplemental Testimony, Appendix B). Upon cross-examination, however, Dr. Fisher admitted that he was uncertain whether accidents had been eliminated because they occurred in fog (Tr. 3667). Our reading of the record indicates that, in fact, no accidents were excluded by the Applicants because they occurred in fog (Kalelkar Supplemental Testimony at 16-17; Tr. 3969). Dr. Kalelkar testified that he examined several collisions which occurred in fog and which "could have been discarded as not being applicable to LNG tanker accident analysis since USCG regulations forbid the entry of an LNG tanker to the Delaware unless the visibility is at least 2 miles (see Appendix B)" (Kalelkar Supplemental Testimony at 16-17). But these accidents were "examined in detail" and eliminated for one or more of the reasons which we have considered, *supra*, and found appropriate (*ibid*). Thus, accidents in fog have been included in the data base by the Applicants. The Staff, too, did not exclude accidents because they occurred in fog (Read Supplemental Testimony at 17-19).

22. The order of the Captain of the Port of Philadelphia relating to LNG/LPG traffic provides that LNG and LPG vessels will not start a transit unless visibility is at least 2 miles. Nevertheless, it was not unreasonable for Applicants and Staff to include in their data bases accidents which occurred in fog because, as Dr. Fisher testified, fog over water is often found

in patches; hence, there may be times when LNG vessels will operate in restricted visibility (Fisher Prepared Testimony at 25). Lieutenant Stanton testified that should an LNG vessel encounter fog, it would proceed to the nearest anchorage or continue its voyage to the terminal; but he said he would expect the vessel to continue its voyage rather than anchor and thus create a greater hazard (Tr. 3448). He said, further, that in the early morning before an LNG ship is to enter the river, the Coast Guard escort vessel will make a transit down river from Gloucester City to determine whether there are changing fog or weather conditions which might affect the transit, and also to check navigation aids and look for hazards in the river (Tr. 3447). If the patrol craft encountered bad visibility, the LNG vessel would be required to anchor near Ship John Shoal Light to await better weather conditions (*ibid.*).¹³ Considering these facts, we believe that the likelihood of a fog-caused accident is so remote that it need not have been factored into the probability analysis. It was conservative, therefore, to include in the data base accidents which occurred in fog.

23. Based on the foregoing analysis, Applicants concluded that the only type of accident which could produce an unignited spill of LNG in the river section of interest was a collision between an LNG tanker and another large vessel (Kalelkar Supplemental Testimony at 10). The U.S. Coast Guard marine casualty reports used by Applicants for their accident data base identified 67 collisions on the Delaware River during the period 1969-1975 (*id.* at 13). Of the 67 collisions, 25 were discarded as not relevant because they involved small vessels or barges (*id.* at 13-15, 17-18); 22 collisions were discarded because they involved vessels which were moored or anchored (*id.* at 15-18); one was discarded because it occurred in an anchorage area (*id.* at 15); five were discarded because they involved vessels which were docked, docking, or undocking (*id.* at 17-18); and four were discarded because they were found to have occurred outside the Delaware River (*id.* at 13). Thus, the Applicants' examination of all 67 collisions involving any type of vessel revealed that ten could be considered as capable of causing an LNG tanker spill (*id.* at 18).¹⁴

24. The Staff utilized accident narratives of Captain Goodwin for the period 1967-1974 for developing its casualty data base (Read Supplemental Testimony at 16-17). These narratives are limited to casualties which involved

¹³The anchorage for LNG ships near Ship John Shoal Light is outside the catchment distance, apparently having been located there by the Coast Guard in 1975 so as to specifically avoid anchoring LNG vessels within 12 miles of the Salem Nuclear Generating Station (Tr. 3460). The Hope Creek site is immediately adjacent to and north of the Salem plant.

¹⁴The Appeal Board rejected, as inadequately supported in the record, a reduction from 43 collisions to seven relevant collisions in Applicants' analysis of the record for 1969-1973 (ALAB-429, 6 NRC at 236). That reduction was based on the same rationale as used in analyzing the data for 1969-1975 (Kalelkar Supplemental Testimony at 18-19).

over \$10,000 damage; it is Staff's opinion that accidents causing less than \$10,000 damage would not cause sufficient vessel damage to result in cargo loss from an LNG vessel (Read Supplemental Testimony at 17). Forty accidents causing more than \$10,000 damage occurred during the 8-year period examined by the Staff (*ibid.*). From 40 casualties, Staff eliminated accidents involving large ships colliding with small vessels or barges, accidents involving ships at anchor or docked, other dockside accidents, and rammings (Read Supplemental Testimony at 17-18). The rationales for these eliminations have been discussed and evaluated in paragraphs 16 through 20, *supra*. In addition, Staff discarded the following: a collision with a car ferry, on the ground that there are no ferries within the catchment zone; a barge which exploded from battery hydrogen ignition, on the ground that such an accident is limited to unpowered barges which utilize batteries for running lights; an accident in which deck equipment was lost overboard, on the ground that this event would not endanger the hull; and groundings which did not cause bottom damage sufficient to endanger water tightness (*ibid.*). The Staff's criterion for eliminating groundings differed somewhat from that used by the Applicants, and resulted in Staff accepting one grounding accident in which the hull was penetrated (Read Supplemental Testimony at 19; Tr. 3201-3203). The Staff testimony cast some doubt on the relevance of this case, however (*ibid.*).

25. After excluding accidents on the basis of all these criteria, Staff was left with five ship collisions and the one grounding, which it considered to be possibly capable of causing an LNG spill (*ibid.*). These six relevant accidents involved a total of 11 ships (*ibid.*). While the Applicants counted each relevant collision as one accident of interest, Staff counted each large vessel involved in a collision as one accident of interest; thus Staff obtained 11 accidents of interest from its five collisions and one grounding (Read Supplemental Testimony at 15, 19-21; Tr. 3123).

26. Staff counted each vessel involved in a collision as one accident because it considered both the struck vessel and the striking vessel to be at risk with respect to being a potential source of an LNG spill (Tr. 3123). Applicants, on the other, considered only the struck vessel to be at risk in this sense (Tr. 3699-3700). According to Applicants' witness, Dr. Kalelkar, should an LNG ship be the striking vessel, the probability of a spill would be zero, or close to it, because the bow of the ship would absorb the energy of the collision without damage to the forward LNG tank (*ibid.*).¹⁵

27. The Intervenor's argue that the number of relevant accidents are underestimated by Applicants and Staff because some of the accidents which were excluded from the analyses should have been retained in the

¹⁵Based on our study of Board Ex. 2 (see p. 173), the number one cargo tank on a 125,000-cubic-meter LNG carrier is more than 100 feet from the bow.

data bases (Intervenors' Proposed Findings, paragraphs 35-36). Joint Intervenors' witness, Dr. Fisher, testified that not only should all collisions be included in the data base, but some of the grounding accidents should be included as well; in his opinion collisions and groundings may arise from judgmental errors, misinterpretations of information, or misapplication of data to which LNG tankers are susceptible (Fisher Prepared Testimony at 24, 26-27). It is clear, however, that accidents resulting from errors in judgment were in no way eliminated from the data base. Judgmental errors are an inherent cause of accidents contained in the historical record from which Applicants and Staff derived their data. We must reject, therefore, Dr. Fisher's suggestion in this regard. Additional reasons which the Intervenors advanced for not discarding certain types of accidents from the data base have been dealt with by us in paragraphs 11, 12, 18, and 21, *supra*.

28. The criteria used by the Applicants and the Staff for determining the relevancy of accidents were similar, except for the single grounding accident included by the Staff. We have found these criteria to be reasonable. We also find the difference with respect to groundings to be insignificant, because the evidence we have received on grounding accidents leads us to believe that the grounding accident included in Staff's calculation would not have produced an LNG spill. The historical records used by Applicants and Staff for deriving their data, however, were different.

29. Staff used as its historical record the accident narrative of the Captain of the Port of Philadelphia, which at once eliminated from consideration all accidents involving damage amounting to \$10,000 or less. Staff believes that an accident causing \$10,000 damage or less would not cause an LNG spill. We concur, and we find Staff's final selection of five relevant collisions and one relevant grounding to be reasonable.

30. Applicants used as their historical record the U.S. Coast Guard casualty reports. This record did not eliminate accidents on the basis of damage costs, which accounts, in part, for the fact that Applicants obtained a total of 67 accidents for their data base compared to Staff's total of only 40 casualties.¹⁶ Thus the Applicants worked from a much more comprehensive data base than did the Staff. From their data base, Applicants selected a total of ten collisions which they determined to be relevant to a possible LNG spill. We find this determination to be reasonable. In addition, because of the large data base and the conservatism used by the Applicants in selecting relevant accidents, we find Applicants' determination of number of relevant accidents to be conservative. In reaching our decision,

¹⁶Another difference between Applicants' and Staff's historical records is that Applicants' data came from the period 1969-1975, whereas Staff's came from the period 1967-1974; this also contributes to the difference in number of accidents obtained by Applicants and Staff (Read Supplemental Testimony at 15).

we have relied on the Applicants' estimate of number of accidents per year.¹⁷

31. As noted, *supra*, Applicants obtained their estimates of traffic at risk, or exposure data, from the historical record contained in the U.S. Corps of Engineers' *Waterbone Commerce of the U.S.* (Kalelkar Supplemental Testimony at 8; Tr. 3003-07, 3690-93). To obtain the number of ship transits on the Delaware River, Applicants used information contained in a table entitled "Consolidated Report Upbound and Downbound" (Tr. 3691-92). Average miles traveled was obtained from another part of the report which gave total tons of traffic moved upbound and downbound and total ton-miles for the same cargo (Tr. 3692). From these data, with an adjustment to account for internal movements on the Delaware, Applicants derived their estimate of total ship-miles transited (Kalelkar Supplemental Testimony at 20-21; Tr. 3692-93). The estimate was an average of 9,474 one-way transits per year, each involving a movement of 100 miles, to give an annual exposure of 9.47×10^5 ship-miles per year (*ibid.*). By dividing the estimate of accident rate, 1.43 accidents per year (ten accidents in 7 years), by this estimate of exposure, Applicants obtained per-mile accident rate of 1.51×10^{-6} collisions per mile-year (Kalelkar Supplemental Testimony at 21).

32. In order to test the validity of the Applicants' estimate, Staff independently obtained an estimate of exposure of 60 miles per port call, based on an assumed round trip transit of the river from the anchorage off Smyrna to the Delaware Memorial Bridges, even though the five collisions and one grounding selected by Staff occurred over a wider range of the river (Read Supplemental Testimony at 20-21; Tr. 3124-26). Port calls were used as a basis for estimating exposure in response to a suggestion made by the Appeal Board, and the 30-mile section of the river from Smyrna to the Delaware Memorial Bridges was used because it contains the 24-mile catchment zone and is unlike other sections of the river (*ibid.*). Staff divided its accident rate (based on 11 accidents in 8 years) by this estimate of exposure, to obtain a per-mile accident rate of 1.5×10^{-6} accidents per mile-year (*ibid.*).

33. The Appeal Board questioned the validity of the Applicants' original accident rate of 1.5×10^{-6} , which had been found to be reasonable by the Staff and by this Licensing Board, because it was unclear why some types of

¹⁷As we noted in paragraph 26, *supra*, Applicants considered only the struck ship to be at risk with regard to a possible LNG spill, whereas Staff counted both ships involved in a collision. Applicants argue that the bow of the striking ship would absorb the energy of the collision without damaging the forward LNG tank (Applicants' Proposed Findings, paragraph 24). Applicants' position is supported by the SAI report, which states, "to crush an LNG ship's bow sufficiently to release LNG would require a speed in excess of 30 knots, a speed greater than the ship's capability. Thus, there is no risk of a release of LNG due to ramming another ship by an LNG ship" (Board Ex. 1, §2.3.2.3). We accept this argument.

accidents were excluded from the data base, and because of "apparently conflicting and larger values" (ALAB-429, 6 NRC at 238). Applicants have provided the requisite explanations for eliminating accidents from the data base, and we have dealt with these in paragraphs 15 through 23. We now consider the conflicting values obtained in other studies. In question are the DEIS prepared by the FPC for the proposed West Deptford LNG terminal (Board Ex. 2), the risk assessment done by Science Applications (SAI) for the proposed Raccoon Island LNG terminal,¹⁸ the analysis of LNG marine transportation by Booz-Allen,¹⁹ and a study by the Oceanographic Institute of Washington (OIW).²⁰

34. The FPC study had different objectives from the analyses performed by the Applicant and the Staff (Arvedlund Prepared Testimony at 3). The purpose of the FPC study was to assess the risks from LNG traffic to the public residing along the entire tanker route (*ibid.*). FPC used as its data base a historical record of only tanker accidents in the Delaware, and calculated accident rates for six zones of the river, some of which had been determined to be uniquely hazardous (*id.* at 4). In addition to being based on different data, the method used by FPC for screening accidents differed from those used by the Staff and Applicants, because ships experience different risks in different zones of the river; consequently, many accidents used in the FPC study would not be appropriate for the 24-mile catchment distance of concern here (*id.* at 5-6). The FPC study gives an accident rate of 1.0×10^{-5} collisions per mile, which is greater than those estimated by Applicants and Staff (Kalelkar Supplemental Testimony at 23). The Intervenor's argue that the FPC rate should be applied to the Hope Creek risk calculation, on the ground that all accidents should be included in the analysis (Intervenor's Proposed Findings, paragraphs 52-54).²¹ We have already found, however, (see paragraphs 15 through 29, *supra*) that the accident screening carried out by Applicants and Staff was justified. Hence, we conclude that the FPC rate of 1.0×10^{-5} accidents per mile is not applicable to the problem before us, and we do not consider it as contradicting the rates calculated by Applicants and Staff. In fact, if the FPC analysis is applied correctly to the Hope Creek plant site, a rate of 1.5×10^{-6} collisions

¹⁸"Risk Assessment of LNG Marine Operations for Raccoon Island, New Jersey," Science Applications, Inc., 1975.

¹⁹"Analysis of LNG Marine Transportation for the Maritime Administration," Booz-Allen Applied Research, Inc., 1973.

²⁰"Offshore Petroleum Transfer System for Washington State—A Feasibility Study," Oceanographic Institute of Washington, 1974.

²¹Intervenor's witness Dr. Fisher testified at some length with regard to the FPC analysis (Fisher Prepared Testimony at 20-21). His testimony was rebutted by Staff witness Arvedlund (Tr. 3316-17, 3339-43, 3359-61, 3374-75). In our view, the effort at rebuttal was successful, and we need not review that testimony here.

per mile-year is obtained (Kalelkar Supplemental Testimony at 25). This value corroborates those calculated by Applicants and Staff.

35. The SAI report utilizes a theoretical mathematical model which disregards the physical and geographical features of the river (*id.* at 26; see Appendix A of the SAI report). It predicts a collision rate of 1×10^{-4} collisions per 66-mile transit (*ibid.*). On a collision per mile basis, this comes to 1.52×10^{-6} collisions per mile-year over the 66-mile zone of interest to SAI (Delaware Bay to Wilmington, which includes the 24-mile catchment zone of concern in this proceeding) (*ibid.*). This independent estimate is also very close to the values obtained by the Applicants and the Staff and provides additional corroboration of those values.

36. The Booz-Allen study addresses potential LNG tanker shipments to several major U.S. ports, including the Delaware River (Kalelkar Supplemental Testimony at 27). The analysis for the Delaware River was concerned with risks along the entire river. The approach used by Booz-Allen was similar to that used by the Applicants, except that accidents involving LNG vessels at dock were included because the zone of interest included that region of the river where these ships will dock (*id.* at 27-28). The accident rate derived from the Booz-Allen study is 2.62×10^{-6} "potentially serious incidents per mile" (*id.* at 28). This value is not directly comparable to the accident rates obtained by Applicants and Staff. It is larger than the estimates of Applicants and Staff because it includes dockside accidents, which we have found can be justifiably excluded in analyses with respect to the Hope Creek plant. Thus, we find that the Booz-Allen estimate does not contradict the estimates of Applicants and Staff.

37. The OIW study addresses the question of the likelihood of oil spills in several U.S. ports, including the Delaware River, in connection with an effort to assess the risks of oil spillage associated with an offshore petroleum transfer system for the State of Washington (Kalelkar Supplemental Testimony at 29). If the OIW results are used to calculate a collision rate per mile, the value 2.2×10^{-5} is obtained (*id.* at 30). This rate is applicable to the entire river, not just the 24-mile zone of interest in this proceeding. It includes many accidents of the types we have found to be justifiably excluded from consideration (*id.* at 31). Consequently, we do not consider the OIW estimate to be contradictory of those obtained by the Applicants and the Staff.

38. The Appeal Board calculated a casualty rate of 3×10^{-5} from figures contained in Staff Exhibit 1-F, but acknowledged that it "apparently includes incidents of all types (collisions, rammings, and groundings)" (ALAB-429, 6 NRC at 238 and n. 44). The record now makes clear the types of accidents which were excluded and why they were excluded. We need not go over that again. Because it includes many types of irrelevant accidents,

we find the 3×10^{-5} casualty rate obtainable from Staff Exhibit 1-F (at p. 8) not applicable to the Hope Creek analysis.

39. The Appeal Board also suggested that LNG tanker experience in ports and harbors might be assessed as a check on the validity of the Applicants' accident rate (ALAB-429, 6 NRC at 238). The Applicants responded by estimating that there have been some 9,400 harbor entries or exits by LNG tankers on a worldwide basis without a collision with any other vessel (Kalelkar Supplemental Testimony at 32). Modeling the occurrence of an LNG tanker collision as a Poisson process gives a collision rate of zero, since there have been no collisions of LNG tankers while underway, and permits the calculation of a 95 percent confidence limit of 3 for the unobserved event (*id.* at 33). This confidence limit leads to a collision rate of 3.2×10^{-4} collisions per one-way harbor transit (*ibid.*). Assuming that the average one-way harbor transit of LNG tankers is 8 miles, Applicants calculated a rate of 4.3×10^{-5} collisions per mile-year (*ibid.*). Expressed in other words, one is 95 percent certain that the collision rate for LNG tankers underway in harbors is less than 4.3×10^{-5} (*ibid.*). If the safety record for LNG tankers persists, this confidence level will go down as more and more tanker experience is accumulated.

40. The Staff responded to the Appeal Board's suggestion with regard to analyzing LNG experience using a somewhat similar probabilistic analysis, but its calculation was based on different parameters (Read Supplemental Testimony at 21-22). The Staff assumed that ship traffic possesses a natural attribute, *viz.*, human error, which leads to observed accidents, and that human error is nearly constant with respect to time (*id.* at 21). Staff then noted that 100 ship-years of LNG tanker experience have accumulated without a cargo-loss accident, and calculated that about 4,000 ship-years of experience would be needed to test the likelihood of an accident rate of 1.5×10^{-6} per year-mile (*id.* at 21-22). Thus, Staff concluded that LNG traffic has not been extensive enough to be useful in its analysis (*id.* at 22). With regard to LNG port calls, Staff could only say that enough port calls have occurred to provide evidence that "it is likely that LNG tankers have lower casualty rates than average shipping" (*ibid.*). Based, as they are, on the observation of zero accidents involving LNG tankers underway in harbors, we do not find these estimates derived from LNG experience to be useful to our deliberations. We believe that they are essentially meaningless and that they do not in any way challenge the estimates obtained by Applicants and Staff from historical data on conventional large ships.

41. Finally, the Appeal Board suggested that still other LNG studies might contain information valuable to the analyses of Applicants and Staff (ALAB-429, 6 NRC at 245, n. 94). Dr. Read testified that many studies other than those listed in paragraph 33, *supra*, had been examined by the

Staff (Read Supplemental Testimony, Appendix A, p. 4-5, Tr. 3282). While portions of these other studies were of interest, they were not found to be directly applicable to the analysis of concern in this proceeding (*id.* at 5). Similarly, Dr. Kalelkar testified that a large amount of literature in addition to that cited was reviewed for its relevance to the Hope Creek evaluation (Kalelkar Supplemental Testimony at 31). The studies which were found to be generally useful were listed in Table 2 of his testimony (*id.* at 62-63). Only those cited in paragraphs 34 and 35, however, were directly applicable to the Hope Creek risk analysis (*id.* at 31). From this evidence we conclude that Applicants and Staff have reviewed and made appropriate use of available literature which is relevant to the analysis of concern in this proceeding.

42. Having considered this evidence and made the foregoing findings, we conclude that the accident rate estimated by the Applicants (1.51×10^{-6} collisions per year-mile) is reasonable. It is corroborated by results obtained in the FPC study and by the theoretical model developed by SAI. Larger values obtained in other studies or from other calculations do not contradict the estimates of Applicants and Staff because they are not comparable to them. Finally, we have found the historical record used by Applicants and Staff, and the data screening procedures used by them, to be adequate and justified, for the reasons given, *supra*.

43. We prefer the Applicants' estimate over the one calculated by Staff. Applicants' figure is based upon an analysis of 67 accidents, compared to Staff's analysis of 40 accidents. Staff's data base included only accidents involving more than \$10,000 damage. We have agreed with Staff that it is reasonable to eliminate accidents that do not cause more than \$10,000 damage, on the ground that such accidents would not cause a cargo spill from an LNG tanker. But no such elimination was made in the data base used by the Applicants. We conclude, therefore, that the Applicants' calculation is the more conservative of the two.²²

44. Applicants' witness Dr. Kalelkar testified that using historical data based on conventional tankers and freighters to calculate a collision rate to be applied to LNG tankers is conservative, because LNG tankers have collision avoidance systems, favorable horsepower to tonnage ratios, and bow thrusters, and also will transit the river with tug and U.S. Coast Guard escorts under rules of the Captain of the Port of Philadelphia for LNG tankers on the Delaware River; these factors will make LNG tankers less collision prone than other large ships (Kalelkar Supplemental Testimony at

²²Obviously there is no statistically significant difference between the Applicants' estimate and that calculated by the Staff. Since the Staff's approach was independent of and somewhat different from the Applicants', Staff's estimate serves to corroborate Applicants' estimate.

19-21). The Staff has taken a similar position (Staff's Proposed Findings, paragraphs 55, 59).

45. Joint Intervenor and Intervenor Caccia, on the other hand, maintain that generalized claims for conservatism with regard to LNG vessel characteristics and operations are invalid (Intervenor's Proposed Findings, paragraph 70; Caccia's Proposed Findings at 1-2). Much of the testimony of Intervenor's witness Dr. Fisher was directed toward this contention.²³ To begin with, Dr. Fisher testified that an LNG vessel has more "sail area" than other vessels of comparable draft because its freeboard is as much as four times larger than that of a comparable tanker (Fisher Prepared Testimony at 12-13). Consequently, it is more susceptible to being thrown off course by lateral winds; thus, in the Delaware River it might be subject to groundings with greater frequency than other vessels (*ibid.*).²⁴ Commander Henn testified, however, that he did not see the large freeboards of LNG ships as being unique because there are other large vessels that have similar large sail areas, either by design or by the way they carry their cargo (Tr. 3470). Lieutenant Stanton testified that he knew of only one case in which a ship with a large sail area was blown off course in the Delaware: an automobile carrier, with shallow draft, was blown about the channel by gusty winds in a thunderstorm and required assistance from a tug (Tr. 3473-75). He characterized it as "a remarkable incident," and went on to say that the Coast Guard would not permit an LNG vessel to travel on the river if a severe weather warning was out (Tr. 3474). The Board notes, first, that vessels with large sail areas have been plying the Delaware with no apparent higher incidence of risk than other large ships. Further, LNG vessels will be equipped with bow thrusters, which, according to Commander Henn and Captain Van Leuven, Master of the S.S. LNG AQUARIUS, would aid the vessel in maintaining stability under conditions of strong lateral winds (Tr. 3483, 3722). Finally, LNG vessels would be accompanied by at least one tug, which could assist in the event of wind displacement (Tr. 3472). In view of this evidence, we reject the contention by the Intervenor that the high freeboard of LNG vessels would make them more susceptible to

²³The Board notes that Dr. Fisher testified that he had done no numerical analysis and had reached "qualitative conclusions" (Tr. 3638; Fisher Prepared Testimony at 11, emphasis in original).

²⁴To support his testimony with regard to wind-caused accidents involving large ships, Dr. Fisher cited some accident cases listed in the Todd Shipyard report, "Nature of Ship Collisions Within Ports" (Fisher Prepared Testimony at 13; Applicants' Ex. 12). Dr. Fisher supplemented his prepared testimony extensively under cross-examination and questioning by the Board (Tr. 3414-37). We have studied all of this evidence carefully and believe that it speaks for itself; hence we have decided that we need not review it here. We find that the evidence does not support the interpretation which Dr. Fisher placed on the accident reports he cited from the Todd report.

grounding accidents. Be that as it may, we have determined previously that grounding accidents by LNG vessels can be disregarded in the risk analysis because they would not cause a cargo spill.

46. Second, Dr. Fisher testified that loss of propulsion by an LNG vessel would create a hazardous situation (Fisher Supplemental Testimony at 14). Most loss of propulsion accidents occur when a vessel is maneuvering, such as at docking or anchoring facilities, rather than when the vessel is traveling at a steady speed (*ibid.*; Tr. 3475). In the 24-mile river section of interest, loaded LNG tankers will be proceeding upstream and will not be engaging in maneuvers. In addition, they will be under Coast Guard escort and accompanied by one or more tugs, which would assist should the ship become disabled. In view of the evidence, we find that loss of propulsion by an LNG tanker in the river section of interest is unlikely, and should it occur the resultant risk would be reduced by the assisting escort vessels. In any case, the Applicants' analysis includes accidents resulting from loss of propulsion (Kalelkar Supplemental Testimony at 16). Thus, there is no merit to Dr. Fisher's contention that the methodology to determine risks does not encompass such possibilities (Fisher Prepared Testimony at 14).

47. Dr. Fisher further testified that the greater horsepower of an LNG vessel, which is about twice that of tankers having comparable draft, does not add to the ship's maneuverability, except in the limited situation where the pilot wishes to accelerate the vessel forward to avoid an accident (Fisher Prepared Testimony at 15). Captain Van Leuven testified, however, that at low forward velocities, high horsepower applied in short bursts with the rudder hard over would change the direction of the ship without increasing its speed to any great extent (Tr. 3714). He also testified that the bow thrusters could be used to alter the ship's direction at speeds from 0 to 8 knots (Tr. 3713).²⁵ Dr. Fisher also testified that the steam-turbine driven LNG vessels have very slow response characteristics (Fisher Prepared Testimony at 16). On cross-examination, however, Dr. Fisher said that the

²⁵Dr. Fisher offered extensive testimony on the effectiveness of bow thrusters, all of which we have considered but not all of which need be reviewed here. His position was summarized when he said, "[B]etween 0 and 3 knots they are very effective. Between 3 and 6 knots their effectiveness is appreciably reduced. Above 6 knots they are essentially useless" (Tr. 3566). His testimony was contradicted by that of Captain Van Leuven, however, as just indicated. Captain Van Leuven testified further that at 8 knots "there is enough effectiveness in the bow thruster on the LNG AQUARIUS to significantly move the bow in one direction or the other" (Tr. 3713). On considering Captain Van Leuven's experience compared to Dr. Fisher's, we give more weight to the testimony of Captain Van Leuven (see Tr. 3708-09, 3418-23). The Intervenor's argue that the bow thrusters of the LNG AQUARIUS have capabilities not found generally in bow thrusters on LNG vessels (Intervenor's Proposed Findings, paragraph 67). We have found no evidence to support this contention. Indeed, the LNG AQUARIUS is one of a class of LNG tankers being built by General Dynamics, a fleet of which would serve the West Deptford LNG terminal should it go into operation (Tr. 3715; Board Ex. 2 at 169-170).

response time of a large steam-turbine drive system would be about 60 seconds, compared to about 40 seconds for a large diesel direct-drive system. The bow thrusters of the LNG AQUARIUS have a response time of about 10 seconds (Tr. 3720-21). While transiting the Delaware, LNG vessels will normally travel at 12 to 15 knots except when meeting another vessel; in meeting situations their speed will be restricted to less than 12 knots, to give a *relative* meeting speed of 12 knots (Kalelkar Supplemental Testimony, Appendix B; Tr. 3439-40, 3445).²⁶ These facts suggest that at speeds above 8 knots, the greater horsepower of LNG tankers makes them more maneuverable than conventional large vessels, at least in some situations. At speeds less than 8 knots, the bow thrusters, and under certain circumstances the greater horsepower, makes LNG ships more maneuverable than conventional vessels. Applicants' witness Captain Knapp, a Delaware River pilot, testified that greater horsepower, collision-avoidance systems, and bow thrusters would provide an added margin of safety for LNG tankers over vessels which did not have such equipment (Tr. 3574). We believe that the evidence indicates that the operating characteristics of LNG vessels do provide them with collision-avoidance capabilities not possessed by conventional ships. We find that the performance capability of LNG tankers, which was not factored into the collision probability calculation of the Applicants, imparts conservatism to the estimate.

48. Dr. Fisher also testified that it is erroneous to rely on the Captain of the Port of Philadelphia order, "Procedures for the Movement of LNG/LPG," as a conservatism, because pilot misjudgments, misunderstandings, or misapplication of regulations will tend to negate their intended safety functions (Fisher Prepared Testimony at 17-19; Tr. 3541-45). He also contended that the procedures promulgated by the COTP order for the operation of LNG tankers on the Delaware River are not new; he said that the Delaware River Pilots Association has been following essentially the same rules over the past 10 years (Fisher Prepared Testimony at 19-20). Lieutenant Stanton testified that LNG and LPG vessels would transit the Delaware River under the surveillance of a Coast Guard escort vessel (Tr. 3482). A pilot or master who violates the order of the Captain of the Port would be subject to a \$10,000 civil penalty, or a criminal penalty if the violation were willful (*ibid.*). In his opinion, the presence of the Coast Guard encourages compliance with the rules (Tr. 3483). Captain Van Leuven testified that he believes that the promulgation and use of the COTP rules for LNG/LPG vessels would improve the safety of navigation for such vessels (Tr. 3712). The evidence indicates that the Coast Guard will insure that LNG vessels adhere to the regulations. We do not accept Dr. Fisher's

²⁶The Coast Guard procedures for LNG/LPG vessels state that normally in a meeting situation, both vessels should proceed at 6 knots (Kalelkar Supplemental Testimony, Appendix B).

contention that misjudgments, misunderstanding, or misapplication of regulations will negate the safety function of the rules in question. With regard to Dr. Fisher's claim that the procedures promulgated in the COTP order for LNG/LPG vessels have been followed by pilots for the past 10 years, we note that the order requires several procedures which are *not* followed at present by conventional large vessel traffic. Conventional large vessels do not have Coast Guard and tug escorts. They do not have speed limits in meeting situations. Other river traffic is not forbidden to overtake them. They do not have to notify the Coast Guard and obtain prior approval before transiting the Delaware (Kalelkar Supplemental Testimony, Appendix B; Fisher Prepared Testimony at 19-20; Tr. 3541-43). We believe that these procedures, which are required in the COTP order for LNG/LPG vessels and are over and above those in current use by conventional vessels, will be of major importance in reducing the risk of accident. We reject Intervenors' contention that the Applicants' data base has already accounted for such procedures. We conclude, on the basis of the foregoing, that the procedures contained in the COTP order for LNG/LPG vessels on the Delaware River will reduce the accident risk for such vessels, relative to the accident risk for conventional large vessels. This fact imparts conservatism to the accident rate estimate calculated by the Applicant.

49. In conclusion, we have found that the accident rate calculated by the Applicants, 1.51×10^{-6} collisions per mile-year, is reasonable. We also have found certain conservatisms in the method used by Applicants to screen accidents in the casualty data base. We further find, in view of the foregoing qualitative arguments, that the realistic probability has been shown to be lower than the calculated probability and, consequently, the Applicants' calculation of accident rate is conservative pursuant to guidelines contained in the NRC Standard Review Plan (NUREG-75/087, §2.2.3 (1975)).

C. Spills Per Collision

50. The Appeal Board questioned the assumptions made by Applicants, and accepted by Staff, regarding the angle of collision and relative speed of colliding ships and called for the Applicants to provide additional foundations for these assumptions using actual ship experience (ALAB-429, 6 NRC at 239-240). In addition, the validity of the Minorsky calculation, which was used by the Applicants to predict the depth of penetration into the LNG tanker by a colliding ship, was questioned by the Appeal Board (*id.* at 240). We turn now to a consideration of these questions and to the determination of the probability that an LNG spill would result from a collision of an LNG tanker with another ship in the river segment of interest.

51. According to the Applicants, any collision which might occur in the catchment zone would occur at narrow angles, seldom exceeding 10° to 15°, because the LNG tanker would be moving in a channel which (over most of the distance) is only 800 feet wide and has no docks or moorings, and the tanker would be accompanied by Coast Guard and tug escorts (Kalelkar Supplemental Testimony at 35).²⁷ At bends, notably Bulkhead Bar where the channel widens to 1,600 feet, a collision angle of 40° is considered possible (*ibid.*).²⁸ However, a collision at a bend is thought to be very unlikely because the COTP rules for LNG tankers do not permit meeting another ship at a bend (*ibid.*; Tr. 3037-39). In applying the Minorsky analysis, Applicants assumed that collisions were uniformly distributed between 0° and 45° (*ibid.*). With regard to actual ship experience, only data from the 24-mile section of the Delaware in question would be relevant to the instant analysis, and no angle-of-collision data are available for the few collisions which have occurred in this section of the river (*id.* at 35-36).

52. With regard to speed, Applicants assumed that the relative velocities of an LNG tanker and a colliding ship would be uniformly distributed between 0 and 12 knots (*id.* at 34). Twelve knots was selected because that is the maximum relative speed permitted by COTP regulations for an LNG tanker and another ship in a meeting situation (Tr. 3036). Lower speeds were included in the distribution because ship masters tend to do everything they can to minimize the severity of impact, once they become aware that a collision is impending (Kalelkar Supplemental Testimony at 34). Staff witness Dr. Read testified that “[o]bserved channel collisions are almost invariably at much smaller relative velocities than the maximum 12 knots because of corrective action undertaken by the respective vessels” (Read Supplemental Testimony at 28). Little historical data exist on *actual* vessel velocities in low-speed collisions (*id.* at 23; Kalelkar Supplemental Testimony at 34; Tr. 3035-36). Such data are available for very severe collisions because severe collisions tend to be carefully scrutinized afterwards,

²⁷In recent testimony the Applicants have used the notation 0° for head-on collisions and 90° for beam-on collisions. Earlier, Applicants used Minorsky's designation of beam-on collisions as 0° and head-on collisions as 90° (Applicants' Ex. 10, p. 3). The Appeal Board adopted the latter convention in ALAB-429 (6 NRC at 239, n. 58). Because most of the testimony which we are reviewing uses the former notation (head-on, 0°; beam-on, 90°) we are adopting that convention in this decision.

²⁸Mr. Caccia claims that the ship channel makes a 70° bend at Bulkhead Bar Range (Caccia Proposed Findings at 1). Moreover, under cross-examination Dr. Kalelkar *appeared* to testify that New Castle Range and Deepwater Point Range meet at an angle of 70° (Tr. 3075). In fact, Bulkhead Bar Range is interposed *between* New Castle and Deepwater Point Ranges, so that a ship moving between these two ranges must turn to enter Bulkhead Bar Range and then turn again to leave it. Neither of these turns exceeds 40° (see photocopy of section of NOS chart 12311 attached to letter from Captain Wiman to Chairman Luton, dated November 10, 1977). There is no 70° bend in the ship channel in the 24-mile river section of interest.

but these types of accidents are not relevant to the situation we are considering (Kalelkar Supplemental Testimony at 34; Read Supplemental Testimony at 23-24). The assumption that impact speeds are uniformly distributed between 0 and the maximum speed at which ships transit a given region was also made in the collision analyses by Bovet and by SAI (Kalelkar Supplemental Testimony at 34).²⁹ While data are available to support this assumption, they are inadequate to provide statistical validation (Tr. 3036).

53. Staff chose not to use *a posteriori* methods, such as the Minorsky analysis, to derive a probability of spill estimate, because relevant data are insufficient (Read Supplemental Testimony at 23-24). Rather, using an *a priori* technique, Staff concluded that the Applicants' assumption of uniform independent probabilities for impact angle and speed are conservative because:

- (1) Observed channel collisions are almost invariably at much smaller relative velocities than the maximum 12 knots because of corrective action undertaken by the respective vessels.
- (2) Large angle turns by large ships within the river channel are not expected within the 24-mile area of concern because of the configuration of the river channel.
- (3) All other accidents besides collisions are inherently unlikely to cause deep penetrations.

(*Id.* at 24-28.)

54. Intervenor' witness Dr. Fisher criticized the use of Minorsky's model, on the grounds that the model was not applicable to LNG tankers "because the collision characteristics of LNG carriers are different than (sic) those of the vessels studied by Minorsky" (Fisher Prepared Testimony at 72). Dr. Fisher also testified that he had been told by Mr. Minorsky, in a telephone conversation, that the Minorsky calculation cannot be applied to double-hulled LNG vessels or to collision angles less than about 60° or 70° (Tr. 3630). Upon cross-examination, however, Dr. Fisher acknowledged that Minorsky had himself applied his correlation to LNG tankers (Tr. 3635-36).³⁰ In rebuttal testimony, Applicants' witness Dr. Kalelkar said that he and members of his staff had visited and consulted with Mr. Minorsky, and had shown to and discussed with Minorsky the Applicants' collision analysis (Tr. 3697-98). According to Dr. Kalelkar, Minorsky said that his methodology would predict adequate results if applied at narrow angles and

²⁹D.M. Bovet, "Preliminary Analysis of Tanker Grounding and Collisions," U.S. Coast Guard (January 1973); see n. 18, *supra*, for reference to SAI study.

³⁰This study by Minorsky was carried out for Marathon Oil Company and involved Cooks Inlet, Alaska, and Negishi, Japan (Tr. 3706).

that the numbers being obtained by the Applicants were in the same range that Minorsky, himself, had obtained when he applied his methodology to LNG tankers (*ibid.*).

55. The Board received into evidence a copy of a paper published by Minorsky in 1959, in which an attempt was made to predict what structural strength should be built into the hull of a nuclear-powered ship in order to safely absorb a given amount of kinetic energy in a collision (Applicants' Ex. 13, p. 1).³¹ The analytical method developed in the paper also permits computation of the maximum depth of penetration of a striking ship, given known characteristics and structural features of the colliding ships (*id.*, p. 4). Our study of this paper has shown that Minorsky eliminated sharp angle collisions from his analytical analysis because (1) use of them would have rendered the selection of significant strength structural members too difficult, (2) eliminating them minimized "error due to neglecting components of kinetic energy parallel to the struck ship's axis," and (3) penetrations in oblique collisions were much smaller than in right angle collisions and therefore oblique collisions were not pertinent to the problem of protecting the struck ship's nuclear plant (*id.* at 1). We find nothing in the paper to cause us to believe that Minorsky's method is *invalid* when applied to oblique collisions. The paper leads us to believe that the accuracy of the Minorsky prediction declines as one moves from a 90° collision toward a 0° collision. Furthermore, the paper makes it quite clear that in a right angle collision, the Minorsky correlation is very good for high-energy collisions but much less so for low-energy collisions (*id.* at 3-4). Minorsky defined a high-energy collision as being of the order of 10 to 16 knots (*id.* at 3). With reference to the Applicants' analysis, obviously the higher speeds of the 0 to 12-knot distribution are in the range considered to be high-energy collisions by Minorsky. High-energy collisions are, of course, more likely to cause a cargo spill from an LNG tanker than low-energy collisions.³² Thus, for our purposes, it is important that the Minorsky model predicts accurately at high speeds and not so important that it predicts less accurately at low speeds. Finally, we note that we have no information about *how* inaccurate the model becomes as the angle of collision decreases, *i.e.*, moves away from 90° toward 0°.

56. The Appeal Board questioned the validity of the Minorsky calculation because collision studies by Bovet and by Comstock and Robertson gave average penetration depths of approximately 5 meters, which exceeds

³¹V.U. Minorsky, "An Analysis of Ship Collisions With Reference to Protection of Nuclear Power Plants," *Journal of Ship Research* (October 1959).

³²According to the FPC analysis, a vessel of 38,000 tons displacement would have to impact an LNG tanker at a speed in excess of 3.4 knots, assuming an impact angle of 90°, in order to rupture a cargo tank (Board Ex. 2, p. 191).

the inboard distance of the LNG tank wall (approximately 4 meters) (ALAB-429, 6 NRC at 240). Dr. Kalelkar testified that Bovet's study was biased toward major collisions, in which detailed casualty investigations had been made, and thus was biased toward relatively great penetration depth (Kalelkar Supplemental Testimony at 37). Consequently, the average depth of penetration in the cases studied by Bovet cannot be used as a criterion for the spill probability analysis carried out by the Applicants (*ibid.*). Moreover, it was shown that Bovet's method of prediction was less accurate, or at least less precise, than Minorsky's method (*id.* at 39-41). Dr. Kalelkar also attempted, but without success, to determine the source of the collision data used by Comstock and Robertson (*id.* at 38). Because their study focused on ship structure and design which govern survivability of ships struck in collisions, Dr. Kalelkar believes that Comstock and Robertson also selected a data base of major collisions rather than a spectrum of collision events representative of the entire range of possible collisions. Thus, the average penetration depth in the study by Comstock and Robertson is likewise not applicable to the instant case (*ibid.*). Dr. Read also testified that the studies by Bovet and by Comstock and Robertson are not directly comparable to the instant spill probability problem for LNG tankers (Read Supplemental Testimony at 25). He does not believe that there is a disagreement between Minorsky's work and that of Bovet and that of Comstock and Robertson (*id.* at 26).

57. The Appeal Board indicated that a determination should be made as to whether there is a difference in the spill vulnerability between an LNG ship with freestanding tanks as opposed to one with membrane tanks (ALAB-429, 6 NRC at 246). Freestanding tanks are self-supported and have sufficient strength in themselves to withstand cargo loads and the stresses of cargo movement (Kalelkar Supplemental Testimony at 44-46; Tr. 3454-55, 3456-69). Membrane tanks have a thin, metal barrier which contains the LNG and which is supported by an insulation system which, in turn, is supported by the inner hull and sidewalls (*ibid.*). The freestanding systems include prismatic, cylindrical, and spherical tank designs, while the membrane systems usually use a prismatic waffled configuration (Kalelkar Supplemental Testimony at 46-47). According to Commander Henn, the Coast Guard considers one system as safe as another (Tr. 3468-69). The Applicants and Staff, however, believe that ships with prismatic tanks would, under most situations of marine traffic, be more susceptible to a spill than ships with cylindrical or spherical tanks, because prismatic tanks have larger areas close to the hull than cylindrical or spherical tanks (Kalelkar Supplemental Testimony at 46-47; Read Supplemental Testimony, Appendix A, p. 6; Tr. 3277). On balance, we believe that the evidence supports the view of Applicants and Staff. In any case, however, the Applicants have factored

both tank designs into their Minorsky analysis, and therefore the spill probability is valid for both designs (Applicants' Ex. 10, pp. 1-2).

58. In applying the Minorsky analysis to the LNG problem, the Applicants assumed that if the striking ship penetrated to a depth equivalent to the inboard distance of the LNG tank, the tank would be ruptured and a rapid loss of cargo would result (Applicants' Ex. 11, p. 24). An additional assumption made in using the Minorsky model is that all of the energy of impact is absorbed by the struck ship (Tr. 2681, 3698). Considered together, we believe that these two assumptions lend conservatism to the probability calculation.

59. Using the Minorsky calculation, Applicants obtained a probability of 5×10^{-3} spills per collision for 23 miles of the 24-mile river section of interest, and 5×10^{-2} for the 1-mile section near the C & D Canal, where 90° collisions are possible (Applicants' Ex. 11, p. 24). The value 5×10^{-3} is consistent with the estimate of 6×10^{-3} spills per collision obtained by the FPC for collisions at piers, harbors, and entrances (Board Ex. 2, p. 198). The FPC estimate is expected to be greater than Applicants' estimate of 5×10^{-3} because it applies to the entire river and hence considers all impact angles (Board Ex. 2, p. 180-83). The fact that it is not as great as Applicants' estimate of 5×10^{-2} , applicable to the vicinity of the C & D Canal where all impact angles are possible, can be attributed to differences in data base and analytical method. The larger value obtained by the Applicants for all impact angles is consistent with the belief that the Minorsky method is conservative.

60. We have noted that Staff chose to avoid *a posteriori* methods in evaluating the Applicants' estimate of spill probability, because of the paucity of historical data. Nevertheless, in the end Staff accepted the probability value obtained by Applicants from the Minorsky analysis, "not because it was likely to be correct, but because there was no basis to believe that any accident that was predictable near Artificial Island would cause the rapid release of LNG gas necessary to endanger the nuclear power plants . . ." (Read Supplemental Testimony at 28-29).

61. Joint Intervenor argue that the Applicant's estimate of spill probability is "neither conservative nor even necessarily accurate . . ." (Intervenor's Proposed Findings at 38). They cite the testimony of Dr. Fisher, wherein he developed scenarios for collision angles greater than 45° (*id.* at 40; Fisher Prepared Testimony at 12-22, 29-33). We have reviewed Dr. Fisher's testimony in paragraphs 11 and 12, 20 through 22, 27, and 45 through 48, and have rejected so much of it as pertains to the maneuverability and control of LNG tankers in the river section of interest. We have also reviewed Dr. Fisher's testimony on the Minorsky model in paragraph 54. Our own study of Minorsky's 1959 paper causes us to con-

clude, with regard to the contradictory evidence concerning Mr. Minorsky's comment about Applicants' use of the Minorsky model, that the greater weight must be given to the testimony of Dr. Kalelkar. We believe that the Minorsky model, while not *ideally* applicable to the instant problem, is nevertheless a valid, reasonable, and adequate method for application here. We believe it is to be preferred over Bovet's method. Indeed, it may be the most appropriate technique available for the Applicant's analysis (see Board Ex. 1, p. 2-17).

62. With regard to the assumed distributions for collision angle and speed at impact, we find both assumptions to be reasonable. The evidence shows that LNG ship size, physical characteristics of the channel, COTP rules for LNG tankers, Coast Guard supervision, and tug escort will make the likelihood that an LNG ship would be impacted at angles greater than 45° negligible, except in the vicinity of the C & D Canal. Applicants have reasonably accounted for the likelihood that wider angled collisions could occur there by assuming that collision angles in that section of the river are distributed between 0° and 90° . We find it reasonable to assume that impact speeds are uniformly distributed between 0 and 12 knots because of COTP rules, which require that the relative meeting speed of an LNG tanker and another ship not exceed 12 knots, and the presence of a Coast Guard escort to enforce those rules. Considering the Coast Guard escort, the presence of a tug, the collision avoidance capability of LNG ships, and the evasive maneuvers which pilots are known to take when they become aware that a collision is imminent, we conclude that impact speeds would be more densely distributed at lower speeds in the 0 to 12-knot range. Thus, we think that this assumption is conservative. We also find the Minorsky model to be conservative because of the assumption that all of the energy of impact is absorbed by the struck ship. We conclude that Applicants' estimate of spill probability for 23 miles of the catchment zone, 5×10^{-3} spills per collision, is both reasonable and conservative. The estimate for the 1-mile section in the vicinity of the canal, 5×10^{-2} , is likewise reasonable and conservative for the same reasons. We accept these estimates.

D. Vapor Clouds Per Spill

63. The Appeal Board found insufficient support in the record for the estimate by Applicants and Staff that the probability of a flammable cloud of LNG not igniting, given a spill, before it reached the Hope Creek site was 0.1 (ALAB-429, 6 NRC at 241). Since there has never been a large accidental release of LNG in a maritime casualty, the probability of a spill not igniting immediately cannot be evaluated from historical evi-

dence (Kalekar Supplemental Testimony at 49). There have been however, more than 100 reported vapor cloud release accidents on land, involving a diversity of hydrocarbons and release conditions (Read Supplemental Testimony at 29). In over half of these cases ignition was immediate, and in only a very few did the gas disperse prior to ignition. These observations suggest that the probability of ignition immediately upon release is more than 0.9 (*ibid.*). To apply this probability to the maritime problem being considered here, however, requires the demonstration that conditions for ignition in a marine accident in the Delaware are at least as good as in a land-based accident (*ibid.*).

64. The energy that would be dissipated by a large ship striking an LNG tanker with sufficient force to penetrate the double hull and rupture a cargo tank is tremendous; it has been estimated to amount to over 10^8 Joules (Read Supplemental Testimony at 30). This dissipation of energy would give rise to substantial heating of metal surfaces and frictional sparking during impact (Kalekar Supplemental Testimony at 49). Following impact, electrical sparking would be expected from severed and shorted electrical cables, and frictional sparking would continue to be produced as the ships rub together (*ibid.*). The use of spark igniters in gas appliances attests to the efficacy of spark-ignition sources for flammable gas (Read Supplemental Testimony at 30). Both Applicants and Staff believe that such sparking virtually assures that the methane cascading from a ruptured cargo tank of an LNG tanker and mixing with air would be ignited (*ibid.*; Kalekar Supplemental Testimony at 49).³³ Thus, Applicants believe that a 0.99 probability of ignition is realistic, but conservatively estimates the probability at 0.9 (Kalekar Supplemental Testimony at 50).

65. Other evaluations of the probability of ignition of LNG released from a tanker involved in an accident support the conclusion of Applicants and Staff. In the SAI risk analysis for the proposed Raccoon Island LNG terminal, an investigation was made of 12 tank ship and tank barge accidents in which a low flash point product was released (Arvedlund Prepared Testimony at 6; see Board Ex. 1). Ignition occurred immediately in 11 of these cases. In the one accident in which ignition was not immediate, the cloud was ignited a few minutes later (*ibid.*). From these data one can estimate the probability of immediate ignition to be 0.92. In another study involving propane released in truck, pipeline, and rail accidents on

³³There has been one marine accident in U. S. waters in which an unignited gas cloud was released (Read Supplemental Testimony at 30, n. 5). In that incident a barge carrying refrigerated propylene sank without its cargo tank being penetrated, and the spill occurred under water. The circumstances associated with this accident are unlike those postulated for a spill from an LNG tanker.

land, SAI obtained an ignition probability of 0.94 by the time the vapor clouds had dispersed over a surface area of about 10⁵ square meters (Kalelkar Supplemental Testimony at 50-51; Staff Exhibit 1-F, p. 10). LNG tankers of the type to be used by Tenneco, having a capacity of 125,000 cubic meters, have a net surface area in excess of 10³ square meters which, in a severe collision, would contain a high density of ignition sources (Kalelkar Supplemental Testimony at 51). Finally, the FPC, in its DEIS for the proposed West Deptford LNG terminal, estimated ignition probability conservatively to be 0.90, although the Appeal Board has complained that the FPC estimates are based on "the qualitative or intuitive judgment of experienced persons" (Board Ex. 2, p. 194; ALAB-429, 6 NRC at 241, n. 72).

66. Intervenor's witness Dr. Fisher criticized the Applicants' estimates of ignition probability on the ground that "the foundation of the ten percent probability of vapor cloud formation is, in this area, essentially 'science by consensus' (sic)," (Fisher Prepared Testimony at 33). Dr. Fisher also criticized Applicants and Staff for not producing new evidence to support the ignition probability value, on the grounds that new evidence was called for by ALAB-429 (*id.* at 245). In fact, the Appeal Board found that there was "insufficient support in the record for the assumed probability value" and asked "that a greater effort [be] made to arrive at a reasonable estimate of that probability" (ALAB-429, 6 NRC at 241). Clearly, to the extent that new information is available, Applicants and Staff should be expected to make use of it in response to the Appeal Board's request, and to the extent that new information is not available, we would expect them to apply "greater effort" in using what has already been produced. We believe that Applicants and Staff have adequately complied with the Appeal Board's request. Further, we see no merit in Dr. Fisher's allegation that the agreement in ignition probabilities among different analyses represents "science by consensus." If the probability of ignition is really 0.90 or greater, then we would expect estimates from different studies to be 0.90 or greater. The Intervenor's have produced no evidence to support their contention that the 0.90 ignition probability is not conservative, nor does the record indicate that this probability value is arbitrary (see Fisher Prepared Testimony at 34). We believe that the evidence indicates the ignition probability actually is greater than 0.90. Therefore we conclude that the Applicants' estimate for nonignition probability, 0.1, is both reasonable and conservative.

67. The Appeal Board requested, further, that consideration be given the likelihood and consequences of a fire involving the entire cargo of an LNG ship in the river near the plant (ALAB-429, 6 NRC at 246). The Applicants have investigated this problem by assuming that a one-tank

spill would result in a fire which would spread to the rest of the cargo either (1) instantaneously, immediately producing a pool fire from five tanks, or (2) in domino fashion, such that the second tank is ignited as fuel from the first is consumed, the third is ignited as fuel from the second is consumed, and so on, with the result that the fire lasts five times as long as a one-tank fire (Kalelkar Supplemental Testimony at 51-52). Fire size as a function of time, radiation emitted by the fire, and hazard distances associated with the fire were calculated using a method reported in a paper by Ray and Kalelkar (see Kalelkar Supplemental Testimony, Appendix E).³⁴ The results showed that concrete buildings would be safe at distances beyond 900 m from the center of the fire (Kalelkar Supplemental Testimony at 52). The Hope Creek plant would be about 2,000 m from the fire center and hence would not be affected by the fire (*ibid*). Staff witness Read likewise testified that a massive fire storm caused by a multi-tank release of LNG would not constitute a significant threat to the Hope Creek plant, because the concrete walls of the plant could withstand the radiant flux from such a fire (Read Supplemental Testimony at 31).

68. The Joint Intervenors, in arguing about a multi-tank disaster, do not address themselves to the five-tank fire scenario about which the Appeal Board expressed concern (Intervenors' Proposed Findings at 58). Rather, they postulate a multi-tank spill followed by detonation of the methane cloud (*ibid*). To support their argument, they cite testimony of Dr. Read given in cross-examination, but they have introduced no evidence of their own on this subject (*ibid.*). A full reading of the transcript reveals that Dr. Read testified that detonation of spilled LNG would be very unlikely, and in the event it did occur, it would cause a weak blast which would not propagate sufficient energy over the distance to the plant to cause overpressure that would damage the plant (Tr. 3286-91). This question has been considered previously, however, and disposed of by us; it need not be reconsidered here (LPB-74-79, 8 AEC at 751).

69. Upon the evidence, we conclude that a multi-tank fire on an LNG ship in the river would not threaten the Hope Creek plant. We find that such an accident need not be factored into the risk analysis.

E. Meteorological Factor

70. The meteorological factor, previously accepted by this Board, was found to be reasonable and appropriately conservative by the Appeal

³⁴P. K. Raj and A. S. Kalelkar "Fire Hazard Presented by a Spreading Burning Pool of LNG on Water," Paper No. 73-25, Western States Section of the Combustion Institute, October 1973.

Board (LBP-77-22, 5 NRC 694; ALAB-429, 6 NRC at 242). Defined as the probability that an LNG cloud formed in any 1-mile section of the catchment zone would be transported by the prevailing wind to the Hope Creek site and would arrive at the site in a flammable concentration, the meteorological factor was calculated from data collected on Artificial Island assuming a spectrum of meteorological stability conditions (Applicants' Ex. 11, p. 23-28). No additional evidence has been introduced to cause us to change our finding that the meteorological factor accepted in LPB-77-22 and ALAB-429 is reasonable. We accept 0.35 as the probability that an LNG cloud would be transported to the Hope Creek site from all 1-mile segments of the river except where the C & D Canal joins the Delaware River, and 0.004 for the probability of a cloud being transported from the vicinity of the C & D Canal to the plant site (see Kalelkar's Supplemental Testimony at 53).³⁵

71. Intervenors' Witness Dr. Fisher expressed concern that progressive failure of tanks might occur as a result of damage to noncryogenic structures of the ship by LNG spilled from one tank; he suggested that such a sequence of events might enlarge the catchment zone (Fisher Prepared Testimony at 22). Dr. Read testified, however, that it is the rate at which LNG is spilled, not the number of tanks spilled, that is of significance in determining the catchment distance (Tr. 3226). In formulating the one-tank spill scenario, it has been assumed that the spill from the ruptured tank *instantaneously* releases the entire contents (*ibid.*). This assumption gives the 24-mile catchment zone and, in Dr. Read's view, is itself conservative (Tr. 3229). Should the contents of all five tanks somehow be released very rapidly into the hull, the boiling of the LNG would destroy the ship by overpressurization, and the probability of ignition would be very high (Tr. 3230-31). Dr. Kalelkar testified that the structure of the hull and the presence of water outside to act as a heat source for the spilled LNG would make a multi-tank spill caused by cold stress, as suggested by Dr. Fisher, an incredible event (Tr. 3085-87). Commander Henn testified that the Coast Guard considered a one-tank failure as the only credible accident for an LNG tanker (Tr. 3481). The Coast Guard position on this question is based on "the judgment of many Coast Guard officers with varied backgrounds, both in the operation of vessels, in the design of ships, and in the investigation of casualties" (Tr.

³⁵Previously the Applicants used 0.002 for the meteorological factor for the portion of the river in the vicinity of the C & D Canal because this value was obtained for mile N7 where the canal joins the Delaware River (Applicants' Ex. 11, p. 29). It is not clear why Applicants now use 0.004. Since 0.004 is more conservative than the previous estimate, however, and both we and the Appeal Board have found 0.002 acceptable, we have no difficulty in now accepting 0.004.

3485-86). While this view has not been proven beyond all doubt, it is supported by tests sponsored by the Coast Guard and other agencies (Tr. 3486). Upon consideration of the foregoing evidence, we conclude that a multi-tank spill occurring at a rate which would produce a cloud large enough to increase the catchment distance, without the cloud igniting at the ship, is so unlikely that it need not be considered in the risk analysis.

F. Probability of a Flammable LNG Vapor Cloud Reaching the Plant Site

72. The probability that a flammable gas cloud released by an accident involving an LNG tanker in the Delaware River will reach the site of the Hope Creek plant is given by the product of the conditional probabilities discussed above.³⁶ Based on its revised and updated analysis, the Applicants have calculated the overall probability of an LNG vapor cloud presenting a potential threat to the hope Creek plant to be 8.6×10^{-8} occurrences per year (Kalelkar Supplemental Testimony at 53). Initially, the Staff chose to rely upon its original analysis, which gave an overall probability of 1×10^{-7} occurrences per year (rounded up from 9.5×10^{-8}) (Read Supplemental Testimony at 37-38; Staff Exhibit 1-F, p. 14). These probability estimates and the values from which they were calculated are summarized in Table I (p. 675). The Staff subsequently has modified its position, however, and now adopts the Applicants' estimate (Staff's Proposed Findings, paragraphs 98-99).

73. We have found all of the Applicants' estimates for the factors used to calculate the overall probability to be reasonable, and therefore we find the estimate of 8.6×10^{-8} occurrences per year to be reasonable. In addition, for reasons already given, we found Applicants' estimates for collisions per mile, spills per collision, and vapor clouds per spill to be conservative. On the basis of these findings, we could accept Applicants' estimate for the overall probability as a conservative estimate. We indicated, however, that Applicants' estimate of 292 tankers per year was reasonable, while Staff's estimate of 360 tankers per year was both reasonable and conservative. We believe that a most conservative estimate can be obtained by using Staff's conservative estimate of number of tankers per year and Applicants' conservative estimates of collisions per

³⁶Dr. Read does not believe that we and the Appeal Board should apply the term "conditional probabilities" to refer to the probabilistic factors for the sequential events considered in this case (Read Supplemental Testimony at 4-5). It appears that he would use the term only in the specialized sense relating to conditionally distributed variates. We believe that applying the term to appropriate probabilistic factors in product-rule calculations is acceptable usage, however.

TABLE I

Applicants' and Staff's Estimates of Parameter Values and Resultant Probabilities for LNG Traffic Over 24-Mile Range

| | Applicant | Staff |
|-------------------------------|-------------------------------|----------------------|
| | <hr/> | <hr/> |
| Tanker Trips per Year | 292 | 360 |
| Collisions per Mile-Year | 1.51×10^{-6} | 1.5×10^{-6} |
| Probability of Spill | 0.005 (24-mi) 0.05 (C & D) | 0.005 |
| Probability of Nonignition | 0.1 | 0.1 |
| Meteorological Factor | 0.35 (24-mi) 0.004 (C & D) | 0.35 |
| | <hr/> | <hr/> |
| Product | 8.6×10^{-8} | 9.5×10^{-8} |

mile, spills per collision, and vapor clouds per spill, along with Applicants' reasonable estimate for the meteorological factor. These values are summarized in Table II (p. 676). The overall probability that can be calculated from them is 1.1×10^{-7} occurrences per year. We accept this value as a most conservative estimate of the probability that a flammable gas cloud, released in an accident involving an LNG tanker on the Delaware River (but not including a ramming of tower 97), will reach the Hope Creek plant. Because of the arguments that led us to find conservatism in the estimates of tankers per year, collisions per mile, spills per collision, and vapor clouds per spill, we believe that the realistic probability is lower than 1.1×10^{-7} . Therefore we find this estimate to be conservative pursuant to NUREG-75/087, §2.2.3 (1975).

TABLE II

Parameter Values and Resultant Probabilities Accepted by the Board for LNG and LPG Traffic Over 24-Mile Range

| | LNG | | LPG | | | |
|----------------------------|-----------------------|--------------------|-----------------------|-----------------------|-----------------------|----------------------|
| | | | Propane | Butane | Butadiene | Total |
| Tanker Trips per Year | 360 | | 40 | 10 | 10 | 60 |
| Collisions per Mile-Year | 1.51×10^{-6} | | 1.51×10^{-6} | 1.51×10^{-6} | 1.51×10^{-6} | — |
| Probability of Spill | 0.005 0.05 | (24-mi) (C & D) | 0.005 0.05 | 0.1 | 0.1 | — |
| Probability of Nonignition | 0.1 | | 0.1 | 0.1 | 0.1 | — |
| Meteorological Factor | 0.35 0.004 | (24-mi) (C & D) | 0.307 0.003 | 0.32 | 0.25 | — |
| Product | 1.1×10^{-7} | | 1.0×10^{-8} | 4.8×10^{-8} | 3.8×10^{-8} | 9.6×10^{-8} |

II. LPG TRAFFIC

74. The Appeal Board found areas of uncertainty relating to LPG traffic similar to those relating to LNG traffic (ALAB-429, 6 NRC at 243). Specifically, that Board requested clarification as to the expected LPG traffic, an explanation of why the spill probability for LPG ships is not as large as that for LNG ships, and more information on how the flammability factor for LPG was determined (*id.* at 243-245). The Appeal Board appears to consider LPG as "virtually" synonymous with propane, but indicated that it was also concerned about "other forms of river traffic which could lead to flammable vapor clouds at the site, *i.e.*, butane tankers" (*id.* at 243, n. 81). The Applicants have included in their analysis propane, butane, butadiene, and vinyl chloride (Kalelkar Supplemental Testimony at 53-60). Staff, on the other hand, considered only "propane and LPG" and "butane" (Staff Exhibit 1-F, p.14). The Coast Guard defines LPG as "liquified petroleum gas including butane, butadiene, propane, and propylene" (Kalelkar Supplemental Testimony, Appendix B, p. V-1). To comply with the Appeal Board's directive that we consider LPG, we hereby adopt the Coast Guard definition of LPG. We shall, therefore, consider the cumulative probability that a flammable cloud of propane, propylene, butane, butadiene, or LNG (methane) could reach the Hope Creek plant as a result of an accident involving a tanker on the Delaware River. Since the Applicants have also done a risk analysis for vinyl chloride shipments, we shall consider the evidence on vinyl chloride separately. We turn now to LPG.

A. Ships Per Year

Propane

75. In 1976 the Sun Oil facility at Marcus Hook, Pennsylvania, was completed, and this facility will begin receiving propane shipments on a regular basis in the near future (Kalelkar Supplemental Testimony at 53; Tr. 3042-43). When the project matures in 1980, the facility will receive a maximum of 40 propane tankers per year (*ibid.*). Applicants use as their estimate of propane tankers per year the number 40, based on Sun Oil's projection of maximum number of shipments that could be received each year (Kalelkar Supplemental Testimony at 54). Staff, on the other hand, uses the estimate of 50 propane tankers per year, based on the maximum possible storage capacity of the Marcus Hook facility (Read Supplemental Testimony at 9). It is normal practice, however, to maintain 20% to 25% of storage capacity as a reserve, which accounts for the difference in the

estimates of Applicants and Staff. Staff considers its estimate of 50 tankers per year to be "a biased overestimate of future traffic rates" (Read Supplemental Testimony at 9). Considering the fact that 40 is the maximum number of propane shipments that the Sun Oil facility could receive in a year, we believe that figure to be the more reasonable number for use in our analysis.

Propylene

76. No evidence was presented to indicate that propylene is or will be shipped on the Delaware River. We conclude, therefore, that it need not be considered.

Butane

77. The Applicants assumed that the number of butane carriers that would transit the Delaware each year would be two (Kalelkar Supplemental Testimony at 59-60). This assumption is based on the observation that there has been only one spot shipment of butane on the Delaware in the last 3 years, a shipment received by Gulf in 1977 (*ibid.*). The Staff, on the other hand, assumed that ten butane carriers would pass the Hope Creek plant each year (Read Supplemental Testimony at 9). The basis for Staff's judgment appeared to be current river traffic (*ibid.*; Staff Exhibit 1-F, p. 5). But when Dr. Read was asked, in the evidentiary hearing, to explain the basis for Staff's estimate of ten butane tankers per year, he stated that butane is used as a gasoline additive and is periodically shipped to refineries on the upper reaches of the Delaware River (Tr. 3216).³⁷ The amount required by the refineries depends on their gasoline output relative to residual oil or bunker fuel, and while there is no indication that the demand for gasoline, and thus butane, will be greater in the future than in the past several years, Staff nevertheless selected ten butane ships per year as a conservative estimate of this parameter (Tr. 3216-17). We believe that Staff's estimate of ten butane tankers per year is preferable to Applicants' estimate of two per year because the lower estimate leaves little margin for market changes.

Butadiene

78. The Applicant indicated that butadiene is shipped up the Delaware River to Mantua Creek on an average of ten times per year (Kalelkar Sup-

³⁷Dr. Read's response modifies his earlier testimony that the estimate of ten butane tankers per year is based upon "present traffic" (Read's Supplemental Testimony at 9).

plemental Testimony at 59). On this basis, Applicant estimates that ten butadiene tankers will pass the Hope Creek plant per year. Staff has made no specific estimate for butadiene traffic (Staff Exhibit 1-F; Tr. 3219). We conclude that the evidence indicates that ten butadiene shipments per year should be accounted for in the risk analysis.

Total LPG Traffic

79. The total LPG traffic estimated by Applicants is 52 transits per year, while Staff estimates 60 transits per year. The values which produce these totals are summarized in Table III (p. 680). We have found all of Applicants' estimates reasonable except for the number of butane shipments. We have found Staff's estimate for butane to be reasonable, however. If we use Staff's estimate for butane and Applicants' estimate for the other LPG products, we obtain a total of 60 LPG transits per year (see Table II, p. 676).

80. Joint Intervenor argue that these estimates "are so uncertain as to be nonconservative in themselves and to destroy the conservatism of the entire risk estimate" (Intervenor's Proposed Findings, paragraph 25c). The basis for their argument is the increase in LPG traffic on the river since 1974, when Applicants estimated that there would be two LPG shipments per year on the river (*id.*, paragraphs 23-25). Intervenor argue that Applicants and Staff have failed to account for the potential continued increase in annual LPG shipments (*id.*, paragraph 25d). The testimony of both Dr. Kalelkar and Dr. Read indicates, however, that the estimates of Applicants and Staff are based on information currently available from the industry as to expected future shipments (Tr. 3043-44, 3078-79, 3220-21). Unfortunately, projections up to 40 years are not available (*ibid.*). Intervenor also argue that using Staff's figure for butane instead of the Applicants', produces a risk from LPG which exceeds the risk from LNG alone (Intervenor's Proposed Findings, paragraph 25a). The evidence contradicts this claim (see Table II, p. 676). Intervenor have presented us with no alternatives to the estimates of Applicants and Staff and apparently would have us simply speculate about future traffic. But our decision cannot be based on speculation. Consequently, we do not accept Intervenor's argument.

81. We conclude, based on the above findings, that the estimate of a total of 60 LPG ships per year, consisting of 40 propane tankers, ten butane tankers, and ten butadiene tankers is reasonable. We accept these estimates in reaching our decision.

TABLE III

Applicants' and Staff's Estimates of Parameter Values and Resultant Probabilities for LPG Traffic Over 24-Mile Range

| | Applicant | | | | Staff | | |
|----------------------------|--------------------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|
| | Propane | Butane | Butadiene | Total | Propane and LPG | Butane | Total |
| Tanker Trips per Year | 40 | 2 | 10 | 52 | 50 | 10 | 60 |
| Collisions per Mile-Year | 1.51×10^{-6} | 1.51×10^{-6} | 1.51×10^{-6} | — | 1.5×10^{-6} | 1.5×10^{-6} | — |
| Probability of Spill | 0.005 (24-mi) 0.05 (C & D) | 0.1 | 0.1 | — | 0.02 | 0.02 | — |
| Probability of Nonignition | 0.1 | 0.1 | 0.1 | — | 0.1 | 0.1 | — |
| Meteorological Factor | 0.307 (24-mi) 0.003 (C & D) | 0.32 | 0.25 | — | 0.35 | 0.35 | — |
| Product | 1.0×10^{-9} | 9.7×10^{-9} | 3.8×10^{-8} | 5.8×10^{-8} | 5.3×10^{-8} | 1.1×10^{-8} | 6.4×10^{-8} |

B. Accidents Per Year

82. The accident rate which we have accepted, *supra*, for LNG traffic, 1.51×10^{-6} occurrences per mile-year, is also applicable to LPG traffic. Moreover, LPG tankers will transit under the same COTP rules that govern LNG ships (Kalelkar Supplemental Testimony at 54-55). In addition, at least two-thirds of the LPG transits (the 40 propane shipments) will involve modern vessels which are less collision prone than conventional tankers and cargo ships (*ibid.*). Thus the real accident rate for LPG ships, considered as a whole, will be less than the calculated rate. We conclude, therefore, that the estimate of 1.51×10^{-6} accidents per mile-year is conservative when applied to LPG traffic.

C. Spills Per Collision

83. The spill probability for LPG ships was previously estimated by the Applicants to be 0.02, based on the assumption that, because of their small size, LPG ships are susceptible to collisions from all angles up to 90° (Applicants Exhibit 9, pp. 23-24). The Appeal Board asked why this value was not as great as the 0.05 probability determined for LNG ships in the vicinity of the C & D Canal, where LNG carriers are susceptible to collision angles up to 90° (ALAB-429, 6 NRC at 244). The reason for this difference was that LPG was being shipped in vessels outfitted with steel pressure vessel tanks at the time the previous analysis was made (Kalelkar Supplemental Testimony at 53). The tanks have greater rupture resistance than the refrigerated tanks used on LNG vessels, and consequently the spill probability was lower for LPG tankers than for LNG tankers (*id.* at 53-54). New Coast Guard regulations, however, will require that LPG ships be similar in design to LNG ships in the future; those ships will also be required to comply with the same regulations in transit as LNG ships (*id.*, Appendix B; Tr. 3454-55). Therefore Applicants no longer use 0.02 as the spill probability for LPG.

Propane

84. While the modern ships that will be used to transport propane will not be as large as LNG ships, they are larger than vessels previously used for this purpose and will have essentially the same spill resistance as LNG tankers (Kalelkar Supplemental Testimony at 53-55; also see Appendix F). Consequently, Applicants now believe that the probability of spill for propane tankers should be the same as for LNG ships: 0.005 for the river section of interest, except in the vicinity of the C & D Canal, where it is

0.05 (*id.* at 55-56). Staff is now in agreement with this analysis (Staff Proposed Findings, paragraph 109).

Butane and Butadiene

85. No information is available about ships that may carry butane on the Delaware River in the future, because there are no plans for future shipments (Kalelkar Supplemental Testimony at 59-60). Consequently, the Applicants assumed that future shipments will be carried in vessels similar to the Faraday, the last ship to carry butane on the Delaware (*ibid.*). On the basis of this assumption Applicants used 0.1 as the spill probability for butane, given a collision (*id.* at 60). With respect to butadiene, the tankers are expected to be small (*id.* at 59).³⁸ Consequently, a spill probability of 0.1 was assumed for butadiene, as well (*ibid.*).

86. The Joint Intervenor argue that Applicants have assumed that LPG ships will have double bottoms, and they suggest that "differences between the physical characteristics of LNG and other double-bottom gas vessels raise doubts about the applicability of the Applicants' analysis of LNG tankers to these other vessels" (Intervenor's Proposed Findings, paragraph 38). To support their argument, they cite the testimony of Commander Henn, who in fact did say that not all LPG ships are double bottomed (Tr. 3464-65). Commander Henn went on to testify, however, that LPG ships without double bottoms would have pressure vessel cargo tanks, not membrane tanks (*ibid.*). He also said that pressure vessel cargo tanks do not require a secondary barrier because "it's an overdesigned, very rugged tank" (Tr. 3455). When asked whether such ships would be any less safe than double-bottomed ships, he replied, "Absolutely not, sir" (Tr. 3466). Commander Henn then provided detailed testimony explaining why the Coast Guard considers pressure vessel tankers to be as safe as double-bottomed tankers (Tr. 3467-69). From the evidence before us, we conclude that LPG tankers equipped with pressure vessel cargo tanks may be considered at least as safe in a collision or a grounding as double-bottomed vessels equipped with membrane tanks. This finding is consistent with our earlier finding that freestanding tanks, *i.e.*, pressure vessel tanks, would be less susceptible to a spill than membrane tanks (see paragraph 57, *supra*). In any case, it is not true that Applicants apply the spill resistance of LNG ships to all LPG ships. Propane tankers were considered to have the same spill resistance as LNG ships, because of their size and other structural and performance characteristics. Butane and butadiene carriers, on the other hand, were assigned a spill prob-

³⁸The capacity of a typical butadiene tanker is 12,000 m³, compared to 50,000 to 75,000 m³ for a propane tanker and 125,000 m³ for an LNG tanker (*id.* at 54, 59).

ability of 0.1, twice that of LNG carriers susceptible to 90° impact angles. In our view, these assumptions are very reasonable and, consequently, we find the Applicants' spill probabilities for LPG tankers acceptable.

D. Vapor Clouds Per Spill

87. The Appeal Board raised the same questions with regard to the nonignition probability for LPG that it did for LNG (ALAB-429, 6 NRC at 244). We considered this matter above, with regard to LNG (see paragraphs 63 through 69). Based on those considerations, we concluded that the use of 0.1 as probability of nonignition, given as spill, was reasonable and conservative. We make the same finding here, for the same reasons, with regard to the probability of nonignition of LPG, given a spill.

E. Meteorological Factor

88. The Appeal Board noted that propane (LPG) is flammable at concentrations ranging from 2% to 6%, whereas methane (LNG) is flammable at concentrations ranging from 5% to 15% (a 2.5-fold difference), and questioned why the meteorological factors of the two types of gas did not reflect this difference (ALAB-429, 6 NRC at 244-245). Evidence presented in the remanded proceeding demonstrates that flammable limits for gases, when expressed in percentages, are mole-percentages (Kalelkar Supplemental Testimony at 56). In terms of molecular weight, propane is 2.75 times "heavier" than methane (*ibid.*). When the flammable limits of the two are converted from mole-percent to pounds per cubic feet, the lower flammable limits of the two are approximately the same: 2.59×10^{-3} lb/ft³ for propane and 2.24×10^{-3} lb/ft³ for methane (*id.* at 57). The distance that a vapor cloud remains flammable is a direct function of the flammable limit expressed in units of mass. Since in mass units the lower flammable limits of the gases are about the same, the maximum hazard distances for them are about the same (*ibid.*).

Propane

89. In the earlier analysis, Applicants calculated the meteorological factors for all LPG on the basis of an assumed 10,000-ton spill (Applicants' Ex. 9, p. 50). The tankers which will be used for propane shipments on the Delaware in the future, however, have tanks that hold an average of 9,000 m³, which is less than 10,000 tons (Kalelkar Supplemental Testimony at 54). In the revised and updated analysis, Applicants assumed that size of a propane spill would be 12,000 m³, or 4,500

tons (*id.* at 54, 56). Under the most adverse weather conditions, a vapor cloud of propane from a spill of this size on water could travel a distance of 9 miles and still contain flammable concentrations (*id.* at 54-55). On the basis of these facts and assumptions, Applicants calculated the meteorological factors for propane to be 0.307 for the entire river section of interest except in the vicinity of the C & D Canal, where it is 0.003. These values are less than comparable values obtained for LNG because of the difference in spill size, 12,000 m³ for propane versus 25,000 m³ for LNG, and the difference in flammability (*id.* at 56). Previously, we concluded that the method used for calculating the meteorological factor was reasonable, and the Appeal Board accepted that methodology. We find here that the assumed 12,000 m³ spill for propane is also reasonable. We conclude, therefore, that the meteorological factors of 0.307 and 0.003 for the 24-mile river segment and the 1-mile segment at the C & D Canal, respectively, are reasonable and acceptable.

Butane

90. In the absence of any plans by Gulf and Exxon to receive butane at their Delaware River terminals in the future, Applicants assume that the last ship to carry butane on the Delaware was representative of butane carriers (Kalelkar Supplemental Testimony at 59-60). On this basis, it was assumed that a butane spill would release 10,000 m³ of LPG (*id.* at 60). With this assumption, Applicants found that a butane cloud could travel 9 miles and still contain flammable concentrations. The meteorological factor calculated on the basis of these assumptions and facts is 0.32. We find the Applicants' assumptions to be reasonable and conclude that the meteorological factor for butane is also reasonable and acceptable, for the reasons set forth in the preceding paragraph.

Butadiene

91. Butadiene shipments are transported on the Delaware in a number of different tankers, but the typical tanker has a capacity of 12,000 m³ and a tank size of 4,000 m³ (Kalelkar Supplemental Testimony at 59). Based on its flammability limit of two mole-percent and a 4,000 m³ spill, Applicants determined that a flammable cloud of butadiene produced in an accident on the Delaware River could travel about 4 miles (*ibid.*). From the foregoing information, the meteorological factor for butadiene was calculated to be 0.25 (*ibid.*). We find the assumptions with regard to a butadiene spill to be reasonable, and therefore conclude that the meteorological factor of 0.25 is also reasonable and acceptable.

F. Probability of a Flammable LPG Vapor Cloud Reaching the Plant Site

92. The probability that a flammable cloud of LPG vapor will reach the Hope Creek plant from an accident in the river is obtained from the sum of the products of the conditional probabilities for each type of LPG. These values are summarized in Table III (p. 680). The Applicants obtained the following probabilities that a gas cloud would threaten the plant: for propane, 1.0×10^{-8} (Kalekar Supplemental Testimony at 55); for butane, 1.0×10^{-8} (rounded up from 9.7×10^{-9}) (*id.* at 60); for butadiene, 3.8×10^{-8} (*id.* at 59). The cumulative probability for all types of LPG based on the Applicants' calculations is 5.8×10^{-8} occurrences per year. For purposes of comparison, the estimate obtained by Staff in Supplement No. 5 to the SER is 6.4×10^{-8} occurrences per year (see Staff Exhibit 1-F). We did not accept Staff's estimate of the number of propane tankers, however, and Staff did not consider butadiene. Moreover, the 2×10^{-2} (0.02) spill probability is no longer acceptable. Consequently, we reject Staff's estimate. We have found, in addition, that Applicants' estimate of number of butane tankers is unacceptable. We must, therefore, also reject the Applicants' estimate of cumulative probability for LPG.

93. We have found Staff's estimate of number of butane tankers and Applicants' estimates for the other parameters all to be reasonable. Using Staff's value for number of butane tankers and Applicants' values for the other parameters, then, we have calculated our own probability estimate for a butane cloud reaching the plant: 4.8×10^{-8} occurrences per year. The values we used in reaching this estimate are summarized in Table II (p. 676). We have found the Applicants' values for the parameters associated with propane and butadiene all to be reasonable. We conclude that the probability estimates of 1.0×10^{-8} that a propane cloud will reach the plant per year and 3.8×10^{-8} that a butadiene cloud will reach the plant per year are both reasonable. We have also found the collision rate and the nonignition probability (vapor clouds per spill) used in all the calculations to be conservative, for reasons discussed previously. Consequently, we find the probability estimates above to be conservative.

94. Accepting these probability values as reasonable and conservative, we have calculated a cumulative probability for LPG of 9.6×10^{-8} occurrences per year (see Table II, p. 676). Considering the evidence before us, and for the reasons set forth above, we find this estimate of the probability that a flammable cloud of LPG vapor, resulting from an accident involving a tanker on the Delaware River (except for a ramming of tower 97), will reach the Hope Creek site to be both reasonable and conservative pursuant to the guidelines set forth in NUREG-75/087, §2.2.3 (1975).

III. TOWER 97

95. There remains to be considered the possibility that an LNG or LPG cloud will reach the Hope Creek site from a ramming accident involving a tanker at tower 97. The circumstances which called this matter to our attention and caused it to become of concern to us have been described *supra*, in paragraphs 16 and 17. We turn now to a consideration of the evidence on this subject, received by us in the hearing on January 10, 1978.³⁹

96. Tower 97 is being constructed upstream from the Hope Creek site, near the north end of New Castle Range (letter to Chairman Luton from Captain K. G. Wiman, U. S. Coast Guard, dated November 10, 1977).⁴⁰ The exact distance from the tower to the Hope Creek site is not made clear by evidence which we have received. Captain Wiman informed us that the "distance from the towers to Hope Creek Station site on Artificial Island is approximately 8.75 miles" (letter to Chairman Luton from Captain Wiman, dated November 29, 1977).⁴¹ Dr. Kalelkar, on the other hand, testified that tower 97 was 9.1 nautical miles from the Hope Creek site (Tr. 3748). Since this inconsistency could not be resolved during the hearing, the Board asked LTJG Stanton to have another letter sent to us by the Coast Guard informing us of the correct distance from tower 97 to the Hope Creek site (Tr. 3785). On January 27, 1978, we received a letter from Captain J. C. Griggs, U. S. Coast Guard, advising us that he had determined that the distance from tower 97 to the "southern dome of the existing Salem generating station," the closest reference point on the chart, is 9.1 nautical miles.⁴² From information in the Hope Creek FES, we have determined that the southern dome of the Salem plant is about 1,950 feet or 0.32 nautical miles, from the northern dome of the Hope Creek plant (see Final Environmental Statement, Hope Creek Generating Station, Fig. 3.2). Using Captain Griggs' information, then, we obtain 8.8 nautical miles (rounded to one decimal place) as the distance from tower 97 to the Hope Creek plant. We consider this value to be consistent with

³⁹Evidence at the hearing was presented by witnesses for Applicants, Staff, and the Board. Joint Intervenors presented no evidence but relied on cross-examination of the witnesses. In addition, the parties stipulated to submit the record as it stood at adjournment of the hearing, *i.e.*, without their submitting proposed findings of fact and conclusions of law (Tr. 3840-42).

⁴⁰The correspondence between Captain Wiman and the Board was received into evidence at the hearing on January 10, 1978 (Tr. 3748).

⁴¹See n. 40.

⁴²All parties were aware that this information was solicited by the Board and none objected to it (Tr. 3785).

Captain Wiman's figure of 8.75 as the distance from tower 97 to the Hope Creek site. We conclude, therefore, that 8.8 nautical miles is the correct distance from the tower to the plant. Finally, tower 97 is located west of New Castle Range, about 800 feet from the edge of the shipping channel (letter from Captain Wiman dated November 10, 1977; Tr. 3738, 3746).⁴³

97. The tower is constructed of tubular steel and is about 380 feet tall (Tr. 3756). It is anchored to a concrete platform, the top of which is about 14 feet above mean water level (Tr. 4755). There is a fender system of concrete pilings surrounding the tower on the east and east-southeast sides, between the tower and the channel (Tr. 3736, Applicants' Ex. 16). The fender system is designed to withstand a ramming by a 2,000-ton barge striking it with a velocity of 3 or 4 feet per second (Tr. 3756-57). Navigational warning devices which will be installed on tower 97 will consist of flood lights, to illuminate the base, and a foghorn that will be audible for one-fourth mile (letter from Captain Wiman dated November 10, 1977; Tr. 3770-71).⁴⁴ In addition, the tower will be equipped with red flashing lights to warn aircraft (Tr. 3738, 3772). The water at tower 97, according to Captain Wiman who obtained his information from the Army Corps of Engineers, is 34 feet deep at mean low water (letter from Captain Wiman dated December 19, 1977).⁴⁵ Applicants' witness Boettger, who inspected the tower from a fisheries research vessel on January 6, 1978, testified that the depth finder on the boat registered depths varying "from something like 29 feet to 32 feet" at about mean water; these depth readings were taken at distances of from 100 to 200 feet from the tower (Tr. 3739-41, 3745). The deeper reading was around the northeast corner of the tower, and the more shallow reading was around the southwest corner (Tr. 3739). Witness Boettger disclaimed any personal knowledge or expertise about the accuracy of the depth finder on the boat, but he indicated that he understood from others who possessed such knowledge that it was accurate to within ± 1 foot (Tr. 3739, 3742-45). While witness Boettger's testimony cannot be accorded the weight that could be accorded testimony from an expert who is reporting results from careful and deliberate measurements, the Board nevertheless notes that Mr. Boettger's observation that deeper water was recorded northeast of the tower and shallow water was recorded southwest of the tower is consistent with information contained on the photocopy of a section of NOS chart 12311 which was attached to one of Captain Wiman's letters (letter

⁴³See p. 686, n. 40.

⁴⁴See p. 686, n. 40.

⁴⁵See p. 686, n. 40.

from Captain Wiman dated November 10, 1977).⁴⁶ That chart shows a depth of 35 feet northeast of the tower, near the channel, and depths of 26 feet in two places southeast of the tower, toward the channel (*ibid.*; Tr. 3815). All of this evidence leads us to believe that the only direction an LNG tanker could approach the tower and ram it would be from the northeast. Loaded LNG and LPG tankers traveling to terminals for unloading will be approaching the tower, in normal operation, from the south-southeast. We believe an LNG or large LPG vessel would run aground before ramming the tower from this direction. Nevertheless, in making their analysis of the probability of a tanker ramming tower 97, the Applicants conservatively assumed that the water around the tower was more than 35 feet deep at all times (Tr. 3768). This assumption would adequately account for smaller LPG tankers which might be able to impact the tower by approaching through water which is less than 35 feet deep.

A. LNG Traffic

98. In their analysis of the problem of a possible ramming of tower 97 by an LNG ship, the Applicants used 292 as the estimate of the number of LNG ships that would pass the tower each year. This is the same number used for LNG traffic in the collision analysis (Tr. 3748-49). The rate of rammings was estimated on the basis of historical information on rammings on the Delaware, obtained from Coast Guard accident casualty data for 1969-1976. An analysis was made of all rammings involving ships of more than 18 feet draft (*ibid.*). Even though these accidents included seven occurring at night and one occurring at anchorage, all of which are accidents that would not be relevant to an LNG tanker in the 24-mile catchment zone, for the sake of conservatism Applicants included all 15 in their calculations (Tr. 3479, 3810-11). There was an average of 9,500 one-way trips per year during the 8-year period from which the data were taken, to give an estimated probability of a ramming accident involving a large ship of 1.9×10^{-4} per trip (Applicants' Exhibit 14; Tr. 3749).

99. To provide a basis for estimating the probability that an LNG ship would ram tower 97, given the occurrence of a ramming by an LNG ship, the Applicants counted 75 rammable objects in the river from its mouth to the Conrail Bridge near Philadelphia (Tr. 3750). Only one of these objects, *viz.*, tower 97, is located in the 24-mile catchment zone (*ibid.*). Most of the rammable objects are in the heavy industrial area north of Wilmington, and the 15 rammings accepted for the data base occurred in that section of the river (*ibid.*). Nevertheless, Applicants assumed, for the

⁴⁶See p. 686, n. 40.

sake of conservatism, that tower 97 is one of 50 rammable objects on the river which might pose a risk to the Hope Creek plant (*ibid.*). This assumption yielded a probability of 2×10^{-2} that, given a ramming in the river section of interest, the object rammed would be tower 97 (*ibid.*; Applicants' Exhibit 14). Taking the probability that a large ship will be involved in a ramming accident, 1.9×10^{-4} , as the probability that an LNG ship will be involved in a ramming, and multiplying this by the probability that tower 97 will be rammed, given a ramming, gives a probability of 3.8×10^{-6} per trip as the probability that an LNG ship will ram tower 97.

100. Staff's approach to estimating the probability that an LNG ship would ram tower 97 differed significantly from Applicants' approach (see Read Tower Testimony). First, Staff used its previous estimate of 360 ships per year (Read Tower Testimony at 4). Then Staff obtained a data base of 26 rammings in an 8-year period, 1967-1974 (*id.* at 2). The difference between Staff's figure of 26 rammings in 8 years and Applicants' figure of 15 rammings in 8 years may result, in part, from a large number of rammings in the years 1967 and 1968, which were included in Staff's analysis but not in the Applicants' (Tr. 3834). The difference can also be attributed to the fact that the Applicants considered only rammings which involved a vessel having a draft of over 18 feet, while Staff's data included small vessels such as barges (Tr. 3830). Also, Staff's data included rammings of stationary vessels, while Applicants' did not (Tr. 3837). Staff's analytical approach involved a geometric model in which it was assumed that tower 97 obstructs one percent of the river, and that ships proceed up the river at random, without regard to the channel and without their pilots detecting the tower until the ship arrives at it, at which time the ship may or may not avoid it (Read Tower Testimony at 2-3). This model predicts the occurrence of 1×10^{-5} rammings per ship passage (*id.* at 4). This risk was applied to LNG tankers by accounting for their size, 600 meters in length, calculating a risk per meter, and then prorating that risk out to 1 mile (Tr. 3833). The result is a ramming rate of 2.7×10^{-5} per mile which Staff takes as the effective ramming rate at the tower (Read Tower Testimony at 4).

101. Staff's estimate of the rate at which LNG ships would ram tower 97 is about one order of magnitude greater than the probability obtained by the Applicants, 3.8×10^{-6} . While it is very difficult to compare the two estimates because of the difference in approaches, we do note that Staff considered all rammings, not just those involving large vessels. We note, also, that the geometric model on which Staff based its analysis is extremely conservative. In fact, in our view the model is so unrealistic that we consider Staff's estimate unacceptable. Clearly the assumptions on which the model is based are invalid. We consider the Applicants' esti-

mate of accident rate at the tower, on the other hand, to be reasonable. We believe the historical data base is sound and the accident screening is justified. Further, we find the estimate to be conservative because the 15 rammings included accidents which occurred under circumstances that are not applicable to LNG tankers, and because the number of rammable objects (50) used in Applicants' analysis is substantially greater than the real number (1) which an LNG tanker could ram in the 24-mile catchment zone.

102. Next, we must consider the probability that a cargo spill will occur, given a ramming of tower 97 by an LNG tanker. If an LNG tanker rammed tower 97, a cargo spill could occur by one of two general mechanisms: tank penetration or rupture resulting from hull damage, or tank penetration or cracking resulting from the tower falling onto the ship (Tr. 3758-62). Because of the geometry of the fender protection system relative to the tower and to the channel, the likelihood that an LNG ship could strike the tower without first ramming the fender is negligible (see Applicants' Ex. 16 and the photocopy for NOS chart 12311 attached to the letter to Chairman Luton from Captain Wiman dated November 10, 1977).⁴⁷ Since the fender system is not designed to withstand impact from a large vessel, it would probably be pushed over or pushed aside if struck by an LNG tanker (Tr. 3756, 3758). The vessel might then proceed to the tower and impact the base, or both the legs and the base (Tr. 3759). Considering the structural resistance of the ship, relative to that of the fender and the tower, it is unlikely that such an accident would cause significant damage to the ship (*ibid.*) Consequently, if the impact did not cause the tower to fall on the ship, we do not believe that damage to the vessel ramming the fender or tower, or both, would be sufficient to cause a cargo spill.

103. If the impact of the ship were sufficient to cause the tower to fall, one of several things could happen. The tower might be pushed forward or to the side, so that it fell away from the ship (Tr. 3761, 3798). For the reasons just given regarding structural resistance, we do not think that such event would cause a cargo spill. If the vessel impacted the tower with sufficient force to break the tower away from its foundation, however, inertia effects might cause the tower to fall back on the ship (*ibid.*). Should that happen, at least one of the cargo tanks could be penetrated or cracked, resulting in the release of LNG (*ibid.*) Since the tower is 380 feet tall, it is conceivable that it could strike two tanks (Tr. 3798). As the tower fell, however, energy would be absorbed as it impacted the bow or side of the ship; it would strike one tank before striking a second, and

⁴⁷See p. 686, n. 40.

additional energy would be absorbed by the first tank to be struck (Tr. 3805, 3817). Only if it fell horizontally, which is extremely unlikely, would it strike more than one tank simultaneously (*ibid.*). In that case the energy would be equally divided between the impacted tanks (*ibid.*). Consequently, it is highly unlikely that a two-tank spill would occur; witness Kalelkar testified that the probability of a two-tank spill, given the ramming of tower 97 by an LNG or LPG tanker, would be on the order of 1×10^{-9} or 1×10^{-10} (Tr. 3806). In view of the evidence, we conclude that the probability of a two-tank spill is negligible.⁴⁸

104. With regard to the probability of a one-tank spill, Applicants witness Athens testified that in view of the many factors involved in determining whether the tower falls and, if so, where it falls, he would estimate the probability of a spill given a ramming to be somewhere between 10^{-1} and 10^{-2} (Tr. 3761-62). As a conservative estimate of this probability, therefore, Applicants have used the value of 1×10^{-1} as the probability of an LNG spill given a ramming of tower 97 (Applicants' Ex. 14). We recognize that this estimate is based on engineering judgment and is not a quantitative evaluation. We also recognize that the number and complexity of the parameters which must be considered in making this determination make a mathematical analysis extremely difficult, if not impossible. Therefore, we will accept an estimate based on engineering judgment. Without explanation, Staff used the same probability of spill as in its collision analysis, 1×10^{-1} (Read Tower Testimony at 4). Thus, Applicants and Staff are in agreement as to the value to be used here. Considering the evidence, we conclude that the Applicants are correct in estimating the probability of spill, given a ramming, to be less than 1×10^{-1} . We accept that value, therefore, and find it to be conservative.

105. We turn now to a consideration of the probability of nonignition of an LNG gas cloud released as the result of a ramming of tower 97 by an LNG tanker. Applicants and Staff both used the same probability (1×10^{-1}) in this analysis as they did in the analysis involving ship collisions (Applicants' Ex. 14; Read Tower Testimony at 4; Tr. 3768). In response to questions by the Board, Applicants' witness Boettger testified that the transmission line to be supported by tower 97 would be carrying 500,000 volts; witness Kalelkar said that this fact was not taken into account in using a nonignition probability of 1×10^{-1} (Tr. 3768). Mr. Boettger testified further that sparking would occur if the cable carrying current parted or came in contact with the tower, any other conductor, or the water; this sparking would last less than a second before power in the cable was shut off automatically (Tr. 3823). We have concluded, *supra*, that the only

⁴⁸We consider a three-tank spill incredible because cargo tank #3 on an LNG tanker is more than 380 feet from the bow (see Board Ex. 2 at 173).

credible scenario which would produce an LNG spill if a tanker rammed tower 97 involves the tower falling onto the ship and penetrating or cracking a tank. Given that situation, it is likely that the cable carrying current would fall and produce sparks on or near the ship. If the cables did not produce sparks, we believe that the nonignition probability, given a gas cloud produced as a result of the ramming of tower 97 by an LNG ship, would be about the same as the nonignition probability given a gas cloud production in a ship-to-ship collision. We have accepted 1×10^{-1} as a reasonable and conservative probability in that situation. We also accept that probability here for the same reasons, but we consider it even more conservative in this situation because of the likelihood that the cloud would be ignited by sparks produced by the transmission lines.

106. The last parameter to be consider in the analysis of the risk posed by the possibility that an LNG ship might ram tower 97 is the meteorology factor. Again, we note that the Appeal Board accepted Applicants' analysis of the meteorology factor (ALAB-429, 6 NRC at 242). Applicants and Staff both estimate that the probability that a methane gas cloud released by a ramming accident at tower 97 will reach the Hope Creek plant in flammable concentrations is 2×10^{-3} .⁴⁹ We accept this value.

107. Based on an estimated 292 transits per year by LNG tankers and on the foregoing probabilities, Applicants calculated a probability of 2.2×10^{-8} that the Hope Creek plant would be enveloped by a flammable gas cloud resulting from the ramming of tower 97 by an LNG ship (Applicants' Ex. 14). We have found the number of transits and the foregoing probabilities estimated by Applicants to be reasonable. We therefore find the cumulative probability to be reasonable. We have also found the conditional probabilities used to obtain this product to be conservative, for reasons already explained. Consequently we find the estimate, 2.2×10^{-8} occurrences per year, to be conservative (see Table IV, p. 693). We have rejected Staff's method for estimating the probability related to tower 97 on the grounds that it required unrealistic assumptions. But we did find, previously, that Staff's estimate of 360 transits per year was reasonable and more conservative than Applicants' estimate of 292. Using Applicants' method with Staff's estimate of number of transits, we have calculated a most conservative estimate of 2.7×10^{-8} occurrences per year (see Table V, p. 694). Our decision is based on this value.

⁴⁹This estimate is based on the belief that the distance from the tower to the site is 9.1 miles. We have found, *supra*, that this distance is actually 8.8 miles. The small difference in distance does not affect the value of the meteorological factor (see Applicants' Ex. 11, p. 28).

TABLE IV

Applicant's Estimates of Parameter Values and Resultant Probabilities for LNG Traffic and LPG Traffic at Tower 97

| | LNG | LPG* |
|------------------------------------|----------------------|----------------------|
| Tanker Trips per Year | 292 | 52 |
| Probability of Ramming per Trip | 1.9×10^{-4} | 1.9×10^{-4} |
| Probability of Ramming Tower 97 | 0.02 | 0.02 |
| Probability of Spill | 0.1 | 0.1 |
| Probability of Nonignition | 0.1 | 0.1 |
| Meteorological Factor | 0.002 | 0.002 |
| Product | 2.2×10^{-8} | 3.9×10^{-9} |

*The Applicant did not calculate a probability for LPG traffic at tower 97. The parameter values listed are from Applicant's analysis. The probability was calculated from them by the Board.

B. LPG Traffic

108. The Applicants did not consider an LPG spill at tower 97 to constitute a risk to the plant (Tr. 3749). Although the distance that an LPG cloud will travel, while still remaining flammable, is about the same as the distance that an LNG cloud will travel and remain flammable, LPG will be carried in much smaller cargo tanks than LNG (Tr. 3769). The average tank size of LPG ships that will be serving the Sun Oil

TABLE V

Parameter Values and Resultant Probabilities Accepted by the Board for LNG Traffic and LPG Traffic at Tower 97

| | LNG | LPG |
|------------------------------------|----------------------|----------------------|
| Tanker Trips per Year | 360 | 60 |
| Probability of Ramming per Trip | 1.9×10^{-4} | 1.9×10^{-4} |
| Probability of Ramming Tower 97 | 0.02 | 0.02 |
| Probability of Spill | 0.1 | 0.1 |
| Probability of Nonignition | 0.1 | 0.1 |
| Meteorological Factor | 0.002 | 0.002 |
| Product | 2.7×10^{-8} | 4.6×10^{-9} |

terminal will be about 9,000 cubic meters (Tr. 3801). Applicants used a tank size of 12,000 cubic meters to calculate the distance that a propane cloud would travel and remain flammable, and found that distance to be 8.6 miles (*ibid.*).⁵⁰ On the basis of the belief that the distance from the tower to the plant is 9.1 miles, Applicants concluded that LPG posed no risk for the Hope Creek facility (*ibid.*). We have determined that it is 8.8 miles from the tower to the plant site, however. While it would still be legitimate to ignore LPG, even in view of our finding of the correct distance, we believe that the need for conservatism requires that the risk from LPG be considered. We proceed now with that consideration.

⁵⁰Applicants' estimate of 9 miles used in the collision calculations was obtained by rounding up from the 8.6 miles reported here (Tr. 3801).

109. First, we note that the parameters relating to LNG traffic at tower 97, except for number of ships and the meteorological factor, can be applied to the LPG calculations. The meteorological factor for LNG will be too large for LPG, because LNG tanks, and hence volume of spill, are larger than LPG tanks and spill volume. For the sake of conservatism, however, we shall apply the LNG meteorological factor to the LPG calculation. If we use Applicants' estimate of LPG traffic, 52 ships per year, we obtain a probability of 3.9×10^{-9} that a flammable cloud of gas will reach the Hope Creek site as a result of an LPG tanker ramming tower 97 (see Table IV, p. 693). A more conservative estimate however, can be obtained by using the estimate of 60 LPG ships per year, which we have found to be acceptable in the collision analysis. This value for traffic yields a probability estimate of 4.6×10^{-9} occurrences per year (see Table V, p. 694). We accept this as a reasonable estimate that a ramming of tower 97 by an LPG tanker will threaten the Hope Creek plant each year. We believe this estimate is greater than the real probability, because (1) Applicants assumed that there were 50 rammable objects in the river which might cause a threat to the plant when in fact there is only tower 97, (2) Applicants included in their data base rammings which are not appropriate to LNG tankers, (3) the probability of a spill, given a ramming, is actually less than 1×10^{-1} , (4) sparking from broken transmission lines was not accounted for in the nonignition probability determination, and (5) the meteorological factor used in the LPG calculation is an overestimate.

110. In conclusion, we find the probability estimates presented in Table V to be reasonable and also conservative pursuant to the guidelines contained in NUREG-75/087, §2.2.3 (1975). We accept them for the purpose of reaching our decision.

IV. CUMULATIVE PROBABILITY

111. The Appeal Board agreed with the Licensing Board's previous finding that it is the cumulative probability of a flammable gas cloud reaching the Hope Creek site from an accident involving an LNG or LPG tanker which we must consider in deciding whether it is necessary to design the plant to protect against a gas cloud fire (ALAB-429, 6 NRC at 243, n. 81).⁵¹ That probability is obtained from the sum of the prob-

⁵¹Joint Intervenors have argued that risks associated with gasoline and ammonia shipments should be considered along with LNG and LPG shipments (Intervenors' Proposed Findings, paragraphs 39, 104, 126, 127). We do not agree. Gasoline has been considered as a pool fire risk to the facility's intake structure, and ammonia poses a toxic hazard, not a flammable hazard (see Applicants' Ex. 9, pp. 28-31; also Staff Ex. 1-F, p. 15). These hazards are distinct from the flammable gas hazard which is being considered in this remanded proceeding.

abilities for the mutually exclusive events of (1) a collision involving an LNG tanker, (2) a collision involving an LPG tanker, (3) the ramming of tower 97 by an LNG tanker, and (4) the ramming of tower 97 by an LPG tanker. We previously accepted as the criterion for our decision the guideline probability values set forth in the NUREG-75/087, §2.2.3 (1975). Thus, an event resulting from the presence of hazardous materials in the vicinity of the plant may be disregarded if a "realistic" calculation of the event's probability of occurrence is less than 10^{-7} per year or if a "conservative" calculation indicates that the probability is less than 10^{-6} per year (LPB-77-22 at 709-10). The event referred to is one which has the potential of causing radiation exposures in excess of the guidelines contained in 10 CFR Part 100. The Appeal Board also accepted these guidelines (ALAB-429, 6 NRC at 234). Since valid statistical data are not available on the casualty experience of LNG and LPG ships in inland waterways, the estimates with which we must deal are based in part on data from analogous experience and in part on engineering judgment. Consequently, the calculation of cumulative probability on which we must base our decision will not be "realistic." We can, however, consider it acceptably "conservative" if the probability is approximately 10^{-6} and is combined with "reasonable qualitative arguments" which show the realistic probability to be less than 10^{-6} (NUREG-75/087, §2.2.3).

112. The probability estimates which we have accepted above as being reasonable and conservative are listed in Table VI (p. 697). The probability that LNG traffic over the 24-mile range of the catchment zone will result in a flammable gas cloud reaching the Hope Creek site, 1.1×10^{-7} occurrences per year, is conservative because of conservatisms associated with the estimates of collision rate, probability of spill, and probability of nonignition. The probability that LPG traffic will lead to a gas cloud at the plant site, 9.6×10^{-8} occurrences per year, is conservative because of conservatisms in the estimates of collision rate and probability of nonignition. The probability that the ramming of tower 97 by an LNG tanker would produce a gas cloud that would reach the plant, 2.7×10^{-8} occurrences per year, has been found conservative because of conservatisms in the estimates of the probability that an LNG ship would ram the tower and the probability of nonignition of the gas, given a ramming and a spill. Finally, the probability that an LPG tanker would ram the tower and produce a vapor cloud that would threaten the plant, 4.6×10^{-9} occurrences per year, is conservative because of conservatisms in the estimates of the probability of ramming, the probability of nonignition, and the meteorological factor.

113. In conclusion, we find the cumulative probability of a flammable gas cloud reaching the Hope Creek plant because of an accident involving an LNG or LPG tanker on the Delaware River to be 2.4×10^{-7} occurrences

per year (see Table VI, p. 697). We find, further, that this calculation is conservative pursuant to the guidelines contained in NUREG-75/087, §2.2.3 (1975), because of the qualitative arguments set forth herein which show that the realistic probability, although unknown, is less than the estimate which we have calculated.

TABLE VI
Probability Estimates Accepted by the Board

Risk from:

| | |
|--------------------------------|------------------------------|
| LNG Traffic Over 24-Mile Range | 1.1 x 10 ⁻⁷ |
| LPG Traffic Over 24-Mile Range | 9.6 x 10 ⁻⁸ |
| LNG Traffic at Tower 97 | 2.7 x 10 ⁻⁸ |
| LPG Traffic at Tower 97 | 4.6 x 10 ⁻⁹ |
| <hr/> | |
| Cumulative Probability | 2.4 x 10⁻⁷ |

V. VINYL CHLORIDE TRAFFIC

114. Although vinyl chloride is not included in the Coast Guard's classification of LPG, the Applicants considered the risk to the Hope Creek plant from shipments of vinyl chloride on the Delaware River (Kalelkar Supplemental Testimony at 57, Tr. 2993). Within the past 2 years shipments of vinyl chloride have been received by PPG Industries at Paulsboro, New Jersey, and it is expected that these shipments will continue at the current rate into the foreseeable future (Tr. 3043-44). There is an average of 25 tanker shipments of vinyl chloride per year, all of which are carried by one tanker, the Puerto Rican (Kalelkar Supplemental Testimony at 57). The Puerto Rican is a double-bottomed American flag-ship having a draft of 11 m (about 36 feet), length of 200 m (about 656 feet), and beam of 27 m (about 89 feet) (*id.* at 58). The tanks in which vinyl chloride is carried are arranged longitudinally in the center of the ship and are surrounded by cofferdams. Between the cofferdams and the hull are other tanks used for nonflammable materials (*id.* at 57-58; Tr. 3049). At their closest point to the hull of the ship, the vinyl chloride tanks are 26 feet away (Tr. 3046). Tankers carrying vinyl chloride are subject to the same Coast Guard regulations as ships carrying LNG and LPG (Tr. 3450).

115. Because of the size and construction of the ship, and because of the fact that it must transit the Delaware under the same Coast Guard regulations as LNG ships, Applicants applied their LNG analysis to the vinyl chloride tanker (Tr. 3046-48). Thus, the collision rate was estimated to be 1.51×10^{-6} (Kalelkar Supplemental Testimony at 58). Conditional probability of a spill, given a collision, was estimated to be 0.01 (*ibid.*). This estimate takes into account the fact that the tanks are 26 feet from the hull and are surrounded by other tanks of nonflammable materials and cofferdams (Tr. 3046, 3097-98). A meteorological factor of 0.24 was calculated for vinyl chloride, based on a tank size of 2,000 tons and the flammability characteristics of the commodity (Kalelkar Supplemental Testimony at 58-59). From these values, the Applicants calculated that the probability of a flammable cloud of vinyl chloride posing a threat to the Hope Creek plant was 0.9×10^{-8} occurrences per year. The Staff has accepted this estimate (Staff Proposed Findings, §129). The Joint Intervenors direct the same argument at Applicants' estimate for vinyl chloride that they did for LPG, *viz.*, the Applicants have not adequately accounted for future increases in shipments of the commodity (Intervenors' Proposed Findings, paragraph 25d).

116. We find, with regard to Intervenors' arguments, the same as we did with regard to Intervenors' arguments concerning Applicants' estimates of LPG traffic, and we reject them. We believe that the Applicants' estimates of vinyl chloride traffic, collision probability, probability of spill, nonignition probability, and meteorological factor all to be reasonable. We find further the probability that a vinyl chloride cloud will reach the plant in flammable concentrations is a conservative calculation because of conservatism inherent in the estimates of chance of collision and of nonignition. Although the probability that vinyl chloride shipments will pose a threat to the plant has not been included in our cumulative probability for LNG and LPG, 2.4×10^{-7} occurrences per year, we note that if it is included, the cumulative probability increases to only 2.5×10^{-7} . This effect is insignificant, and we conclude therefore that the threat from vinyl chloride shipments is negligible.

VI. CONCLUSIONS

117. On the basis of the evidence before us, and for the foregoing reasons, we have found that a conservative calculation of the probability that a flammable gas cloud resulting from an accident involving an LNG or LPG tanker could reach the Hope Creek plant is 2.4×10^{-7} occurrences per year. This value is less than 1×10^{-6} , the guideline probability for a conservative calculation set forth in NUREG-75/087. Events which are

expected to occur with probabilities less than 1×10^{-6} , based on a conservative calculation, may be disregarded in the design basis of a facility. We therefore conclude, as stated in our order dated January 26, 1978, that the Hope Creek Generating Station, Units 1 and 2, need not be designed so as to protect against flammable gas cloud accidents. We also reiterate the conclusion previously stated in our Supplemental Initial Decision of March 28, 1977, namely, that the environmental impacts of LNG or LPG tanker accidents which might affect the plant are so remote and speculative that there is no need to prepare and circulate a supplemental environmental impact statement covering this matter.

VII. ORDER

118. It is ordered, in accordance with Sections 2.760, 2.762, 2.764, 2.786 of the Commission's Rules of Practice, that this Second Supplemental Initial Decision shall become effective immediately and shall constitute, with respect to the matters covered herein, the final action of the Commission forty-five (45) days after issuance hereof, subject to any review pursuant to the Commission's Rules of Practice. Exceptions to this Second Supplemental Initial Decision may be filed by any party within seven (7) days after service of this decision. Within fifteen (15) days thereafter (20 days in the case of the Regulatory Staff) any party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (20 days in the case of the Regulatory Staff) any other party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND
LICENSING BOARD

Ernest E. Hill, Member

Oscar H. Paris, Member

Edward Luton, Chairman

Dated at Bethesda, Maryland,
this 13th day of April 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ADMINISTRATIVE LAW JUDGE

Samuel W. Jensch

In the Matter of

BML 45-02808-04

ATLANTIC RESEARCH CORPORATION
5390 Cherokee Avenue
Alexandria, Virginia 22314

April 6, 1978

The Administrative Law Judge holds that byproduct material licensee Atlantic Research Corporation has not presented an adequate basis for removing or mitigating civil penalties imposed for seven items of noncompliance stemming from a radioactivity overexposure incident.

CIVIL PENALTIES: ASSESSMENT

Individual penalties may be imposed for related violations of Commission regulations or license conditions as long as each violation refers to a single factual transaction requiring proof separate from that for the other violations. See *Blockburger v. U.S.*, 284 U.S. 299 (1932); *Brown v. Ohio*, 432 U.S. 161, 166 (1977).

CIVIL PENALTIES: PURPOSE

The civil penalty program of the Atomic Energy Act has a twofold purpose: to serve as a basis for corrective action in connection with past violations, and to assure improved conduct and planning in the future.

ADMINISTRATIVE TRIBUNALS: JURISDICTION

An administrative proceeding on the issue of removal or mitigation of civil penalties imposed on a licensee is not the proper forum for invalidating the Commission's policy and program for civil penalties.

CIVIL PENALTIES: DISCRETIONARY CHARACTER

A contention that the Director of the Office of Enforcement has en-

forced the civil penalty program in a discriminatory manner requires a positive showing of an abuse of discretion on the part of the Director.

INITIAL DECISION

Appearances

Atlantic Research Corporation, Licensee, by Coleman Raphael, President

James Lieberman, Esq., Karen D. Cyr, Esq., James P. Murray, Jr., Esq., on behalf of the Regulatory Staff of the U. S. Nuclear Regulatory Commission

Atlantic Research Corporation, Licensee pursuant to Byproduct Material License No. 45-02808-04, filed a request seeking a removal or mitigation in the amount of civil penalties assessed against it. The Director of the Office of Inspection and Enforcement assessed a total amount of \$8,600 in civil penalties on this Licensee for various violations which were considered and approved in, and reference may be made to a previous Order dated October 28, 1977, in this proceeding.¹ Thereafter, Licensee filed its request for mitigation which was based upon its statements of good faith endeavor by management to comply with Commission directives, either from regulations or technical specifications. The Licensee also contended that unequal treatment had been given to its violations as compared with other licensees of the Commission, both reactor operators and radiographers. A hearing was held on January 31, 1978, in response to that request. The Regulatory Staff presented evidence through the Director of the Office of Inspection and Enforcement; the Licensee presented statistical charts based upon an examination of the public records pertaining to several licensees of this Commission.

The evidence from the Staff consisted in the main of two principal parts: a presentation of the policy and basic concepts of the civil penalty program administered by the Commission, and a detailed recital of the factors considered by the Director in the imposition of civil penalties in this instance. In addition, the Director discussed the reasons for variations in the amounts of civil penalties assessed in other instances pertaining to other licensees, to thus dispel the suggestion of discrimination in the application and enforcement of the statute providing for civil penalties. After a consideration of the data thus presented and a comparison with the Commission's Inspection and Enforcement Manual (manual) pertain-

¹ALJ-77-2, 6 NRC 702.

ing to civil penalties, the evidence provides a more lucid presentation of the penalty program and might be considered for some adaptation to the enforcement manual. The Licensee was not represented by counsel in the proceeding and did not cross-examine the Director.

The Licensee relied mainly upon quotations taken from the manual and a listing of 12 instances in which Licensee argued that the penalty enforcement program was unevenly applied. These 12 instances pertained to reactor operators as well as byproduct material licensees. The stress was laid upon the reported number of violations, the extent of the exposures of radioactivity that occurred, and the level of the civil penalty imposed. Four of the instances showed civil penalty amounts greater than imposed on this Licensee. Another category of four instances, not necessarily overlapping with the first category, showed exposure levels higher than involved in this proceeding. Other aspects of asserted discrimination were alleged by the Licensee. Upon the basis of these statistics from the public records of the Commission, the Licensee herein contended that the penalties assessed against it were imposed for both causes and effects (as if a double jeopardy assessment) and that the manual's proclaimed principles were violated in that: uniform procedures were not followed, did not consider all relevant factors, did not provide a proper incentive for programs of consistent compliance with the Commission's requirements, and finally, the penalties were punitive and thus violative of the endeavor for corrective operations.

The October 28th Order in this proceeding sets forth in detail the facts serving as the basis for the imposition of the civil penalties and will not be reasserted here. The October 28th Order in this proceeding affirming imposition of civil penalties is incorporated fully herein by reference and constitutes a portion of this Initial Decision.

The Licensee contends that its radiographer who was exposed to higher than permissible levels of radioactivity was violating not only Commission requirements but the in-house, as it were, instructions given by the Licensee to all of its radiographers.

In response to the position presented by the Licensee, the Director of Inspection and Enforcement was recalled by the Staff for presentation of further evidence. This additional evidence related in further detail the specifics considered in the determination of penalties for various kinds of situations, wherein facts vary, not only as to exposure limits, extent of violations, and the periods of time in which they occurred, but the attitude and endeavors for corrective action portrayed by the various managements of the licensees. Implicit in much of this additional evidence by the Director is the exercise of discretion in the consideration of these several factors determining the imposition of penalties.

The Licensee in this proceeding emphasizes that this is a first instance occurrence of a violation in its operations. The Licensee states that the Staff is incorrect in referring to a violation under another license; the facts to correct that reference are asserted that such a violation occurred by a different management who were part of a larger organization, with a similar name (but actually a division of the Susquehanna organization), but operating generally in a different area of business. The present Licensee is asserted to be a different organizational entity, with different people, under different management, and operating pursuant to a different license. The Licensee reported these factors in a communication dated October 21, 1977, and the Regulatory Staff has not disputed these assertions. The Staff may have believed that a mere change in corporate structure would not prevent a "piercing of the corporate veil," as the term is often used, but different personnel without any knowledge of the previous incident would dispel that belief. The Staff, however, did contend that no reliance was had on that previous incident as a basis for the imposition of penalties here contested.

The Licensee has also contended that the penalties here are computed upon both causes and effects; in other words, the penalties include amounts for a violation of survey requirements and for a violation of the license conditions requiring maintenance of an automatic alarm system. The Regulatory staff has cited two court authorities to support its penalty assessment, specifically: *Blockburger v. U.S.*, 284 U.S. 299 (1932), and *Brown v. Ohio*, 432 U.S. 161, 166 (1977). In the former case, the court held:

... where the same act or transaction constitutes a violation of two distinct statutory provisions, the test to be applied to determine whether there are two offenses or only one, is whether each provision requires proof of a fact which the other does not.

In the case of *Iannelli v. U.S.*, 420 U.S. 770, 785 (1974), the court recognized that some overlapping might occur and the *Brown* case did not remove that aspect.

The Staff appended to its comments, filed on March 1, a copy of a determination by the General Counsel of the Commission (Rowden, August 22, 1973), who held in part:

... nothing in this paragraph [20.101(a)] or elsewhere renders a violation of the paragraph contingent or dependent upon an associated violation of some other regulation or license condition.

The court authorities from both Federal and State jurisdictions have held varying positions over the years. One extreme instance frequently cited is the holding that seven offenses were committed to justify seven

punishments from the event of one person cutting open seven sacks of mail at one occasion in seeking valuables to steal. Variations toward the other extreme include the decision that a bank robbery involves one offense although the law violation is first a breaking and entering a bank and secondly, robbery without regard to the place. Gradually, however, the decisions appear to endeavor to center upon a determination of what is the principal offense and when so determined to include all lesser but related offenses. In other words, the trend is toward total incorporation into one offense of all related violations. See: *Double Jeopardy*, 65 Yale L.J. 339. Despite that trend, the sharp distinction emphasized in the *Brown* case, *supra*, is to be borne in mind, and that is the test to be applied here. For reference, the violations alleged by the Director of the Office of Inspection and Enforcement in Appendix A to his February 14, 1977, Notice of Violation follow:

- A. 10 CFR §20.101, "Exposure of individuals to radiation in restricted areas," requires, in part, that no licensee shall possess, use, or transfer licensed materials in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter a dose to the whole body in excess of 1-1/4 rems or a dose to the hands in excess of 18-3/4 rems. Provision is made for the permissible dose to the whole body to be 3 rems per calendar quarter when an acceptable history of radiation exposure is established on Form NRC-4.

Contrary to the above, during radiographic operations conducted at the Pine Ridge Plant on December 12, 1976, a nonradiographic employee received a calculated whole body dose of 4.4 rems, exceeding the applicable 1-1/4 rems quarterly limit. In addition, a radiographer received a calculated hand dose in excess of the 18-3/4 rems limit. Clinical evidence and calculations using TLD data indicate that he received approximately 1,250 rems to portions of one hand. This radiographer also received a calculated whole body dose of approximately 9.2 rems.

This violation constituted an occurrence related to health and safety.

Civil Penalty \$2,000.

- B. 10 CFR §34.43(b), "Radiation surveys and survey records," requires that a physical radiation survey be made after each radiographic exposure during a radiographic operation to determine that the sealed source has been returned to its shielded position.

Contrary to the above, on December 12, 1976, a physical radiation survey was not performed to determine that the sealed source had been returned to a shielded position following completion of a radiographic exposure, using 166 curies of cobalt-60 in an Automation Industries Model 151 exposure device.

This violation contributed to an occurrence related to health and safety.

Civil Penalty \$2,000.

- C. License Condition 16 requires, in part, that byproduct material shall be used in accordance with the procedures submitted with the application dated May 23, 1974. Attachment 6(a), item 3, of these procedures requires that a horn must sound automatically if the control room door is opened during a radiographic exposure.

Contrary to the above, on December 12, 1976, a radiographer defeated this automatic alarm system by turning the control panel switch to the "off" position during a series of radiographic exposures.

This violation contributed to an occurrence related to health and safety.

Civil Penalty \$2,000.

- D. 10 CFR §34.33(a), "Personnel monitoring control," requires, in part, that the licensee shall not permit any individual to act as a radiographer unless, at all times during radiographic operations, each such person wears a pocket dosimeter or pocket chamber and a film badge.

Contrary to the above on December 12, 1976, a radiographer conducted radiographic operations without wearing either a film badge or a pocket dosimeter or pocket chamber.

This is an infraction.

Civil Penalty \$1,000.

- E. License Condition 16 requires, in part, that byproduct materials shall be used in accordance with the procedures submitted with the

application dated May 23, 1974, and letter dated August 9, 1974. Attachment 6(d) of these procedures requires, in part, that all visitors be issued a film badge and a pocket chamber.

Contrary to the above, on December 12, 1976, a nonradiographic employee was allowed to enter the restricted area of the radiographic facility during radiographic operations without having been issued a film badge, a pocket chamber, or a pocket dosimeter.

This is an infraction.

Civil Penalty \$1,000.

- F. 10 CFR §34.27, "Utilization logs," requires, in part, that the identity of the radiographer and the dates of use for the radiographic exposure device be recorded on the utilization logs.

Contrary to the above, on December 12, 1976, a radiographer conducted radiographic operations without recording his name or date of use.

This is a deficiency.

Civil Penalty \$300.

- G. License Condition 16 requires, in part, that byproduct materials shall be used in accordance with the procedures submitted with the applications dated May 23, 1974, and August 9, 1974. Attachment 6(g) of these procedures requires, in part, that the results of internal inspections shall be reported to higher management.

Contrary to the above, internal inspections conducted between April 14, 1975, and December 12, 1976, were not reported to higher management.

This is a deficiency.

Civil Penalty \$300.²

²Civil penalty proposed for item G was remitted by the Director of the Office of Inspection and Enforcement on March 28, 1977.

- H. 10 CFR §34.43(d), "Radiation surveys and survey records," requires, in part, that records shall be kept of the surveys required by 10 CFR §34.43(c). In addition, Section 9.1.2(c) of the Operating Procedures (incorporated into the license as License Condition No. 16) requires that a daily log be maintained of the final survey reading of the source container after the last exposure of the day.

Contrary to the above, on December 12, 1976, a radiographer did not record the final radiation survey when the source was secured at the end of the last radiographic exposure.

This is a deficiency.

Civil Penalty \$300.

The parties to this proceeding have stipulated the pertinent facts; their differences are minor, for instance, whether a hand of the radiographer was overexposed, or whether only a thumb and finger, etc.

Each of the violations asserted against this Licensee refers to a single factual transaction—illustrated in one instance by the allegation that the radiographer turned off the automatic alarm system and in another instance, the allegation of the overexposure. The facts needed for proof of the turn-off do not necessarily mean that there would be an overexposure. Likewise, a failure to survey a site is an omission and constitutes a distinct transaction from that wherein a survey is undertaken. Each such event embraces different facts. It is concluded that each of the asserted violations involve facts solely applicable to the relevant violation, and thus there is not any undue overlapping of the penalties imposed.³

The Regulatory Staff expressed its doubts that double assessment or double jeopardy aspects were present since the civil penalties are not punishments like criminal proceedings provide. The Staff did concede, however, that the penalties were punitive in order to provide a basis for corrective action. The term "civil penalties" thus loses its single character of being civil only in scope; but, the semantics aside, the program for civil penalties throughout the Federal Government is so general in scope and

³Of course, if overlapping occurred in any of the asserted violations, the double jeopardy problem would be present, for even corporations may assert that objection. *U.S. v. Fung Foo*, 369 U.S. 143 (1962).

It was stated in *U.S. v. Security National Bank*, 546 F. 2d 492 at 494 (1976):

We see no reason why a corporation which is a "person" entitled to both equal protection and due process under the Constitution (337 U. S. at 574) should not also be entitled to the constitutional guaranty against double jeopardy.

well established with enforcement and compliance, that the combination character of civil and penalty may be accepted. In addition, the court has considered the matter in *Helvering v. Mitchell*, 303 U.S. 371 (1937), quoted in *Rex Trailer v. U.S.*, 350 U.S. 149 (1955), thusly:

Congress may impose both a criminal and civil sanction in respect to the same act or omission; for the double jeopardy clause prohibits merely punishing twice, or attempting to punish criminally for the same offense.

Needless to add, this proceeding does not involve criminal aspects.

The other objections asserted by the Licensee seeking a removal or mitigation of the amount of the penalties concern the Commission's policy and program for civil penalties. The Licensee contends that the imposition of penalties in this instance came after corrective action had been taken, the radiographer demoted, and more stringent procedures adopted and enforced. While it is not clear whether the Licensee could anticipate the imposition of penalties and thus complete the corrective action recited, the program for penalties is also directed to the future conduct and planning that may have been more efficient after the penalties were assessed. In any event, this proceeding is not the forum to invalidate a Commission's policy or program.

The Licensee, at the January 1978 hearing, also objected to civil penalties on the ground that discriminatory enforcement has been applied. In response to these allegations, the Director of the Office of Inspection and Enforcement (IE) testified respecting the instances cited by the Licensee, and pointed out the distinctions in the several instances and emphasized his exercise of judgment and the discretion entrusted to him by the Commission. An attack upon the civil penalties on the basis of exercise of discretion requires a positive showing of an abuse of discretion, which has not been presented here. The IE Director recited the distinctions in instances which he concluded were reasonable bases for different penalties, bearing in mind that his responsibility in this matter develops from 1976. The vast reorganization of the IE since his advent on duty reflects a more concerted effort by the Commission to a performance of evenhanded imposition of penalties through vigilant inspection. The Licensee here has not established any basis for mitigation of penalties by its assertions respecting exercise of discretion.

In conclusion, the Licensee has not presented an adequate basis for any removal or mitigation of the civil penalties imposed, and the claims and contentions of the Licensee respecting those penalties are denied.

WHEREFORE, IT IS ORDERED, in accordance with the Atomic Energy Act, as amended, and the Rules of Practice of the Nuclear

Regulatory Commission, that the Order of the Commission's Director of the Office of Inspection and Enforcement is affirmed in the imposition of penalties on Atlantic Research Corporation, Alexandria, Virginia, the holder of Byproduct Material License No. 45-02808-04 in the total amount of \$8,600 for violations of Commission regulations and conditions of that license, all as identified in the Director's Order imposing the penalties, and the request for mitigation is denied.

It is further ORDERED, in accordance with 10 CFR Sections 2.760, 2.762, and 2.764 of the Commission's Rules of Practice, that this Initial Decision shall be effective immediately and shall constitute the final action of the Commission thirty (30) days after the date of issuance hereof, subject to any review pursuant to the Rules of Practice. Exceptions to this Initial Decision may be filed by either party within seven (7) days after service of this Initial Decision. A brief in support of the exceptions shall be filed within fifteen (15) days thereafter (twenty (20) days in the case of the NRC Staff).

FOR THE NUCLEAR
REGULATORY COMMISSION

Issued:
April 6, 1978
Bethesda, Maryland

Samuel W. Jensch
Administrative Law Judge

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of

Docket Nos. RM-50-5

MIXED OXIDE FUEL

50-201

50-332

50-564

70-1327

70-1432

70-1821

May 8, 1978

The Commission issues opinions providing reasons for its earlier order (CLI-77-33, 6 NRC 861) which terminated the GESMO proceeding and (with specified exceptions) pending proceedings on plutonium recycle-related applications (subject to later reexamination), directed the staff safeguards supplement studies to be published, withdrew the November 1975 policy statement on mixed oxide fuel, 40 Fed. Reg. 53056 (November 14, 1975), and reserved decision on certain other potential license applications for experimental purposes.

ATOMIC ENERGY ACT: COMMON DEFENSE AND SECURITY

It is appropriate for the Commission to consider the Administration's foreign policy in deciding whether to terminate GESMO and the plutonium recycle-related licensing proceedings since the common defense and security is an essential element in all the domestic licensing decisions affected by this decision. Atomic Energy Act §§53(b), 57(c) (2), 103(b) (3), (d), 104(d), 161(b), (i) (2), 182(a).

NUCLEAR REGULATORY COMMISSION: EXECUTIVE BRANCH POLICY

It has been settled that regulatory agencies such as the Nuclear Regulatory Commission are independent of executive control; however, since the President is the national spokesman in the area of foreign policy, the NRC has accorded due regard to Executive Branch views in matters affecting United States foreign policy in the absence of a clear statutory mandate to the contrary.

NUCLEAR REGULATORY COMMISSION: EXECUTIVE BRANCH POLICY

In considering the Administration's policy on plutonium recycle, it is significant that Congress as a body has not taken any action disagreeing with the President's position on plutonium recycle in light water reactors.

NUCLEAR REGULATORY COMMISSION: EXECUTIVE BRANCH POLICY

In determining whether to terminate GESMO and the plutonium recycle-related proceedings, it is appropriate for the Commission to consider ongoing national and international alternative fuel cycle studies which may materially influence the nuclear fuel cycle plans of the United States and other nations and which will develop sufficiently extensive information on plutonium recycle and its alternatives that any record compiled by the Commission in the interim would have to be substantially supplemented or entirely revised.

NUCLEAR REGULATORY COMMISSION: JURISDICTION

While the Commission cooperates with other agencies of government as appropriate, it is not the Commission's function to hold a proceeding to make a general study unrelated to the licensing of particular facilities, particularly where Congress has determined that such studies, when appropriate, should be performed by the Department of Energy.

NUCLEAR REGULATORY COMMISSION: ADJUDICATORY RESPONSIBILITIES

The Atomic Energy Act's licensing provisions do not compel the processing of all applications. The Commission is empowered to terminate licensing hearings under §189(a) and other licensing proceedings and to decline to accept new applications when there are sound regulatory reasons to do so. Here, processing is suspended, subject to later re-examination, while fundamental policy questions are being examined.

ATOMIC ENERGY ACT: HEARINGS

The Nuclear Regulatory Commission possesses general authority to terminate consideration of licenses under §§53, 57, 103, and 104, subject

to later reexamination, without reaching the specific question of inimicality with respect to any particular facility under those sections based on an adjudicatory record.

NEPA: HEARINGS

NEPA does not require public hearings, *Jicarilla Apache Tribe of Indians v. Morton*, 471 F.2d 1275, 1286 (9th Cir. 1973), and does not prevent their termination.

NUCLEAR REGULATORY COMMISSION: ENVIRONMENTAL RESPONSIBILITIES

Once the Commission begins hearings, NEPA requires consideration of environmental factors in the proceedings, as well as health, safety, and economic factors. *Calvert Cliffs' Coordinating Committee v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971).

NEPA: "FEDERAL ACTION"

Termination of hearings, not on the merits and subject to reexamination, is not the kind of "recommendation or report on a proposal" which the Supreme Court has determined requires an impact statement. *Aberdeen & Rockfish R. Co. v. SCRAP*, 422 U.S. 289, 320-21 (1975); *Kleppe v. Sierra Club*, 427 U.S. 390 (1976).

NEPA: "FEDERAL ACTION"

No impact statements are required for termination either of GESMO proceeding or of individual plutonium recycle-related license applications. Such termination preserves rather than alters the status quo.

MEMORANDUM OF DECISION

On December 23, 1977, the Commission issued an order concerning its proceedings on the Generic Environmental Statement on Mixed Oxide Fuel (GESMO), pending license applications, and other matters related to the reprocessing of spent light water nuclear reactor fuel and the recycling of uranium and plutonium in mixed oxide fuel. 42 Fed. Reg. 65334 (December 30, 1977); CLI-77-33, 6 NRC 861. In that order the Commission announced its decision—

- (1) to terminate the GESMO proceeding;
- (2) to terminate the proceedings on pending or future plutonium recycle-related license applications, except for—
 - (a) proceedings on licenses for the fabrication or use of small quantities of mixed oxide fuel for experimental purposes, and
 - (b) those portions of proceedings which involve only spent fuel storage, disposal of existing waste, or decontamination or decommissioning of existing plants;
- (3) to reexamine the above matters after the completion of the ongoing domestic and international studies of alternative fuel cycles, now expected to take about 2 years;
- (4) to publish the draft safeguards supplement to the GESMO document as a staff technical report;
- (5) as a consequence of the above decisions, to withdraw the November 1975 policy statement on mixed oxide fuel, 40 Fed. Reg. 53056; and
- (6) to reserve for decision, if it arises, the question whether a facility such as the Allied-General Nuclear Services (AGNS) Nuclear Fuels Plant at Barnwell, South Carolina, may be licensed for experimental and feasibility purposes on a noncommercial basis to investigate processes which support the nation's non-proliferation objectives.

This memorandum provides the reasons for the December 23 decision.

BACKGROUND

The use of mixed oxide fuel has been before the Commission and its predecessor, the AEC, for more than a decade. In 1960, Nuclear Fuel Services (NFS) began a small reprocessing plant at West Valley, New York, which operated from 1966 through 1971. Construction of the AGNS Plant at Barnwell began in 1970 and parts of the plant are now essentially complete. AGNS' application for an operating license is currently before the Commission. In 1973, Westinghouse Electric Corporation (Westinghouse) requested a construction authorization letter for a mixed oxide fuel fabrication plant near Anderson, South Carolina. Finally, Exxon Nuclear Company, Inc., (Exxon) is currently seeking permission to construct a reprocessing plant at Oak Ridge, Tennessee.

The health, safety, and environmental impacts of the wide-scale use of mixed oxide fuel were evaluated in the draft Generic Environmental Statement on Mixed Oxide Fuel, published in August 1974. The draft GESMO prompted many public comments, including a January 1975 letter from the President's Council on Environmental Quality which stressed the need to consider the safeguards aspects of wide-scale plutonium recycle. In

May 1975, the Commission announced its provisional intention to supplement GESMO with an analysis of safeguards and to limit interim licensing of recycle-related activities to experimental purposes. 40 Fed. Reg. 20142 (May 8, 1975). Over 200 public comments were received in response. In November 1975, the Commission published a policy statement which announced that safeguards alternatives would be a part of the GESMO decision, provided for hearings on the GESMO documents, and stated criteria under which interim licensing of nonexperimental recycle-related activities would be considered. 40 Fed. Reg. 53056 (November 14, 1975), corrected 40 Fed. Reg. 59497 (December 24, 1975). The United States Court of Appeals for the Second Circuit affirmed the Commission's hearing procedures but held that interim licensing of recycle-related activities on a commercial scale violated the National Environmental Policy Act (NEPA). *Natural Resources Defense Council, Inc. v. Nuclear Regulatory Commission*, 539 F.2d 824 (1976), vacated and remanded to determine mootness, 434 U.S. 1030 (January 16, 1978).

The final impact statement on health, safety, and the environment was published in August 1976 and associated public hearings began that November. The hearings progressed through questioning of the NRC staff on its testimony and the filing of written testimony by all participants and proposed questions on that testimony.

Congress and other parts of the Federal Government, members of the public, and experts in the national security field have continued to express concerns related to the nuclear weapons proliferation risks of plutonium recycle technology as it is presently conceived. That technology produces separated plutonium, which can be used in the production of nuclear explosives. The concern is basically that the international spread of plutonium recycle technology for commercial nuclear power production creates a risk that nonnuclear weapons states might turn plutonium from the commercial fuel cycle to the production of nuclear explosives. See generally Senate Committee on Government Operations, 94th Cong., 1st. Sess., *Peaceful Nuclear Exports and Weapons Proliferation—A Compendium* (Comm. Print 1975). Moreover, a decision by the United States to proceed with commercial plutonium recycle domestically would undermine U.S. efforts to restrain premature international resort to plutonium. This risk led the Commission in late summer 1976 to direct its staff to begin an analysis for GESMO for international proliferation risks and safeguards.

On October 28, 1976, President Ford discussed these risks in his Statement on Nuclear Policy, and stated that the nation "should pursue reprocessing and recycling in the future only if they are found to be consistent with our international [non-proliferation] objectives" (p.4).

President Carter expressed his concern over the proliferation risks of plutonium recycle and the potential availability of other weapons-grade materials in the nuclear fuel cycle in his April 7, 1977, Statement on Nuclear Power Policy. As part of his response to these risks, the President stated that the Administration's policy would be to defer indefinitely domestic plutonium recycle and to initiate a multinational evaluation of alternative fuel cycles in order to promote the government's international non-proliferation goals. The GESMO hearings, were indefinitely postponed by the GESMO Hearing Board, and on May 3 the Commission announced that it intended to reassess "the future course and scope of GESMO, the review of recycle-related license applications, and the matter of interim licensing." 42 Fed. Reg. 22964 (May 5, 1977). Public comments were received in June.

On May 5, Marcus Rowden, then Chairman of the Commission, wrote the President requesting his views on these matters. Stuart Eizenstat, Assistant to the President for Domestic Affairs and Policy, responded for President Carter on October 4. The letter (reprinted at 42 Fed. Reg. 57186 (November 1, 1977)) states that "the President believes that his non-proliferation initiatives would be assisted both domestically and internationally if the Commission were to terminate the GESMO proceedings," "terminat[e]. . .staff reviews and hearings relating to recycle activities. . .den[y]. . .interim licensing of fuel cycle facilities, den[y]. . .interim licensing for use of mixed oxide fuel in reactors, except in small quantities for experimental purposes," and publish the staff's safeguards supplement.

The Commission sought public comment on the President's views and on several specific alternative courses of action. 42 Fed. Reg. 57185 (November 1, 1977). Over 40 comments were received from public interest groups, industry, States, utilities, individuals, and the GESMO Hearing Board. The major issues raised in these comments and those received in June are addressed below.

In light of these events and after consideration of all the comments received, the Commission issued its December 23 order, based on the reasons which follow.

THE ADMINISTRATION'S POLICY AND ITS RECEPTION IN CONGRESS

The proliferation risk arising from the availability of separated plutonium in the commercial nuclear fuel cycle is an important problem for United States foreign policy. In his constitutional role as the chief architect of foreign policy, the President adopted a policy of deferring implementation of plutonium fuel cycles in the United States, and has begun

important international initiatives and negotiations seeking a reevaluation of plutonium recycle abroad and an examination of alternative fuel cycles which offer greater resistance to proliferation. See the President's April 7 statement.¹ The Eizenstat letter explicitly linked the Commission's domestic recycle-related proceedings to the President's foreign policy goals and stated the President's view that U.S. international non-proliferation initiatives would be assisted if the Commission were to terminate its proceedings. In particular, the letter stated that continuation of "staff reviews and hearings relating to recycle activities" "could lead other nations to question the United States commitment to deter commercial reprocessing and plutonium recycle."²

The basis for the President's request is evident. Under most agreements for cooperation between the United States and recipient nations, the United States possesses the right to approve any reprocessing of U.S.-supplied fuel or any fuel irradiated in a U.S.-supplied reactor. See, e.g., Agreement for Cooperation Concerning Civil Uses of Atomic Energy, May 10, 1974, United States-Sweden, art. II, para. C, T.I.A.S. No. 7854, amending *id.*, July 28, 1966, T.I.A.S. No. 6076. Section 123(a)(7) of the Atomic Energy Act, recently added by Section 401 of the Nuclear Non-Proliferation Act of 1978, Pub. L. No. 95-242, 92 Stat. 120,³ requires such a right of prior approval in all future agreements for cooperation, and Section 404 of the Nuclear Non-Proliferation Act mandates a program of renegotiation to bring current agreements into conformity with the new statute. Moreover, a substantial proportion of enriched uranium

¹This position has been further developed by U.S. foreign policy spokesmen in international forums. See statement by Joseph S. Nye, Jr., Deputy to the Under Secretary of State for Security Assistance, Science, and Technology, at the International Conference on Nuclear Power and Its Fuel Cycle, Salzburg, Austria (May 2, 1977); address of Joseph S. Nye, Jr., before the Ebert Conference on Problems of Nuclear Energy Supply, Bonn, Germany (October 3, 1977).

²President Ford's October 28, 1976, Statement on Nuclear Policy also focused on the proliferation risks of separated plutonium. It announced the President's conclusion that "the reprocessing and recycling of plutonium should not proceed unless there is sound reason to conclude that the world community can effectively overcome the associated risks of proliferation" (p. 4). To implement this decision it announced, *inter alia*, accelerated international initiatives "to control the spread of plutonium and technologies for separating plutonium" (p.4), the need for the U.S. to "undertake a program to evaluate reprocessing in support of" these international policies (p.6), and that the nation's "domestic policies must be changed to conform to [the President's] decision on deferral of the commercialization of chemical reprocessing...which results in the separation of plutonium" (p.5). The statement also suggested that the GESMO studies should continue (p.12).

³This statute was pending at the time of our December 23 decision as H.R. 8638 and S. 897, 95th Cong., 1st Sess. (1977). The Commission has relied before on the policy expressed in it in passing on export matters. See *Ten Applications for Low Enriched Uranium Exports to Euratom Member Nations*, CLI-77-24, 6 NRC 525 (1977).

fuel which has been irradiated to date in reactors abroad is of U.S. origin because, until recently, no other nation has had a substantial commercial uranium enrichment capacity. The United States thus asserts the right under its cooperative agreements to deny approval for reprocessing of most spent fuel currently held by U.S. nuclear trading partners. However, if the United States were to deny other nations the right to reprocess while continuing to pursue commercial reprocessing at home, it would undermine the credibility of our concern about the use of plutonium and our international initiatives toward non-proliferation.

Although the GESMO proceeding and the individual recycle-related license proceedings concern domestic activities, it is clearly appropriate for us to consider the foreign policy matters discussed above in deciding to terminate the proceedings. Congress has determined the common defense and security to be an essential element which the Commission must consider in all the domestic licensing decisions affected by this decision. Atomic Energy Act §§53(b), 57(c)(2), 103(b)(3), (d), 104(d), 161(b), (i)(2), 182(a). Each of the individual license applications was considered under one or more of these sections. Our decision concerning the GESMO proceeding must be made in light of this statutory consideration.⁴

The President's request is also due substantial deference. It has been settled that regulatory agencies such as this Commission are independent of executive control. *Humphrey's Executor v. United States*, 295 U.S. 602, 628 (1935); *Weiner v. United States*, 357 U.S. 349 (1958). But it is also well established that the President is the national spokesman in the area of foreign policy. See *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579 (1952); *Chicago and Southern Air Lines Co. v. Waterman S.S. Corp.*, 333 U.S. 103 (1948); see also *New York Times Co. v. United States*, 403 U.S. 713 (1971). Thus while the Commission is not compelled to adhere to the President's views, it has accorded due regard to Executive Branch views in matters affecting United States foreign policy in the absence of a clear statutory mandate to the contrary.⁵

⁴We do not find at this time that issuance of any of the licenses would be inimical to the common defense and security. As is discussed in detail below, we are not required in these circumstances to make any such finding.

⁵This has been formally recognized in the Commission's recent export licensing decisions: The Federal judiciary has often expressed the view that expressions of the Executive Branch on matters affecting the conduct of United States foreign policy are entitled to great weight in evaluating the claims of litigants. The Supreme Court stated in *Republic of Mexico v. Hoffman*, 324 U.S. 30, 35 (1944) "...it is a guiding principle... that the courts should not so act as to embarrass the executive arm in its conduct of foreign affairs." In like measure here, the Commission must pay due regard to the potential damage to the conduct of foreign relations which the Department of State

(Continued on next page.)

In addition, it is significant that Congress as a body has not taken any action disagreeing with the President's position on plutonium recycle in light water reactors.⁶ Over a year has passed since the President made the deferral of plutonium recycle a matter of national policy and no substantial Congressional opposition has appeared. Indeed, the Congress has in several instances supported the actions the President has taken to implement the Administration's policy. The Department of Energy Act of 1978—Civilian Applications, Pub. L. No. 95-238, 92 Stat. 47,⁷ provides \$13 million for various activities at the Barnwell Nuclear Fuels Plants related to alternative fuel cycle technologies and the nation's non-proliferation objectives, but "none of the authorized funds may be used for operations of the plant to process spent fuel from reactors."⁸ Sections 101(20), 106.⁹ Congress has also explicitly supported the President's alternative fuel cycle studies in Section 105 of the Nuclear Non-Proliferation Act of 1978:

The President shall take immediate initiatives to invite all nuclear supplier and recipient nations to reevaluate all aspects of the nuclear fuel cycle, with emphasis on alternatives to an economy based on the separation of pure plutonium or the presence of high enriched uranium, methods to deal with spent fuel storage, and methods to improve the safeguards for existing nuclear technology....¹⁰

(Continued from previous page.)

believes could result from delaying action in the instant license application.

Babcock & Wilcox (Application for Facility Export License), CLI-77-18, 5 NRC 1332, 1349 (1977); see *id.* at 1344; *Westinghouse Electric Corporation* (Application for Export of Reactor to Asociacion Nuclear ASCO II, Barcelona Spain), CLI-76-9, 3 NRC 739, 755-756 (1976).

⁶While Congress has strongly disagreed with the Administration's proposal to discontinue the Clinch River Breeder Reactor project, see note 7, *infra*, that debate has not extended to the deferral of recycle for light water reactors.

⁷At the time of our December 23 decision, an act of the same name and identical in the relevant provisions had been passed by Congress and vetoed by President Carter because of its provisions funding the Clinch River Breeder Reactor. S. 1811, 95th Cong., 1st Sess., §§101(20), 107 (1977); Veto Message from the President, S. Doc. No. 95-73, 95th Cong., 1st Sess. (November 5, 1977). Though vetoed, it indicated Congressional intentions at the time.

⁸The conferees on the previous vetoed version of the Act, see note 7, *supra*, also indicated their opinion that "the Barnwell facility should be used in such a way as to not to limit the potential for eventual use as a reprocessing plant." H.R. Rep. No. 714, 95th Cong., 1st Sess. 86 (1977).

⁹See also debates on NRC Authorization Act of 1978, S. 1131, 123 Cong. Rec. S8592 (daily ed. May 25, 1977) (remarks of Senator Hart). But see *id.* at S8593 (remarks of Senator McClure).

¹⁰While the Act did not pass until after our December 23 decision, nearly identical language had been reported out of committee and was before the Senate in October 1977. S. 897, 95th Cong., 1st Sess., §105. Similar language had passed the House in September 1977. H.R. 8638, 95th Cong., 1st Sess., §103.

In addition, Congress has strongly supported the non-proliferation goals of the Administration's policy. Section 2 of the Nuclear Non-Proliferation Act of 1978 states the following policy:

The Congress finds and declares that the proliferation of nuclear explosive devices or of the direct capability to manufacture or otherwise acquire such devices poses a grave threat to the security interests of the United States and to continued international progress toward world peace and development. Recent events emphasize the urgency of this threat and the imperative need to increase the effectiveness of international safeguards and controls on peaceful nuclear activities to prevent proliferation. Accordingly, it is the policy of the United States to—

(a) actively pursue through international initiatives...the establishment of more effective international controls over the transfer and use of nuclear materials and equipment and nuclear technology for peaceful purposes in order to prevent proliferation....

Moreover, Section 3 states that

It is the purpose of this Act to promote the policies set forth above by—

(a) establishing a more effective framework for international cooperation...to ensure that the worldwide development of peaceful nuclear activities and the export by any nation of nuclear materials and equipment and nuclear technology intended for use in peaceful nuclear activities do not contribute to proliferation...

Finally, Section 2(c) strongly endorses the Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, T.I.A.S. No. 6839, the sole function of which is to halt the proliferation of nuclear weapons.¹¹

THE ALTERNATIVE FUEL CYCLE STUDIES

The alternative fuel cycle studies initiated by the President provide another important reason for termination. The studies will at least provide important information on plutonium recycle and its alternatives which the Commission must consider to reach a sound decision on wide-scale commercial plutonium recycle. The primary study is the International Nuclear Fuel Cycle Evaluation (INFCE), a multinational study of

¹¹Language identical to that quoted or referred to in the text had been reported out of committee and was before the Senate in October 1977. S. 897, 95th Cong., 1st Sess., §§2(a), (c), 3(a). Language of similar intent passed the House of September 1977. H.R. 8638, 95th Cong., 1st Sess., §§2(1), (3), 3(1), (3), (4).

alternative fuel cycles aimed at "minimiz[ing] the danger of the proliferation of nuclear weapons without jeopardizing energy supplies or the development of nuclear energy for peaceful purposes." Final Communique of the Organizing Conference of INFCE (October 21, 1977). It will entail a comprehensive evaluation of the proliferation, technical, economic, and safeguards aspects of spent fuel reprocessing and alternative fuel cycles. INFCE may materially influence the nuclear fuel cycle plans of many of the over 50 participating countries, including the United States, although participants are not bound by the study's results. The INFCE organizing conference was held in Washington in October 1977, at which time eight working groups were established to examine all facets of the subject, including reprocessing and recycle.¹² The entire study is expected to take at least 2 years. See generally Statement of President Carter, Plenary Session of the Organizing Conference of INFCE (October 19, 1977); Final Communique, *supra*. Commission staff members are actively participating in the support effort for the United States' participation.

In order to develop a technical basis for United States contributions to INFCE, the Energy Research and Development Administration (now DOE) initiated an interagency Non-Proliferation Alternative System Assessment Program (NASAP). NASAP is intended as a comprehensive review and analysis of a wide variety of reactors and reactor fuel cycle systems and concepts emphasizing proliferation risks and considering technical, economic, and commercial feasibility, resource utilization, safety, the environment, and other factors.

The specific focus of both studies is on alternatives which combine superior proliferation resistance with efficient use of resources. In these circumstances, with the results of the studies expected in the near term, it would be inappropriate for the Commission to continue its present proceedings. The Commission must consider the information and alternatives developed in these studies before reaching a decision either on the GESMO proceedings or on licensing plutonium recycle functions.¹³ If the

¹²They are (1) Fuel and Heavy Water Availability, (2) Enrichment Availability, (3) Assurances for Long-Term Supply, (4) Reprocessing, Plutonium Management, and Recycle, (5) Fast Breeder Reactors, (6) Spent Fuel Management, (7) Waste Management and Disposal, and (8) Advanced Reactors and Fuel Cycle Concepts.

¹³Accord, GAO Report, An Evaluation of the Administration's Proposed Nuclear Non-Proliferation Strategy, B-181963 (October 4, 1977). The report analyzed at length the President's policy of deferring domestic reprocessing (pp. 36-52). Although it recommended that the Commission continue the GESMO proceedings, it also recommended that they be expanded to include alternatives to current reprocessing technology, and that the Commission "defer any irrevocable decision until," *inter alia*, "the feasibility of the alternatives to reprocessing is determined" (p. 52).

studies reveal preferable alternatives, domestic plutonium recycle as it is presently conceived may be abandoned in favor of other processes. In any event, the information developed on plutonium recycle and its alternatives will probably be sufficiently extensive that any record compiled by the Commission in the interim would have to be substantially supplemented or entirely revised to reflect this information. Moreover, the viability of commercial plutonium recycle depends substantially on future energy demands and the availability and cost of uranium. Changes in projections of these factors during the pendency of the alternative fuel cycle studies would also require substantial revision of any record compiled in the interim.

In sum, the pending alternative fuel cycle studies together with the Administration's policy and the President's request strongly support the Commission's decision to terminate the GESMO proceeding and pending proceedings on plutonium recycle-related license applications.¹⁴ As a result of this decision, the Commission also withdrew the November 1975 policy statement on mixed oxide fuel, 40 Fed. Reg. 53056 (November 14, 1975), which announced the policies under which the terminated proceedings had gone forward.

COMMISSION REEXAMINATION

The Commission's decision to terminate these proceedings does not involve their final disposition on the merits. As we have noted, the present state of studies and national fuel cycle policy evaluations precludes an informed decision on the merits of plutonium recycle at this time. Moreover, the Administration has not taken a final position on plutonium fuel cycles, but rather opposes premature entry into a plutonium economy. Statement of Joseph Nye at Salzburg, *supra*. The Administration's policy will take appropriate account of the studies' results when they become available. Congress has also indicated that its position on non-proliferation may require reexamination after the completion of the studies. See Nuclear Non-Proliferation Act of 1978, §602(e); 124 Cong. Rec. S1456, S1459 (daily ed. February 7, 1978) (remarks of Senators McClure and Glenn). The Commission is committed to reexamining its decision to terminate recycle-related proceedings in light of the completed studies, expected to take about 2 years, and any revisions of the Administration's policies. At the present time it is not possible to determine whether our proceedings will then be reinstituted or whether some other course will be adopted. But in this posture, termination is not a final disposition of the issues surrounding wide-scale plutonium recycle or of

¹⁴The exceptions to termination of the recycle-related proceedings are discussed below.

the individual license applications on the merits.¹⁵ As we discuss in more detail below, we are empowered to decline to process applications while fundamental policy questions are being examined. See *Kessler v. FCC*, 326 F.2d 673 (D.C. Cir. 1963); *Mesa Microwave, Inc. v. FCC*, 262 F.2d 723 (D.C. Cir. 1958).

ARGUMENTS FAVORING CONTINUATION AS A POLICY MATTER

The Commission does not find persuasive other arguments for continuing the recycle-related proceedings.

Some commentators have said that plutonium is a much needed energy source and that the proceedings should be continued to permit its timely development. The Commission is acutely aware of the nation's need for electrical energy. However, as previously noted, the development of plutonium recycle entails substantial problems, and it is not yet clear whether they will outweigh the potential energy benefits. The proliferation risks of foreign plutonium recycle are an overriding foreign policy concern, and the President's efforts to reduce them justify at least some delay in related domestic activities. Furthermore, we expect to reexamine our decision in about 2 years. A delay in the implementation of plutonium recycle for this period of time does not provide substantial grounds for concern about the economic aspects of the Commission's decision.¹⁶ Finally, significant progress probably could not be made in these proceedings in the interim, since any record would probably have to be substantially supplemented or entirely revised in light of the alternative fuel cycle studies and changes in energy demand and uranium availability and costs in the interim.

Some commentators have also argued that the Commission's proceedings should continue so that the considerable resources invested by the NRC and the participants in the proceedings will not be wasted. We think such an argument rests on several false premises. We recognize the magnitude of the investment that participants and the staff have made in the

¹⁵The license applications in these proceedings have been denied without prejudice to the applicants' rights to have consideration of their applications resumed at the point they were terminated, if a future Commission decision permits such a resumption and it is appropriate under the circumstances.

¹⁶The Commission's staff concluded in the final GESMO document that delaying plutonium recycle for 5 years would cost about \$74 million. Final GESMO, vol. 4, VIII-9, XI-79. While this figure and other economic analyses were sharply contested in the GESMO hearings, we believe that the economic costs of our decision, whatever the proper value may be, are not so high that they are of substantial concern compared to the risks of nuclear explosives proliferation that are the basis for the Administration's policy.

proceedings. But we reject the notion that an unnecessary proceeding must continue to absorb time and resources simply because a substantial investment has already been made in it. Also if the proceedings are ultimately reopened, the record already created will be reintroduced to the extent appropriate. The contribution already made will thus be used to the extent possible. However, parts of the record which may have become outdated as a result of new information from the alternative fuel cycle studies and changing conditions could not somehow retain their validity merely because the proceedings were continued on an interim basis. Indeed, a more substantial waste of effort would ensue if the proceedings were continued now and the record later required substantial revision.

Commentors have also contended that the GESMO proceedings would produce information important to the alternative fuel cycle studies by thoroughly investigating plutonium recycle as a "base case" against which other fuel cycles could be compared. This argument misconceives the Commission's function. The purpose of GESMO was to determine whether and under what conditions plutonium recycle should be licensed, as a prerequisite to review of pending or anticipated license applications for particular recycle-related facilities. While we closely cooperate with other agencies of government as appropriate, it is not the Commission's intention to transform a proceeding of this sort into a general study unrelated to the licensing of particular facilities. Congress has determined that such studies, when appropriate, should be performed by the Department of Energy, which is currently engaged in studies necessary to implement INFCE and NASAP. Finally, as to the view of some commentors that continuing the GESMO proceeding would be useful to the President's domestic and international initiatives, we would only note that he has indicated that it would not.

ARGUMENTS THAT CONTINUATION IS LEGALLY REQUIRED

We now turn to contentions that the Commission is legally required to continue the proceedings. Westinghouse, B&W, and NLCPI contend that the Atomic Energy Act requires the Commission to continue individual plutonium recycle-related license application proceedings and that NEPA requires the Commission to continue GESMO.

Arguments Based on the Atomic Energy Act

Westinghouse, B&W, and NLCPI first observe that Section 189(a) of the Atomic Energy Act requires that "[i]n any proceeding...for the granting...of any license or construction permit...the Commission shall grant

a hearing upon the request of any person whose interest may be affected. . . ." They contend that applicants constitute "person[s] . . . affected" and therefore that Section 189(a) requires that the adjudicatory hearings on the license applications be completed. In addition, Westinghouse observes that Section 103(b) of the Atomic Energy Act states that the Commission "shall" issue commercial licenses to applicants who meet the criteria set forth in that section, and that Section 103(d) prohibits the issuance of any license which would "in the opinion of the Commission . . . be inimical to the common defense and security or to the health and safety of the public." Westinghouse argues, essentially, that an applicant's compliance with Section 103(b) mandates issuance of a license unless the Commission makes an affirmative finding of inimicality under Section 103(d), supported by a substantial basis in fact developed on an appropriate public record compiled at a public hearing under Section 189(a). We disagree.¹⁷

The argument that the Act's licensing provisions somehow compel the processing of all applications is without merit. The Commission has the discretion to stop processing applications and to refuse to accept new ones when there are sound regulatory reasons to do so. This principle is particularly applicable when foreign policy considerations involving non-proliferation have been strongly asserted by the President in his constitutional role as chief foreign policymaker. His judgment in such matters requires substantial deference. Also, the usefulness of the present record will be significantly affected by ongoing studies in which many nations are examining major policy questions involving the nuclear fuel cycle. Judicial decisions in analogous situations support this principle.

The *Permian Basin Area Rate Cases*, 390 U.S. 747, 776-781 (1968), dealt with the authority of the Federal Power Commission to impose a two-and-one-half-year "moratorium" on rate filings, while its new area ratemaking concept took hold. The court sustained this moratorium, even though a section of the relevant statute seemed to authorize gas producers to file rate increases with the Commission to be effective in 6 months, subject to a later refund mechanism. Another section of that statute authorized the Federal Power Commission to determine whether existing rates are "just and reasonable," and to prescribe future rates by order. The court rejected the argument that the statute gave gas producers an unrestricted right to file rate changes, such as to preclude a moratorium upon those increases.

In upholding the moratorium the court specifically referred to the FPC's general rulemaking authority under Section 16 of the Natural Gas Act as a source of its authority to impose moratoria. *Id.* at 776, n. 40,

¹⁷The discussion below applies as well to Sections 53, 57, and 104 as it does to Section 103

781. That section is nearly identical to Section 161(p) of the Atomic Energy Act, which provides the NRC with general authority to issue "such rules and regulations as may be necessary to carry out the purposes of this Act." Moreover, Section 103, under which applicants seek licenses, contains similar authority for the Commission to subject commercial licenses "to such conditions as the Commission may by rule or regulation establish to effectuate the purposes and provisions of this Act."

The court also reasoned generally that "the width of administrative authority must be measured in part by the purposes for which it was conferred..." and that "the Commission's broad responsibilities...demand a generous construction of its statutory authority." 390 U.S. at 776 (footnote omitted), and cases cited therein. It further noted that the Commission's discretion in its authority to make rates necessarily extended to its entire process, "embracing the method used in reaching the legislative determination as well as that determination itself." *Id.*; *American Commercial Lines v. Louisville & Nashville R. Co.*, 392 U.S. 571, 592 (1968). After analyzing the particular sections of the Act relied upon by the Commission and the gas producers, the court concluded that the consequences of the gas producers' construction of the statute would be the "enervation" of the section under which the Commission had proceeded and the destruction of the Commission's new area ratemaking concept. 390 U.S. at 780. Having previously observed that "the ultimate achievement of the Commission's regulatory purposes [might] easily depend upon" its ability to adopt such concepts, *id.* at 777, the court was "in the absence of compelling evidence that such was Congress' intention, unwilling to prohibit administrative action imperative for the achievement of the agency's ultimate purposes," *id.* at 780. "We cannot, in these circumstances, conclude that Congress has given authority inadequate to achieve with reasonable effectiveness the purposes for which it has acted." *Id.* at 777.

We see no reason why the NRC's statutory authority should be construed any less broadly. The Atomic Energy Act gives the Commission very wide authority and discretion to regulate the possession and use of nuclear materials through all of the usual administrative methods. Section 161(p), for example, has been quoted above, and Section 161(b) provides that the Commission is authorized to

establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property....

Indeed, the Court of Appeals for the District of Columbia Circuit has characterized the Atomic Energy Act as enacting

a regulatory scheme which is virtually unique in the degree to which broad responsibility is reposed in the administering agency, free of close prescription in its charter as to how it shall proceed in achieving the statutory objectives.

Siegel v. AEC, 400 F.2d 778, 783 (1968); *Union of Concerned Scientists v. AEC*, 499 F.2d 1069, 1079 (D.C. Cir. 1974). We thus conclude that the Commission possesses general authority to terminate consideration of licenses under Section 103, subject to later reexamination, without reaching the specific question of inimicality with respect to any particular facility under Section 103(d) based on an adjudicatory record.

The argument that applicants are entitled to a hearing on their applications under Section 189(a)¹⁸ must be rejected for similar reasons, by analogy to judicial decisions supporting the FCC's power to "freeze" license applications. Despite a statute which required either a hearing or a summary grant of applications, the FCC has on several occasions instituted a "freeze" on specified classes of license applications, neither granting them nor conducting hearings, when it was developing new policy in response to a particular problem which would be exacerbated by granting licenses. Even though the freezes appear to contravene the statute, the courts have consistently upheld them, and have found no right to a hearing. *Kessler v. FCC*, 326 F.2d at 684; *Mesa Microwave, Inc. v. FCC*, *supra*; *Wentronics, Inc. v. FCC*, 331 F.2d 782 (D.C. Cir. 1964); *Harvey Radio Laboratories, Inc. v. United States*, 289 F.2d 458 (D.C. Cir. 1961). In *Mesa Microwave*, the court sustained a freeze on all pending and future cable TV applications pending a broad technological review. The courts have also indicated that under the new policies developed during a freeze, previous license applicants might not receive licenses. See *Harvey Radio Laboratories, supra*, at 460.

The decisions rest not so much on any statutory provision as on broad considerations of a regulatory agency's proper authority—general findings that the agency was to regulate in the public interest and that its actions were in the public interest and were not arbitrary and capricious. While the Atomic Energy Act uses the terms "public health and safety" and "common defense and security," we see no reason why the same regulatory tools available to other agencies to carry out their statutory

¹⁸The courts have read this section flexibly. See *BPI v. AEC*, 502 F.2d 424 (D.C. Cir. 1974), holding that the Commission had the authority (under Section 161) to deny a petition to intervene for failure to set forth specific contentions, notwithstanding Section 189's guarantee of a hearing to anyone with the requisite interest.

mandates should not also be available to the NRC, so long as the line between regulation and promotion drawn by the Energy Reorganization Act of 1974 is observed. In addition, when the President has expressly requested that the Commission terminate individual licensing proceedings to assist the implementation of an important national and foreign policy, we are hard-pressed to see how the interests of the individual license applicants here could outweigh the government's interest in preventing the proliferation of nuclear explosives. This is particularly so when our refusal to follow the President's request could substantially undermine the international studies and sensitive negotiations which the President has initiated. We would take such a course only if the law clearly compelled it, and as we have shown above, that is not the case here. We thus conclude that this Commission is empowered to terminate licensing hearings and other licensing proceedings under Section 189(a), subject to later reexamination. See *Siegel v. AEC*, *supra*.

Arguments Based on NEPA

Westinghouse, B&W, and NLCPI also contend that terminating the GESMO proceedings would itself be a major Federal action under NEPA, and thus an environmental impact statement on plutonium recycle must be completed before the GESMO proceedings may be terminated.¹⁹ This contention draws some apparent support from the conclusion in the final GESMO document on health, safety, and the environment that recycling plutonium could reduce impacts from the mining and milling of uranium by approximately 20%. Final GESMO, vol. 3, pp. IV-F-19 to -23; vol. 4, pp. VIII-25 to -26, VIII-44, XI-71, XI-74; see New Mexico comment of June 1977. Discontinuing consideration of such a program could be argued to have a significant environmental impact and thus require an impact statement. The commentators concluded that NEPA requires continuation of GESMO.

We disagree. As we stated above, we terminated GESMO in part because any record assembled in GESMO before the completion of the alternative fuel cycle studies would be an inadequate basis for a Commission decision on plutonium recycle. This course of awaiting information on alternatives is consistent with NEPA's requirement that we carefully

¹⁹As several commentators noted, if the Commission continued the individual license application proceedings, it would not be appropriate to terminate GESMO. Licensing the Barnwell plant or the proposed Exxon facility for commercial use would constitute approval of wide-scale plutonium recycle, and prior completion of GESMO or similar generic proceedings would be required. Cf. November 1975 policy statement, 40 Fed. Reg. at 53057, 53061-53062 (November 14, 1975).

develop and thoroughly evaluate alternatives. NEPA §§102(2)(C)(iii), (E); *Natural Resources Defense Council v. Morton*, 458 F.2d 827 (D.C. Cir. 1972). The alternative fuel cycle studies are broad in scope and will produce a great deal of information about alternatives to plutonium recycle as it is presently conceived, and a full evaluation of these alternatives must await the availability of that information. While NEPA might *permit* us to proceed without the results of these studies, in the face of substantial uncertainty, it does not *require* us to complete proceedings on an impact statement when we do not yet have a substantial part of the information required to make the record of those proceedings adequate for responsible decisionmaking.

Moreover, NEPA does not require public hearings. *Jicarilla Apache Tribe of Indians v. Morton*, 471 F.2d 1275, 1286 (9th Cir. 1973). The hearings we held on GESMO were appropriate as a matter of informed decisionmaking. See 40 Fed. Reg. at 53057, 53060. Once the Commission embarked on hearings, NEPA required consideration of environmental factors in those proceedings, as well as health, safety, and economic factors. See *Calvert Cliffs' Coordinating Committee v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971). However, NEPA did not compel initiation of the hearings to begin with, and does not now prevent their termination.

We also disagree with the proposition that the termination itself—not on the merits and due to be reexamined—requires its own impact statement. It is not the kind of “recommendation or report on a proposal” which the Supreme Court has determined to require an impact statement. *Aberdeen & Rockfish R. Co. v. SCRAP*, 422 U.S. 289, 320-321 (1975) (*SCRAP II*); *Kleppe v. Sierra Club*, 427 U.S. 390 (1976). This decision simply preserves the status quo, rather than causing any new damage to the environment. NEPA has never, to our knowledge, been interpreted to require an impact statement in such circumstances. GESMO is a study of a proposed course of action, and its termination will simply continue the status quo. This situation is thus the reverse of that in *National Helium Corp. v. Morton*, 455 F.2d 650 (10th Cir. 1971), and *City of New York v. United States*, 337 F. Supp. 150 (E.D.N.Y. 1972), where termination of longstanding activities substantially altered the status quo and impact statements were required. It is also the converse of *Scientists' Institute for Public Information v. AEC*, 481 F.2d 1079 (D.C. Cir. 1973) (*SIPPI*), where the AEC was required to write a generic statement on the ongoing Liquid Metal Fast Breeder Reactor research program and the impacts future commercial use of that technology might have. In the instant case, commercial implementation of recycle technology is being postponed at least until a fuller evaluation can be carried out. The mere fact that this will be accomplished through a policy statement, the only

parallel to *SIFI* that commentators cite, hardly requires an impact statement.²⁰

Finally, it is only necessary to consider the practical implications of commentators' interpretation of NEPA to demonstrate its absurdity. By turning NEPA on its head, the result would be to overwhelm the government by requiring preparation of impact statements each time an agency decided *not* to pursue a major Federal action. Such a result was not intended by Congress when it enacted NEPA and defies a reasonable construction of the statute.

REMAINING POINTS

Exceptions to the Termination of Recycle-Related Proceedings

Two kinds of plutonium recycle-related license application proceedings were excepted from this decision. The first is "proceedings on licenses for the fabrication or use of small quantities of mixed oxide fuel for experimental purposes." The exception for "use" covers the three operating commercial reactors which currently have partial loads of mixed oxide fuel—Big Rock Point, Dresden Unit 1, and Quad Cities Unit 1. The "fabrication" exception covers the operation of small-scale facilities which fabricate small quantities of plutonium-bearing fuel for experimental purposes.

These activities are essentially experimental in nature, and are thus outside the scope of this decision, which concerns wide-scale commercial reprocessing.²¹ They were exempted from the Second Circuit decision, which similarly distinguished commercial-scale reprocessing from licensing for "experimental and feasibility purposes." 539 F.2d at 845, vacated and remanded to determine mootness, 434 U.S. 1030. These limited activities may thus proceed without completion of GESMO. Moreover, the use exception was specifically mentioned in the Eizenstat letter. While no exception for fabrication appeared there, we think one along the lines of the use exception may properly be implied, since use would be impossible without the related fabrication capability. We thus believe that these facilities are outside the scope of the President's request, and that there is no reason not to allow their activities to continue.

The second class of excepted proceedings is "those portions of pro-

²⁰We think these arguments also adequately demonstrate that no impact statements are required for termination of individual plutonium recycle-related license applications.

²¹The licenses for the Naval reactor program and the Fast Flux Test Facility are also outside the scope of this decision, since they are not related to commercial plutonium recycle.

ceedings which involve only spent fuel storage, disposal of existing waste, or decontamination or decommissioning of existing plants." These proceedings are related to plutonium recycle only in that they may occur at reprocessing facilities. They do not otherwise involve commercial implementation of plutonium recycle, and therefore are not subject to this decision. Additional spent fuel storage capacity is currently needed, partly as a result of the nation's deferral of reprocessing. The use of storage facilities available or planned at existing or planned reprocessing plants thus should not be foreclosed by our decision here.²² The NFS West Valley reprocessing plant, which is no longer in commercial operation, generated high-level wastes which are currently stored at the site. A program for their disposal is being investigated. Decontamination or decommissioning of the plant is also being investigated by DOE. The Commission is involved in that investigation, which may result in NRC licensing activity. The December 23 order should be read as allowing storage as well as disposal of existing waste and the possession of radioactive materials.²³

Publication of the GESMO Draft Safeguards Supplement

In accordance with the November 1975 policy statement, the staff began work on a safeguards supplement to the GESMO document. That supplement is now essentially complete. All commentators favor its release, and we believe it would be in the public interest to publish it as a staff technical report. It should provide considerable safeguards information useful in the alternative fuel cycle studies.

Limited Exception for Non-Proliferation Purposes

The order also stated that the Commission "reserve[d] for decision, if it arises, the question of whether a facility such as the Barnwell facility may be licensed for experimental and feasibility purposes on a noncommercial basis to investigate processes which support the nation's non-proliferation objectives."²⁴ This reservation was in response to the provis-

²²AGNS currently holds a construction permit for portions of the Barnwell facility not covered by the exception for spent fuel storage, and thus within the ambit of activities for which proceedings have been terminated. However, since those facilities have already been essentially completed and the operating license proceedings have been terminated, we see no need to disturb the outstanding construction permit, or to continue the pending NEPA proceedings on the modification, suspension, or revocation of the construction permit.

²³NFS currently holds an operating license for the West Valley facility. The facility was shut down in 1971 for modification, and NFS has since indicated that it will not reopen it. The staff's plans to convert the operating license to possession only are appropriate in light of our decision here.

²⁴Commissioner Gilinsky noted that he considered the inclusion of this item unnecessary and inappropriate in the order.

ions in the DOE authorization bill, discussed above, and AGNS' comment that such activities should not be foreclosed (no other commentators addressed this particular issue). So long as such activities support the nation's non-proliferation objectives, the Commission believes they would not conflict with the policy underlying the decision to terminate these proceedings. Limited to "experimental and feasibility purposes on a noncommercial basis," such activities would also be consistent with the Second Circuit's decision. See 539 F.2d at 845. Activities at Barnwell may not need NRC approval if they are "under contract with and for the account of" DOE. See Atomic Energy Act §110(a). However, our decision here should not foreclose activities requiring a Commission license which fall within the above category.

CONCLUSION

The reasons stated above express the basis for the Commission's actions stated in its order of December 23, 1977. This memorandum shall be filed in the dockets of all the proceedings listed in that order and shall be served on all parties of record.

The separate views of Commissioner Kennedy appear below.

Commissioner Gilinsky was not present at the Commission meeting at which this document was approved.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 8th day of May 1978.

Concurring View of Commissioner Kennedy:

I concur in the Commission's decision to bring the GESMO Proceeding to a halt. As indicated in the Commission's order of December 23, 1977, however, I would have preferred that the Commission "defer" rather than "terminate" the GESMO proceeding and the proceedings on pending or future plutonium recycle-related license applications. I take this view for the following reasons.

"Deferral," in my view, is more consistent with the President's Policy Statement of April 7, 1977. The President stated that the U.S. should "defer indefinitely the commercial reprocessing and recycling of the plu-

onium produced in U.S. nuclear power programs." Since that time, as Mr. Eizenstat's letter of October 4, 1977, notes, "(t)he Administration has proposed an accelerated research and development program to examine alternative fuel cycles not involving direct access to plutonium. The President has also asked other countries to join us in an International Nuclear Fuel Cycle Evaluation to examine alternative approaches to advanced nuclear technologies." Thus it is the Administration's position that any final decision on reprocessing and recycle will have to await the completion of the domestic and international studies on alternative fuel cycles. Meanwhile, deferral of reprocessing would be a clear signal to other countries that the United States was forgoing any concrete steps toward implementation of plutonium recycle pending results of the ongoing studies. This is a significant argument bearing on the foreign policy of the United States and, as such, deserves to be given considerable weight in our deliberations. And in that light, I believe that it would have been more appropriate to hold in abeyance our consideration of domestic reprocessing than to "terminate" the very process which was designed to lead to a decision. For "termination" may be seen by some as evidence of a predetermined conclusion.

"Deferral" also is more consistent with active participation by the NRC in the INFCE study of alternative fuel cycles, and the Commission's December 23 decision to reexamine the issues of reprocessing and recycle following the alternative fuel cycle studies. "Termination" of the GESMO proceeding implies that the agency has ceased to consider matters related to an eventual decision on reprocessing. This is not the case. The NRC has not foreclosed consideration of plutonium reprocessing and recycle. Indeed, the Commission's very considerable participation in the INFCE clearly demonstrates that we are continuing to develop and analyze not only information directly related to the "base case" of plutonium recycle considered in GESMO, but also information regarding more proliferation-resistant fuel cycles. All of this information will be demonstrably relevant at some point in the future to a final Commission decision on reprocessing and recycle. It would seem clear, therefore, that we have not terminated our examination of the questions addressed by GESMO. We have instead merely halted a hearing on one option alone, while we determine which other available options ought also to be considered.

Finally, I believe that "deferral" rather than "termination" of the GESMO proceeding is the closer analogy to the several "freeze" cases which the Commission referenced in support of our decision to halt consideration of individual license applications.¹ I agree that those cases

¹See pages 725-727 of the Commission's opinion.

strongly support the concept of the Commission's suspending action on all licenses in a particular class, while it develops new policy related to that class. In each of those situations, however, a "policy" was being developed. The cases, therefore, are of questionable relevance in a situation in which it was believed that even consideration by the Commission of one class of licenses would be counterproductive to the President's policy.

Deferral of these proceedings would have avoided the unfortunate appearance that the Commission has made a final decision not to act upon license applications which are properly before it. Additionally, deferral would have left the Commission less susceptible to the argument that the Commission is improperly deferring to a Presidential request affecting not only a rulemaking hearing but also specific licenses which are being treated in an adjudicatory context.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Victor Gilinsky
Richard Kennedy
Peter Bradford

In the Matter of

**Docket Nos. 50-443
50-444**

**PUBLIC SERVICE COMPANY OF
NEW HAMPSHIRE, et al.**

(Seabrook Station, Units 1 and 2)

May 31, 1978

The Commission (1) grants, in part, the staff's petition to review ALAB-471, 7 NRC 477 (1978); (2) elects to review on its own motion an aspect of ALAB-471 (permit suspension) on which timely review was not sought; and (3) denies other petitions for review.

ORDER

On April 28, 1978, the Atomic Safety and Licensing Appeal Board decided ALAB-471, 7 NRC 477, which deals with the proposed Seabrook facility. Petitions to review that decision have been filed by the lead applicant, Public Service Company of New Hampshire, and by the Commission staff. On May 26, 1978, we extended the time for review of applicant's petition and for review on our own motion until June 2, 1978.

We have decided to grant staff's petition in part, to grant review on our own motion of an aspect of ALAB-471 on which timely review was not sought, and to deny the other petitions for review.¹ First, we wish the parties to address the issue whether, in light of *Vermont Yankee Nuclear Power Corp. v. NRDC*, _____ U.S._____, 46 U.S.L.W. 4301 (April 3, 1978), and the record compiled to date, we should now terminate, as no longer necessary or useful, the comparison between Seabrook and certain alter-

¹On May 24, 1978, the Seacoast Anti-Pollution League filed a cross-petition for review of one aspect of ALAB-471, and on May 26, 1978, the New England Coalition on Nuclear Pollution filed a petition for review of that issue. Both petitions are untimely; however, we will review on our own motion the issue of suspension of construction during remand which SAPL and NECNP sought to raise.

native sites in southern New England which we ordered in CLI-77-8, 5 NRC 503 (1977). Second, we wish the parties to address whether the Seabrook construction permits should be suspended while EPA is reexamining the Seabrook cooling system or during the pendency of the cooling-tower remand called for in ALAB-471 and, should we not terminate it, during a remand on the southern New England sites issue.²

The parties to the review shall be the same as the parties before the Appeal Board in ALAB-471. The parties' initial briefs shall be *received* by the Commission by June 14, 1978. Any reply briefs should be *received* by June 20, 1978. If we determine to have oral argument, it will be scheduled in a future order.

It is so ORDERED.³

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 31st day of May 1978.

²To avoid unnecessary delay we direct the Atomic Safety and Licensing Board to begin preparing for the remanded hearings called for by ALAB-471.

³We grant the New England Coalition on Nuclear Pollution's motion for an extension of time to file a motion to stay ALAB-471. We will consider the stay question after the other parties have had an opportunity to respond to SAPL's May 24, 1978, stay motion and to NECNP's May 26, 1978, stay motion. Those responses should be *received* by the Commission Monday, June 5, 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket No. 27-39

NUCLEAR ENGINEERING
COMPANY, INC.

(Sheffield, Illinois,
Low-Level Radioactive
Waste Disposal Site)

May 3, 1978

The Appeal Board affirms the Licensing Board's denial of joint petition to intervene as of right but grants one of the two petitioners a further opportunity to show that it should be permitted to intervene as a matter of discretion.

RULES OF PRACTICE: STANDING TO INTERVENE

Contemporaneous judicial concepts of standing are applied to determine whether a petitioner has an interest which may be affected by the proceeding and thus is entitled to intervene as of right.

RULES OF PRACTICE: INTERVENTION PETITION

To intervene as of right, a petitioner must show that it will or might be injured in fact by one or more of the possible outcomes of the proceeding; and that its asserted interest is arguably within the zone of interests protected by the applicable statutes. *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

RULES OF PRACTICE: STANDING TO INTERVENE

An organization which seeks to intervene as of right to vindicate broad

public interests of particular concern to its members or contributors does not have a sufficiently particularized interest to confer standing.

RULES OF PRACTICE: STANDING TO INTERVENE

Standing to intervene hinges neither upon the litigating posture the petitioner assumes nor on the merits of its case. *Association of Data Processing Service Organizations v. Camp*, 397 U.S 150, 153 (1970). Whether a petitioner opposes or favors a proposal is thus of no consequence in determining whether it has standing. The test for standing is whether a cognizable interest of the petitioner might be adversely affected if the proceeding has one outcome rather than another.

RULES OF PRACTICE: STANDING TO INTERVENE

An interest sufficient to confer standing is not presumed. There must be a concrete demonstration that harm to the petitioner might result.

RULES OF PRACTICE: CONTENTION REQUIREMENT FOR INTERVENTION

In the case of a petitioner who supports a license application, all that need be initially asserted to fulfill the contention requirement of 10 CFR 2.714(a) is that the application is meritorious and should be granted.

RULES OF PRACTICE: CONTENTION REQUIREMENT FOR INTERVENTION

Once contentions in opposition to a license application have been set forth, the Licensing Board is entirely free to call upon intervenors supporting the license to take a position on the contentions.

RULES OF PRACTICE: STANDING TO INTERVENE

Where petitioner lacks standing to intervene as of right, intervention may be permitted as a matter of discretion. *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 614-17, (1976).

RULES OF PRACTICE: INTERVENTION PETITION

In determining whether to permit discretionary intervention, the most

important factor to be considered is the extent of the contribution expected from petitioner.

RULES OF PRACTICE: INTERVENTION PETITION

Where petitioner conditions its ability to participate in a proceeding on an award of attorneys' fees and costs from the Commission, the Board is justified in concluding that petitioner does not satisfy the "contribution" test for discretionary intervention.

Mr. John M. Cannon, Chicago, Illinois, for the petitioners Mid-America Legal Foundation and the Chicago Section, American Nuclear Society.

Ms. Ellen B. Silberstein for the Nuclear Regulatory Commission Staff.

DECISION

This proceeding involves the application of the Nuclear Engineering Company for renewal and amendment of its license to operate a low-level radioactive waste burial site near Sheffield, Illinois. On March 1, 1978, the Licensing Board denied the joint petition of the Mid-America Legal Foundation (Mid-America) and the Chicago Section, American Nuclear Society (Chicago Section) for leave to intervene. The petitioners appeal that denial under 10 CFR 2.714a.¹ We conclude that the Board below correctly ruled that the allegations of the petition are insufficient to establish the standing of either petitioner to intervene as a matter of right. We have further decided, however, to accord the Chicago Section (but not Mid-America) a further opportunity to demonstrate that, despite its lack of standing, it should be permitted to participate in the proceeding as a matter of discretion.

A. Both the Atomic Energy Act and the Commission's Rules of Practice confer a right to intervene in a licensing proceeding upon those who possess an "interest [which] may be affected by the proceeding."² It is

¹The appeal was addressed to us. Because, however, this proceeding arose under 10 CFR Parts 30, 40, and 70 (rather than under Part 50), we lacked jurisdiction to entertain it in the absence of an explicit Commission authorization. See 10 CFR 2.785(a). By unpublished order of April 11, 1978, the Commission provided that authorization. We thereupon assumed jurisdiction over the appeal and calendared it for oral argument.

²Section 189a. of the Act, 42 U.S.C. 2239(a); Section 2.714(a) of the Rules of Practice, 10 CFR 2.714(a).

now settled that, in determining whether such an interest has been satisfactorily alleged, contemporaneous judicial concepts of standing are to be applied. More specifically, it must appear from the petition both (1) that the petitioner will or might be injured in fact by one or more of the possible outcomes of the proceeding; and (2) that the asserted interest of the petitioner in achieving a particular result is at least arguably within the "zone of interests" protected or regulated by the statute or statutes which are being enforced. *Portland General Electric Company* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

In the present case, Mid-America and Chicago Section seek intervention for the purpose of lending support to the application to renew the Sheffield license (as amended to allow the expansion of the site). Thus, the first question is whether the petitioners have sufficiently alleged that they will or might be injured in fact if (1) the license is not renewed; (2) the amendment is not approved; or (3) renewal or amendment is made subject by the Board to the imposition of onerous conditions. If that question requires an affirmative answer, we must then decide whether the petitioners' interest in the avoidance of the injury comes within the "zone of interests" protected or regulated by the Atomic Energy Act or the National Environmental Policy Act.

1. Insofar as they bear upon the interest of Mid-America, the allegations of the petition (as supplemented) amount to this: Mid-America "is an Illinois not-for-profit corporation engaged in nonpartisan legal research, study, and analysis for the benefit of the general public as to the effects of evolving concepts of law on our democratic institutions interest at all levels of the judicial process." Its desire to participate in this proceeding stems from the fact that the Sheffield facility "has a direct effect upon the cost and availability of virtually all facilities and services involving radioactive materials, particularly in the mid-America region" which is of principal concern to the organization. According to Mid-America, its "interest in the benefits to the general public utilizing goods and services provided by users of the Sheffield facility will be adversely affected by the denial or limitation of a license for [that] facility without a proper and knowledgeable balance of concerns for the protection of the public health, welfare and safety, and environmental protection in accordance with the Atomic Energy Act and the National Environmental Policy Act. More specifically, Mid-America, as a public interest foundation, is concerned with both the benefits accruing to the general public from the use of radioactive materials and with the disposal of waste products in a safe manner with respect to persons and the environment."

The petition goes on to note that, "[i]n addition to presenting public interest views on its own behalf," Mid-America has provided legal rep-

resentation to another organization in a judicial proceeding likewise involving "particular questions of the relationship between the National Environmental Policy Act and the Atomic Energy Act and of the responsibility of the Commission thereunder." Moreover, it "also has been active in other actions involving questions of public interest in matters of energy and the environment."

For its part, the Chicago Section is identified simply as an organization of "professionals interested in the optimum development of nuclear science and technology for the benefit of mankind." Most of its members (among them "persons engaged in academic, commercial, and governmental affairs") are said to reside in northern Illinois and many are assertedly involved in work which utilizes the Sheffield facility. The Section and its members are claimed to "have particular interest and expertise in matters which may be involved in consideration of the proposed facility."

2. As is readily apparent from the foregoing, neither petitioner has identified, let alone particularized, any specific injury that it or its members would or might sustain should the Sheffield license renewal and amendment application be denied or, alternatively, granted subject to the imposition of burdensome conditions upon the license.³ Rather, both petitioners seek intervention in order to vindicate broad public interests said to be of particular concern to them and their members or "contributors" (Mid-America does not claim to have members as such).

Two years ago, we considered and squarely rejected a similar claim of interest as a sufficient basis for standing. *Allied-General Nuclear Services* (Barnwell Fuel Receiving and Storage Station), ALAB-328, 3 NRC 420 (1976). There, the American Civil Liberties Union of South Carolina (ACLU/SC) sought to intervene in opposition to the grant of an application under 10 CFR Part 70 for a materials license to receive and possess irradiated fuel assemblies at the proposed Barnwell facility. The asserted

³The mere fact that some of the members of the Chicago Section may be engaged in work which utilizes the facility does not establish that those members would be harmed were the license to be terminated or freighted with additional conditions. This would depend upon, among other things, the nature of the work being performed and the availability of other facilities for the disposition of low-level radioactive wastes.

Nor is it important for present purposes that, according to the petition, certain identified representatives of users of the facility had "expressed to petitioners on behalf of themselves and similarly situated users . . . their interest in the continued availability of low-level waste disposal sites such as the Sheffield facility." For one thing, none of the identified users or their representatives elected to have himself named as a petitioner, and insofar as the petition discloses, none of them is a member of either Mid-America or the Chicago Section. For another, there is no indication whether, and if so how and to what extent, they might be injured by licensing board action adverse to the application.

foundation for its right to participate in the proceeding on the application was that its "members' work on civil liberties problems provides the organization with unique qualifications to introduce evidence, question the completeness and accuracy of the information presented, and assist the Board in having before it sufficient factual information and data on civil liberties issues." 3 NRC at 422. Accepting this allegation as true, we nonetheless determined that it was not enough to satisfy the "injury in fact" test. What was lacking "was a particularization of how the interests of one or more members of ACLU/SC might be adversely affected by the grant of the sought materials license." *Ibid.* In this connection, we relied (*id.* at 421) on observations of the Supreme Court in the course of holding that a national organization could not predicate its standing to seek to enjoin Federal agency approval of commercial development of a national game refuge upon its "asserted special interest in the conservation and the sound maintenance of the national parks, game refuges, and forests of the country":

. . . a mere "interest in a problem," no matter how longstanding the interest and no matter how qualified the organization is in evaluating the problem, is not sufficient by itself to render the organization "adversely affected" or "aggrieved" within the meaning of the APA. The Sierra Club is a large and long-established organization, with a historic commitment to the cause of protecting our Nation's natural heritage from man's depredations. But if a "special interest" in this subject were enough to entitle the Sierra Club to commence this litigation, there would appear to be no objective basis upon which to disallow a suit by any other bona fide "special interest" organization, however small or short-lived. And if any group with a bona fide "special interest" could initiate such litigation, it is difficult to perceive why any individual citizen with the same bona fide special interest would not also be entitled to do so.

The requirement that a party seeking review must allege facts showing that he is himself adversely affected does not insulate executive action from judicial review, nor does it prevent any public interests from being protected through the judicial process. It does serve as at least a rough attempt to put the decision as to whether review will be sought in the hands of those who have a direct stake in the outcome. That goal would be undermined were we to construe the APA to authorize judicial review at the behest of organizations or individuals who seek to do no more than vindicate their own value preferences through the judicial process. The principle that the Sierra Club would have us establish in this case would do just that.

Sierra Club v. Morton, 405 U.S. 727, 739-40 (1972) (footnotes omitted).⁴

It need be added only that we perceive no good reason why any different rule should apply to the petitioners here merely because, unlike the *Barnwell* petitioners, they favor rather than oppose the proposal under consideration. Standing to intervene hinges neither upon the litigating posture the petitioner would assume if allowed to participate nor on the merits of its case. *Association of Data Processing Service Organizations v. Camp*, 397 U.S. 150, 153 (1970). Rather, the test is whether a cognizable interest of the petitioner might be adversely affected if the proceeding has one outcome rather than another. And, to repeat, no such interest is to be presumed. There must be a concrete demonstration that harm to the petitioner (or those it represents) will or could flow from a result unfavorable to it—whatever that result might be. In this instance, if in fact the outright denial of the Sheffield application or the imposition of license conditions would pose a threat of injury to petitioners or their members, it should have been easy enough to have provided a bill of particulars on that score. In short, contrary to petitioners' claim on the appeal, to conclude (as we do) that their standing to intervene as of right has not been established is not perforce to foreclose all attempts at intervention in support of an application.⁵

B. In *Pebble Springs*, CLI-76-27, *supra*, the Commission went on to hold that, in circumstances where standing to intervene as a matter of right is lacking, participation in the proceeding may nonetheless be allowed as a matter of discretion. 4 NRC at 614-17. In determining whether to permit intervention on that basis, the most important factor to be con-

⁴It should be noted that *Sierra Club* was later cited by the Commission in its discussion of intervention as a matter of right in *Pebble Springs*. CLI-76-27, *supra*, 4 NRC at 613.

⁵Because of our determination on the standing question, we need not decide the correctness of the Licensing Board's additional ruling that the petition also failed to meet the contentions requirement contained in 10 CFR 2.714(a). We are nonetheless constrained to note our belief that, in the case of a petitioner who supports the license application, all that need be initially asserted in fulfillment of that requirement is that the application is meritorious and should be granted. Indeed, it would be patently unreasonable to expect more of such a petitioner in advance of his being informed of the basis of any opposition which might be filed to the application.

In this connection, Section 2.714(a) has just been amended, effective May 26, 1978, to provide that petitions for intervention need not set forth contentions. Rather, the petitioner has until 15 days before the holding of the special or first prehearing conference in which to file his contentions in the form of a supplement to the petition. 43 Fed. Reg. 17798 (April 26, 1978). Even under this new procedure, the petitioner who favors the license application may very well not know in advance of filing his supplement what issues are being raised in opposition to the application. Once, however, those issues have surfaced, the Licensing Board is entirely free to call upon any intervenors supporting the license application to take a position on them.

sidered is the extent of the contribution which might be expected of the petitioner. *Id.* at 612, 617; *Virginia Electric and Power Company* (North Anna Power Station, Units 1 and 2), ALAB-363, 4 NRC 631 (1976); *Public Service Company of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-397, 5 NRC 1143, 1145 (1977); *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977).

In its March 1 order, the Licensing Board made no reference to the possibility of discretionary intervention. It cannot, however, be faulted in this regard. For not only did the petition fail to illumine the nature and degree of the contribution which either petitioner might make, but also it contained this express reservation:

(i) petitioners intend to seek attorney's fees and costs in connection with their participation in this proceeding and a failure to grant such fees and costs in connection with valuable contribution may affect their ability to participate.

The potential significance of the reservation is apparent given the Commission's determination not to provide financial assistance to intervenors. See *Nuclear Regulatory Commission* (Financial Assistance to Participants in Commission Proceedings), CLI-76-23, 4 NRC 494 (1976); *Detroit Edison Company* (Greenwood Energy Center, Units 2 and 3), ALAB-376, 5 NRC 426, 428 (1977).

In these circumstances, we would be justified in concluding, without any further inquiry, that the petitioners do not satisfy the test for discretionary intervention. Insofar as the Chicago Section is concerned, however, we think there nevertheless to be some cause to provide it with a second chance to demonstrate, if it can, that it is both willing and able to make a valuable contribution to the full airing of the issues which the Licensing Board must consider and resolve in this proceeding.⁶ In contrast to Mid-America, which appears from the petition to be essentially a public interest law firm, the Chicago Section can be presumed to have within its ranks individuals with considerable training and experience in various areas of nuclear technology. It is accordingly reasonable to suppose that there may be members of the Chicago Section who are equipped to supply enlightenment on some, if not all, of the matters confronting the Board.

We do not suggest that this is necessarily so or that it is to be further assumed that the Chicago Section and its members are prepared to expend

⁶In this connection, the Licensing Board has granted petitions in opposition or potential opposition to the application. Consequently, there will be a hearing on at least the issues which those petitions properly raise.

the time and resources required to bring their knowledge to bear upon the technical issues which the Board must address. If the Chicago Section elects to avail itself of this fresh opportunity to seek discretionary intervention, the burden will be on it to satisfy the Licensing Board on these points. In this regard, broad, generalized averments will not suffice. The Board should insist that the Chicago Section identify with particularity the issues on which it is willing to participate notwithstanding the current (and probable future) *unavailability* of financial assistance derived from public funds. Beyond that, the organization must specify the extent to which it will involve itself on those issues and the contribution which that involvement can reasonably be anticipated to make. Failing an appropriate showing along these lines, discretionary intervention is to be denied.⁷

The March 1, 1978, order of the Licensing Board is *affirmed*.⁸ The Chicago Section, American Nuclear Society, shall, however, be accorded an opportunity by the Licensing Board to make a further request for leave to intervene as a matter of discretion; if made, such request shall be acted upon by the Board in conformity with the views expressed in this opinion.⁹

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

⁷We leave it to the Board below to determine the form which the showing is to take, as well as how much time the Chicago Section should be given to put it forward.

⁸Only that portion of the order involving the Mid-America/Chicago Section petition was appealed and thus the affirmance does not relate to the rulings of the Board contained in other portions of it.

⁹Without seeking leave to do so, the petitioners submitted a brief in reply to the staff's opposition to their appeal. On the ground that Section 2.714a does not provide for reply briefs, the staff moved to strike it. The motion has merit. *Cf. Detroit Edison Company* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-469, 7 NRC 470 (April 26, 1978). Because, however, the reply brief added nothing of moment to what petitioners had said in their opening brief, we have chosen not to take the formal step urged by the staff.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matter of

Docket No. 50-320

METROPOLITAN EDISON
COMPANY, et al.

(Three Mile Island
Nuclear Station, Unit No. 2)

May 5, 1978

Upon untimely motion to reopen the record, the Appeal Board decides to consider the motion on its merits, notwithstanding its inexcusable lateness, in view of the important safety question which it raises.

RULES OF PRACTICE: ADMINISTRATIVE FAIRNESS

The orderly functioning of the administrative process is not furthered by allowing parties to ignore prescribed time limits without adequate justification.

RULES OF PRACTICE: PUBLIC PARTICIPATION

Nonlawyers are normally held to the same standards as lawyers insofar as observing filing deadlines is concerned.

RULES OF PRACTICE: PETITION TO REOPEN THE RECORD

When a motion to reopen is addressed to an important safety question, the public interest dictates that the motion be considered on its merits even though the movant was inexcusably tardy in putting the matter before the Board.

RULES OF PRACTICE: DISCIPLINE

A motion which is insulting and disrespectful in tone and which, if submitted by a lawyer, manifestly runs afoul of 10 CFR 2.713(b) will not be tolerated, whether submitted by a lawyer or a nonlawyer.

RULES OF PRACTICE: AUTHORITY OF APPEAL BOARD

An appeal board may strike on its own initiative submissions which are insulting and disrespectful. *Louisiana Power and Light Company* (Waterford Steam Electric Station, Unit 3), ALAB-121, 6 AEC 319 (1973).

Mr. Ernest L. Blake, Jr., Washington, D.C., for the applicants, Metropolitan Edison Company, *et al.*

Mr. Chauncey R. Kepford, State College, Pennsylvania, for the intervenors, Citizens for a Safe Environment and York Committee for a Safe Environment.

Ms. Karin W. Carter, Assistant Attorney General of Pennsylvania, Harrisburg, Pennsylvania, for the Commonwealth of Pennsylvania.

Mr. Henry J. McGurren for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

This proceeding is before us on the intervenors'¹ appeal from the December 19, 1977, initial decision of the Licensing Board authorizing the issuance of an operating license for Unit No. 2 of the Three Mile Island Nuclear Station.² At the oral argument of the appeal held on March 23, intervenors were granted leave to file a motion to reopen the record on the issue of emergency planning. The deadline specified for the filing of the motion was April 3 (App. Bd. Tr. 112).

The motion to reopen was not filed until April 16. Although on March 31 the intervenors' representative had advised one of the secretaries to this Board by telephone that he could not meet the April 3 deadline, no application for an extension of time was submitted. In the motion to reopen, however, intervenors attempted an explanation for the tardiness.

¹Citizens for a Safe Environment and York Committee for a Safe Environment.

²LBP-77-70, 6 NRC 1185.

We agree with both the applicants and the staff that the explanation is unsatisfactory. We thus have ample cause to deny the motion to reopen on the ground that it was untimely filed without adequate justification. The orderly functioning of the administrative process scarcely would be furthered were we to allow parties to our proceedings simply to ignore prescribed time limits whenever it suited their convenience to do so. We therefore must insist that those limits be honored.³ This is true even if, as here, the party happens to be represented by a nonlawyer. In some respects, we do relax our rules to accommodate the fact that a party may not have the benefit of counsel. See *Detroit Edison Company* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-469, 7 NRC 470,471 (April 26, 1978), and cases there cited. But no good reason exists why a double standard should obtain insofar as observance of deadlines is concerned. A nonlawyer has no less capability than does a member of the Bar to apprehend when a document is due for filing (particularly if he has been expressly so informed) and then to act accordingly.

Because, however, the motion to reopen is addressed to an important safety question, we have decided to pursue a course other than the one which its untimeliness normally would commend to us. If, in fact, there is warrant for exploring further the emergency planning issue along the lines which the motion suggests, the public interest dictates that we not brush that consideration aside merely because the intervenors were inexcusably tardy in putting the matter before us. Consequently, we shall hold the motion in abeyance to await the completion of our review of the existing record on emergency planning. At the appropriate time, the motion will be determined on its merits in accordance with the outcome of that review.

There is one other matter which deserves comment at this juncture. The intervenors' motion was, to say the least, insulting and disrespectful in tone. Such a submission by a lawyer manifestly would run afoul of 10 CFR 2.713(b), which requires that attorneys appearing in our proceedings conform to "the standards of conduct required in the courts of the United States." Although Section 2.713(b) does not in terms apply to nonlawyer representatives of parties, the likely reason is that the rules do not appear to contemplate the appearance in a representative capacity of other than lawyers. See 10 CFR 2.713(a).⁴ Be that as it may, in this area no more than

³*Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-424, 6 NRC 122, 125 (1977).

⁴The single exception is that a party may request the licensing board to permit the examination and cross-examination of expert witnesses by "a qualified individual [with] scientific or technical training or experience" 10 CFR 2.733. It should be noted that the party employing the technical interrogator, and his attorney, are nonetheless responsible for the manner in which the examination or cross-examination is conducted. *Ibid.*

with respect to time limits are we disposed to adopt a double standard which would excuse conduct on the part of nonlawyers which would not be tolerated in the case of lawyers. Thus, any future submissions by these intervenors which bear the same tone might well be stricken on this Board's own initiative. *Cf. Louisiana Power and Light Company* (Waterford Steam Electric Station, Unit 3), ALAB-121, 6 AEC 319 (1973).

The intervenors' motion to reopen is therefore accepted notwithstanding its inexcusable untimeliness; the merits of the motion are carried with the appeal from the Licensing Board's December 19, 1977, initial decision.¹

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

Concurring Opinion of Mr. Sharfman:

I join in the decision of the Board to defer consideration of the merits of the motion until disposition of the appeal and in most of its opinion. However, I deem it desirable to make a separate and supplementary explanation of my reasons for doing so.

The first question we face is whether intervenors have shown good cause for filing their motion late. Their reasons are stated in the unsworn motion papers signed by Dr. Kepford.¹ Like my colleagues, I have concluded that they are insufficient on their face. Unlike my colleagues, I think that in-

¹Mr. Rosenthal and Dr. Johnson do not necessarily subscribe to everything said in Mr. Sharfman's concurring opinion. They see no occasion, however, to elaborate on any areas of possible disagreement. The precise reasons for rejecting intervenors' excuse for late filing scarcely merit memorialization inasmuch as this Board has unanimously decided *not* to deny the motion to reopen on timeliness grounds. Nor is there any present need even to touch upon the standards which should control our ultimate disposition of the motion. The appropriate time for that will be when we announce our decision on reopening following the full evaluation of the existing record. As Mr. Sharfman himself recognizes, we will then be able to discuss and apply the governing standards in a concrete setting, rather than abstractly.

¹Our practice has not been to require an affidavit to support a motion for permission to file papers out of time. I have some doubt as to whether this is wise in the case of a nonlawyer such as Dr. Kepford, who is not subject to the ethical strictures of the Code of Professional Responsibility or to the disciplinary authority of the Bar.

tervenors deserve an explanation of our reasons for reaching that conclusion.

Shorn of their invective, the excuses offered by Dr. Kepford are as follows: He states that the engine of his automobile failed in January 1978, that he lacked sufficient money to repair it then, but that the 10 days he was spending in Virginia (which apparently coincided with the 10 days we gave him in which to prepare the written motion) "offered a place and opportunity to overhaul the engine."² During that period, he continues, it also became necessary to overhaul the engine of the car he was using in the interim. Upon his return to his home in Pennsylvania, "a major failure in the heating system left his residence without heat or hot water for nearly a week."³ Repairing this failure "fully occupied his time."⁴ As a result of these and other unspecified "time-consuming events," he was unable to meet the deadline which he erroneously describes as being April 10th.⁵

This story is insufficient to justify failure to meet the deadline. What happened in January is surely not relevant to a time period in March and April. Moreover, even if Dr. Kepford had no car at all while sojourning in Virginia between March 23rd and April 3rd, there is no reason why that should have prevented him from preparing his motion. All that was necessary was a typewriter and paper, not an automobile. Any papers he needed to refer to should have been with him when he came to this area for the oral argument. If they were not with him, he knew that at the time of the argument and should have objected then to the deadline set. He did not do so.⁶ Finally, by the time he returned home and was confronted by a broken heating system, his time had expired. Therefore, any time he might have had to spend repairing it is irrelevant.

Dr. Kepford assigns two other reasons for his tardiness. One is that we "created confusion by mentioning this matter in ALAB-465, but neglecting to specify any deadline." The other is that the transcript of the oral argument did not arrive at his home until April 8th. These reasons are equally lacking in merit.

In ALAB-465, we mentioned in a footnote that, "[a]t oral argument, intervenors were granted leave to file a motion to reopen the record on the emergency planning issue."⁷ We added that, "[s]hould such a motion be

²Motion, p. 4.

³*Ibid.*

⁴*Ibid.*

⁵It is clear that Dr. Kepford knew what the deadline was because, when he called our secretary on Friday, March 31st, he told her that he could not meet the Monday deadline and wanted an extension until Friday, April 7th.

⁶App. Tr. 112.

⁷7 NRC 377, 380 (March 27, 1978).

filed, we will, of course, promptly consider it”⁸ This footnote was designed to inform the Licensing Board of the possibility of a remand on another issue in the near future. It did not mention the deadline set for the filing of the motion because there was no necessity to do so. The deadline clearly was not revoked. There was nothing confusing about it, as is revealed by the fact that Dr. Kepford, in his call to us on March 31st, 4 days after we mailed ALAB-465 to his temporary Virginia address, showed that he understood that the deadline still applied and that he needed an extension of time.

Moreover, there is no showing by Dr. Kepford as to why he needed the transcript of oral argument in order to prepare his motion papers. He was the only advocate who discussed his motion at the argument. What he knew at the argument he knew thereafter.

The question, then, is why we should consider the motion at all. To say, as does the majority, that we should do so because the motion “is addressed to an important safety question” is not sufficient. It is entirely possible to have an insubstantial motion addressed to a substantial question. It seems to me that the correct criterion was set forth by us in *Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station)*, ALAB-138, 6 AEC 520, 523 (1973).⁹ We there stated that “a matter may be of such gravity that the motion to reopen may be granted notwithstanding that it might have been presented earlier.”¹⁰ The adequacy of the emergency planning is an issue which is pending before us on appeal. Until we analyze the evidence thoroughly, we will not be able to tell whether the matter raised by the motion is of sufficient gravity to warrant reopening despite the motion’s untimeliness and its defiance of our power to regulate the course of the proceeding.¹¹ Therefore, I would not state, as does the majority in the ordering paragraph of its opinion, that the motion is “accepted notwithstanding its inexcusable untimeliness” but merely that it is deferred pending our decision on the appeal.

⁸*Ibid.*

⁹Although, there, we were speaking of a motion to reopen “on new issues not previously considered” (*ibid.*), I see no reason to treat differently a motion to reopen for new evidence on old issues which were previously considered.

¹⁰Even in such a case, I don’t believe that we meant to imply that we are required to reopen, only that we have discretion to do so.

¹¹That defiance is expressed repeatedly at pp. 2-4 of the motion.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Michael C. Farrar
Richard S. Salzman

In the Matter of

Docket No. 50-341A

THE DETROIT EDISON
COMPANY

(Enrico Fermi Atomic
Power Plant, Unit No. 2)

May 9, 1978

The Appeal Board affirms the Licensing Board's decision (LBP-78-13, 7 NRC 583) to deny petition to intervene in antitrust proceeding on the ground that petitioner lacks standing to raise the antitrust issues which she wishes heard.

RULES OF PRACTICE: ANTITRUST HEARINGS

A public hearing on the antitrust aspects of a license amendment is not obligatory where the Attorney General does not recommend one.

RULES OF PRACTICE: STANDING TO INTERVENE

To decide if one has standing is to determine whether one has a right to have a dispute heard and decided by a particular tribunal. *Warth v. Seldin*, 422 U.S. 490 (1975).

RULES OF PRACTICE: STANDING TO INTERVENE

Two considerations govern standing: (1) the petitioner must show that his own interests may be injured by the challenged action and (2) the interest must lie within the zone of interests protected or regulated by the statute sought to be invoked.

ATOMIC ENERGY ACT: SCOPE OF ANTITRUST REVIEW

The Commission's writ to enforce the antitrust laws does not run to the electric utility industry generally. *Houston Lighting and Power Company* (South Texas Project, Units 1 and 2), CLI-77-13, 5 NRC 1303, 1312, fn. 8, 1316 (1977).

ATOMIC ENERGY ACT: SCOPE OF ANTITRUST REVIEW

The preservation and encouragement of competition in the electric power industry through "fair access to nuclear power" is the principal motivating consideration underlying Section 105c of the Atomic Energy Act. *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892, 1100 (1977).

ATOMIC ENERGY ACT: SCOPE OF INTERESTS PROTECTED

The Nuclear Regulatory Commission and its adjudicatory boards do not sit to supervise the general business decisions of the public utility industry nor to second-guess the judgment of those who do; that task is entrusted to others. *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-63 (1978).

RULES OF PRACTICE: DISCRETIONARY INTERVENTION

The test for permitting discretionary intervention is whether petitioner's participation would be likely to contribute significantly to the proceedings. *Portland General Electric Company* (Pebble Springs, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

RULES OF PRACTICE: DISCRETIONARY INTERVENTION

Where a hearing would be begun at the instance of an intervenor who does not allege injury in fact, there should be cause to believe that some discernible public interest will be served by the hearing. If petitioner cannot offer anything of importance, it is unlikely that any public interest would be furthered by commencing a hearing at her behest. *Tennessee Valley Authority* (Watts Bar, Units 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977).

Messrs. Eugene B. Thomas, Jr., Harry H. Voigt, and Patrick K. O'Hare, Washington, D.C., for the applicant Detroit Edison Company.

Mrs. Martha G. Drake, Petoskey, Michigan, petitioner *pro se*.

Messrs. Fredric D. Chanania and Joseph Rutberg for the Nuclear Regulatory Commission staff.

DECISION

I

Detroit Edison Company is constructing Unit 2 of the Fermi nuclear facility under a Commission permit obtained several years ago.¹ In May 1977, that large investor-owned utility applied to the Commission for an amendment to the permit to add as co-owners of the facility two generation and transmission rural electric cooperatives, Northern Michigan Electric Cooperative and Wolverine Electric Cooperative. The application was prompted by an agreement between Detroit Edison and those cooperatives which, contingent upon Commission approval, called for the latter's acquisition of a 20% undivided interest in Fermi Unit 2 (11.22% and 8.78%, respectively).

Northern Michigan is owned by and supplies the entire power needs of three Michigan cooperatives that distribute electricity at retail. Top O'Michigan is one of those distribution cooperatives. Among its members—and thus both an equity owner and ratepayer of it—is Mrs. Martha G. Drake.

Mrs. Drake is opposed to Northern Michigan's participation in the Fermi project for the asserted reason that it will visit economic harm upon the members of Top O'Michigan. To give expression to that opposition, she petitioned to intervene in the proceeding now being conducted by a Licensing Board on the public health and safety and environmental aspects of the application to amend the construction permit. Her petition was denied for lack of the requisite standing, and we recently affirmed that denial.²

That proceeding, however, does not involve the antitrust ramifications of transferring part ownership of the Fermi facility to Northern Michigan and Wolverine. (Under the Atomic Energy Act, hearings on such matters, where required, come before a separate antitrust licensing board constituted

¹See LBP-72-26, 5 AEC 120, *affirmed*, ALAB-77, 5 AEC 315 (1972).

²ALAB-470, 7 NRC 473 (April 26, 1978).

for the purpose.)³ On that score, the Commission sought the advice of the Attorney General. Noting, *inter alia*, that Northern Michigan expects its load to quadruple over the next 15 years, the Attorney General responded on September 30, 1977, that he discerned no antitrust problems that warranted a Commission antitrust hearing under Section 105c of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2235(c). A public hearing on the antitrust aspects of the application to amend the Fermi construction permit is not obligatory where the Attorney General does not recommend one.⁴ In accordance with established procedures, the Commission published the Attorney General's advice letter in the FEDERAL REGISTER, together with a notice of opportunity to petition for such a hearing and for leave to intervene if one were ordered.⁵

Mrs. Drake alone filed an intervention petition in response to this notice. In it she asserted essentially the same personal economic interest as had undergirded her endeavor to become a participant in the basic permit amendment proceeding. Her petition was referred in due course to a licensing board for consideration,⁶ where it was opposed both by Detroit Edison and the Commission's antitrust staff (none of the cooperatives answered). On April 7, 1978, the Board denied the petition. LBP-78-13, 7 NRC 583. What is now before us is Mrs. Drake's appeal from the April 7 order.

II

The opinion below gives careful consideration to Mrs. Drake's many arguments (which were forcefully presented, though she appears without counsel and is not specially versed in antitrust law). We need not review them all chapter and verse, for affirmance of the decision below is compelled as a matter of law: we agree with the Licensing Board's holding that Mrs. Drake lacks standing before this Commission to litigate the matters she wishes heard.⁷

To decide if one has "standing" (in the sense that concept is employed in the courts and this Commission) is to determine whether one has a right

³See *Public Service Company of Indiana* (Marble Hill Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-73 (1976).

⁴The circumstances in which a Section 105c antitrust hearing may be called for notwithstanding the Attorney General's advice that none is necessary are discussed in *Kansas Gas and Electric Company* (Wolf Creek, Unit 1), ALAB-279, 1 NRC 559, 565-66 (1975).

⁵42 Fed. Reg. 54894 (October 11, 1977).

⁶This Board was separate and distinct from the one hearing the nonantitrust aspects of the application. See fn. 3, *supra*, and the text which it accompanies.

⁷Detroit Edison also argued below that the Licensing Board lacked jurisdiction to entertain Mrs. Drake's petition because what is involved is an amendment to DE's license to build Fermi 2, not an "initial application" to construct or to operate the nuclear facility. DE reads Section 105c and the Commission's *South Texas* decision (see fn. 12, *infra*) to allow preclicensing an-

(Continued on next page.)

to have a dispute heard and decided by a particular tribunal.⁹ As the Licensing Board correctly held, two considerations govern: *first*, has the person shown that one of his own interests may be injured by the action he seeks to challenge, and, *second*, is that interest of a kind which lies within the "zone of interests" protected or regulated by the statute sought to be invoked (and which the tribunal is empowered to administer).⁹

The Licensing Board turned its decision on the remoteness of Mrs. Drake's alleged injuries from the licensing action before it. Declining to rule that "a ratepayer or consumer of electricity is necessarily beyond the scope of interests protected by §105,"¹⁰ the Board stressed instead that Mrs. Drake is a customer of neither Detroit Edison nor Northern Michigan. On this basis it held that her complaints as a ratepayer of a utility purchasing electricity from the latter do not allege any injury arguably related to activities under the NRC license, much less demonstrate how licensing the two cooperatives to own a portion of the nuclear plant could create or maintain a situation inconsistent with the antitrust laws specified in Section 105c.¹¹

While we agree that Mrs. Drake lacks standing to intervene in this proceeding, we prefer to rest on a slightly different ground. Petitioner seeks to invoke the Commission's antitrust jurisdiction. That jurisdiction is not plenary, however; the Commission's writ to enforce the antitrust laws does not run to the electric utility industry generally.¹² Neither does it reach all actions by utilities that generate electricity with nuclear-powered facilities. Rather, Congress authorized this Commission to condition nuclear power plant licenses on antitrust grounds only where necessary to insure that the activities so licensed would neither create nor maintain situations inconsistent with the antitrust laws.¹³ The reason for the grant, as the Commission

(Continued from previous page.)

titrust review only in conjunction with those two licensing actions. The Board below (agreeing with the staff) held that an amendment of an existing license to add new owners was an "initial application" insofar as they were concerned; hence, prelicensing antitrust review was required and the Board was authorized to entertain the petition. LBP-78-13, 7 NRC at 587-589. The question is one of jurisdiction and thus a threshold we must pass before we may reach Mrs. Drake's petition. Detroit Edison does not renew its argument on appeal, however. It is therefore sufficient simply to note our essential agreement with the decision below on this point.

⁹Warth v. Seldin, 422 U.S. 490 (1975).

¹⁰Data Processing Service v. Camp, 397 U.S. 150, 153 (1970); Sierra Club v. Morton, 405 U.S. 727 (1972); Portland General Electric Company (Pebble Springs, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

¹⁰LBP-78-13, *supra*, 7 NRC at 592-593.

¹¹*Id.* at 593.

¹²See *Houston Lighting and Power Company* (South Texas Project, Units 1 and 2), CLI-77-13, 5 NRC 1303, 1312, fn. 8, 1316 (1977) (appeal pending).

¹³Atomic Energy Act of 1954, as amended, Section 105c, 42 U.S.C. §2235 (c).

has explained, was "a basic Congressional concern over access to power produced by nuclear facilities," because the industry was nurtured by public funds and the legislature was anxious that nuclear power "not be permitted to develop into a private monopoly via the [NRC] licensing process."¹⁴ Put another way, the preservation and encouragement of competition in the electric power industry through "fair access to nuclear power" is the principal motivating consideration underlying Section 105c of the Atomic Energy Act.¹⁵

Mrs. Drake's interest is not of this stripe; indeed her concerns are quite the opposite. As she sees it, Detroit Edison (assertedly in conjunction with another large investor-owned Michigan public utility) has not sought to keep nuclear power away from her cooperative. She alleges, rather, that in violation of the antitrust laws, those private utilities used their "*monopoly powers . . . to force [the cooperatives] into buying [part of the Fermi nuclear plant] because DE and CP could not finance it any other way. This is the crux of petitioner's argument*" (emphasis in original).¹⁶

Mrs. Drake may or may not be correct in her allegations; for purposes of her petition and this appeal we must accept them.¹⁷ But doing so cuts against her. They place beyond dispute that her asserted injuries stem from sources unrelated to the denial of access to, or competitive advantage flowing from, the use of nuclear power. Boiled down, Mrs. Drake's arguments amount to dissatisfaction with the cooperatives' management decision to satisfy an expected need for more baseload power by acquiring part of the Fermi nuclear plant. She would prefer some other course; she fears this one will raise her electrical rates inordinately.

But the Nuclear Regulatory Commission and its adjudicatory boards do not sit to supervise the general business decisions of the public utility industry nor to second-guess the judgment of those who do; that task is en-

¹⁴*Louisiana Power and Light Company* (Waterford, Unit No. 3), CLI-73-25, 6 AEC 619, 620 (1973).

¹⁵*Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892, 1100 (1977). Mrs. Drake cites the *Midland* antitrust decision as support for her petition to intervene. Unfortunately, she has misread it. To begin with, Detroit Edison was not a party to that proceeding. Obviously, then, it was not held by us to have violated any laws, as she suggests. Second, a key complaint of the cooperatives in *Midland*—including both Northern Michigan and Wolverine—was that the utility would *not* sell them a share of its Midland nuclear plant. It was *failure* to provide a reasonable access to nuclear power which entitled the cooperatives to invoke the Commission's antitrust jurisdiction. To read *Midland* as supporting Mrs. Drake's petition is to stand that decision on its head. See 6 NRC at 1094-98 (Part VIII, "Nexus").

¹⁶Mrs. Drake's brief on appeal (dated April 14, 1978), page 5.

¹⁷See *Florida Power and Light Company* (St. Lucie, Unit 2), ALAB-420, 6 NRC 8, 13 (1977) (appeal pending); *Wolf Creek*, *supra*, ALAB-279, 1 NRC at 562.

trusted to others.¹⁸ Injuries from those causes are beyond the zone of interests that Section 105c of the Atomic Energy Act was designed to protect or regulate. Accordingly, the decision of the Licensing Board denying Mrs. Drake's petition to intervene and for an antitrust hearing must be *affirmed*.¹⁹

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹⁸See *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-163 (February 14, 1978).

¹⁹There remains whether Mrs. Drake should be permitted to intervene as a matter of discretion. The test is whether her participation would be likely to contribute significantly to the proceedings. *Pebble Springs, supra*, CL1-76-27, 4 NRC at 612, 617; *Nuclear Engineering Company* (Sheffield Waste Disposal Site), ALAB-473, 7 NRC 737 (May 3, 1978). Without a successful petition to intervene as of right, there is no automatic antitrust hearing under Section 105c when the Attorney General does not recommend one and the Commission has not ordered one on its own. What we said in *Watts Bar* applies here: "Certainly, before a hearing is triggered at the instance of one who has not alleged any cognizable personal interest in the operation of the facility, there should be cause to believe that some discernible public interest will be served by the hearing. If the petitioner is unequipped to offer anything of importance bearing upon [the subject matter], it is hard to see what public interest conceivably might be furthered by nonetheless commencing a hearing at his or her behest." *Tennessee Valley Authority* (Watts Bar, Units 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977). We agree with the Licensing Board that petitioner lacks the background and training to prosecute a complex antitrust proceeding. See 7 NRC at 594-95.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal Chairman
Dr. John H. Buck
Richard S. Salzman

In the Matter of

Docket Nos. 50-452
50-453

THE DETROIT EDISON
COMPANY

(Greenwood Energy Center,
Units 2 and 3)

May 11, 1978

The Appeal Board affirms the grant of an inexcusably late petition to intervene.

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Because 10 CFR 2.714(a) confers broad discretion upon licensing boards in applying the four factors included therein to late intervention petitions, appellate review is limited to determining whether there has been an abuse of that discretion. *Public Service Company of Indiana* (Marble Hill, Units 1 and 2), ALAB-339, 4 NRC 20, 24 (1976); *Virginia Electric and Power Company* (North Anna Power Station, Units 1 and 2), ALAB-342, 4 NRC 98, 107 (1976).

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Among the four factors in 10 CFR 2.714(a) applicable to nontimely intervention petitions, the delay factor is extremely significant: the later the petition to intervene, the greater the potential that the petitioner's participation will drag out the proceeding.

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Only that delay which can be attributed directly to the tardiness of the

petition to intervene is to be taken into account in applying the fourth (delay) factor in 10 CFR 2.714(a). *Long Island Lighting Company* (Jamesport, Units 1 and 2), ALAB-292, 2 NRC 631, 650, n. 25 (1975).

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Petitioner's inexcusable tardiness is not cause to bar intervention where intervention will cause no delay and the other three factors of 10 CFR 2.714(a) do not weigh heavily in favor of rejection.

RULES OF PRACTICE: CONSOLIDATION

To the extent that two intervenors advance substantially the same interest and raise substantially the same questions, the Licensing Board is free to consolidate their presentation of evidence, cross-examination, briefs, proposed findings of facts, and conclusions of law and argument. 10 CFR 2.715(a).

Mr. Harry H. Voigt, Washington, D.C., for the applicant Detroit Edison Company.

Dr. Robert G. Asperger, Midland, Michigan, for the Citizens for Employment and Energy.

Mr. David A. Kubichek for the Nuclear Regulatory Commission staff.

DECISION

In ALAB-472, 7 NRC 570 (April 28, 1978), we dismissed applicant's appeal from an unpublished April 3 order entered in this construction permit proceeding involving Units 2 and 3 of the Greenwood nuclear facility. The applicant had construed that order as granting the petition of Citizens for Employment and Energy (CEE) for leave to intervene in the proceeding. We concluded, however, that the order did not have that effect. More specifically, although the Board below had decided both that CEE had established its standing and that the petition should not be denied because untimely, no ruling had been made on whether the contentions requirement in the Commission's intervention rule (10 CFR 2.714(a)) had been satisfied. Rather, that question had been left open for later resolution. See ALAB-472, *supra*, 7 NRC at 571.

The Licensing Board has now determined that the CEE petition does assert at least one acceptable contention and, on the strength of that determination, has granted leave to intervene.¹ Accordingly, the applicant renews its appeal under 10 CFR 2.714a. The sole issue presented is whether the Licensing Board should have denied the petition as too late.

1. There is no question that the CEE petition was very late. The notice of hearing on the Greenwood construction permit application was published on October 30, 1973, and fixed November 30, 1973, as the deadline for filing intervention petitions. 38 Fed. Reg. 29908. Yet the CEE petition was not filed until July 6, 1976—more than 2-1/2 years thereafter.

Moreover, the excuse tendered by CEE for its inaction over such a protracted period was patently insubstantial. We need not burden this opinion with a detailed discussion on the point. It suffices to say that CEE gave the Licensing Board no cause to conclude either that the organization was unable to file the petition at a much earlier date or that there were circumstances which conceivably might have justified its choice to rest on its oars for so long.

2. The question thus becomes whether intervention was nonetheless warranted on an application of the four factors specifically enumerated in 10 CFR 2.714(a):

- (1) The availability of other means whereby the petitioner's interest will be protected.
- (2) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (3) The extent to which petitioner's interest will be represented by existing parties.
- (4) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.²

The Licensing Board answered this question affirmatively in its April 3 order.³

In confronting a petition as late as this one, it is natural to focus at once

¹Board order of May 1, 1978 (unpublished).

²See *Nuclear Fuel Services, Inc.* (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975); *Duke Power Company* (Perkins Nuclear Station, Units 1, 2, and 3), ALAB-431, 6 NRC 460, 462 (1977); *Metropolitan Edison Company* (Three Mile Island Nuclear Station, Unit 2), ALAB-384, 5 NRC 612, 615 (1977).

³The Board did not set forth its reasoning, beyond the notation that the NRC staff had "correctly analyzed the situation" in a filing on September 3, 1976, and that it concurred with the staff that "mitigating factors warrant the acceptance of the nontimely petition" (April 3 order, pp. 1-2). We regard this explanation as too cryptic. In *West Valley*, CLI-75-4, *supra*, 1 NRC at 275, the Commission indicated that 10 CFR 2.714(a) confers "broad discretion" upon

(Continued on next page.)

upon the fourth factor—that of the delay in the progress of the proceeding which might result if the petition were granted. We have previously stressed the significance which attaches to the delay factor in striking a balance on all four.⁴ Manifestly, the later the petition, the greater the potential that the petitioner's participation will drag out the proceeding.

As it turned out, however, such is not the case here. In November 1974—some 18 months before the CEE petition was filed—Detroit Edison voluntarily halted all activities in connection with its Greenwood application because at the time it was unable to finance the construction of the facility.⁵ As late as last November, “the engineering and licensing effort” in connection with the project was still in a state of suspension; the applicant's prediction then being that that effort would resume in January of this year.⁶ That the applicant in fact had entirely laid the Greenwood application to one side is graphically illustrated by its response on December 22, 1976, to CEE's motion to the Licensing Board “to act affirmatively” on the intervention petition. In urging the Board to deny the motion, the applicant represented (at p. 2) that it “still does not have technical personnel assigned to the Greenwood project necessary to enable [it] to respond on the merits to CEE's original petition to intervene and various amendments thereto.” Thus, according to the applicant itself, “[w]ere [the Licensing] Board to take action now on CEE's petition, [a]pplicant would be denied the opportunity to make a complete response prior to the Board's ruling.”

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licensing boards in the application of the four factors to late intervention petitions. Consequently, appellate review is limited to determining whether there has been an abuse of that discretion. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-339, 4 NRC 20, 24 (1976); *Virginia Electric and Power Company* (North Anna Power Station, Units 1 and 2), ALAB-342, 4 NRC 98, 107 (1976). In light of these considerations, it is most important—especially where gross and inexcusable tardiness is involved—that the Board do more than simply announce its adoption of the analysis of one of the parties without even illumining the ingredients of that analysis. Indeed, when given as little as the Board itself provided here, we may be compelled to lay aside the normal rule regarding scope of review in favor of *de novo* consideration of the matter.

⁴See *Long Island Lighting Company* (Jamesport Nuclear Power Station, Units 1 and 2), ALAB-292, 2 NRC 631, 650-51 (1975) (opinion of Mr. Rosenthal speaking for the entire Board on the point); *Project Management Corporation* (Clinch River Breeder Reactor Plant), ALAB-354, 4 NRC 383, 394-95 (1976).

⁵See June 30, 1976, letter from the applicant's counsel to the Licensing Board.

⁶See November 30, 1977, letter from the applicant's counsel to the Licensing Board at p. 2.

⁷The Licensing Board denied the CEE motion on December 29, 1976. CEE's attempt to obtain review by us was unsuccessful. ALAB-376, 5 NRC 426 (1977). We did suggest that the Board might wish to reexamine its December 29 order “from the standpoint of whether the avoidance of possible later delay might constitute an adequate reason for ruling on the intervention petition at this juncture.” *Id.* at 429. Upon such reconsideration, the Board apparently adhered to its prior view that there was no need to act on the petition until there was some concrete indication that the applicant was prepared to resume the licensing process.

In these circumstances, it is small wonder that the applicant explicitly disclaims any assertion that "granting intervention will . . . delay any presently scheduled hearings" (although it does urge, without elaboration, that "CEE's participation will surely broaden the issues and delay the hearings once they are resumed").⁸ What we do find surprising, however, is that, having elected (albeit doubtless for good and sufficient business reasons) to have the *Greenwood* proceeding placed in limbo for years, the applicant is heard to complain at all of the CEE's belated arrival on the scene. Be that as it may, the proceeding still being at an incipient stage by reason of the applicant's own choice, we are hesitant to take CEE's lateness as enough cause to bar its participation. Indeed, it would be patently inequitable to do so unless it were clearly to appear that the three other factors weigh heavily in favor of rejecting the petition.

It does not so appear. The applicant expressly eschews any argument that there are other available means by which CEE might protect the concededly cognizable health and safety concerns of those of its members who reside in close proximity to the plant.⁹ But we are told that there is a "strong interlocking relationship" between CEE and the Detroit Area Coalition for the Environment (DACE), which was granted intervention some time ago. To the applicant's mind, "[t]hat relationship suggests that DACE is capable of representing any CEE interest that might evolve into acceptable contentions." Assuming this to be true, however, the record does not disclose sufficient identity between the two organizations to compel the inference that DACE necessarily will exercise that capability on CEE's behalf. To the extent that CEE and DACE may advance "substantially the same interest [and] raise substantially the same questions," the Licensing Board will be free, of course, "to consolidate their presentation of evidence, cross-examination, briefs, proposed findings of fact, and conclusions of law and argument." 10 CFR 2.715a.

⁸The applicant's use of the word "resumed" is misleading in light of the fact that, insofar as we are aware, there have been *no* evidentiary hearings to date. Moreover, we do not understand why CEE participation would necessarily broaden the issues. To this point at least, only one of its contentions has been admitted to the proceeding. That contention is addressed to the applicant's ability "to raise the requisite funds to construct [the Greenwood] units." See Licensing Board order of May 1, 1978, at pp. 2-3. This financial qualifications question will, of course, be before the Licensing Board for resolution whether or not CEE is a party. Leaving that consideration aside, only that delay which can be attributed directly to the tardiness of the petition is to be taken into account in applying the fourth factor. *Jamesport*, ALAB-292, *supra*, 2 NRC at 650, fn. 25. Inasmuch as there appears to be no present certainty respecting when the *Greenwood* hearings will commence, it scarcely can be seriously claimed that the lateness of the CEE petition might itself be a source of delay.

⁹As the Licensing Board noted in both its April 3 and May 1 orders, those concerns were developed in affidavits furnished by four such CEE members.

What this leaves is the second factor. CEE claimed below that the technical expertise of many of its members will be brought to bear on the issues it desires to raise and will be of assistance in the development of a sound record. The applicant's response is that CEE has supplied no bill of particulars to support that broad claim. The applicant is right about that, and had the balance struck on the other factors been close, we might well have found that consideration dispositive. But, to repeat, that balance cannot be so characterized without blinking the reality that the proceeding became dormant long before, and remained dormant long after, the CEE petition was filed. Taking all factors into proper account, it is *this* consideration which is determinative here.

The Licensing Board order under appeal is *affirmed*.¹⁰
It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

Opinion of Dr. Buck, dissenting:

Notwithstanding the fact that this licensing proceeding has been in a state of suspension for several years, I would deny the grossly tardy CEE petition. There is absolutely nothing to indicate that CEE is prepared or able to make a substantial contribution to the development of the record on any issue. Beyond that, the relationship between DACE and CEE appears to be much closer than my colleagues indicate.

The early papers (November 26, 1973) for DACE were signed by Robert Magnusson who presented an affidavit to show that he was then Chairperson of DACE. Similarly, the initial papers presented by CEE (dated July 6, 1976) were signed by Robert Philip who later (October 5, 1976) presented an affidavit to the effect that "[he] is authorized by CEE and its members to act in their behalf" However, in July 1975 a Robert G. Asperger

¹⁰After full examination of the applicant's appellate papers and the underlying record, we informally advised the staff that it need not reply unless it proposed to support the appeal. The staff thereupon decided to waive a response. CEE had previously submitted an opposition to the appeal.

began to sign papers¹ for DACE, and beginning December 12, 1977, the same Robert Asperger has signed all of the papers submitted by CEE.² It must also be noted that the contention so far accepted by the Licensing Board for CEE concerns the financial qualifications of the applicant just as did DACE's motion of July 29, 1975, signed by Dr. Asperger (see fn. 1).

From this record I am persuaded that, as they now stand, DACE and CEE (both apparently represented by Dr. Asperger) are essentially one and the same organization and that their interests are inseparable. I would therefore reverse the Licensing Board and deny admission to CEE as a party to this proceeding.

My colleagues disagree and would affirm. They do call attention, however, to 10 CFR 2.715a, which authorizes licensing boards to order the consolidation of parties who have substantially the same interest and raise substantially the same questions. I think there almost certainly will be ample warrant for resort to that authority and trust that the Licensing Board will give the most serious consideration to doing so. Otherwise, the sole probable result of allowing CEE now to intervene will be an unjustified protraction of the proceeding.

¹DACE's Motion to Find Applicant Wanting in Fiscal Soundness (July 29, 1975).

²I find nothing in the record that the members of either DACE or CEE have authorized Dr. Asperger to represent them.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

Docket No. STN 50-482

KANSAS GAS AND ELECTRIC
COMPANY

KANSAS CITY POWER
AND LIGHT COMPANY

(Wolf Creek Generating
Station, Unit No. 1)

May 17, 1978

The Appeal Board denies a petition for reconsideration of ALAB-462, 7 NRC 320 (1978).

MOTION FOR RECONSIDERATION: RAISING MATTERS FOR THE FIRST TIME

An appellant is not entitled to raise on petition for reconsideration a matter which was not placed in contest either before the Licensing Board or on appeal. *Tennessee Valley Authority* (Hartsville Plant, Units 1A, 2A, 1B, 2B), ALAB-467, 7 NRC 459, 462 (1978).

MOTION FOR RECONSIDERATION: RAISING MATTERS FOR THE FIRST TIME

Where a party raises a matter at the inception of the proceeding but does not pursue it further until after the appeal from the decision dealing with that matter has been determined, the party cannot raise that matter on a motion for reconsideration.

RULES OF PRACTICE: PETITION TO REOPEN THE RECORD

Where new material comes to light between the time a party files its brief on appeal and the time of the appellate decision, the party may seek leave to submit a supplemental brief or move to reopen the record.

NEED FOR POWER: FORECASTING FUTURE DEMAND

Given the substantial margin of uncertainty inherent in load demand forecasts, a 2-year difference in demand forecasts is insufficient to defeat the permit application. *Niagara Mohawk Power Corp.* (Nine Mile Point, Unit 2), ALAB-264, 1 NRC 347, 365 (1975).

Mr. Jay E. Silberg, Washington, D.C., for the applicants, Kansas Gas and Electric Company and Kansas City Power and Light Company

Mr. William H. Ward, Shawnee Mission, Kansas, for the intervenor, Mid-America Coalition for Energy Alternatives.

Mr. Stephen H. Lewis for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Intervenor Mid-America Coalition for Energy Alternatives (Coalition) has petitioned for reconsideration of ALAB-462,¹ in which we affirmed both the partial and the ultimate initial decisions of the Licensing Board² in this construction permit proceeding involving Unit No. 1 of the Wolf Creek Generating Station. The petition is primarily a rehearsal of arguments which were previously advanced by the Coalition and, upon full consideration, rejected in ALAB-462. We did, however, call for replies on two matters raised in the petition which appeared to warrant further examination.³ On a close scrutiny of all of the papers now before us, we conclude that there is no occasion to disturb the result reached in ALAB-462. Accordingly, the petition for reconsideration must be denied.

¹7 NRC 320 (March 9, 1978).

²LBP-77-3, 5 NRC 301 (1977) and LBP-77-32, 5 NRC 1251 (1977), respectively.

³See unpublished order of April 10, 1978.

1. In the course of the discussion in ALAB-462 of the need for the power to be generated by the Wolf Creek facility, we took note of the testimony indicating that "[e]lectric power generally does not represent a major cost factor in most industrial plants and commercial establishments," with the consequence that "those concerns may not be so ready to alter drastically their mode of operation to accomplish savings in electricity costs." 7 NRC at 332. The Coalition tells us (petition, p. 5) that the record additionally reveals that the Vulcan Materials Company accounts for 10.18% of the retail sales of the applicant Kansas Gas and Electric Company (and as such is KG&E's largest retail customer); that Vulcan "for years" has unsuccessfully sought to be provided with an interruptible rate; and that, upon being apprised of these facts, the Licensing Board should have explored "the potential for load reduction implicit therein."

Both the applicants and the NRC staff insist that it is now too late for the Coalition to put forward this assertion. By way of elaboration, the applicants stress (1) that the Coalition had raised below but had not pressed a contention (I-21(f)) dealing with interruptible rates; and (2) that no exception was taken by the Coalition to the Licensing Board's findings in its partial initial decision to the effect that interruptible rates would not reduce the need for the Wolf Creek facility (LBP-77-3, *supra*, 5 NRC at 363-64).

We recently observed that an appellant is not entitled to raise on petition for reconsideration a matter which was not placed in contest either before the Licensing Board or on its appeal to us. *Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, 2B), ALAB-467, 7 NRC 459, 462 (April 19, 1978). This principle is equally applicable where, although raising the matter at the inception of the proceeding, the party then does not pursue it further until after the appeal from the Licensing Board's decision has been determined. There being not even an attempt by the Coalition to explain its lack of prior and timely action on the interruptible rate point, no good reason exists why it should be permitted to come forward with the point at this juncture.

These considerations aside, however, the Coalition has given us no basis to think that, were Kansas Gas and Electric now to make an interruptible rate available to Vulcan, the Wolf Creek facility might not be needed. As the staff correctly observes, this would depend upon, *inter alia*, the answers to such questions as (1) what is Vulcan's contribution to Kansas Gas and Electric's *peakload*; (2) what portion of that contribution is amenable to interruptible service; and (3) what is the relationship between Vulcan's expenditures for electric power and that company's total costs of operation. The record at hand is of no help on any of these questions. The Coalition cannot, of course, be heard to complain about the fact. In the hearings below, it had every chance to explore the subject (e.g., through cross-examination of the applicants' witnesses). But, to repeat, it apparently

decided not to press the interruptible service issue at all.

Although the matter justifiably might be left at that, the applicants have supplied us with the affidavit of W.K. Woolery, the Director of Marketing Services for Kansas Gas and Electric. Mr. Woolery, who was a witness below, stated that Vulcan had sought interruptible or peak-shaving service only for a portion of its entire plant load and that, in 1977, that portion would have represented between 0.42% and 0.84% of KG&E's total peakload. For this and other reasons touched upon in the affidavit, Mr. Woolery believes that the honoring of the Vulcan request would not significantly affect the need for Wolf Creek power. Viewed in its entirety, the prevailing record on the need for power issue (summarized in ALAB-462, 7 NRC at 326-331) provides little cause to disagree with that appraisal.⁴

2. The Coalition's second point requiring discussion (beyond that contained in ALAB-462) also relates to the need for the power to be generated by Wolf Creek. In ALAB-462, we make several references to the applicants' forecast of a 5.3% annual growth rate for peakload demand between 1974 and 1983. 7 NRC at 329, 330, 331. The Coalition maintains (petition, p. 10) that the 5.3% figure should not have been employed because it rested in part on demand growth projections for the Kansas City Power and Light Company which later had been revised downward (to approximately 4-1/4% per year).

The revision had come to light below subsequent to the rendition of the Licensing Board's partial initial decision in January 1977 (LBP-77-3, *supra*), albeit prior to the issuance 4 months later of the ultimate initial decision (LBP-77-32, *supra*). See Tr. 5791-97, 5868-69. It had prompted an oral motion by the Coalition to reopen the record on need for power (Tr. 5973-74), which was denied by the Licensing Board in a written order entered on April 27, 1977. The Board assigned two reasons for its refusal to reopen: (1) it had lost jurisdiction over the need for power issue when the partial initial decision (which dealt with that issue) had been appealed to us; and (2) "long and involved proceedings will always be accompanied by

⁴The Coalition availed itself of the opportunity provided it to respond to that affidavit. See our unpublished order of May 1, 1978. The response does not challenge the factual assertions in the affidavit. Rather, the Coalition offers the speculation that Vulcan might have sought interruptible service with regard to a much larger portion of its plant load had it not been for Kansas Gas and Electric Co.'s "consistent intransigence on the subject, and . . . pending huge construction program." We would not be justified in indulging in such conjecture. Nor, in all the circumstances, do we share the Coalition's apparent belief that the staff was under a duty to make an independent investigation into whether the potential for reducing Vulcan peakload demands had been fully realized. Indeed, the claim along that line has an especially hollow ring given the fact that the Coalition essentially abandoned its interruptible service contention below and, in any event, did not endeavor to focus attention upon Vulcan's particular situation (or that of any other large customer of KG&E).

changes in figures and costs which, if not completely overwhelming of a prior presentation of evidence, must be rejected in order to adjudicate the record once prepared" (citing *ICC v. Jersey City*, 322 U.S. 503, 514 (1944)). See April 27, 1977, order, pp.2-3.

At no time prior to the filing of its petition for reconsideration did the Coalition ask us to overturn the Board's ruling. Further, the petition appears to be the first occasion on which the Coalition has sought to bring the revised KCP&L demand growth projection to our notice. True, the Coalition's brief on its appeal from the partial initial decision had been filed in February 1977—i.e., more than 2 months before the Licensing Board acted on the motion to reopen. There was nothing, however, to preclude the Coalition from later seeking leave to submit a supplemental brief. Moreover, as appears from ALAB-424, 6 NRC 122, 128 (1977), the Coalition in June 1977 employed the mechanism of a motion to reopen the record to apprise us of a development in April 1977 which assertedly bore upon another of the questions considered and determined in the partial initial decision. (That motion was entertained by us and later denied in ALAB-462, 7 NRC at 337-339.)

In short, in common with the interruptible rate matter, the revised KCP&L demand growth projection was not placed before us in a timely fashion. Nevertheless, here too we have chosen not to rest our disposition of the petition for reconsideration on that consideration alone. Instead, we have gone on to examine the merits of the Coalition's present claims. Such examination does not persuade us that construction of the Wolf Creek facility must now be found unwarranted. Even were the revised demand growth projection to be applied to Kansas Gas and Electric as well, the most that might be said is that the plant will not be needed any earlier than 1984, rather than in 1982. See LBP-77-3, *supra*, 5 NRC at 355. Given the substantial margin of uncertainty inherent in load demand forecasts, however, this possible 2-year difference is insufficient to defeat the permit application. *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 365 (1975). That conclusion is reinforced by the testimony of one of the Coalition's own witnesses to the effect that, even should the plant not be needed until 1990, there still might be a net benefit to consumers were it to be placed on line in 1982 and operated at capacities in excess of 55%. See ALAB-462, 7 NRC at 332, fn. 26.⁵

⁵For the purposes of this discussion we have disregarded the affidavit of Donald T. McPhee, Vice-President of Kansas City Power and Light Company for System Power Operations, which was also appended to the applicants' response to the petition for reconsideration. We note merely that the McPhee affidavit, which deals essentially with developments since March 1977, contains no concessions which might be thought to counter the ultimate conclusion on need for power announced in ALAB-462.

The petition for reconsideration is *denied*.
It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Richard S. Salzman

In the Matter of

Docket Nos. STN 50-491
STN 50-492
STN 50-493

DUKE POWER COMPANY

(Cherokee Nuclear Station,
Units 1, 2, and 3)

May 17, 1978

The Appeal Board permits the staff and applicant to file supplemental briefs for the limited purpose of showing whether the staff's exceptions to LBP-77-14, 6 NRC 1314 (1977), have operative significance insofar as the design, construction, or operation of the facility is concerned and hence should be entertained.

APPEAL BOARD: ADVISORY OPINIONS

Only where a party is aggrieved by, or dissatisfied with, the action taken below and invokes the Appeal Board's appellate jurisdiction to change the result are exceptions permitted to be filed. *Public Service Company of Indiana* (Marble Hill, Units 1 and 2), ALAB-459, 7 NRC 179, 202 (1978).

Messrs. J. Michael McGarry III, Washington, D.C.,
and **William L. Porter**, Charlotte, North Carolina, for
the applicant Duke Power Company.

Messrs. Charles A. Barth and **Richard C. Browne** for
the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Pending before this Board are certain exceptions filed by the NRC staff to the December 30, 1977, partial initial decision of the Licensing Board in

this construction permit proceeding. LBP-77-74, 6 NRC 1314. All briefs relating to those exceptions have now been filed.

An examination of the papers on file suggests to us that the exceptions are not addressed to anything determined by the Licensing Board which might possibly have operative significance insofar as to the design, construction, or operation of the Cherokee facility is concerned.¹ In this circumstance, it is unclear to us why they should be entertained at all. An appeal lies from the *decision* of the Licensing Board, not its *opinion*; it is the Board's orders (the administrative equivalent of a judgment) which are subject to appellate review. "Only where a party is aggrieved by, or dissatisfied with, the action taken below and invokes our appellate jurisdiction to change the result need exceptions be filed—or are they permitted." *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 202 (February 16, 1978).

The present state of our docket is such that we have every reason to give full effect to these principles and, thus, to confine our attention to those findings and conclusions of the Licensing Board which have practical import in the particular proceeding at bar. Nonetheless, we cannot entirely exclude the possibility that, although not readily discernible from what has been so far told us by the staff, there are special considerations which might dictate a different course here. Accordingly, we are now providing the staff with an opportunity to file a supplemental memorandum *on or before May 30, 1978*, for the limited purpose of bringing any such considerations to our attention. The applicant may file a response within 10 days of service of the memorandum upon it.

It is so ORDERED.

FOR THE APPEAL BOARD

Margret E. Du Flo
Secretary to the Appeal Board

¹This appears to be so even with regard to the staff's dissatisfaction with the Licensing Board's use of the phrase "anchored to bedrock" in paragraph 59 of the decision, 6 NRC at 1329. In any event, because the applicant agrees that the phrase "founded on bedrock and/or fill concrete" would be more accurate, if found warranted the requested substitution in phraseology might be made in the course of this Board's *sua sponte* review of the operative portions of the decision below.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Richard S. Salzman, Chairman
Dr. John H. Buck
Michael C. Farrar

In the Matter of

Docket No. 50-471

BOSTON EDISON COMPANY,
et al.

(Pilgrim Nuclear Generating
Station, Unit 2)

May 25, 1978

The Appeal Board affirms LBP-77-66, 6 NRC 839 (1977), denying applicants' request for a limited work authorization.

NEPA: CONSIDERATION OF ALTERNATIVES

NEPA requires the Commission to consider whether reasonable alternatives less harmful to the environment exist before allowing a utility to proceed with construction of a nuclear power plant and, if they do exist, to decide if the utility's proposal should be modified or rejected in light of their relative costs and environmental benefits.

NEPA: CONSIDERATION OF ALTERNATIVES

An applicant's proposed site for a nuclear facility is acceptable if, after giving each reasonable alternative a "hard look," none is found obviously superior to it. *Public Service Company of New Hampshire* (Seabrook Station), CLI-77-8, 5 NRC 503, 530, fn. 30 (1977); *Kleppe v. Sierra Club*, 427 U.S. 390, 410, fn. 21 (1976).

NEPA: CONSIDERATION OF ALTERNATIVES

To satisfy NEPA, an agency must provide a detailed, thoughtful analysis drawn from adequate data so that a reviewing body can decide ob-

jectively whether alternative courses of action realistically open were fairly assessed.

NEPA: FINAL ENVIRONMENTAL STATEMENT

Where other agencies' comments on a draft environmental impact statement disclose new or conflicting data or opinions, those comments must be analyzed and fairly considered. *Silva v. Lynn*, 482 F.2d 1282, 1285 (1st Cir. 1973).

NEPA: FINAL ENVIRONMENTAL STATEMENT

Because the final environmental impact statement must accompany the proposal through the existing agency review process, inadequacies in the FES may be cured in some (but not all) circumstances at the next stage of Commission review, *i.e.*, at the licensing board hearing.

NEPA: CONSIDERATION OF ALTERNATIVES

The "obviously superior" test for comparing alternative sites comes into play after those alternatives have been identified and properly explored.

NEPA: CONSIDERATION OF ALTERNATIVES

Summary rejection of alternative sites (except those obviously unsuitable) on the basis of hypothetical or generalized considerations is not permissible.

NEPA: CONSIDERATION OF ALTERNATIVES

The staff's most important environmental task is determining whether an application should be rejected because the plant ought to be built elsewhere.

LICENSING BOARD: RESOLUTION OF ISSUES

In contested proceedings, a board is expected to go beyond resolving the litigants' contentions and assure itself, by inquiry into areas where it perceives problems, that the staff's review has been adequate.

NEPA: CONSIDERATION OF ALTERNATIVES

In the absence of a satisfactory analysis of alternatives by the staff, the board may decline to accept an applicant's alternate site comparison as a

substitute; under NEPA, the applicant's analysis alone is not adequate as a review of alternatives. *Texas Utilities Generating Company* (Comanche Peak, Units 1 and 2), ALAB-260 1 NRC 51, 55 (1975).

Mr. George H. Lewald, Boston, Massachusetts, argued the cause for the applicants, Boston Edison Company and others, *appellants*; with him on the brief was **Mr. Dale G. Stoodley**, Boston, Massachusetts.

Special Assistant Attorney General of Massachusetts **Ellyn R. Weiss**, Washington, D.C., argued the cause and filed a brief for intervenor Commonwealth of Massachusetts, *appellee*.

Mr. Milton Grossman argued the cause for the Nuclear Regulatory Commission staff; **Messrs. Richard C. Browne** and **Barry H. Smith** and **Ms. Marcia E. Mulkey** were on the briefs.

DECISION

On the ground that the "Staff's evaluation of alternate sites is inadequate," the Licensing Board denied the applicants permission to start preliminary construction work on Unit 2 of the Pilgrim Nuclear Generating Station. LBP-77-66, 6 NRC 839, 845 (1977). The applicants and the staff challenge that ruling, and their appeals bring the decision before us. The Commonwealth of Massachusetts, an intervenor in the proceedings below, defends the Board's action. We affirm.

I

This appeal had its genesis in applicants' request for a "limited work authorization"¹ to allow them (at their own risk) to start preliminary work on the construction of Pilgrim Unit 2. The applicants propose to build Unit 2 at "Rocky Point," the site on Cape Cod Bay 40 miles southeast of Boston where Unit 1 of the Pilgrim nuclear facility now stands. The Commonwealth of Massachusetts opposed the LWA on the ground that an

¹An "LWA" is a restricted license issued by the Commission's Director of Nuclear Reactor Regulation. The Director must have licensing board approval before granting one. 10 CFR §50.10(e).

evaluation of other places to put this facility is required by the National Environmental Policy Act of 1969² but was not undertaken, and that NRC regulations call for compliance with all NEPA mandates before an LWA may issue.³ Without espousing any particular alternate site for Unit 2, the Commonwealth pointed out that other places in New England were identified in the staff's Final Environmental Statement as suitable for a nuclear plant. Intervenor urged that closer inspection might reveal one or more of them as environmentally superior to or in a less populated area than Rocky Point, or both.

The Commonwealth's arguments were essentially accepted by the Licensing Board, which judged the site review in the Pilgrim 2 FES no more than a superficial examination of alternatives. That Board was also unsatisfied by witnesses proffered by the staff to explain the procedures and assumptions which underlay its exploration of alternate sites. Describing their testimony as "couched in generalities," the Board below concluded that "[t]here is no record of a careful examination, either physically or by review of proffered descriptions of other than Rocky Point," and denied the LWA. 6 NRC at 844-45.

On appeal,⁴ the staff acquiesces in the Licensing Board's unfavorable characterization of the alternate site analysis in its Final Environmental Statement, expressly acknowledging at oral argument that the Pilgrim 2 FES standing alone is inadequate for this purpose.⁵ The staff's position

²Usually called by its acronym, NEPA. 42 U.S.C. §§4321 *ff*.

³10 CFR §§50.10(e) and 51.52(c).

⁴During the pendency of its appeal, the staff has been pursuing the alternative site review further "in order that, in the event [its] appeal is not successful, valuable time will not [have been] lost." Letter of February 22, 1978, from staff counsel to the parties.

⁵App. Tr. 7-8:

MR. FARRAR: Would you expand that a little bit, Mr. Grossman? As I read your brief I take it you [concede] if the only evidence in this case [were] the Final Environmental Statement, then the Licensing Board's decision would have to be affirmed.

* * *

MR. GROSSMAN [counsel for the staff]: I would not be prepared seriously to dispute that contention.

App. Tr. 8-9:

MR. SALZMAN: . . . If what you say is true, and the Final Environmental Statement is inadequate—inadequate in what manner? Are you conceding, sir, that the statement is inadequate to alert those interested agencies and citizens to whom it was circulated, to the existence of possible other sites for this plant; and, therefore, failed to alert them to the possibility of those sites, and to enable them to bring their attention to bear on it? Because if that is so, that is an inadequacy very difficult to cure by a hearing after the fact.

MR. GROSSMAN: No, I am not conceding that, Mr. Salzman. I think it is inadequate in that I am prepared not to contest the proposition it is inadequate in the context of an adjudicated hearing when a specific contention has been raised that [the] Staff has failed.

before us is “that *the FES together with the supplemental testimony* that the Staff gave at the hearing did outline a rational process that led reasonably to the conclusions that there was no manifestly superior site to Pilgrim”⁶ and, therefore, the Licensing Board erred in withholding approval of the LWA.

The applicants essentially endorse the staff’s position.⁷ But they make the further point that the Board also erred in failing to credit the applicants’ case on the availability of alternate sites. Their evidence, they say, confirms that there is no site for Pilgrim 2 environmentally superior to Rocky Point. Observing that Massachusetts introduced no evidence of any better place to put the new Pilgrim facility, applicants contend that if the Board was unsatisfied with the staff’s presentation, it should have taken applicants’ evidence into account. This, applicants say, would have constrained the Board to find the alternate site review adequate and to authorize the LWA, a result they now urge upon us.

The Commonwealth of Massachusetts supports the decision below. It argues that, even with the applicants’ evidence, the record demonstrates that the required scrutiny of alternative sites was in fact not made. Acknowledging that it offered no evidence suggesting a better site for Pilgrim 2,⁸ the Commonwealth contends that it was not obliged to do so. Massachusetts stresses that the burden of establishing compliance with NEPA was not on it but on the NRC staff.

II

1. Licensing construction of a nuclear power plant is a “major Federal action” within the meaning of Section 102(2)(C)(iii) of the National Environmental Policy Act.⁹ For this reason NEPA requires the Commission to consider whether reasonable alternatives less harmful to the environment exist before allowing a utility to proceed with construction. If there are any, the Commission must decide if the utility’s proposal should be modified or rejected in light of the relative costs and environmental benefits.¹⁰

In its *Seabrook* decision last year, the Commission translated NEPA’s abstract directives into concrete requirements for nuclear power plant li-

⁶App. Tr. 9, emphasis added.

⁷Without necessarily agreeing that the FES was inadequate. See applicants’ br., p. 25.

⁸App. Tr. 76; Commonwealth brief p. 5 at fn. 5.

⁹42 U.S.C. §4332(2)(C)(iii); *Scientists’ Institute for Public Information v. AEC*, 481 F.2d 1079, 1088 (D.C. Cir. 1973); *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 541 (1977).

¹⁰*EDF v. Corps of Engineers*, 492 F.2d 1123, 1135 (5th Cir. 1974); *EDF v. Froehle*, 473 F.2d 346, 353 (8th Cir. 1972); *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162 (February 14, 1978); *Detroit Edison Company* (Greenwood Energy Center, Units 2 and 3), ALAB-247, 8 AEC 936, 944 (1974).

censing purposes generally and alternate site comparisons particularly.¹¹ The Commission explained in *Seabrook* how it has apportioned its NEPA responsibilities; described what is expected of applicants, its staff, and the adjudicatory boards in carrying out those responsibilities; and elucidated the standards that govern decisions to be made in this area.¹² For reasons elaborated in that case, "the test to be employed in assessing whether a proposed site is to be rejected [is] . . . whether an alternate site is obviously superior to the site which the applicant has proposed." 5 NRC at 526.

Application of that standard, however, does not weaken the staff's obligation to compare alternatives with the applicant's proposal. It remains the staff's independent duty to gather, review, and analyze detailed data on potential alternative sites. 5 NRC 530, fn. 30. The Commission further recognized in *Seabrook* that simply following the requisite procedural steps will not guarantee a record or an alternate site review up to NEPA standards. *Id.* at 523. As we have been reminded recently, "the term 'alternatives' is not self-defining."¹³ Whether an alternative is a reasonable one—or whether it has been adequately considered—is in the end a matter of sound judgment dependent on the facts and circumstances of each situation.¹⁴

The litmus which the courts apply—and which we must perforce use—is whether the environmental consequences of each reasonable alternative have been accorded a "hard look."¹⁵ We distill from the cases a requirement that, to satisfy NEPA, an agency must go beyond mere assertions. At a minimum, it must provide a detailed, thoughtful analysis drawn from adequate data so that a reviewing body can decide on an objective basis whether the agency fairly assessed other courses of action which might realistically be substituted for the one proposed.

2. The question before us boils down to whether that hard look was in fact taken in this case. Massachusetts asserts it was not—and the Licensing Board agreed. The Commonwealth contends that the staff only went through the motions of conducting an alternate site review. According to

¹¹CLI-77-8, 5 NRC 503 (1977).

¹²*Id.* at 521 *ff.*

¹³*Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S._____, 55 L.Ed. 2d 460, 484 (1978).

¹⁴*Ibid.* See also, *NRDC v. Morton*, 458 F.2d 827, 837-38 (D.C. Cir. 1972); and *Life of the Land v. Brinegar*, 485 F.2d 460 (9th Cir. 1973), *certiorari denied*, 416 U.S. 961 (1974).

¹⁵*Kleppe v. Sierra Club*, 427 U.S. 390, 410, fn. 21 (1976); *Culpeper League v. NRC*, _____ F.2d_____, 11 ERC 1473 (D.C. Cir. 1978); *Sierra Club v. ICC*, _____ F.2d_____, 11 ERC 1241 (D.C. Cir. 1978); *Sierra Club v. Morton*, 510 F.2d 813, 818-20 (5th Cir. 1975); *NRDC v. Morton*, *supra*, 458 F.2d at 838. See also, *NRDC v. Callaway*, 524 F.2d 79, 92-93 (2nd Cir. 1975); *Silva v. Lynn*, 482 F.2d 1282, 1284-85 (1st Cir. 1973); *Monroe County Conservation Society, Inc. v. Volpe*, 472 F.2d 693, 697-98 (2nd Cir. 1972).

that intervenor, the staff prejudged the applicants' Rocky Point site as best because Pilgrim Unit 1 was already there, and paid only lip service to other potential sites coming to its attention.

We would normally look first at the project's environmental impact statement to see if alternatives were properly examined. As we noted, however, the staff concedes that its Final Environmental Statement for Pilgrim 2 does not pass muster under NEPA.¹⁶ Nonetheless, we must explore this question because the applicants did not join in the concession.

The alternate site discussion in the FES recites that applicants' own studies identified other New England locations as potentially suitable for nuclear plants. The FES mentions at least four sites under active consideration for that purpose,¹⁷ but discards them all in favor of Rocky Point because that one "meets the site selection criteria and does not require the development of a new site." It does this, however, without describing those alternatives or explaining the factors and reasoning which compelled their rejection.¹⁸ We do not believe that this measures up to the "detailed statement by the responsible official on . . . alternatives to the proposed action" that NEPA demands. 42 U.S.C. §4332(2)(C). See, *Silva v. Lynn, supra*, 482 F.2d at 1284-85.

It is one thing to reject remote or speculative locations after a cursory review. It is quite another to dismiss in that offhand manner alternatives which the applicants' own consultants suggest may be suitable. This is not a case of intervenors coming forward at the eleventh hour with antic proposals involving seemingly peripheral issues. The need to consider alternate sites for proposed nuclear reactors is a basic responsibility of the NRC, an "undoubted obligation" of this Commission.¹⁹ Moreover, not only the Commonwealth of Massachusetts but also the Environmental Protection Agency, in commenting on the Draft Environmental Statement for Pilgrim 2, timely and unmistakably called the staff's attention to the inadequacies of its alternate site comparison. EPA, for instance, told the staff flatly (Pilgrim 2 FES, p. A-47):

We cannot conclude from the draft environmental impact statement that alternative sites have been considered by the regulatory staff or that a thorough site selection process was employed by the applicant. The final statement should address the site selection process in more detail and present the basis for the staff conclusion that the Pilgrim location is superior to practical alternatives.²⁰

¹⁶See p. 777, *supra*.

¹⁷Montague, Millstone, Seabrook, and Charlestown. Other possible sites were also suggested but not identified by name.

¹⁸FES, pp. 9-3 and 9-4.

¹⁹*Seabrook, supra*, 5 NRC at 522.

²⁰The Commonwealth's criticism was equally pointed:

(Continued on next page.)

Where comments from “sister agencies disclose new or conflicting data or opinions that cause concern that the agency may not have fully evaluated the project and its alternatives, these comments may not simply be ignored. There must be a good faith, reasoned analysis in response.” *Silva v. Lynn*, *supra*, 482 F.2d at 1285. This requirement is expressly reflected in the Commission’s regulations. 10 CFR §51.26(b). The staff’s response to the EPA and Commonwealth criticism was to revise the environmental statement on Pilgrim 2.²¹ The revision deleted the sentence in the Draft Statement acknowledging that “specific alternative nuclear sites have not been identified or thoroughly evaluated,” substituting for it in the Final Statement the assertion that the “staff concludes that alternate sites have been identified and evaluated *with sufficient specificity* to judge that the choice of the [Rocky Point] site . . . is acceptable” (emphasis added).²²

We pressed staff counsel at oral argument to explain what was meant by “sufficient specificity” and to tell us whether the staff did or “did not really examine any other particular site at all.” Counsel’s response was that “[t]he staff did not examine specific sites as it has done in many other cases.”²³ What supposedly occurred was that the staff focused on broad geographic regions of New England and, where it considered a region’s characteristics to be generally unacceptable (or at least no better than those at Rocky Point), ruled out individual sites within it on the assumption that they shared those characteristics.²⁴ As a consequence, sites specifically identified as potentially satisfactory locations for nuclear power plants were shunted aside.

That summary rejection is hardly conveyed by the assertion in the FES that alternate sites had been “identified and evaluated with sufficient specificity.” Rather, the statement represents something as having been done that was not done—that the staff had actually looked into the alternatives identified in the FES—for the staff now tells us that (brief, p. 18), “it did not visit alternative sites or conduct a detailed environmental analysis of a specific alternative site.” The representation in the FES is

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A different standard for consideration of alternatives appears to have been set up for expansion upon already occupied sites than for new sites. If so, the staff should be required to articulate the reasons for this, and to clearly formulate the standard. Does the staff take the position that, in such a case, the suitability of the site shall be determined without the benefit of a true analysis of the alternatives? This section appears to be only a *pro forma* attempt to comply with NEPA.

Pilgrim 2 FES at pp. A-8 and A-9.

²¹See Pilgrim 2 FES at Section 11.1.9.1.

²²Compare the last line of Section 9.1.2.2 of the Pilgrim 2 DES with the last line of the corresponding section of the FES.

²³App. Tr. 14-15.

²⁴See App. Tr. 11-23 and staff brief, pp. 10-11.

therefore inaccurate at best and at worst misleading; certainly it is not a "good faith, reasoned analysis in response" to the pointed criticism that EPA and the Commonwealth had levelled at the staff's site selection procedures.²⁵

We faced an analogous situation in *St. Lucie*.²⁶ In that case, as in this one, the FES indicated that specific alternate sites had been reviewed by the staff.²⁷ There, as here, no alternatives had actually been examined. What we said in rejecting the staff's alternate site analysis in *St. Lucie* applies with equal vigor here: "Approval may not be given to an FES which treats in such a cavalier and misleading fashion one of the most important questions which NEPA requires to be considered."²⁸ Staff counsel's acknowledgment that the Pilgrim 2 FES is unsatisfactory was advisedly made.

3. The National Environmental Policy Act places responsibility for carrying out its mandates on "all agencies of the Federal Government" generally, directing that an environmental impact statement be prepared on each proposal for major Federal action and "accompany the proposal through the existing agency review process."²⁹ Because of this, in some circumstances inadequacies in an FES prepared by the NRC staff may be made up at the next stage of Commission review,³⁰ i.e., at the licensing board hearing on the application to build the nuclear facility.³¹

The staff invokes that principle here, arguing in essence that the FES description of its alternate site analysis was merely inartful and that, in fact, that analysis was properly conducted. It relies on the testimony of the witnesses it presented at the hearing as establishing this. Those witnesses

²⁵See p. 781, *supra*.

²⁶*Florida Power and Light Company* (St. Lucie, Unit No. 2), ALAB-335, 3 NRC 830 (1976).

²⁷See 3 NRC at 844 (dissenting opinion).

²⁸3 NRC at 840. By divided vote the Board elected not to set aside the LWA that had been authorized by the Licensing Board on the basis of the inadequate site review. That failure was reversed by the court of appeals *sub nom.*, *Hodder v. NRC* (No. 76-1709, D.C. Cir. 1976) (unpublished order *per curiam*).

²⁹42 U.S.C. §4332.

³⁰But see pp. 791-794, *infra*.

³¹Commission regulations require the introduction and consideration of the FES at the hearing. 10 CFR §§51.40(d) and 51.52(b). Where the licensing board (or we) reach findings and conclusions that differ from those expressed in the FES, the statement is "deemed modified to that extent." 10 CFR §51.52(b)(3). *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 29, fn. 43 (1978) (appeal pending); *St. Lucie*, Unit 2, *supra*, ALAB-435, 6 NRC 541, *affirming* LBP-77-27, 5 NRC 1038 (1977) (alternate site analysis). See also *Citizens for Safe Power v. NRC*, 524 F.2d 1291, 1294 (D.C. Cir. 1975); *Ecology Action v. AEC*, 492 F.2d 998, 1001-04 (2nd Cir. 1974); *Seabrook*, *supra*, CLI-77-8, 5 NRC at 526; and *Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 334 *ff.* (1973), *reversed on other grounds sub nom. Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976), *reversed sub nom. Vermont Yankee Power Corp. v. NRDC*, 435 U.S. —, 55 L.Ed. 2d 460 (1978).

testified that Rocky Point, the applicants' preferred site, was evaluated by actual inspection as well as by consideration of the applicants' submissions.³² This was sufficient to satisfy the staff that a second nuclear plant would be acceptable there.³³ The other locations mentioned in the Pilgrim 2 FES as potential nuclear power plant sites, however, were not explored in the same manner as Rocky Point. According to the staff's brief (pp. 5-6) these were tested

by comparing the known impacts at the Rocky Point site with the generalized impacts of the construction and operation of Pilgrim 2 within specific geographic areas. The purpose of this examination was to determine whether there existed an area which demonstrated a potential significant advantage over the existing site and which might therefore contain a superior alternative site; if so, more detailed analysis of potential sites within that particular area would have been necessary.

In other words the Staff surveyed specific geographic areas, ruling out those areas only after determining that a particular characteristic of each area, common to all potential sites within the area, rendered the entire area inferior to—or at any rate no better than—the characteristics at the Pilgrim site.³⁴

As it turned out, that "generalized" review process eliminated all the other sites. For this reason "[t]he staff did not examine any specific site" other than Rocky Point in settling on it as the location of choice for Pilgrim 2.³⁵

The National Environmental Policy Act does not specify how investigations into possible alternate courses of action are to be conducted. The breadth of activities covered by NEPA has necessitated judicial acceptance of the idea that the issues, format, length, and detail of such inquiries may legitimately differ from one proposal to another.³⁶ But whatever form it takes, the investigation must elicit "information sufficient to permit a reasoned choice of alternatives so far as environmental aspects are concerned."³⁷ Vague and general assertions will not suffice. NEPA's call for a "detailed statement" means more than "[a] conclusionary statement 'unsupported by empirical or experimental data, scientific authorities, or explanatory information of any kind,' " for such "affords no basis for a com-

³²Froelich, Tr. fol. 1931 at 2.

³³*Ibid.*

³⁴See also App. Tr. 9, and Froelich, Tr. fol. 1931 at 2.

³⁵Staff's Proposed Finding of Fact, No. 201.

³⁶See, *Scientists' Institute for Public Information v. AEC*, *supra*, 481 F.2d at 1091.

³⁷See, e.g., *NRDC v. Morton*, *supra*, 458 F.2d at 836; *NRDC v. Callaway*, *supra*, 524 F.2d at 93. See also *Florida Power and Light Company* (St. Lucie, Unit No. 2), LBP-77-27, 5 NRC 1038, *affirmed*, ALAB-435, 6 NRC 541 (1977) (appeal pending).

parison of the problems involved with the proposed project and the difficulties involved in the alternatives." *Silva v. Lynn, supra*, 482 F.2d at 1285 (citations omitted).³⁸ The record compels our agreement with the Licensing Board's conclusion that those basic requirements were not met in this case.

To begin with, the suggestion in its appellate brief (pp. 5-6) that the staff divided the relevant portions of New England into "specific geographic areas" for examination in order to "determine whether there existed an area which demonstrated a potential significant advantage . . . and might therefore contain a superior alternative site," does not reflect what was actually done. The staff made no attempt to discover alternate sites beyond those previously suggested to it by the applicants, according to the testimony of the sole staff witness to address the matter. Froelich, Tr. 1947.³⁹ What it did was simply to lump the sites listed in the FES into three general types or classes: inland, coastal, and offshore.⁴⁰ These were then considered generally under the assumption that the sites within each class shared given characteristics.⁴¹ The basis for that assumption does not appear in the record, however, and the general geography and demography of New England does not make it self-evident.

Before we turn to the specific characteristics assigned to each class of sites, another assertion in the staff's brief also gives us pause. The suggestion is reiterated there that the staff's analysis of alternatives was conducted with an eye to determining whether an "obviously superior alternative site is available for Pilgrim Unit No. 2."⁴² In essence, the staff contends that it applied in the case now before us the standard for judging alternate sites laid down by the Commission in *Seabrook*.⁴³ To be sure, the staff was a proponent of the "obviously superior" test in that proceeding. See 5 NRC at 526. But a number of considerations make it a highly unlikely proposition that the Pilgrim 2 alternative site analysis was carried out under that standard. For one, the DES and FES for Pilgrim 2 were prepared years before

³⁸Accord; *Monroe County Conservation Council v. Volpe, supra*, 472 F.2d at 697; *Alaska v. Andrus*, _____ F.2d _____, 11 ERC 1321, 1327-28 (D.C. Cir. 1978); *NRDC v. Callaway, supra*, 524 F.2d at 92-94; *Council on Environmental Quality, Impact Statement Guidelines*, 40 CFR §1500.8(a)(4).

³⁹Of the other three staff witnesses, Messrs. Soffer and Grimes confined their testimony to questions of comparative population density, see Tr. fol. 1842, and Mr. Harbour restricted his to considerations of placing the facility underground. Tr. fol. 1493.

⁴⁰Froelich, Tr. fol. 1391 at 3; Tr. 1932 and 1947.

⁴¹Froelich, Tr. fol. 1391 at 3 *ff.* Mr. Froelich made no attempt in his testimony to discuss features particular to any specific site.

⁴²Staff br. at 17. See also *id.* at 3, 5, 11, 18, 21.

⁴³See Staff br. at 19, 20, 22.

Seabrook was rendered by the Commission in March of 1977.⁴⁴ Neither document so much as mentions the "obviously superior" test, much less indicates that it was used. For another, the staff's witnesses at the hearing—proffered for the very purpose of explaining how the Pilgrim 2 impact statements were prepared⁴⁵—made no such suggestion. Nowhere in their testimony (given in 1975) do the words "obviously superior" even appear; their statements do not even hint at resort to that touchstone. Only after the Commission released its *Seabrook* opinion in March 1977, did the staff assert for the first time that it had evaluated other places in New England to see if there was an "available site which is obviously superior" to Rocky Point—but this was in staff counsel's proposed findings, not in the witnesses' sworn testimony.⁴⁶ These circumstances make it difficult to accept that the staff anticipated and applied the "obviously superior" standard in this case. They suggest instead that the assertion it did so is no more than counsel's after-the-fact rationalization.

Our suspicions find confirmation in the staff's handling of the alternate site investigation in this case. At oral argument, staff counsel told us he agreed with the Commonwealth that the obviously superior test "is something you apply at the end of your analysis, rather than to determine the scope of your analysis." App. Tr. 94. In other words (as the Commission explained in *Seabrook*), it comes into play *after* alternatives have been identified and their salient features explored.⁴⁷ The test must operate this way, of course.⁴⁸ Otherwise, the staff would be called upon to make a final selection among alternate sites based on a record that was only superficial.

But that is precisely what did happen here. The treatment of the "inland site" alternatives perhaps exemplifies this most clearly. (For convenience, the staff's prepared testimony evaluating inland sites with wet cooling towers appears in the margin below in its entirety).⁴⁹ The first assertion

⁴⁴The Pilgrim 2 DES was published in June and the FES in September 1974.

⁴⁵Froelich, Tr. 1932.

⁴⁶Staff's Proposed Findings and Conclusions, No. 220 (at p. 84), filed August 15, 1977. The applicants made no similar assertion. They simply sought to alert the Licensing Board to the test laid down in *Seabrook* by means of a footnote to its Proposed Finding 258 (at p. 130).

⁴⁷*Seabrook, supra*, 5 NRC at 530, fn. 30: "... we do not wish to be misunderstood as suggesting that the obligations of NEPA *analysis* are any less than have previously been required by our staff with respect to alternate sites, or that the [obviously superior] standard adopted above is appropriate for deciding whether to condition a proposed license. NEPA requires that the performance of the analysis which has been done, and the thoroughness and good faith of that analysis to remain an issue to be resolved before a license may issue." (Emphasis in original.) See, also, this Board's most recent *Seabrook* opinion, ALAB-471, 7 NRC 489-496 (April 28, 1978)(appeal pending).

⁴⁸"Only in Wonderland is "sentence first—verdict afterward" acceptable procedure.

⁴⁹Tr. fol. 1931 at 3-5, Mr. Froelich:

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made is that whereas "the Pilgrim Station site [*i.e.*, Rocky Point] is already committed to the production of nuclear power, and will not further impact land use," other places would take land away from uses "such as farmland, wildlife habitat, future recreational development, etc." in order to make room for the new plant and associated transmission corridors. See fn. 49, p. 785-787. But certainly this is not equally true at *every* inland site. Whether farmland need be withdrawn from cultivation depends on whether the land is being farmed; surely not every acre of rural New England is orchard or garden. Neither is it clear that every inland site would require the extensive use of new land, as the testimony of Mr. Froelich states. *Ibid.* At least one inland site identified in the FES, Montague in central Massachusetts, is already proposed for a nuclear plant. Conceivably it

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Three types of alternative sites were considered in our evaluation; inland sites, which were compared on the basis of a closed cycle cooling system, coastal sites, which were compared on the basis of an open cycle cooling system, and offshore sites using a barge-mounted floating nuclear station. The principal environmental considerations that were used in our comparison included the following: land use impacts, water use impacts, aquatic ecology impacts and terrestrial ecology impacts.

Coastal site comparisons were principally based on land use and aquatic/terrestrial ecology impacts. Inland site comparisons included these as well as water use impacts. We also considered socio-economic impacts, economic factors, and feasibility (both technical and time-scale) of associated plant/equipment design requirements at alternative sites.

1. In our consideration of inland sites which would be more suitable from an environmental standpoint (Contention 12), we assumed that these sites would require closed cycle cooling, and were evaluated on the basis of using wet towers, either mechanical or natural draft, since the dry cooling tower alternatives are presently believed to be technologically and economically premature. (See testimony that follows.)

Plant sites would need to be located on sufficiently large rivers to supply cooling tower makeup requirements of approximately 25,000 gpm. The environmental impacts from this class of site were compared with the Pilgrim Station site as follows:

a. Land use impacts will be moderate to significant, depending on plant location. Land required for the station site (Pilgrim Station occupies some 517 acres) would not be available for other uses such as farmland, wildlife habitat, future recreational development, etc. New transmission corridors would be required, which would also impact land use. The Pilgrim Station site is already committed to the production of nuclear power, and will not further impact land use.

b. Cooling tower makeup will have a substantial impact on water use. Cooling tower makeup water requirements are estimated to be approximately 25,000 gpm, about 2/3 to 3/4 of which will be evaporated, and 1/3 to 1/4 discharged as lower quality cooling tower blow-down. Such consumptive water use will have an impact on current users of river water, goes against current efforts to upgrade the water quality of Southeastern New England rivers, and detracts from the current and future use of these waters to supply the increasing water needs of the region. The Pilgrim Station has no such impacts on water use.

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could accommodate another without additional acreage. Such information—if not then within the staff's possession—was certainly within easy reach.¹⁰

Similarly, whether the elimination of a "wildlife habitat" is to be condemned hinges on whether one is talking of eagles' nests or rodents' nests. The significance of the destruction cannot be evaluated without some indication of the nature of the habitat, the types of species, and the extent of destruction involved, to suggest but a few matters which come readily to mind.¹¹ And surely "future recreational development" is a subject particularly contingent upon location. It does not follow as night the day that every inch of ground spared from a power plant or transmission facilities is so much parkland preserved.¹²

Neither would the choice of an inland site over Rocky Point automatically mean taking large amounts of land for new transmission corridors.¹³ At some places it might be a relatively easy matter to connect with the existing New England power grid. *Cf. Seabrook, supra*, ALAB-471, 7 NRC at 497 (fn. 23; dissenting opinion at 549). Again our point is not that this could be done efficiently at low cost, but that the staff made no effort to find out. Froelich, Tr. 2164-65.

And where an aspect of its "generalized review" appeared to favor an

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c. Impacts to aquatic biota will be less than at the Pilgrim Station site, if compared on a total biomass basis. However, since at times the cooling tower makeup requirements could represent an appreciable fraction of total river flow, the net effect on aquatic biota would be more significant than the predicted impact at Pilgrim Station. Of course, any final assessment of impacts to aquatic biota at these alternative sites would require specific site ecology data, including data on type and density of biota present, as well as detailed design and performance data for the proposed cooling system.

d. Impacts to terrestrial biota will range from moderate to significant, depending on site location and selection of transmission corridors. It is probable that these impacts could be held to acceptable levels, but would be greater than those predicted for Pilgrim Station.

e. There will also be an economic impact associated with closed cycle cooling. Wet cooling towers can be expected to increase generating costs by about 4%, due to the higher owning and operating costs of the wet cooling towers plus a small capability and energy penalty.

¹⁰That the DES on Montague was published in 1975, after the testimony below, does not detract from the fact that the information could have been obtained and considered. And the FES for Montague certainly does not rule out a second plant at the site. Our point is that the possibility was ignored by the staff.

¹¹One need look no further than the FES for Pilgrim 2 to confirm this. See pp. 2-14 through 2-17.

¹²*Culpeper League for Environmental Protection v. NRC*, _____ F.2d_____, 11 ERC 1473 (D.C. Cir. 1978).

¹³Even applicants' witnesses asserted only that were a site other than Rocky Point selected, "new transmission rights-of-way may have to be obtained." Tr. fol. 1656 at 38.

inland site, the staff was quick to discount it. For example, Mr. Froelich testified that:

[i]mpacts to aquatic biota [at an inland river site] will be less than at the Pilgrim Station site, if compared on a total biomass basis. However, since at times the cooling tower makeup requirements could represent an appreciable fraction of total river flow, the net effect on aquatic biota would be more significant than the predicted impact at Pilgrim Station. Of course, *any final assessment of impacts to aquatic biota at these alternative sites would require specific site ecology data*, including data on type and density of biota present, as well as detailed design and performance data for the proposed cooling system.⁴

Although this witness went on to agree that at least two New England rivers "would certainly have sufficient flow to support sites with wet cooling towers" (Froelich, Tr. 2185), the necessary "final assessment" to which he adverted was never made. Froelich, Tr. 2154-59.⁵

The reason why the staff failed to follow through its alternate site investigation is not hard to perceive. Because Pilgrim Unit 1 was already in place and operating at Rocky Point, the staff made a "threshold" judgment that this was an "acceptable site" for a nuclear power plant from an environmental standpoint, and that no other location could be superior to it given the existence of the plant already there.⁶

But that threshold judgment was seriously flawed. For one thing, Rocky Point was never determined to be an "acceptable site" in the sense that environmental considerations played a significant role in its selection. Con-

⁴Tr. fol. 1931 at p. 5 (emphasis added).

⁵The only other evidence which the staff assertedly studied on this point are Appendices I and M to the Applicants' Environmental Report. See staff br. at 4. They were submitted after the staff initially rejected applicant's application as deficient in these areas. Tr. 2179. Appendix I mentions no particular sites at all, contains no discussion of inland river locations, deals entirely with Massachusetts coastal areas, and offers no specific environmental site comparisons. Appendix M, prepared by an engineering consultant to the applicant, expressly disclaims any suggestion that it constitutes a "completed, comprehensive siting study tailored to a defined objective." *Id.* at M-2. As in Appendix I, no actual sites or specific environmental consequences of power plant siting are presented, e.g., "this section [of Appendix M] outlines in general terms (not related to specific sites) the potentials for siting nuclear units in the Commonwealth." *Id.* at M-3. Manifestly, neither of those documents can fairly be said to represent a detailed examination of alternate sites. Reliance on them therefore provides no assistance to the staff's position.

⁶See, e.g., Tr. 2179-80:

Q. [Staff Counsel]: Mr. Froelich, there's been discussion here of alternative sites, specific sites versus general sites. What is your policy of determining whether an Applicant has to submit to you as part of their environmental report documentation on specific sites for your review?

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struction of Pilgrim Unit No. 1 was licensed in 1968, before the enactment of NEPA and without an alternate site analysis of the type mandated by the statute.⁵⁷ The impact statement prepared in connection with the operating license for Pilgrim 1 noted that the plant's construction was "essentially complete," and that no alternative site comparisons were undertaken in light of that *fait accompli*.⁵⁸ Indeed, the Pilgrim 1 FES expressly acknowledges that "environmental considerations were not the dominant factor in selecting the [Rocky Point] site."⁵⁹

Moreover, building a second nuclear plant next to an existing one is not always the most favorable solution. We need look no further than the recent *Sterling* proceeding to demonstrate this proposition. There, a proposed facility could have been constructed on land where one of the applicants was already operating a nuclear power plant. Notwithstanding this, a detailed study of alternative locations convinced the staff that, all things considered, the best place for the new plant was a virgin site 40 miles away.⁶⁰ This Licensing Board upheld the selection of the new site over the use of the one previously "spoiled" by the earlier construction.⁶¹ What we seek to get across is not that *Sterling* was correctly decided (that question is currently pending before another appeal board). Rather, we wish to emphasize that until all the relevant factors have been perused, it is premature to declare that the "best" place for a new nuclear plant is alongside an old one.⁶²

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A. [Mr. Froelich]: There is no hard and fast rule on that; however, were we to be reviewing a new site we would want more specific information on alternative sites than we would in this case. And the reason is very simple.

We have a site which has already been judged acceptable and on that basis it is rather reasonable to assume that it would probably be acceptable for the second application. As a result, we are not quite as strict on demanding specific alternative sites and will accept discussions in terms of general site areas.

Q. When you say "new site," could you define new site?

A. A new site would be a site upon which there is no power, nuclear or otherwise. (Emphasis supplied.)

See also, staff brief at 3.

⁵⁷See 4 AEC 144 (1968), *affirmed*, 4 AEC 306 (1970).

⁵⁸Pilgrim Nuclear Power Station, Final Environmental Statement (Operating License) (May 1972) at 41. See also LBP-72-25, 5 AEC 103, *affirmed*, ALAB-83, 5 AEC 354 (1972).

⁵⁹Pilgrim 1 FES, *supra*, at 4, 79.

⁶⁰See Final Environmental Statement, Sterling Power Project, Nuclear Unit 1 (June 1976), pp. 9-7 through 9-11.

⁶¹*Rochester Gas and Electric Corp.* (Sterling Power Project, Nuclear Unit No. 1), LBP-77-53, 6 NRC 350, 413-19 (1977).

⁶²While *Sterling* turned to a certain extent on economic considerations, the staff took the position that the "virgin" site was also environmentally superior to the one already burdened with a nuclear plant.

Finally, even were it an established and binding legal presumption that clustering nuclear plants minimizes environmental harm, the conclusion that Rocky Point is the place for Pilgrim 2 still would not be compelled. A number of the other potential alternative sites are also under consideration for nuclear facilities.⁶³ Conceivably Pilgrim 2 could be placed at one of those locations with equally little environmental harm. The matter was simply not explored. See *Seabrook, supra*, ALAB-471, 7 NRC at 491.

We need not detail the inadequacies in the staff's comparison of inland sites with Rocky Point any further for our purposes. And little would be gained by our elaborating why the staff's analysis of the other alternative sites was no better. The upshot is that the record belies any notion that the staff took a "hard look" at sites other than Rocky Point. The staff simply relied on its general understanding of New England, gathered for the most part at second hand, to support an assumption that all inland sites in that region shared certain environmental, geographic, and demographic characteristics. It then rejected those sites—without actually studying them—as inferior to or no better than Rocky Point.

We perceive no significant difference between that approach and the "hypothetical best alternate site" technique employed in *St. Lucie*. (Neither, for that matter, does the staff's appellate counsel.)⁶⁴ The vice in both is fundamental: If the underlying assumptions are wrong, their "methodology" is not geared to reveal that possibility. In *St. Lucie*, for example, reliance on the technique initially caused the staff to rule out all inland sites in Florida on the theory that none had adequate supplies of water to support the operation of a nuclear power plant. Only upon exploring specific locations *at the Board's insistence* did the staff discover its assumption to be ill-founded. That "hard look" uncovered the existence of not one but two sufficiently watered sites (which were, incidentally, owned by the applicant itself).⁶⁵

In the case now before us we cannot tell whether there is no site "obviously superior" to Rocky Point; the record is inadequate to judge. Further proceedings will be needed for that purpose. The Licensing Board will

⁶³Pilgrim 2 FES at p. 9-3.

⁶⁴I would not argue to you, however, that when you get down to the substance of the manner in which it is done, that there is any fundamental difference between postulating a hypothetical best site based on regional characteristics and directly examining the overall regional characteristics, as was done in this case.

App. Tr. 11-12.

⁶⁵See LBP-75-5, and LBP-75-25, 1 NRC 101 and 463 (1975), *reversed*, ALAB-335, 3 NRC 830 (1976), *on remand*, LBP-77-27, 5 NRC 1038, 1041-47, *affirmed*, ALAB-435, 6 NRC 541 (1977). That, for unrelated reasons, neither of those sites were ultimately selected does not detract from our point.

undoubtedly conduct these in due course. The time has come, however, to give the quietus to "hypothetical" and "generalized" exploration of alternate sites. Experience has now twice taught that the techniques used in such analyses are insufficient to assure that alternatives are properly evaluated. The *St. Lucie* Licensing Board's observation that "[c]ommon experience overwhelmingly suggests that one cannot truly know the physical characteristics of a particular *site* without at least some study of that particular *site* (not a generalized 'region' containing many sites)," expresses a central truth.⁶⁶ That "general propositions do not decide concrete cases" is hardly a novel thought.

For the reasons the Commission elaborated in *Seabrook*,⁶⁷ the staff cannot be and is not expected to scrutinize every suggested alternate site as closely as the applicant's proposal. But before a potential alternative (other than one obviously unsuitable) may be rejected, the staff must insure that it truly understands the salient features of that new location.⁶⁸ We do not imply that every alternate site candidate merits maximum attention. Nor do we preclude categorizing alternatives (where this can be done), winnowing the best of each group, and reserving those for closest scrutiny.⁶⁹ But, once again, we stress that "the most important environmentally related task the staff has is to determine whether an application should be turned down because there is some other site at which the plant ought to be located. No other environmental question is both so significant in terms of the ultimate outcome and so dependent upon facts particular to the application under scrutiny."⁷⁰ Those considerations—and a desire to avoid in future cases the need to reconsider issues because of similar procedural inadequacies—lead us to hold that the alternate site review procedures followed here do not pass NEPA muster and should be abandoned. (The staff's more recent environmental statements suggest that it may have already done so.) Be that as it may, because of the staff's use of those inadequate investigatory techniques, key aspects of this case must be considered further by the Licensing Board. It is fortunate (but also fortuitous) that there will be time for that

⁶⁶5 NRC at 1045 (emphasis in original).

⁶⁷See 5 NRC at 521-30.

⁶⁸Whether this entails a visit to every such site is a matter the staff must decide for itself in individual cases as they arise.

⁶⁹See, e.g., *Northern Indiana Public Service Company* (Bailly Generating Station), ALAB-224, 8 AEC 244, 268-270 (1974), *reversed on other grounds sub nom. Porter County Chapter v. AEC*, 515 F.2d 513 (7th Cir.), *reversed and remanded sub nom. Northern Indiana Public Service Company v. Porter County Chapter*, 423 U.S. 12 (1975), *affirmed on remand*, 533 F.2d 1011, *certiorari denied*, 429 U.S. 945 (1976).

⁷⁰*St. Lucie*, *supra*, ALAB-435, 6 NRC at 543.

reconsideration to be made without extending the date at which a final decision on the application is now anticipated.⁷¹

4. The applicants assert that even if the staff's consideration of alternate sites was inadequate,⁷² their own was not. In their view, Commission regulations contemplate a licensing board decision in contested cases that rests on the entire record.⁷³ Pointing to the Board's authority (to which we alluded earlier)⁷⁴ to modify the FES based on evidence introduced at the hearing, the applicants contend that the Board should have done so in this case. As they see it (br. at 27):

To make the adequacy of the NEPA review conducted by the Commission Staff a threshold issue and determinative of the application, as the Licensing Board has done here, is to frustrate and disrupt the regulatory scheme, and the Licensing Board erred in so doing.

The Board below therefore erred, in the applicants' judgment, in failing to weigh their evidence on alternate sites along with the staff's in deciding whether the requirements of NEPA had been satisfied. They urge that we do this ourselves and approve the issuance of an LWA.

We decline to follow that course. The applicants misconceive the interplay between the discrete roles assigned the staff and the boards in executing the Commission's responsibilities under NEPA for appraising the environmental impact of its nuclear licensing activities. As we explained in *Comanche Peak*:⁷⁵

The carrying out of that responsibility involves in the first instance the preparation of an FES by the NRC staff. The role played by the FES as the licensing process moves forward is a crucial one. To be sure, in fulfilling its duty to strike the ultimate cost-benefit balance, the Licensing Board must take into account all of the relevant evidence in the record. And the FES may be amended by the Board (or by us upon review) to reflect additional information adduced during the hearing. *Maine Yankee*, ALAB-161, *supra*; 10 CFR 51.52 (b) (3), 39 FR 26279 (July 18, 1974). Nonetheless, the FES stands as the product of the study made by that segment of the agency which has the specific function of ferreting out the baseline facts upon which the final environmental judgments re-

⁷¹The proceeding below is continuing on other issues. At oral argument, counsel for Boston Edison advised us that it was his current expectation to obtain a licensing decision at the end of this year. App. Tr. 43. The company's current projection calls for having Pilgrim Unit 2 in service in 1985. *Ibid.* See fn. 4, *supra*.

⁷²The applicants do not agree that it was.

⁷³See 10 CFR §2.760 (c).

⁷⁴See p. 782, *supra*.

⁷⁵*Texas Utilities Generating Company* (Comanche Peak Steam Electric Station, Units 1 and 2), ALAB-260, 1 NRC 51, 55 (1975).

quired by NEPA must be made. That being so, it necessarily is a prime ingredient in the ultimate fashioning of the agency's NEPA determinations by the adjudicatory tribunals.

It was for this reason we cautioned in *Barnwell* that an inadequate environmental analysis by the staff may not always be remediable simply by taking more evidence into account at a subsequent licensing board hearing.⁷⁶ The boards are adjudicatory tribunals. While, to be sure, interstices in an FES may in some cases be filled by evidence introduced before them, it is not a licensing board's function to backstop the staff's responsibility for conducting NEPA analyses. Rather, the boards serve as an independent check on whether those responsibilities have been satisfied.⁷⁷ And, contrary to the applicants' contentions, the Commission itself has made clear that in contested proceedings a board has not only the right to but "is expected to" do more than simply resolve the litigants' contentions. In these cases a licensing board must take steps

to assure itself that the regulatory staff's review has been adequate, and to inquire further into areas where it may perceive problems or find a need for elaboration. If it finds itself not satisfied with the adequacy or completeness of the staff review, or of the evidence presented in support of the license application, it may, for example, reject the application, or may require further development of the record to support such application.⁷⁸

That appears to us to be no more than what the Licensing Board had done in this case. Having satisfied itself that the staff's alternate site analysis was not adequate (a conclusion with which we cannot take issue), it has in effect called upon the staff to supplement its efforts in this particular regard.⁷⁹

It is not correct to say that the Board below ignored the applicants' evidence. Indeed, the Board's opinion reviews the applicants' presentation

⁷⁶*Allied-General Nuclear Services (Barnwell Facility)*, ALAB-296, 2 NRC 671, 680 (1975). We observed there that, "... in a given instance, the staff's evidence may depart so markedly from the positions espoused or information reflected in the FES as to require formal redrafting and recirculation for comment of the environmental statement (or at least those portions which are affected by the changes) before the licensing board gives any further consideration to the subjects involved."

⁷⁷*Seabrook, supra*, CLI-77-8, 5 NRC at 526 (quoting from *Consumers Power Company (Midland Plant, Units 1 and 2)*, ALAB-123, 6 AEC 331, 334, *rev'd. on other grounds sub nom. Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976), *reversed sub nom. Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S._____, 55 L.Ed. 2d 460 (1978)).

⁷⁸*Ibid.*

⁷⁹This is the import of the Board's decision as we read it.

on alternate sites more extensively than it does the staff's (no doubt because there was more of the former than the latter).¹⁰ The obligation to explore the environmental ramifications of licensing construction of a nuclear power plant, however, lies with the Commission—and as a practical matter, this means with its staff. It is one thing to accept the evidence of the applicant in resolving a disputed point that the staff views in one light and an intervening party sees in another. But it is quite something else again to rely on an applicant's appraisal of whether an alternative is superior to its own proposal in circumstances where the staff's consideration of this essential point is totally inadequate. It is not that the applicants' evidence is suspect, but that, under NEPA, "it cannot be taken as a substitute for the appraisal of the staff." *Comanche Peak, supra*, ALAB-260, 1 NRC at 55. *Accord, Sierra Club v. Hodel*, 544 F.2d 1036, 1043-44 (9th Cir. 1976). See also, *Essex Cty. Preservation Assn'n v. Campbell*, 536 F.2d 956, 960 (1st Cir. 1976) ("The agency clearly may not substitute a private firm's efforts and analysis for its own and it must bear responsibility for the ultimate work product designed to satisfy the requirements of 42 U.S.C. §4332(2)(C)"); *Greene County Planning Board v. FPC*, 455 F.2d 412, 418-19 (2nd Cir.), *certiorari denied*, 409 U.S. 849 (1972). We therefore may not fault the Licensing Board's disinclination to act on the basis of the applicants' evidence alone. It was entitled to receive a sound analysis of the situation from the staff as well. We conclude accordingly that the refusal to authorize an LWA in the circumstances presented was within the ambit of the Licensing Board's discretion.¹¹

5. One further point merits comment. The Commonwealth of Massachusetts is contending here that Rocky Point is not necessarily the best place to put Pilgrim Unit 2, pointing to the other locations mentioned in the FES as deserving of further consideration. All well and good; we agree. But, in connection with a separate proposal to build a nuclear plant in central Massachusetts at the Montague site (one of the other places mentioned in the FES), the Commonwealth insists that "[t]he consideration of alternatives to the Montague units should include consideration of retaining [*inter alia*] a 13% share in Pilgrim Unit 2 as an alternative"¹²

We accept that a litigant may be allowed to take inconsistent positions in different cases. And we are not unaware of the dictum of a distinguished

¹⁰See 6 NRC at 842-845.

¹¹This disposition makes it both unnecessary and inappropriate for us to review the applicants' evidence in advance of a full analysis and appraisal by the staff. We need only add that it of course merits consideration by the Board below in the continued proceedings, along with any renewed submissions by it or the staff.

¹²NRC Final Environmental Statement, Montague Nuclear Power Station, Units 1 and 2 (NUREG-0084) at A-94 (February 1977).

New Englander that begins "a foolish consistency is the hobgoblin of little minds" Even so, when the Licensing Board again takes up the point, we would think it not amiss to seek some clarification of the Commonwealth's position on alternative sites.¹³

Affirmed.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹³The seeming inconsistency cannot be laid to inadvertence; on both occasions the Commonwealth's position was articulated by the same counsel.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARDS*

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Michael C. Farrar
Richard S. Salzman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matters of

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|---|---------------------------|
| PHILADELPHIA ELECTRIC COMPANY, et al. | Docket Nos. 50-277 |
| (Peach Bottom Atomic Power Station, Units 2 and 3) | 50-278 |

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| METROPOLITAN EDISON COMPANY, et al. | Docket No. 50-320 |
| (Three Mile Island Nuclear Station, Unit No. 2) | |

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| VIRGINIA ELECTRIC AND POWER COMPANY | Docket Nos. 50-338 |
| (North Anna Power Station, Units 1 and 2) | 50-339 |

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| PUBLIC SERVICE ELECTRIC AND GAS COMPANY | Docket Nos. 50-354 |
| (Hope Creek Generating Station, Units 1 and 2) | 50-355 |

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| FLORIDA POWER AND LIGHT COMPANY | Docket No. 50-389 |
| (St. Lucie Plant, Unit No. 2) | |

*Every Appeal Panel member is on one or more of the boards hearing the captioned proceedings; their collective designation is simply a convenience in issuing this joint order.

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| CAROLINA POWER AND LIGHT COMPANY (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4) | Docket Nos. 50-400 50-401 50-402 50-403 |
| PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al. (Seabrook Station, Units 1 and 2) | Docket Nos. 50-443 50-444 |
| KANSAS GAS AND ELECTRIC COMPANY KANSAS CITY POWER AND LIGHT COMPANY (Wolf Creek Generating Station, Unit No. 1) | Docket No. STN 50-482 |
| NORTHERN STATES POWER COMPANY (MINNESOTA) NORTHERN STATES POWER COMPANY (WISCONSIN) (Tyrone Energy Park, Unit No. 1) | Docket No. STN 50-484 |
| ROCHESTER GAS AND ELECTRIC CORPORATION, et al. (Sterling Power Project, Nuclear Unit No. 1) | Docket No. STN 50-485 |
| DUKE POWER COMPANY (Cherokee Nuclear Station, Units 1, 2, and 3) | Docket Nos. STN 50-491 STN 50-492 STN 50-493 |
| THE TOLEDO EDISON COMPANY, et al. (Davis-Besse Nuclear Power Station, Units 2 and 3) | Docket Nos. 50-500 50-501 |
| WASHINGTON PUBLIC POWER SUPPLY SYSTEM (WPPSS Nuclear Project No. 4) | Docket No. 50-513 |

**TENNESSEE VALLEY
AUTHORITY
(Hartsville Nuclear Plant,
Units 1A, 2A, 1B, and 2B)**

**Docket Nos. STN 50-518
STN 50-519
STN 50-520
STN 50-521**

**PUBLIC SERVICE COMPANY
OF INDIANA, INC.
(Marble Hill Nuclear Generating
Station, Units 1 and 2)**

**Docket Nos. STN 50-546
STN 50-547**

**TENNESSEE VALLEY
AUTHORITY
(Phipps Bend Nuclear Plant,
Units 1 and 2)**

**Docket Nos. 50-553
50-554**

**TENNESSEE VALLEY
AUTHORITY
(Yellow Creek Nuclear Power
Plant, Units 1 and 2)**

**Docket Nos. STN 50-566
STN 50-567**

May 30, 1978

Upon the staff's motion to consolidate 17 proceedings pending before appeal boards with respect to the issue of the health effects of radon-222 emissions, which the Commission had authorized to be considered in individual licensing proceedings, the Appeal Boards for the 17 proceedings issue a joint opinion adopting an alternate lead case procedure for each such proceeding.

Motion denied, but alternative procedure established. Previous remands of the radon issue to the Licensing Boards in *Tennessee Valley Authority* (Hartsville Units 1A, 2A, 1B, 2B), ALAB-467, 7 NRC 459 (1978) and *Metropolitan Edison Company* (Three Mile Island, Unit 2), ALAB-465, 7 NRC 377 (1978) are vacated. So much of *Northern States Power Company* (Tyrone Energy Park, Unit 1), ALAB-464, 7 NRC 372 (1978) is withdrawn as indicated that the Licensing Board should reopen the record on radon-222 emissions.

RULES OF PRACTICE: COLLATERAL ESTOPPEL

Nonparticipants cannot be held bound by the record adduced in another proceeding.

MEMORANDUM AND ORDER

1. On April 11, 1978, the Commission amended Table S-3 of 10 CFR Part 51, entitled "Summary of Environmental Considerations for Uranium Fuel Cycle," to delete the value assigned to the emissions of radon-222 expected to occur as a result of the mining and milling of uranium. 43 Fed. Reg. 15613 (April 14, 1978). The basis for this action was that the value was incorrect. The Commission went on to state that, although the question of the correct value was under reconsideration, it had decided not to institute at this juncture a rulemaking proceeding on radon emissions. Rather, the matter was to be considered "in individual [licensing] proceedings." In this connection, the Commission directed that the radon question be entertained not merely in those proceedings in which it had been previously placed in issue (or in which a party now desired to raise it) but, as well, in all other proceedings "still pending before Licensing or Appeal Boards." The Commission went on to state that, "[w]here cases are pending before Appeal Boards, the Appeal Boards are also directed to reopen the records to receive new evidence on radon releases and on health effects resulting from radon releases." 43 Fed. Reg. at 15615-16.

We first took note of these instructions in an opinion issued on April 19 in the *Hartsville* proceeding.¹ Because that proceeding remained before the Licensing Board on another issue, we ordered that Board to reopen the record to "receive written evidence on radon releases and the health effects resulting therefrom. Whether or not a hearing is required in connection with that evidence will be for the Licensing Board to determine in the first instance." 7 NRC at 464.²

Shortly after ALAB-467 was issued, the NRC staff moved us to consolidate a total of 17 proceedings for the limited purpose of receiving new evidence and making a decision regarding the environmental impact of radon releases in the uranium fuel cycle. Aspects of each of these proceed-

¹*Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, 2B), ALAB-467, 7 NRC 459.

²This course was presaged by what we had done some 3 weeks earlier in *Metropolitan Edison Company* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-465, 7 NRC 377 (March 27, 1978). In that case, the Commission had directed us to review the Licensing Board's initial decision authorizing the issuance of an operating license as though Table S-3 contained no value for radon emissions at all. CLI-78-3, 7 NRC 307 (March 2, 1978). After exploring with the parties how that direction might be best carried out, we remanded the radon issue to the Licensing Board with instructions "to reopen the record to receive new evidence, to hold such further hearings as may be required, and to render a supplemental initial decision." ALAB-465, 7 NRC at 378-379. See also *Northern States Power Company* (Tyrone Energy Park, Unit 1), ALAB-464, 7 NRC 372 (March 17, 1978).

ings were said to be then pending before an appeal board; the motion did not encompass any proceeding in which the Licensing Board had not as yet rendered its decision on the issuance of a construction permit, limited work authorization, or operating license.³ The justification offered by the staff for seeking consolidation was that the "public interest" would be served. By way of elaboration, we were told (motion, pp. 4-6; footnote omitted):

Since the question of radon impacts is general and totally unrelated to the particular situations of particular reactors, there would be no real advantage to having the issue addressed by the Licensing Boards which received the evidence on the other issues in the proceedings. The Appeal Board need not involve itself in drawing up detailed cost-benefit balances in close cases. It could reasonably limit its function to making an initial determination of whether the effects of radiation from radon could be substantial enough to affect the cost-benefit balances or determinations on the health effects of the nuclear fuel cycle. *Cf. Vermont Yankee Nuclear Power Corp., et al.* (Vermont Yankee Nuclear Power Station), CLI-77-10, 5 NRC 717 (1977); ALAB-392, 5 NRC 767 (1977). If the radon impacts are determined to be very small, there would be no need to have the particularized redeterminations of the cost-benefit balance made by the individual Licensing Boards. *Cf. Public Service Electric and Gas Company, et al.* (Salem Nuclear Generating Station, Units 1 and 2), ALAB-426, 6 NRC 206 (1977).

Should there be no consolidation, the Staff's testimony would be essentially the same in each proceeding. Presenting it one time would be more efficient and less expensive. Because of conflicting demands on the time of a limited number of Staff witnesses, scheduling these witnesses in many separate proceedings would inevitably mean substantial delays in reaching the issue in many proceedings. Similarly, we think it likely that a good deal of rebuttal evidence would be duplicated from one proceeding to another. Consolidation could thus speed up the consideration of the radon-related issues and conserve the resources of all parties.

Consolidation would also be generally fair to Applicants and Intervenor. Those trying the third or fourth cases involving these issues

³Included, however, were *Hartsville*, *supra*, fn. 1, and *Three Mile Island*, *supra*, fn. 2—despite the earlier remand of the radon issue to the Licensing Board in each of those cases. Not included was *Washington Public Power Supply System* (WPPSS Nuclear Project, Nos. 3 and 5), Docket Nos. STN 50-508, 50-509, which case is pending before us for review on our own motion, because the staff feels that it is not necessary to reopen that proceeding.

would not be faced with the effects of those issues having been determined previously in other proceedings. Although the effects of the earlier decisions would not be binding, there is no gainsaying that the earlier public decision would affect later cases. Conversely, if early decisions on the radon releases had no effect on later decisions, the likelihood of inconsistent decisions would be increased. This result too should be avoided.

The motion went on to indicate (at pp. 6-7) that, "[a]s a first step," the staff proposed to tender five affidavits which purportedly establish (1) that the environmental impact of radon releases in the uranium mining and milling process are so insignificant that the cost-benefit balance for no facility would be "substantially affected"; and (2) "that after the radon impacts are considered, a wide gap still exists between the projected health effects of the uranium and coal fuel cycles." The staff recognized, however, that at least some parties in one or more of the individual cases might wish to controvert that evidence. The motion concluded on this note (p. 8):

We respectfully request that the Appeal Board order the consolidation of the above-captioned proceedings for the purpose of dealing with the radon issue. A conference of parties to the consolidated proceeding should be held with the Appeal Board members involved to discuss procedures for the consolidated hearing, including methods of efficiently and expeditiously handling discovery, submission of written testimony, identification of Board questions, and cross-examination. We would suggest that such a conference be held in the near future at a location as reasonably convenient as possible to all parties who indicate an interest in participating.

To put it mildly, the motion was not well received by other parties. The applicants in all but one of the 17 proceedings were heard from; without exception, the response took the form of an unqualified opposition to consolidation. In only three proceedings did intervenors reply to the motion; each of those responses likewise expressed the view that it should be denied.

The reasons advanced were not precisely the same in each instance. We need not rehearse them all here. Some of the more frequently expressed objections of applicants were that consolidation (1) would be inconsistent with the Commission's apparent decision that the radon issue should not be treated generically at this time; (2) would be inefficient and time-consuming and, additionally, would pose serious logistical problems; and (3) would impose unwarranted burdens upon those applicants

who are not confronted with a contest on the radon issue (*i.e.*, an applicant in a proceeding in which the issue has not been placed in controversy should not have to participate in a dispute between parties to other proceedings).⁴ For their part, the responding intervenors believe, *inter alia*, that consolidation would be financially burdensome to them.⁵

2. We are satisfied that the Commission's April 11 order neither explicitly nor implicitly precludes the relief which the staff seeks. Although electing not to initiate now a rulemaking proceeding on the radon issue, but instead to call for a reopening of the record in each individual pending case, the Commission left to the discretion of the various appeal and licensing boards both how the reopening was to be accomplished and how the "new evidence on radon releases and on health effects resulting from radon releases" was then to be treated. More specifically, the Commission did not purport to suspend the operation of 10 CFR 2.716, which expressly authorizes it (and thus us as its delegate) to "consolidate for hearing or for other purposes two or more proceedings" on a finding "that such action will be conducive to the proper dispatch of its business and to the ends of justice."⁶

We are nonetheless constrained to observe that the staff's motion is a source of some puzzlement. The April 11 order was not issued by the Commission *sua sponte*. Rather, that order represented the adoption of a staff recommendation (in the Commission's words) "that Table S-3 be amended to remove the value for radon releases and that the subject of radon releases and associated health effects be declared litigable in all individual licensing proceedings." See *Three Mile Island*, CLI-78-3, *supra*, fn. 2, 7 NRC at 309. When it made that recommendation, the staff presumably was just as aware as it is now of each of the considerations which, according to its consolidation motion, militate against case-

⁴Some of the applicants went so far as to assert that the April 11 order does not apply to their proceedings. We summarily reject those assertions. They rest on the theory that the Commission intended the order to extend only to those proceedings in which NEPA issues still remain open (*i.e.*, have not received final disposition within the Commission). But the direction that the record be reopened in "cases...pending before Appeal Boards" was without any such qualification, express or implied. To the contrary, it clearly appears from the terms of the Commission's order that it wishes the radon question to be reexamined in every pending proceeding in which the now-repudiated value for radon emissions assigned in Table S-3 had been employed.

⁵There is sharp disagreement between applicants and intervenors as to the adequacy of the affidavits identified in the staff's motion. We need not, of course, address that controversy at this time. As already noted, the staff recognizes that, were the proceedings to be consolidated, an opportunity would still have to be provided other parties to challenge the content or sufficiency of the affidavits.

⁶Effective May 26, 1978, Section 2.716 was amended to confer this authority on "presiding officers" (*i.e.*, licensing boards) as well. 43 Fed. Reg. 17798, 17802 (April 26, 1978).

by-case treatment of what is beyond dispute a truly generic issue. One thus might reasonably ask why these considerations did not prompt the staff to recommend a rulemaking proceeding to amend Table S-3. Alternatively, once it had focused upon the manifest difficulties attendant upon having many adjudicatory boards independently hear and decide the same generic issue, why did the staff not then bring those difficulties to the Commission's attention with a request for a modification of the directives set forth in the April 11 order?

Although we have not paused to solicit the staff's answers to these questions, the only possible explanation which comes to mind is that the staff's reanalysis of the radon matter has not as yet reached the point at which the staff might be ready to offer its *final* views on how Table S-3 should be revised with regard to radon emissions. It would appear from the consolidation motion, however, that the reanalysis has progressed at least far enough that the staff is now quite prepared to assert that it should be used to determine the appropriate licensing action with regard to a substantial number of nuclear facilities—not merely the 17 covered by the motion but also several others under licensing board scrutiny. In view of this level of confidence, we fail to understand the reticence of the staff to employ its present thinking on the subject as a foundation for a proposed *interim* revision to Table S-3. Stated otherwise, what is a sufficient evaluation (as the staff sees it) for the purposes of two dozen or so *pending* proceedings ought to be no less satisfactory for the relatively few additional proceedings to which an interim rule might apply.

All things considered, there is scant cause to lend a sympathetic ear to the staff's concerns regarding the additional burdens to which it may be subjected in the absence of consolidation. Apart from that, there is much to be said for the consensus of the responding parties that consolidation (along the lines proposed by the staff) would be unworkable and, as to many (if not all) of those parties, unfair. Indeed, the validity of the objections to this effect seems to us to be sufficiently self-evident to require no further discussion.

At the same time, however, we cannot allow our dissatisfaction with the staff's handling of this matter to obscure that there is little to be said for calling upon 17 different licensing boards to hear and decide this generic issue independently.⁷ Because of this, we have resisted the natural

⁷[I]t would be absurd that the issue of the environmental effect of uranium mining in Wyoming should have to be separately considered on every application to construct nuclear plants from Maine to California. Rather the idea that a licensing agency should endeavor to identify environmental issues common to many applications and handle them in "generic" proceedings would seem to benefit all parties, particularly the poorly-financed environmental groups.

Ecology Action v. AEC, 492 F.2d 998, 1002 (2nd Cir. 1974) (per Friendly, C. J.).

temptation simply to deny the consolidation motion and to leave it to the staff to seek, if so inclined, relief of some kind from the Commission itself. Instead, we have undertaken to search on our own for some alternative solution to the problem (within the framework of the April 11 order) which would be both feasible and fair to all concerned. We conclude that there is such a solution. Although by no means perfect (we doubt that any flawless procedure for dealing with this situation could be devised), it seems to us to be a reasonable accommodation of the competing interests which either have specifically been brought to our attention or have occurred to us.

The Licensing Board in the *Perkins* construction permit proceeding⁸ has recently held an evidentiary hearing on the radon question and, as we understand it, will shortly be receiving additional testimony in deposition form. One of the members of the Board is Dr. Walter H. Jordan. In its April 11 order, the Commission made direct reference to a memorandum written by Dr. Jordan last fall, in which he raised questions regarding the accuracy of the value then assigned to radon in Table S-3. Also involved in the *Perkins* hearing is Dr. Chauncey R. Kepford. In the capacity of a technical interrogator for the intervenors, he cross-examined the witnesses for the staff and the applicant.⁹ Dr. Kepford has been an active participant in the *Three Mile Island* proceeding, in which he represents two intervenor organizations. He was an early and outspoken critic of the treatment formerly given radon emissions in Table S-3 and has evinced a good measure of skepticism respecting the validity of the staff's new analysis.

We have not, of course, evaluated the content of the *Perkins* record—even to the extent that it has already been developed. It is at least possible, however, that, once that record is complete, there will be general agreement that it reflects a full and fair ventilation of all facets of the radon inquiry. This possibility would appear to be enhanced by the presence of Drs. Jordan and Kepford. In this connection, a preliminary look at the transcript of the 2-day hearing discloses that Dr. Jordan was not merely a passive observer. As was his right—indeed his manifest duty in the full discharge of his responsibilities as a technical member of the Licensing Board—he interrogated the witnesses himself on aspects of the radon inquiry which appeared to him to warrant further exploration.

In the circumstances, the *Perkins* record (when complete) should be sufficient to serve as the base point for the examination of the radon is-

⁸*Duke Power Company* (Perkins Nuclear Station, Units 1, 2, and 3), Docket Nos. STN 50-488, 50-489, 50-490.

⁹Moreover, it is his testimony that will be furnished to the Board by way of deposition.

sue in the 17 other proceedings to which the staff motion relates. This is not to say, of course, that every party to each of those proceedings will necessarily concur that that record is satisfactory in every particular. No matter how thorough may have been the treatment of the radon issue in *Perkins*, one or more of the parties to other cases nonetheless may conclude that there were stones left unturned; *i.e.*, that portions of the staff's new analysis were not adequately tested or that there is available evidence bearing upon the issue beyond that presented to the *Perkins* Board. Obviously, nonparticipants in *Perkins* cannot be held bound by the record adduced in that proceeding. At the same time, however, it would be to no party's advantage to insist that the radon issue be relitigated from the starting line in his own case, so long as he were given an opportunity in his proceeding to supplement, contradict, or object to anything in the *Perkins* record. In our view, this is a fair and appropriate procedure.

In short, the use of *Perkins* as the "lead case" on this generic issue would (1) obviate the need for the rehearsal of the basic staff evidence in 17 different proceedings (at large cost in time and effort); but yet (2) not foreclose the further pursuit of the issue by a litigant in one of those proceedings who might believe it warranted. To this end, in lieu of the consolidation of the 17 proceedings sought by the staff, we hereby direct the following:

1. Each appeal board assigned to one of the 17 proceedings will either reassume or retain jurisdiction over the radon issue in that proceeding. The remand of the issue to the *Three Mile Island* and *Hartsville* Licensing Board in ALAB-465 and ALAB-467, respectively, is vacated. Also withdrawn is so much of ALAB-464, *supra*, as indicated that, in certain circumstances, the *Tyrone* Licensing Board should reopen the record on the issue.

2. Within 10 days after the evidentiary record on the radon issue is closed in *Perkins*, a copy of that record shall be served upon every party to each of the 17 proceedings.¹⁰ *It shall be the responsibility of the NRC staff to insure that such service is accomplished.* Further, the record in each of the 17 proceedings shall be deemed automatically reopened for the receipt of the evidence so served.

3. Within 14 days after his receipt of the *Perkins* evidentiary record, any such party may request in writing that the appeal board assigned to the particular proceeding (a) receive additional written evidence on the radon question; (b) call for a further hearing on the *Perkins* record; or (c) consider objections to any aspect of the *Perkins* radon proceeding. The

¹⁰As used herein, the term "party" shall be deemed to include a participant under 10 CFR 2.715(c).

request shall set forth with specificity the respects in which the *Perkins* record is deemed to be incomplete, inaccurate, or objectionable, as well as precisely how such defects should be remedied. Responses to such requests may be filed by any other party to the proceeding within 10 days thereafter.

4. When rendered, the Licensing Board's decision on the radon question in *Perkins* shall be served on every party to each of the 17 proceedings (the staff shall see to it that this service is accomplished). Within 14 days following the service, a party may file a memorandum with the appropriate appeal board addressed to two questions: (a) whether the *Perkins* evidentiary record supports the generic findings and conclusions of the Licensing Board respecting the amount of the radon emissions in the mining and milling process and resultant health effects; and (b) whether the radon emissions and resultant health effects are such as to tip the NEPA balance against construction (or operation) of the particular facility in question.¹¹ (A party who has earlier filed a request to supplement in his proceeding the evidentiary record adduced in *Perkins* might, of course, choose to defer the submission of a memorandum on these two questions pending the outcome of his request and any supplementation of the record which may be ordered.)

5. Each appeal will deal with the radon question independently. The manner and timing of the disposition obviously will depend upon, *inter alia*, whether, in the specific proceeding, there are (a) requests to supplement the record developed in *Perkins*; or (b) challenges to the *Perkins* findings.

We repeat our acknowledgment that the procedure outlined above is not free of all possible criticism—indeed, it too has some cumbersome features. In none of the 17 cases, however, has a party suggested an alternative procedure which commends itself as being more efficient and no less equitable. That being so, we go this route.

It is so ORDERED.

FOR THE APPEAL BOARDS

Margaret E. Du Flo
Secretary to the Appeal Boards

¹¹In confronting this question, the party could either accept the *Perkins* Licensing Board's generic findings or employ his own analysis of the *Perkins* record (presumably set forth in response to the first question).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Jerome E. Sharfman, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket Nos. 50-516
50-517

LONG ISLAND LIGHTING
COMPANY

(Jamesport Nuclear Power
Station, Units 1 and 2)

May 31, 1978

The Appeal Board denies intervenor's motion to stay LBP-78-17, 7 NRC 826 (1978).

RULES OF PRACTICE: STAY PENDING APPEAL

Where a decision does *not* authorize the issuance of any licensing authorization, a motion to stay the decision will be denied because there is nothing for the Appeal Board to stay.

RULES OF PRACTICE: STAY PENDING APPEAL

It is a well established rule of administrative law that a party is not ordinarily granted a stay of an administrative order without an appropriate showing of irreparable injury.

RULES OF PRACTICE: STAY PENDING APPEAL

Where a decision sought to be stayed does not affect the *status quo ante*, the movant will not be injured in any way by the absence of a stay.

Mr. W. Taylor Reveley III, Richmond, Virginia, for the
Long Island Lighting Company, applicant.

Mr. Irving Like, Babylon, New York, for Suffolk County, New York, intervenor.

Mr. Richard K. Hoefling for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

1. The County of Suffolk moves to stay the Licensing Board's partial initial decision dated May 9, 1978. LBP-78-17, 7 NRC 826. That decision determined all the safety and environmental issues in this case except for the environmental effects of radon-222 emissions resulting from the mining and milling of uranium attributable to this facility. That issue is before the Board as a result of the Commission's recent amendment of Table S-3 of 10 CFR §51.20, the effect of which was to open the issue to litigation in individual licensing proceedings. See 43 Fed. Reg. 15613 (April 14, 1978). Because the Licensing Board had not completed its environmental review, it was not able to—and did not—authorize the issuance of a permit to construct the Jamesport plant. Consequently, there is nothing for us to stay and the motion must be denied.

"It is a well established rule of administrative law that 'a party is not ordinarily granted a stay of an administrative order without an appropriate showing of irreparable injury.' *Permian Basin Area Rate Cases*, 390 U.S. 747, 773 (1968)(Harlan, J.)." *Toledo Edison Company* (Davis-Besse Nuclear Power Station, Units 1, 2, and 3), ALAB-385, 5 NRC 621, 626 (1977); cf. *Metropolitan Edison Company* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-456, 7 NRC 63, 68 (1978). See generally 10 CFR §2.788(e), 42 Fed. Reg. 22128, 22130 (May 2, 1977). In an effort to show that it would be injured in the absence of a stay, the county expresses the fear that applicants might spend money or take "incremental steps and decisions towards construction." However, a stay would not prevent any expenditures or management decisions short of actual construction, and as we said, construction itself has not been authorized. Applicant simply remains free to do whatever it might otherwise do without this Commission's permission; the decision sought to be stayed does not affect the *status quo ante* and thus the county will not be injured in any way by the absence of a stay.¹

¹We need only add that the county's papers also do not demonstrate that it has satisfied the other prerequisites for a stay. See 10 CFR §2.788(e) and *Virginia Petroleum Jobbers Ass'n v. FPC*, 259 F.2d 921, 925 (D.C. Cir. 1958).

2. In a footnote to the title of its partial initial decision, *supra*, the Licensing Board announced its intention to reopen the record on the radon issue in compliance with the Commission's April order. We have just issued a procedural order to govern the reopening of this issue in 17 other cases that were pending before us on the date of publication of the Commission's order. *Philadelphia Electric Company* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-480, 7 NRC 796 (May 30, 1978). The Licensing Board in this case may want to consider adopting the procedures outlined there in order to simplify its consideration of the radon issue. In any event, because the balancing of environmental factors has not yet been done in this case, the Licensing Board is to retain jurisdiction of the radon issue and resolve the matter itself.

The motion for a stay is *denied*.
It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Ivan W. Smith, Chairman
Lester Kornblith, Jr.
Dr. James C. Lamb III

In the Matter of

Docket No. 50-334
Spent Fuel Pool
Modification

DUQUESNE LIGHT COMPANY,
et al.
(Beaver Valley Power Station,
Unit No. 1)

May 4, 1978

The Licensing Board authorizes the Director of Nuclear Reactor Regulation to issue an operating license amendment to expand the capacity of the unit's spent fuel storage pool.

RULES OF PRACTICE: OPERATING LICENSE HEARING

In a proceeding for the issuance of an operating license amendment, a hearing is conducted only as a result of a valid petition for leave to intervene and request for a hearing under 10 CFR §2.714.

OPERATING LICENSES: AMENDMENTS

In a proceeding for the issuance of an operating license amendment, only matters placed in controversy by an intervenor and, in extraordinary circumstances, by the Board are considered.

RULES OF PRACTICE: RIGHT TO PARTICIPATE

Where the Licensing Board does not direct the filing of proposed conclusions of law or a proposed order, as permitted by 10 CFR §2.754(a), failure to file is not a default.

NEPA: NEGATIVE DECLARATION

When the Licensing Board determines that a proposal will not have significant environmental impacts and that a negative declara-

tion is appropriate, further consideration of a cost-benefit balance and alternatives to the proposal is not required as a matter of law or of logic.

TECHNICAL ISSUES DISCUSSED: Spent fuel rod integrity.

INITIAL DECISION
(Amendment to Operating License)

Appearances

George F. Trowbridge, Esq., for the Licensees.

Marvin A. Fein, Esq., for the city of Pittsburgh.

Dr. Thomas M. Gerusky, Director, Pennsylvania Bureau of Radiological Health, for the Commonwealth of Pennsylvania.

Stephen Sohinki, Esq., David A. Kubichek, Esq., and Michael Grainey, Esq., for the Nuclear Regulatory Commission Staff.

I. INTRODUCTION

1. On December 12, 1976, the co-owners of Beaver Valley Power Station, Unit No. 1 (BVPS-1), Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company (Licensees) filed an application for an amendment to the operating license to expand the capacity of the spent fuel storage pool. The amendment would permit the replacement of the existing low density spent fuel storage racks having a capacity of 272 fuel assemblies with higher density racks capable of housing 833 assemblies. In this decision the Board determines all the matters in controversy among the parties in a manner supporting the issuance of the requested amendment.

2. On January 27, 1977, the Commission issued a notice of "Proposed Issuance of Amendment to Facility Operating License." 42 Fed. Reg. 5155. The notice provided an opportunity to any interested person to file a petition for leave to intervene and a request for hearing pursuant to 10 CFR §2.714. The city of Pittsburgh (Pittsburgh) filed such a petition and request. A Board was constituted to consider the petition and on April 1, 1977, the

petition was granted, and a hearing was ordered with Pittsburgh as a party to the proceeding.

3. The Pennsylvania Bureau of Radiological Health, representing the Commonwealth of Pennsylvania, participated in the proceeding pursuant to 10 CFR §2.715(c). Dr. Thomas M. Gerusky, Director of the Bureau, attended a portion of the evidentiary hearing. BVPS is located near the borough of Shippingport, Pennsylvania. James M. Keller, Esq., Solicitor for the borough, made a limited appearance statement in opposition to the proposed amendment pursuant to provisions of §2.715.

4. The Board convened a prehearing conference on May 10, 1977, in Pittsburgh, Pennsylvania, to consider Pittsburgh's contentions. Subsequently the Board issued a special prehearing conference order dated May 27, 1977, in which some of Pittsburgh's contentions were admitted as issues in controversy. Pittsburgh's contention no. 1 asserted that the activity contemplated by the proposed amendment would be an action significantly affecting the quality of the human environment, and for that reason, the Licensees should submit an environmental report and the Commission should issue an environmental impact statement pursuant to the National Environmental Policy Act of 1969. The Board rejected this as a contention because it appeared that it was not a factual contention but an ultimate issue to be decided later by the Board. This issue is discussed below under "Negative Declaration," ¶16, *et seq.*

5. On August 12, 1977, the NRC Staff issued a Safety Evaluation and Environmental Impact Appraisal of the proposed modification. The appraisal concluded that there will be no significant environmental impacts attributable to the proposed modification, that therefore no environmental impact statement need be prepared, and that a negative declaration to this effect is appropriate.

6. Following issuance of the Staff Safety Evaluation and Environmental Impact Appraisal, Pittsburgh filed on November 4, 1977, a Motion to Amend or Expand Contentions, which motion was subsequently revised by an amended motion, dated December 1, 1977. The amended motion, in addition to seeking to add new contentions lettered (a) through (h), withdrew all but contentions 6 and 13 of Pittsburgh's contentions previously allowed by the Board. By memorandum and order dated February 1, 1978, the Board ruled on the amended contentions, again allowing some and rejecting others.

7. In addition to the Intervenor's contentions the Board requested that the parties address the balance between the reduction of occupational radiation exposure achievable by installing all of the proposed racks in a single phase prior to the first fuel reloading and the potential extra cost of a two-phase procedure involving the later installation of the last four racks in the

pool when it contains spent fuel. On March 6, 1978, counsel for Licensees informed the Board that a single-phase installation prior to fuel reloading was feasible, and it was therefore Licensees' intention to install all of the racks prior to that time. Licensees Proposed Findings, ¶7.

8. An additional issue arose when it became known that the Beaver Valley spent fuel pool had been utilized for the storage of slightly radioactive waste liquid pumped from the trenches and sump of the auxiliary building. This circumstance has been treated as a contention in our Findings of Fact below.

9. On March 13 and 14, 1978, the evidentiary hearing was held in Bethesda, Maryland. The Licensees and the Staff presented exhibits and the testimony of witnesses who addressed each issue in controversy. Pittsburgh presented no affirmative evidence, limiting its case to cross-examination of the Licensees' and Staff's witnesses.

10. The record in this proceeding consists of the NRC Staff's Safety Evaluation and Environmental Impact Appraisal, plus respective amendments thereto;¹ the Licensees' application for the modification of the spent fuel pool;² the Licensees' responses to two Staff requests for additional information;³ the Licensees' proposed changes to the Technical Specifications relating to the spent fuel storage pool;⁴ and the testimony and cross-examination of witnesses presented by both the Staff and the Licensees at the March 13-14, 1978, hearings.

11. Pursuant to the provisions of 10 CFR §2.754 the parties were provided an opportunity to file proposed findings of fact, proposed conclusions of law, briefs, and a proposed form of order or decision. The Licensees and the NRC Staff filed proposed findings of fact, conclusions of law, briefs, and a proposed form of order and decision. The city of Pittsburgh, however, filed only proposed findings of fact as we discuss next.

II. PITTSBURGH'S INTERVENTION

12. In a proceeding for the issuance of an amendment to an operating license such as this one, a hearing is conducted only as a result of a valid petition for leave to intervene and request for a hearing under 10 CFR §2.714. In such proceedings usually only the matters placed into controversy by an intervenor and, in extraordinary circumstances, by the Board are considered. The Board has therefore very carefully examined Pittsburgh's intervention papers and filings to determine exactly what relief it seeks.

¹Tr. 2053, 2058, and 2061, respectively.

²Licensees' Exhibit 1.

³Licensees' Exhibits 2 and 3.

⁴Licensees' Exhibit 4.

13. We learn from Pittsburgh's petition that it seeks to ensure that a nuclear waste disposal facility is not being created indirectly near its municipal boundaries. It wants other alternatives to the disposal of spent nuclear fuel besides those presented in the application for the amendment to be considered, and it wants the long-term effects of any revision to be seriously investigated. In addition, Pittsburgh seeks to ensure that the spent fuel storage pool will be designed, constructed, operated, and maintained so as to prevent adverse environmental and health effects to its residents and to protect the public health from any hazards resulting from the storage of additional spent fuel.⁵ In its amendments to the petition to intervene⁶ Pittsburgh requests only that its contentions be considered by the Commission in its review of the application in this proceeding.

14. Nowhere in its prehearing filings does the city of Pittsburgh take the position that the application to expand the spent fuel storage pool should be denied. It seems that Pittsburgh quite appropriately simply wishes to be assured that full consideration be given to the radiological health and safety and environmental aspects of the proposed expansion.

15. Now, after Pittsburgh has taken advantage to the fullest of its opportunity in the adjudicative process to examine all of the evidence on the issues in controversy, including the cross-examination of Licensees' and Staff's witnesses, the city still does not oppose the expansion of the spent fuel storage pool nor does it urge any conclusion which would support the denial of the application. It is a fair inference that the city of Pittsburgh, represented by its experienced and learned utilities counsel, has examined the evidentiary record in this proceeding and has not been able to identify any reason it wishes to assert for denying the application. In fact, if the Board were to adopt verbatim each of Pittsburgh's Proposed Findings of Fact, our conclusions and the ultimate decision would not materially be affected.⁷

III. NEGATIVE DECLARATION AND CONSIDERATIONS OF COST-BENEFIT AND ALTERNATIVES

16. Section 102(2) (C) of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §4332(2) (C), requires the preparation and circulation of a detailed environmental impact statement on all major Federal actions

⁵Intervention Petition, pp. 2 and 3.

⁶Motion to Amend or Expand Contentions served November 4, 1977, and Amended Motion to Amend or Expand Contentions served December 1, 1977.

⁷We do not deem Pittsburgh's failure to file proposed conclusions of law, briefs, or a proposed form of order or decision to be a default. The Board did not direct the filing of conclusions or a proposed form of order. 10 CFR §2.754(a). We respect Pittsburgh's right even now to take no ultimate position but simply to be assured that the law is being followed. Accordingly, we will resolve all issues placed into controversy.

significantly affecting the quality of the human environment. The Staff has concluded that, pursuant to 10 CFR §51.5, an environmental impact statement is not required and that a negative declaration supported by an environmental impact appraisal (EIA) is appropriate in this case. This was the issue raised by Pittsburgh's rejected contention no. 1, but we don't know whether Pittsburgh continued to believe that a full environmental impact statement is required.

17. The Board concurs in the Staff's judgment that the proposed action will not have significant environmental impacts. The negative declaration supported by the environmental impact appraisal satisfies the NEPA requirements and the provisions of Part 51. As evidentiary support for this conclusion, we adopt almost verbatim the Staff's Proposed Findings 11 and 12 as in our paragraphs 18 and 19 following.

18. With respect to both incremental impacts and cumulative or synergistic impacts, the proposed action will not result in any significant environmental impacts. As determined in the Staff's EIA, this modification will not require a commitment of additional land resources.⁸ Nor will it result in a significant increase in the facilities' consumption of water.⁹ Further, the potential offsite radiological impacts associated with the modification will also be environmentally insignificant;¹⁰ no incremental addition to the long-lived radioactive effluents released from the facility is expected;¹¹ there will result only an insignificant increase in the amount of solid radioactive waste produced;¹² no increase in liquid releases of radioactive effluent is expected;¹³ and there will occur only an insignificant increase in occupational exposures.¹⁴

19. In addition, the license amendment will result in no changes in either the quantity or the character of the chemical and biocidal effluents discharged from the facility,¹⁵ and will result in only a negligible increase in the facilities' thermal impact on the Ohio River.¹⁶ Finally, installation and use of the new high density racks will not result in radiological consequences from postulated fuel-handling accidents different from those reported in the Beaver Valley FES.¹⁷

⁸Staff EIA at p. 8.

⁹*Ibid.*

¹⁰*Id.* at 9.

¹¹*Id.* at 9-10.

¹²*Id.* at 12.

¹³*Id.* at 13.

¹⁴*Id.* at 14.

¹⁵*Id.* at 15.

¹⁶*Id.* at 16.

¹⁷*Id.* at 17; *Final Environmental Statement* related to the Beaver Valley Power Station, Unit 1 (July 1973), Table 7.2 at 7-4.

20. Having concluded that the proposed action will not have significant environmental impacts and that the negative declaration is appropriately supported by the environmental impact appraisal, the Board concludes further that considerations of cost-benefit and alternatives to the proposed action under NEPA are not required either as a matter of law or as a matter of logic. Commission regulation, 10 CFR §51.7, concerning the requirements for negative declarations and environmental impact appraisals, makes no reference to cost-benefit evaluations and consideration of alternatives. The Board's findings and conclusion on the adequacy of the negative declaration alone would warrant an order authorizing the Director of Nuclear Reactor Regulation to proceed with the processing of the application for an amendment. Counsel for Licensees agrees with this view, but counsel for Pittsburgh and the NRC Staff take the position that cost-benefit analyses and considerations of alternatives to the extent covered in the environmental impact appraisal and by Pittsburgh's contentions are traditional and necessary.¹⁸ This issue remains in controversy. It is therefore appropriate for the Board to make such findings, and in the interest of presenting a suitable record for review, the Board proceeds to resolve the Intervenor's contentions and other issues.

IV. CONTENTIONS AND OTHER ISSUES

21. The Board adopts the organization proposed by the NRC Staff in discussing contentions in two categories. First, contentions concerned with the adequacy of the Staff's analysis of the proposed license amendment are discussed under "A. Cost-Benefit-Balance," and those concerned with alternatives to expanding the pool are dealt with below under "B. Alternatives."

A. Cost-Benefit-Balance

Contention (a): The cost-benefit analysis employs the wrong cost per assembly for the increased capacity inasmuch as there is an inadequate consideration of the construction costs, added costs of holding a large fuel inventory, loss of credit for reprocessed fuel, and decontamination costs of the additional fuel storage facilities.

22. Pittsburgh's Proposed Findings of Fact, ¶18, and its cross-examination of witnesses on this contention (Tr. 2163-2177 and Tr.

¹⁸See memorandum and order dated November 23, 1977. Licensees agree that the Board should make findings on cost-benefit and alternatives.

2186-88) ignored the portions relating to construction costs, added costs of holding a large fuel inventory, and loss of credit for reprocessed fuel. Its proposed finding on this contention is limited to decontamination and decommissioning expenses in the cost per assembly of additional fuel storage facilities.

23. With respect to construction costs, the Licensees' witness Carey¹⁹ testified concerning the breakdown of the construction costs of the two phases of the fuel rack replacements. The total cost is about \$1.94 million. No further analysis is required.

24. Licensees' Sieber testimony on contention (a), following Tr. 2183, and the Staff's Nash testimony on contention (a), following Tr. 2162, demonstrate that there are no costs associated with holding a large inventory of spent fuel since fuel costs are amortized prior to discharge. The same testimony points out that Licensees carry no credit for spent fuel in their accounts.

25. From Intervenor's Proposed Finding ¶18 (p. 4) we learn that its position on the decontamination and decommissioning costs attributable to the proposed expansion depends upon the assumption that there will not be a permanent repository or reprocessing plant. This possibility is remote.²⁰ This being so, additional decontamination and decommissioning costs attributable to the pool enlargement would not be discernible. Nash testimony on contention (a), pp. 5-6.

Contention (b): The costs of storage per assembly are understated because the cost of the additional fuel storage has not been amortized on a yearly basis.

26. The Board accepted contention (b) because there were no objections to it. However, we did not understand how the costs would be affected by the amortization expression. So in the memorandum and order dated February 1, 1978, we asked the Intervenor to explain its position. No explanation was submitted, the contention was not covered on cross-examination, and we cannot identify any proposed finding addressed to it.²¹ In any event, the Johnson and Sieber testimony, pp. 15-16, following Tr. 2125, and the Nash testimony, following Tr. 2162, express these costs on an annually amortized basis apparently to the satisfaction of Pittsburgh.

Contention 13: The amendment request and supporting documentation failed to discuss adequately the continued integrity of the spent

¹⁹Licensees' Carey testimony on contention (a), following Tr. 2183.

²⁰*Northern States Power Company* (Prairie Island, Units 1 and 2), ALAB-455 (January 27, 1978).

²¹See Pittsburgh's Proposed Findings of Fact, pp. 3 and 4.

fuel rods during the long-term storage in the pool and possible increased radioactive release from loss of rod integrity, which may create difficulties in moving and shipping the rods from the site after prolonged storage.

27. Both the Licensees and the Staff presented competent experts²² to discuss the long-term integrity of spent rods under storage conditions.²³ Both witnesses concluded that long-term storage would not affect the integrity of the fuel or jeopardize subsequent normal handling operations. Ferrari testimony, p. 7; Weeks testimony, pp. 1, 3.

28. They based their conclusions on their (and others') observations of Zircaloy-clad fuel that was exposed to reactor operating conditions and subsequently stored for relatively protracted periods in fuel storage pools. Such fuel has been stored for up to 18 years with no evidence of degradation. Ferrari, pp. 5-6; Weeks, pp. 1-2. Observations also show that fuel that was defective at the time it was stored suffered no further degradation during storage and that the UO₂ pellets themselves were sufficiently corrosion-resistant to prevent significant contamination of the storage pool. Ferrari, p. 2. The likelihood of clad deterioration is inherently low because of known corrosion resistance of Zircaloy-4²⁴ and is further reduced by the moderate temperature and the controlled water chemistry in the fuel storage pool. Ferrari, pp. 4-5; Weeks, p. 3. Any contamination released to the pool will be removed by the purification system. EIA, p. 8.

29. Pittsburgh, in Proposed Finding of Fact 10 asserts that Zircaloy-4 is a chemically reactive material (Licensees' witness agrees, Tr. 2107) and that a report questioning its use as a cladding material was not considered by Licensees' witness in preparation of his testimony. The witness pointed out, however, that the report dealt with behavior of the material during a loss-of-coolant accident rather than during pool storage and that both Westinghouse and the NRC had considered the report (presumably in a different context) and arrived at a contrary conclusion. Tr. 2103-05.

30. We find, based on the testimony presented, that there is no significant likelihood of loss of rod integrity and resulting increased radioactivity in the spent fuel pool due to long-term storage of spent fuel in the Beaver Valley spent fuel pool.

²²Pittsburgh's Proposed Findings of Fact, pp. 6-8, identify certain limitations to the experience of Licensees' witness. The Board does not conclude that these adversely affect his qualifications.

²³Applicants' testimony of Harry M. Ferrari on contention 13, following Tr. 2097; Weeks testimony on contention 13, following Tr. 2112.

²⁴Licensees' testimony shows that even at 500°F, the corrosion rate is only about 10⁻³ inches per year. Ferrari, pp. 4-5.

Contention (g): The environmental impact of the proposed modification has not been analyzed adequately because the potential long-term effects of the release of I-129 to the environment have not been considered in the Environmental Impact Appraisal.

31. The assertion that the potential long-term effects of the release of I-129 was not specifically considered in the EIA is correct. The testimony presented²⁵ and the information developed through subsequent cross-examination brought out that the reason for this is that the effects are completely insignificant and do not warrant specific attention.

32. The Staff's calculations indicate an annual gaseous release rate of I-129 of .014 microcuries per year for the entire reactor. The resulting dose estimates are less than .001% of the total estimated dose from the station set forth in the FES. Donohew testimony, p. 2. The Licensees' witness gave a more conservative best-estimate of 1 microcurie per year. Tr. 2201-03. For either estimate, the Board finds the effects are inconsequential.

33. Pittsburgh, in its Proposed Findings of Fact, sets forth a number of statements which are, for the most part accurate but which, in the circumstances, are immaterial.

Contention (h): There is no indication in the Environmental Impact Analysis that the total anticipated occupational radiation exposures are known; therefore, there is no validity to the estimate on page 14 that the proposed modification will add less than 1% to the total annual occupational radiation exposure burden.

34. The Staff's witness testified that experience at other facilities leads him to estimate an occupational exposure of about 2.4 man-rems per year from the unmodified spent fuel pool and an insignificant increase in this value resulting from the modification. This exposure, together with the Staff's estimate of total occupational exposure of 500 man-rems per year at a typical PWR, leads to the Staff's estimate of less than a 1% increase in the total annual occupational indication exposure border. Testimony of Donohew, following Tr. 2226 (see fn. 25, *supra*).

35. The Licensees' estimate was arrived at in a similar way but is somewhat smaller. Testimony of Carey, following Tr. 2222. We find therefore that the proposed modification will add less than 1% to the total annual occupational exposure.

²⁵Johnson testimony, following Tr. 2192; Donohew testimony, following Tr. 2209. (Note: In at least some copies of the transcript, the testimony of Mr. Donohew on this contention and his testimony on contention (h), which should follow Tr. 2226, are interchanged.)

B. Fuel Storage Pool Contamination

36. The Beaver Valley spent fuel pool has been used since September 1976, for the storage of slightly radioactive waste liquid pumped from the trenches and sump of the BVPS-1 auxiliary building. The pumping occurred at a time when both the high and low-level waste tanks were full and when the only alternative to pumping the liquid waste into the spent fuel pool was to shut down the plant. Tr. 2298-99. Licensees testified that the pool and existing racks will be decontaminated prior to the installation of the new racks and estimated that the residual radioactivity following decontamination will result in an occupational exposure of approximately 1 man-rem during the period of removal of the existing racks and installation of the new racks. Carey testimony on contamination of spent fuel pool, pp. 4-6, following Tr. 2297. Because this additional exposure is relatively insignificant, we find it does not in any way alter our conclusion with respect to the acceptability of the proposed amendment.

37. We are concerned, however, about the manner in which this matter was handled by the Licensees. It was brought to the Staff's attention only as a result of an inspection by the Office of Inspection and Enforcement in January 1978, Tr. 2059, although the Licensees had been aware of it since its inception 16 months earlier. As a result, the Staff's Safety Evaluation and Environmental Impact Appraisal were prepared on an incorrect (albeit harmlessly so) basis and this incorrect basis was not brought to the attention of either the Staff or the Board by the Licensees. Further, examination of the Licensees' witness brought out information indicating that either the Licensees did not handle the contamination in a completely responsible fashion or the witness was not fully informed on what had taken place. Tr. 2300-10, 2317-19. Although this entire matter is within the scope of the Staff's normal activities and we have no doubt will be or has been adequately addressed, we feel obliged to take this opportunity to remind the Licensees that, in future cases, it is imperative that they fully apprise the Staff of significant new developments or changed circumstances in a timely fashion. The demonstrated reticence of the Licensees in this case serves neither the Staff, the Licensees, nor the public.

C. Alternatives

Contention 6: In its request for amendment and modification of its license and in the documentation supporting that request, the Licensee fails to address alternatives for the storage of spent fuel in the short term. Although the Licensee is a member of the Central Area Power Coordination Pool, commonly known

as CAPCO, it nowhere indicates in its application that the CAPCO members have considered joint financing of offsite storage facilities for spent fuel from the many nuclear power plants owned or planned by CAPCO members.

38. The parties stipulated that the only alternative raised by this contention is the alternative of building an independent, offsite CAPCO fuel storage facility. Tr. 1969, 1977-78.

39. An independent CAPCO fuel storage facility would have two built-in cost disadvantages. It would require double handling of fuel. This is self-evident, requiring no citation. Because of its greater size and the CAPCO fuel use pattern, it would have a lower utilization factor for many years. Johnson and Sieber testimony on contention 6, pp. 11-12, following Tr. 2124.²⁶ An analysis of this effect by Messrs. Johnson and Sieber, *id.* at 10-15, is persuasive and remains unchallenged. Expanding the BVPS-1 pool is clearly cheaper. In addition, a joint CAPCO storage facility would not be ready on time. *Id.* at pp. 8, 15.

40. Intervenor now ignores the dollar cost disadvantages of offsite fuel storage. In cross-examination, Tr. 2164-66, and in Proposed Findings, paragraphs 14, 15, Pittsburgh suggests that the issue was really environmental costs. Pittsburgh did not raise this issue before the hearing. It failed to make any showing sufficient to require reasonable minds to inquire further.²⁷ Without such a showing, there is nothing inherent in the offsite suggestion to indicate that such a consideration would be appropriate. In fact, with double shipping, and all else being equal, the offsite alternative would appear to be inherently more costly in the environmental sense as well as in its economic aspects.

Contention (d): The cost-benefit analysis in the Environmental Impact Appraisal does not adequately consider either short-term or long-term shutdown of the plant as an alternative based on actual power need in the CAPCO service area for the period during which the additional fuel storage capacity will be needed.

41. Licensees address this contention under a hypothesis where it is assumed that the single licensee, Duquesne Light Company, could meet its system demand without Beaver Valley-1 by replacing the 850 MW of lost

²⁶See also Nash testimony on contention 6, following Tr. 2124.

²⁷See U.S. Supreme Court in *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc., et al.*, 46 L.W. 4301, 4310 (April 3, 1978).

power with fossil units within its system or by purchased power. Sieber testimony on contention (d), following Tr. 2232. The Staff employs a similar approach. Zielinski testimony on contention (d), following Tr. 2272.

42. Licensees' witness testified that replacing Beaver Valley power would cost on a yearly average about \$203,000 per day. Sieber (d) testimony, pp. 2-3. Staff's estimate of replacement costs ranges from \$92,000 to \$240,000 per day. Zielinski testimony, pp. 2-6. Under either estimate, it requires little balancing to see that the \$1.94 million cost of the pool expansions would soon be exceeded by the cost of replacement power. Moreover, only incremental costs are compared, with no consideration given to capital costs which would continue even with BVPS-1 shutdown.²⁸

43. Pittsburgh challenges these conclusions by questioning Duquesne's computer code data base and the Staff's use of data from other power systems in computing the costs of operating nuclear power facilities. The Board believes that an analysis of the Licensees' position, with its conservative assumption and reliable foundation, is dispositive of the issue. The Staff testimony, although reliable enough for its purpose, is cumulative and findings concerning Staff's testimony are not required.

44. Pittsburgh challenges Licensees' testimony by Mr. Sieber because it was based on computer printouts, and in some instances he was unable to satisfy the Intervenor's queries about present costs of operating certain fossil and nuclear plants, future costs of nuclear fuel, costs of operating Beaver Valley on a partially derated basis, and because of assertedly incomplete data on the BVPS operating history.²⁹

45. To estimate the incremental production costs of replacing BVPS-1 with fossil units or purchased power, Licensees used a Duquesne Company computer code called "PRODCOST" which simulates the operation of the economic load dispatch system to produce the most efficient operation of the system and then computes production costs. Two code runs were made, one assuming the availability of BVPS-1 and the other that BVPS-1 would be shut down. The cost differentials were then determined. The computations were made for the year 1978 but would be generally similar for any year through the 1980's. Sieber contention (d) testimony.

46. The PRODCOST code accepts as input the historical fuel costs with appropriate escalation, historical plant performance factors, historical hourly system load demand profiles, monthly predicted peak and average system demands, scheduled outages on a per unit basis, and historical forced

²⁸But in its EIA, pp. 20 and 21, Staff reports that in addition to the cost of replacement power, the cost of maintaining the plant in a shutdown condition would be about \$100 million per year. Apparently this would include capital costs.

²⁹Pittsburgh Proposed Findings, paragraphs 28-32. Cross-examination, following Tr. 2233.

outage rates. The code uses Monte Carlo simulation techniques to distribute the forced outages for the units over the calendar year, develop incremental loading schedules and using these loading schedules, simulates the operation of the economic load dispatch system to produce the most efficient operation of the existing system configuration, and the costs associated therewith, on an hour-by-hour basis for the time period under study. *Id.* p. 2.

47. On cross-examination, the most Intervenor was able to develop with respect to the testimony on the PRODCOST code was that witness, Mr. Sieber, did not have mastery of all the input details, and that some data, for example future costs of nuclear fuel, may not be reliable. While it is true that Mr. Sieber could not testify to all details of the input data, he was thoroughly familiar with the methodology. *E.g.*, Tr. 2252. Moreover the PRODCOST code was developed and is actually used by Duquesne for budget purposes. Not only has it produced a preponderance of the reliable, probative, and substantial evidence on this issue, but it is probably the best practical evidence of these facts.

48. As we state above, the Licensees' assumptions were conservative in that the contention was not addressed on a need for power basis, despite the fact that proceedings within this Commission have already produced decisions that there is a need for nuclear generation in the CAPCO pool.³⁰ In fact Intervenor seems to recognize the need for BVPS-1 in its Proposed Finding 38, where it states that without BVPS-1, the projected reserve margin in 1986 would be 14.76%, falling somewhat short of the Federal Power Commission recommendations of 15-20% and the 20% found to be desirable in the CAPCO pool.³¹ Finally, no decision shutting down an operating power reactor under the circumstances argued here could be justified without an analysis of the *marketability* of the power and considerations of regional needs and national energy policies.

49. The Board finds that contrary to the contention, adequate consideration has been given the effects of shutting down BVPS-1, and that alternative is undesirable.

Contention (e): The proposal of the Department of Energy released on October 18, 1977, must be considered as an alternative.

50. On October 18, 1977, the Department of Energy announced a program to provide interim storage facilities for spent nuclear power plant fuel.

³⁰See, e.g., *The Toledo Edison Company, et al.* (Davis-Besse Nuclear Power Station, Units 1 and 2), LBP-75-75, 5 NRC 993, 1012-1017 (December 31, 1975).

³¹David-Besse, *id.* at 1013.

Under this program DOE predicted that storage facilities would be available in 1983. Witnesses for both the Licensees³² and the Staff³³ expressed doubts that this date was realistic. Their skepticism is reasonably founded because the DOE proposal would require enabling legislation to begin with; then, if the 1983 date were to be met, Congress would have to provide some relief relating to the need for environmental review under NEPA. Johnson and Sieber, *ibid.* Given the uncertain nature of the required Congressional approvals, and the necessary leadtime to plan, license, and build the BVPS-1 expansion, it would be poor planning to defer the project to see if the DOE proposal proceeds as it has predicted. The DOE proposal therefore is not a suitable alternative.

ORDER

51. The Board having considered and decided all matters in controversy among the parties, the Director of Nuclear Reactor Regulation is authorized to make such additional findings on uncontested issues as may be necessary to the issuance of an operating license amendment authorizing modification of the BVPS-1 spent fuel storage pool.

52. In accordance with 10 CFR §§ 2.760, 2.762, 2.764, 2.785, and 2.786, this Initial Decision shall be effective immediately and shall constitute the final action of the Commission 45 days after the issuance thereof subject to any review pursuant to the above-cited rules. Exceptions to this Initial Decision must be filed 7 days after service of this Initial Decision. A brief in support of the exceptions must be filed within 15 days thereafter (20 days in the case of the NRC Staff). Within 15 days of the filing and service of the brief by the appellant (20 days in the case of the NRC Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD

Lester Kornblith, Jr., Member

Dr. James C. Lamb III, Member

Ivan W. Smith, Chairman

Dated at Bethesda, Maryland,
this 4th day of May 1978.

³²Johnson and Sieber testimony on contention (e), pp. 18-19, following Tr. 2124.

³³Roberts testimony on contention (e), p. 2, following Tr. 2162

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Sheldon J. Wolfe, Chairman
E. Leonard Cheatum
Ralph S. Decker

In the Matter of

Docket Nos. 50-516
50-517

LONG ISLAND LIGHTING COMPANY
NEW YORK STATE ELECTRIC AND
GAS CORPORATION

(Jamesport Nuclear Power
Station, Units 1 and 2)

May 9, 1978

The Licensing Board issues a partial initial decision in construction permit proceeding covering all issues in contention and other matters required by the Notice of Hearing except those which could be affected by the Board's future consideration of new evidence on releases of Radon-222.

FWPCA: §401 CERTIFICATION

Receipt of a §401 certification from the applicable State is dispositive of the question of compliance with applicable limitations and standards.

FWPCA:EPA AUTHORITY

Pursuant to §401(d) of the FWPCA, effluent limitations, monitoring requirements, and any other appropriate requirements of State law contained in a §401 certification are required to be made conditions of any construction permits which may be issued.

NEPA: SCOPE OF INFORMATION REQUIRED FOR LICENSING

The probability of a Class 9 accident is so remote as to be incredible and need not be considered absent a showing that special circumstances make a

Class 9 accident more probable at the site than elsewhere. *Duke Power Company* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 415-16 (1976).

EMERGENCY PLAN: CONTENT

Staff's calculations for transient populations and azimuthal population distributions for the purposes of satisfying NRC's regulations specifying minimum distance to the nearest population center are not to be taken to infer that actual transient population concentrations and actual azimuthal and radial population distributions need not be considered in developing evacuation plans.

CONSTRUCTION PERMITS: SITE CRITERIA

The April 1973 AEC report entitled "Population Distribution Around Nuclear Power Plants" does not represent an official staff position and has no legal significance. *Duke Power Company* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397 416 (1976).

CONSTRUCTION PERMIT HEARINGS: SCOPE

No regulation requires applicant to submit a preliminary security plan for safeguarding against criminal acts and sabotage at the plant or during transportation of fuel to the plant or radioactive wastes from the plant, at the *construction* permit stage.

NEED FOR POWER: APPLICABLE STANDARD

In analyzing need for power, the question of "need" is really one of benefit, *i.e.*, whether construction and operation of the proposed plant will offer sufficient public benefit to offset the attendant financial and environmental costs. *Public Service Company of Indiana* (Bailly Generating Station, Nuclear-1), ALAB-227, 8 AEC 416, 419 (1974). The "benefits" and "costs" to be considered are not to be confined to those affecting the county in which the plant will be located.

CONSTRUCTION PERMITS: HEALTH AND SAFETY ISSUES

An application for a construction permit for a replicate plant normally must be submitted within two and one-half years, but the construction permit for the replicate plant need not be issued within that time limit.

TECHNICAL ISSUES DISCUSSED: Standard (replication); anticipated transients without scram; steam generator tube integrity; radioactive waste storage; population concentration; emergency plans; quality assurance; need for power; transmission lines; dewatering; dredging program and beach erosion; water quality (suspended solids); marine entrainment and impingement; alternative sites; consideration of coal as an alternative energy source; socioeconomic impacts; pressure relief underdrain system.

PARTIAL INITIAL DECISION*
(Construction Permit)

Appearances

W. Taylor Reveley III, Esq., Case Whittemore, Esq., Jeffrey Futter, Esq., and Edward J. Walsh, Esq., for the Applicant, Long Island Lighting Company, and **Frederick H. Lawrence, Esq.,** for Applicant, New York State Electric and Gas Corporation.

Irving Like, Esq., Werner J. Zumbrunn, Esq., for Intervenor County of Suffolk; **Jean H. Tiedke, Shirley Bachrach, Adelaide Flatau, Laetitia Bradley, Mari Quint, and Jean E. Marriner,** for Intervenor League of Women Voters; **Joseph C. Gramer, Esq., and William Chapek,** for Intervenor International Brotherhood of Electrical Workers, Local 25, AFL-CIO; **Sandra Caron, Esq., and Jeffrey Cohen, Esq.,** Counsels for Intervenor New York State Energy Office; **Donald E. Brown, Esq., Jonathan Sinnreoch, Esq., and Bruce Coolidge, Esq.,** for Intervenor Town of Riverhead; **Anthony J. Montenigro** for Intervenor Environmental Protection and Progress Committee, Local 25; **Dr. Caryl R. Granttham and Ann Carl,** for Intervenor Concerned Citizens of Suffolk County.

*On April 14, 1978, the Commission issued a clarifying amendment to Table S-3 of 10 CFR Part 51 (43 Fed. Reg. 15613). Therein, the Commission directed us (and other licensing boards) "to reopen the record on NEPA issues for the limited purpose of receiving new evidence on radon releases and on health effects from radon releases." We, of course, are governed by that directive. Nevertheless, we believe it to be in the public interest to issue a partial initial decision at this time as we are authorized to do under 10 CFR Section 2.718 and Section I (c) of Appendix A to 10 CFR Part 2. This partial initial decision covers all issues in contention and other matters required by the Notice of Hearing except those which could be affected by our consideration of new evidence on radon releases and resultant health effects.

Bernard M. Bordenick, Esq., Richard Goddard, Esq.,
Lawrence J. Chandler, Esq., Harry H. Glasspiegel,
Esq., William Massar, Esq., Lawrence Brenner, Esq.,
and Richard K. Hoefling, Esq., for the U.S. Nuclear
Regulatory Commission.

TABLE OF CONTENTS

| | | |
|------|---|-----|
| I. | PRELIMINARY STATEMENT | 830 |
| II. | FINDINGS OF FACT—HEALTH AND SAFETY | 833 |
| | A. General..... | 833 |
| | B. Description and Safety Evaluation of the Facility..... | 834 |
| | Replication..... | 834 |
| | Nuclear Steam Supply System | 836 |
| | Advisory Committee on Reactor Safeguards Review | 839 |
| | C. The Site | 839 |
| | D. Common Defense and Security..... | 840 |
| | E. Research and Development | 841 |
| | F. Financial Qualifications | 841 |
| III. | FINDINGS OF FACT—COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA), SECTIONS 102(2)(A), (C), AND (D), THE FEDERAL WATER POLLUTION CONTROL ACT, AND 10 CFR PART 50, APPENDIX D (NOW 10 CFR PART 51) | 842 |
| | A. General..... | 842 |
| | B. Compliance with the Federal Water Pollution Control Act | 843 |
| | C. Compliance with NEPA and 10 CFR Part 51 | 844 |
| IV. | FINDINGS OF FACT RE: CONTENTIONS ADMITTED AS ISSUES IN CONTROVERSY, BOARD QUESTIONS, AND OTHER MATTERS..... | 846 |
| | A. Compliance of Application With 10 CFR § 50.35(a) | 846 |
| | B. Compliance With 10 CFR Part 100 Requirements Regarding Population..... | 848 |
| | C. Compliance with 10 CFR Part 50, Appendix E, I and II ... | 852 |
| | D. Spent Fuel and Radioactive Waste Storage and Disposition..... | 856 |

| | | |
|------|---|-----|
| E. | Steam Generator Tubes | 859 |
| F. | Quality Assurance | 863 |
| G. | Common Defense and Security, Health and Safety | 866 |
| H. | Environmental Matters | 867 |
| | 1. Need for Power | 867 |
| | 2. (Environmental) Site Suitability | 883 |
| | a. Societal Costs | 883 |
| | b. Contravention of Existing Land Use Plans..... | 887 |
| | 3. Impact of Construction | 889 |
| | a. Effect on Ground Water | 889 |
| | b. Effect of Construction Worker Traffic..... | 893 |
| | c. Impact of Dredging, Jetties, and of Beach Erosion | 895 |
| | d. Impact on Marine Ecology in Long Island Sound | 896 |
| | 4. Impact of Operation | 900 |
| | a. Cumulative and/or Synergistic Effects | 900 |
| | b. Thermal Effects | 903 |
| | c. Impact of Entrainment and Impingement..... | 905 |
| | 5. Alternatives to Proposed Action | 909 |
| | a. Alternative Sites | 909 |
| | b. Alternative Sources of Power..... | 914 |
| | c. Alternative Cooling Systems..... | 917 |
| | 6. Cost-Benefit Analysis | 919 |
| | a. Power Plant Reliability and Costs | 919 |
| I. | Other Matters | 923 |
| | 1. Compliance with Appendix I, 10 CFR Part 50..... | 923 |
| | 2. New Commercial Operating Dates and Peakload Projections | 925 |
| V. | CONCLUSIONS OF LAW | 929 |
| VI. | ORDER | 930 |
| VII. | APPENDIX A—DECISIONAL RECORD | |

I. PRELIMINARY STATEMENT

This partial initial decision involves the application (Appl. Ex. 17A) filed under date of August 28, 1974, with the Atomic Energy Commission, the predecessor of the Nuclear Regulatory Commission (NRC), by the Long Island Lighting Company (LILCO) pursuant to Section 103 of the Atomic Energy Act of 1954, as amended (Atomic Energy Act), 42 U.S.C. §2133 (1970). Therein, LILCO requested authorization to construct the Jamesport

Nuclear Power Station, which includes two duplicate 1,150 MWe pressurized water reactors.¹ Pursuant to 10 CFR §2.101(a), LILCO also submitted the Environmental Report (ER) (Appl. Ex. 17B) and the Preliminary Safety Analysis Report (PSAR) (Appl. Ex. 17C), which after review by the NRC Staff (Staff) and after changes by LILCO, were docketed on September 6, 1974. The ER was subsequently amended six times and the PSAR has been amended 11 times. The Staff issued the Draft Environmental Statement (DES) on February 12, 1975, which was circulated for comment (Staff Ex. 6). The Safety Evaluation Report (SER) was issued by the Staff on October 6, 1975, (Staff Ex. 12) and the Final Environmental Statement (FES) was issued on October 7, 1975 (Staff Ex. 7). Three supplements to the SER have been issued, the latest having been issued on January 17, 1977 (Staff Exs. 13-15).² Pursuant to Section 182(b) of the Atomic Energy Act, 42 U.S.C. §2232(b) (1970), the Advisory Committee on Reactor Safeguards submitted its report to the Nuclear Regulatory Commission on November 13, 1975 (Staff Ex. 13, SER Supp. 1 at App. B).

The Jamesport Notice of Hearing was published on September 20, 1974, (39 Fed. Reg. 33817) and an Atomic Safety and Licensing Board was established. By April 1976, all of the Board's initial members had been replaced due to schedule conflicts, and the Board was reconstituted to consist of its present members. The Notice of Hearing set forth the issues pursuant to the Atomic Energy Act and the issue pursuant to the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§4321, *et seq.* (1970), and the responsibilities of the Board with regard to these issues in contested and uncontested proceedings. The aforementioned notice also provided for intervention and limited appearances.

Petitions for leave to intervene were filed and ultimately the Board admitted the following as intervening parties pursuant to 10 CFR §2.714: the Environmental Protection and Progress Committee of Local 25, International Brotherhood of Electrical Workers (IBEW); the Town of Riverhead

¹Subsequently, on February 2, 1976, New York State Electric and Gas Corporation (NYSEG) purchased 50 percent of the facility. As amended on October 29, 1976, the license application designated NYSEG as a co-owner and stated that LILCO, acting on its own behalf and acting as an agent of NYSEG, retained full responsibility for the design, construction, and operation of the plant, as well as for its licensing (Appl. Ex. 17A). No petitions for leave to intervene were filed after the publication of an amended Notice of Hearing which noticed the NYSEG purchase. (Hereinafter, LILCO and NYSEG will be referred to individually or as the applicants.)

²In response to our inquiry, the Staff estimated that, through October 31, 1976, it had expended a total of 9.1 man-years in conducting its environmental and safety reviews, and that through November 30, 1976, in assisting the Staff, the Oak Ridge National Laboratory had expended a total of 5.5 man-years in conducting its environmental review (Staff Ex. 10).

(TR); Concerned Citizens of Suffolk County (CCSC); Suffolk County (SC);³ and the League of Women Voters of Suffolk County (LWV). The New York State Energy Office was permitted to participate pursuant to 10 CFR §2.715(c) and intermittently did participate in the proceeding. While TR withdrew from the proceeding on July 15, 1976, the Board retained its admissible contentions as issues (Tr. 644-646). On August 24, 1976, CCSC indicated it would not participate and thereafter did not participate in the evidentiary hearings although it remained a party with admitted contentions (Tr. 844-848). IBEW, LWV, and SC participated fully throughout the proceedings and were the only intervening parties that submitted proposed findings, conclusions of law, and briefs.

After six prehearing conferences had been held, after discovery had been concluded, and after the Board visited the Jamesport and Shoreham West sites,⁴ the evidentiary hearing began on August 24, 1976, in Riverhead, Long Island. Several individuals made limited appearance statements at the

³Early in the hearing SC's special counsel, Irving Like, Esq., advised that the county executive had made the decision to intervene in this proceeding as a neutral party (Tr. 2753). In a letter dated July 30, 1977, the special counsel indicated that the county's proposed findings and related materials constituted the county executive's position with regard to the Applicants' application and would be delivered to the county legislature. We were told that the legislature would make its position known within approximately a month's time and that we would be advised as to the outcome of the legislature's determination. In a letter dated February 15, 1978, Mr. Like stated that an enclosed Report of the Nuclear Energy Committee of the Suffolk County Legislature on Introductory Resolution #1882-77 dated February 1978 recommends that the county legislature adopt the county executive's resolution opposing LILCO's application to the NRC and the New York State Siting Board to construct Jamesport 1 and 2. However, Mr. Like did not tell us what action, if any, the legislature had taken. Thereafter in correspondence dated February 21 and February 23, 1978, IBEW and LILCO representatives filled this void. LILCO's letter reads in part:

... the Suffolk County Legislature on February 14, 1978, declined to approve a resolution presented to it adopting Mr. Like's proposed findings and conclusions and authorizing Mr. Like on its behalf to oppose the application made to the Nuclear Regulatory Commission.

The above-described resolution had initially been tabled by the legislature on August 18, 1977, and referred to a committee on nuclear energy for consideration. The committee report forwarded to you was delivered to the legislature on February 14, 1978. However, at that legislative session on February 14, the legislature rejected a motion to restore the tabled resolution to the calendar by a vote of 13 to 5.

In a letter dated February 27, 1978, Mr. Like disagreed with the interpretation set forth in paragraph one of LILCO's letter, *supra*. He asserted that the rejection of the motion to restore the tabled resolution indicates only that the legislature has decided not to vote on the resolution, and that, as the matter now stands, the county executive has taken a position but the legislature has not.

⁴LILCO has applied for a license to operate the Shoreham Nuclear Power Station which is approximately 15 miles to the west of the proposed Jamesport facility.

public hearing. After five hearing sessions totaling 44 days, the record was closed on June 9, 1977 (Tr. 9209).

In tandem with this case, a companion proceeding has taken place before two hearing examiners representing the New York State Board on Electric Generation Siting and the Environment (Siting Board), a creation of Article VIII of the New York Public Service Law, §§140-149-b (McKinney Supp. 1975). Hearings in the Article VIII (or Siting Board) proceeding began in October 1974 and, we understand, have been recently concluded. The Article VIII hearings cover a vast range of environmental, economic, social, and technical matters, many of them akin to issues before this Board, especially under its NEPA jurisdiction. Since October 28, 1975, the Siting Board proceeding has also been the vehicle for applying the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. §§1251, *et seq.*, (Supp. V, 1975) to Jamesport (see 40 Fed. Reg. 54462-63 (1975); Appl. Ex. 22 at 2). Portions of the Siting Board record were incorporated into the record of this proceeding upon agreement of the parties and Board.⁵ Applicants, IBEW, LWV, SC, TR, CCSC (under a different group name), and various New York State agencies have participated in the Siting Board proceedings. This Board's and the State Siting Board's proceedings were scheduled so as not to conflict with one another.

The following findings of fact relate to issues which were set out in aforementioned Notice of Hearing published on September 20, 1974, and which are detailed in 10 CFR Parts 20, 50, 51, 73, and 100. Said findings also relate to the various parties' contentions which were admitted as issues in controversy, and deal with those matters raised by Board questions or requests for information as set forth in the attachment to the Board's order of June 25, 1976. Our findings also relate to matters raised by us during the course of the hearing and to subjects raised by the Staff.

II. FINDINGS OF FACT—HEALTH AND SAFETY

A. General

1. The Board is required by the Notice of Hearing issued in this proceeding on September 20, 1974, to determine:

(1) whether in accordance with the provisions of 10 CFR §50.35(a):

(a) the Applicant has described the proposed design of the facilities including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components

⁵Appendix A hereto delineates our decisional record and lists the exhibits which have been admitted into evidence.

incorporated therein for the protection of the health and safety of the public;

(b) such further technical or design information as may be required to complete the safety analysis and which can reasonably be left for later consideration will be supplied in the final safety analysis report;

(c) safety features or components, if any, which require research and development have been described by the Applicant and the Applicant has identified, and there will be conducted a research and development program reasonably designed to resolve any safety questions associated with such features or components; and

(d) on the basis of the foregoing, there is reasonable assurance that (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of the proposed facilities, and (ii) taking into consideration the site criteria contained in 10 CFR Part 100, the proposed facilities can be constructed and operated at the proposed location without undue risk to the health and safety of the public;

(2) whether the Applicant is technically qualified to design and construct the proposed facilities;

(3) whether the Applicant is financially qualified to design and construct the proposed facilities;

(4) whether the issuance of permits for construction of the facilities will be inimical to the common defense and security or to the health and safety of the public; and

(5) whether, in accordance with the requirements of 10 CFR Part 51, the construction permits should be issued as proposed.

B. Description and Safety Evaluation of the Facility

Replication

2. The Jamesport application was the first one accepted under the Commission's replication policy. Applicants propose to replicate the Millstone 3⁶ plant, the base plant for which an SER was issued on March 13, 1974, and a construction permit on August 9, 1974 (Staff Ex. 12, p. 1-1).

3. The Board notes that replication has been accepted as a transitional step in the Commission's policy to standardize the design of nuclear power plants described in the Commission's Policy Statement on Standardization of March 5, 1973, under "duplicate plants." This licensing approach involves submission of an application by a utility for licenses for a nuclear

⁶The Millstone 3 plant now being constructed is located on Millstone Point near Waterford, Connecticut.

power plant utilizing a plant design that was previously submitted by the same utility or by another utility as part of a construction permit application, where the base plant had received the construction permit subsequent to June 30, 1974 (*id.*).

4. One of the principal features of the Staff's replication review is a qualification review of the base plant (as described in the Regulatory Staff's "Policy and Procedures for the Replication of Custom Plant Designs" issued in July 1974), to determine the acceptability of the base plant for replication. The Staff's qualification review of the Millstone 3 plant was made prior to the issuance of the July 1974 policy and procedures guidelines and, accordingly, did not reflect all of the current procedures applicable to qualification reviews. The Jamesport application was accepted and docketed on August 28, 1974, based on the replication of the Millstone 3 plant. The principal basis of acceptance was that the Millstone SER contained no outstanding safety issues, and that the Applicant agreed to make all changes to Jamesport as a result of the Millstone 3 review. Under current replication practice, the Staff evaluates the need during the qualification review of the base plant for the Applicant to address additional safety issues related to implementing regulatory guides and branch technical positions published since issuance of the base plant SER. For the Jamesport plant, however, this evaluation was conducted during the course of the Staff's construction permit review. The Staff's safety evaluation of Jamesport was based on its evaluation of the differences from the base plant, listed in Section 1 of the PSAR (Appl. Ex. 17C) and summarized in Section 1.10 of the SER (Staff Ex. 12), and the need for the Jamesport plant to conform to regulatory guides and Staff branch technical positions published since the issuance of the Millstone 3 SER. References were made to the Millstone 3 safety evaluation in the Staff's SER for those parts of the plant replicated by the Jamesport plant (Staff Ex. 12, pp. 1-1 and 1-2).

5. In its proposed findings Staff states that except for the site differences in plant design between Millstone 3 and Jamesport, the Jamesport plant will be identical to the "as-built" Millstone 3 plant. Staff also states that this requires that any modifications to the base plant deemed necessary as a result of the operating license review on the Millstone 3 plant will be applicable also to the Jamesport plant, unless the Jamesport Applicants propose to solve any identified problems by other acceptable alternatives.⁷

⁷In a letter dated November 4, 1977, served upon all parties, the Staff notified us that Millstone 3 had deferred its fuel-loading date from May 1984 until 1986. This raised the possibility that Millstone 3 in the future might cease to be available as a replicate base for Jamesport. In that event, the Staff would be required to conduct an in-depth review of the Jamesport operating license application. Obviously, this eventuality has no bearing on the construction permit re-

(Continued on next page.)

In the PSAR, Applicants have adopted the final design, where known, of systems and components currently being developed for the Millstone 3 plant even though these designs may not be presently documented in the Millstone 3 PSAR (Appl. Ex. 17C).

Nuclear Steam Supply System⁸

6. The nuclear steam supply system for each of the Jamesport Units 1 and 2 will consist of a pressurized water reactor with an electrical output of approximately 1,150 MWe, and a four-loop reactor coolant system (RCS). Isolation valves will be provided in each of the four reactor coolant loops to permit isolation of a loop during reactor operation. The reactor core will be composed of uranium dioxide pellets enclosed in Zircaloy tubes with welded end plugs. The fuel tubes will be grouped and supported in assemblies. The reactor core will be initially loaded in regions consisting of three different enrichments of U-235. Water will serve as both the moderator and the coolant and will be circulated through the reactor vessel and core by four coolant pumps. The water, heated by the reactor, will flow through four steam generators where heat will be transferred to the secondary (steam) system. The water will then flow back to the reactor coolant pumps to repeat the cycle. An electrically heated pressurizer will establish and maintain the reactor coolant pressure and provide a surge chamber and a water reserve to accommodate reactor coolant volume changes during operation (Staff Ex. 12, p. 1-3).

7. Each nuclear steam supply system will be housed in a containment structure. The containment will consist of a steel-lined, reinforced-concrete structure which will operate at subatmospheric pressure. It will be cylindrical, 140 feet in diameter, will be capped by a hemispheric dome, and will have an interior vertical height of 200 feet. The reinforced-concrete structure, including its penetrations, will be designed to safely confine the radioactive material that could be released in the event of an accident. The containment leakage will be filtered and exhausted to the atmosphere by the

(Continued from previous page.)

view already conducted. Moreover, in a recent submission filed on January 28, 1978, Applicants projected that Jamesport, Units 1 and 2, will come on line in mid-1988 and in mid-1990 respectively rather than in November of 1984 and in November 1986 as previously projected. Thus, even if Applicants' projections are overprojected, Millstone 3 would continue to be the base plant.

⁸The NSSS for each unit is being supplied by the Westinghouse Electric Corporation. The turbine-generator system will be manufactured by the General Electric Company. Stone & Webster Engineering Corporation, the architect-engineer, is designing the balance of the plant and will provide construction and management services as required (Staff Ex. 12, pp. 1-4, 1-5; Staff Ex. 13, p. 17-1).

supplementary leak collection and release system. An auxiliary building, to be located near the containment structure, will house gaseous radioactive waste treatment facilities, components of engineered safety features, and various related auxiliary systems for the reactor unit. A waste disposal building to be located directly east of the fuel building and north of the auxiliary building, will house liquid radioactive waste treatment facilities. The fuel building will contain the spent fuel pool and new fuel storage facilities. Engineered safety features equipment required to function for long periods in the unlikely event of an accident will be located in the engineered safety features building which will be adjacent to the containment structure (Appl. Ex. 17C, Table 1.3.1.3-1, p. 3.8-1; Staff Ex. 12, p. 1-3).

8. The steam and power conversion system will be designed to remove heat energy from the reactor coolant in the four steam generators and convert it to electrical energy. The excess heat removed by the condensers will be discharged through the circulating water system into Long Island Sound, through submerged multiport diffusers (Staff Ex. 12, pp. 1-3 to 1-4).

9. The reactor will be controlled by control rod movement and regulation of the boric acid concentration in the reactor coolant. The control elements, whose drive shafts will penetrate the top head of the reactor vessel, will be moved vertically within the core by individual control rod drives. A reactor protection system, that automatically initiates appropriate action whenever a plant condition monitored by the system approaches preestablished limits, will be provided. This reactor protection system will act to shut down the reactor, close isolation valves, and initiate operation of the engineered safety features should any or all of these actions be required (*id.* at p. 1-4).

10. The plant will be supplied with electrical power from two independent offsite power sources and will be provided with independent and redundant onsite emergency power supplies capable of supplying power to engineered safety features. Each unit is to have onsite standby emergency power sources consisting of two diesel-driven, synchronous generator sets each feeding its own bus. Either of the two generators will be completely able to supply sufficient power to cope with an accident or to safely shut down the reactor. The engineered safety features available to limit the consequences of an accident and to bring and maintain the unit in a safe shutdown condition will include, for example, the containment depressurization system for containment heat removal (quench-spray and recirculation subsystems); supplementary leak collection and release system; emergency core cooling system (accumulator, water storage tank, residual heat removal, safety injection, recirculation, and charging subsystems); containment isolation system; hydrogen recombiner system; and actuation system. A

service water system able to supply water under accident conditions is also to be provided for each unit. In addition, each reactor's control room will be equipped with a habitability system that will permit the room to be isolated and plant operators to remain in it under accident conditions (Appl. Ex. 17C, pp. 1.2-7 to -10, 6.4-1 to -8; Staff Ex. 12, p. 1-4; Staff Ex. 13, pp. 8-2 to -3).

11. The principal features of Jamesport's design are similar to those evaluated and approved previously by the Nuclear Regulatory Commission for other nuclear power plants now under construction or in operation, especially the Millstone Nuclear Station, Unit 3 (Docket No. 50-423), whose major plant systems are being replicated at Jamesport. As to other facilities, Jamesport's containment is similar to that of the Surry Power Station, Units 1 and 2 (Docket Nos. 50-280 and 50-281), which have subatmospheric containments. In addition, because LILCO's PSAR incorporates by reference certain portions of the Westinghouse Reference Safety Analysis Report (Appl. Ex. 17D), the station's NSSS design is similar to those of a number of other plants, for instance, Catawba, Units 1 and 2, Byron/Braidwood, Units 1 and 2, Vogtle, Units 1 to 4 (Appl. Ex. 17C, p. 1.3-1; Staff Ex. 12, pp. 1-1, 1-3, 4-5).

12. LILCO presented and analyzed the health and safety aspects of the proposed facility in its Preliminary Safety Analysis Report (see Part I, *supra*). The PSAR contains a description and safety assessment of the site and of the design of the station. It also describes the quality assurance to be applied to the design, fabrication, construction, and testing of the facility. The PSAR describes as well a preliminary plan for LILCO's Jamesport organization, the training of its personnel, and conduct of its operations. Finally, the PSAR sets out LILCO's technical qualifications and other pertinent information (Appl. Ex. 17C, *passim*).

13. The Staff performed a technical review and evaluation of the data submitted by LILCO and NYSEG in the license application and by LILCO in the Preliminary Safety Analysis Report and its subsequent amendments. As a result of this review and its own independent studies, the Staff prepared the SER and its supplements (see Part I, *supra*). The SER as supplemented analyzes and evaluates the following topics among others: the distribution of population and use of land offsite and the physical characteristics of the site, including seismology, geology, hydrology, and meteorology; the design, fabrication, construction, testing, and expected performance of the plant's structures, systems, and components important to safety; the response of the facility to various anticipated operating transients and to a broad spectrum of postulated accidents including design basis accidents; plans for conducting plant operations, the organizational structure of plant personnel, the steps to be taken for industrial security, and the planning for

action required in the event of an accident that might affect the general public, as well as the financial qualifications of the Applicants and the technical qualifications of LILCO to carry out the project as proposed (Staff Exs. 12-15, *passim*). A number of issues on which the Staff wished more information, or those LILCO plans with which the Staff was dissatisfied, were identified in the initial Safety Evaluation Report. During the course of three supplements to the SER over a 15-month period, all of these matters were resolved to the satisfaction of the Staff (Staff Ex. 15, p. 1-1).

Advisory Committee on Reactor Safeguards Review

14. As stated in Part I, *supra*, the Advisory Committee on Reactor Safeguards (ACRS) submitted its report in a letter dated November 13, 1975, to the then-Chairman of the Commission. Therein, the ACRS concluded that if due consideration is given to certain enumerated matters which the ACRS believes can be resolved during construction, the Jamesport Nuclear Power Station, Units 1 and 2, can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public (Staff Ex. 13, App. B). The Board finds that the Staff has considered the comments and recommendations of the ACRS and addressed the Committee's statements in the SER, Supplement 1 (Staff Ex. 13, Section 18.0).

15. Further findings regarding the safety evaluation of the Jamesport facility are found in Part IV, *infra*.

C. The Site

16. The site for the Jamesport Nuclear Power Station, Units 1 and 2, is a 555-acre tract of land located on the north shore of Long Island in Suffolk County, New York. Most of the site is within the Town of Riverhead, but a small portion of its eastern edge falls within the Town of Southold. The site is rectangular and nearly level except for steep bluffs along most of its shoreline. The average elevation of the property is 70 feet above mean low water. The site is approximately 65 miles east-northeast of New York City, 3 miles north of the unincorporated community of Jamesport, 6 miles north of the Town of Riverhead, and 3 miles west-northwest of the community of Mattituck. The Unit 1 containment structure will be located at 72° 35' 39" west longitude and 40° 59' 24" north latitude. The Unit 2 reactor will be constructed about 465 feet to the west of the Unit 1 reactor (Appl. Ex. 17C, p. 2.1-1; Staff Ex. 12, p. 2-1; Staff Ex. 7, p. 2-1).

17. Applicants have selected as an exclusion area the envelopes of two circles each having a radius of 670 meters (approximately 2,200 feet) and centered on each of the containments of Units 1 and 2. The minimum ex-

clusion boundary distance as measured from the edge of either containment is 655 meters (2,150 feet). LILCO owns all the land (including mineral rights) within the exclusion area. Except for that portion of Long Island Sound which lies within the exclusion area, there are no highways, railroads, or waterways that traverse the exclusion area. The Applicants' control of the land area extends up to the mean high-water line. Because of tidal fluctuations as well as occasional beach erosion and accretion, there will be occasionally uncovered land lying within the exclusion boundary. This "tidal beach" area is owned by the State of New York. There is no anticipated public use of such land. The Board concludes that any public use of the tidal beach as a passageway traversing the exclusion area will be minimal and will not create a significant hazard to the public health and safety. Applicants have made suitable arrangements with the U.S. Coast Guard to control access to that portion of the exclusion area lying within Long Island Sound, in the event of emergency. On the basis of ownership of the exclusion area and suitable plans with the U.S. Coast Guard, the Board concludes that the Applicants have the necessary authority to determine all activities within the exclusion area, as required by 10 CFR Section 100.3(a) (Staff Ex. 12, p. 2-1; Appl. Ex. 17C, p. 2.1-1). Further findings regarding Applicants' compliance with 10 CFR Part 100 (requirements regarding population) are found, *infra*, in Part IV.

18. In sum, we have examined Applicants' license application and PSAR (Appl. Exs. 17A and C) and Staff's SER and Supplements (Staff Exs. 12-15) concerning the numerous other factors considered by the Staff in determining suitability of the Jamesport site. These determinations include the use characteristics of the site environs, meteorology, hydrology, geology, and seismology. We are satisfied that the record supports the suitability of the site for the Jamesport facility. In addition, we find that the plant as designed adequately takes into account the meteorological, hydrological, and geological conditions, including the possibility of floods, tornadoes, and earthquakes. Therefore, for those reasons and the reasons set forth in Part IV below, the Board finds that the facility can be constructed and operated at the location proposed without causing undue risk to the public health and safety.

D. Common Defense and Security

19. The activities to be conducted under the permits and licenses applied for will be within the jurisdiction of the United States. All the directors and principal officers of the Applicants are citizens of the United States (Appl. Ex. 17A).

20. The Applicants are not owned, dominated, or controlled by an alien,

a foreign corporation, or a foreign government. The activities to be conducted do not involve any restricted data, but Applicants have agreed to safeguard any such data that might become involved in accordance with the requirements of 10 CFR Part 50. Applicants will rely upon obtaining fuel as it is needed from sources of supply available for civilian purposes, so that no diversion of special nuclear material for military purposes is involved (*id.*). For these reasons, and in the absence from the record of any evidence to the contrary, we find that the activities to be performed will not be inimical to the common defense and security.

21. Further findings regarding the area of security are set forth *infra* in connection with the Board's consideration of Contention IV.1.

E. Research and Development

22. Applicants have identified in the PSAR (Appl. Ex. 17C, Section 1.5) and in the Reference Safety Analysis Report (Appl. Ex. 17D, Section 1.5) certain development programs applicable to the Jamesport plants. These programs, which are aimed at verifying the nuclear steam supply system design and confirming the design margins, are all being conducted by Westinghouse. The objectives, schedules for completion, and current results are summarized in Applicants' PSAR. In addition, Westinghouse is conducting an integrated test program to confirm the design margins associated with the 17x17 fuel assembly design which is discussed further in Section 4.3 of the SER (Staff Ex. 12, p. 1-6).

23. The Board concludes that Applicants have identified and will perform development tests necessary for verification of the design and safe operation of the Jamesport 1 and 2 plants as proposed on a timely schedule, and that in the event the results of any of this work are not successful, appropriate restrictions in operation can be imposed or proven alternate designs can be installed to protect the health and safety of the public.

F. Financial Qualifications

24. In accordance with 10 CFR §50.33(f), there must be reasonable assurance that the Applicants possess or can obtain the funds necessary to finance the activities for which the Jamesport construction permits are sought. Both LILCO and NYSEG filed data indicating that the relevant costs, divided equally between the two companies, can be financed in the ordinary course of their businesses, using funds derived from operations and the sale of securities (Appl. Ex. 17A, p. 4-5; Staff Ex. 14, pp. 20-3 to 20-8). After reviewing the Applicants' data and subjecting that information to an independent check, the NRC Staff concluded that the Applicants are

financially qualified (Staff Ex. 14, p. 20-8). Neither the Applicants' nor the Staff's financial determinations were contested during this proceeding. Against this background and in light of its own review of the record, the Board finds that there is reasonable assurance that the Applicants can finance the activities for which the Jamesport construction permits are sought.

III. FINDINGS OF FACT—COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA), SECTIONS 102(2)(A), (C), AND (D), THE FEDERAL WATER POLLUTION CONTROL ACT, AND 10 CFR PART 50, APPENDIX D (NOW 10 CFR PART 51)

A. General

25. The Board is required by the Notice of Hearing issued in this proceeding on September 20, 1974, to:

(1) determine whether the requirements of §102(2)(A), (C), and (D) of NEPA and 10 CFR Part 50, Appendix D, (now 10 CFR Part 51) have been complied with in this proceeding;

(2) independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken; and

(3) determine after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering available alternatives, whether the construction permits should be issued, denied, or appropriately conditioned to protect environmental values.

26. Applicants submitted, in accordance with 10 CFR Part 50, Appendix D, (now Part 51) an "Environmental Report—Construction Permit Stage," on the environmental effects of construction and operation of Units 1 and 2. The original Environmental Report was further expanded by six amendments (Appl. Ex. 17B). Upon receipt of the Environmental Report, the Staff commenced its review and in February 1975, issued its Draft Environmental Statement (Staff Ex. 6). The DES was circulated to various interested Federal, State, and local agencies for comment including the County of Suffolk. No comments were received from SC. After the comments from others were received, they were answered by the Staff, and the answers were included as part of the Final Environmental Statement (Staff Ex. 7; see also Staff Exs. 8, 9) on Units 1 and 2 in October 1975.

27. The FES describes the plant site, the major systems of the plant, the environmental effects of site preparation and transmission line construction, the environmental effects of both plant operation and postulated de-

sign basis accidents, and the Applicants' environmental monitoring program. The FES also contains an analysis of plant design alternatives, including cooling systems. In addition, the FES contains a cost-benefit analysis which considers and balances the environmental effects of the facility and the alternatives available for reducing or avoiding adverse environmental effects, against the environmental, economic, technical, and other benefits of the facility. The FES concludes that construction permits for the plant, subject to certain conditions for the protection of the environment, should be issued (Staff Exs. 7, 8, 9).

The Staff review has also been supplemented by its extensive evidentiary presentations at the hearing. These are discussed in Part IV, *infra*.

B. Compliance With the Federal Water Pollution Control Act

28. Section 401(a)(1) of the Federal Water Pollution Control Act Amendments of 1972 (FWPCA) requires that the State in which a discharge will originate certify "that any such discharge will comply with the applicable provisions of Sections 301, 302, 306, and 307 of this Act." On June 15, 1977, the State of New York Board on Electric Generation Siting and the Environment issued an order granting such certification. Said Board found and determined in pertinent part (Appl. Ex. 22):

... that LILCO will comply with all applicable Federal and State environmental and water quality laws, rules and regulations, effluent standards and, therefore, we certify that the construction and operation of Jamesport, Units 1 and 2, will comply with all applicable provisions of Sections 301, 302, 306, and 307 of the Federal Water Pollution Control Act (FWPCA); provided that the Applicant complies with all Section 402 permit conditions (including any effluent limitations finally established for this facility) and all applicable provisions of State law, rules, and regulations. Such conditions and provisions will apply to this certification and, when issued, shall be attached to and become part of this certification, which is issued solely for purposes of Section 401 of the Federal Water Pollution Control Act (FWPCA).

29. Because of the above-quoted certification by the State of New York, the Board may not determine compliance with applicable standards and limitations (FWPCA §511(c)(2))—*i.e.*, the 401 certification from the State of New York is dispositive of the question of compliance with applicable limitations and standards. However, pursuant to Section 401(d) of the FWPCA, effluent limitations, monitoring requirements, and "any other appropriate requirements of State law" contained in a Section 401 certification are required to be made conditions of any construction permits which may be issued. As set forth in the above-quoted "certification," it is issued

with a provision (condition) which the Staff shall make a condition of any construction permit which it may issue.

30. Based on all the foregoing, the Board finds that the Applicants have complied with the FWPCA.

C. Compliance with NEPA and 10 CFR Part 51

31. The Board finds that all Staff actions required by NEPA and 10 CFR Part 50, Appendix D, (now Part 51) have been complied with.⁹ However, Intervenor contends in effect that the FES is inadequate in certain aspects. Our findings on these contested matters are discussed in Part IV below.

32. In addition, during the course of the hearings, SC orally and in writing argued that (1) the Staff had not given adequate consideration to a letter dated June 7, 1976 (SC Ex. 30), wherein the Environmental Protection Agency (EPA) stated that certain of its concerns (previously addressed in its May 15, 1975, letter of comments upon the DES (Staff Ex. 6)) had been inadequately addressed in the FES and that (2) the Staff had not reviewed the New York State Article VIII Siting Board record prior to or after the issuance of the FES.

33. Cognizant of our responsibilities under NEPA, the Board requested that two Staff witnesses appear on November 19, 1976, to testify as to the procedures followed in preparing the DES and the FES, and to testify whether or not consideration had been given to the EPA letter dated June 7, 1976. The Board questioned these two witnesses (Tr. 4414-4454) and permitted cross-examination in the hope that SC would specify and clarify on the record how or why the Staff had allegedly not complied with NEPA requirements. After it became evident (Tr. 4497-4502) that SC had no sharply focused concerns other than the two adverted to *supra*,¹⁰ and that cross-examination was not effectively serving to spread on the record any additional specific concerns, we ruled that there would be no further cross-examination at that time and that briefs should be submitted (Tr. 4507-4518). Under date of November 23, 1976, the Board issued an order, which read in pertinent part as follows:

This order is issued to clarify the ruling made by the Board during the hearing on November 19, 1976. On or before December 23, 1976, the County of Suffolk shall file a legal memorandum wherein it will set

⁹As noted previously, new evidence will have to be presented regarding the releases and health effects of radon.

¹⁰The county did allude to the October 6, 1976, issuance of an "Errata" document to the FES (Staff Ex. 3) but did not indicate that it had any specific concern with regard thereto (Tr. 4509).

forth factual averments or allegations upon which it bases its legal argument that the NRC Staff failed to meet its responsibilities under the National Environmental Policy Act. These factual averments or allegations must be *specifically enumerated*, and the county will predicate its legal argument thereon [footnote deleted]. Within 10 days after receipt of the county's legal memorandum, the Staff, Applicant, and any other party desiring to do so, shall file responding legal memoranda. The county's factual averments or allegations shall be assumed to be true merely for the purpose of the parties legal arguments. If the Board concludes under the assumed facts that, as a matter of law, the Staff apparently has not met its responsibilities under NEPA as implemented by 10 CFR Part 51, it will allow the county to proceed with its cross-examination in an effort to prove the truth of the aforementioned specifically enumerated factual allegations. On the other hand, if the Board concludes under the assumed facts that, as a matter of law, the Staff has met its responsibilities under NEPA as implemented by 10 CFR Part 51, the Board will not permit cross-examination in order to prove the truth of the aforementioned alleged facts.

34. On December 29, 1976, SC filed its Motion to Require Staff to Circulate Supplemental EIS Through the NEPA Review Process and for Other Relief¹¹ and, on January 14, 1977, Applicants and Staff filed their responses in opposition. During the course of hearings subsequent to December 29, 1976, SC orally argued that on other occasions the Staff had not complied with NEPA requirements. We did not reach and decide these arguments because the SC had not raised them in its motion and because Staff and Applicants had not had an opportunity to file written responses. They have not been formally raised again.

35. The Board, for the reasons set forth in our memorandum and order dated March 21, 1977, 5 NRC 684 (1977), denied the relief sought by the

¹¹SC requested the following relief in its motion:

1. The county requested that NRC witnesses Boyle and Rush be recalled for cross-examination concerning the Staff's handling of the Siting Board record and the adverse comments of EPA and other Federal agencies [footnote omitted].

2. The Board should direct the Staff to prepare a supplemental EIS:

a) evaluating the Siting Board record to date;
b) evaluating the EPA's comments on the Final Environmental Statement set forth in EPA's letter of June 7, 1976;
c) setting forth the matters contained in the "ERRATA" [i.e., Staff Ex. 3 which was superseded by Staff Ex. 8].

3. The Board should further direct the Staff to circulate such supplemental EIS through the NEPA review process and to consult with the Council on Environmental Quality as to the procedures to be followed with respect to such circulation (see CEQ Guidelines 1500.11 at page 20556).

County of Suffolk. In addition, we note that, subsequent to issuance of our memorandum and order, the EPA issued a letter stating, in effect, that it no longer adhered to the views which we summarized in our memorandum and order (see Staff Ex. 5).

36. (This finding and certain other findings have been deleted. The Board's independent cost-benefit findings will be provided later after our evaluation of new evidence regarding radon releases and effects.)

IV. FINDINGS OF FACT RE: CONTENTIONS ADMITTED AS ISSUES IN CONTROVERSY, BOARD QUESTIONS,¹² AND OTHER MATTERS¹³

A. Compliance of Application With 10 CFR §50.35(a)

Board Questions 1.A.4, A.5:

4. The Board requests that Applicant advise what is the current status of its compliance with WASH-1270 "Anticipated Transients Without Scram (ATWS)."¹⁴

¹²In the attachment to our order of June 25, 1976, we listed several questions, and during the course of the hearing, we posed other questions to one or more of the parties. There being no inviolate duty to make additional findings specifically addressing the subject matter of the Board's questions (*Southern California Edison Company, et al.* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-248, 8 AEC 957, 975 (1974)), we did not make findings upon all of the responses thereto.

¹³The rendering of our decision has been made infinitely more difficult because of SC's prolix Proposed Findings of Fact and Conclusions of Law which consisted of 487 pages (exclusive of Appendices A through P) and because said submission in no way followed the suggested sequence set forth in the attachment to our order of June 25, 1976. Frequently, the county's proposed findings are redundant, lack citations to the record, rely upon and/or cite documents which had not been admitted into evidence, and ignore the fact that certain of the county's exhibits had been admitted into evidence for limited or qualified purposes. We can only conclude that the county's submission was not prepared primarily to persuade this adjudicatory Board as to the merits of its positions upon the issues in controversy, but rather was prepared to influence various individuals or groups which had not heard the testimony and had not reviewed the record.

¹⁴The (then-Atomic Energy Commission) Staff issued a Technical Report on ATWS for Water-Cooled Power Reactors, WASH-1270, (of which we here take official notice) in September 1973. WASH-1270 includes a definition of ATWS, a discussion of probability of occurrence, and the Staff's requirements of reactor vendors and Applicants. The Westinghouse initial response, WCAP-8330, was submitted in September 1974 (Paulson, p. 2). Staff reviewed the Westinghouse analysis in WCAP-8330 and issued its "Status Report on ATWS for Westinghouse Reactors" on December 5, 1975 (attached to written testimony of Snell, following Tr. 1086). The Advisory Committee for Reactor Safeguards (ACRS) reviewed

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5. The Board requests that Staff advise what is the current status of its review of ATWS for Jamesport (especially of WCAP-8330) and what conclusions or tentative conclusions have been reached as far as Jamesport is concerned.¹⁵

37. Applicants' witnesses were C. Keith Paulson (written testimony following Tr. 1052, pp. 1 and 2), John A. Weismantle (Tr. 1141-1166), and Joseph P. Novarro (written testimony following Tr. 8327, pp. 1-3). Staff presented James C. Snell (written testimony following Tr. 1086 with three attachments, (a) letter from Heinman, NRC, to Eicheldinger, Westinghouse, April 7, 1976, (b) a letter from Boyd, NRC, to Wofford, LILCO, July 28, 1976, and (c) the NRC Status Report on Anticipated Transients Without Scram for Westinghouse Reactors, December 9, 1975). Thomas M. Novak and Ashok C. Thadani also testified for Staff (written testimony following Tr. 6910A, pp. 1-4). No other party presented witnesses.

38. The lengthy record sets forth the history of events on this subject. Unfortunately, the final status as it pertains to the Jamesport application had not completely jelled before the record was closed. However, we know that the Staff will require at the minimum the following modifications to mitigate the consequences of ATWS events: (a) diverse power interruption to reactor control rods, (b) diverse initiation of the auxiliary feedwater system, and (c) diverse initiation of turbine trip (Novak and Thadani, pp. 2 and 3). Applicants' witnesses testified that these additional safeguards could be achieved by straightforward means at a cost of approximately \$850,000 (Paulson, p. 2, and Novarro, pp. 1-2). Staff will also require Applicants to perform analyses to demonstrate that, in the event of an ATWS, automatic containment isolation would not be necessary, the auxiliary feedwater valves would be sufficiently open to allow the required flow, and the effects on the piping between the pressure relief valves and pressurizer relief tank would not produce more severe consequences than those predicted by the worst loading conditions otherwise analyzed (Novarro, p. 2). Applicants believe these analyses will demonstrate that there will be adequate auxiliary feedwater flow and that dose limits could be met without automatic con-

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Staff and vendor positions in January 1976, and concurred in general with Staff's approach (Novak and Thadani, p. 2). Staff's status report listed 18 remaining unresolved items and requested further analyses from reactor vendors. As of March 1977, Westinghouse had submitted much of the required information but Staff review of it was not yet complete (Novak and Thadani, p. 2). Staff expected to publish the results of its generic review of Westinghouse reactors and its final position as to required reactor modifications during the summer of 1977, and Applicants were to respond. Applicants and Staff did not furnish copies of these documents, if any, to the Board.

¹⁵A very general statement of the status of Staff review is given in Section 7.2 of the SER.

tainment isolation. Additional piping and/or restraints between the pressurized relief valves and pressurizer relief tank, and strengthened foundations for the tank itself may be required. If so, Applicants estimate the cost to range from \$100,000 to \$600,000 (Novarro, p. 3). Staff agrees that all of these modifications can be made during construction with detailed description of the design changes to be included in Applicants' Final Safety Analysis Report (Novak and Thadani, p. 4).

39. The League of Women Voters and the county cross-examined at length but failed to show that the status and planned actions described above fall short of meeting the requirements of 10 CFR Section 50.35a.¹⁶

40. The Board finds that modifications required of the Jamesport design to mitigate the consequences of an ATWS can be made by straightforward engineering means, that research and development is not required, that there is ample time to effect modifications, and that the additional costs involved are at most less than 0.1% of the total Jamesport cost and could not possibly tip the cost-benefit balance. In short, all requirements of 10 CFR Section 50.35(a), which relate to the issuance of a construction permit when designs are not finalized, have been and will be met.

B. Compliance With 10 CFR Part 100 Requirements Regarding Population Contention I.B.1:

The site for the proposed facility does not conform to the requirements of 10 CFR Part 100 because the population density in the vicinity of the proposed site is either unacceptably high at the present time or will be unacceptably high during the life of the plant (CCSC G.1; LWV F.1 TR F.1) because there is no mechanism to control population density (LWV Amendment, April 9, 1976). In addition, AEC's April 17, 1973, report (released April 9, 1974) on "Population Distribution Around Nuclear Power Plants" has been disregarded as has the proximity of schools within the 2-mile zone (CCSC Contention G.1).

41. Applicants' witnesses were Foroohar Boorboor, Matthew C. Cordaro, and Charles A. Daverio (written testimony following Tr. 1202, pp. 1-2) and Boorboor and John A. Weismantle, Tr. 1390, *et seq.* Leonard Soffer appeared for Staff (written testimony following Tr. 1305, pp. 1-10 plus two figures). The intervenors did not present witnesses.

¹⁶SC's proposed findings of fact (37.13-18 and 35.15 and 16) indicate a serious misunderstanding of ATWS phenomena and the Jamesport reactor design. Moreover, they misstate the record in several important respects (see, for example, Applicants' Reply to Proposed Findings of Fact submitted by the IBEW, League, Staff, and Suffolk County, August 14, 1977, pp. 77-84). No other intervenor submitted proposed findings.

42. With respect to population in the vicinity of nuclear plants, 10 CFR Part 100 includes specific provisions regarding an exclusion area, a low population zone (LPZ), and the minimum distance to the nearest population center. An exclusion area must be established under the Applicants' control such that the calculated exposure dose at the periphery in case of a major accident is below guideline values. As reflected in finding 17, *supra*, Applicants have established an exclusion area, a small part of which extends into Long Island Sound, and they own and will control all of the land within the exclusion area with the exception of a strip of beach between high and low tide levels which is owned by New York State. However, Applicants intend to execute an agreement with the State giving it control over the beach (statement of Applicant's counsel following Tr. 1045, p. 5). In case of accident, the small portion of Long Island Sound within the exclusion area can be controlled by police and Coast Guard vessels. There are no residences within the exclusion area or public roads or railroads crossing it (Boorboor, *et al.*, p. 4; Staff Ex. 12, §§2.1.2, 2.2.2, 2.1.3).

43. Applicants have calculated whole body and thyroid dose levels at the nearest periphery which are well below guideline values. Independent calculations of the Staff give similar results (Boorboor, *et al.*, p. 9). None of the intervening parties contested the acceptability of Applicants' proposed exclusion area, and the Board finds that it meets the requirements of 10 CFR Part 100.

44. Applicants propose a low population zone (LPZ) bounded by a circle of 2-mile radius centered on Unit 1. The majority of the land is used for farming. In 1970, 632 persons resided in the LPZ. Applicants believe that the land usage and population will remain essentially unchanged over the lifetime of the plant because of the real estate tax relief made possible by the tax revenues from Jamesport, Suffolk County's Farmlands Preservation Program, and the long commuting distances to large employment centers. Applicants' witness also pointed to the zoning authority of the town as a means of controlling population growth (Boorboor, *et al.*, pp. 4, 5).

45. Both the county and the league questioned Applicants' assumptions during cross-examination but did not offer a witness or other evidence to refute Applicants' population projection within the LPZ. Neither SC nor LWV proposed findings that the LPZ failed to meet the purpose intended by 10 CFR Part 100.

46. Whole body and thyroid dose levels calculated by the Applicants at the outer periphery of the LPZ are well below the guideline values of 10 CFR Part 100 and are in substantial agreement with the results of independent calculations of the Staff¹⁷ (Boorboor, *et al.*, p. 9).

¹⁷Dose calculations at the outer periphery of the exclusion area and LPZ assumed that the release resulted from a loss of coolant accident (the design basis accident). In its proposed
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47. The Board finds that, even if the population within the LPZ were to double or triple during the lifetime of the plant, the area is such that the requirements and objectives of 10 CFR Part 100 would be met for the LPZ as proposed.

48. Applicant projected population growth at all nearby locations and found that only the community of Riverhead was likely to reach about 25,000 residents during the life of the plant. The distance from the reactors to the nearest point on the periphery of that community is about 4.5 miles or nearly twice the minimum distance specified in 10 CFR Part 100.

49. Again, neither SC nor LWV proposed contrary findings. The Board finds the proposed site acceptable with respect to the distance to the nearest densely populated center.

50. The major controversy under this contention related to the means of calculating and evaluating population density out beyond the LPZ and results from the facts (a) that roughly half of the area within a radial distance of 30 miles is water, and (b) that there is a large transient population within this area during the summer. Except for the requirement concerning the minimum distance to the nearest population center, 10 CFR Part 100 itself is silent regarding population density and distribution outside the LPZ. However, it is clear from the statement of considerations concerning 10 CFR Part 100 (27 Fed. Reg. 3509, April 12, 1962) that a basic objective of the Commission "is to assure that the cumulative exposure dose to large numbers of people as a consequence of any nuclear accident should be low. . . ." Presumably with this objective in mind, the Staff has developed and published methods for estimating population density beyond the LPZ in Regulatory Guide 4.7, Revision 1, and for evaluating the results in Section 2.1.3 of its Standard Review Plan. Applicant and Staff used the methods of Regulatory Guide 4.7 for calculating present and projected population density out to a radial distance of 30 miles, *i.e.*, the population within the circle was divided by the area of that circle without regard to the fraction of the area occupied by land and water. SC and LWV propose several findings to the effect that adherence to Regulatory Guide 4.7 is inappropriate at Jamesport since roughly half of the area within a radius of 30 miles is water. The actual population density on land would be roughly twice that calculated by considering the total area. SC and LWV thus assert

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finding 40.25, the county asserts that no evaluation was made of the effects of a Class 9 accident in making the dose calculations for the purpose of 10 CFR Part 100. The county does not allege that failure to consider the Class 9 accident constituted error, however. In any case, there is ample legal precedent to the effect that the probability of a Class 9 accident is so remote as to be incredible and need not be considered absent a showing—not here made—that special circumstances make a Class 9 accident more probable here than elsewhere. *Duke Power Company* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 415-16 (1976).

that the Board is presented with an incongruous situation. While the SC and LWV assertions are arithmetically correct, the Board does not find the method used to be inappropriate or incongruous.

51. As can be seen from Figures 2-1 and 2-5 of the SER, an offshore breeze is as probable as an onshore wind which would carry any accidentally released effluent over populated areas. Since the postulated accident is a very low probability event assumed to occur at a random time, the wind is as likely to be blowing offshore (giving a near zero population dose) as onshore. Thus, the Staff's method gives a valid indication of the probable consequences of an accident. It should be noted here that the highest estimated population exposure dose would undoubtedly result if it were specified that the calculation assume the occurrence of the accident at a time when the wind is blowing directly toward the nearest large population center. But the criterion for the minimum distance to that center already addresses that possibility. The Staff's calculation, under the assumption that the accident occurs at a random time, is simply one additional means of assuring that the Commission's stated objective is met.

52. Using the methods of Regulatory Guide 4.7, Applicants and Staff also accounted for transient population, first by weighting it by the fraction of time transients are in the area, and then by adding the weighted value to the resident population (Boorboor, *et al.*, p. 6; Soffer, p. 8). Once again, SC and LWV object on the grounds that, should the accident occur during the summer, and should the wind happen to be blowing toward a concentration of visitors, the cumulative population dose would be higher than the probable dose assuming occurrence at a random time. For the same reasons as given in the preceding paragraph, the Board finds the Staff's method of accounting for the transient population reasonable and appropriate. The Board wishes to make clear, however, that its findings (regarding Staff's methods of handling transient populations and azimuthal population distributions) are not to be taken to infer that the actual transient concentrations and actual azimuthal and radial population distributions need not be considered in developing evacuation plans—quite the contrary. These factors were indeed considered by the Board before reaching its overall findings concerning the acceptability of the proposed site (see findings 58-70, *infra*).

53. In Section 2.1.3 of its Standard Review Plan, the Staff states its criteria for evaluating population density in the vicinity of a nuclear plant: If, at the CP stage, the population density, including weighted transient population, projected at the time of initial plant operation exceeds 500 persons per square mile averaged over any radial distance out to 30 miles (cumulative population at a distance divided by the area of that distance), or the projected population density over the lifetime of the

facility exceeds 1,000 persons per square mile averaged over any radial distance out to 30 miles, special attention should be given by the Staff to the consideration of alternate sites in the environmental review.

54. Applicants and Staff have each projected population densities in the vicinity of the plant using information from a variety of sources. As may be seen from Figure 2.3 of the SER, projected population densities are well within the Staff's criteria at all distances out to 50 miles.

55. The county (and to some extent the league) extensively cross-examined in an effort to discredit the projections by establishing that the Applicants' and Staff's witnesses were not professional demographers, that all possible sources of information were not used, that these are some indications that the projected populations may be higher, and the like. However, neither intervening party presented competent witnesses with alternate projections. Moreover, as can be calculated from information presented in SER Figure 2.3, either the resident or the weighted transient populations could be twice as high as projected for the years 1980 and 2020 and still fall within Staff's criteria at all distances out to 25 miles.

56. The Staff did not deny that it disregarded the April 1973 AEC report entitled "Population Distribution Around Nuclear Power Plants" in evaluating the surrounding population density but stated that the report did not represent the official Staff position and had no legal significance (Soffer, p. 2). The Board agrees. *Duke Power Company* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 416 (1976).

57. For the reasons stated above, the Board finds the proposed Jamesport site to be quite acceptable in regard to current and projected population density.

C. Compliance With 10 CFR Part 50, Appendix E, I and II

Board Questions I.C.1-3:

1. With regard to the adequacy and feasibility of preliminary evacuation plans, the Board requests that Applicants and Staff advise what plans are being made, in the event of an accident requiring precautionary evacuation within a 5-mile radius of the plant, to handle the logistics of such a move via ground and/or air and water transport.
2. The Board requests that Applicants and Staff establish the precise roles of State and local entities in the evacuation plan involving population in the 5-mile radius.
3. The Board requests that Applicants and Staff establish what judgment can now be made on the magnitude of the problems to

be overcome in an evacuation over a radius of 15 miles over the life of the plant (attachment to Board order of June 25, 1976, p. 3).

58. Three witnesses testified on emergency planning. Applicants presented William J. Tunney (written testimony following Tr. 1395, pp. 1-16); Staff witness John R. Sears (written testimony following Tr. 1543, pp. 1-9); SC presented Norman Kelly (written testimony following Tr. 1766, pp. 1-16 (Appl. Ex. 1)).

59. Before addressing specifically the Board questions we will first consider evidence adduced upon Applicants' compliance with 10 CFR Part 50 Appendix E. For purposes of emergency planning, the NRC requires that nuclear power plants be prepared to deal with the hypothetical consequences of the most severe DBA, calculating its consequences conservatively. Regulatory Guide 1.70.14 sets out the criteria for a conservative calculation of the evacuation area. PSAR Figure 13.3-1 (Appl. Ex. 17C) presents the results of LILCO's analysis using these criteria. This figure shows that the 8-hour terminus of the 5 rem whole body dose curve would be within the station's exclusion area, which circles the reactors with a 2,200-foot radius. The figure also indicates that the 8-hour terminum of the 25 rem thyroid dose curve would fall 0.8 miles from the reactor, that is, within the plant's 2-mile low population zone. Thus the Jamesport outer boundary is farther away from the plant than the two 8-hour termini just cited. It follows that under Regulatory Guide 1.70.14's conservative approach, the evacuation area is defined by the outer LPZ, or 2-mile, boundary. Based on a step-by-step analysis of the evacuation process, LILCO has estimated a maximum of 5 minutes for the plant operator to assess the extent of an accident from control room instrumentation, a maximum of 10 minutes for estimation of possible offsite doses, and 5 minutes to notify local authorities, and that the entire LPZ could be cleared within 2 hours after an order is given to begin notification for evacuation. Removal of people from any single 45° sector within the LPZ could be completed in much shorter time (Tunney, pp. 10-14).

60. Staff witness Sears' testimony (pp. 1-9) described the requirements of 10 CFR Part 50, Appendix E, and the Staff procedure in independently reviewing the Applicants' emergency plan. Staff found, based upon calculated radiological dose consequences of an airborne release following the most serious DBA, that the plan at maximum, conforms to the provisions of Appendix E. The Staff has reviewed the Applicants' basis for estimation of evacuation times and agrees that these are reasonable estimates (*id.* at pp. 6-7).

61. The Board finds that the estimates of evacuation times submitted by the Applicants for Jamesport comply with the Staff's acceptance criteria.

The Board finds that the Staff has considered emergency planning in response to the consequences of a DBA, as described in other regulatory guides and in Chapter 15 of the PSAR (Appl. Ex. 17C).

62. Now we turn to the specific Board requests. At the time these requests were formulated and subsequent thereto we were aware of various cases which indicated that, under existing Commission regulations, an Applicant may not be required to plan for the evacuation of people living outside the low population zone.¹⁸ However, in ALAB-390 the Appeal Board indicated that the doctrine of *stare decisis* is subject to exception. In the instant case there were unusual circumstances which we deem should be considered in the absence of specific standards prescribed by rulemaking and which, because they were so unusual, could not be evaluated on a generic basis. The site is on Long Island's North Fork, a narrow strip of land bordered by large bodies of water to the north and south. The Board wished to assure itself that, in the remote possibility of an accident more severe than a design basis accident, no unsurmountable difficulties to evacuation were posed by the Jamesport location. We did not require herein that Applicants devise and submit definitive plans on evacuation outside the LPZ since such a mandate rests with SC and the State of New York.

63. In response to the Board's requests both Applicants and Staff testified in some detail. Staff witness Sears considered a precautionary evacuation out to 5 miles from the plant (Sears, p. 7). A 5-mile radius would include the town of Mattituck to the east and south, Jamesport to the south. The principal road for evacuation would be generally east-west artery, Route 25. The projected population for the year 2020 for the two 45° sectors which include these two towns is about 9,000 people each. In an EPA study on evacuation (EPA 520/6-74-002, page 42), in which historical records of some incidents for which evacuation of an area took place were analyzed, the conclusion is made that an average of 10,000 people per lane of traffic per hour could be evacuated. Consequently, based on projected population, present road networks and the historical record, the Staff concluded that the logistic problems in a 5-mile evacuation around Jamesport would be well within the capability of the responsible authorities (*id.*, pp. 7-8).

64. Both Staff and Applicants' witnesses asserted their belief that need for evacuation over a radius of 15 miles from the plant was extremely remote, but both addressed testimony to this eventuality (Sears, pp. 8-9; Tunney, pp. 15-16). Extensive cross-examination by County of Suffolk and the league of both Sears (Tr. 1556-1636, 1684-1709) and Tunney (Tr.

¹⁸See cases cited in *New England Power Company, et al.* (NEP, Units 1 and 2) and *Public Service Company of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), ALAB-390, 5 NRC 733 (1977).

1408-1438, 1464-1506) produced no new information on evacuation problems peculiar to the Jamesport site which could not be adequately handled.

65. The Board appreciates the contribution of County of Suffolk's witness Kelly. Though the written testimony was prepared for and presented in the Article VIII proceeding in December 1975, the testimony was of assistance respecting Board request I.C.2, since it described the substance of meetings held with State, local, and Federal representatives concerning the Applicants' preparation of an emergency plan for Jamesport (Appl. Ex. 1; Kelly, pp. 1-16).

66. The Board's requests in the matter of emergency planning have been thoroughly considered in this proceeding. The Board finds that the Applicants, the responsible authorities of New York State, and the County of Suffolk have reached written agreements which establish their respective roles in an emergency, that there is an ample road network for orderly evacuation should it become necessary, that the Applicants' PSAR (Ex. 17C) is in compliance with 10 CFR Part 50, Appendix E, and provides reasonable assurance that appropriate measures can and will be taken in event of an emergency to protect the public health and safety.

67. In its Proposed Finding No. 27, LWV contends that due to the unique geographical configurations of eastern Long Island and inadequate accounting for transient populations, emergency planning has not been adequately addressed, and that definitive emergency planning and evacuation procedures are needed for Jamesport at the construction license stage.

68. The Board on its own initiative has probed the question of uniqueness of the Jamesport site in relation to emergency planning. The evidence in this record satisfies the Board that there is no logistical problem inherent to the site which would necessitate a more definitive emergency plan than that required for the construction license. The Board rejects the LWV finding as not supported by the evidence.

69. In its proposed findings SC presents 20 pages of argument (Nos. 41.1-41.85, pp. 350-371) to support its conclusion that "Applicants and NRC Staff have failed to demonstrate that an adequate radiological emergency response plan can be developed and executed for the Jamesport site." The bulk of this conclusion is based on the written testimony of Mr. Kelly which alleges that the NRC Staff agrees with the position taken by the county that for purposes of emergency planning, an accident worse than a DBA must be assumed (p. 12). Given this assumption, the county bolsters its conclusion by arguing the inadequacy of road networks, emergency vehicles, meteorological monitoring, and failure to provide for a public drill on evacuation procedures "...embodying, to the maximum feasible extent, real world conditions to be encountered in the event of a public evacuation..." (Kelly, pp. 14-16).

70. The county ignores Applicants' cross-examination of Mr. Kelly at the Article VIII proceedings (Appl. Ex. 1) which evidenced that the NRC Staff's position was either misunderstood or misrepresented by the county (*id.* pp. 1648-1655). Further, in testimony before this Board, Staff, in responding to the Board request on emergency planning, in no respect gave comfort or support to the county's position (Sears written testimony pp. 1-9, and his cross-examination by the county, Tr. 1544-1643). Mr. Kelly admitted he was not informed of the Board request on emergency planning, and consequently had made no preparation to offer specific testimony on the request (Tr. 1768-1772). The county does not argue whether or not the Applicant is in compliance with 10 CFR Part 50, Appendix E, but strains beyond, and in effect argues that such compliance is not enough, and in general disregards contrary testimony by Applicants' and Staff's expert witnesses. Accordingly, we reject the SC findings as being without merit.

D. Spent Fuel and Radioactive Waste Storage and Disposition

Contentions I.D.1 and 2:

1. Applicants have made no provision for additional radioactive waste storage, occasioned by the present lack of any commercial operating fuel reprocessing plant in the U. S. or of any permanent waste storage repository (CCSC Contention B.6, admitted by Board order of May 8, 1975). In addition, the probability of longer storage of radioactive waste at the plant may well mean radioactive spills which will contaminate the ground water (CCSC Contention F.9, admitted by order of May 8, 1975)... which is the sole source of Suffolk County's public water supply (SC additional Contention 1.d, as limited by Board order of May 8, 1975; CCSC Contention D.3, admitted by order of May 8, 1975).
2. Applicant has inadequately considered the releases during normal operations and/or accident conditions resulting from fuel handling and/or spent fuel and rad-waste storage, which may be extensive in time and because site-specific precautions are required by 10 CFR §100.10. Despite there being no rad-waste processing facilities or burial grounds, no design changes have been made to increase the Jamesport storage capacity and safety (LWV Contention D.1, as amended May 12, 1976).

71. Applicants presented a panel of three witnesses, Foroohar Boorboor, Matthew Cordaro, and William Tunney (written testimony, pp. 1-13, following Tr. 5563). Appearing for the Staff were Leonard Soffer (written testimony, pp. 1-3 and 1-4, following Tr. 5757), William Bivins (written

testimony, pp. 1-3, following Tr. 5787), and Walter Brooks, Marcus Greenberg, James Snell, and Soffer (written testimony, pp. 1-10, following Tr. 7017).

72. In addition to spent fuel elements (which we treat separately below), operation of the proposed Jamesport units will entail the generation of gaseous, liquid, and solid radioactive wastes. The sources, characteristics, and quantities of these wastes, the equipment to be provided to handle and package them for shipment, and the precautionary measures to be followed are described in Section 11.2 of the PSAR (Appl. Ex. 17C) and Section 11.2 of the SER (Staff Ex. 12). The Jamesport rad-waste processing and monitoring systems will replicate those previously approved for Millstone 3 (*ibid.*). The liquid rad-waste processing system will include measures intended to control the release of radioactive liquids due to potential overflow from indoor and outdoor tanks. Tank levels will be monitored and alarms activated should preset levels be exceeded. Overflow provisions such as sumps, dikes, and overflow lines will permit the collection and subsequent processing of any tank overflow. Applicants and Staff both testified that if, in spite of these measures, some radioactive liquid does reach the ground water, the public water supply would not be contaminated because the flow is always northward toward Long Island Sound (Boorboor, *et al.*, p. 9; Bivins, pp. 2, 3).

73. Applicants' witnesses testified that "spent fuel is the only type of radioactive waste material that may be stored at Jamesport for more than a short period. The other radioactive wastes generated at Jamesport will have low activity levels and will be sent to a commercial low-level waste¹⁹ burial facility. There are several such facilities operating at this time" (Boorboor, *et al.*, p. 2). Intervenors offered no evidence and did not cross-examine or otherwise contest any of the Staff's and Applicants' evidence regarding the prompt shipment of radioactive wastes (other than spent fuel elements) to offsite locations for disposal.

74. During operation of the Jamesport reactors, fuel elements will be periodically replaced. Spent fuel elements will be stored temporarily in fuel storage pools (one for each unit) which will have a capacity of 1-1/3 cores each. The first refueling of Unit 1 will occur 1-1/2 years after initial startup at which 1/3 of the fuel in the reactor will be removed and transferred to the

¹⁹There is some confusion in the record regarding terminology. Staff's SER describes the rad-wastes as both high-level and low-level whereas Applicants characterize them all (except fuel elements) as low-level. However, the Board is satisfied from Applicants' testimony that there is no discrepancy. Applicants use the term "low-level" to include all wastes (except fuel elements) reserving the term "high-level" for aqueous wastes generated at a spent fuel element reprocessing plant as defined in and used for the purpose of Appendix F of 10 CFR Part 50 (Tunney, Tr. 5588-90).

fuel storage pool. An additional 1/3 will be transferred annually thereafter. Thus, all the spent fuel from each unit could be stored in its spent fuel pool until the fifth refueling approximately 5-1/2 years after initial operation.²⁰ Applicants also state that, if the need arises, the supporting racks could be redesigned to accommodate twice as many spent fuel elements in each pool (Cordaro and Tunney, p. 5).

75. The spent fuel pools are seismic Category I structures with walls of 6-foot thick reinforced concrete with a stainless steel liner and are designed to maintain leaktight integrity over the life of the plant. Channels cover welds so as to collect any water that might leak through weld defects. The walls and roof are designed to withstand tornado missiles which might otherwise breach the pools' watertight integrity. Because of these and other design features and precautions, leakage of contaminated water from the spent fuel pools is remote. Should leakage nevertheless occur, it would move northward toward Long Island Sound (Boorboor, *et al.*, p. 8-9).

76. Much of the controversy under this contention related to the possibility of fuel-handling accidents and their consequences. Following Mr. Soffer's initial testimony on this subject, the Board considered the record to be incomplete and posed several questions to the Staff (Tr. 5883-91). In response, Staff later introduced additional testimony sponsored by witnesses Brooks, Greenberg, Snell, and Soffer (Tr. 7017, *et seq.*). This testimony and the response of the witnesses under cross-examination provided a sound record upon which the Board bases its findings that postulated fuel-handling accidents have been thoroughly, properly, and conservatively analyzed. We also find that the consequences of a worst-case fuel-handling accident are conservatively estimated and are well below the dose guidelines of 10 CFR Part 100 (SER, Supp. No. 1, Table 15.3; see also Brooks, *et al.*, p. 10).

77. Two further matters are worthy of comment. First, we agree with the league that any contamination of Long Island Sound is undesirable no matter how the concentration may be reduced by dilution. As we state above, however, we believe that adequate precautions are being taken²¹ and that the analysis of that eventuality is highly conservative. Nonetheless, the

²⁰See *Northern States Power Company* (Prairie Island Generating Plant, Units 1 and 2), *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-455, 7 NRC 41 at 51 (January 27, 1978), wherein the Appeal Board stated that it both can and should be assumed that there will be spent fuel repositories available "when needed."

²¹The record shows that monitoring wells, which will be used primarily to check for the intrusion of saltwater and other contaminants during construction, could also be used to monitor for radionuclides in ground water during operation (Bivins, Tr. 5838-41). As the league points out, the record is not clear as to whether monitoring of wells for radiation will in fact be carried out. Unfortunate as that may be, it is a question which is properly dealt with at the operating license stage and need not be resolved at this time.

Board will take that residual risk into account in its cost-benefit balancing.

78. Secondly, SC makes the argument that radioactive airborne effluents may contaminate the ground water as had been experienced with chemical pollutants from smoke stacks. We do not doubt that this is physically possible. The question, however, is one of degree. Considering the low airborne concentrations and resultant inhalation doses, the mechanisms of transfer from air to the ground water, and the many mechanisms at work to reduce radiation levels which might eventually reach man (including sorption, decay, and migration to Long Island Sound), Staff has deemed this pathway to be insignificant. In the absence of any evidence or even sound argument to the contrary, the Board agrees with Staff's position.

79. With regard to all radioactive wastes except spent fuel to be generated at Jamesport, the Board finds:

- a. that the rad-waste monitoring and process systems for Jamesport are adequate;
- b. that rad-wastes need not be stored onsite for long periods but will be shipped offsite for disposal;
- c. that the design provides adequate means for avoiding possible radioactive liquid overflows and for trapping and reprocessing any liquid wastes should overflows accidentally occur; and
- d. that even if some radioactive liquid reaches the ground water, public water supplies will not be contaminated.

Concerning spent fuel elements which must be stored onsite for longer periods than other rad-wastes, the Board finds:

- a. that it will be at least 5 years after the initial startup of each unit before its spent fuel pool is full;
- b. that it appears entirely feasible to double the capacity of each pool by incorporating a higher density rack design;
- c. that it is reasonable to assume that offsite spent fuel repositories will be available when needed;
- d. that in the unlikely event that water from the spent fuel pools enters the ground water, it will not contaminate public water supplies; and
- e. that possible fuel-handling accidents have been conservatively analyzed and any resultant radiological doses would be minimal and well within specified limits.

E. Steam Generator Tubes

Contention IV.F:

General corrosion, localized wastage, and intergranular cracking are types of corrosion that may lower the Jamesport PWR steam generator

tube structural integrity. Intergranular corrosion can cause leakage and wall thinning by localized corrosion or wastage can lower tube strength and cause failures during LOCA or postulated accident. If significant steam generator tube leakage from the secondary system into the primary system were to occur, it could affect the ECCS performance for reducing the core reflood rate following a LOCA (SC Contention 6, as amended May 7, 1976).

80. Applicants' witnesses were Daniel D. Malinowski (of Westinghouse) and John A. Weismantle (written testimony following Tr. 1852, pp. 1-10). The Staff's witnesses were Jai Rai N. Rajan, Frank M. Almeter, and Rene F. Audette (written testimony following Tr. 1937, pp. 1-13, pp. 1-5, and pp. 1-2, respectively). Dr. Rajan testified about the design criteria related to steam generator tube structure integrity. Dr. Almeter's testimony identified the measures that would be used to maintain the structural integrity of the steam generator tubes. Mr. Audette covered the effect of steam generator tube performance on ECCS performance.

81. The Jamesport units incorporate steam generators of the Westinghouse Model D4 design. The steam generator tubes are fabricated from Inconel 600, a material selected for its superior resistance to corrosion. The main condensers are also specifically designed to minimize corrosion and vibration of their titanium tubes and thus minimize any tube cracking or joint failures which could allow leakage of seawater into the secondary coolant. The use of materials containing copper has been minimized. The chemistry of the secondary system will be controlled within narrow limits by the use of zero solids treatment (ZST) which involves all-volatile treatment (AVT) chemicals and full condensate demineralization (Weismantle and Malinowski, *passim*).

82. Staff has imposed rigid design and quality standards for steam generator tubes, has reviewed the Model D4 design, and has concluded that the design meets its standards (Rajan, *passim*). Applicant will comply with additional Staff standards for in-service monitoring of secondary water quality and for in-service monitoring and inspection of steam generator tube integrity. Any tubes found to be sufficiently degraded on inspection will be removed from service by plugging (Almeter, *passim*).

83. Final criteria as to maximum permissible leak rates, wastage, and crack size will be established at the operating license stage. Sufficient and experimental evidence now exists, however, to establish that steam generator tubes which have not degraded beyond certain limits will not rupture under postulated loss-of-coolant (LOCA) and steam line break (SLB) accidents (Rajan, pp. 6, 9, 10). Because of this and the assurance from in-service monitoring and inspections that tube degradations can be detected

and corrected, Staff testified that tube rupture concurrent with LOCA or SLB is not considered a design basis condition. However, Staff is pursuing further studies of the probability and consequences of a LOCA or SLB with concurrent steam generator tube failure. Based on analyses done for the Prairie Island plant, the Staff believes that the ECCS criteria would not be exceeded even if a few steam generator tubes were ruptured. Should further generic studies so indicate, Staff will require specific analyses of the Jamesport design prior to the operating license phase (Audette, pp. 1, 2).

84. Upon cross-examination, the county made no attempt to demonstrate that either the Jamesport design or the precautionary measures to be taken were inadequate. It was brought out, however, that there was, as of September 1976, little experience with operating pressurized water reactors of like steam generator design. However, Applicants' and Staff's witnesses testified that adequate experience would be available from several plants coming on-line many years prior to the operating license phase for Jamesport (Malinowski, Tr. 1862, 1898; Almeter, Tr. 1950-1954). Much of the cross-examination related to Staff's December 5, 1975, Technical Safety Activities Report (TSAR) which pertained to various aspects of steam generator tube degradation phenomena. It was brought out that better understanding of the causes of degradation is needed as is more extensive operating experience to strengthen confidence in the effectiveness of designs and preventative operating techniques. It also showed that Staff is pursuing continuing efforts to improve knowledge and evaluate operating experience.

85. Subsequent to the hearings on this contention, the Board became aware through several NRC Appeal Board decisions of occurrences of steam generator tube failures by a mechanism called denting.²² This phenomenon was not discussed during the Jamesport hearings. Staff also informed the Board that, for as then-unknown reasons, the Millstone 3 steam generators were being returned to the vendor for modification. Because of this new information and the uncertainty as to its relevance to the Jamesport application, the Board, by its order of November 2, 1977, posed an extensive series of questions to both Applicants and Staff. On that same day the Appeal Board issued another decision from which we learned of the Westinghouse Model F steam generator design.²³ Model F incor-

²²*Northern States Power Company* (Prairie Island Generating Plant, Units 1 and 2), ALAB-343, 4 NRC 169 (1976), *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33 (1977), and *Northern States Power Company* (Prairie Island Generating Plant, Units 1 and 2), ALAB-427, 6 NRC 212 (1977). See ALAB-427 for a description of the denting phenomenon.

²³*Public Service Company of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), ALAB-442, 6 NRC 728 (1977). See affidavit of John D. Haseltine attached to ALAB-442 for description of the Westinghouse Model F design.

porated many features which appeared to us to be marked improvements over the Westinghouse Model D4 design.

86. Applicants responded to our November 2, 1977, order by way of an affidavit by Joseph P. Novarro, the Jamesport Project Manager.²⁴ Staff also responded with an affidavit by Frank M. Almeter.²⁵

87. Mr. Novarro's affidavit states:

a. that, by reason of different steam generator design, different secondary water treatment, and/or different condenser materials and design, none of the previously reported tube failures are entirely relevant to Jamesport;

b. that Applicants continue to believe that the Jamesport designs, material selections, controls, and planned precautionary measures provide adequate protection against steam generator tube degradation;

c. that experience to date supports this position;

d. that fabrication of the Jamesport steam generators will not begin for at least 2 more years;²⁶

e. and that, provided they prove out in practice and are approved by the Staff, Applicant will utilize the Model F generators at Jamesport.

88. Almeter's affidavit supports Applicant's position.

89. Suffolk County availed itself of the opportunity to comment offered in the Board's order of November 2, 1977.²⁷ SC did not therein take issue with any of the factual assertions in the affidavits of Applicants and Staff. The county did argue strongly, however, that the uncertainties regarding steam generator tube degradation were so great that the granting of a construction permit at this time would be inappropriate.

90. Upon careful review of the matter, the Board finds:

a. that Westinghouse, the Applicants, and the Staff are taking all reasonable measures to eliminate steam generator tube corrosion;

b. that there is more than ample time to accumulate adequate operating experience before the Jamesport steam generators are ordered, the main condensers are fabricated, and the secondary water treatment provisions and other precautionary measures are finalized;

c. that operating limitations and additional inspection, sampling, monitoring, and cleaning techniques are available and could be imposed should Applicants current approach prove less than fully satisfactory;

²⁴APPLICANTS' REPLY TO BOARD ORDER OF NOVEMBER 2, 1977, which was dated November 30, 1977.

²⁵Attached to NRC STAFF REPLY TO BOARD'S ORDER OF NOVEMBER 2, 1977 (REGARDING STEAM GENERATOR TUBE FAILURE), dated December 22, 1977.

²⁶Now even longer due to the possible further slippages (see finding 284, *infra*).

²⁷COMMENTS OF THE COUNTY OF SUFFOLK RESPONDING TO THE BOARD'S ORDER OF NOVEMBER 2, 1977, dated January 9, 1978.

d. and finally, that, contrary to the county's position, the current uncertainties regarding steam generator tube degradation do not constitute sufficient reason to deny a construction permit for Jamesport.

F. Quality Assurance

Contention II.1:

Applicant is not qualified to design and construct the proposed facility because it is not technically qualified to design and implement quality assurance and quality control programs which meet the requirements of 10 CFR Part 50, Appendix B (LWV Contention E, TR Contention E.1, as admitted by order of May 8, 1975; CCSC Contention D.5, as limited by order of July 1, 1975).

91. LILCO and the Staff presented witnesses who testified regarding this contention and Board questions. Appearing for LILCO were T. Frank Gerecke and John Weismantle (written testimony, pp. 1-7, following Tr. 2027 and pp. 1-6, following Tr. 2028), and Joseph Novarro (Tr. 7234, *et seq.*). Mr. Weismantle, being recalled, testified at Tr. 2165, *et seq.* Appearing for the Staff were John Spraul, Robert Heishman, Richard Keimig, and George Napuda (written testimony following Tr. 2139); James Snell (Tr. 2900, *et seq.*); Messrs. Snell and Spraul (Tr. 2928, *et seq.*); and Mr. Spraul (Tr. 2956, *et seq.*).

92. LILCO, as required, submitted in its PSAR a description of the quality assurance and quality control programs for the design and construction of the Jamesport facility (Appl. Ex. 17C, Chapter 17). The Staff reviewed LILCO's submittal in order to ascertain that each requirement of Appendix B to 10 CFR Part 50 had been adequately addressed. LILCO's commitments in Chapter 17 of the PSAR were compared against each requirement in a PSAR review checklist. This checklist was a forerunner of the Staff's Standard Review Plan for quality assurance during the design and construction phase of nuclear power plants. This checklist covers the controls for an acceptable quality assurance program to be applied to activities such as designing, constructing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, and testing that may affect the quality of safety-related structures, systems, and components. The area of review included each of the 18 quality assurance criteria of Appendix B of 10 CFR Part 50. The Staff found that the quality assurance program described in the PSAR met the acceptance criteria in the checklist (Spraul, following Tr. 2139, pp. 1, 2).

93. Upon completion of the review by the Quality Assurance Branch in the Staff's Office of Nuclear Reactor Regulation, the Staff's Office of In-

spection and Enforcement (I&E) inspected LILCO's implementation of the quality assurance program. These inspections included an examination of LILCO's quality assurance manual, procedures, representative records, interviews with personnel, and observation by Staff inspectors regarding the implementation of LILCO's quality assurance program (*id.*; Heishman, Keimig, Napuda, following Tr. 2139).

94. The record shows that LILCO's quality assurance program is administered by its Engineering Quality Assurance Department (EQA), which is staffed with personnel with extensive engineering and QA experience. EQA is responsible to the Senior Vice-President, Engineering, and to Project Management, and has the authority to stop work and/or to take conflicts to the Senior Vice-President for resolution. In order to assist in the effective control of its QA program, LILCO has delegated to Stone & Webster, the architect-engineer, and to Westinghouse, the supplier of the nuclear steam supply system, the enforcement of quality assurance and control within their own organizations and within the companies responsible to them for design, equipment, material, construction, or other services. LILCO has reviewed and approved Stone & Webster's and Westinghouse's quality assurance and quality control programs and associated manuals and procedures. LILCO will periodically conduct followup quality reviews and audits of Stone & Webster, Westinghouse, and their suppliers (Gerecke and Weismantle, following Tr. 2027, pp. 3-6).

95. After the several inspections adverted to in finding 93, *supra*, which were concluded on February 13, 1976, in Supplement 1 to the SER, the Staff stated that (Staff Ex. 13, Section 17.6):

In our review, we have evaluated the quality assurance program of Long Island Lighting Company, Westinghouse Electric Corporation, and Stone & Webster Engineering Corporation for compliance with the Commission's regulations and applicable regulatory guides and industry standards. Based on this review, we conclude that the quality assurance program complies with Appendix B to 10 CFR Part 50 and applicable guides and standards and is acceptable for the design, procurement, and construction of Jamesport Nuclear Power Station.

96. The thrusts of SC's and LWV's proposed findings are substantially similar. Therein, said Intervenor contend that the Staff's quality assurance review of LILCO's program is essentially a paper review, the Staff's review of Westinghouse's, Stone & Webster's, and their vendors' quality assurance-quality control program is really of a "generic" (programmatic) nature, and thus there is no specific assurance that the various items of equipment fabricated offsite for Jamesport will comply with the specifications. The evidence of record reflects that the NRC's Office of Inspection

and Enforcement will make periodic inspections, both at LILCO's corporate offices and at the plant site, to examine quality assurance program implementation, design, procurement, and construction work in progress, and records of ongoing activities (Heishman, p. 1; Tr. 2231). Further, the record reflects that, after making "generic" inspections of prime contractors' and/or vendors' plants to assure that the quality assurance programs are being followed with regard to components being fabricated (which may or may not be those destined for the Jamesport facility), the Office of Inspection and Enforcement then conducts a number of tests upon the assembled items of equipment at the Jamesport site during the course of preservice and in-service inspection programs (Heishman, Tr. 2171-74, 2232; Spraul, Tr. 2952-53). We conclude that the actions of the Office of Inspection and Enforcement will constitute an adequate overview, particularly in light of the fact that LILCO itself will periodically conduct followup quality reviews and audits of its suppliers.

97. SC and LWV also contend that LILCO's QC-QA program is deficient in that, contrary to the ASME Code, it does not require, for example, that certain inspections be certified by independent, third-party inspection. We note, however, that, while LILCO's QC-QA program does not contain such an ASME Code requirement, LILCO does require that its contractors and subcontractors meet all ASME requirements (Weismantle, Tr. 2105; Heishman, Tr. 2195). It is further contended that LILCO has not committed itself in the PSAR to inspect the fabrication of the fuel assemblies by Westinghouse, and that Westinghouse has not committed itself to test (other than generically) the fuel to be fabricated for Jamesport. However, the Westinghouse Nuclear Fuel Division has submitted a quality assurance plan which has been reviewed and accepted by the Staff, and, pursuant thereto, Westinghouse has the responsibility for quality control, which is checked by Stone & Webster and by LILCO. Further, the Office of Inspection and Enforcement inspects the Westinghouse fuel fabrication facility about three times a year (Spraul Tr. 2957-59).

98. We conclude that LILCO, having lead responsibility,²⁸ is technically qualified to design and implement the quality assurance and quality control programs which comply with the Commission's requirements specified in Appendix B to 10 CFR Part 50 and applicable guides and standards. Further, upon reviewing the evidence adduced in response to the Board's questions and the testimony subjected to cross-examination, we also find that LILCO is technically qualified to design and construct the proposed facility. LILCO's technical personnel are well qualified and experienced, its nuclear steam supply system vendor and its architect-engineer have had extensive experience in designing and constructing nuclear power plants and

²⁸See footnote 1, *supra*.

equipment, and its own construction management personnel have had experience in constructing the Shoreham nuclear facility and several fossil-fueled units (written testimony of Gerecke and Weismantle, following Tr. 2027, pp. 1-3, Tables 1-3; Novarro, Tr. 7234, *et seq.*).

G. Common Defense and Security, Health and Safety

Contention IV.1:

Applicants' preliminary security plans are incomplete because they do not consider radioactive releases resulting from criminal acts and sabotage at the plant and/or occurring during the transportation of fuel to the facility from the fabricator and transportation of radioactive wastes from the facility to a fuel reprocessing plant or waste storage area (TR Contention C.3, admitted by order of July 1, 1975; TR Contention G, partially admitted by order of August 25, 1975; LWV Contention G, as amended May 12, 1976).

99. Applicants' witnesses were Lawrence Low and William Tunney (written testimony, pp. 1-9, following Tr. 5903) and John Weismantle (Tr. 5947-50, 6001-04) and Donald Kasun, Robert Barker, and C. Vernon Hodge (revised written testimony, pp. 1-9, following Tr. 6018).²⁹

100. We have reviewed the industrial security section of Applicants' PSAR (Appl. Ex. 17C, Section 13.7) and we are in complete agreement with the Staff's evaluation in the SER (Staff Ex. 12, Section 13.7) which reads as follows:

The Applicant has provided a general description of plans for protecting the plant against acts of industrial sabotage. Provisions for the screening of employees at the plant and for design phase review of plant layout and protection of vital equipment have been described and conform to Regulatory Guide 1.17. We conclude that the Applicants' arrangements for protection of the plant against acts of industrial sabotage are satisfactory for this stage of the licensing process.

101. Contention IV.1 is without merit and, at best, is premature. We are unaware of any applicable regulation, and none has been cited by the parties, that requires an Applicant for a construction permit to submit at that stage preliminary security plans which would consider and/or specify the exact measures to be taken for safeguarding against radioactive releases resulting from criminal acts and sabotage at the plant³⁰ (see Tunney and

²⁹We disregard much of this testimony as being irrelevant since it did not bear on the issue of whether Applicants' preliminary security plans are incomplete.

³⁰Of course, 10 CFR §§50.34(c) and 73.55 require that every *licensee* who is authorized to operate a nuclear power reactor must submit a very detailed physical security plan.

Low, p. 1; Tunney, Tr. 5907; Weismantle Tr. 6002; Sears, Tr. 6026). Indeed, in the absence of such a regulation, at the construction permit stage in the licensing process, the Division of Project Management of NRC requests that certain information relative to industrial security be presented by an applicant for review by the Staff. This information is described in Regulatory Guide 1.70.15, Information for Safety Analysis Reports, Industrial Security for Nuclear Power Plants, December 1974, and covers plans for (a) the screening of employees to work at the plant, and (b) the layout of the plant and other design features intended to provide protection of vital equipment against acts of industrial sabotage (Tunney, Tr. 5930-31; Sears, p. 3). As indicated above, this was the information furnished in Applicants' PSAR. During the course of construction, Stone & Webster will maintain a security organization which will handle security matters (Tunney, Tr. 5922).

102. Further, we are unaware of any applicable regulation, and none has been cited by the parties, that requires an Applicant for a construction permit to submit at that stage preliminary security plans which would consider and/or specify the exact measures to be taken for safeguarding against radioactive releases occurring during the transportation of fuel to the facility from the fabricator and transportation of radioactive wastes from the facility to a fuel reprocessing plant or waste storage area.

H. Environmental Matters

1. Need for Power

Contentions V.A.1-4:

- (1) Peak power demand projections of Applicant and Staff, which consist primarily of extrapolation of historical trends, are overestimated. There is no need for the additional power generating capacity of the magnitude represented by the proposed facility. Applicant and Staff have inadequately considered a combination of factors which would depress demand including:
 - a. promoting a vigorous energy conservation program to change the patterns of consumption and reduce demand for electricity by present customers (LWV Contention A.1 and CCSC Contention A.2, admitted by order of May 8, 1975; SC Contention 4.a, admitted by order of January 9, 1975);
 - b. promoting solar heating and cooling, refuse-derived fuel, tidal and wind power to reduce baseload need (LWV Contention A.2, as amended on May 12, 1976; CCSC Contention A.2, as

- amended on May 12, 1976; CCSC Contention A.3, admitted by order of May 8, 1975);
- c. improving the efficiency of design and operation of present power plants and transmission facilities (LWV Contention A.1);
 - d. altering Applicant's present rate structure (LWV Contention A.1; TR Contention A.1, and CCSC Contention A.3, admitted by order of May 8, 1975);
 - e. the effects of price elasticity on demand (LWV Contention A.1 and TR Contention A.1, admitted by order of May 8, 1975);
 - f. the most recent population projections and trends for Applicant's service area (LWV Contention A.1, TR Contention A.1, and CCSC Contention A.2, admitted by order of May 8, 1975).
- (2) Applicant and Staff have adequately demonstrated that there is a need for the power, within Applicant's service territory, from the proposed facility if Applicant is to maintain an adequate and reliable supply of electric energy (IBEW Contention 1.A, admitted by order of May 8, 1975).
- (3) If the power from the proposed facility is not provided by Applicant, there will be adverse economic and environmental impacts on the people who reside and/or work within Applicant's service territory in that the improvement and expansion of mass transportation systems, environmental protection systems, and the option for comprehensive regional planning will be rendered impossible. In addition, the potential for continued and necessary economic growth within Applicant's service territory will be curtailed (IBEW Contention 1.B, admitted by order of May 8, 1975).
- (4) The Board requests that the New York State Atomic Energy Council,³¹ the County of Suffolk, and the Town of Riverhead present evidence to establish whether or not, in an effort to reduce peak-load demands, statutes, ordinances, building codes, or plans have been promulgated to (a) promote usage of solar heating and cooling, refuse-derived fuel, tidal and wind power, and (b) require or recommend architectural features, including insulation techniques.

103. All parties except LWV offered testimony on at least some aspects of this complex contention. Alfred Calsetta, Ray Hull, Adam Madson, and Bernard Rider appeared for the Applicants (written testimony following Tr.

³¹Now known as the New York State Energy Office.

2365, pp. 1-18). Messrs. Calsetta and Rider appeared again later (written testimonies following Tr. 7118, pp. 1-3 with appendix and pp. 1-2 with appendix). Mr. Madsen also appeared again (written testimony following Tr. 7322 with Report P-1420, Costs Incurred With Jamesport Units Located Upstate New York). The IBEW presented Marc Goldsmith (written testimony following Tr. 2615, pp. 1-20). At the Board's request, Jeffrey Cohen and Parker Mathusa appeared for the New York State Energy Office to testify with regard to documents that were ultimately admitted into evidence as New York State Energy Office Exhibits 1-6 (Tr. 5202, *et seq.*). Donald Cleary testified for the Staff (written testimony following Tr. 2658, pp. 1-17). Walter Gunderson of the Federal Power Commission also testified for the Staff (written testimony following Tr. 6438, pp. 1-4). Suffolk County presented Fred Dubin, who testified regarding the Dubin-Mindell-Bloom Associates Report (Suffolk County Ex. 18, Tr. 2256, *et seq.*). In response to a Board request, SC also presented Floyd Linton (Suffolk County Ex. 39, Tr. 5309, *et seq.*). Also at the Board's request, Allen Smith testified as Supervisor of the Town of Riverhead (Tr. 5042, *et seq.*). All parties except LWV and New York State submitted proposed findings on this contention.

Introduction

104. Before taking up the various aspects of this contention, the Board makes several initial observations. First, the title "Need for Power" is somewhat misleading. The question of "need" is really one of "benefit," *i.e.*, whether construction and operation of the proposed plant will offer sufficient public benefit to offset the attendant financial and environmental costs (*Public Service Company of Indiana* (Bailly Generating Station, Nuclear-1), ALAB-227, 8 AEC 416, 419 (1974)). Throughout the hearings on this contention, the county tried to narrow the issue to one of whether the benefit to *Suffolk County* justified the environmental costs to the county. The Board does not read NEPA either to suggest or require such narrowing of cost-benefit balancing nor are we aware of any precedent to that effect. Moreover, in this day of common and voluminous interstate and international trade and interdependence, we find no sound logic to support such a position and none was offered. Hence no further consideration is given herein either to the county's attempts to narrow the issue or to alternatives which, unless meritorious for other reasons, appear to be advanced simply in an effort to preclude construction of Jamesport within Suffolk County.

105. As can be seen from the wording of the contention, it covers not only need for power but many alternatives to its means of production and to possibilities for avoiding the need for additional generating capacity of any

kind. Hence many alternatives to the proposed plant are considered under this contention with the exception of coal. Thus, we address herein the question of whether or not there is a need for a large new baseload generating plant fueled either by coal or nuclear fuel, and whether or not there are preferred alternatives to that new plant. The question of the preferability of coal over nuclear fuel is addressed in findings 249-250, 255-258.

106. This contention is also complicated by the fact that it was written and accepted by the Board long before it was announced that NYSEG was to be a half-owner of Jamesport, Units 1 and 2, and would own half of the electricity generated by these units. Among other things, NYSEG's entry into the picture reopened the question of whether or not it would be preferable to locate one or both of the proposed units in NYSEG's service area in upper New York State. This alternative is therefore addressed under this contention.

107. The fact that Applicants announced an additional slippage of 18 months in expected operational dates (to November 1984 for Unit 1 and November 1986 for Unit 2) during the course of the hearings also complicated the issue (Tr. 7354; Appl. Ex. 9, p. 1). In addition, new peak power demand predictions were issued by both LILCO and NYSEG as required by the New York State Public Service Commission (attachments to Calsetta, Rider testimony following Tr. 7118). Consequently, additional testimony was introduced and examined some months following the initial hearings on this aspect of the contention. Since these new projections incorporate an additional year's experience and are held out as Applicants' best current projections, the Board has ignored previous predictions except as they may relate to the validity of Applicants' prediction methodology.

108. Largely because of NYSEG's entry into the picture, questions regarding Statewide distribution of electricity were raised by the Board during the course of the hearing thus requiring still additional testimony long after the initial evidence was heard. Nevertheless, that aspect of the issue is also addressed herein.

109. With these initial remarks in mind, we now turn to our evaluation of the many facets of the contention.

110. For a variety of separate but related reasons, Applicants urge that it is necessary and beneficial for Jamesport's 2,300 MW of power to come on line as now scheduled (Calsetta, *et al*, pp. 4-10):

- a. to satisfy expected LILCO and NYSEG peak power demands;³²

³²The increasing gap between the growing demand for power in the NYSEG service area and NYSEG's generating capacity would not be relieved *directly* by the addition of the proposed Jamesport plant on Long Island. There is no exclusive-use transmission line connecting the two service areas. Rather, all of the generators and consumers in the whole of New York State and

(Continued on next page.)

- b. to provide required reserve margin;
- c. to provide economic electric energy to the LILCO and NYSEG service areas and economic dispatch to New York State at large;
- d. to drastically lessen the dependence on foreign oil in the LILCO area and provide diversity in the NYSEG area.

111. Suffolk County, on the other hand, argues that the need for additional generating capacity is not likely to develop because of such factors as conservation, increased use of solar and wind power, use of load-leveling techniques, and use of total energy systems at the point of use. The Board evaluates these arguments, *infra*.

Available Capacity, Peak Power Demand Forecasts, Reserve Margins, and Date of Need for Additional Capacity

112. The New York Public Service Law requires utilities in New York to submit new forecasts of peak power demand and energy usage annually along with a detailed explanation of the methodology used and the factors considered in making them. The LILCO and NYSEG 1976 submissions are in evidence as Applicants' Exhibit 4A. Both utilities made use of population and household projections of the New York State Office Planning Services. Further, both took into account such factors as the expected change in the real price of electricity and its price elasticity, saturation of appliances including electric heating and air-conditioning, and expected degree of conservation and use of solar energy. Both NYSEG and LILCO obtained independent forecasts from National Economic Research Associates, and LILCO also obtained further independent econometric estimates from the Brookhaven National Laboratory. LILCO and NYSEG both provided revised forecasts, made early in 1977, using the same methodologies as for 1976 but incorporating the previous year's sales experience and other more recent data (Calsetta, p. 1, and Rider, p. 1).

113. The County of Suffolk commissioned an independent study by

(Continued from previous page.)

surrounding regions are interconnected by an electric power generation network or grid. If the total generating capacity connected to the grid is sufficient, local shortages can be relieved from the surplus in neighboring areas. Or, if the total generating capacity falls short of the total demand, and if the capacity of the transmission system permits, then the addition of new capacity at any point on the grid can serve to relieve shortages at any other point. It is by this method that Applicants assert that forecast shortages in NYSEG's service area in upper New York State will be relieved by the addition of the Jamesport units on Long Island (Madsen, Tr. 7342; see also Gunderson, Tr. 6485-86).

Dubin-Mindell-Bloom Associates, P.C. (DMBA) (SC Ex. 18). Mr. Dubin also testified for the county at Tr. 2255, *et seq.* (see also Appl. Ex. 5 which covers LILCO cross-examination of Dubin in the New York State Article VIII proceeding). Unfortunately, the DMBA report is limited entirely to the LILCO service area. Among other things, the DMBA report includes the results of their independent assessment of future peak power demands for the LILCO service area and a description of the prediction methodology utilized. LILCO's summer peak exceeds its winter peak and the DMBA results for the "normal case" summer peak are somewhat lower than LILCO's 1976 projections but somewhat higher than LILCO's 1977 forecasts to 1987 (compare Fig. 2, DMBA, with Calsetta, *et al.*, p. 5, and with Attachment 1 to Calsetta written testimony following Tr. 7118).

114. Staff reviewed the LILCO projections in the FES (Staff Ex. 7, Section 8) and more recently both the LILCO and NYSEG 1976 projections (Cleary, p. 9). Staff also made independent calculations based on growth rates of the Federal Energy Administration's Project Independence forecast revised downward (by FES) as a result of eight studies completed since mid-1973. These growth rates are somewhat higher than projected by LILCO and NYSEG and therefore result in somewhat higher peak demand forecasts. Staff also reviewed the methodologies utilized by both utilities and independently checked some of the important inputs (such as population and household growth, appliance saturation, and price elasticity). Although LILCO and NYSEG use different forecasting techniques, Staff finds them both reasonable and sound (*ibid*, pp. 9, 12).

115. Without either Jamesport unit, NYSEG's generating capacity during the 1980's will be primarily coal fired and will amount to 2,801 MW assuming its 850 MW coal-fired Cayuga plant, now in the early stages of the NY State licensing process, comes on line as scheduled. In addition, firm purchases bring NYSEG's total capacity up to 3,480 MW (Calsetta, p. 6, Tr. 2439-41). LILCO's generating capacity, on the other hand, is currently derived entirely from oil-fired plants (FES, 8.3.1). However, LILCO's 820 MW Shoreham nuclear plant is expected to become operational in 1979 or the early 1980's. Including Shoreham and firm purchases, LILCO's total capacity is expected to be 5,009 MW before Jamesport 1 comes on line (Calsetta, Tr. 7162).

116. Both LILCO and NYSEG are members of the New York Power Pool which requires its members to maintain a minimum 18% reserve in order to insure acceptable Statewide electric service reliability (Calsetta, *et al.*, p. 4). The need for this reserve margin is uncontested in these proceedings.

117. The following tables indicate that even if NYSEG's Cayuga plant and LILCO's Shoreham plant come on line as currently anticipated, both

utilities will require the additional generating capacity of Jamesport, Unit 1 or its equivalent by 1984 or earlier and Jamesport Unit 2 or its equivalent by 1986 or earlier.

LILCO

| | | W/o Jamesport, Units 1 and 2 ² | | With Jamesport Unit 1 but not Unit 2 ³ | |
|------|---|--|--|--|----------------------------------|
| Year | Predicted Summer Peak MW ¹ | Total Controlled Source MW | Reserve Margin in % ⁴ | Total Controlled Source MW | Reserve Margin % ⁴ |
| 1985 | 4,370 | 5,009 | 14.6 | 5,584 | 27.8 |
| 1986 | 4,560 | 5,009 | 9.8 | 5,584 | 22.5 |
| 1987 | 4,740 | 5,009 | 5.7 | 5,584 | 17.8 |
| 1988 | 4,920 | 5,009 | 1.8 | 5,584 | 13.5 |
| 1989 | 5,110 | 4,960 | | 5,535 | 8.3 |

¹LILCO's 1977 predicted summer peakload from Attachment 1 to Calsetta testimony following Tr. 7118.

²LILCO's total controlled source without Jamesport, Units 1 or 2. Calsetta testimony, Tr. 7162.

³LILCO total controlled sources with Jamesport Unit 1 operational in 1984 but without Jamesport Unit 2: Same as above plus the LILCO share of Jamesport Unit 1, i.e., 575 MW.

⁴Reserve margin percentages calculated by the Board.

NYSEG

| | | W/o Jamesport, Units 1 and 2 | | With Jamesport Unit 1 but not Unit 2 | |
|------|--------------------------------|--|--|--|----------------------------------|
| Year | Predicted Winter Peak MW | Total Controlled Sources MW ⁵ | Reserve Margin in % ⁶ | Total Controlled Sources MW ⁵ | Reserve Margin % ⁶ |
| 1983 | 3,060 | 3,497 | 14.3 | 3,497 | 14.3 |
| 1984 | 3,220 | 3,488 | 8.3 | 4,063 | 26.2 |
| 1985 | 3,390 | 3,480 | 2.6 | 4,055 | 19.6 |
| 1986 | 3,570 | 3,480 | -2.5 | 4,055 | 13.6 |
| 1987 | 3,750 | 3,480 | -7.2 | 4,055 | 8.1 |

⁵NYSEG total controlled sources without Jamesport, Units 1 and 2 (Rider testimony, Tr. 7175, less NYSEG's share of Jamesport Unit 1 (575 MW) beginning 1984 and less an additional 575 MW for Unit 2 beginning in 1986).

⁶Reserve margins were derived from Rider testimony, Tr. 7176.

118. In its proposed findings (pp. 1-11, and Appendixes A, B, and C) the county proposes for the first time new projections of peak power demand for the LILCO service area (nothing along these lines advanced for NYSEG service area). The projections are based on the fact that, after an average annual growth of over 10% from 1964 through 1973, the LILCO summer peak dropped 124 MW or 4.2% from 1973 to 1974 (Table 8.1, SER). As alleged by the county (although not in the record) the 1974 summer peak fell even further below LILCO's previous projection. SC also alleges (without citing the record) that LILCO's predictions for 1975 and 1976 summer peaks made in 1974 and 1975, respectively, were also higher than actually experienced. The county then extends this "trend" out into the future in the attempt to demonstrate that Jamesport will not be needed to meet demands on the LILCO system as soon as Applicants predict.

119. With regard to the county's argument, the Board observes first that it is based on material largely outside the record. Moreover, having been offered for the first time long after the record was closed and without even the suggestion that it was based on new information, it did not give the other parties an opportunity to examine or rebut the prognostication on the record. Secondly, the unexpected oil embargo and recession, among other things, are generally blamed for the overprediction by many utilities in the mid-1970's. As Federal Power Commission witness Gunderson pointed out (Tr. 6522):

If you want to look at what Long Island Lighting or any other company in the country forecast was for the next 10 years, made in 1973, it will look significantly different from what they made in the summer of 1974, much less today.

120. Currently LILCO predictions not only incorporate the actual setbacks experienced in the mid-1970's, their forecasting techniques have changed markedly as a result, and predicted growth rates have been reduced to less than half of the 10% plus rates experienced in the late 1960's and early 1970's (Table 2, Cleary testimony; appendices to Calsetta and Rider testimony following Tr. 7118). Moreover, *all* forecasts of record in this proceeding indicate a need for new generating capacity in the mid-1980's including those of both utilities and their consultants, the Staff, and the county's own consultant, DMBA.

121. For the above reasons, the Board is unable to give much weight to the peak power predictions advanced in the county's proposed findings.

122. Suffolk County also argues that the need for additional generating capacity is not likely to develop because of such factors as conservation, increased use of solar, wind and refuse-derived power, use of load-leveling techniques, and use of total energy systems. The Board takes these possibilities very seriously since, except for initial installation, most do not

involve continuing consumption of any irreplaceable resource.

123. In addition to making peak power demand projections for the normal case as mentioned above, SC consultant and witness Dubin also provided additional curves indicating potential reductions if all of its suggested conservation measures were fully implemented. These curves were given for both summer and winter peaks with and without the additional potential of solar cooling and heating (SC Ex. 18, Figures 2, 3, 5, and 6). Projected annual electric energy consumption curves were also included along with potential reductions due to conservation and use of solar energy (Figures 4 and 7, *ibid*). The methodology used and assumptions incorporated in these projections were also detailed in the DBMA report. In general, the Board was impressed with the thoroughness and quality of this report. Unfortunately, however, as noted previously, the report was limited entirely to the LILCO service area on Long Island. The effects on other consumers of LILCO-generated electricity, including NYSEG's customers, were not mentioned.

124. With respect to solar energy, sizable potential reductions are indicated for both annual electric energy usage and winter peak demand. However, LILCO's peakload occurs in summer, and the DMBA report indicates negligible reduction attributable to the use of solar cooling. Thus, while the Board is impressed with indicated potentials for reductions in electric energy consumption and associated fuel savings, the increased use of solar energy has only a slight bearing on the need for and benefits of the proposed Jamesport plant.

125. The DMBA report also contains a chapter indicating the potential of wind-driven generation on Long Island.³³ Although the chapter is very preliminary and incomplete, the Board was nevertheless encouraged by the apparent potential for Long Island (should all fuels become exceedingly scarce and expensive at some future date). Be that as it may, we find that wind systems do not constitute a practical alternative to the proposed Jamesport plant nor do they hold out hope for significant reductions in power demand from central generating stations because:

- a. system costs and product prices were not estimated;
- b. considering the variability of the wind, either extensive storage arrangement or auxiliary generators would be required to produce either heat or electricity on demand (Calsetta, *et al*, pp. 10-11);
- c. although individuals might choose to install private wind driven generators for their own particular needs, even small capacity central plants with attendant storage and distribution networks would require no small

³³An Assessment of the Wind Energy Resource Available to Long Island, N.Y., University of Massachusetts (Amherst) Energy Alternatives Program, July 1975 (SC Ex. 18; 65-110).

organized effort to accomplish design, engineering, purchasing, construction, operation, maintenance, and the innumerable other functions common to any utility operation. There is no evidence of record that any organization, governmental or private, has proposed to install a wind-driven system either as an alternative or an adjunct to LILCO;

d. neither an environmental impact assessment nor a cost-benefit analysis for a wind-driven generating system is included in the record before us.

126. The Dubin report also suggests that "total energy systems" (TES) have the potential for reducing peak demand on the LILCO system. TES generate electricity and utilize waste heat for heating or cooling at the point of use. They might be used for apartment complexes, industries, schools, or hospitals. Again, the Board finds that TES are unlikely to make any significant dent on the demand from LILCO.

a. From the information in the record, we are unconvinced that TES are either cheaper or more efficient than machines using electricity from the LILCO system.

b. They would be fueled with oil, natural gas, or coal and would thus be undesirable for the same reasons Applicants rejected those fuels for Jamesport.

c. Experience with TES has been disappointing. Applicants state that of five such ventures initiated on Long Island, four have been terminated and the fifth has expressed interest in buying electricity from LILCO for its expansion (Madsen, Tr. 2390).

127. Major emphasis in the Dubin report is placed on the potential for conservation. However, the county has hardly even attempted to show how much of that potential might realistically be expected to materialize. Beyond such initial discretionary steps as adjusting thermostats and switching off lights when not in use, conservation measures identified require sizable capital investments. Most would also require imposition by law. However, State, county, and Town of Riverhead witnesses appearing at the request of the Board indicated that little, if anything, had been legislated to date or was planned for the future (Linton, p. 3, Tr. 5313-17; Smith, Tr. 5045-47; Cohen, Tr. 5212; Mathusa, Tr. 5214-16). The Board has no doubt that conservation has served to depress peak demand to some degree in the last 5 years and is likely to depress it even further in the future. On the basis of the record before us, however, we are unable to make a firm judgment as to the extent to which suggested conservation measures will actually be adopted. We can say, however, that (a) LILCO and NYSEG have already considered the effects of conservation in their projections, and (b) while Applicants may have underestimated their impact, it is highly improbable

that anything like the full potential indicated by the Dubin report will be realized.

128. Methods for improving load leveling (such as time-of-day-metering) are also suggested by the county. However, LILCO in particular has been actively working with the New York Public Service Commission on rate structures designed to depress peakload. To date, progress has been disappointing and slower than expected (Calsetta, *et al*, written testimony following Tr. 2365, pp. 3-4; Calsetta written testimony following Tr. 7118, p. 3).

129. The county also holds out refuse-derived fuel (RDF) as an alternative. LILCO is already engaged in a cooperative project with the Town of Hempstead and is discussing possibilities with other communities on Long Island. NYSEG is also pursuing discussions with communities in their service area. However, it is clear that the maximum amount of electricity which could theoretically be generated from refuse would be only 2% or 3% of LILCO's current generating capacity (Calsetta written testimony following Tr. 2365, pp. 11-14).

130. In summary, the Board finds that the combined effects of all of the load-depressing measures suggested by SC are not likely to curtail future growth enough to eliminate the need for additional generating capacity in the mid to late 1980's.

Preferred Type of Plant and Economic Benefits

131. To this point, projected peak demands and the need for additional generating capacity have been discussed only in terms of quantities of power without regard to types of generating plants or the cost of the electricity produced. Currently LILCO plants are 100% oil fueled, with the great bulk of oil supply from foreign sources (Madsen, Tr. 7329). Moreover, as much as 30% of LILCO's current generating capacity is in gas turbine peaking plants, resulting in expensive electrical power for LILCO's customers (Madsen, Tr. 7352). Consequently, even when the 820 MW Shoreham nuclear plant is added to the system, LILCO will be inordinately short on large coal or nuclear plants which can be economically baseloaded. Thus Applicants state that the Jamesport units will be baseloaded and operated as nearly continuously as possible (Madsen, Tr. 7348-50).³⁴ In this respect,

³⁴Applicants' witness Madsen states that the LILCO baseload is about 55% of its peakload (Tr. 7460). The earliest peakload for which Jamesport Unit 2 will be available is in the summer of 1987 when the projected peakload is 4,740 MW. Thus the projected baseload would be about 2,600 MW. The combined capacity of Shoreham and Jamesport is 3,120 MW. However, necessary shutdowns for refueling and maintenance make it impossible for a baseload plant to

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Staff reports the results of several studies which find a significant superiority for nuclear baseload plants (FES 8.5). One study in particular found that the operating, maintenance, and fuel costs for oil plants are almost equal to the total (inclusive of construction) cost of nuclear *i.e.*, 35.39 v. 36.22 mills/kWh. This means that for the same baseload a new nuclear plant could be built and operated to replace entirely an existing oil-fired plant with only a slight cost penalty. Or, if there is some modest increase in baseload so that the existing oil plant operates at partial capacity to augment the baseloaded nuclear plant, an economic advantage is realized. This general circumstance had been specifically confirmed by several LILCO studies which indicate clear economic advantage for Jamesport even if load growth falls substantially short of forecasts (Appl. Ex. 8). SC witness, Bupp, however, concluded that there is such a wide range of uncertainty in the key parameters that a definite conclusion as to cost advantage cannot now be made (Tr. 5474-84).

132. Applicants also claim that the economic advantages of adding a large baseload plant are greater if construction is undertaken early, even before the absolute need develops, since the costly effects of inflation are thereby minimized. The county does not contest this concept unless it is pushed too far beyond some unspecified break-even point (Bupp, Tr. 5503). Moreover, a substantial economic advantage is realized by building identical plants "back-to-back" on the same site (Costs Incurred With Jamesport Units Located Upstate New York, July 1976 at pages 18, 19, following Tr. 7322).

Substitution of New Plant for Existing Oil-Fired Plants

133. Quite independent of (a) the need to provide additional generating capacity to meet projected growth in demand with necessary reserves, and (b) the economic advantages of a large new baseload plant, Applicants argue that Jamesport is needed to reduce dependence on oil in general, and foreign oil in particular.^{35,36} There are many advantages to reducing

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be operated continuously. Assuming a 2/3 capacity factor and staggered shutdowns, the maximum available capacity would be 2,300 MW (Jamesport 1 and 2 operating and Shoreham shutdown) or about 300 MW less than LILCO's projected baseload in 1987. Even if LILCO's baseload falls short of projections, Applicants state that the Jamesport units would nevertheless be run as continuously as possible with any surplus power sold outside its service area. This is so because the minimum hourly load in New York State is still higher than the maximum nuclear capability in the State (Madsen, Tr. 7443).

³⁵See written testimony of Calsetta, *et al*, pp. 8-9, following Tr. 2365; Rider, Tr. 7188; Madsen, Tr. 7329. See also Applicants' opening statement, Tr. 753-58.

³⁶Applicants also urge that the plant should be nuclear, in part because it would provide ad-

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dependence on oil. Of these, the Board considers the greatest benefit to be that of providing insurance on Long Island against the possibility of partial or total loss of oil supply.¹ Although not really contested during the hearings, the Board has explored this aspect at considerable length on the basis of the record before it.

134. The need for providing protection against the partial or total loss of oil supply is especially acute on Long Island since all of LILCO's generating plants are oil fired. There may well be differing opinions as to the probability of a loss of oil supply at some time during the projected lifetime of Jamesport.³⁷ However, unless new generating capacity derived from some other fuel is added to the LILCO system, it is overwhelmingly clear on its face that the consequences on Long Island would be catastrophic. In such a situation, the benefits of having Jamesport available would be incalculable. See *Public Service Company of New Hampshire, et al*, (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 95-98 (1977). Recognizing this benefit, we now turn to explore its possible cost. Both the cost of providing insurance and the degree of protection provided depend on future growth in demand for electrical power and on LILCO's ability to sell any surplus outside its own service area.

a. If demand within LILCO's service area grows as Applicants project, and if there is a ready market for any surplus, then all of LILCO's existing and planned generating capacity would be fully utilized, and insurance against loss of oil supply would be provided at no additional cost. However, Jamesport and Shoreham together would not have sufficient capacity to provide full protection against complete loss of supply. Nevertheless, it appears that they would suffice to meet the most essential needs and thus prevent an out-and-out tragedy.

b. If demand does not grow as much or as fast as Applicants predict, or if all surplus power cannot be sold, then Jamesport and Shoreham would still be operated as much as possible but existing oil-fired plants would be only partially utilized. In this case, the costs of idle plants would be chargeable to insurance. However, Jamesport and Shoreham would be more nearly capable of providing full protection.

c. In the extreme case of no growth in demand, the question arises as to whether Jamesport would provide too much protection, *i.e.*, whether its

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ditional diversification within New York State. NYSEG's current generating plants are almost entirely coal fired (Madsen, Tr. 7454; Rider, Tr. 2381). Shortages and dwindling coal supplies resulting from the recent coal miners' strike (of which we here take official notice) add emphasis to this argument.

³⁷See for example, Bupp, Tr. 5483.

capacity could be fully utilized in case of loss of oil supply.³⁸ At the present time, LILCO's peak demand is about 3,000 MW and its baseload 55% of that, or about 1,650 MW. Jamesport's 2,300 MW capacity exceeds the current baseload but falls short of the peakload. As previously mentioned, large nuclear (or coal) plants designed for baseload are best operated at steady state although there is some capability to load follow, *i.e.*, to vary the output so as to follow variations in demand. We believe, however, that Jamesport would nonetheless be operated at full capacity under these conditions. First, of all, the whole of New York and surrounding States are heavily dependent on oil (P-1420, p. 5, following Tr. 7322). Therefore, an extreme shortage or complete loss of oil supply would affect the whole region and any excess power not needed on Long Island would undoubtedly be in great demand. But even if export off Long Island was not possible for some unforeseen reason, we still believe that Jamesport (and Shoreham) would be operated at full capacity. Under such circumstances, governmental controls over distribution and utilization would undoubtedly come into play to effect load leveling. Moreover, storage devices (such as fuel cells) could be used to permit full utilization of Jamesport's capacity and still provide for some fluctuation in demand. Finally, those residences and industries which relied on oil for heating and other uses would also be without supply and would convert to electricity to the extent possible.

135. As a result of this analysis, the Board concludes that the proposed Jamesport plant can indeed be fully utilized to provide protection against the possibility of a serious reduction or loss of oil supply, and that its value for this purpose is enormous. To put it another way, the Board finds it inconceivable for it to deny the people of Long Island the opportunity for the Applicants to provide them with such protection.

136. In addition to providing protection against loss of oil supply, there are other important advantages to substitution. First of all, oil is indispensable for the petro-chemical industry, for transportation, agriculture, commercial fishing, national defense, and many other essential functions. Substitution of Jamesport for existing oil-fired plants would save over 10 million barrels of oil annually (SER 8.5, Staff Ex. 12). The disadvantages of continued reliance on foreign oil are particularly severe and include its growing price under alien control, its balance of payments burdens, the encumbrances to foreign policy, and the additional stress on World peace (see for example, Bupp, Tr. 5485).

Alternate Sites and Means to Meet Applicants' Needs

137. Early in the site selection process, sites in upper New York State

³⁸We assume here, as in the economic discussion above, that only two of the three LILCO nuclear units would be operating at any one time.

were considered and rejected (Madsen, p. 2, following Tr. 7322). However, this determination was made prior to the time that NYSEG became an equal owner and co-applicant. Moreover, Applicants continued to hold out power needs in the NYSEG service area as part of the justification for the need for Jamesport even though those needs could not be met directly if Jamesport were to be located on Long Island. The Board, therefore, suggested that Applicants prepare and sponsor written testimony as to why it would not now be preferable to locate one or both of the Jamesport units in upper New York State.³⁹

138. Applicants responded by presenting Adam Madsen as a witness (Tr. 7321). Madsen's written testimony entitled "Prohibitive Costs of Locating Jamesport's 2,300 Megawatts Upstate" included LILCO Report P-1420, "Costs Incurred With Jamesport Units Located Upstate New York" (both follow Tr. 7322). In addition, Mr. Madsen orally testified upon direct examination (Tr. 732-7345).

139. The essence of Madsen's testimony is:

a. that although half of the power demand in New York State is from New York City and Long Island, the bulk of the low cost generation is located outside this area (Madsen, p. 5);

b. the result is that there is already a large flow down from baseload plants in upper New York to New York City and Long Island (Gunderson at Tr. 6493; Madsen, p. 6);

c. as a result, transmission capability is already loaded. If Jamesport were also located upstate, new transmission lines costing over one billion dollars would have to be added (Madsen, p. 4);

d. moreover, transmission losses would increase by about 200 MW whereas if Jamesport were located on Long Island, the net flow south to New York City and Long Island would be reduced and line losses would also be reduced;

e. in addition, Long Island would be even more vulnerable to loss of power due to transmission line overloads.

140. Other disadvantages of locating the Jamesport units upstate include the fact that Applicants could not possibly conclude the long preconstruction engineering and State and Federal licensing procedures in time to provide timely additional power.

141. For these reasons, the Board finds that there is no advantage to the alternative of locating the Jamesport units in upper New York State.

142. It is clear from a comparison of LILCO's projected peak power

³⁹Staff had already offered the testimony of Walter Gunderson of the Federal Power Commission on this subject (see Gunderson written testimony and subsequent cross-examination following Tr. 6438).

demands and its total generating capacity after Jamesport is added to its system that LILCO will have a large excess capacity well into the 1990's.⁴⁰ This raises the question of why it would not be preferable to locate one unit on Long Island and the other upstate. Such an arrangement would lessen the need for additional transmission capability and would lessen line losses. As against having both units located upstate New York, it would also provide Long Island with additional protection against loss due to transmission overload failure. However, it would entail considerable new environmental and monetary costs to develop two sites and it would also negate the savings of back-to-back construction. Moreover, the additional engineering and licensing time involved would preclude completion of construction in time to meet the need. Of much more importance, it would not provide nearly as much protection to the people of Long Island and New York City against the drastic reduction or loss of oil supply as discussed above. The Board therefore finds this alternative to be much less desirable than Applicants' proposal to locate both units on Long Island.

143. In its proposed findings of fact, SC argues that other alternatives are available if the NYSEG and LILCO needs are treated separately and that these alternatives should have been explored. For example, SC argues (in PPF 5.1-5.12) that it would be cheaper for LILCO to strengthen its import capability rather than constructing Jamesport. The tacit assumption is that the necessary generating capacity is and will be available at some undesignated point off Long Island. But the record does not bear this out and SC makes no attempt to demonstrate it. If, as we believe, new capacity would have to be added off Long Island, the monetary and environmental costs involved would have to be added to the new transmission line costs resulting in much higher overall costs. Moreover, this alternative would involve most of the same disadvantages associated with locating both Jamesport units off Long Island as previously discussed. In its Proposed Findings 6.1-6.19, the county makes a similar argument for NYSEG, *viz.*, that it has the alternative of buying power. In this case, SC claims that sufficient excess capacity is available (see PPF 6.4). However, we do not understand the cited testimony to support that claim.

144. In summary, the Board finds all of the county's proposed alternatives to be obviously inferior to Applicant's proposed Jamesport plant on Long Island. Thus, we do not agree with the county that either Applicants or Staff erred in failing to evaluate the alternatives suggested by the county.

⁴⁰The Board recognizes that assigning half of the capacity of each Jamesport Unit to NYSEG is valid and proper for the purpose of meeting the 18% reserve requirements of the New York Power Pool. But that does not change the reality of having a large excess on Long Island.

Board Findings

145. Upon review of the lengthy record on this contention, the Board finds that the proposed Jamesport units are needed for the several reasons already discussed and that the proposed site is superior to the alternatives of locating one or both units in upstate New York. In our view, the major benefit to be derived from adding 2,300 MW of new, nonoil-fueled, base capacity on Long Island is the protection it would afford against the tragedy of loss of oil supply which the Board considers to be very probable at some time during the projected lifetime of the Jamesport plant (see findings 284-297, *infra*).

2. (Environmental) Site Suitability

a. Societal Costs

Contention V.B.1:

The cost to society due to the impact of the Jamesport facility on agriculture is greater than just on Applicant's property because:

- a. transmission lines needed to connect the plant with Applicant's grid will cross cultivated fields. There is the possibility of spreading golden nematodes during construction. Transmission lines will interfere with current farming practices and increase costs;
- b. there is a ripple effect, which will cause abandonment of agriculture beyond the site because the present tax structure will attract residential development (LWV Contention C.5, as amended on May 12, 1976).

Board Question V.B.2:

The Board requests that the County of Suffolk call as a witness a responsible county representative to testify whether consideration has been given to the aforementioned alleged "ripple effect" and what plans have been made to preserve green belts and agricultural lands in the county.

146. The parties presenting testimony on V.B.1 were LILCO, the NRC Staff, and SC. Matthew Cordaro testified for the Applicants, (written testimony following Tr. 2838, pp. 1-8). Appearing for the NRC Staff were Roger Kroodsma (following Tr. 3217) and Bruce Purdy (following Tr. 3221, *et seq.*). Dr. Kroodsma's written testimony was in two parts: one on the impacts of transmission lines on agriculture in general and the other on

golden nematodes. Mr. Purdy's testimony concerned the effects of Jamesport's taxes on residential development. SC's witness was Arthur Kunz, who also testified on Item V.B.2, (written testimony following Tr. 3137, pp. 1-6).

147. In order to connect Jamesport to the LILCO transmission grid the Applicants propose to construct about 36 miles of 345 kV transmission lines within corridors encompassing around 598 acres of which the Applicants now own about 20%. The corridors are broken down into four segments and each described as to current land use (Staff's Ex. 7, FES 3.8.1-4, and Table 3.10). This route is being considered along with other alternatives in the New York State Public Service Commission's Article VII hearings. The Jamesport-Calverton segment is the only new segment which will cross agricultural lands. Transmission poles will be 800 feet apart, each occupying less than 100 square feet constituting the area interfering with tillage. It is estimated that no more than 1/4 acre of cultivated land would be permanently removed from agriculture by placement of poles in this segment (Cordaro, pp. 2-4).

148. Transmission poles will cause some interference with wheeled irrigation systems, and together with overhead links may interfere with aerial application of pesticides. Since aerial spraying of potatoes in the Jamesport area is done primarily by helicopter rather than by fixed-wing aircraft, the Staff expects that impacts on aerial spraying will be minimal (Kroodasma, written testimony on transmission lines, pp. 2-4).

149. A limited appearance statement and the cross-examination of Dr. Cordaro by the County of Suffolk, evidenced that the Long Island Farm Bureau was concerned about adverse effects of soil compaction in constructing transmission lines. Testimony of expert witnesses to this effect were cited by the county for the Article VII proceedings. Dr. Cordaro responded by describing the construction methods to be used by Applicants to minimize compaction effects. Use of low pressure tires on large construction vehicles and restricting construction activities in sensitive areas to times when soil is relatively frozen, or dry and hard were the principle techniques to be used (Tr. 3071-3074).

150. The Board finds that through careful placement of poles at the edges of fields or in nonproductive areas wherever possible, by holding to a minimum the crossing of fields by transmission lines, and by implementing the plan to minimize soil compaction during construction, the Applicants will have used all practicable means to keep the impacts on agriculture to an acceptable level.

151. Concerning the golden nematodes, the Board recognizes that construction of the transmission lines will indeed affect fields cultivated mainly for potatoes and that this pest seriously threatens the potato industry (Cor-

daró, p. 4; Kroodsmá on nematodes, pp. 1-2). The nematodes occupy upper layers of soil and can be transmitted through movement of infested soil particles.

152. Through extensive efforts this pest is being relatively well controlled. Since 1944, a New York State quarantine has been enforced to prevent spread of the nematode to uninfested areas. Marketing regulations and restrictions have been placed on the movement of potatoes, top soil, and other commodities capable of carrying the nematode. At the same time, cooperative Federal-State research and regulatory programs have been expanded to develop better ways to detect infestations of the pest and prevent its spread to other agricultural lands. Several methods of treatment have been developed to eliminate nematodes from infested lands. At the present time and as a result of these extensive control measures, serious infestations of the pest are quite limited in area, and the control programs may be completely successful in preventing serious future outbreaks of the pest (*id.*, p. 2). During construction and maintenance of the Jamesport transmission lines, the nematode could be transported and spread from infested areas, if any, to uninfested areas. Any practice which would allow transport of clods or particles of soil out of nematode infested areas would likely result in spread of the nematode. Pieces of soil could be transported, for example, on the footwear of construction workers and on the tires of construction vehicles and machinery moving from one potato field to another (*id.*). Accordingly, the Staff has proposed as a condition to the issuance of a construction permit, that the Applicants be required to survey, prior to construction, appropriate local, State, and Federal agencies to determine if the golden nematode exists along the proposed transmission corridors. If the result of this survey indicates nematodes do exist along the transmission corridor, then the Applicants shall be required, prior to the commencement of construction of these lines, to develop a plan for preventing the spread of the nematodes during the construction of the Jamesport transmission lines. In addition, the Applicants should survey appropriate agencies to determine if the nematode will present a problem during plant construction. If a survey indicates that the nematode would be spread as a result of plant construction, the Applicants shall be required to develop a plan to control the spread of the nematodes. If either plan becomes necessary, the Applicants should develop the plans in close cooperation with appropriate local, State, and Federal agencies and the plans should be submitted to the NRC for Staff approval.

153. In Contention V.B.1.b. LWV contends that construction and operation of the Jamesport station resulting in a favorable tax situation for the Town of Riverhead will stimulate residential development at the expense of land now in productive agriculture. Contrarily the Applicants contend

the large increase in tax revenue to the Town will enable it to participate more actively in the Suffolk County Farmlands Preservation Program, purchasing development rights to keep lands in agriculture (Cordaro, written testimony, p. 7). Although granting there may be some "ripple effect," the Staff contends that the extent and direction of residential development within a community may be controlled with efficient preconstruction and ongoing planning on the part of a community. For example, lack of sufficient preconstruction planning by the community of Plymouth, Massachusetts (where the Pilgrim I Nuclear Station is sited), led to the development of some ripple effect in that community, whereas in Waterford, Connecticut (where the Millstone 1 and 2 Nuclear Stations are sited), community planning on the part of the local citizenry mitigated development of the ripple effect. Thus, there is evidence to suggest that the Town of Riverhead by (a) developing the Town of Riverhead Master Plan, (b) contracting with the H2M Corporation to prepare the "Report on Proposed Jamesport Nuclear Plants, Environmental and Socioeconomic Impact" (further discussed below), and (c) entering into an agreement with Long Island Lighting Company, dated September 5, 1975, is taking an initiative to guide its future development growth (Purdy supplemental written testimony, following Tr. 3221, p. 3, and extensive cross-examination by SC, Tr. 3282-3291).

154. SC's witness, Mr. Kunz, testified that he felt that the addition of the Jamesport station to the town's tax base would attract residential development by reason of the favorable tax situation resulting and interfere with the town's Farmland Preservation Program (Tr. 3180-82). He stated that approximately a dozen farms on which development rights are being acquired would be affected by the Applicants' prime route for the transmission lines (Tr. 3144). At no time did he refute the Applicant's and Staff's testimony that the increased tax revenues would aid the town to control residential growth and preserve farmland.

155. The Board finds that although some ripple effects may be expected from development of the Jamesport station, the Town of Riverhead through sufficient planning could offer new options to the community and enable the town to pursue its objectives of balanced growth along with preservation of open space and farmland as set forth in the Town Master Plan of 1973.

156. The LWV contends that the Applicants have failed to adequately consider population growth and land use problems in connection with the Jamesport site and the eastern end of Long Island and that the plans for the site are not substantially compatible with the goals and objectives of the Nassau-Suffolk Regional Plan. The Board cannot agree that the record supports this conclusion, and finds that Applicants have indeed given adequate

attention to the possible impact of station development to population growth and agriculture in the Riverhead area.

b. Contravention of Existing Land Use Plans

Contention V.B.3:

Applicant's plans for the Jamesport project (a) ignore the Riverhead town plan which designates park land and open areas, sets aside Sound Avenue as a historic road, and identifies seven structures as historic houses and two archeological sites as important Indian habitations (CCSC Contention F.3, admitted by order of May 8, 1975), and (b) Applicant's plans are contrary to a recommendation of the Nassau-Suffolk Regional Development Plan because they remove the Jamesport site from its present agricultural use (LWV Contention C.5, admitted by order of May 8, 1975).

157. The Applicants' witness was Matthew Cordaro (written testimony, pp. 1-5, following Tr. 3040). The Staff presented two witnesses—Regis R. Boyle testified on historic and archeological matters (written testimony, pp. 1-5, following Tr. 3224) and Bruce Purdy testified on land use plans (written testimony, pp. 1-3, following Tr. 3221). Suffolk County's witness was Arthur Kunz (written testimony, pp. 1-6, following Tr. 3137).

158. The Riverhead Town Plan was adopted by the Town Board about 10 months after the Jamesport application was filed with the NRC. As adopted the plan sets out planning goals. It recommends that slightly less than half of the Jamesport site be used for park land and/or open space, and the rest for residential use. The plan does not designate Sound Avenue as a historical area, and does not refer to the seven historical houses along Sound Avenue or to the two archeological sites on the Jamesport property (Cordaro, written testimony, pp. 1-2).

159. As to the historical and archeological resources of the site, the Board finds that these have been given proper consideration and the procedures followed by the Staff are in accordance with those set forth in 36 CFR Part 800 (Procedures for the Protection of Historic and Cultural Properties) (Boyle, p. 1). Any adverse effect which might result from plant construction and operation will be avoided or satisfactorily mitigated by compliance with the conditions set forth in the memorandum of agreement executed by the Advisory Council on Historic Preservation, the New York State Historic Preservation Officer, and the NRC Staff (attachments to Boyle testimony). The Staff recommends and the Board directs that those conditions shall be set forth in any construction permit which may be authorized for issuance.

160. The Staff testified that while the proposed development of the Jamesport site does not fully conform to the Riverhead Town Plan which designates park land, open space, and residential development, some portion of the shorefront may be usable for recreational purposes by the community, and that Camp Carey facilities located in the northwest corner of the site (outside the exclusion area) may be made available for recreational or cultural purposes to the town though control would remain under the Applicants' jurisdiction (Purdy, p. 1).

161. The Nassau-Suffolk Regional Development Plan recommends that much of Long Island's North Fork continue to be used for agriculture, and the majority of the Jamesport site is included in this category of land use. The plan suggests that the entire Jamesport shoreline, the area around Camp Carey, and the corridor along the Camp Carey access road be devoted to parks and conservation. The Applicants plan to leave Camp Carey undisturbed and in this regard is in accord with the Nassau-Suffolk Plan. Through its plans to stabilize the eroding bluffs and to supplement and maintain the beach configuration, the Applicants contend it will be furthering the conservation goals of the Bi-County Plan (Cordaro, pp. 3-4).

162. Though conceding that development of Jamesport will remove some land from present agricultural use, both Applicants' and Staff's witnesses were of the opinion that the large increase in tax revenue to the Town of Riverhead, amounting to 80% of the town budget (Cordaro, p. 4), would enable a significant real estate tax reduction on agricultural lands, thus permitting their continuance in farming, and assist the town in furthering the Farm Lands Preservation Program of Suffolk County (Purdy, p. 2).

163. The County of Suffolk's witness, the Assistant Director, Suffolk County Planning Commission, and Coordinator to the Nassau-Suffolk Regional Planning Board, testified that the Nassau-Suffolk Comprehensive Development Plan was adopted in 1970, and at that time the Jamesport site was designated for industrial use. It was subsequently deemed unsuitable for industrial purposes and its shorefront was proposed to be reclaimed and used for recreational purposes. The remainder of the Jamesport parcel was shown for agricultural use (Kunz, p. 1). On cross-examination he testified that the Jamesport site was of particular importance in providing access to the Long Island Sound beach because "there is not a significant amount of publicly owned land along Long Island Sound . . . most of Suffolk County" (Tr. 3163). He admitted that the agreement entered into by LILCO and the Town of Riverhead providing public access to the beach at the Jamesport site was not in conflict with the plan to provide waterfront recreational use for the Jamesport area, but that the land back of the waterfront to be used for development of the Jamesport facility was in conflict with its designated agricultural and residential use (Tr. 3164).

164. The Board finds the Applicants' plans for Jamesport are partially in conflict with the Nassau-Suffolk Regional Development Plan as it stands currently. However, it recognizes that such plans provide goals and general guidelines, subject to periodic updating and modification, as has taken place with respect to LILCO's Shoreham I site.

165. The league, in its Proposed Finding No. 86 alleges (1) that the Applicants have failed to adequately consider land use problems relevant to the Jamesport site, and (2) that their plans are not substantially compatible with the overall goals and objectives of the Nassau-Suffolk Regional Plan. The Board rejects the first allegation because the record shows the Applicants have given abundant consideration to land use impacts of its Jamesport proposal. The Board is in partial agreement with the second allegation, to the extent that the proposed development of the Jamesport site does not fully conform to the Riverhead Town Plan and to the Nassau-Suffolk Regional Development Plan, and we take this into account in our cost-benefit analysis.

3. Impact of Construction

a. Effect on Ground Water

Contention V.C.1:

In that Applicant's will use only cofferdams in conjunction with wells and/or recharge basins, saltwater intrusion into the freshwater dome will not be prevented (LWV Contention B.2, as amended May 12, 1976).

In the event spillages of chemicals, salts, oil, or other contaminants occur during excavation processes, ground water would be contaminated because the excavated foundations of both the pump house and the reactor containment building will be below sea level (LWV Contention B.3, as amended May 12, 1976).

166. Only Applicants and NRC Staff presented witnesses on V.C.1. A panel testified for the Applicants: P. Douglas Burgess, Matthew Cordaro, John Isbister, Larry Picking, and Robert Stollar (written testimony, pp. 1-7, following Tr. 8126). William Bivins testified for the NRC Staff (written testimony pp. 1-5, following Tr. 8356).

167. Jamesport construction will require dewatering for the shorefront facilities and for the reactor containments. The shoreforont facilities will be built in the "dry" in an "open cut" excavation using a cut-off wall to retard seepage of ground water into the excavation. The wall will be installed to a depth of 100-150 feet, where test boring data indicate a layer of low permeability soil. By extending the cut-off wall down into this low

permeability zone, water seepage beneath the bottom of the wall and up through the bottom of the excavation will be minimized. A common method for constructing such a wall consists of excavating a trench 3 to 6 feet wide to the desired depth, and then backfilling the trench with a mixture of bentonite clay, excavated soil and, if required, stabilizing portland cement. This type of cut-off wall has proven very effective in minimizing ground water seepage from adjacent soil into dewatered excavations. A dewatering system will be used within the excavated area to handle the salty water seepage, which will be discharged into Long Island Sound. For the reactor containment excavations, it is anticipated that a cofferdam in conjunction with dewatering will be used. Discharge water from the reactor dewatering will be returned to the ground through recharge basins and/or water injection wells (written testimony of Burgess, *et al.*, pp. 2-3; Tr. 8131, 8200; Bivins testimony, pp. 2-3).

168. To help assess the impact that dewatering for the station will have on the existing salt/freshwater interface, field tests were conducted to determine the characteristics of the aquifer systems on the site. The aquifer characteristics were then used as inputs into a digital model that simulated construction dewatering activities and forecast their impact on the water levels in the water table aquifer. Based on the results of this model, the expected movement of the salt/freshwater interface was quantified using a second digital model (Burgess, *et al.*, p. 2; Appl. Ex. 16, pp. 41-42, 68). In addition to this approach, the saltwater encroachment question was considered in two other ways: through use of the conservation Ghyben-Herzberg relationship and via comparison of other cases of saltwater encroachment (Burgess, *et al.*, pp. 4-5).

169. The results of these three approaches indicate that the amount of saltwater encroachment caused by dewatering at Jamesport should be relatively minor. In all probability, the landward migration of a thin wedge of saltwater will be negligible west of the site and amount to only 100 feet or less east of the property limits. This eastward encroachment will taper to zero movement about 1-1/2 miles east of the site (Appl. Ex. 16, p. 70, and Figure 19). Onsite encroachment will be somewhat greater. But even if no control measures were to be used, the wedge should not advance south of the reactor containments. Use of control techniques—strategically located recharge and pumping facilities—will to a great extent minimize the onsite encroachment. Moreover, whatever encroachment does take place will be temporary in nature. Once dewatering is ended, conditions will return to normal (Burgess, *et al.*, at p. 5; Appl. Ex. 16, pp. 76, 82).

170. LILCO will establish a well-monitoring program to detect any adverse trends in saltwater movement. In the event such trends are observed, the Applicants will implement the necessary control techniques

(Burgess, *et al.*, p. 5; Appl. Ex. 16, pp. 80-87; Tr. 8135-8138; Tr. 8215-8217; Bivins, p. 4, Tr. 8366-8372; Staff Ex. 7, p. 2, pp. 4-11).

171. There was extensive cross-examination of Applicant's and Staff witnesses by the county and the league. Responses by the witnesses, in the judgment on the Board, further substantiated the general adequacy of the Applicants' plan to control saltwater intrusion at the Jamesport site. Though some intrusion may occur on the site, the Applicants' proposed monitoring program, as extended hereinafter by the Board, should detect on a timely basis, any potential for offsite effects.

172. The Applicants are committed to establish a well-monitoring program to detect any adverse trends in saltwater movement, and to implement any control measures including recharge basins or injection wells necessary to correct adverse trends. Intervenors questioned the adequacy of the well-monitoring program (Tr. 8136-8140) as described by Applicants, and the reliability of a recharge basin and/or injection wells as corrective measures (Tr. 8199-8201). Referring to Applicants' Exhibit 16, the Board questioned the extent to which the Applicants were committed to the ground water monitoring program described on pages 83-87 of the exhibit. Witness Cordaro responded that it was Applicants' intent to commit to these recommendations unless "more detailed investigations develop information that would suggest some sort of alternate approach . . ." which might be carried out in consultation with Geraghty and Miller, a geological and hydrological company, and the NRC Staff (Burgess, Tr. 8216-8217).

173. At the request of Staff the Applicants have committed to insure that siltation will not adversely affect the recharge facilities. The Applicants will monitor the ground water shoreward of the recharge system to assure the system is functioning adequately. If, during the construction dewatering operation, the chloride concentration at the shoreward monitoring well exceeds 250 mg/l, the Applicants will cease dewatering or take other action such as increasing the recharge rate until the situation is corrected (Bivins, p. 4). The Board concurs in Staff's recommendations. Furthermore, since the record shows the possibility, however, slight, of some adverse effects from the dewatering operation on ground water east of the site boundary, the Board will require that the construction permit, if issued, reflect that well #22 or its equivalent in general location be included in the monitoring program in order to detect in a timely manner any such adverse effects and to take whatever corrective measures are required. We will not require that there be any monitoring west of the site boundary for there is no evidence indicating there will be adverse effects from the dewatering operation in that area.

174. As far as construction spills are concerned, the Applicants will take

proper precautionary measures to prevent contamination of the ground water in excavations near the shore and at the reactor containments. The excavation processes themselves will not require the use of chemicals or other contaminants except for petroleum products. All equipment in the excavation areas will be carefully maintained and watched for oil spillage. Thus, the excavation processes themselves pose very little risk of ground water pollution, and what little potential there is will be offset by good housekeeping practices. The quality of the ground water in the excavation areas will also be protected by the fact that any potential pollutant-producing structures on site will be so located and constructed that spills at them should not reach the excavation areas. The reactor containment areas will be approximately 300 feet from the closest point of the fuel oil storage area, approximately 600 feet from the heavy equipment storage area, and approximately 1,800 feet from the paint shop and concrete batch plant. The closest point of the septic system leaching field will be approximately 500 feet away. The shorefront excavations will be at least the same or greater distances from these areas. Dikes and sumps will be constructed around the storage and maintenance areas as appropriate to ensure that any spills at them will be contained, and runoff from these areas will be diverted away from the excavation sites (Burgess, *et al.*, at pp. 6-7).

175. The Board finds that the Staff's analysis of ground water conditions at the site, potential for saltwater intrusion and mitigation procedures, and measures for protection of ground water from contaminants generated by construction activities and equipment is adequate at this stage of the Applicants' plans. The Board finds that the potential for offsite adverse effects on ground water quality and quantity is small, and that mitigating measures committed to by Applicants and the condition imposed in the construction permit, if issued, will assure adequate protection against such effects.

176. In its Proposed Finding No. 139, LWV summarizes its numerous criticisms of the Applicants' and Staff witnesses' testimony in averring that "information on the ground water system at the Jamesport site and the surrounding area is insufficiently documented and that no construction permit should be granted at this time." We cannot agree with the LWV for we understand that not all questions concerning ground water characteristics and their response to perturbations can be answered with the precision and authoritativeness apparently demanded by the league. The record is replete with examples of the honesty and care with which the witnesses responded to the extensive questions put to them by both the league and the County of Suffolk. Their responses, together with their written testimony and Applicants' Exhibit 16, satisfy the Board that indeed there is sufficient evidence at hand to warrant our conclusions regarding this contention.

b. Effect of Construction Worker Traffic

Contention V.C.2:

Increased traffic occasioned by out-of-county construction workers, as well as equipment too heavy for the design of the roads, will mean a hardship for local motorists and a degrading of road surfaces, and may well require construction of extra roads (CCSC Contention F.4, admitted by order of May 8, 1975).

177. The Applicants, the NRC Staff, and Suffolk County presented testimony. Edward Sharsky appeared for the Applicants (written testimony, pp. 1-9, following Tr. 3354) and Richard Rush for the Staff (written testimony, pp. 1-2, following Tr. 3450). Appearing for Suffolk County were Robert Meunkle and Richard LaValle (Tr. 3518, *et seq.*; SC Exs. 28A, Tr. 3522; 288, pp. 1-10, Tr. 3526; 29A, Tr. 3534; 29B, Tr. 3536).

178. The Jamesport traffic will peak each workday morning and afternoon and will reach its maximum for 2-3 years during the middle of the construction period, involving about 2,054 vehicles. If all the personnel originating from west of Jamesport drove from the Long Island Expressway to the site by the most direct route, traffic congestion and delays would occur (Sharsky, pp. 1-2, 5; Rush, p. 1; Muenkle, SC Ex. 28B, p. 9; Tr. 3560). However, there are three available parallel routes, each with travel times only 1 to 2 minutes longer than the most direct route. The drivers will try to avoid, and thus minimize congestion by using these parallel routes. To assist distribution of traffic among the three routes, LILCO will post notices on-site and/or use various traffic control measures, such as variable message signs, to direct drivers to the route with the most unused capacity. When the Jamesport traffic is distributed in this fashion, the flow on all three routes will be near but below their capacities. Thus, the Jamesport traffic during the construction period can be accommodated on existing roads. However, during periods of peak traffic flow, there will be some inconvenience to local motorists, such as 10 mph slower driving speeds and about 1 minute delays entering the roads from driveways and unsignaled crossroads (Sharsky, pp. 3-5; Tr. 3391-92, 3453).

179. The small impact adverted to above could be further reduced by the following three alternative actions: (1) widening a portion of Old Country Road to four lanes, which is currently planned by Suffolk County; (2) making Sound Avenue one-way during the morning and afternoon rush hours; or (3) a combination of (1) and (2) along with making Northville Turnpike one-way. These alternatives would substantially lessen and quite possibly eliminate the adverse effects on local motorists occasioned by the Jamesport traffic (Sharsky, pp. 5-8; Tr. 3453).

180. During cross-examination, Mr. Muenkle testified that, with proper distribution of the Jamesport traffic, the three parallel routes noted above will probably accommodate the traffic most of the time and that alternative (3) described above would substantially reduce the effects of the traffic (Tr. 3543-44). Mr. LaValle's testimony was largely irrelevant. Four out of the five road improvements for which he gave cost estimates would not be needed unless the three parallel routes and the three alternatives discussed above failed to accommodate the Jamesport traffic (Tr. 3557). His one relevant estimate of \$3,650,000 for widening of a portion of Old Country Road to four lanes (Tr. 3533) was substantially higher than Mr. Sharsky's estimate of \$2,285,000 (Tr. 3397). This discrepancy resulted because Mr. LaValle relied upon a county engineer's estimate and Mr. Sharsky used the figure actually in the county budget.

181. Trucks will not contribute to the Jamesport rush-hour traffic because the Applicants state that trucks will be prohibited from entering and leaving the site during those periods. The effects of trucks on the road surfaces in the site vicinity will be negligible. Only about 1% of the Jamesport shipments will exceed the unrestricted weight limit of 71,000 pounds. Shipments over this weight will be made on trucks designed with sufficient axles and wheels to distribute the load in accordance with the requirements of the New York State Vehicle and Traffic Law and the conditions of special permits that must be obtained for each such shipment (Sharsky, pp. 8-9).

182. The Staff will require as a construction permit condition that, where severe traffic problems are encountered, Applicants will take reasonable measures to minimize such adverse impacts. Dr. Rush testified that he considered the above permit condition enforceable, and that it was necessarily generalized because future traffic problems, if any, cannot be anticipated with any degree of certainty (Tr. 3461-64, 3496, 3510-12). Through cross-examination, Applicants established that Dr. Rush's conclusions were consistent with those reached by Mr. Sharsky in his testimony (Tr. 3451-52).

183. The Board rejects LWV Proposed Finding No. 150, because nowhere in the record do we find that either the Town of Riverhead or the county will be required to construct new roads or carry out road improvements solely for the accommodation of increased traffic from Jamesport construction workers.

184. We agree in principle with action designed to reduce the number of commuting vehicles which would serve to relieve traffic congestion, conserve energy, and reduce pollution. However, we find no assurance in the record that car pooling and/or a busing system would be feasible in the Jamesport situation (e.g., Sharsky, Tr. 3443-3446). Nor do we find that the

traffic impact would be so severe as to demand more stringent measures than Applicants have proposed to reduce or even eliminate such problems. Therefore we must also reject LWV's Proposed Findings No. 147 and No. 151 and affirm our concurrence with Staff's proposed permit condition.

c. Impact of Dredging, Jetties, and of Beach Erosion

Contention V.C.3:

Applicant has not evaluated the total impact on Long Island Sound of the beach erosion and of the dredging for diffusers, piers, and intakes associated with the construction and the presence of the Jamesport facility (CCSC Contention F.10, as limited by order of May 8, 1975). The jetties planned to be erected will cause an adverse impact on the shoreline at and adjacent to the Jamesport site (LWV Contention C.3., admitted by order of May 8, 1975).

185. The only witnesses testifying with regard to Contention V.C.3 were Matthew Cordaro for the Applicants (written testimony, pp. 1-8, following Tr. 3590) and William Bivins for the Staff (written testimony, pp. 1-3, following Tr. 3640).

186. Applicants' direct case consisted of testimony setting forth the need for jetties, their description, and expected impact, and concluding that Applicant's program to be undertaken to mitigate damage would effectively improve the presently existing condition of the beach at the proposed site. The shoreline processes at the site include a net west-to-east littoral drift of sediment, and thus jetties must be constructed on either side of the intake canal to assure adequacy of water supply unimpeded by sedimentary deposition. Such jetties, while not totally precluding sedimentation, will reduce deposition to a level ensuring adequate flow under all conditions. The alternative to such jetties, considerable widening of the intake canal, would still allow the possibility of inadequate flow to occur during storms (Cordaro, pp. 1-2). Seventy-two cubic yards of drift material will be intercepted daily by the 800-foot jetties and intake structure, and such process, continuing unmitigated, would result in beach erosion down-drift of the facility. However, Applicants are committed to taking steps to counteract this effect by placing sand and excavation material of similar composition along the beach eastward (down drift) of the jetties. This beach enrichment will widen the existing beach strip significantly, and provide additional protection to the bluffs above the beach. Applicants are committed to further sand bypass operations in which sand deposits building upward of the jetties will be redeposited where monitoring indicates it is most needed. Therefore, such beach enrichment will counteract erosion at-

tributable to the jetties, increase the protection of the bluffs, and in fact improve the existing condition of the beach (Cordaro, pp. 5-8).

187. On cross-examination, Dr. Cordaro testified that Applicants' operations during the construction and beach maintenance phases would widen and raise the level of eastward beachfront (Tr. 3599). He testified that jetties would similarly be required if a coal-fired plant were constructed at the proposed Jamesport site, necessitating comparable dredging operations, although the depth of the intake canal might not be as great (Tr. 3624-26). In the opinion of Dr. Cordaro, no significant wetlands east of the jetties would be impacted by littoral drift of sediment, but in any event, Applicants would commit to take corrective action for any damage to the area's shoreline caused by its action (Tr. 3627-31). Monitoring, utilizing marine sounding equipment and sieve analysis of silt deposit, and aerial photography of the shoreline, will be a continuing program (Tr. 3632-34).

188. The Staff described and evaluated the Applicants' dredging and deposition programs and their commitment to a beach-monitoring and maintenance program, and concluded that they constitute appropriate and well-established procedures to mitigate any adverse effects attributable to the jetties (Bivins, pp. 2-3; Staff Ex. 7, Section 11.2.2). On cross-examination, Mr. Bivins testified that potential effects of the jetties would decrease if they were smaller than those required for a nuclear power plant, but that the reduction in size would not necessarily be linear to the required water flow (Tr. 3654-57). He indicated that he was quite satisfied with Applicants' monitoring and maintenance proposals, based on current knowledge, and acknowledged that modifications might become necessary at a later time in response to actual data obtained during monitoring (Tr. 3668).

189. Based on the foregoing, the Board finds that Applicants have taken adequate steps to evaluate beach erosion and deposition attributable to construction and operation of the proposed facility; that such dredging and jetties as are planned can be managed so as to control and mitigate any adverse effects on the shoreline in the vicinity of the site; and, that Applicants' commitment is sufficiently specific to require them to initiate corrective action to repair any adverse effects caused by the proposed structures.

d. Impact on Marine Ecology in Long Island Sound

Contention V.C.4:

There will be an unacceptable adverse impact on the marine ecology in Long Island Sound in the vicinity of the proposed plant resulting from siltation, turbidity, erosion, and water runoff caused by the construction of the proposed facility (TR Contention B.4, admitted by Board

order of May 8, 1975—see also Tr. 592).

190. The Applicants' witness panel consisted of Thomas Biffar, P. Douglas Burgess, Matthew Cordaro, and Gerald Lauer (written testimony, pp. 1-9, following Tr. 3673). The Staff's witness was Richard McLean (written testimony, pp. 1-12, following Tr. 3980).

191. In a Soil Erosion and Sediment Control Plan, the Applicants analyzed the steps necessary to curb any construction runoff which could lead to siltation and turbidity in Long Island Sound. No runoff is expected to reach the Sound from that part of the shorefront affected by construction because of the extreme permeability of the sand. Areas affected by construction south of the shorefront slope away from the Sound, thereby preventing runoff into it. In any event, runoff in these areas will be controlled through the sequencing of excavation, the covering of areas with prolonged exposure times (other than those around excavations), the placing of riprap at pipeline discharge outlets, and the installation of a network of drainage ditches to channel runoff into recharge basins (Biffar, *et al.*, pp. 7-9; Tr. 3916-21, 3939). The Staff agreed that construction runoff will not pose a problem because of the high percolation value of the dune near the shorefront, the fact that the facility will be built upon land which slopes away from the sand, and the erosion control measures to be taken by the Applicants (McLean, p. 5).

192. Siltation and turbidity will be caused by Jamesport dredging, but with minimal harm to benthos, plankton, and nekton (Biffar, *et al.*, pp. 1-3). Although most of the benthos directly affected by dredging the intake canal and diffuser trench and temporarily stockpiling backfill will not survive, the overall effect of dredging on the benthic community will be minimal. This is because the intake canal dredging will be confined to an area of relatively low biomass, the diffuser trench will be only a few hundred feet wide, no unique species of benthos will be affected, and all adverse effects will be rapidly offset by recolonization. Benthos inhabiting the area underneath each of the jetties will be eliminated, but the jetties in turn will provide an increased diversity of habitats off Jamesport for marine organisms (*id.*, pp. 3-4). As regards plankton, the impact of dredging will at worst be a temporary, minor reduction of phytoplankton productivity. Similarly, any harm to fish and other nekton should be minor and temporary. Few fish eggs will be affected since the great majority of the eggs in the dredging area are buoyant. Nekton may leave the area, feed on exposed organisms, or not react at all to the offshore construction activities (*id.*, pp. 4-6). For much the same reasons, the Staff concluded that impacts of offshore construction at Jamesport will not have unacceptable effects on the marine ecology (McLean, pp. 5-8).

193. McLean testified that the effects of construction on the marine aquatic system will arise from three basic sources: (1) construction of the jetties, (2) shoreline alteration, and (3) dredging. A fourth potential source, land runoff, is not expected to be a problem because of the erosion control measures proposed by the Applicants. Additionally, the slope of the land on which the plant will be built is away from the shoreline, thus water runoff will tend to flow away from the bluffs. Because of the high percolation value of the foredunes, water will tend to soak into the sand instead of running down the face of the dune. This greatly reduces the potential for erosion (McLean, p. 5; Staff Ex. 7, Section 4.4.2).

194. Construction of the jetties will result in a loss of 4.35 acres, the ecological effects of which are discussed in the FES, Section 4.4.2 (Staff Ex. 7) and found acceptable by the Staff (*id.*).

195. Shoreline alteration due to jetty and intake construction will affect about 1,260 feet. The main organisms affected will be the sandy beach in-fauna. Because of the extensive shorelines of Long Island Sound the loss of this amount of habitat for these organisms is considered negligible by the Staff (*id.*).

196. Dredging will be the main cause of turbidity at the site and will be the greatest source of ecological damage of the four sources identified. About 40 acres of bottom will be dredged for the intake canal and the diffuser trench and approximately 60 additional acres will be covered by spoil. The Staff assumed that most or all of the organisms in these 100 acres will be killed. The Staff also predicts, however, that at least 70 of these acres will be recolonized within $\frac{1}{2}$ to 1- $\frac{1}{2}$ years after construction (*id.*).

197. Faunal composition and colonization time of dredge spoil differ mainly according to the type of spoil present. A study on the effects of sewage sludge and polluted dredge spoil dumping in New York Bight reported no macrofauna present to the dredge or spoil material. In 1968, 812 million cubic yards of silty sand dredge spoil from Providence River was dumped in Rhode Island Sound. Spoil colonization included some silty bottom species of polychaetes but the chief colonizers were the sandy bottom organisms of the surrounding area. In the Chesapeake Bay, in two separate areas, dredge spoils dumped close to the area dredged were reported to be colonized by the same species that colonized the area before the dredging. In one study, colonization was complete in 18 months and in another it took only 6 months. Similarly in the upper Chesapeake, it was revealed in one study that 18 months were necessary to reestablish the number of organisms present prior to dredging. Since the dredge spoil at the proposed Jamesport site will have a local origin and thus be similar to the dredge spoil in the surrounding area, recolonization consisting of organisms of the surrounding community is expected to be complete within 6-18 months after construction (*id.*, p. 6).

198. In addition to direct removal of organisms, dredging will increase the turbidity of the water. Increased concentrations of suspended solids and the subsequent settling out of this material, can affect animals in the Jamesport area by causing damage to their respiratory surfaces. However, these levels of turbidity must be high and continuous for extended periods of time to have this effect. Shallow-water, sand-dwelling infauna like those found at the proposed Jamesport site are highly tolerant of suspended solids. In shallow (9 m) areas of the Chesapeake suspended sediment has been reported to increase 18-fold (from 15-280 ppm) due to tidal changes. Organisms have had to adjust to these naturally occurring phenomena. Since filter feeders such as clams depend on suspended particles for food, they have developed elaborate methods of handling such particles including rejection of large quantities of the material as pseudo-feces. It has been reported that no mortality of the valuable commercial hard clam, *Mercenaria mercenaria*, occurred as the result of smothering from silt released by dredging. Attached organisms such as oysters are much less tolerant but there are few of these in the Jamesport area (*id.*, pp. 6-7).

199. Small, relatively immobile infauna will probably be the most susceptible to siltation. These include small polychaetes and tube-dwelling amphipods. A burial experiment conducted with animals of lower Providence River, Rhode Island, showed that of the three most abundant organisms, an active polychaete and a small filter-feeding bivalve attained the surface in 24 hours through 21 cm of sediment. A tube-dwelling amphipod was not successful. It is expected that many of the small infauna organisms in the Jamesport area will be killed if rapidly covered by more than 25 cm of silt. However, the area in which this will happen, outside of the spoil area, is expected to be small. In such areas, recolonization is expected to be rapid (*id.* p. 7).

200. Larger organisms, such as the lobster *Homarus americanus* and fish have been known to be resistant to high levels of silt or to avoid it. For example, lobsters have been exposed to a suspension of up to 4,100 ppm of silt and spoil sediment for 24 hours and recorded no mortality attributable to these sediment concentrations. Although silt can irritate the gills of fish and reduce oxygen uptake, most fish display an avoidance reaction to it and, thus, are rarely affected by silt. In one study fish were held in cages close to the effluent of a hydraulic dredge. No lethality was recorded. In addition, another study found no gross effects of suspended fine material on adult fish, eggs, or larvae. At the proposed Jamesport site fish are expected to avoid any dredge effluents and thus not be directly affected by them (*id.*, pp. 7-8).

201. In summary, some benthic organisms will be lost due to dredging operations. Areas affected (other than those under the jetties) are expected

to be recolonized within 18 months after termination of the disturbance. Fish are expected to avoid dredge effluents and thus are not directly affected. The Staff considers these impacts to be acceptable (*id.*, p. 8).

202. The Board finds, first, that onshore construction activities at Jamesport should not result in runoff into Long Island Sound because of the site's physical characteristics and of the control measures to be taken by the Applicants, and second, that the adverse effects on marine life resulting from offshore construction will be slight, and within acceptable limits.

4. Impact of Operation

a. Cumulative and/or Synergistic Effects

Contention V.D.1:

The Board requests that Applicant and Staff present evidence to establish whether or not there is a clearly demonstrable interaction, cumulative and/or synergistic, between the environmental effects of the Jamesport facility and those of any other facility and, if so, what impact such interaction will have on Long Island Sound (derived from LWV Contention 3, submitted May 21, 1976). The Board also requests that Applicant and Staff advise whether they and/or any Federal or State agency studied and reported the cumulative impact of chemical discharges from all sources upon Long Island Sound.

203. The Applicants' witnesses were Thomas Biffar, Matthew Cordaro, and Gerald Lauer (written testimony, pp. 1-8, following Tr. 3673). Staff's witnesses were Richard McLean (written testimony, pp. 1-3), Alan Witten (pp. 1-2), Michael Parsont (written testimony, pp. 1-2, following Tr. 3980). The SC presented John Frizzola, whose oral testimony at Tr. 6224, *et seq.*, was based in part on SC Exhibits 45 and 45A.

204. The Applicants' panel testified that the quality of the Sound waters adjacent to the facility site is excellent, and that the facility's discharges will meet stringent State water quality standards and EPA New Source Performance Standards. These witnesses also pointed out that, because the concentrations of the various chemicals as discharged into the Sound by Jamesport under maximum discharge conditions will approximate ambient Sound levels, the incremental effect of these chemical discharges on the water quality of the Sound will be virtually undetectable (Biffar, *et al.*, pp. 1-3).

205. Dr. McLean identified a study⁴¹ dealing with the cumulative impact

⁴¹Potential Effects of Electric Generating Plants on Long Island Sound, Grumman Ecosystems Corporation (Vols. 1 and 2, 1976).

of chemical discharges into the Sound, which concluded that, based on its review of the literature, there was no documented evidence to suggest that any adverse effects have occurred in the Sound through the discharge of any chemical other than chlorine. Dr. McLean characterized this study as an "extensive analysis," and stated that the Staff was in agreement with its conclusions. He noted that the Staff has required that the Applicants keep chlorine releases at levels below that which will harm marine biota. He also indicated that, since the chemicals to be discharged from the facility will be in smaller concentrations than the background levels in the Sound, the Staff believes that no environmental damage will result from them (McLean, pp. 2-3; Tr. 4144).

206. So far as impingement/entrainment interaction is concerned, testimony shows that the maximum potential losses caused by Jamesport will be slight and thus that these losses can have only a very small incremental effect when considered in combination with such losses from other facilities. More specifically as to entrainment at existing facilities on the Sound, plus those planned for operation by 1985,⁴² the Applicants' panel calculated that these facilities together will withdraw 0.6% of the plankton in an amount of water equivalent to the Sound's tidal exchange volume, assuming no reentrainment. Because each tidal exchange represents only 8.6% of the total volume of the Sound, the effect of this rate of entrainment on aquatic species will be insignificant (Biffar, *et al.*, pp. 5-8; Tr. 3747-48). Similarly, Dr. McLean stated that the potential impact on the Sound of cumulative impingement losses is expected to be small, and, relating cumulative entrainment losses to potential finfish, that these losses will represent only 1.44% of the yearly commercial finfish catch of the three States bordering the Sound⁴³ (McLean, pp. 1-2, as corrected at Tr. 3977).

207. Turning to thermal interaction, the Applicants' panel referenced two temperature prediction model studies of Long Island Sound which considered the thermal effluents from steam-electric plants now on the Sound and those planned for the near future.⁴⁴ The studies differed as to the number of plants considered, and predicted respectively that average temperature rises throughout the Sound as a result of power plant operations will not exceed approximately 0.16°F and 0.25°F—well within the range of natural variation. Although the temperature rises are minute, these estimates are nonetheless conservative since some of the projected plants taken into account have since been cancelled (Biffar, *et al.*, pp. 3-4, and Tr. 3799-3818).

⁴²Sixteen (16) electric generating plants on the periphery of Long Island Sound were considered including Jamesport and Shoreham.

⁴³Only Jamesport, Shoreham, and Northport plants were included in this analysis.

⁴⁴By Stone & Webster Engineering Corporation.

There has been no formal study of possible thermal interaction between the discharges from Jamesport and those from the Shoreham facility 15 miles to the west, but the 1973 dye study conducted at Jamesport indicated a worst-case temperature rise of 0.10°F 6 miles west of the Jamesport diffuser. Accordingly, even in combination Jamesport and Shoreham's far-field thermal effects will be scarcely perceptible, with no adverse consequences for aquatic biota (Biffar, *et al.*, p. 5). Mr. Witten testified that the Staff's far-field computer model FAROUT predicted that, under worst-case conditions, the maximum Jamesport-produced temperature rise 8.75 miles from Shoreham will never exceed 0.5°F. Thus, the Staff "believes that no measureable interaction will occur" between the thermal plumes of Jamesport and Shoreham (Witten, p. 1). Similarly, Dr. McLean testified that the plumes of the various steam-electric plants on the Sound do not come into contact (McLean, p. 2).

208. Radiological doses to biota from power plant operations are too low to raise an interaction issue, much less an interaction problem (Biffar, *et al.*, Tr. 3863-65; Parsont, Tr. 4171-4172). With respect to cumulative atmospheric effects, Mr. Parsont testified about interaction among radioactive gaseous releases and concluded that, assuming completely additive doses from all operating and proposed nuclear generating stations within 50 miles of the Jamesport facility⁴⁵ ("an extremely conservative" assumption), the annual average individual dose in the vicinity of the Jamesport proposed station would be about 0.008 millirem, a radiological dose of insignificant proportions (Parsont, pp. 1-2).

209. SC asserted that Mr. Frizzola's testimony was relevant to the Board's request (Tr. 6228). Mr. Frizzola, when pressed by Applicants on cross-examination was unable to show clearly how his testimony (County Exhibits 45 and 45A) was responsive to the Board's request (Tr. 6230-6232). In further cross-examination by Staff, it became clear that the witness was mainly critical of the methodology used by Applicant and Staff in their analyses of the meteorological data for both Shoreham and Jamesport, because the analyses did not sufficiently account for the complications in meteorology induced by the marine influence of Long Island Sound (Tr. 6238-6243). Said witness contended that the dispersion characteristics of the plume may be affected by such a large body of water as the Sound over a distance of "perhaps of the order of 30 miles or more . . ." (Tr. 6245), and that "these phenomena are not considered by standard Gaussian plume approximations that are used in most nuclear plant analyses" (Tr. 6248). In answer to Board questions (Tr. 6265-6275) on the relevance of his criticisms to the Applicants' and Staff's conclusions on radioactive dose calculations, Mr. Frizzola could not agree that they were conservative until they could be validated by using

⁴⁵Millstone 1 and 2 and Connecticut Yankee are operating. Shoreham has applied for an operating license.

analytical methods "updated and refined" as he has recommended to the Commission on Guide 1.111 (Tr. 6274). The Board concludes that the above testimony may be appropriate to Staff's consideration of a revision of Regulatory Guide 1.111 but that it did not contribute to a finding on this request.

210. The Board finds that no significant, clearly demonstrable interaction or cumulative effects are likely to result from the chemical, impingement/entrainment, thermal, and radioactive impacts from the proposed facility and other generating facilities now existing or currently proposed for location on Long Island Sound.

211. LWV emphasizes the gaps in knowledge concerning the function of ecosystems in Long Island Sound as a whole. LWV's Proposed Finding No. 167 requests that we find "that there is insufficient evidence at this time to determine whether there is a clearly demonstrable interaction between the Jamesport facility and any other facility located on Long Island Sound, and that a construction permit should not be granted at this time." The Board rejects this finding, because in our judgment sufficient evidence has been presented on the record by the Staff's and Applicants' expert witnesses to support our finding in the instant case. The Board does grant, however, that the Sound must have at some point a limit in its ability to withstand pollutants and depletion of its aquatic life, and that the evidence is not yet available to define that point.

b. Thermal Effects

Contention V.D.2:

A waiver of the FWPCA cooling tower requirements will mean use of large intakes and diffusers which will produce unquantifiable, irreversible destruction of marine life at the site and Long Island Sound, and those effects will not be provable until symptoms show the process has proceeded too far to rectify (CCSC Contention F.1, admitted by Board order of May 8, 1975).

There will be an unacceptable adverse impact on the aquatic life of Long Island Sound in the vicinity of Jamesport resulting from the discharge of heated effluents into Long Island Sound from Jamesport (LWV Contention C.2, TR Contention C.1, admitted by Board order of May 8, 1975).

212. The Applicants' witnesses on thermal effects were Thomas Biffar, Matthew Cordaro, Gerald Lauer, and David McDougall (written testimony, pp. 1-14 following Tr. 3673). Staff's witness was Dr. Richard McLean (written testimony, pp. 8-10 following Tr. 3980). None of the other parties presented witnesses on this matter.

213. Jamesport's circulating and service water will be discharged through two submerged diffusers with a combined length of 4,800 feet. The water will exit at 15 ft/s through numerous diffuser ports, whose nozzles are to direct the flow away from the bottom of the Sound. During ordinary operations (six circulating pumps per unit), the total station discharge will be approximately 1,864,000 gal/min and will involve a condenser temperature rise of approximately 18°F. In cold weather, each unit may operate with fewer pumps in order to improve plant efficiency. With the minimum of three pumps per unit operating, the condenser temperature rise would be approximately 36°F but the surface temperature rise would remain essentially the same as for six-pump operations (Biffar, *et al.*, pp. 1, 4-5).

214. The 15 ft/s discharge velocity will produce rapid dilution. The surface area of the Sound dominated by the diffuser-induced dilution process will be less than 20 acres. During summer the surface temperature rise at the perimeter of this area will range from 0.4°F to 1.9°F, depending upon the stage of the tidal cycle. The average summer surface temperature rise through a tidal cycle will be approximately 0.8°F. During winter the surface temperature rise will range from 0.9°F to 2.4°F. Although these figures refer to temperature rise at the perimeter of the area dominated by diffuser-induced dilution, temperatures throughout that area (including at the bottom) will not vary significantly from those at the perimeter (*id.* pp. 6-7).

215. Plankton will be entrained in the thermal plume. However, because of rapid dilution (the discharge is diluted to within 6°F of ambient within a few seconds of leaving the diffuser port), exposure to stressful temperatures will last for only a few seconds. Accordingly, the effect on plankton will be insignificant (*id.* pp. 7-8). The same will be true of the effects on benthos, including shellfish, since the diffuser nozzles will direct most of the heated effluent away from the floor of the Sound. Organisms living in or on the floor are not expected to be exposed to temperature elevations greater than 2.9°F at any time of the year. Exposure to such temperatures is not stressful (*id.* at 8-9; Tr. 3675). Fish are known to avoid stressful water temperatures and seek out preferred temperatures. Also, the relatively high discharge velocities will prevent prolonged residence by fish in the high-temperature portion of the plume, thereby reducing the potential for cold shock. This potential is reduced again by the fact that with two units operating at Jamesport, a complete shutdown has less likelihood of occurring. Given the very rapid dilution of heated effluent and the superior water quality in the vicinity of the site, there is virtually no potential for either significant depletion of dissolved oxygen or the supersaturation of gases that could lead to gas bubble disease (*id.* pp. 9-14).

216. The Staff summarized its conclusions on thermal effects by stating in the FES that "In the Staff's judgment, the proposed thermal discharge

and the resulting plume will have a negligible effect on the aquatic organisms in the area. These conclusions are based on physical components as well as the behavioral and physiological characteristics of the organisms to be affected'' (Staff Ex. 7, Section 5.5.2.1.4, p. 5-33). With respect to unquantifiable, irreversible effects, the Staff agreed that while loss of organisms due to entrainment, impingement, and thermal effects are impossible to quantify exactly, its calculations of maximum effects do not lead to the conclusion that they will be either irreversible or unacceptable (McLean, pp. 8-10; Tr. 4029-4030).

217. Staff Exhibit 5, a letter dated March 24, 1977, addressed to the New York State Board on Electric Generation Siting and the Environment, indicates the acceptability of the proposed once-through cooling system to the U.S. Environmental Protection Agency.

218. The Board finds that, based on the above considerations and other supporting evidence in the record which was uncontroverted, the thermal effects of the proposed once-through cooling system for Jamesport will be minimal and within acceptable limits, and will not result in unacceptable or irreversible consequences for marine populations in the vicinity of the plant or for Long Island Sound as a whole.

c. Impact of Entrainment and Impingement

Contention V.D.3:

There will be an unacceptable adverse impact on the aquatic life of Long Island Sound resulting from the entrainment and impingement of fish and larvae in the intake structure in the Jamesport vicinity (LWV Contention C.2 and TR Contention C.1, admitted by Board order of May 8, 1975).

The fish and shellfish industries and the Long Island economy will suffer irreparable damage and loss. Not only have Applicant's studies ignored an extremely productive habitat offshore at the site of the diffuser, but daily impingement of fish on intake screens and daily entrainment of biomass (which includes fish eggs and plankton) and will provide a death trap to the young produced offshore as well as to migrating schools of fish (CCSC Contention F.2, admitted by Board order of May 8, 1975).

219. The Applicants presented a panel consisting of Thomas Biffar, Matthew Cordaro, and Gerald Lauer (written testimony, pp. 1-22 following Tr. 3673). The Staff's witness was Dr. Richard McLean (written testimony, pp. 1-10, following Tr. 3980). Intervenors presented no witnesses.

220. The Jamesport intake canal, bounded by jetties, will be approximately 850 feet long and 702 feet wide. The canal is to slope from elevation -12 feet MLW at the jetties' mouth to -27 feet MLW 200 feet in front of the intake structure for each unit. These structures will have six bays each. Each bay will be 16 feet wide, extending down to -27 feet MLW. A concrete curtain wall will extend across the mouths of the bays down to -5 feet MLW. Approximately 20 feet behind the curtain wall will be trash racks, consisting of 1/2 by 2-inch vertical steel bars, 50 feet long and spaced on 3-7/16 inch centers. Traveling screens will be located approximately 13 feet behind the trash racks. The screens will have a 3/8-inch mesh. Each section of screen will be fitted along the bottom edge with a horizontal trough in which fish and water are to be held as the screen is rotated upward. The fish will then be gently transferred to a sluiceway for return to the Sound (Biffar, *et al.*, pp. 2-3, 7; see also pp. 17-20 for a review of those parts of the Jamesport Environmental Report in which the proposed intake structure was found to be superior to four alternative intakes).

221. The relatively low maximum approach velocities in the intake canal will allow most fish to avoid contact with the intake structure (*id.* pp. 3-4). Estimates based on recent monitoring at another LILCO power plant on Long Island Sound indicate that only 3,000 pounds of fish per unit are likely to be impinged annually at Jamesport.⁴⁶ Depending on the manner in which the traveling screens are operated, as many as 90% of the impinged fish should survive. Thus, the actual mortality rate is expected to fall somewhere between 300 and 3,000 pounds of fish per unit each year (*id.*, pp. 3, 7-9).

222. The frequency with which the intake screens are operated can vary, depending primarily on differential water levels across the screens. If the threshold differential level is not reached during any given 8-hour operating shift, the screens will be rotated as a normal maintenance procedure. If the impingement monitoring program to be conducted by the Applicants indicates that impingement rates are unacceptably high, the losses can be mitigated by operating the screens on a sustained basis during periods of high impingement, or by backfitting additional fish protection devices into the intake structure (*id.* pp. 7-9).

223. Conservatively estimated, the potential annual entrainment induced plankton mortality at both units will be the *equivalent* of 1×10^6 pounds of fish. This, however, is a "worst-case" estimate because it is based upon three unrealistic assumptions: first, that all entrained organisms will be killed; second, that there will be no compensation mechanisms; and third, that once entrained, organisms will be completely lost from the ecosystem

⁴⁶The estimates were based on extensive sampling at the Northport plant during 1975. Sampling was conducted 24 hours per day, 4 days per week, totaling 10,315 hours of sampling (*id.*, pp. 5-7).

and will not be available for biomass conversion (*id.* pp. 10-13; Tr. 3745-46, 3893).

224. With regard to the impacts of impingement and entrainment at Jamesport on the aquatic life in the Sound, Applicants have previously conducted a study which assessed the effects on five "representative species"—menhaden, winter flounder, tautog, scup, and surf clam—and related such effects to the commercial catch statistics for each species (*id.* p. 15). Using a fisheries population model, it appears that an equilibrium menhaden population 0.00116% below the nonimpacted population will result from Jamesport's operations. This is equivalent to 0.00116% of the North Atlantic commercial catch of menhaden, the appropriate reference population (menhaden near the site being part of the North Atlantic stock). Since no population estimates are available for the four remaining representative species, their estimated potential losses were translated into percentages of commercial catches. It was estimated that the combined impingement and entrainment losses for winter flounder will be equivalent to about 5% of the average annual winter flounder catch in the Sound. No impingement is expected for scup, and their entrainment-induced loss will be the equivalent of 0.8% of the annual Sound scup catch. Although the loss of tautog is estimated to be the equivalent of 119% of the annual Sound catch, the tautog population is much larger than is suggested by the commercial catch statistics underlying this estimate.⁴⁷ The surf clam will be affected solely by larval entrainment. Its potential loss is estimated to be the equivalent of 0.2% of the annual New York State commercial surf clam fishery, conservatively assuming that all veligers entrained are those of surf clams (*id.* pp. 13-17).

225. In addition to this "representative species" analysis, Applicants' panel calculated that the total loss of all fish species resulting from impingement and entrainment at Jamesport will be the equivalent of 5.3% of the average annual commercial landings in New York from 1970 through 1973. Thus, the impact of Jamesport, if any, on the commercial fish and the shellfish industries of Long Island will be minor (*id.* at 20-21).

226. Furthermore, it is not the case that an "extremely productive" fish habitat in the path of the proposed diffuser has been ignored. Applicants' aquatic studies made clear that there are not a disproportionately large number of fish in the area of the diffuser. While these studies did indicate some rocks there, a subsequent side scan sonar and seismic profiling survey showed that only scattered rocks lie in the diffuser's path. Because the diffuser will displace simply one small cluster of rocks and a few isolated boulders, its

⁴⁷The estimate relied on 1970-73 commercial catch statistics. The fact that one fisherman operating at Jamesport during 21 days in 1976 caught an amount of tautog greater than 50% of the average annual 1970-73 catch indicates that the tautog population greatly exceeds that reflected in the catch statistics (Biffar, *et al.*, p. 16).

effect on local fishing should be minimal (*id.* pp. 21-22).

227. Staff witness McLean testified that, although the FES recommends an intake velocity no greater than 0.5 ft/s, the Staff has since determined that a higher velocity will be acceptable, because the Applicants have agreed to include in the Jamesport intake design the fish-handling system described above, and because experience elsewhere shows such a system to be effective. The Staff did, however, state that Applicants should be required to operate the traveling screens continuously for 1 year to define more precisely impingement and survival rates (McLean, pp. 1-4). The Board concurs with this requirement.

228. As to the effects of entrainment at Jamesport, Dr. McLean stated that they do not constitute a potential for irreversible damage since the effects are so minor⁴⁸ when compared to commercial catch statistics for the Sound. He also concluded that, in the unlikely event that there were to be significant damage to aquatic life in the Sound as a result of Jamesport, the harm would be detected through a decline in the commercial fishing take before it became irreversible (*id.* pp. 8-10; FES Section 5.5.2.1.2, pp. 5-28, 5-33; Tr. 3988-89).

229. Later, following Staff introduction of testimony on comparison of entrainment losses between the Jamesport and Shoreham West sites (written testimony of McLean following Tr. 7268) the Board questioned Dr. McLean on the reliability of catch statistics on commercial fishing. He responded that everyone, even the commercial fisherman, agree that the recorded landings are a "minimum estimate of the catch" (Tr. 7307-7308). Further, in response to a question on what level of loss he would describe as "significant," he explained that the "state of the art of trying to determine significance is very primitive." He went on to say that losses which are measurable against some beneficial use for which statistics are available (*i.e.*, a commercial fishery) become viewed as significant whereas losses which probably could not be measured in the commercial fishery or in reproductive performance such as reflected in numbers of fish eggs and larvae would be termed not significant or "not measurable" (Tr. 7303-7305).

230. The Board concludes that the evidence of record in this proceeding is both comprehensive and thoroughly discussed in connection with this contention. The Board finds that though there will be some impact on the aquatic life of Long Island Sound resulting from entrainment and impingement of fish and their eggs and larvae at the Jamesport station, the adverse impact will be small. The Board further finds no evidence for any likelihood that operation of the plant will cause a measurable, let alone irreparable

⁴⁸0.43% of the commercial finfish catch of the States bordering the Sound (New York, Connecticut, and Rhode Island) (FES as amended by Errata Tr. 6631-6632; Staff Ex. 8, pp. 5-32, 5-33).

damage and loss to the fish and shellfish industries of Long Island. The Board finds that the Applicants have adequately surveyed and described the location for the station's diffusers and that this location does not represent an extremely productive aquatic habitat.

5. Alternatives to Proposed Action

a. Alternative Sites

Board Question V.E.1:

The Board requests that Applicants and Staff present evidence to explain in detail the reasons for favoring the Jamesport site over the Shoreham West site, including comparative environmental effects and development costs (attachment to Board order, June 25, 1976).

231. Subsequently the Board asked for more specific comparative information on the two sites regarding the effects of traffic during the construction period (Tr. 3381-3382); on meteorological need for additional instrumentation for monitoring gaseous releases and radiological impact (Tr. 6277-6282); evacuation feasibility and cost (Tr. 6327 and 6331).

232. LILCO, the NRC Staff, and Suffolk County presented testimony on some or all of these requests as indicated below. Appearing for the Applicants were Matthew Cordaro, Adam Madsen, and Edward Sharsky (written testimony following Tr. 6289, pp. 1-3 (general site comparison and traffic)); William Tunney (following Tr. 7463, pp. 1-9, Tr. 7688, *et seq.* (evacuation and costs)); Foroohar Boorboor and John Wilson (following Tr. 7490, pp. 1-14 (radiological impact, additional instrumentation, and meteorology)). Witnesses for the Staff presenting written testimonies were Richard Rush (following Tr. 6539, pp. 1-8 (general comparison)); Richard McLean (following Tr. 7268, pp. 1-4 (aquatic effects)); Leonard Soffer (following Tr. 7070, pp. 1-4 (radiological impact)); John Goll (following Tr. 7556, pp. 1-10) and William Travers (following Tr. 7558, pp. 1-5 (meteorology, additional instrumentation, and radiological impact)). The Suffolk County witnesses were Arthur Kunz (Tr. 6128, *et seq.*, SC Ex 43 (general comparison)), and John Frizzola (Tr. 6201, *et seq.*, SC Exs. 44, 45, 45A (meteorology)).

233. A comprehensive site analysis was prepared for the Applicants by Grumman Ecosystems Corporation, titled *Baseload Electric Generating Facility Site Reconnaissance Study for Long Island Lighting Company, Bethpage, New York*, September 1973. This study at the outset considered broad regions, *i.e.*, Upstate New York, Connecticut, New Jersey, and even

offshore sites.⁴⁹ By successive elimination the study resulted in settling on Long Island as the most suitable location for the plant. The Grumman report identified a total of 68 potential sites on Long Island. Sufficiently strong objections existed to form a basis for rejection of 47 of these sites, based upon wetlands encroachment, insufficient available land area, and/or present land uses. The remaining 21 sites were then subjected to a preference review, which yielded 11 highly favored sites, which in turn were analyzed with regard to 19 main considerations (Staff Ex. 7, pp. 9-14).

234. The characteristics chosen for consideration were (1) area, (2) exclusion radius and local residential density, (3) topography, (4) geology and soils, (5) meteorology and air quality, (6) wetlands, (7) present use, (8) proximity to airports, (9) population, (10) noise-sensitive areas, (11) overland access and egress, (12) access by sea, (13) access to cooling water intake and outfall, (14) tidal current, (15) water use, (16) access to bulk transmission system, (17) aquatic quality and ecology, (18) terrestrial ecology, and (19) aesthetics (*id.*).

235. The five most favorably ranked sites were then considered for more detailed study. These sites were (1) Shoreham West, (2) Jamesport, (3) Cutchogue East, (4) East Marion, and (5) Montauk. Of these, Jamesport was selected as the most highly favored of the five sites. Based upon site visits, review of Applicants' site selection process, and evaluation of the relative costs attendant to each of the proposed sites, the Staff concluded that none of the alternative sites represented a more desirable alternative from an economic and environmental viewpoint than the Jamesport site (*id.* pp. 9-18, 9-19).

236. The primary environmental reasons for favoring Jamesport over Shoreham West are that (1) less site disruption will be required at Jamesport because the bluffs have already been breached by a now-defunct sand mining operation, (2) positive effects will result from the Applicants' plans to check existing erosion at Jamesport by supplementing and maintaining the beach (see findings 186-189, *supra*) and by stabilizing the bluffs, (3) site clearing will necessitate removing less economically valuable vegetation at Jamesport than at Shoreham West where there is a fairly extensive stand of mature red oak forest, (4) the smaller ichthyoplankton populations off Jamesport compared to Shoreham West indicate that entrainment would be at least 2.7 times greater at the latter site, and (5) deeper water and better flushing rates off Jamesport provided better mixing and dispersion of discharged cooling water than at Shoreham West (Cordaro, *et al.*, pp. 1-2; Rush, pp. 2-3; written testimony of McLean, following Tr. 7268, *passim*). Partially offsetting

⁴⁹For further discussion of Upstate New York sites, see findings re: Need for Power, IV.H.1, *supra*.

these environmental factors in Jamesport's favor are (1) the effects of traffic during the construction period, which will be somewhat larger for Jamesport because of its greater distance from the Long Island Expressway (see finding 239), (2) greater impact on agriculture, (3) the destruction at Jamesport of a small freshwater pond and an archeological site after a salvage excavation, and (4) the lesser aesthetic impact of siting the new plant near the existing Shoreham Station (Cordaro, *et al.*, p. 1; Rush, pp. 2-3).

237. Mr. Kunz's written testimony discussed the Coastal Zone Management Plan for Long Island being developed by the Nassau-Suffolk Regional Planning Board (SC Ex. 43, *passim*). Since the plan is not complete (Tr. 6132-33) Mr. Kunz noted only the factors under consideration that are germane to a comparison of Jamesport with Shoreham West. All of these factors are treated under our findings 234-236, *supra*, and/or other items covering environmental matters. Mr. Kunz testified that the environmental problems of siting a power plant would be similar for any site on the eastern end of Long Island. He expressed no preference for either Jamesport or Shoreham West, but did suggest a close examination to determine if the former site is preferable to the latter (Tr. 6161-62).

238. It will be less expensive to build the station at Jamesport than Shoreham West. Less excavation will be necessary at Jamesport because of the previous sand mining. Also the cooling water diffuser can be 2,500 feet shorter than at Shoreham West because of the deeper water, better flushing action, and absence of nearby sources of thermal discharge. Partially offsetting these economic advantages is the higher cost of installing transmission lines over the longer distance from the LILCO transmission network to Jamesport than to Shoreham West. Jamesport's net economic advantage for development costs was most recently estimated to be \$66.5 million (Cordaro, *et al.*, pp. 2-3, as corrected at Tr. 6286).

239. There are sufficient roads between the Long Island Expressway and the two sites to accommodate traffic during the construction period. Therefore, the traffic impacts will be limited to the inconvenience caused to some motorists along the routes during the morning and afternoon rush hours. Jamesport has a slight disadvantage in this area because it is farther from the Long Island Expressway (Sharsky, Tr. 6299). However, this is offset by the smaller cost of the traffic control measures and one road improvement necessary for Jamesport as compared to the necessary road improvements in the vicinity of Shoreham West. Mr. Sharsky stated that the minimum cost for Jamesport would be \$340,000 (Tr. 6313) for (1) installation of a traffic signal or use of a police officer, (2) installation of traffic signs, and (3) resurfacing a portion of Sound Avenue (Tr. 6303). The cost of the minimum improvements for Shoreham West would be \$500,000 for (1) adding several left turn lanes, and (2) rebuilding and realigning a 1-mile section of roadway (Tr. 6312-13, 6302).

240. Mr. Frizzola stated that it was not the purpose of his testimony to favor one site over the other, but rather to evaluate the Applicants' meteorological analysis, which he asserted was wanting (Tr. 6234-36). In light of Mr. Frizzola's testimony, the Board requested LILCO and the NRC Staff to consider whether additional refinement in the meteorological analysis was necessary to show compliance with 10 CFR Part 50, Appendix I, and Part 100 (Tr. 6277-82). The Applicants' witnesses identified three coastal meteorological phenomena that theoretically could cause a higher maximum individual radiological dose than would occur if a site were located away from a large water body. These phenomena were (1) "sea breeze" circulation associated with either Long Island Sound or the Atlantic Ocean, (2) flow reversal, and (3) rapid downsweeping of air containing radioactive effluents. For a variety of reasons discussed in the written testimony, these phenomena will not cause higher maximum individual doses than those calculated by Applicants and the Staff (Boorboor and Wilson, pp. 2-8; Goll, pp. 5-8). The Staff also demonstrated that the meteorological analytical models that Applicants and it used tend to overestimate the doses caused by gaseous radiological effluents (Goll, pp. 2-5). Therefore, no refinement in the meteorological analysis is necessary to show compliance with 10 CFR Part 50, Appendix I, and Part 100.

241. No additional meteorological instrumentation is necessary during construction because (1) the coastal phenomena will not adversely affect the dose calculations, and (2) the analytical models overestimate the doses (Boorboor and Wilson, pp. 8-9; Goll, pp. 8-9; Sears, pp. 2-3, *passim*).

242. The atmospheric dispersion characteristics of the Shoreham West and Jamesport sites are similar with no significant difference from the standpoint of radiological dose to an individual (Boorboor and Wilson, pp. 9-14; Goll, pp. 9-10; Soffer, pp. 3-4).

243. When comparing the feasibility and cost of evacuating the areas near the Jamesport and Shoreham West sites, the Board recognizes that an accident that would require evacuation of anyone offsite is extremely unlikely. Assuming evacuation nonetheless, the larger population in the Shoreham West vicinity could be notified and removed in approximately the same time as the smaller population near Jamesport. This is because there are more police available to assist the Shoreham West area, and the road network there has a higher capacity than in the Jamesport vicinity (Tunney, pp. 4-8). Since most evacuation expenses are a function of the number of evacuees, the cost of any evacuation in the vicinity of Jamesport would be substantially smaller than at Shoreham West (*id.* at 8-9; Tunney, Tr. 7688, *passim*; Tr. 7472, 7692).

244. For the above reasons, which take into account both environmental and economic factors, the Board finds that the Jamesport site is preferable to the Shoreham West site. The Board further finds that LILCO's and the

NRC Staff's meteorological analyses are sufficiently refined to demonstrate compliance with the applicable NRC regulations and that no additional meteorological instrumentation is necessary.

245. The Board further finds that Applicants and Staff have performed careful and comprehensive independent alternative site reviews, which gave adequate consideration to alternate plant sites. The Board specifically finds that, from the standpoint of economics and environmental impact, the Jamesport site is acceptable for the proposed plant, and that there is no evidence available in the record of this proceeding from which this Board could find that any other alternate site considered is "obviously superior" to the proposed Jamesport site. *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 526-31 (1977).

246. Suffolk County contends in its proposed findings that the Applicants and Staff failed to prove that comparison of alternate sites favored Jamesport (SC Proposed Findings, pp. 320-329). These proposed findings were based largely on the testimony of its own witness Mr. Kunz, they sometimes misrepresented his testimony and generally ignored contrary testimony of Staff and Applicants. For example, SC in paragraph 38.3 states that "Kunz concluded that the Shoreham West site was a preferable choice, and the Jamesport site was in contravention to existing land use plans." During extensive cross-examination by Staff on comparison of sites, Mr. Kunz was asked, "Is there another site that would be better in your opinion . . . from the standpoint of transmission line effects on the surrounding farmland?" Mr. Kunz replied that Jamesport's location in the "agricultural-tourist area of Long Island is the most significant point." He went on to say "So therefore, my point raised in the testimony is that we should look very carefully at whether we really can use the Shoreham site and may not need Jamesport" (Tr. 6160-6161). Certainly this advisory statement does not support SC's proposed finding.

247. Many of the county's proposed findings were not supported by citations to the record or ignored contrary evidence. For example, in its paragraph 38.29 the assertion is made "Information is not sufficient yet to evaluate the significance of the effect on commercial and sport fishing presented by the Shoreham site as opposed to the Jamesport site." Tr. 6175 is cited by the county in support thereof. We have reviewed the record and find that Mr. Kunz was referring to uncompleted studies instituted in connection with the Coastal Zone Management Plan requirements. Until they are completed, he contends it will not be known whether one site is preferable to another with respect to the marine, ground water, and other resources of the Sound. The county apparently ignored the extensive studies on fisheries in the vicinity of the Jamesport and Shoreham sites, and the conclusions favoring Jamesport over Shoreham. See findings 233-236, *supra*. We reject

the county's findings as being unsupported by the record.

b. Alternative Sources of Power

Contention V.E.2.a:

With respect to western low sulfur coal, Applicant and Staff failed to sufficiently evaluate its availability and cost as an alternative to the proposed Jamesport facility. The U. S. Department of Interior estimates western low sulfur bituminous coal reserves at 46.5 billion tons, practically all of which would meet New York State's new source performance standard for coal used in new generating plants such as Jamesport. In addition, these are western reserves of sub-bituminous coal amounting to 185.5 billion tons, a substantial portion of which could meet New York's new source performance standards for steam plants. According to the New York State PSC, the delivered cost of western coal (19.5 million Btu/ton), .4 of sulfur for Jamesport is as follows:

| 1983 | 1985 | 2000 |
|--------|--------|--------|
| \$2.91 | \$3.21 | \$6.66 |

(SC Contention 4.C, as amended May 7, 1976).

248. Applicants' witnesses were Adam Madsen (written testimony, pp. 1-3, following Tr. 4567) and Charles Kroetz (written testimony, pp. 1-12, following Tr. 4571). The Staff's witnesses were Robert Spore and Norman Hinkle (written testimony, pp. 1-11, following Tr. 7715).

249. We conclude that western low sulfur coal is not an economic alternative to nuclear generation at Jamesport. In the first place, using the delivered western coal costs set forth in the contention, a simplified calculation made within the framework of an economic study by Applicants showed that low sulfur western coal would cost 1.7 billion dollars more than nuclear fuel over the life of the Jamesport plant in present worth of revenue requirements (Madsen, pp. 1, 2; Appl. Ex. 8). Moreover, we are persuaded by the Staff's carefully detailed projection which shows its 1985 estimated cost of delivered western coal with a heat content of 8,500 Btu per pound (17.0 million Btu/ton) to be about \$3.75 (\pm 15 cents for variation in the heating value) (Spore and Hinkle, pp. 4-10). Second, other than establishing in cross-examination that various reports reflected coal cost forecasts for the 1980's that differed from the Staff's forecasts, SC did not prove affirmatively that these reports were superior to the Staff's source material (*e.g.*, cross-

examination, Hinkle, Tr. 7770, *passim*). Indeed, the county's witness on the issue of power plant economics, Charles Komanoff, did not testify regarding western coal and instead addressed only eastern low sulfur coal (SC Ex. 48C).

250. In light of our conclusion that western low sulfur coal is not an economic alternative to nuclear because of its greater cost over the life of the Jamesport plant, we need only touch upon the issue of availability. The record reflects that, while most of the approximately 720 billion tons of known coal reserves under less than 3,000 feet of cover and containing 0.7% sulfur or less are located in western states, the estimated doubling of usage by electric utilities by 1985 will place severe strains on the physical and financial capabilities of western coal producers. In addition, since about 75% of the western coal reserves are located on public lands and are subject to Federal regulation, legal considerations add uncertainty to the future availability of this coal (Spore and Hinkle, pp. 1-4).

Contention V.E.2.b:

The Board requested that Applicant testify as to what plans, if any, it has to phase out its oil-fired generating plants in the event the Shoreham and Jamesport plants do or do not become operational.

251. Applicants' witness was Adam Madsen (written testimony, pp. 1-2, following Tr. 4567).

252. If Shoreham and Jamesport were not to become operational, LILCO would be desperately short of the generating capacity needed to provide its service territory with a reliable supply of electricity. Every effort would then be made to keep even the oldest, most inefficient oil-fired units on line, and no facility would be phased out if it remained able to generate power, although at extremely high costs. If, however, Shoreham and Jamesport do come on line, LILCO will have sufficient new generating capacity to permit the phasing out of its older, less efficient units. That process may involve the actual decommissioning of particular facilities, or simply their demotion from baseload to intermediate or peaking use. In deciding whether and to what extent a particular unit should be phased out, we understand that LILCO is guided by these criteria: how to provide its customers with the most economic power while satisfying environmental and reliability requirements (Madsen, pp. 1, 2). Assuming the existence of Shoreham and Jamesport and applying these criteria, it seems certain that LILCO's two oldest oil-fired units, Glenwood Nos. 2 and 3 (each 77 MWe) will be retired by the mid-1980's (Madsen, Tr. 4566-67). Other than these Glenwood units, it is not useful to speculate precisely which other oil-fired plants will be phased out,

when, and how, in light of the years that must pass before LILCO's nuclear plants begin to operate and in light of the various circumstances that may characterize LILCO's oil-fired units at that time (Madsen, p. 2).

253. Oil-fired generation, however, provides no viable alternative to the proposed nuclear station at Jamesport. LILCO's system is presently 100% oil-fired, with its source of fuel mainly foreign (Madsen, Tr. 2381, 7329), and we take official notice that there is governmental and public concern about the future availability of foreign oil. Moreover, LILCO's dependence on oil especially from abroad is at odds with national policy, which seeks an early end to the use of any oil, but particularly foreign oil, as a utility boiler fuel (official notice taken of President Carter's April 20, 1977, speech on energy policy, Tr. 8986-87).

Contention V.E.2.c:

The availability and cost of nuclear fuel as compared to the availability and cost of fossil fuels makes the proposed facility economically more desirable than a fossil-fired unit or units of like capacity (IBEW Contention 1.C, admitted by order of May 8, 1975).

254. Applicants' witnesses were Charles Kroetz (written testimony, pp. 1-12, following Tr. 4571) and Leonard Geller (written testimony, pp. 1-16, following Tr. 4573). The Staff's witnesses were John Patterson (written testimony, pp. 1-3 and pp. 1-24, following Tr. 4190), M. Dean Houston (written testimony, pp. 1-8, following Tr. 6806), P. M. Wood (written testimony, pp. 1-17, following Tr. 7717). Marc Goldsmith testified for IBEW (written testimony, pp. 1-20, following Tr. 2611; Tr. 5695, *et seq.*). Charles Komanoff testified for SC (SC Ex. 48C; Appl. Ex. 20; written testimony, pp. 1-8, following Tr. 9119) as did Irvin Bupp (Tr. 5490, *et seq.*).

255. As reflected in findings 249-250 and 253, neither western coal nor oil is a viable alternative to the use of nuclear fuel at Jamesport. Accordingly, our findings are directed to the availability and cost of nuclear fuel vis-a-vis eastern high sulfur coal.

256. There are adequate domestic uranium resources to fuel reactors of the Jamesport vintage⁵⁰ (Geller, p. 2; Patterson, pp. 1-24; Wood, p. 17). The record also indicates that there is adequate high sulfur eastern coal to fuel a major fossil station at Jamesport, coming on line in the mid to late

⁵⁰Projection of future uranium needs relies on an assumption that design burnup will be attained. While past fuel failure mechanisms have resulted in premature discharge of nuclear fuel assemblies, technological advances in dealing with these problems should make design burnup readily achievable in practice (written testimony of Houston, p. 7; Appl. Ex. 10; Geller, Tr. 20899).

1980's (Kroetz, pp. 1-2). (Parenthetically, while there is eastern coal of low sulfur content, it is used primarily as metallurgical-grade coking coal and the competent evidence of record shows that this eastern low sulfur coal demands a premium price which would make it commercially unavailable for major fossil stations in the northeast by the mid to late 1980's.) (Spore and Hinkle, p. 24; Kroetz, Tr. 9143-53.)

257. Extensive testimony was presented covering future prices for nuclear fuel and various types of coal, and covering economic uncertainties in the nuclear and coal fuel cycles⁵¹ (Geller, pp. 1-16; Kroetz, pp. 1-12; Geller, cross-examination in New York State Siting Board, Appl. Ex. 10). Of the witnesses presented, SC's Mr. Komanoff predicted the lowest coal costs. However, upon comparing his lowest coal price with his nuclear fuel price, Mr. Komanoff's projected costs for Jamesport coal in 1983 (16.7 mills/kWh) were two times greater than those for nuclear fuel costs (8.33 mills/kWh) (Komanoff, written testimony following Tr. 9119, p. 2 as varied at pp. 5-6). In two other case studies, Mr. Komanoff's projected costs for Jamesport coal were over two and one-half times more expensive than for nuclear fuel (see written testimony following Tr. 9119, p. 2; SC Ex. 48C, pp. 5-6). Other witnesses projected as large or larger economic penalties for the use of coal at Jamesport (Goldsmith, pp. 9-13, Tr. 5721; Spore and Hinkle, pp. 22, 26; see also Appl. Ex. 9, pp. 12-14).

258. To the extent power plant economics are determined by the availability and cost of fuel, we conclude that the proposed nuclear power facility at Jamesport will be significantly more economic than any fossil alternative.

c. Alternative Cooling Systems

Board Question V.E.3:

The Board requests that Applicant and Staff present evidence explaining in detail the reasons for rejecting the usage of a natural-draft cooling

⁵¹SC witness Dr. Bupp opined that fuel cycle costs for nuclear power could easily be uncertain by a factor of three, and that the major sources of uncertainty with regard to nuclear fuel cycle costs are the future costs of uranium, the future cost of separative work units, the cost of reprocessing, the cost of waste storage, and the issue of whether plutonium is to be considered a debit or credit in the light water reactor cycle (Tr. 5490, 5492). However, no weight was accorded to this testimony because Dr. Bupp conceded that the subject of nuclear fuel cycle costs was not in his field or expertise and that his testimony was derived from research performed by others (Tr. 5492).

We note that Dr. Geller, in testifying about reprocessing in this country, stated that nuclear fuel costs would increase by 25% over the life of the plant (Tr. 4921). However, one of the sensitivity studies contained in Table 5 of Appl. Ex. 9 hypothesized nuclear fuel costs 50% higher than the base case. The result showed that the cost of nuclear generated electricity was still much lower than for coal.

tower as an alternative to direct-cycle cooling.

259. The Applicants' witness was Dr. Matthew Cordaro (written testimony, pp. 1-9, following Tr. 6590); Staff's witness was Dr. Richard Rush (written testimony, pp. 1-3, following Tr. 6621).

260. Dr. Cordaro explained in detail the Applicants' reasons, environmental and economic, for rejecting natural-draft towers as a cooling system alternative for Jamesport. Each of the nuclear units would require two 495-foot-high towers with base diameters of 380 feet and exit diameters of 203 feet. The towers and the plumes emitted from them would dominate local vistas and be apparent from such distant points as Connecticut. As a result of tower operations, up to 52 pounds of salt would be deposited annually per acre onsite and up to 70 pounds per acre about 10,000 feet south-southeast of the towers. Short-term (3-hour) or maximum airborne salt concentrations would range from 35 to 698 ug/m^3 at the property boundary and would be approximately 757 ug/m^3 3,000 feet east-southeast of the facility. Roughly 5,800 acres would receive short-term concentrations over 100 ug/m^3 . Agricultural crops south of Sound Avenue could be damaged though the extent of possible damage could not be quantified. Further, the noise generated by tower operations would result in a 54 dBA noise level at the property line—a 14 to 19 dBA increase over the estimated sound level of the proposed facility with once-through cooling. Although fog from the towers would not reach the ground, ice formation could cause ground traffic hazards 1,489 hours per year. And because cooling water might have to be treated with corrosion-inhibiting chemicals if towers were used, there could be an increase in the types and concentrations of chemicals discharged by the station (Cordaro, 1-7).

261. Use of natural-draft cooling towers as opposed to once-through cooling would also have economic (capital and operation and maintenance) disadvantages. Based on 1984/86 commercial operating dates for the proposed nuclear units, the total annualized incremental costs that would stem from the use of such cooling towers would be \$6,965,000 (*id.* at 8-9; Tr. 6589, 6600).

262. The environmental and economic penalties would not be offset by the fact that cooling towers would have less adverse impacts than once-through cooling. The adverse impacts projected for the latter are outweighed by the adverse impacts anticipated for the former (*id.* pp. 7-9; Appl. Ex. 17B, pp. 10.1-23, 10.1-25).

263. In general Staff testimony compared the environmental and economic effects and costs between the two cooling systems citing the extensive consideration it had given to this matter in the FES (Staff Ex. 8, Section 5.5.2 on aquatic effects of once-through cooling; Section 9.3.1.1 on evalu-

ation of natural-draft cooling towers). The Staff considers the impact of the direct-cycle cooling system on the aquatic biota to be small and acceptable and that the benefit of a closed-cycle system would be further reduction of this effect. The major costs associated with a natural-draft cooling tower system are monetary, adverse aesthetic impact, and adverse effects of saline drift (Rush, pp. 1-2). The Staff's independent analysis of salt drift from natural-draft cooling towers gave estimates of 180-360 lb/acre-year in areas of 1 mile south of the site and 15-35 lb/acre-year in Riverhead, south Jamesport, and Mattituck. Deposition rates in the range of that estimated for 1 mile south of the site are potentially harmful to agricultural crops (*id.*, p. 2). The Staff concluded that although the benefits and costs are not all quantifiable, in balance the benefits of a natural-draft cooling tower system are less than the costs and such an alternative cooling system is not warranted (*id.*, p. 3).

264. With this evidence before us the Board is satisfied with reasons given for rejecting natural-draft cooling towers as an alternative to direct-cycle cooling.

6. Cost-Benefit Analysis

a. Power Plant Reliability and Costs

Contention V.F.1:

Applicant has overestimated the capacity and reliability of the Jamesport operation as is evidenced by its cost estimates which do not take into account the outages and shutdowns and resultant costly repairs which have characterized current large nuclear power plant operations (CCSC Contention B.8; LWV Contention D.3, as stated in March 26, 1975, Prehearing Conference at Tr. 100-01 and admitted by Board order of May 8, 1975; SC Contention 10 as limited by Board order of May 8, 1975) and did not take into account accelerating construction costs, which includes labor, material and services, cost overruns, high interest rates, higher nuclear fuel costs expected when uranium must be imported, changes in design or regulatory requirements, labor shortages and/or strikes, and late delivery of major equipment (CCSC Contentions B.1 and B.2, admitted by Board order of May 8, 1975; TR Contention E.2, admitted by Board order of May 8, 1975; SC additional Contention 9, admitted by Board order of May 8, 1975). Staff and Applicant have not established the comparative economic advantages of nuclear over fossil fuel generation (SC Contention 4.f, admitted by order of May 8, 1975).

Since Applicant has overestimated the capacity and reliability and under-

estimated the cost of the Jamesport facility, costly substitute power will be required to supply customers (CCSC Contention B.8, admitted by Board order of May 8, 1975).

265. Applicants' witnesses were Adam Madsen and James Walsh (written testimony, pp. 1-15, following Tr. 4576; Appl. Ex. 13). The Staff's witnesses were Robert Spore and Norman Hinkle (written testimony, pp. 1-47, following Tr. 7717). IBEW presented Marc Goldsmith (written testimony, pp. 1-20, following Tr. 2610; Tr. 5695, *et seq.*). SC presented Irvin Bupp (SC Exs. 40, 41; Appl. Ex. 11) and Charles Komanoff (SC Exs. 48A-C; written testimony, pp. 1-8, following Tr. 9119).

266. This contention overlaps our findings 249-250, 252-253, and 256-258, *supra*, with regard to fossil alternatives to the Jamesport nuclear facility and with regard to comparative fuel costs. Thus, the remaining economic issues are nuclear versus coal capital costs, operation and maintenance expenses (O&M), and capacity factors.

267. The Applicants' projected capital costs for two 1,150 MWe nuclear units coming on line in late 1984 and late 1986, respectively, and for three 800 MWe coal units with scrubbers coming on line in 1984/86/88, were higher than the equivalent projections by the NRC Staff, the percentage difference between the Applicants' and the Staff's nuclear estimates being slightly greater than the difference between their coal projections:

**Millions of Dollars Present
Worthed, Assuming a 9%
Discount Rate and 5% Escalation**

| | Present Worth | | |
|------------|----------------------|----------------|-------------|
| | Date | Nuclear | Coal |
| Applicants | November 1984 | 2,570 | 1,988 |
| NRC Staff | January 1985 | 2,190 | 1,727 |

(Compare Appl. Ex. 9, p. 8, with written testimony of Spore and Hinkle, p. 15.) Similarly, although Mr. Goldsmith's nuclear estimates were in 1985 dollars per kilowatt for a single 1,150 W unit rather than in total dollars for a two-unit 2,300 MW, he appeared to have projected a lower nuclear capital cost than that of the Applicants (Goldsmith, pp. 7, 7A). Again, although Dr. Bupp's and Mr. Goldsmith's estimates for coal plant with scrubbers were not made on a directly comparable basis with those of the Applicants and Staff, their coal projections seem in line with those of the Applicants and Staff (Appl. Ex. 11, Tr. 17589-90, 19686-91; Goldsmith, p. 11).

268. The capital cost of nuclear and coal plants is of much greater sig-

nificance in a comparison between them. In this respect, Mr. Komanoff accepted the estimate for nuclear capital costs made by the Applicants on the basis of 1983/85 commercial operating dates (e.g., Appl. Ex. 20, New York State Siting Board, Tr. 26856). And Mr. Komanoff worked from the Applicants' capital costs for three 800 MWe subcritical coal units with scrubbers, coming on line in 1983/85/87, to derive the capital costs for his coal station, consisting of four 600 MWe supercritical units without scrubbers, coming on line in 1983/84/85/86 (written testimony of Komanoff, p. 3, as corrected at Tr. 8995). In 1983 dollars, Mr. Komanoff arrived at a "Nominal Present Worth (PW) Capital Cost" of \$1,688 million for his coal station and an "Actual PW Capital Cost" of \$1,604 million (*id.*, pp. 2, 3). He made errors in the methodology and assumptions used in reaching these calculations—errors which if corrected would have raised the ensuing capital cost (Appl. Ex. 20 at Tr. 26858-61, 26876-77; Tr. 9022-26, 9035-36, 9133-36, 9138). But even without these corrections, the differential between Mr. Komanoff's 1983 "Actual PW Capital Cost" for the nuclear and coal units (\$2,163 million versus \$1,604 million) is akin to that between the Applicants' November 1984 projections (\$2,570 million versus \$1,988 million).

269. The NRC Staff's projected 1985 O&M costs for the nuclear station were estimated to be 1.54 mills/kWh. From Table 7 of the Spore/Hinkle written testimony, it is clear that this figure results from a computation which assumes a capacity factor of 0.67. Thus the projected cost of 1.54 mills/kWh is in terms of kilowatt-hours of plant output—not per kWh of total plant capacity. Since we will discuss plant capacity factor later, we wish to confine comparisons here to O&M costs per unit of installed capacity. Adjusting the Staff's projection gives 1.03 mills per kWh of installed capacity. This compares with a figure of 1.20 mills per kWh of installed capacity assumed by SC witness Komanoff (derived from Komanoff written testimony, p. 2, *i.e.*, 10,500 mills/kw-yr divided by 8,760 hrs/yr gives 1.20 mills per kWh of installed capacity). Staff's figure includes insurance costs whereas Applicants' does not. When insurance costs are subtracted out Staff's O&M figure is slightly lower than Applicants' estimate. Consequently, the spread in estimated O&M costs for the nuclear plant is not large. Moreover, O&M costs represent less than 4% of the total generating cost for nuclear plants in all cases. We thus conclude that there is no significant difference among the parties in this regard.

270. Staff also estimated O&M costs for three coal plants of equivalent capacity to be 4.16 mills/kWh. This estimate also incorporates an assumed plant capacity factor (CF) of 0.64. When this is factored out, the estimate becomes 2.67 mills per kWh of installed capacity. Without explaining its basis, Mr. Komanoff assumed the same O&M cost for coal as for nuclear plants, *viz.*, 1.20 mills per kWh of installed capacity. Applicants' estimate

is higher than Staff's because Applicants' allowance for sludge disposal is significantly higher (compare Appl. Ex. 9, p. 12, with written testimony of Spore and Hinkle, p. 18). The Staff's sludge costs were derived from a generic computer program, not from a Long Island-specific inquiry. Again, however, O&M costs for a coal plant represent only 3%-5% of the total generating costs. When so weighted, the differences among the parties is not of significant importance.

271. Beyond fuel, capital and O&M costs, another important variable in power plant economics is the extent to which any given unit actually generates power during a particular year. All witnesses except Mr. Komanoff concluded that the capacity factors of large electric generating units—whether nuclear or coal—will be essentially the same over the life of a station of Jamesport's vintage. The Applicants projected CF's of 64% for the Jamesport nuclear units and 63% for their coal alternatives during each unit's first 3 years and 72% for both thereafter (Appl. Ex. 8, p. 15; *see* Madsen and Walsh, pp. 1-12). The Staff used as its baseline CF's 64% for coal and 67% for nuclear, because "[t]o match the annual output of the 2,400 MWe three-unit coal station [at 64% CF] . . . the 2,300 MWe two-unit nuclear station would have to be operated at a capacity factor of about 67%" (Spore and Hinkle, p. 17). Mr. Goldsmith assumed CF's of 65% for both nuclear and coal stations (Goldsmith, pp. 10, 12). Only Mr. Komanoff predicted that the capacity factors of these two types of generation would diverge widely in assigning coal a 75% CF and nuclear only 55% (written testimony of Komanoff, p. 2).

272. Mr. Komanoff arrived at this 20% differential by various statistical extrapolations from historical CF data. However, the nuclear data through 1976 remain far too small to support meaningful results via statistics alone (*see* Komanoff, Tr. at 7895, 7905, 7912; Appl. Ex. 19B at 2; Appl. Ex. 19C, pp. 2-3). Further, although the historical coal information from which he extrapolated was far more ample than for nuclear, it stopped in 1973, and showed a CF of only 57.8% for units above 400 MWe—more than 17% below the 75% CF that Mr. Komanoff projected for Jamesport coal units (Tr. 7939). A document (Appl. Ex. 13) prepared by Mr. Madsen at the request of counsel for Suffolk County (Tr. 6406-07), analyzed a case of nuclear pessimism/coal optimism as postulated by SC: that is, the complete removal of the nuclear plant from service after 15 years, leaving the coal station to generate power for a total of 30 years. However, even when generating power for only 15 years out of the 30 years considered, the nuclear plant still proved more economical than the coal (Appl. Ex. 13).

273. Mr. Komanoff's economic testimony—which varied many assumptions while holding nuclear and coal CF's rigid at 55% and 75% respectively—provided a sensitivity test for the economic conclusions of other witnesses (*see* Madsen, Tr. 9142-43). Despite awarding coal a constant 20%

CF advantage (as well as making some other assumptions favorably to coal), Mr. Komanoff found that in most of his scenarios nuclear power nonetheless would be cheaper than coal on Long Island (*see* Appl. Ex. 20 at New York State Siting Board Tr. 26854-924) (concerning his Green Book, SC Ex. 49); Tr. 9004-63 (concerning his Final Supplemental Testimony) (*see also* Madsen and Kroetz rebuttal, Tr. 9125-53). Mr. Komanoff's testimony underscored the basic reality about the economics of nuclear versus coal generation at Jamesport. For reasons of coal transportation, ash/sludge disposal, and air quality maintenance, Jamesport would be a peculiarly expensive place to operate a major coal station (*see, e.g.*, Dr. Bupp, Tr. 5506-09; Komanoff, Tr. 8016-19; Madsen, Tr. 9140-41; Appl. Ex. 20 at Siting Board, Komanoff Tr. 26924).

274. The NRC Staff concluded that the electricity produced by a high sulfur coal station would be 45% more expensive than that from the proposed nuclear facility (Spore and Hinkle, p. 44). Mr. Goldsmith, using assumptions that he termed "optimistic" so far as coal was concerned, found that coal would be 20% more expensive than nuclear power (Goldsmith, p. 12). The Applicants' analysis showed that, in present worth of revenue requirements assuming a 9% discount rate and 5% escalation, over 30 years, the Jamesport coal alternative would cost from 2.9 to 5.3 billion dollars more than the proposed nuclear station, depending on the cost of coal (Appl. Ex. 9, p. 7). Dr. Bupp, appearing for SC, concluded "that the economic comparison of the performance of large light-water reactors and large coal-fired plants is effectively indeterminate on the basis of empirical evidence" (Tr. 5474). However, Dr. Bupp admitted that this conclusion was based on a generic study of many plants in the United States, that there were significant regional variations, and that he had not made a specific comparison for Long Island. Dr. Bupp, in fact, stated that he had no view as to the practicality of a coal-fired plant on Long Island (Tr. 5504-06).

275. While there are uncertainties in making economic comparisons between nuclear and coal power plants, based upon the evidence in this record regarding fuel, capital, and operation and maintenance costs, as well as plant capacity, we conclude that there is a greater economic advantage for nuclear generation at Jamesport, as compared to any fossil fuel alternative.

I. Other Matters

1. Compliance with Appendix I, 10 CFR Part 50

276. Section 50.34a of 10 CFR Part 50 requires releases of radioactive materials in liquid and gaseous effluents from nuclear power reactors to be "as low as reasonably achievable." In its SER Section 11 (Staff Ex. 12)

and FES Section 3.5 (Staff Ex. 7), Staff described the Jamesport radioactive waste management system design and concluded on the basis of its evaluation that the design was capable of meeting the "as low as reasonably achievable" criterion.

277. As a result of its rulemaking proceedings, Docket RM-50-2, the Commission on May 5, 1975, adopted Appendix I to 10 CFR Part 50 which provided quantitative guidance and design objectives for meeting the "as low as reasonably achievable" criterion. In addition, Appendix I also required Applicants to perform a cost-benefit analysis of radioactive waste management systems designs. However, on September 4, 1975, the Commission adopted amendments to Appendix I permitting qualified Applicants to proceed without the cost-benefit analysis provided the expected liquid and gaseous releases and consequent radiological doses were below even lower values than those specified in Sections II. A, B, and C of Appendix I.⁵²

278. In a letter of September 24, 1975, Applicants notified the Commission that it chose to meet the "as low as reasonably achievable" requirements as permitted by this option.

279. In Supplement 1 of its SER (Staff Ex. 13) issued in April 1976, Staff published the results of its evaluation of the proposed Jamesport design and found it to be acceptable. During the hearings in the Jamesport proceedings, Staff introduced additional testimony to supplement its FES, SER, and SER Supplement 1.

280. Staff witnesses were Richard A. Weller (written testimony following Tr. 6662, pp. 1-4, with two attachments), Michael A. Parsont (written testimony following Tr. 6662, pp. 1-8), later joined by Frank J. Miraglia (Tr. 6675-95).

281. Using revised release and dose models in response to Commission guidance,⁵³ Staff reanalyzed the proposed Jamesport Radioactive Waste Management System design and found that it was capable of meeting the "as low as reasonably achievable" requirement in all respects.

282. The League of Women Voters, Suffolk County, and IBEW cross-examined Staff witnesses but failed to develop anything which would cast doubt on Staff's analysis and conclusions.⁵⁴

283. The Board finds the Staff's evaluation to be reasonable and agrees with the Staff's conclusion regarding the acceptability of the Jamesport Radioactive Waste Management System design.

⁵²40 Fed. Reg. 40816 (September 4, 1975). See also Annex to Appendix I entitled "Concluding Statement of Position of the Regulatory Staff (Docket RM-50-2) and Statement of Consideration.

⁵³See Section 7, Implementation, Statement of Consideration (40 Fed. Reg. 40816, September 4, 1975).

⁵⁴None of the intervening parties submitted proposed findings regarding this matter.

2. New Commercial Operating Dates and Peakload Projections

284. Recently the Board and the parties were served with Applicants' submission of January 28, 1978, which:

a. states that the November 1984/86 commercial operating dates are no longer realistic and that Applicants now project that Unit 1 will come on line in the summer of 1988 and Unit 2 in the summer of 1990;⁵⁵

b. provides new peakload forecasts for both utilities. NYSEG's projections have declined somewhat in earlier years and risen in later years. NYSEG's need for additional generating capacity is still indicated in the mid-1980's. LILCO's projections have dropped markedly so that deficits (capacity v. projected peak plus reserve) are not predicted until 1989;

c. urges that the substitution of nuclear for oil continues to apply and that the record as it stands supports the need for Jamesport.

285. The Staff notified the Board in a letter dated February 10, 1978, that it had posed questions to Applicants with regard to the Applicants' January 28th filings. In a letter of February 21, 1978, Suffolk County stated that Applicants' submission raised substantial additional legal questions regarding not only the issue of the need for the proposed facility but also directly affected other areas of contention, and that the county intended to submit written legal arguments after reviewing Applicants' responses to the Staff's questions. On March 3, 1978, Applicants submitted their responses to the Staff's questions. Thereafter, in an order dated March 8, 1978, we directed SC to file a submission of not more than 30 pages by March 20th, with any replies due on April 3rd.⁵⁶ After the SC submitted its Supplemental Legal

⁵⁵Applicants advised that the commercial operating dates are revised because of (1) the time that still appears to be required to obtain firm approval at both the State and Federal levels, including time for any judicial review necessary to confirm the regulatory decisions, (2) 18 months of engineering and procurement required thereafter to support construction startup, and (3) the lengthy construction period that now seems probable in light of recent construction experience. However, Applicants advise that, if developments permit, these commercial operating dates may well be advanced.

⁵⁶The county's legal argument was presented in 30 pages. However, SC evaded the intent of our March 8, 1978, order by including 31 additional pages in the form of appendices which it cited and referred to in the legal arguments. SC took advantage of this opportunity to rehash several matters which had been thoroughly briefed previously and which had only the most tenuous and questionable link to Applicants' new forecasts and schedule. For example, SC resurrected the steam generator tube issue without even hinting at any technical basis for assuming that a 4-year delay in commercial operating dates might somehow impact upon the safety implications of this phenomenon. Similarly, LWV states in its response, without suggesting any link with Applicants' January 28th submission, that "The overall environmental compatibility of a nuclear plant at Jamesport is nonexistent." Whereas the Board does discuss hereinafter its reasons for rejecting those SC and LWV arguments which have at least some discernible nexus to the revised schedule and forecasts, we do not deal explicitly with others of the same stripe as the examples just given.

Arguments on March 20th, the Applicants, Staff, and LWV timely filed responses.

286. At the time of Applicants' January 28, 1978, submission, this Board in the main had finalized its decision on all matters pending before it, including Section IV.H.1, "Need for Power." Since then, we have carefully reviewed the record in light of Applicants' submission and the aforementioned legal arguments of the parties:

287. The county's central argument, to which the league subscribes, is that the 44-month slippage announced by Applicants confirms its previously held position that Jamesport is simply not needed. As we see it, this view follows from SC's persistence in equating "benefit" or "need" to "need for additional generating capacity to meet peak demand on Long Island with adequate reserve," while ignoring or belittling all other bases of need. Moreover, SC (and LWV) invariably make the tacit assumption that the supply of fuel oil will continue indefinitely into the future and at a nonprohibitive price. Thus Intervenors assume that LILCO's current generating capacity will always be available and that any additional capacity required to meet growth in demand can be met by means such as conservation, solar and wind power, and imports. The dire consequences to themselves as well as to others should these assumptions prove false are consistently ignored. In addition, the Intervenors persistently focus on the needs of Long Island and either ignore the needs of NYSEG (and the rest of New York State and the nation) or treat the LILCO-NYSEG joint application as at best devious, unjustified, and unfair. Finally, the only justification advanced for re-arguing or raising anew many extraneous issues is Intervenors' assertion, based on this narrow point of view, that Jamesport is not needed.

288. After careful review, this Board has determined that Applicants' revised peak power forecasts and anticipated operating dates do not alter our previous findings that Jamesport is needed and that its benefits far outweigh its monetary costs.

289. First of all, NYSEG's need for additional generating capacity in the mid-1980's is unchanged. In this respect, we note that NYSEG's peak power forecasts remained uncontested throughout the hearings, in Intervenors' proposed findings, and in their recent legal arguments.

290. LILCO's new peakload forecasts assume an average growth rate of only 3% per year out to 1990 and progressively lower rates thereafter.⁵⁷ On this basis, a need for additional generating capacity in the LILCO service area is indicated by the summer of 1989. We note in passing that even at

⁵⁷No party has suggested that these growth rates are still too high. SC, in fact, appears to endorse them since their use yields results similar to those of the county's own witness Dubin and to SC's proposed findings of fact (see pages 5, 11, and 12 of SC's Supplemental Legal Arguments, March 20, 1978).

an average growth rate as low as 2% per year, new capacity would still be required 5 years later. However, we need not assume any growth at all in the LILCO service area to find a need for and benefit from the proposed Jamesport facility. Rather, it suffices to base that judgment on the need for new generating capacity in the NYSEG service area, and the need to substitute for oil-fueled plants in the LILCO area as we next discuss.

291. In addition to a need for additional generating capacity, we continue to see major benefits in the substitution of Jamesport for existing oil and coal-fired plants. The county states that Applicants argued the substitution basis for the first time in their January 28, 1978, submission. We disagree. There are several reasons for substitution including (a) more dependable fuel supply, (b) lower cost electricity,⁵⁸ (c) lower environmental impact, and (d) advantages of reducing consumption of oil, especially foreign oil.⁵⁹ A lengthy evidentiary record was made on all of these factors in these proceedings, they were all thoroughly briefed in proposed findings of fact, and all have been previously discussed in this partial initial decision. Moreover, we find that the benefits of substitution are especially strong in this case, and that this basis of need is entirely in accord with NRC Appeal Board decisions.⁶⁰

292. In addition to the issue of need, per se, we find nothing about the projected slippage which would alter our previously stated findings regarding

⁵⁸The league comments that Applicants' "Emphasis is now on *reducing oil consumption* by going nuclear. Since the present dates of 1988-1990 are still far away, and the need to save oil is immediate, all alternative means of reducing oil consumption must be employed." We certainly agree. However, LWV gives no indication as to how that saving is to be accomplished *starting now*. We presume the league has in mind such measures as conservation, solar and wind power, and refuse-derived fuel. If so, this Board would agree wholeheartedly that such measures should be pushed hard and quickly. We see no conflict at all with these means of reducing oil consumption beginning in the near term with the much greater potential offered by the Jamesport plant some 10 years hence. This follows from the fact that no party has even suggested that such measures taken together could begin to replace Applicants' current generating capacity but rather that if pushed hard, they might possibly handle future growth in demand. Thus, even if effected, such measures could not avert a catastrophe—especially on Long Island—should fuel oil supply be lost, drastically limited, or its price become prohibitive. Moreover, any conservation of oil resulting from such methods would not compete with the oil savings from substituting Jamesport for existing LILCO plants but would complement it.

⁵⁹We understand that the estimated dollar cost for construction has risen as a result of the expected 44-month slippage. Although the record does not include an economic analysis for the exact construction and operating dates now projected, one analysis of record is sufficiently close to indicate that strong economic advantages will still prevail (App. Ex. 8, pp. 10 and 11).

⁶⁰*Niagra Mohawk Power Corporation* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 352-369 (1975); *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 95-96, 98 (1977).

alternate sites or alternate means of generating electricity.⁶¹

293. We have also reviewed the record with regard to other areas of contention which Intervenor's assert will be directly affected by Applicants' current revisions. For the following reasons, we disagree with Intervenor's in all these matters and find no adequate reason to revise our previous findings and conclusions.

294. The county resurrects its argument that the revised forecasts and schedule require that a new Environmental Impact Statement must now be prepared and circulated. Except for restating the county's view that Applicants' recent revisions confirm its opinion that Jamesport is not needed, all of the reasons advanced by SC are entirely unrelated to the January 28, 1978, submission. Moreover, SC makes no attempt to argue that the projected 44-month slippage will entail greater environmental impacts than those already considered. We therefore find that an amendment to Staff's Final Environmental Statement is not required.⁶²

295. SC also asserts without advancing any basis for it, that "by reason of the 4-year postponement, Staff and Applicant's testimony on the health and safety impacts of the Jamesport plants—the cost—has been seriously undermined."⁶³ The Board, however, believes that the additional time now available will likely lead to advancements in knowledge and improvements in technology which will enhance the safety of the proposed plant.⁶⁴

296. SC also argues that the announced slippage invalidates the use of Millstone 3 as a replication base for Jamesport. The county asserts that "... a plant design is only permitted to be replicated for 2-½ years from the date of issuance of its 'Safety Evaluation Report' (SER) by the NRC." SC then points out that a construction permit for Jamesport cannot possibly be issued before 1978, approximately 4 years following issuance of the Millstone 3 SER on March 13, 1974. Although the county does not give a precise citation for this alleged 2-½ year time limit, we can only assume that SC refers to a Staff document entitled, "Policies and Procedures for the Replication of Custom Plant Designs," dated July 1974 which was attached

⁶¹SC asserts that the postponement of operating dates "further confirms the county's findings [in that] it renders speculative any asserted economic advantage of nuclear generation over coal, or vice versa" (p. 5 of SC's Supplemental Legal Arguments). However, the only reasons given for this speculation are "higher interest charges, labor and inflation costs" (footnote 9, *id.*). We see no reason why these factors would not apply equally to construction costs of a coal-fired plant and SC offers none.

⁶²See *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179 (February 16, 1978).

⁶³SC's characterization of Applicants in the singular is indicative of the county's erroneous and persistent tendency to equate the Applicants with LILCO to the exclusion of NYSEG.

⁶⁴This belief is entirely consistent with the underlying basis for permitting the issuance of construction permits under 10 CFR Section 50.35(a).

to the county's submission as part of Appendix E thereto. Therein the Staff states that "The duration of availability (*i.e.*, period of time during which a base plant design may be used in a replicate plant *application*) for use as a base plant is normally 2-½ years commencing from the date of the original SER issuance for the base plant" (emphasis supplied). It seems clear enough to us that Staff intended that an application for a CP for a replicate plant normally must be submitted within 2-½ years—not that the CP for the replicate plant had to be issued within 2-½ years. The Jamesport application was docketed September 6, 1974, less than 6 months after the Millstone 3 SER was issued (March 13, 1974). Moreover, if the county believed that the CP had to be issued within 2-½ years from publication of the Millstone 3 SER, that period would have ended in September 1976. Hence SC could have, but did not, make this argument in its proposed findings submitted July 30, 1977. The county also makes other arguments against what SC terms "this abuse of the replication policy" without giving any technical basis for its inference that the announced 44-month slippage somehow invalidates the Jamesport design.

Accordingly, the Board finds SC's arguments concerning replication (a) to be based on an erroneous construction of the Staff policy, (b) untimely, and (c) to be otherwise without merit.

297. In summary, the Board finds that neither the postponement and revised forecasts announced by Applicants, nor the "legal arguments" of Intervenors provide sufficient basis for altering our previous findings regarding "need" or any other issue under contention in these proceedings.

V. CONCLUSIONS OF LAW

1. The Board has considered all of the extensive documentary and oral evidence presented by the parties to this proceeding. Those proposed findings of fact and conclusions of law submitted by the parties which are not incorporated directly or inferentially in this partial initial decision are rejected as being unsupported in law or as being unnecessary to the rendering of this decision.

Based upon our review of the entire record in this proceeding and the foregoing findings and in accordance with 10 CFR §50.10(e) and 10 CFR Part 51 of the Commission's regulations, the Board has concluded as follows: The application and the record of the proceeding contain sufficient information and that the review of the application by the Staff has been adequate to support the following.

2. We find that:

A. In accordance with the provisions of 10 CFR §50.35(a):

(1) The Applicants have described the proposed design of the facilities, including, but not limited to, the principal architectural and engineering criteria for the design, and have identified the major features or components incorporated therein for the protection of the health and safety of the public; (2) such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied by the Applicants in the Final Safety Analysis Report; (3) safety features or components, if any, which require research and development have been described by the Applicants and the Applicants have identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components; and (4) on the basis of the foregoing, there is reasonable assurance that (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of construction of the proposed facilities, and (ii) taking into consideration the site criteria contained in 10 CFR Part 100, the proposed facilities can be constructed and operated at the proposed location without undue risk to the health and safety of the public.

B. Long Island Lighting Company is technically qualified to design and construct the proposed facilities.

C. The Applicants are financially qualified to design and construct the proposed facilities.

D. The issuance of permits for construction of the facilities will not be inimical to the common defense and security or to the health and safety of the public.

VI. ORDER

IT IS ORDERED, in accordance with 10 CFR §2.760, §2.762, §2.764, §2.785, and §2.786 of the Commission's Rules of Practice, that this partial initial decision shall become effective immediately and shall constitute with respect to the matters covered therein the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the Commission's Rules of Practice.

Exceptions to this partial initial decision may be filed by any party within seven (7) days after service of this partial initial decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff) any party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (twenty (20) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD

Dr. E. Leonard Cheatum, Member

Ralph S. Decker, Member

Sheldon J. Wolfe, Esquire, Chairman

Dated at Bethesda, Maryland,
this 9th day of May 1978.

[Appendix A has been omitted from this publication but is available in the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Marshall E. Miller, Chairman
Dr. Emmeth A. Luebke
Dr. Oscar O. Paris

In the Matter of

Docket Nos. STN 50-568
STN 50-569

NEW ENGLAND POWER
& LIGHT COMPANY

(NEP, Units 1 and 2)

May 25, 1978

Upon consideration of untimely intervention petition, the Licensing Board, after balancing the four factors of 10 CFR §2.714(a), grants intervention on a single issue but denies it on other issues. The Board also defers ruling on a motion to require certain intervenors to consolidate for discovery purposes.

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

Failure to receive the *Federal Register* does not justify the nontimely filing of an intervention petition. *Tennessee Valley Authority* (Browns Ferry, Units 1 and 2), ALAB-341, 4 NRC 95, 96 (1976).

RULES OF PRACTICE: NONTIMELY INTERVENTION PETITIONS

The particular public interest advanced by a local government entity may differ from the interests of other participants asserting the same issues. *Project Management Corp.* (Clinch River Breeder Reactor Plant), ALAB-354, 4 NRC 383, 390 (1976); *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-339, 4 NRC 20, 24-25 (1976).

ORDER REGARDING INTERVENTION AND LIMITED APPEARANCES

I

On January 5, 1978, the town of Exeter (Exeter) filed a petition to extend time for leave to intervene and a proposed intervention petition. This motion was filed about 14 months after the expiration of the period for intervention on November 11, 1976, as published in the *Federal Register* (41 Fed. Reg. 44761, October 12, 1976). Exeter seeks to justify its untimely filing by stating that it does not receive the *Federal Register* and was unaware of the timetable for filing intervention petitions and that its town solicitor became aware of the published notice in "the fall" of 1977 (Petition to Extend Time, pp. 1-2).

The Staff does not oppose the petition to extend time, but urges that the intervention be limited to the single issue of transmission line routing. The Applicant considers it likely that good cause has been shown as to the transmission issue, but not as to any of the other issues sought to be raised. CCRI, *et al.*, support the intervention petition as to all issues.¹

Nontimely filings for intervention will not be entertained in the absence of a determination that the petitioner has made a substantial showing of good cause for failure to file on time. The "good cause" determination involves a consideration of both (1) the substantiality of the justification offered for the late filing, and (2) the four factors enumerated in 10 CFR §2.714(a).² Those factors are:

- (1) The availability of other means whereby the petitioner's interest will be protected.
- (2) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (3) The extent to which petitioner's interest will be represented by existing parties.
- (4) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.³

In this case, Exeter explains its late filing by stating that it does not receive the *Federal Register* and was therefore completely unaware of the

¹These issues include transmission lines, financial qualifications, need for power, radiological emissions (including onsite rad-waste disposal), and LPZ evacuation.

²*Gulf States Utilities Company* (River Bend Station, Units 1 and 2), ALAB-444, 6 NRC 760, 796 (1977); *Nuclear Fuel Services, Inc.* (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975).

³Section 2.714(a) has recently been amended, effective May 26, 1978. However, the amendment in this respect is in essence a codification of the Commission's decision in *West Valley, supra*.

timetable for intervention. This is not an adequate excuse to justify a non-timely filing.⁴ This proceeding was well publicized in the area, and Exeter's town council voted on June 5, 1977, to intervene. Its town solicitor became aware of the *Federal Register* notice in the fall of 1977, yet there is no adequate explanation for not filing an intervention petition until January 1978.⁵

Although Exeter has failed to justify its untimely filing, a balancing of the four factors described above warrants the granting of intervention on the single issue of transmission line routing. The transmission line issue has previously been admitted as a valid contention (Contention No. 23) in this proceeding. It is doubtful whether Exeter would have available as a practical matter any other means of protecting its own interest in this issue (factor 1). Since property within its corporate limits would be utilized for high-voltage transmission lines, the town would have a direct interest so that its participation could assist in developing a sound record (factor 2). Although other municipal and private intervenors have raised the transmission line issue, it is likely that each will represent only its own perceived interest in this regard, which may vary from that of Exeter. In other cases, it has been recognized that particular public interests which are advanced by some local governmental entities may be of a different stripe than those of other participants in the proceeding⁶ (factor 3). Finally, it cannot be said that Exeter's participation will broaden the issues or delay the proceeding (factor 4). The transmission line contention has previously been admitted as a cognizable issue, and discovery has not yet commenced.

However, the four factors described above militate against allowing an untimely intervention as to the other contentions⁷ which Exeter seeks to assert. A number of other intervenors, many represented by counsel, have raised all of these contentions, and their interests do not differ significantly in these respects from those of Exeter (factors 1-3).⁸ The Petitioner makes clear that its principal concern and chief contribution in developing a sound record revolve around the transmission lines issue (Petition, p. 2). Although Exeter's intervention on these other contentions would not broaden the issues or delay the proceeding (factor 4), this is not dispositive in view of the conclusions reached on the other three factors.⁹

⁴*Tennessee Valley Authority* (Browns Ferry, Units 1 and 2), ALAB-341, 4 NRC 95, 96 (1976).

⁵*Project Management Corporation, et al.* (Clinch River Breeder Reactor Plant), ALAB-354, 4 NRC 383, 389 (1976).

⁶*Id.* at 390. See also *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-339, 4 NRC 20, 24-25 (1976).

⁷Fn. 1, *supra*.

⁸See analysis of contentions in NRC Staff Response to Town of Exeter's Petitions, p. 5.

⁹*Long Island Lighting Company* (Jamesport Nuclear Power Station, Units 1 and 2), ALAB-292, 2 NRC 631, 650-51 (1975); *Clinch River, supra*, 4 NRC at 394-95.

Accordingly, Exeter's petition for leave to intervene is granted, but its participation is limited to the single issue of transmission line routing.

II

The consolidated Intervenor LAMP, *et al.*, have filed a motion pursuant to 10 CFR §2.715(a) for an order compelling those parties opposing the application to consolidate, for discovery purposes. It was requested that liaison counsel be appointed, who would serve one consolidated set of interrogatories, requests for production of documents, and requests for admissions in each round of discovery.

The Staff urged the consolidation of parties on a contention-by-contention basis unless they voluntarily consolidated upon 30 days notice, but opposed the appointment of liaison counsel. A table was prepared listing the number of private and municipal intervenors who are parties to each admitted contention.

The Applicant supported the motion, and tendered a proposed order of consolidation which grouped various parties for consolidation arranged according to categories of contentions.

Responses in opposition to the motion were filed by CCRI, *et al.*, as well as by the town of South Kingstown.

The Board has deferred ruling upon the motion to consolidate and the suggestions of counsel as being premature at the present time. Discovery has not commenced and will not begin until after the conclusion of an evidentiary hearing on the *Douglas Point* criteria, in accordance with our order of February 21, 1978. It is expected that experience gained in conducting that hearing will aid the Board in fashioning the appropriate consolidation of parties and issues. However, in view of the large number of parties and contentions, it is apparent that some consolidation, voluntary or otherwise, will be required to avoid unwieldy proceedings. The parties should give further consideration to the best methods of accomplishing this purpose.

In this connection, we note that considerable liberality was extended in the first two special prehearing conferences in permitting various representatives to be heard. All parties have now entered the appearance of counsel or identified their designated representatives, and in the future only these persons will be permitted to address the Board. Appropriate formality will now be required in order to keep the proceedings expeditious and orderly. The Federal Rules of Civil Procedure and the Federal Rules of Evidence will be followed by analogy wherever they are reasonably appropriate to our administrative proceedings. The Commission's Rules of Practice (10 CFR Part 2) will control the conduct of all hearings.

III

Requests to make a limited appearance in this proceeding have previously been filed by 394 persons or organizations in accordance with a published Notice of Hearing on Application for Construction Permits (41 Fed. Reg. 44761, October 12, 1976). Limited appearances by persons who are not parties may be allowed under the provisions of 10 CFR §2.715(a), which has recently been amended,¹⁰ effective May 26, 1978, to provide as follows:

- (a) A person who is not a party may, in the discretion of the presiding officer, be permitted to make a limited appearance by making oral or written statement of his position on the issues at any session of the hearing or any prehearing conference within such limits and on such conditions as may be fixed by the presiding officer, but he may not otherwise participate in the proceeding.

The Board believes that it is in the public interest for it to be fully informed of the positions of the citizens of Rhode Island "on the issues" as delineated by the 51 contentions held to be admissible in our Special Prehearing Conference Order of September 15, 1977, pp. 5-17. Accordingly, the requests to make a limited appearance previously filed are granted. A list of the persons making such requests is attached hereto as Attachment 1, and is incorporated herein by reference. However, because of the large number of requests and the difficulty encountered in deciphering some of the names and addresses, it will be necessary to require a written verification by each person of his or her continued interest in making an oral or written statement of position. Such verification of intention and correct name and current address shall be printed or typed. All written verifications must be received by the Board by July 14, 1978. Only one statement of position on the issues, whether written or oral, shall be allowed each person. It is the intention of the Board to allow a limited number of statements of position at each future prehearing conference or evidentiary hearing, to be selected at random from the verified list of limited appearance requests. These statements should be kept relevant to the issues defined in the admitted contentions, and unnecessary repetition should be avoided by submitting joint written statements or by designating a spokesman to describe commonly held views. We will rely on the good sense and cooperative spirit of the participants to prevent this procedure from becoming too cumbersome.

IT IS SO ORDERED.

¹⁰43 Fed. Reg. 17798 (April 26, 1978).

**-FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

Marshall E. Miller, Chairman

**Dated at Bethesda, Maryland,
this 25th day of May 1978.**

**[Attachment 1 has been omitted from this publication but is available in the
NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy

In the Matter of

Docket No. 50-389A

FLORIDA POWER & LIGHT COMPANY

(St. Lucie Plant, Unit No. 2)

June 21, 1978

The Commission affirms the grant of a late intervention petition seeking an antitrust hearing in a construction permit proceeding.

ATOMIC ENERGY ACT: ANTITRUST PROVISION

Congress did not envision for the NRC a broad, ongoing antitrust enforcement role, but rather established specific procedures (and incentives) intended to tie antitrust review to the two-step licensing process.

ATOMIC ENERGY ACT: PRELICENSING ANTITRUST REVIEW

Section 105c of the Atomic Energy Act and its implementing regulations contemplate that mandatory antitrust review be conducted early in the construction permit process.

ATOMIC ENERGY ACT: PRELICENSING ANTITRUST REVIEW

Antitrust review might be conducted out of time if significant doubts were cast on the adequacy of the initial antitrust review.

ATOMIC ENERGY ACT: ANTITRUST PROVISION

One of the policies reflected in §105c of the Atomic Energy Act is that a government-developed, monopoly-like nuclear power electricity generation should not be used to contravene the policies of the antitrust laws. §105c is a

mechanism to allow smaller utilities, municipalities, and cooperatives access to the licensing process to pursue their interests in the event that larger utility applicants might use a government license to create or maintain an anti-competitive market position.

ATOMIC ENERGY ACT: PRELICENSING ANTITRUST REVIEW

Although §105c of the Atomic Energy Act encourages petitioners to voice their antitrust claims early in the licensing process, reasonable late requests for antitrust review are not precluded so long as they are made concurrent with licensing. Licensing boards must have discretion to consider individual claims in a way which does justice to all of the policies which underlie §105c and the strength of particular claims justifying late intervention.

RULES OF PRACTICE: INTERVENTION PETITION (ANTITRUST)

The criteria of 10 CFR §2.714 for late petitions are as appropriate for evaluation of late antitrust petitions as in health, safety, and environmental licensing, but the §2.714 criteria should be more stringently applied to late antitrust petitions, particularly in assessing the good cause factor.

RULES OF PRACTICE: INTERVENTION PETITIONS (ANTITRUST)

Late requests for antitrust review hearings may be entertained in the period between the filing of an application for a construction permit—the time when the advice of the Attorney General is sought—and its issuance. However, as the time for issuance of the construction permit draws closer, licensing boards should scrutinize more closely and carefully the petitioner's claims of good cause.

ATOMIC ENERGY ACT: ANTITRUST RELIEF

Where an antitrust petition is so late that relief will divert from the licensee needed and difficult to replace power, the licensing board *may* shape any relief granted to meet this problem.

RULES OF PRACTICE: INTERVENTION PETITION (ANTITRUST)

In evaluating intervention petitions to determine whether the requisite specificity exists, whether there has been an adequate delineation of the basis for the contention, and whether the issue sought to be raised is cog-

nizable in an individual licensing proceeding, licensing boards will not appraise the merits of any of the assertions contained in the petition. But when considering untimely petitions, licensing boards are required to assess whether the petitioner has made a substantial showing of good cause for failure to file on time. In doing so, boards must necessarily consider the *merits* of claims going to that issue.

ATOMIC ENERGY ACT: SCOPE OF ANTITRUST REVIEW

In dealing with antitrust issues, the NRC's role is something more than a neutral forum for economic disputes between private parties. If an antitrust hearing is convened, it should encompass all significant antitrust implications of the license, not merely the complaints of private intervenors. If no one performs this function, the NRC staff should assure that a complete picture is presented to licensing boards.

J. A. Bouknight, Jr., Washington, D.C., and **John E. Mathews**, for the Applicant, Florida Power and Light Company

Robert A. Jablon, Washington, D.C., for the Petitioner, Florida Cities

Melvin Berger and Janet Urban, for the Department of Justice

J. Rutberg and Lee Scott Dewey for the Nuclear Regulatory Commission staff

MEMORANDUM AND ORDER

In May 1973, the Florida Power & Light Company submitted the antitrust portions of its application for permission to build the St. Lucie Plant, Unit No. 2, to our predecessor agency, the Atomic Energy Commission. In accordance with the Section 105c(1) of the Atomic Energy Act, a copy of the application was transmitted to the Attorney General requesting his advice on possible antitrust implications. The Attorney General's November 1973 response was duly published in the FEDERAL REGISTER with an invitation to any interested persons to file intervention petitions by December 28, 1973. No petitions were filed in response to the FEDERAL REGISTER notice. 38 Fed. Reg. 32159. However, interest in participation in the plant had previously been expressed by certain entities. The letter of the Attorney General noted these requests and the "probability that participation [in the facility] will be made to certain of [them]."

Accordingly, the Attorney General did not recommend an antitrust hear-

ing, instead proposing that the Commission await the outcome of FP&L's consideration of the participation requests. Subsequently, FP&L and the NRC staff agreed upon conditions—to be placed on any license which might issue for St. Lucie No. 2—to resolve the antitrust issues raised by the Attorney General's letter, and "accordingly obviate an antitrust hearing."

The health, safety, and environmental aspects of the St. Lucie No. 2 application were filed in September 1973. An initial decision favorable to issuance of a construction permit was rendered in April 1977, LBP-77-27, 5 NRC 1038 (1977), and ultimately affirmed by the Appeal Board, in ALAB-435, 6 NRC 541 (1977). A limited work authorization had been issued in March 1975, and a construction permit allowed in May 1977. Construction is presently underway, with commercial operation expected in the summer of 1983.

In August 1976, before the issuance of a construction permit for the facility, but 31 months after the publication of the notice of opportunity for any interested person to file a petition for leave to intervene and request an antitrust hearing, the Florida Cities¹ filed such a petition. The petition was referred to a Licensing Board which granted the Cities' request. LBP-77-23, 5 NRC 789 (1977). The Licensing Board took its guidance from NRC intervention regulations, 10 CFR §2.714(a), and the Commission's decision in *Nuclear Fuel Services, Inc.* (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975), setting out standards to be applied in interpreting §2.714(a) with reference to late petitions.

The Cities offered a number of reasons to justify late intervention, two of which were deemed by the Licensing Board to fulfill the §2.714 requirements. First, the Board accepted the claim of Orlando, one of the Cities, that it would have submitted a timely intervention petition were it not for what it perceived as FP&L's promises of willingness to share future generating capacity, both nuclear and nonnuclear. The intervention petition for the St. Lucie No. 2 facility was filed when Orlando determined that FP&L intended to exclude it from participation in the subsequently planned (and now abandoned) South Dade facility. Orlando's claim was supported by an affidavit filed by one of its officers, Harry C. Luff, Jr. FP&L did not present countering affidavits to either the Licensing or Appeal Boards.² Its

¹Florida Cities consist of the Fort Pierce Utilities Authority of the City of Fort Pierce, the Gainesville-Alachua County Regional Electric Water and Sewer Utilities, the Lake Worth Utilities Authority, the Utilities Commission of the City of New Smyrna Beach, the Orlando Utilities Commission, the Sebring Utilities Commission, and the Cities of Alachua, Bartow, Fort Meade, Key West, Lake Helen, Mount Dora, Newberry, St. Cloud, and Tallahassee, Florida, and the Florida Municipal Utilities Association.

²On August 11, 1977, as part of a motion lodged subsequent to its petition for review, the applicant placed affidavits before the Commission. For reasons which we explain later in this

(Continued on next page.)

reasons for not doing so will be discussed below. Having made the finding in Orlando's favor, however, the Licensing Board saw "no basis to impute this showing of good cause" to the other petitioning Florida Cities. *Id.* at 797.

As to the other Cities, the Licensing Board accepted the argument that "the extent, duration, and consequences of fossil fuel shortages, and price increases did not become apparent" until after the time for intervention, and that "the combined effects of the energy crisis and the Applicants' later anticompetitive conduct were not clear to the petitioners in 1974." *Id.* at 797. For this separate reason it found "substantial good cause for late filing."

Finally, the Licensing Board reviewed the four factors set out in §2.714(a), and found that three argued for providing an NRC forum for resolution of the antitrust issues associated with the proposed reactor. In particular, the Licensing Board found justification in the unique antitrust standard contained in Section 105c and its belief that other possible forums, including the FTC, a Federal district court, and others lacked jurisdiction to provide petitioners access to nuclear generation. The withdrawal of the South Dade application made it unlikely, in their view, that any record would be made, or the issues raised by the petition resolved, if an NRC forum were denied. And, the proceeding would not cause delay because the parties expressly agreed not to hold up issuance of the construction permit.³

FP&L appealed this decision to the Appeal Board, 10 CFR §2.714a, arguing as it did before us that the Licensing Board had ignored policies underlying Section 105c which favored "early resolution of antitrust matters," and which should be "weighed against convening an antitrust hearing which probably could not be completed until substantial investment will have been committed to construction of the facility." Brief to Commission at p. 9.

The Appeal Board (ALAB-420, 6 NRC 8 (1977)) did not indicate that it weighed late antitrust petitions by standards different than those applied to late interventions in the environmental, health, and safety aspects of a license application. Nevertheless, its opinion emphasized that petitioners whose petitions are lodged as late as those involved here have a heavy burden of persuasion. The Board stated that it had approached the Cities' petition with "some skepticism," 6 NRC at 14, doubting whether "any

(Continued from previous page.)

opinion, we find no reason to give the applicant the benefit of hindsight, and therefore have decided not to accept these late filed affidavits.

³Under Section 105c if antitrust issues are unresolved, a construction permit may not issue unless the parties consent.

petitioner 31 months late could mount a case for intervention, much less a convincing one." Despite this, the Appeal Board could not say that the Licensing Board had abused the discretion conferred on it by §2.714(a). *Id.* at 20. Reviewing in detail the Luff affidavit and the circumstances surrounding it, the Appeal Board concluded that, "viewed from Orlando's perspective, we can see how [FP&L's] actions formed a pattern which gives the . . . impression" that the company had promised to share participation in future nuclear facilities. *Id.* at 18.

In reaching this result we do not imply that the company deliberately set about to mislead Orlando (or anyone else) into foregoing intervention. The record does not compel any such conclusion and we do not suggest it to be the case. But certainly as perceived by those on the outside, the company's actions and representations indicated a willingness to join with Florida municipal electric utilities in the development of nuclear power facilities.

Id. at 20.

As for the other Cities, the Appeal Board held "inasmuch as the basic antitrust issues to be tried would be the same whether Orlando were allowed to intervene alone or in concert with its Florida brethren for purposes of this appeal we will assume (as did the Board below) that if Orlando may intervene, the others may follow." 6 NRC at 12, fn 13.

Finally, the Appeal Board considered the four factors set forth in §2.714(a), although it noted that in view of the "satisfactory" explanation for lateness, a "much smaller demonstration on these factor is necessary." The Appeal Board found that at least one, and possibly two factors weighed in intervenors' favor, and in combination with the finding of good excuse were sufficient reason to grant the late intervention petition.

The applicant sought Commission review on three questions. First, should the §2.714 criteria be modified in considering a very late antitrust petition to account for a statutory policy for early resolution of antitrust matters? Here, the applicant argued that both decisions below were contrary to the Commission's *South Texas* decision, and the policies examined there. *Houston Lighting & Power Company* (South Texas Project, Unit Nos. 1 and 2), CLI-77-13, 5 NRC 1303 (June 15, 1977). Second, was it proper for the Appeal Board to impute Orlando's good cause, if such exists, to the other petitioners? Third, did the Appeal Board err in drawing adverse inferences from the applicant's failure to present counter-ing affidavits? On the last question, applicant argued that in view of its reading of Commission precedent, it had no reason to think that "the truth of Cities allegations concerning the reasons for its tardiness could be called into question at the stage of ruling on the petition for leave to intervene."

The regulatory staff and the Cities opposed the granting of FP&L's petition.

We granted FP&L's petition in part, asking the parties to brief two questions.

1. Did the Appeal Board err in allowing late intervention by other petitioners merely on the basis of what the Appeal Board found was a showing by Orlando of good cause for its own lateness?
2. Was the Appeal Board's affirmance of the Licensing Board's acceptance of the Orlando petition correct in light of the policy of the Act encouraging early consideration of antitrust claims alluded to in the Commission's *South Texas* opinion?

As the questions indicate, in granting review of ALAB-428 we wished to explore whether the §2.714a standards for late intervention in NRC antitrust proceedings should be more stringently applied in antitrust proceedings and indeed whether they are applicable to such proceedings. In our *South Texas* decision, we spoke of contrasts between NRC's "special responsibilities" dictating an "expansive health and safety jurisdiction," 5 NRC at 1316, and the more limited reach of our antitrust authority. In the former, for example, a hearing—and Appeal Board review—is required whether or not petitions seeking intervention are received. In the latter, the initiation of a hearing is not automatic, but rests on the advice of the Attorney General or the filing of intervention petitions by interested persons.

In the *South Texas* decision, we concluded that the Congress did not envision for this agency a broad, ongoing antitrust enforcement role, but rather established specific procedures (and incentives) intended to tie NRC antitrust review to the two-step licensing process. We also noted that Section 105c, and our implementing regulations, contemplated that mandatory antitrust review would be conducted early in the process of construction permit application. Here, for example, the antitrust portions of the St. Lucie application were filed some 4 months before its health, safety, and environmental aspects, and the antitrust review, including negotiation of license conditions, concluded within 5 months of the filing of the entire application, and slightly more than 3 years before the initial decision was rendered.

The petition of the Florida Cities asks for an antitrust review tied to the licensing process but out of time with the schedules for antitrust review contemplated by Section 105c and our regulations. In *South Texas* we recognized that antitrust review might be conducted out of time if significant doubts were cast on adequacy of the initial antitrust review. We hypothesized there an extreme case in which a "license applicant had falsified pertinent antitrust review information or had otherwise obtained an

unconditioned license by some sort of fraud or concealment.” 5 NRC at 1311. Such a case is not before us now. Nonetheless, subject to our discussion below, and even accounting for the substantial policies in the Act for early resolution of antitrust issues we cannot say that the Appeal Board erred in allowing this very late intervention in the unusual circumstances of this case.

It is true, as the applicant has stated, that there is considerable evidence in the legislative history of Section 105c that Congress intended antitrust review to be conducted “at an early stage in [utilities] planning,” Statement of Chairman Holifield, “*Prelicensing Antitrust Review of Nuclear Power Plants: Hearings before the Joint Committee on Atomic Energy*, 91st Congress, 1st and 2nd Sess. 319 (1969-70) (hereinafter “Hearings on Prelicensing Antitrust Review”). In our *South Texas* decision, we recited at some length the legislative history which supports this conclusion.

But other policies are also reflected in Section 105c, viz, that a government-developed, monopoly-like nuclear power electricity generation not be utilized in ways which contravene the policies contained in the various antitrust acts. Section 105c is a mechanism to allow the smaller utilities, municipals, and cooperatives access to the licensing process to pursue their interests in the event that larger utility applicants might use a government license to create or maintain an anticompetitive market position. While the statute encourages petitioners to voice their concerns early in the licensing process, we do not think that we can reasonably cut off all rights to NRC antitrust review for late requests so long as they are made concurrent with licensing.⁴ On the contrary, we think that licensing boards must have discretion to consider individual claims in a way which does justice to all of the policies which underly Section 105c, and the strength of particular claims justifying late intervention. Section 2.714 contains this grant of discretion. With some modification to account for the policy generally favoring early resolution of antitrust claims, Section 2.714 is equally appropriate for evaluation of late antitrust petitions as it is in the health, safety, and environmental aspects of licensing.

The qualification we envision in the application of the intervention regulation involves a somewhat more stringent application of §2.714, particularly in assessing the good cause factor. By this we mean that late requests for antitrust review hearings may be entertained in the period between the filing of an application for a construction permit—the time when the advice of the Attorney General is sought—and its issuance. However, as the time for issuance of the construction permit draws closer, li-

⁴Cf. *Florida Power and Light Company* (St. Lucie Plant, Unit No. 1) (Turkey Point Plant, Units No. 3 and 4), ALAB-428, 6 NRC 221 (1977).

censing boards should scrutinize more closely and carefully the petitioner's claims of good cause. A very late petition must present a very strong reason for late intervention. And, in evaluating the good cause element of §2.714, boards must bear in mind that NRC antitrust review is anticipatory. Parties who had good reason to suspect, at the time of construction permit application, that antitrust abuses were likely or possible under a license, should make their claims known at that time.

A more stringent application of the §2.714 factors will give some weight to the policy favoring early review when a late antitrust hearing is requested. But even applying these standards, when a strong finding of good cause is found to justify intervention and a late hearing, an applicant may be justly concerned that late granted relief will divert from its own use needed and difficult to replace power. Early antitrust review was favored by the Congress because of the special long-range planning needs of electric utilities. Chairman Holifield, among others, expressed concern that utility planners have advance notice of any "diversion from [their own planned] plant to another source." *Hearings on Prelicensing Antitrust Review* at 37. Experience since the 1970 amendments teaches that utilities' planning problems may be particularly acute when the projected source of power is a nuclear facility, with building schedules for such facilities already subject to many variables, such as intensive Federal regulation and complex and expensive construction. In view of this, when we heard oral argument in this matter, we asked the parties to comment on whether and how licensing boards might take into account the lateness of a request for an antitrust hearing in determining the scope of the hearing, and in granting relief.

While all parties had difficulties with the suggestion that the Commission could shape the scope of a hearing to account for the lateness of a request, they agreed that NRC had latitude to shape the scope of any relief granted, although not necessarily on the details of such an approach. Upon consideration of these views, we have concluded that relief is sufficiently tractable to provide an appropriate vehicle to reconcile the Section 105c policies discussed above. In discussing "scope of relief," we do not mean to prejudge questions which are better addressed in a specific factual setting. Specifically, we are aware that parties to NRC antitrust proceedings may be in disagreement as to the precise forms (and extent) of the relief we can grant. We can illustrate the principle we have in mind here by reference to varying degrees of access to the particular nuclear facility being licensed. For example, a licensing board could order that an applicant make available to intervenors a smaller participation share than might have been ceded had the requests been timely. Or, as suggested by the Cities, if relief were deemed appropriate a board could structure relief, with minimal initial percentage shares to be increased to more substantial shares over the life of the

license. In this way, the applicant can be given adequate time to arrange to meet his load demand before diversion of needed power takes place. While its precise outlines should be left to licensing boards in individual cases, the flexibility of this approach would allow licensing boards to give the lateness of a request for an antitrust hearing substantial significance, while at the same time leaving room for antitrust relief in appropriate cases.

The general disagreement of the parties as to whether licensing boards may also shape the scope of a hearing to account for late requests gives us some pause. However, we are less pessimistic than counsel about the ability of licensing boards to control the scope of a hearing without losing sight of the basic antitrust issue which they must resolve. For example, in all hearings, decisions are routinely made to limit discovery and/or the presentation of evidence to specified time periods. We think that these well-recognized tools, already among the powers of hearing panels, to shape, expedite, and make more efficient pending litigation become even more important when, as here, parties emphasize the importance of early resolution of antitrust claims. If parties are genuinely concerned that they have adequate notice of power diversions for load planning purposes, they should be amenable to the techniques listed above as well as tools such as stipulations and expedited hearing schedules to speed trial.

The Appeal Board decision rested heavily on a close examination of the Luff affidavit and circumstances surrounding the 1973 antitrust review conducted for the St. Lucie No. 2 facility. As previously pointed out, the applicant did not present countering affidavits, nor did it use any other method to call into dispute the Luff affidavit. Applicant tells us its decision on not to do so was in reliance on Commission precedent. *Kansas Gas and Electric Company* (Wolf Creek Generating Station, Unit No. 1), ALAB-279, 1 NRC 559 (June 30, 1975); *Alabama Power Company* (Joseph M. Farley Nuclear Plant, Units 1 and 2), ALAB-182, 7 AEC 210 (March 7, 1974); *Northern States Power Company* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-107, 6 AEC 188 (March 29, 1973); *Duquesne Light Company* (Beaver Valley Power Station, Unit No. 1), ALAB-109, 6 AEC 243 (April 2, 1973); *Mississippi Power and Light Company* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423 (June 19, 1973). We cannot accept this argument. The very issue before the Licensing Board was whether good cause for late intervention could be found. The affidavits were directed to that point. It was incumbent upon applicant to counter these affidavits and show—if it could—that good cause was lacking. The cases cited to us by applicant say that in evaluating intervention petitions to determine whether the requisite specificity exists, whether there has been an adequate delineation of the basis for the contention, and whether the issue sought to be raised is cognizable in an individual licensing proceeding,

licensing boards will not appraise the merits of any of the assertions contained in the petition. None of the cases cited by the applicant involve untimely petitions. In considering untimely petitions, licensing boards are required to assess an additional factor—whether the petitioner has “made a substantial showing of good cause for failure to file on time.” In doing so, Boards must necessarily consider the merits of claims going to that issue.

Last, we have considered whether Orlando’s “good cause” should be imputed to the other Florida Cities. We have discussed above the policies on which Section 105 rests. While the Act places license-related time constraints on intervenors, it also expresses a strong policy that licensing not undercut significant national economic policies. The NRC’s role is, in our view, something more than a neutral forum for economic disputes between private parties. One evidence we have of this flows from the role of the Attorney General and the express requirement that his views be obtained. If a hearing is convened, we think it should encompass all significant antitrust implications of the license, not merely the complaints of intervening private parties. If no one else performs this function, NRC staff should assure that a complete picture is presented to licensing boards. Consequently, we think it appropriate to allow intervention by all the Cities. Nevertheless, as we have outlined above, some account can and should be taken of the tardiness of the intervenors’ requests. In shaping the timing and extent of relief, the Licensing Board is not required to ignore that the request for an antitrust hearing was very late, particularly where the requester rode the coattails of another’s good cause showing.⁵

For the reasons set forth above, the Licensing Board is directed to proceed expeditiously with further proceedings in accordance with this opinion.

By the Commission
Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 21st day of June 1978.

⁵We are not persuaded that good cause for late intervention was demonstrated by Florida Cities other than Orlando.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Joseph M. Hendrie, Chairman
Victor Gilinsky
Richard T. Kennedy

In the Matter of

**Docket Nos. 50-445A
50-446A**

**TEXAS UTILITIES GENERATING
COMPANY, et al.**

**(Comanche Peak Steam Electric
Station, Units 1 and 2)**

June 21, 1978

The Commission makes a "significant change" determination in order to solicit the Attorney General's advice on the antitrust aspects of the applicant's request for an operating license.

ORDER

Applicants and NRC staff have jointly moved that the Commission delegate specific authority to the Acting Director of Nuclear Reactor Regulation to make a significant change determination with respect to the Comanche Peak Steam Electric Station, Units 1 and 2. A significant change finding would authorize the Acting Director to seek the Attorney General's advice on the antitrust aspects of the Texas Utilities Generating Company's application for an operating license, and if the Attorney General recommends a hearing, to issue or cause to be issued a notice of an operating license antitrust hearing.

The Commission has received no oppositions to this request. However, Houston Lighting and Power Company has commented on the suggestion in the staff/applicant motion that consolidation of the Comanche Peak proceeding (if such recommendation is received) with the antitrust hearing involving *Houston Lighting and Power Company* (South Texas Project, Units 1 and 2), Docket Nos. 50-498A and 50-499A, presently in its pretrial stages, might be appropriate. Houston has expressed concern that premature action to consolidate may have the effect of delaying the South

Texas proceeding, and has therefore requested that the Commission, at this time, not prejudge the consolidation question.

In view of the joint and unopposed request, the similarities between this application and the *South Texas* matter, which we have explored in some detail within the last year, and the general interest in expediting the hearing process in order to reduce as far as possible any delay in the licensing of the Comanche Peak facilities, we have decided ourselves to make the "significant change" determination. As in the *South Texas* matter, we are "accepting the substantial agreement among the parties," and deciding "only that the events [which have occurred] are of such a nature as to convince us that the Attorney General must be consulted." CLI-77-13, 5 NRC 1303 at 1319. We agree, however, with the concerns expressed by Houston Lighting and Power. Consequently, we express no view as to whether either full or partial consolidation of the two proceedings would be appropriate, in the event that the Attorney General recommends a hearing. This question should be brought first to the Licensing Board. In deciding this question, the Licensing Board should consider, as one factor, whether consolidation would materially delay the South Texas proceeding.

It is so ORDERED.

By the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 21st day of June 1978.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Victor Gilinsky, Acting Chairman
Richard T. Kennedy
Peter A. Bradford

In the Matter of

**Docket Nos. 50-443
50-444**

**PUBLIC SERVICE COMPANY OF
NEW HAMPSHIRE, et al.**

(Seabrook Station, Units 1 and 2)

June 30, 1978

Upon review of certain aspects of ALAB-471, 7 NRC 477 (April 28, 1978), the Commission orders termination of the comparison of the Seabrook site with once-through cooling with alternative southern New England sites. It directs the Appeal Board to conduct the further hearings called for in ALAB-471 on the comparison of the Seabrook site with closed-cycle cooling with alternative sites and instructs that Board and the parties to screen alternative sites in order to focus the inquiry on candidates most likely to be "obviously superior" to Seabrook with closed-cycle cooling. Further, the Commission orders suspension of construction at the Seabrook site during the remanded proceedings and reserves to itself the decision as to resumption of construction.

NRC: ENVIRONMENTAL RESPONSIBILITIES

When another agency has yet to resolve a major issue pertaining to a particular nuclear facility, NRC may allow construction to continue at that facility only if NRC's NEPA analysis encompasses all likely outcomes of the other agency's review.

NRC: JURISDICTION

NRC has discretionary authority to determine on basis of factual circumstances whether another governmental body's action (or lack thereof) warrants NRC's suspending or leaving in place existing approvals or proceedings.

NEPA: CONSIDERATION OF ALTERNATIVES

NEPA was not intended merely to give the appearance of weighing alternatives that are in fact foreclosed. Pending completion of sufficient comparison between applicants' proposed site and others, in situation where substantial work has already taken place, the Commission can protect opportunity for a real choice among alternatives only by suspending outstanding construction permits.

RULES OF PRACTICE: SUSPENSION OF PERMITS

Commission may reserve to itself decision as to reinstatement of construction permits it has suspended, although board to which proceedings were remanded would normally have authority to enter any order appropriate to outcome of remand.

Mr. Thomas G. Dignan, Jr., Boston, Massachusetts, (with whom **Mr. John A. Ritscher** and **Mr. R. K. Gad III** were on the briefs) for the applicants, Public Service Company of New Hampshire, *et al.*

Ms. Karin P. Sheldon, Washington, D.C., for the intervenor, New England Coalition on Nuclear Pollution.

Mr. Robert A. Backus, Manchester, New Hampshire, for the intervenors, Seacoast Anti-Pollution League and the Audubon Society of New Hampshire.

Ms. Ellyn R. Weiss, Washington, D.C., Special Counsel for the Commonwealth of Massachusetts.

Mr. Milton J. Grossman (with whom **Messrs. Richard C. Browne** and **James M. Cutchin IV** and **Ms. Marcia E. Mulkey** were on the briefs) for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

I. FACTUAL AND PROCEDURAL BACKGROUND

This is the fourth time this case has been before us. Our three prior opinions¹ fully discuss developments in this proceeding up to January of this

¹*Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1 (1978); *id.*, CLI-77-8, 5 NRC 503 (1977); and *id.*, CLI-76-17, 4 NRC 451 (1976).

year and except as necessary to our discussion herein, we will not recapitulate what is said there. Today we must deal with the effect on the Seabrook proceeding of two recent decisions. The first of these is *Seacoast Anti-Pollution League v. Costle*, 572 F.2d 872 (1st Cir. 1978) in which the decision of the Administrator of the Environmental Protection Agency to approve a particular once-through cooling system for the Seabrook facility was vacated and remanded. The second is the decision of the Atomic Safety and Licensing Appeal Board which we are reviewing today. *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-471, 7 NRC 477 (April 28, 1978). That decision reversed two supplemental initial decisions of the Atomic Safety and Licensing Board. Those decisions had held, first, that no site in southern New England where a nuclear plant exists or is planned is "obviously superior" to the Seabrook site and, second, assuming that the proposed Seabrook plant had to use closed-cycle cooling (*i.e.*, cooling towers), no alternative site with towers is "obviously superior" to Seabrook, and therefore, the cost-benefit balance still favored construction of the plant at Seabrook.

We received petitions to review ALAB-471 from several parties and took review on two issues.² Those issues were (1) should we terminate the effort to compare the Seabrook site with sites in southern New England which we ordered in CLI-7-8 and, (2) should construction at Seabrook be halted during the remand called for by ALAB-471, or during the remanded EPA proceeding required by the *Costle* decision. We also asked the parties to address whether the alternative site inquiry on the cooling tower issue should be narrowed by limiting the number of alternate sites considered. We heard oral argument on these issues in Manchester, New Hampshire, on June 26, 1978.

II. THE SOUTHERN NEW ENGLAND SITE COMPARISON, ASSUMING ONCE-THROUGH COOLING FOR SEABROOK, SHOULD BE TERMINATED

In CLI-77-8, 5 NRC, *supra*, at 536-41, we ordered the Licensing Board on remand to compare the Seabrook site with sites in southern New England where nuclear power plants either are already constructed or are planned. Separate comparisons were to be made based on Seabrook with

²The separate opinions of the members of the Appeal Board left it somewhat unclear whether a majority of that Board was formally deciding the suspension question. Member Farrar clearly favored suspension and Member Buck clearly opposed it. Chairman Rosenthal expressed the view that he would not have favored suspension, but he also stated that the question should be decided by the Commission. Had we not reviewed the question, the construction permits would have remained in effect. However, we elected to exercise our authority to review the suspension question on our own motion.

once-through cooling and Seabrook with closed-cycle cooling. In ALAB-366, 5 NRC 39 (1977), the Appeal Board had declined to require these comparisons because it felt that the issue had not been timely raised in the Seabrook case. While we recognized the Appeal Board's position had support in the record, we felt that the staff's belated concession, that in their opinion the issue had been timely presented to the *staff*, prevented us from ruling that the issue had not been timely raised with the *Commission*. While our opinion clearly indicated our belief that the southern New England sites were not likely to provide an alternative site "obviously superior" to Seabrook, nonetheless, largely because the case had to be remanded on other issues, we remanded that issue as well. In its July 1977 supplemental decision, the Licensing Board held that none of the potential southern New England sites were "obviously superior" to Seabrook. In ALAB-471 the Appeal Board majority (Chairman Rosenthal and Member Farrar) reversed that decision on the ground that the Board's findings did not support its conclusion and also on the ground that the Appeal Board's independent review of the record did not disclose sufficient evidence upon which to base a conclusion that, because of generic factors, the southern New England inquiry should be terminated as neither necessary nor useful.

We conclude that it would not be productive to conduct a further comparison between Seabrook with once-through cooling and the southern New England sites. Our conclusion is based principally on a common-sense appraisal of the facts as they exist today, as compared to what obtained in March 1977, when the Commission, largely as a matter of discretion, directed the Licensing Board to make that analysis.

In March 1977, the Commission had no basis for drawing any inferences with regard to the relative merits of Seabrook and alternative sites other than a Licensing Board decision which the Appeal Board in ALAB-366 had found inadequate in two areas, while leaving other aspects (including the comparison of Seabrook with open-cycle cooling to 18 northern New England sites) unreviewed, pending further proceedings below. Since that time, however, the Appeal Board in ALAB-422, 6 NRC 33 (1977), has found, based on its reanalysis of the record, that none of those sites is "obviously superior" to Seabrook with once-through cooling. We believe that as a practical matter, the likelihood that one of three southern sites will succeed in meeting the "obviously superior" test, where 18 other sites have failed to do so, is not sufficient to justify a further inquiry on this point. Our view is bolstered by the undisputed assertion of the applicant that Seabrook with once-through cooling enjoys cost advantages over other sites much greater than the difference in cost between Seabrook with closed-cycle cooling and alternative sites (whether with open or closed-cycle cooling).

In terminating this aspect of the comparison, it should be emphasized that, as we set forth below, we are not eliminating the three remaining southern New England sites from those that must be compared with Seabrook with closed-cycle cooling.³ As a result of ALAB-471, vacating the Licensing Board's November 1977 supplemental decision, we do not possess the sort of factual basis regarding Seabrook with closed-cycle cooling that allows us to draw the inferences just outlined with respect to Seabrook with once-through cooling.

III. THE CLOSED-CYCLE REMAND

We have not reviewed the Appeal Board's action in ALAB-471 vacating the Licensing Board's November 1977 supplemental decision. However, we are concerned about adding further delay to what has already been a very prolonged proceeding. Much is known about all of the potential alternative sites that are serious candidates. Most of them have been investigated by our staff for several years. The southern New England sites at which nuclear plants either exist or are planned have also been extensively analyzed. On that basis it should be relatively easy to screen the range of alternatives to select those few which appear to be the leading candidates as alternatives to Seabrook with towers. By making such a preliminary winnowing, the Board and the parties will be able to focus on the relatively few alternative sites which are most likely to be obviously superior to Seabrook with towers.

By focusing the inquiry the Board will be able to shorten the time needed to complete the remand and, equally important, to examine the alternatives before it in greater depth. Of course, such a screening should be made only after the staff and the other parties have had an opportunity to present their views as to which alternatives are the leading candidates, including possible sites in southern New England.

IV. CONDUCT OF THE REMAND PROCEEDING

This licensing proceeding has been extraordinarily complex and protracted. Yet another hearing is about to commence as a result of ALAB-471 and our decision today. In 1977 the Commission stated that:

[T]his case has been widely depicted as a serious failure of governmental process to resolve central issues in a timely and coordinated way—a paradigm of fragmented and uncoordinated government decision-

³Originally there were four southern New England alternative sites to be considered: Millstone, Montague, Pilgrim, and Charlestown. The Appeal Board eliminated Charlestown on the basis that the site was not reasonably available. ALAB-471, 7 NRC 495, n.20.

making on energy matters and of a system strangling itself and the economy in red tape. 5 NRC 503, 517.

At that time, the Commission expressed concern about this matter. Today it remains as a valid description of the process. To alleviate to some extent the burden which this course of serial adjudication has placed on applicant and intervenors alike and to avoid unnecessary future delays in bringing the process to an end, we have determined that the remanded proceedings should be conducted in the first instance by the Atomic Safety and Licensing Appeal Board.

Our resort to this unusual step is dictated by our recognition of the extraordinary history of this case. By having the Appeal Board serve as the hearing board, one tier of review is eliminated. The Appeal Board which decided ALAB-471 is thoroughly familiar with the record of this case. We intend no adverse reflection on the dedication and capabilities of the Atomic Safety and Licensing Board which would otherwise sit in the remand proceedings.

We wish to emphasize, however, that, although we have eliminated one step in the adjudicatory process in the interest of expedition, the Appeal Board should not take this to mean that its primary goal should be speed rather than quality. We instruct that Board, as we would have instructed the Licensing Board, to assure a thorough hearing on the remanded issues and to make a sound disposition of them.⁴

V. SUSPENSION

The question remains whether construction should be permitted to continue at Seabrook during the remand just described, or at least until EPA has reached a decision on the Seabrook cooling system, should that decision come first.

EPA's approval for open-cycle cooling is lacking as a result of the First Circuit decision. A new EPA hearing is underway, but we can assume nothing about the outcome. Therefore, we face the possibility that closed-cycle cooling will be required by EPA.

For construction to continue when a major issue is unresolved before another agency, our NEPA analysis must encompass the likely outcomes of that agency's review.⁵ In this case that principle means that our NEPA

⁴The initial "coarse screening" of alternate sites discussed in Part III of this decision will, of course, be undertaken by the Appeal Board.

⁵Applicants rely incorrectly on our decision in *Wisconsin Electric Power Company* (Koshkonong Nuclear Plant, Units 1 and 2), CLI-74-45, 8 AEC 928 (1974), for the proposition
(Continued on next page.)

analysis must cover the possibility that Seabrook can only be built with cooling towers, if EPA so rules.

But Seabrook with closed-cycle cooling lacks NRC site approval. Among the requirements of any NEPA analysis is "a detailed statement by the responsible official on . . . alternatives to the proposed action." No such legally sufficient analysis now compares Seabrook with cooling towers to other possible sites elsewhere in New England. The environmental comparison performed by the Licensing Board has been found unsatisfactory by the Appeal Board largely because the record produced by the staff and applicant was found to be so deficient that it could not be used to make a sound decision. There is, therefore, no valid NRC alternative site comparison as a predicate for continued construction.

The Appeal Board has called for another such comparison on the part of the Licensing Board. We have modified the instructions and have directed the Appeal Board to undertake that comparison. But the Commission's clear instructions, now and earlier, are that a valid comparison and choice of site is required.

Nor can we dismiss the possibility that another site may prove to be environmentally "obviously superior" to Seabrook *with cooling towers*, even taking into account Seabrook's advanced stage of construction. The applicant estimates that the cost of switching to cooling towers at Seabrook would be very large and in fact almost as large as the cost of switching to some other sites.⁶

In March 1977 the Commission stated that a site comparison and choice should normally take account of the actual state of construction at the time of the choice. This merely acknowledged the economic facts of life. Naturally this gives a substantial advantage to a site on which work has been done. The applicant indicates that in the next 3 months work on the site will have doubled to about 20 percent of the total. Even if these figures may be overstated, it is reasonable to assume that over the somewhat longer period it may take to complete an environmental site comparison, more than 20 percent of the work onsite will have been done. At that point, any comparison among sites will be nothing more than a *pro forma* exercise.

(Continued from previous page.)

that this agency will not refuse approval of a license application because some other agency has yet to act. In fact, that decision, read in concert with *Southern California Edison Company* (San Onofre, Units 2 and 3), ALAB-171, 7 AEC 37 (1974), makes clear that this agency possesses discretionary authority to determine whether, based on the factual circumstances presented, another governmental body's action (or lack thereof) warrants this agency's suspending or leaving in place existing approvals or proceedings.

⁶Applicant's Direct Testimony No. 27, pp. 8 and 76.

Whatever chance any other site had to prevail against Seabrook with cooling towers would be eliminated by continued construction at Seabrook.

In short, continued construction at Seabrook is incompatible with the conduct of the site comparison required by NEPA between Seabrook with cooling towers and other sites. It should be emphasized that there is at present no legally valid comparison of Seabrook with cooling towers with any other site. At this point, the only way the agency can preserve its freedom to decide is to call a halt to construction. This is the central issue: protecting our opportunity for a real choice among alternatives.

The Chairman of the Appeal Board has suggested that a halt to construction may not be necessary to preserve the integrity of the agency's decisionmaking process; that the same result could be obtained by simply ignoring in the comparison among sites any construction beyond the present point. While we have the authority, theoretically, to take that approach, we do not regard it as a realistic possibility. It might be otherwise if site comparisons were strictly quantitative and there was a clear way to factor the state of construction into that comparison. But in fact neither is the case. We as decisionmakers can neither ignore nor instruct others to ignore the growing presence of a large facility in advanced stages of construction when we know perfectly well it is there. The real choices before the Commission are then between abandoning all site inquiries and comparisons despite serious violations of NEPA, or preserving the agency's ability to decide by halting construction despite the disruption this causes the applicant and those hostage to his fortunes.

A colorable argument can be made for the proposition that in fact the point of no return has already been passed, that Seabrook is an accomplished fact, and that no other site could at this point prevail over Seabrook with cooling towers. But for reasons given earlier, principally the substantial cost of shifting to cooling towers at Seabrook, the possibility of serious alternatives to Seabrook with cooling towers is much more difficult to dismiss than is the case with alternatives to Seabrook open-cycle.

Furthermore, to drop the cooling towers comparison would be inconsistent with the Commission's March 1977 decision. As the staff concedes, our situation today is identical in all important respects to the circumstances that then compelled a suspension. The Commission did not order this site comparison merely to give the appearance of satisfying the law. NEPA was not intended merely to give the appearance of weighing alternatives that were in fact foreclosed.

Dropping the site comparison now merely on the basis that events have advanced too far would mean that no matter what errors are committed, no matter what warnings have been received, if enough work is done on the site

quickly enough the facility is an accomplished fact, whether NEPA has been complied with or not. That is unacceptable.

Dropping the site inquiry would require the Commission to find by fiat that Seabrook was the preferred site despite the fact that its Appeal Board declared invalid the only existing comparison against Seabrook with cooling towers. It would also have to take account of the fact that the Commission initially accepted that Appeal Board finding when it failed to accept that issue for review. The Commission would be dropping the site inquiry only when it realized the implications for continued construction.

In choosing to halt construction we do not minimize the burdens this imposes on the applicant⁷ and the construction workers onsite. We find the effect on the construction workers the factor weighing most strongly against suspension of the permits. We can only say that the opposite course would cause greater harm through failure to comply with the law and would risk the same impact on the workers through a court-imposed injunction in the immediate future.

VI. SUSPENSION AND POSSIBLE RESUMPTION OF CONSTRUCTION

The applicants and their employees are entitled to a reasonable period of time to allow for an orderly termination of work at the plant site. Under the circumstances of this case where the public health and safety is not involved, we believe that a reasonable period of time would be 21 days from our decision.⁸ Effective 6 p.m. (EDT) July 21, 1978, the construction permits for the Seabrook facility are suspended. After that time applicants may

⁷As Mr. Farrar noted in dissent to ALAB-471, the equities on the applicants' side are limited by the very clear warning that its decision to resume construction should be made in light of the real possibility of further suspension. This concern was echoed strongly by the First Circuit Court of Appeals when it said, "We are unable to identify any other field of publicly regulated private activity where momentous decisions to commit funds are made on the strength of preliminary decisions by several agencies which are open to reevaluation and redetermination. The risk of loss to the private investors is necessarily a real and always present one. Perhaps more important to the public weal, the risk of public agencies and courts accepting less desirable and limited options or, worse, countenancing a *fait accompli* are foreboding" (*Audubon Society of New Hampshire v. United States*, No. 76-1347 (December 17, 1976)). We note that there is a presumption of injunctive relief when NEPA violations are identified as well as a balancing of other equitable factors. See *Alaska v. Andrus*, _____ F.2d _____, 8 ELR 20237, 20249-50 (D.C. Cir. 1978).

⁸In ALAB-366 the Appeal Board allowed 2 weeks for termination of activity but noted that applicants had already substantially reduced the level of construction making termination of activity easier. 5 NRC, *supra*, at 73, n. 53. The Board also noted that when the D.C. Circuit stayed activity under an LWA in the *Hodder* case, it allowed 18 days. *Id.* The more intense level of activity presented here justifies the length of time we allow here.

take only such actions as are necessary to protect the environmental integrity of the site or to protect buildings, material, or personnel at the site. Applicants shall report monthly to the Board identifying what actions they are taking or proposed to take under those exceptions. Significant major components may be delivered to the site only if the applicant can demonstrate to the satisfaction of the Board that "substantial economic penalties" would be incurred if they could not be delivered. See *Public Service Company* (Seabrook Station, Units 1 and 2), CLI-77-5, 5 NRC 403, 405 (1977).

This suspension shall remain in effect until further order of the Commission.⁹ Whether and when the suspension should be lifted will depend upon such factors as (a) the decision rendered by the EPA Administrator as a result of the remanded hearings now being conducted, and (b) the outcome or development of the remanded proceedings we are directing the Board to undertake.

It is so ORDERED.

For the Commission

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.,
this 30th day of June 1978.

Commissioner Kennedy, Concurring in Part and Dissenting in Part:

SUSPENSION

I concur in the Commission's opinion as to the partial termination of southern New England sites review and the further consideration of Seabrook with cooling towers. However, the interim suspension of construction at Seabrook is a more difficult issue and is perhaps the hardest of the Seabrook decisions with which the Commission has been faced to date.

⁹Normally a board to which we remand a proceeding would have authority to enter any appropriate order in connection with the remanded proceeding. However in this unusually complex and protracted proceeding, where construction has already been started and stopped twice, we think it undesirable to create the possibility of yet another resumption of construction being followed by yet another suspension. Thus we are departing in this case from our normal practice and reserving to the Commission the decision as to resumption of construction.

On the one hand a decision to suspend ongoing construction could throw hundreds of people out of work, raise the cost of the plant by millions of dollars, and delay the supply of power from the plant for 6 months to a year. On the other hand, failure to suspend construction will be viewed by some as evidence that the alternative site review process being conducted by the Commission is a sham proceeding and a fraud on the public. It could be asked: How could the Commission be seriously considering alternative sites for the Seabrook plant, when it continues to allow Seabrook to be built?

While I sympathize with this view I nevertheless believe that the equities in this case lie in favor of allowing construction to continue. And in the final analysis, the principal purpose of our deliberations in this matter has been to balance the equitable considerations on each side in order to reach a decision on whether the Seabrook construction permits should be suspended. As Commissioner Gilinsky said in our hearing in Manchester, New Hampshire, on June 26: "All parties seem to agree that we should use an equitable balancing test to decide whether to suspend construction."

As the Commission decision notes, the Seabrook construction permits were suspended once before, commencing on February 7, 1977, because of the uncertainty surrounding the type of cooling system which might be required by EPA and the fact that none of the Commission's tribunals had determined that Seabrook was an acceptable site for a facility employing a closed-cycle cooling system. Subsequent events—the EPA Administrator's decision of June 17, 1977, overturning the decision of the Regional Administrator of EPA Region I and explicitly approving the use of a once-through cooling system at Seabrook, and a supplemental initial decision of the Licensing Board issued July 7, 1977, holding that no alternative sites in southern New England were clearly superior to Seabrook—led the Appeal Board to conclude that applicants were legally entitled to reinstatement of their permits. Accordingly, the Board so ordered effective August 1, 1977.

Almost a year has passed and we must now determine whether the Seabrook construction permits should be suspended for a second time because of more recent vicissitudes in this licensing saga—the decision of the U.S. Court of Appeals for the First Circuit reversing the EPA Administrator's June 17, 1977, decision on procedural grounds (*Seacoast Anti-Pollution League v. Costle*, 572 F.2d 872 (1st Cir. 1978)) and the Appeal Board's reversal of the Licensing Board's southern New England sites decision as well as its decision that no sites anywhere in New England were obviously superior to Seabrook with cooling towers (ALAB-471, 7 NRC 477, April 28, 1978).

First, let me set forth the legal background against which I believe this

suspension decision must be made. As the Commission stated in its March 1977 Seabrook Decision, CLI-77-8,

[T]he need to compare the Seabrook facility with other possible sites arises directly from NEPA which requires that the cognizant Federal agency consider alternatives to a proposed major Federal action. Section 102(e)(C)(iii); 42 U.S.C. 4332(C)(iii). Consideration of alternatives has been called the "linchpin" of environmental analysis. See *Monroe County Conservation Society, Inc. v. Volpe*, 472 F.2d 693, 697-698 (2nd Cir. 1972). Beyond consideration of alternatives, the courts have found an additional requirement for a cost-benefit analysis in which the need for the proposed action is weighed against its environmental costs. See, e.g., *Calvert Cliffs' Coordinating Committee v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971). 5 NRC 503, 522 (1977).

In short, a valid NEPA analysis involves full consideration of the reasonably available alternatives to the proposed action. When defects in the NEPA analysis are identified, they obviously must be corrected. The question then arises as to the relief appropriate in such circumstances. The leading judicial decision on this matter, *Alaska v. Andrus*, _____ F.2d_____, 8 ELR 20237 (D.C. Cir. 1978),¹ sets forth the applicable principles: (1) in cases of NEPA noncompliance there is a "presumption" in favor of injunctive relief; (2) the primary reason for injunctive relief is to preserve for the decisionmaker a full opportunity to choose among relevant alternatives; and (3) what is called for in each case is a "particularized analysis" of the violation, the possibility for relief, and any countervailing public interest considerations. Furthermore, *Alaska* provides that even when the NEPA defect involves consideration of alternatives, injunctive relief is not automatic, but subject to this particularized analysis.

There are NEPA defects in the matter before us and therefore we must address the question of whether suspension is called for. It remains to apply the dictates of *Alaska* by undertaking a particularized analysis of the facts and circumstances of this case and by balancing the equities for and against suspension of the permits. Applying these principles to the facts of this case presents the Commission with a judgmental task of the first magnitude. Clearly there are strong arguments on the side of suspension. Nevertheless, I conclude that at present the balance is in favor of allowing continued construction. In doing so I specifically considered the factors set forth below.

¹I do not imply that the rules that govern judicially ordered relief from NEPA violations necessarily control in all cases an agency's discretion in deciding how it should go about correcting its own errors.

1. The Environmental Impacts of Planned Construction Over the Next Several Months Are Not Significant

No party to the proceeding has indicated that there will be any significant adverse environmental consequences resulting from construction activities planned over the next several months. Only offshore marine work will impact new areas. The applicant is in the process of excavating shafts in the ocean floor for the intake and diffusion of cooling water. The environmental effects of this drilling are mitigated by the recirculation of the water used in the drilling and disposition of excavated debris ashore. If any significant environmental harm were foreseeable, at least one of the three parties who have advocated suspension would have identified it.

Both the NRC staff and applicant stated that virtually no impact will occur. Moreover, the Chairman of the Commission quorum at the commencement of the oral arguments held on June 26, 1978, expressed the Commission's understanding, subject to disagreement by any party, that no party took the position that environmental harm would transpire. No party took issue with these statements. That no significant environmental harm will occur by allowing construction to continue while our administrative tribunal considers the remanded questions and EPA reconsiders its decision on the cooling system weighs in favor of continued construction.²

2. The Effects of Suspension on the Applicant and Its Customers Would Be Substantial

Suspension of construction necessarily entails increased costs to applicant and its customers.

- (a) The cost of the plant is increased by inflation in the costs of materials and labor, carrying charges on the debt, cost of reassembling the skilled work force which would be dissipated during suspension, and the costs of maintaining the site and some work force during the sus-

²The fact that at most only trivial environmental impacts will take place also eliminates a legal impediment to construction. When it ruled in favor of suspension of Seabrook construction in January 1977, the Appeal Board cited with approval Member Salzman's dissent in *Florida Power and Light Company* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-335, 3 NRC 830 (1976), that "the failure of the staff to have provided the Licensing Board with 'that detailed and careful analysis' of alternatives to the St. Lucie site which the law requires was enough to warrant lifting the limited work authorization if more than trivial environmental damage might attend further site preparation activities." ALAB-366, 5 NRC 69. The Appeal Board noted that the court of appeals had expressed agreement with the concerns expressed by Mr. Salzman in *Hodder v. NRC* (D.C. Cir. No. 76-1709). In ALAB-366 the Appeal Board chose to follow *Hodder* in the absence of good reasons for a different outcome and therefore ordered suspension. But we are faced now with a different situation. The prospect of only trivial environmental alteration, if any, is a sufficient reason for a different outcome now.

pension period. While the precise cost is not easily ascertainable, some of the parties have estimated that a delay of 6 months would cost tens of millions of dollars. Even allowing for a margin of error in the cost estimates, the cost is quite substantial. No party disputes this. In fact, the Staff's brief cites the Applicant's estimate that the cost would be upward of \$90 million for a 6-month delay.³ Moreover, the applicant's estimates indicate that the costs of continued construction over the next 6 months (which would to a large extent be wasted if the ultimate decision is unfavorable to location of the facility at the Seabrook site) would not be much greater than the costs that necessarily must be incurred if the Seabrook permits are suspended for that period of time. Though admittedly not an absolute certainty, history tells us that most such costs will be borne eventually by the ratepayers. Thus the costs of suspension, in my view, also weigh in favor of permitting continued construction.

- (b) Suspension would also probably cause delay in the startup of the facility if Seabrook is eventually licensed and would result in increased generation costs for the period of that delay. The Commission has determined that there is a need for the power to be generated by the facility either to assure system reliability or to reduce dependence on fossil fuels. Suspension, if it results in such delay, would reduce for a period of time the available power supply, increasing the potential for "brown-outs" or power cutbacks or the use of higher cost fossil fuels. In either case, both consumers and the applicant would bear significantly higher costs. This consideration also weighs against suspension.

3. Suspension Would Adversely Affect Workers Involved in the Seabrook Project

At present there are about 2,200 persons engaged in construction at the Seabrook site. We have been advised by applicant that if suspension were ordered, approximately 1,800 would be laid off and probably would have to look elsewhere to work. Those put out of work and their families would be seriously injured. While I do not know the ease with which they might find new employment, it seems beyond dispute that a layoff would work serious economic and social injury upon them.⁴ This certain and nonspeculative impact favors allowing continued construction.

³Brief of the NRC Staff in Response to Commission Order of June 1, 1978, p. 28.

⁴Staff alludes to the impact on the area of Seabrook because of the loss of wages paid to workers. This has not been further developed, but I assume that suspension would have some

(Continued on next page.)

4. To a Substantial Extent the Travails of the Seabrook Applicants Are the Result of a Breakdown in the Regulatory Process

The Commission has previously expressed its concern that the Seabrook proceeding stood as an example of fragmented and uncoordinated decision-making and of a system strangling itself, CLI-77-8, 5 NRC 503, 517. The Seabrook licensing process continues to exhibit these features. The applicant, it seems to me, is caught up in a mire primarily of the government's making. Since the Commission's earlier expression, more decisions have been made, relied on, and overturned. PSCO originally applied for a permit to construct the Seabrook facility with open-cycle cooling. An alternative site comparison of Seabrook was made with 18 other possible sites in or near its service area, by the applicant and by the NRC staff. The applicant obtained an approval of open-cycle cooling from EPA and a construction permit from the NRC. In light of prior NRC practice and an adjudicatory decision which held that absent special circumstances there was no need to go outside a utility's service area in the search for alternative sites, the bounds of the alternative site analysis were reasonable. See *Northern Indiana Public Service Company* (Bailly Generating Station), ALAB-224, 8 AEC 244, 266 (1974). PSCO cannot be faulted for commencing construction under its permits when it is allowed to do so under our rules.

The EPA Regional Administrator's reversal of his preliminary determination on once-through cooling and withdrawal of his earlier approval, holding that the applicant had not borne its burden of proof in demonstrating that the proposed once-through cooling could be environmentally acceptable at Seabrook, caused a convulsion in the licensing process. NRC thereupon ordered a suspension of construction and also directed that alternative sites in southern New England be considered. Later, the EPA Administrator ruled that once-through cooling was acceptable, only to be reversed in the First Circuit on procedural grounds. Our own Licensing Board ruled that the southern New England site comparison and comparison of Seabrook with towers favored construction of the plants at Seabrook, only to be overturned by the Atomic Safety and Licensing Appeal Board.

From one aspect, applicant's failure to bear its burden of proof before the Regional Administrator and in our proceeding might be viewed as a problem of its own making. But to say that a party failed to carry its eviden-

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immediate ripple effect beyond the workers themselves and into the local economy. Whatever the extent of this effect, it could only be negative; and, therefore, further argues against suspension.

tiary burden is a judgment made after the fact by reviewers. Here in the judgment of the government tribunals hearing the cases and in a position to call for more evidence, the applicant has been initially judged to have met this burden. That subsequent reviewers view the matter differently does not establish that onus should attach to the unfortunate litigant. Moreover, as a recent Appeal Board decision has pointed out, alternative site appraisal under NEPA is essentially a Commission responsibility which, as a practical matter, means a staff responsibility. Thus an applicant's evidence "cannot be taken as a substitute for the appraisal of the staff." *Boston Edison Company* (Pilgrim Nuclear Generating Station, Unit 2), ALAB-479, 7 NRC 774, 794 (May 25, 1978).⁵

We cannot blind ourselves to the faults of the regulatory system, and these appear paramount. The NRC staff, the Licensing Board, the Commission itself, and EPA all have the responsibility for giving effect to the applicable statutes. And they must assume—and share—the responsibility for this regulatory morass. Suspension would penalize the applicant for the failure of the governmental bodies. This weighs against suspension.

Moreover, it should be noted that the questions facing the Commission here are largely procedural. The applicant has a valid construction permit for a nuclear plant designed with once-through cooling and the Commission has completed its NEPA analysis on that design. What the applicant does not have is a valid EPA permit for once-through cooling. The applicant therefore is faced with the possibility of an EPA denial of once-through cooling and the resulting necessity of obtaining Commission approval of Seabrook with cooling towers. The Commission's NEPA analysis of Seabrook with cooling towers is not yet completed—but need it be at this time?

If a closed cycle system is required as a result of EPA's decision, the applicant will have no choice but to redesign the plant for Seabrook or elsewhere. The question of whether he chooses to risk continuing construction on the present design at this time is not properly our concern. Rather, the question of whether continued construction is unwise in the face of an ongoing EPA proceeding should be decided by the applicant and its State regulatory commission. The NRC ought only to be concerned with whether it has completed its own regulatory obligations, including its NEPA obligations, for the activities now being undertaken by the applicant.

5. The Likelihood of an Ultimate Decision to Move the Plant Elsewhere Is Not High

While I will not engage in prejudgment of questions that may come before us at a later time, it is appropriate to look at the event-tree which

⁵The time period for *sua sponte* Commission review of ALAB-479 has not yet run.

must occur for the Seabrook facility to be moved elsewhere. This should not prejudice a future decision any more than a court is prejudiced when it assesses the likelihood of success on the merits in ruling on preliminary injunctions. The speculative nature of a decision to move Seabrook must be weighed in our balancing decision here. For this to come to pass, the EPA Administrator must deny permission to operate the plant with once-through cooling, and a site must be identified as not only obviously superior to Seabrook with towers but also obviously superior to Seabrook with towers counting forward costs.

It is possible, of course, that an "obviously superior" site would be found. But as I see the matter today, the likelihood of all three of these three events occurring is not high. The speculative nature of these occurrences weighs against suspension. This is so particularly since none of the proceedings to date have produced any evidence of sites obviously superior to Seabrook; and no party at our hearing on June 26 could offer anything more than speculation that such a site might exist.

Even were we to ignore future construction activities of the applicant, we would nevertheless be viewing Seabrook from a position of 10% completion. This means that extensive environmental analysis has already occurred, the site has been cleared, excavation is complete, material is on site, intake and discharge tunnels are almost complete. As a practical matter, it seems unlikely that there is any other site that could offer anything similar. We agreed in the Commission's prior opinion that consideration of future costs of alternative sites in our decisionmaking was appropriate. Assuming we draw the line now not to count further construction, we are still faced with a situation where it is totally speculative that another site could be "obviously superior" to Seabrook.

6. Failure to Suspend Could Prejudice Future Decisionmaking

The arguments in favor of a suspension have also weighed heavily in my thinking. As I remarked at the outset, some will believe that our final decision on Seabrook will be irretrievably committed by a decision to continue construction now. If EPA determines that once-through cooling at Seabrook is unacceptable, and if another site is determined to be obviously superior to Seabrook with towers, it would then be necessary to determine whether the cost-benefit balance between the sites, allowing Seabrook credit for its lower forward costs and shorter completion time, favored the alternative. If we allow construction to continue now, the incremental construction could possibly tilt the cost-benefit balance against the alternative.

It can be argued that even if the Commission did find a site "obviously superior" to Seabrook, it would not order construction stopped. The argu-

ment would go: how could the Commission order a half completed plant torn down? This argument is superficially attractive. But, there is no doubt that we have such authority.

And, it is not valid to argue that the Commission simply will be unable to refrain from taking notice of future construction. It is not as though we were like jurors instructed to disregard an excluded statement but nonetheless influenced by it. Rather, our role here is that of judges, and as such, we are charged by the American jurisprudential system with precisely this sort of mental information sorting. Every judge, every hearing officer, indeed every Federal Commissioner with adjudicatory responsibilities, is charged with deciding what evidence is admissible to the record and what evidence is appropriately considered in making a final decision. The Commission and its Boards are fully capable of making those judgments. In the instant case, if we ordered that future construction could not be counted in subsequent comparison and analyses, future decision on an alternative site would have to compare that site with Seabrook as it existed on June 30, 1978. I believe we are capable of making that comparison fairly, and I believe our Boards are equally capable of so doing. Indeed, Mr. Rosenthal, Chairman of the Appeal Panel and Chairman of the Board to which this case is being remanded, appears fully comfortable with the possibility of making such a comparison.⁶

7. Protection of the Licensing Process and Our Responsibilities Under NEPA

It can be argued that failure to suspend construction at Seabrook undercuts the purpose of NEPA as it applies to our licensing process by allowing a major project to be substantially completed before the appropriate NEPA evaluation is completed.

It should be noted here that we have gone through years of NEPA review and have carefully considered 19 sites during the Seabrook review process. That NEPA review has been thorough and complete as to Seabrook with a once-through cooling design. As discussed above, it is necessary now only to analyze Seabrook with cooling towers—on the chance that EPA may not approve once-through cooling. Estimates have been made of the additional time which would be taken if Seabrook had to be built with cooling towers. Those estimates range in the neighborhood of 3 years according to the applicant. But it now takes over 10 years for a new nuclear plant to be designed, licensed, and constructed. There is no reason to believe that moving Seabrook to a new site would take any less. It is again speculative, to say the least, that any site could overcome such a handicap.

⁶ALAB-471, 7 NRC at 514-17.

More importantly, however, we need to take another look at how a NEPA comparison of Seabrook should be made against alternative sites. A partially completed plant will not be torn down because a somewhat better site has been located during the closing stages of the NEPA process. Indeed, the Seabrook site would have been properly selectable even had a somewhat better site, from an environmental standpoint, been identified in the very beginning of the NEPA process. NEPA does not demand that all alternatives be ranked in the order of their environmental impact. Nor does NEPA demand that the "best" site from an environmental standpoint be picked. What NEPA does demand is that an agency identify the reasonably available alternatives to a proposed action, and that it describe the environmental impacts and the public benefits attributable to each alternative. In this manner, the agency will be aware of and be able to take into account the environmental considerations which Congress considered so important to agency decisionmaking. But having located other "good" alternative sites, must an agency select the "best" possible site? Not necessarily. When one identifies 12 possible sites, for example, one may find that four are unacceptable for a variety of reasons (population density, seismic, lack of cooling water); four others may be marginal because of environmental impacts (ecologically important areas, nesting grounds), and the last four may be suitable sites in all respects for a nuclear power plant. Having determined that these four sites are suitable or "acceptable," any of the four should be available for use by an applicant subject to the approval of the agency. Indeed, such a process is the very essence of early site review and "banked sites"—concepts which this agency and its predecessor have supported for years.

In Seabrook, we have an "acceptable" site, insofar as the once-through cooling design is concerned. This agency has determined after comparison with a broad range of alternatives, that the Seabrook site is appropriate for a nuclear power plant with once-through cooling. Even assuming that any alternative site review might produce a "better" site, this would not necessarily compel the relocation of Seabrook. Practically speaking, that site would be available for the next New England plant, assuming other factors are favorable.

NEPA's purpose is to infuse Federal decisionmaking with concern for environmental values in addition to more traditional concerns (economic, safety, etc). And environmental values have been considered in our decisions on Seabrook. While there may have been flaws in one or more portions of the extensive NEPA analysis, the Commission's NEPA responsibilities have been substantially discharged. Alternative site comparison is an important part of the NEPA analysis, and even here, as has been demonstrated above, NEPA's objectives have been fulfilled. Suspending

construction while further analysis—needed only to cover a contingency—proceeds will not serve to protect the NEPA segment of our licensing process. On the other hand, suspension has serious consequences for other aspects of our licensing process. We will be demonstrating once again that procedural obstructions and fitful decisionmaking can subject applicants and intervenors alike to stop-start situations that serve no one. I therefore conclude that consideration of this factor weighs against suspension.

The Construction Permits Should Not Be Suspended

It is readily apparent that the above factors indicate that suspension should not be required. The major factor which arguably weighs otherwise is the possibility that future decisionmaking may be prejudiced. Nevertheless, substantial arguments support continued construction. We may never have to decide whether an obviously superior site to Seabrook with cooling towers retains that superiority when forward costs are considered. The equitable balance here simply does not support suspension. To mitigate possible prejudice to our decision, should the question ever arise, I would not take account of increased expenditures subsequent to the date of this decision.

Suspending construction will not motivate the Staff to do a better job on remand in this case, or in future cases, for speedy construction is not their concern. Nor will suspending construction aid our future decision, for we are fully able to compare Seabrook as it exists on June 30, 1978, with alternative sites and arrive at a fair judgment.

Who had the obligation to present data under our March 1977 order on the southern New England sites? The Staff. And who will suffer if construction ceases? The applicant, its employees, and the public at large. For the failings of this agency, New England and its people will suffer a delay in getting additional power, employees will be put out of work, and the ratepayers will suffer inevitable increases in the cost of the plant. In the long run, the public will be the loser from suspending construction—and who will be the winner? There is no information available to us which indicates that Seabrook will have to be moved. It serves no purpose then to suspend construction in light of the lack of evidence of any alternative site which might be "obviously superior."

Seabrook and the Regulatory Process

It is important to comment on Seabrook and its lessons for our process. Seabrook is the perfect example of everything that is wrong with the present

licensing process. The Commission's statement in its 1977 opinion, CLI-77-8, concerning the first Commission Seabrook construction suspension remains true today and deserves reiteration here:

[T]his case has been widely depicted as a serious failure of governmental process to resolve central issues in a timely and coordinated way—a paradigm of fragmented and uncoordinated government decision-making on energy matters and of a system strangling itself and the economy in red tape. 5 NRC 503, 517.

The past year's events in this regulatory saga have served only to confirm that Commission judgment. Agency decisions cross other agency decisions. Each successive decision, be it of an agency or a court, raises again the issue of construction suspension. Parties seek review of alternative sites about which they admittedly know little (or at least say nothing)—sites which those same or other parties may well oppose in other proceedings. We are caught up in a great "Gordian knot" of process and procedure—a state unsatisfactory to all parties.

But the particular siting question in this case is only one of many which pervade, confuse, and delay the process. It is incumbent on us as the regulator and on the legislative branch of government to solve the problems that plague nuclear licensing. We simply cannot risk another "Seabrook" in the future. A licensing process which serves the interest of no party to it is simply an exercise of proceduralism for its own sake.

Unless major steps are taken to reform the process under which we work, there can only be an unnecessary, but possibly endless, repetition of the debacle we have helped perpetrate and now must face here.

SOUTHERN NEW ENGLAND SITES

Finally, I concur in the majority opinion on terminating the southern New England site comparison, assuming once-through cooling for Seabrook. In that connection, the following considerations are relevant.

Alternative sites are among the types of alternatives which must be considered under NEPA. Southern New England sites are among the potential alternatives to Seabrook. We are not required to consider every possible alternative, but only those which are reasonable at the time the required comparison is done. *Vermont Yankee*, _____ U.S. *supra* at _____, 55 L.Ed. 2d, *supra*, 483-85. On the basis of the information now available to us, and unless the intervenors on remand can show the Board solid evidence to the contrary, it would be unreasonable for the Board to further compare

Seabrook with once-through cooling against the three remaining southern New England sites.

I believe that decision in this regard is correct because the general rule set forth in *Bailly* on the range of alternative sites to be considered is applicable. See *Northern Indiana Public Service Company* (Bailly Generating Station, Nuclear-1), ALAB-224, 8 AEC 244, 267-68 (1974), and in ALAB-366, 5 NRC, *supra*, at 65-67. The rule of thumb set forth in those cases is that, absent "special considerations in a particular case that warrant looking farther afield," the range of reasonable alternative sites to be considered in connection with an application is limited to sites in or near the applicant's service area. The special circumstances proviso is designed to adapt the rule to atypical cases where an applicant's service area is so small as not to provide a reasonable set of alternatives, or so large that portions of its service area are so distant from the area needing power as to be certain to contain no reasonable alternatives.

The Commission's decision in CLI-77-8 was colored by the then recent court of appeals decision in *Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976), *rev'd sub nom. Vermont Yankee, supra*, which indicated that we should investigate, at least to some extent, virtually every alternative which had been presented in a timely and clear fashion. *Aeschliman* was repeatedly cited to us by the parties urging consideration of the southern New England alternatives issue. In my own consideration of the case, I took account of the apparent logic of *Aeschliman* not to follow a rule, such as the one in *Bailly*, which had the effect of eliminating a significant class of alternatives from our NEPA comparisons. Now that *Aeschliman* has been reversed by the Supreme Court in an opinion which underscores our discretion to impose reasonable limits on the exploration of alternatives, I believe that *Bailly* is both extant and applicable here.

This case demonstrates that the *Bailly* rule is reasonable. Although PSCO is a relatively small utility, 19 potential alternative sites were identified in or near its service area. While those sites varied in their quality, several were reasonable alternatives and were apparently potentially acceptable sites for licensing. Barring a timely showing of the extraordinary quality of a potential site outside the perimeters defined by *Bailly*, the alternative site investigation need not go further.

Special factors in this case argue for considering a broader range of alternative sites, and I do not rule out the possibility that in other cases presenting similar facts broader inquiries would be reasonable. Here the broad area involved is New England, which has been historically thought of as a discrete region. In part, the need for the power from Seabrook is based on demand from the entire New England region. Furthermore, fully 50 percent of the facility is to be owned by utilities other than PSCO with dif-

ferent service areas. However, taking particular account of the time and money already expended at Seabrook, it seems unlikely that any of the three suggested southern New England sites might be found "obviously superior" or even comparable to Seabrook, assuming a once-through cooling system. In addition to forward costs at Seabrook, this conclusion is supported by the years of delay, the obvious difficulties in restarting the lengthy State and Federal licensing process, and the inherent legal and technical difficulties in locating a facility in a State different and distant from that of the operating utility. Moreover, in more than 5 years of investigation neither the NRC staff nor any other party has offered solid evidence that any of the southern New England sites might be superior to Seabrook with once-through cooling.

Commissioner Bradford, Concurring in Part and Dissenting in Part:

I concur in the Commission opinion that halts construction because no meaningful alternative site analysis will be possible if construction continues. I hold somewhat different views on the Commission's NEPA responsibility in this case and on the appropriate disposition of the southern site inquiry as it involves Seabrook without cooling towers.

In my view, the analysis of alternative sites in southern New England was never discretionary and should have preceded initial issuance of a construction permit. The National Environmental Policy Act (NEPA) requires that permits for "major Federal actions significantly affecting the quality of the human environment" issue only after the relevant Federal agency has examined the environmental impact of the proposed course of action and of alternatives to it.

Among the requirements of any NEPA analysis is "a detailed statement by the responsible official on . . . alternatives to the proposed action."¹ No legally sufficient analysis now compares Seabrook with cooling towers to possible units at other sites elsewhere in New England. Furthermore, there is also no such comparison of Seabrook even without cooling towers to other sites in southern New England. The possibility that another site might be a superior location is almost always a real one at the beginning of agency review, and it requires serious agency scrutiny under NEPA.² If it

¹42 U.S.C. §4332.

²In the recently decided *Vermont Yankee* case (*Vermont Yankee Nuclear Power Corporation v. NRDC*, _____ U.S. _____, 55 L.Ed. 2d 460 (1978)), the Supreme Court dealt with a court of appeals holding that it characterized as follows: "When an intervenor's comments 'bring sufficient attention to the issue to stimulate the Commission's consideration of it,' the Commission must 'undertake its own preliminary investigation of the preferred alternative

(Continued on next page.)

can possibly be avoided, it will not do for the NRC to allow a plant covered by NEPA to be partially constructed without an adequate NEPA analysis and then use that partial construction as a basis for terminating its NEPA responsibility to analyze alternatives.

Courts and this agency have frequently acknowledged that construction forecloses alternatives,³ and courts have rarely permitted construction to continue in the face of a deficient NEPA statement of alternatives if those alternatives might be foreclosed by the construction.

Our analysis of alternative sites need not include a "crystal ball inquiry,"⁴ alternatives which are "only remote and speculative possibilities,"⁵ or "every alternative device and thought conceivable by mind of man."⁶ However, the Act clearly requires that "each agency decisionmaker

(Continued from previous page.)

sufficient to reach a rational judgement whether it is worthy of detailed consideration in the EIS. Moreover, the Commission must explain the basis for each conclusion that further consideration of a suggested alternative is unwarranted.' "

The Supreme Court found this rationale to be "not entirely unappealing as an abstract proposition" but "as applied to this case, we think it misconceives not only the scope of the agency's statutory responsibility, but also the nature of the administrative process, the thrust of the agency's decision, and the type of issues the intervenors were trying to raise."

In the Seabrook case, the choice of site by the utility and its ratification by a State agency are entitled to weight in the analysis of alternatives, but they are not dispositive. We do not choose sites, but we must analyze the alternatives to the proposed site, and the alternative site analysis was not required in the State proceeding which was in any case limited to New Hampshire.

The fact that the alternative sites have not been analyzed by the intervenors does not absolve us of our responsibility to do so. The possibility that a plant might be located elsewhere within the territory of the joint applicants or within the pool of which they are members is scarcely an alternative that can be said to be "uncommon or unknown . . . at the time the project was approved" in the sense that energy conservation may have been at the beginning of this decade.

³The principles involved are well set forth in Part 3 of Mr. Farrar's opinion on suspension below (ALAB-471, 7 NRC at 519-22). Mr. Farrar has collected NRC and court opinions endorsing "the principle that continued commitment of resources to a project unfairly tilts the scale against potential alternatives." Those citations (ALAB-471, 7 NRC at 520) are as follows: *Allied-General Nuclear Services* (Barnwell Facility), ALAB-296, 2 NRC 671, 678, 679 (1975); *Consumers Power Company* (Midland, Units 1 and 2), ALAB-395, 5 NRC 772, 779 (1977); *Florida Power and Light Company* (St. Lucie, Unit 2), ALAB-404, 5 NRC 1185, 1188 (1977); *Public Service Company of Indiana* (Marble Hill, Units 1 and 2), ALAB-437, 6 NRC 630, 634 (1977); *Consumers Power Company* (Midland, Units 1 and 2), ALAB-458, 7 NRC 155, 173 (February 14, 1978) (this case also cites a line of judicial decisions recognizing the same principle, e.g., *Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission*, 449 F.2d 1109, 1128 (D.C. Cir. 1971); *Coalition for Safe Nuclear Power v. Atomic Energy Commission*, 463 F.2d 954, 956 (D.C. Cir. 1972); *Union of Concerned Scientists v. Atomic Energy Commission*, 499 F.2d 1069, 1084, fn. 37 (D.C. Cir. 1974)).

⁴*Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 837 (D.C. Cir. 1972).

⁵*Id.* at 838.

⁶*Vermont Yankee, supra.*

has before him and takes into proper account all possible approaches to a particular project. . . ." *Calvert Cliffs Coordinating Committee v. AEC*, 449 F.2d 1109, 1114 (D.C. Cir. 1971).

The entire six-State New England region is smaller than 20 of the other 44 states and would fit within the service area of many utilities, to say nothing of utility holding companies. Within these six small States, there are still more than 100 electric utility service territories. Even the larger of these are much smaller than their counterparts elsewhere, especially in the west. To make utility boundaries the primary determinant of the search for alternative sites in New England is to say that such a review should be much narrower in scope than similar reviews for similar facilities elsewhere in the United States.

Electric generating plants are sited on the basis of considerations of economics, transportation, system stability and reliability, environment, and geopolitics. State and national and utility franchise boundaries play a part, but so do power pool considerations for which New England is the relevant region. It is standard practice in New England for nuclear power plants to be built not just to serve the needs of an individual utility and its service area, but to serve the needs of all the co-owners throughout New England. The New England Power Pool does planning on a regional basis and the New England Power Exchange sets rates based in part on generating capacity assignments to individual utilities. In this case, Public Service of New Hampshire owns 50% of the plant while the rest is owned by other utilities throughout the New England area. Some 45% is owned by utilities in the southern New England area.

Given these facts, the alternative of building the Seabrook nuclear power plant on a site in southern New England where units already exist or sites where planned units have been postponed cannot be dismissed out of hand on the basis that the sites are outside the service territory of Public Service Company of New Hampshire. Furthermore, final environmental impact statements have been prepared for these southern sites. The range of new information to be developed is therefore substantially diminished.

The staff and the applicant rely on *Vermont Yankee* and *Bailly*⁷ for discontinuing the southern New England site inquiry. Neither case has much relevance here. The Commission did not order the southern site inquiry because of the holding in *Aeschliman*⁸ which *Vermont Yankee* over-

⁷*Northern Indiana Public Service Company* (Bailly Generating Station, Nuclear-1), ALAB-224, 8 AEC 244 (1974), reversed on other grounds sub. nom. *Porter County Chapter, etc. v. AEC*, 515 F.2d 513 (7th Cir.), reversed and remanded sub. nom. *Northern Indiana Public Service Company v. Porter County Chapter, etc.*, 423 U.S. 12 (1975), *aff'd on remand*, 533 F.2d 1011 (7th Cir.), cert. denied, 429 U.S. 945 (1976).

⁸*Aeschliman v. NRC*, 457 F.2d 622 (D.C. Cir. 1976), reversed sub. nom. *Vermont Yankee Nuclear Power Corp. v. NRDC*, _____ U.S. _____, 55 L.Ed. 2d 460, 98 S. Ct. 1197 (1978).

turned. Furthermore, it will not do to say that the intervenors were late in raising the southern site question and have not pursued it adequately. The duty to discharge fundamental NEPA responsibilities is on this agency, not on those who may by chance be present at one or another of its proceedings. Much has been made of the fact that no southern site has been suggested as a specific alternative in this case. I have no presupposition that such a site will be obviously superior to Seabrook, but as of today the fact that no specific southern site has been put forward means only that those with the resources and the duty to scrutinize these sites haven't presented the necessary evidence.

The Appeal Board holding in *Bailly* also has little relevance to this plant. In that case, the Appeal Board held that the agency need only examine alternatives outside the applicant's service area in special circumstances. However, it added that "There may well be occasions when the search for an acceptable nuclear power plant site must go far outside a utility's service area, particularly in heavily populated regions." Indeed, the *Bailly* restriction was rejected in this case by the Commission itself when it ordered the southern New England site inquiry in March 1977. Furthermore, *Bailly* emphasizes the effects of long distance transmission lines. Until evidence is heard, we do not know whether extensive new transmission lines will be necessary or what their effects might be.⁹

Just 15 months ago, the Commission agreed that the southern New England sites should be examined as alternatives to Seabrook with and without towers as part of the Commission's NEPA analysis. The circumstances today are the same as the circumstances 15 months ago, except for two factors: (i) the analysis of the southern New England sites which the Commission ordered was not properly made; (ii) considerable additional construction has taken place at the Seabrook site, ostensibly at the applicant's own risk.

My colleagues now admit that they are terminating the southern New England site inquiry because construction of Seabrook with open-cycle cooling has become a *fait accompli*; that is, no alternative could now be compared to Seabrook with open-cycle cooling and be found to be obviously superior. Thus, because the analysis was not done correctly during the last 15 months and because of construction completed during that time, evaluation of the southern New England sites compared to Seabrook with open-cycle cooling is at an end even though it has never been done. This result provides concrete rebuttal to those who doubt that continued construction chokes off or prejudices consideration of alternatives.

⁹Since nearly half of the plant's capacity is owned in southern New England, the transmission network necessary to move the power from New Hampshire south may well look a good deal like the network necessary to move the power from the south to New Hampshire.

If no further proceedings were in order, the Commission might be justified in terminating the southern site comparison to Seabrook without towers. Such a result could perhaps be supported by an appeal to "common sense" in light of the existing investment. It would, however, illustrate the disastrous consequences of permitting extensive construction with a serious alternative site issue not resolved with reasonable finality within the agency.

However, since a remand is necessary in any case to compare Seabrook with towers to the exact same sites, I would not close off the review of Seabrook without towers until the "common sense" result had some hard support in record evidence. We would then have fulfilled one of NEPA's fundamental requirements by acquainting ourselves with the environmental implications of alternatives to our proposed licensing action.

Finally, I have joined Commissioner Gilinsky in holding that no other factor or equitable consideration in this case outweighs the presumption in favor of a stay in the face of a flawed NEPA analysis of alternatives. Indeed, it would take other considerations of an extraordinary magnitude when construction is precluding the very alternatives under consideration. I have also joined in the view that the strongest consideration against suspension is the jobs in question, for the individual workers have not been given the warnings of possible suspension that the courts and this agency have repeatedly conveyed to the company.

I would only add here that even the jobs factor weighs both ways. If the Nuclear Regulatory Commission shows itself to be so intent on continuing construction that it would use protection of the Seabrook jobs as an excuse to proceed with construction in the face of clear failure to comply with the relevant laws, many more jobs than are at stake at Seabrook will be called into question. The courts, the legislative bodies, and the public are unlikely to tolerate nuclear expansion unless the regulators take the laws and their duties seriously. An appraisal of the long-run economic and employment consequences of today's decision must take that fact into considerable account.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Richard S. Salzman

In the Matter of

Docket Nos. STN 50-491
STN 50-492
STN 50-493

DUKE POWER COMPANY

(Cherokee Nuclear Station,
Units 1, 2, and 3)

June 7, 1978

Upon *sua sponte* review (the only appeal having been withdrawn) of the four Licensing Board decisions in this case (LBP-76-18, 3 NRC 627; LBP-77-19, 5 NRC 676; LBP-77-47, 6 NRC 191; LBP-77-74, 6 NRC 1314), the Appeal Board affirms each decision, subject to a minor change in the phraseology of LBP-77-74. Pursuant to ALAB-480, 7 NRC 796 (1978), the Appeal Board retains jurisdiction over the issue of health effects attributable to radon-222.

RULES OF PRACTICE: APPELLATE REVIEW

In normal circumstances, an appeal will lie only from unfavorable *action* taken by the Licensing Board, not from wording of a decision with which a party disagrees but which has no operative effect.

APPEAL BOARD: STANDARD OF REVIEW

An appeal board does not give *stare decisis* effect to licensing board conclusions on legal issues not brought to it by way of an appeal.

DECISION

Before us are a total of four decisions rendered by the Licensing Board in this construction permit proceeding involving the three units of the proposed Cherokee Nuclear Station. No exceptions were filed to the first three

of these decisions.¹ We accordingly elected to postpone review of them on our own initiative pending the ultimate determination by the Board below on whether construction permits should issue. In the fourth decision, rendered last December, the Board resolved that question in the applicant's favor.²

The NRC staff appealed from aspects of the fourth decision. One of its exceptions related to the Board's treatment of the question of the amount of radon (Rn-222) that is generated by the mill tailings produced in the course of the mining and milling of uranium. With our leave,³ that exception was subsequently withdrawn by reason of our intervening decision in *Metro-politan Edison Company* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-456, 7 NRC 63 (1978).

What that left on the appeal was simply the staff's challenge to certain wording in the fourth decision. In ALAB-478, 7 NRC 772 (May 17, 1978), however, we indicated that we were disinclined to entertain that challenge because it did not appear to be "addressed to anything determined by the Licensing Board which might possibly have operative significance insofar as the design, construction, or operation of the Cherokee facility is concerned." The staff was nonetheless accorded an opportunity to bring to our attention any special considerations which might warrant a departure from the normal rule that an appeal will lie only from unfavorable *action* taken by the Licensing Board. In response to ALAB-478, the staff told us that it had decided to abandon the challenge. We now grant it leave to do so.

In these circumstances, there is no appeal remaining in the picture, and the four decisions below are ripe for review *sua sponte* on all but one of the issues considered and determined by the Licensing Board. Although the staff's exception pertaining to the radon matter has been withdrawn, this is one of the 17 proceedings embraced by our recent order in *Philadelphia Electric Company* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-480, 7 NRC 796 (May 30, 1978). By virtue of that order, the question of the effect of the radon emissions in the uranium mining and milling process on the ultimate NEPA cost-benefit balance for the Cherokee facility must be held open to await further developments in another proceeding still pending before a licensing board. This being so, we might, of course, continue to defer our evaluation of any of the findings or conclusions of the Board below until such time (perhaps several months in the offing) as, in the observance of the procedures established in ALAB-480,

¹LBP-76-18, 3 NRC 627 (1976); LBP-77-19, 5 NRC 676 (1977); LBP-77-47, 6 NRC 191 (1977).

²LBP-77-74, 6 NRC 1314 (1977).

³See unpublished order of February 6, 1978.

we are in a position to rule upon the radon question as well. It seems to us, however, that the parties are entitled to be told without additional delay whether, the radon matter to one side, the Licensing Board's result rests on solid ground. Accordingly, we have instead undertaken now to examine each decision and the underlying record.

We conclude that the Licensing Board committed no error requiring corrective action. In its four decisions collectively, the Board confronted each of the questions which must be determined in the course of a construction permit proceeding. Its crucial findings have adequate evidentiary support, and in the context of this case, none of its rulings on material points of law is incorrect.⁴

In its papers submitted on the now abandoned appeal, the staff took issue with the Licensing Board's use of the phrase "anchored to bedrock" in paragraph 59 of the fourth decision (6 NRC at 1329). We took note in ALAB-478 (at fn. 1) of the applicant's agreement that the phrase "founded on bedrock and/or fill concrete" would be more accurate. Our examination of the record suggests that this is indeed so. Consequently, we are amending paragraph 59 to effect the requested substitution in phraseology.

With this minor amendment, the four decisions under review are each *affirmed* on matters considered in them apart from the radon question. In accordance with ALAB-480, *supra*, jurisdiction over that question is being *retained* by us. Pending its resolution in a further order of this Board, no finality shall attach to the Licensing Board's authorization of the issuance of construction permits for the Cherokee facility.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

⁴In this uncontested proceeding, we need not (and do not) say that each such ruling is beyond doubt. Indeed, in passing judgment on questions of law in a nonadversary context, the possibility is enhanced that some important consideration will be overlooked by us. It is for this reason that we do not give *stare decisis* effect to licensing board conclusions on legal issues not brought to us by way of an appeal.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Richard S. Salzman, Chairman
Michael C. Farrar
Dr. W. Reed Johnson

In the Matter of

Docket No. STN 50-484

NORTHERN STATES POWER
COMPANY, et al.

(Tyrone Energy Park, Unit 1)

June 7, 1978

Upon intervenor's request for clarification of ALAB-464, 7 NRC 372 (March 17, 1978), with respect to the scope of the legal ownership issues which were remanded, the Appeal Board rules that (1) intervenor is entitled to show that the change in ownership of the proposed plant has diminished the need for its power and (2) on remand, the Licensing Board is to look at the need for power issue solely for that purpose.

Messrs. Gerald Charnoff and Thomas A. Baxter,
Washington, D. C., for the applicants, Northern States
Power Company and others.

Mr. Thomas Galazen, Turtle Lake, Wisconsin, for
intervenor Northern Thunder, movant.

Mr. Stephen H. Lewis for the Nuclear Regulatory
Commission staff.

MEMORANDUM AND ORDER

Intervenor Northern Thunder has asked, albeit somewhat belatedly, for clarification of our decision of March 17, 1978 (ALAB-464, 7 NRC 372). We there remanded certain issues to the Licensing Board for further consideration in light of the change in legal ownership and other arrangements adopted by the applicants in response to a ruling of the Wisconsin Public

Service Commission. Specifically, we said that those changes could "bear on the utilities' financial and technical qualifications to build the nuclear plant." 7 NRC at 375. Northern Thunder's motion suggests that the "need for power" question might also be affected thereby; in essence it seeks to explore the matter before the Board below.¹

In issuing ALAB-464, we did not have in mind the possibility that "need for power" in the region to be served by the plant stood to be influenced by the altered arrangements. But, in the particular circumstances of this case, we think the intervenor is entitled to an opportunity to show that the need for the plant has diminished *as a result of the change in arrangements*. Accordingly, on remand the Licensing Board is to look again at the need for power issue (as well as the other matters we sent back to it).² We stress, however, that it is to do so only for the purpose of ascertaining whether its prior findings, previously upheld by us, have been affected by the developments mentioned above. Whether this will require a hearing or can be handled summarily is a matter for that Board to decide.³

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

¹The applicants oppose the motion; the staff supports it in principle (see fn. 3, *infra*).

²With respect to the radon issue, however, see our recent order affecting a number of proceedings, including this one. *Philadelphia Electric Company* (Peach Bottom, Units 2 and 3), ALAB-480, 7 NRC 796 (May 30, 1978) (particularly at 805).

³Although it supports giving Northern Thunder the opportunity sought, the staff is at odds with the intervenor on the merits. That is, it has already filed with the Licensing Board an affidavit expressing the opinion that the need for the plant has not changed.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Dr. W. Reed Johnson

In the Matter of

DUQUESNE LIGHT COMPANY,
et al.Docket No. 50-334
(Spent Fuel
Pool
Modification)(Beaver Valley Power
Station, Unit No. 1)

June 7, 1978

Upon *sua sponte* review of the Licensing Board's initial decision (LBP-78-16, 7 NRC 811) authorizing issuance of operating license amendment allowing enlargement of spent fuel pool capacity, the Appeal Board affirms.

DECISION

On May 4, 1978, the Licensing Board rendered an initial decision¹ in which it authorized the issuance of an amendment to the operating license for Unit No. 1 of the Beaver Valley Power Station. The amendment allows the enlargement of the capacity of the facility's spent fuel pool from 272 to 833 spent fuel assemblies.

The hearing below on the amendment application was held at the instance of the city of Pittsburgh. Neither the city nor any other party to the proceeding has appealed from the initial decision. We have therefore reviewed the decision and the underlying record on our own initiative. This review persuades us both that the crucial findings of the Board have sufficient evidentiary foundation and that its legal determinations are consistent with *Northern States Power Company* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41 (1978). We also are in agreement with the Board's admonition to the licensees contained in paragraph 37 of the initial decision. 7 NRC at 821.

¹LBP-78-16, 7 NRC 811.

There accordingly being no error requiring corrective action, the initial decision is *affirmed*.

It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Jerome E. Sharfman, Chairman
Richard S. Salzman
Dr. W. Reed Johnson

In the Matter of

Docket Nos. STN 50-508
STN 50-509

**WASHINGTON PUBLIC POWER
SUPPLY SYSTEM, et al.**

**(WPPSS Nuclear Projects No. 3
and No. 5)**

June 7, 1978

Upon *sua sponte* review, the Appeal Board affirms the Licensing Board's initial decision (LBP-78-14, 7 NRC 599) authorizing issuance of construction permits and rules that this proceeding need not be reopened for further consideration of new evidence on radon emissions resulting from the uranium fuel cycle.

RULES OF PRACTICE: FUEL CYCLE RULE

Commission order requiring reconsideration in pending cases of radon-222 emissions value did not contemplate reopening of proceeding where Licensing Board considered corrected values contained in staff affidavits rather than the values in Table S-3 of 10 CFR Part 51.

FINDINGS OF FACT: PRECEDENTIAL VALUE

A determination of fact in an adjudicatory proceeding which is necessarily grounded wholly in a nonadversary presentation is not entitled to be accorded generic effect, even if the determination relates to a seemingly generic matter rather than to some specific aspect of the facility in question.

DECISION

On April 10, 1978, the Licensing Board rendered its initial decision authorizing the issuance of construction permits for the Washington Public

Power Supply System nuclear units 3 and 5. LBP-78-14, 7 NRC 599. No exceptions having been filed, we have reviewed the decision on our own motion. We find no errors warranting correction. However, one matter deserves comment.

As we recently stated in *Philadelphia Electric Company* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-480, 7 NRC 796, 799 (May 30, 1978):

On April 11, 1978, the Commission amended Table S-3 of 10 CFR Part 51, entitled "Summary of Environmental Considerations for Uranium Fuel Cycle," to delete the value assigned to the emissions of radon-222 expected to occur as a result of the mining and milling of uranium. 43 Fed. Reg. 15613 (April 14, 1978). The basis for this action was that that value was incorrect. The Commission went on to state that, although the question of the correct value was under reconsideration, it had decided not to institute at this juncture a rulemaking proceeding on radon emissions. Rather, the matter was to be considered "in individual [licensing] proceedings." In this connection, the Commission directed that the radon question be entertained not merely in those proceedings in which it had been previously placed in issue (or in which a party now desired to raise it) but, as well, in all other proceedings "still pending before Licensing or Appeal Boards." The Commission went on to state that, "[w]here cases are pending before Appeal Boards, the Appeal Boards are also directed to reopen the records to receive new evidence on radon releases and on health effects resulting from radon releases." 43 Fed. Reg. at 15615-16.

The Commission acted to ensure that environmental evaluations made in pending cases are performed on the basis of the actual radon emissions from the uranium fuel cycle, which are greater than represented in Table S-3. In this case, the staff submitted to the Licensing Board affidavits (staff exhibits 25 and 26) reevaluating both the radon releases during the fuel cycle and the effects of the corrected values on the comparison of the coal and nuclear fuel cycles. These affidavits were received into evidence without objection.¹ The Licensing Board, while recognizing that (at the time of its decision) it was bound by the radon release values in Table S-3, stated:²

Nevertheless, the Board is mindful of the Commission's statement in the Three Mile Island Order (*supra*), that "[The Intervenor]s are correct in asserting that Table S-3 understates these radon releases" (*id.* at 3). The Commission recognized that reopening of the records in individual

¹7 NRC at 638, n. 18.

²*Id.*

licensing proceedings might be necessary in the future to consider the proper impact of radon on cost-benefit balances. To eliminate the possible need for a future reopened record in this proceeding to consider the radon-222 matter, the Board has reviewed Staff Exhibits 25 and 26 with respect to the effects of radon-222 and finds that even if the corrected radon-222 releases were used to replace the value assigned to radon in Table S-3, 10 CFR Part 51, the environmental impacts of the uranium fuel cycle would not be significantly increased. The cost-benefit balance in favor of the licensing of these projects remains unchanged. [Footnote omitted.]

The Licensing Board has thus already taken account of the new evidence on radon emissions resulting from the uranium fuel cycle. No purpose would be served by reopening the record for any further consideration of the issue, and in our judgment,³ the Commission in revising Table S-3 did not contemplate that it be done in a situation such as this. Accordingly, we will not do it.⁴

The initial decision of April 10, 1978, is *affirmed*.
It is so ORDERED.

FOR THE APPEAL BOARD

Margaret E. Du Flo
Secretary to the Appeal Board

³Our conclusion in this regard is also the view of the staff. See the staff's motion before us for consolidation of all Appeal Board cases on the radon issue, dated April 27, 1978, at p. 7, n. 4.

⁴The radon emissions issue is pending before us in 17 other cases and before various licensing boards in still more cases. See *Peach Bottom*, *supra*; e.g., *Long Island Lighting Company* (Jamesport Nuclear Power Station, Units 1 and 2), ALAB-481, 7 NRC 807, 809 (May 31, 1978). Our unwillingness to disturb the Licensing Board's findings in this uncontested case should not be taken as precedent in any of those other cases. "[A] determination of fact in an adjudicatory proceeding which is necessarily grounded wholly in a nonadversary presentation is not entitled to be accorded the slightest generic effect—even if, as here, the determination relates to a seemingly generic matter. . . rather than to some specific aspect of the facility in question." *Commonwealth Edison Company* (La Salle County Nuclear Station, Units 1 and 2), ALAB-193, 7 AEC 423, 425 (1974).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Elizabeth S. Bowers, Chairman
Glenn O. Bright
William E. Martin

In the Matter of

Docket Nos. 50-275 OL
50-323 OL

PACIFIC GAS AND
ELECTRIC COMPANY

(Diablo Canyon Nuclear
Power Plant, Units 1 and 2)

June 12, 1978

Upon application for operating licenses, the Licensing Board issues a Partial Initial Decision covering all environmental and certain health and safety issues, but excluding those which are seismically related, and concludes that the final environmental balance weighs in favor of licensing the units, subject to a number of conditions.

NRC: JURISDICTION

Jurisdiction over the discharge of radioactive effluents composed of source, special nuclear, or byproduct material is preempted by the Nuclear Regulatory Commission, and therefore any attempt by a State to impose conditions on radioactive releases to water is without force and must be disregarded. *Northern States Power Company v. Minnesota*, 447 F.2d 1143 (8th Cir. 1971), *aff'd.*, 405 U.S. 1035 (1972).

TECHNICAL ISSUES DISCUSSED: Cooling systems; cooling water discharge; water quality (suspended solids); efficiency of utilization of uranium fuel; uranium availability (*i.e.*, fuel costs); release of radioactive materials in effluents to unrestricted areas.

PARTIAL INITIAL DECISION

(Operating License)
(Environmental Issues)

APPEARANCES

Philip A. Crane, Jr., Esq., Assistant General Counsel, Pacific Gas and Electric Company, 77 Beale Street, San Francisco, California 94106; **Bruce Norton, Esq.**, and **Arthur Gehr, Esq.**, Snell and Wilmer, 3100 Valley Center, Phoenix, Arizona 85073, on behalf of the Applicant.

James Geocaris, Esq., and **Brent Rushforth, Esq.**, Center for Law in the Public Interest, 10203 Santa Monica Drive, Los Angeles, California, on behalf of Intervenor Scenic Shoreline Preservation Conference, Inc., Ecology Action Club of California State Polytechnic-University (San Luis Obispo), San Luis Obispo Mothers for Peace, John J. Forster, Sandra Silver, and Elizabeth Apfelberg.

James Tourtellotte, Esq., **L. Dow Davis, Esq.**, and **Paul Kiefer, Esq.**, Office of Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, on behalf of the Regulatory Staff.

TABLE OF CONTENTS

I. INTRODUCTION

| | |
|------------------------------|-----|
| A. Notice | 991 |
| B. Parties | 992 |
| C. Contentions | 993 |
| D. Evidentiary Hearing | 996 |

II. CONSIDERATIONS BY THE BOARD

| | |
|--|------|
| A. Issues | 998 |
| 1. Compliance With the Federal Water Pollution Control Act Amendments of 1972 | 998 |
| 2. Environmental Impact Statement | 1000 |
| 3. Contested Issues | 1000 |

| | | |
|------|--|------|
| 1.C. | Turbidity | 1001 |
| 1.D. | Sublethal Thermal Effects | 1002 |
| 1.E. | Recirculation | 1003 |
| 1.F. | Impingement and Entrainment | 1004 |
| 1.G. | Species Losses and Breeding Areas | 1007 |
| 1.H. | Size of the 4-Degree Isotherm | 1008 |
| 1.I. | Plume Monitoring | 1008 |
| 1.J. | Bull Kelp | 1009 |
| | a. Chlorine | 1009 |
| | b. Foam | 1010 |
| | c. Heat | 1011 |
| 2.A. | Nuclear Fuel Shortages | 1013 |
| | a. U.S. Resource Position | 1014 |
| | b. U.S. Demand for U_3O_8 | 1016 |
| 2.B. | Plant Reliability | 1020 |
| 3.A. | Copper Discharge | 1022 |
| 3.B. | Titanium Tubing | 1023 |
| 4.A. | Buildup of Concentration of Radio- isotopes in the Food Chain | 1024 |
| 4.C. | Somatic and Genetic Effects of Radiation | 1024 |
| 4.D. | Occupational Doses to Workers | 1028 |
| 4. | Additional Radiological Matters | 1029 |
| | Table 1 | 1030 |
| | Table 2 | 1031 |
| | Table 3 | 1033 |
| III. | CONCLUSIONS OF LAW | 1035 |

I. INTRODUCTION

A. Notice

1. The United States Atomic Energy Commission¹ issued on October 10, 1973, a "Notice of Receipt of Application for Facility Operating Licenses;

¹In accordance with the Energy Reorganization Act of 1974, 88 Stat. 1233, the Atomic Energy Commission has been abolished, and its regulatory responsibilities have been assumed by the Nuclear Regulatory Commission. All references in this Decision to the "Commission" shall, unless otherwise indicated, refer to the United States Nuclear Regulatory Commission.

Notice of Consideration of Issuance of Facility Operating Licenses and Notice of Opportunity for Hearing." The notice was published in the FEDERAL REGISTER on October 19, 1973 (38 Fed. Reg. 29105). The notice related to Pacific Gas and Electric Company's (the Applicant or PG&E) application for authority to possess, use, and operate the Diablo Canyon Nuclear Power Plant, Units 1 and 2, two pressurized nuclear reactors (the facility) on the Applicant's 750-acre site in San Luis Obispo County, California.² The units are manufactured by Westinghouse and are designed to operate at steady-state power levels of 3,338 and 3,411 megawatts thermal, with a net total electrical output of approximately 2,120 MWe.

B. Parties

2. On December 14, 1973, the Special Licensing Board appointed to rule on petitions stated that California Public Utilities Commission requested admission as a party if a hearing is *otherwise* ordered. The Board determined that all other petitions were defective, but afforded those petitioners thirty (30) days to submit perfected petitions. The order further stated that if acceptable petitions are submitted, California will be admitted as a party under 10 CFR §2.714.

3. On January 25, 1974, the Special Board determined that the amended petitions of Scenic Shoreline Preservation Conference, Inc., Elizabeth E. Apfelberg and Sandra A. Silver, and John J. Forster and Lonnie Valentine were acceptable, and those petitioners as well as California were admitted as parties in the proceeding.³ An out-of-time petition was filed by Mr. William Cornwell, a commercial abalone diver. The Licensing Board's order of June 13, 1974, determined that good cause for the late filing had been established and admitted him conditionally as a party on one contention for the purpose of discovery. On June 25, 1974, PG&E appealed the Board's admission of Mr. Cornwell as a party. The Appeal Board, after seeking more information from the Licensing Board, affirmed the decision to admit Mr.

²Construction of the facilities was authorized by construction permits numbered CPPR-39 and CPPR-69 issued by the Atomic Energy Commission on April 23, 1968, and December 9, 1970, respectively. Unit 2 (CPPR-69) was the subject of an environmental hearing under the then governing regulations, 10 CFR Part 50, Section B of Appendix D. Unit 1 was not the subject of an environmental hearing, although environmental data inseparably applicable to both units was considered at the hearing for Unit 2. *Pacific Gas and Electric Company* (Diablo Canyon Nuclear Power Plant, Unit 2), LBP-74-60, 8 AEC 277 (1974).

³The Special Board's order did not mention the fact that Apfelberg and Silver and Forster and Valentine not only petitioned as individuals but also as representatives of the San Luis Obispo Mothers for Peace and the Ecology Action Club of California State Polytechnic University, respectively. Since the standing would prevail on the same bases, the Licensing Board for the evidentiary hearing corrected this inadvertence.

Cornwell. See *Pacific Gas and Electric Company* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-223, 8 AEC 241 (1974).

4. By letter of March 29, 1975, Mr. Lonnie Valentine informed the Board that he was leaving the San Luis Obispo area and was withdrawing from the proceeding.

5. On June 15, 1976, PG&E moved that Mr. John J. Forster be dismissed as a party to this proceeding because he no longer resided in San Luis Obispo or the State of California and therefore had no interest which may be affected by this proceeding. The Staff recommended that the PG&E's motion be denied without prejudice subject to renewal at a later date when more was known about Mr. Forster's situation. A letter was received from Mr. Forster who claimed that he intends to enter graduate school at Cal Poly in San Luis Obispo and considers it his home. Accordingly, the Board believed that Mr. Forster still had the requisite interest under 10 CFR §2.714 and so held. Mr. Gordon Silver received authorization from Mr. Forster and from Mr. Frederick Eissler, president of Scenic Shoreline Preservation Conference, Inc., to act on their behalf in their absence.

6. In March 1976, those Intervenor who had an admitted contention on the facility security retained counsel, Yale I. Jones, Esq., and Paul C. Valentine, Esq., to represent them limited to only the security contention. In August 1976, all parties, except Mr. Cornwell, were represented on all other issues by the Center for Law in the Public Interest. Mr. Cornwell did not appear at the evidentiary hearing on environmental issues. On August 6, 1977, Mr. Cornwell notified the Board that he did not have a mailing address and asked to have his name withdrawn from the service list. On August 9, 1977, the Board withdrew his name from the service list.

C. Contentions

7. A special prehearing conference was held on March 26 and 27, April 30, and May 1, 1974. In an order dated May 30, 1974, the Board listed the accepted and rejected contentions of the parties. In addition, the Board's order of June 13, 1974, added Mr. Cornwell's contention relating to the effects of the thermal plume on marine life in Diablo Cove. Subsequent orders of the Board clarifying its May 30 order and dealing with requests for reconsideration were issued June 18, July 23, and July 24, 1974. Discovery commenced on the contentions admitted by the Board on May 30, 1974, and continued up to the evidentiary hearing.

8. Additional prehearing conferences were held on April 10, 1975, and July 13, 1976, to attempt to refine the language of the contentions of the Intervenor. On July 20, 1976, the NRC Staff circulated what it regarded as the consensus reached at the July 13, 14 prehearing conference with respect

to the environmental contentions being advanced by Intervenor which were ripe for hearing. Also included were (1) a contention concerning alternatives to once-through cooling and inland sites, which was dropped as being outside the NRC's jurisdiction, and (2) certain contentions, denominated "Controverted Contentions," as to which the parties were unable to agree on language. These various contentions are set forth below:

Uncontroverted Contentions

Once-Through Cooling

1. Whether information developed subsequent to the Commission hearing in September 1973 demonstrates that the Staff's Final Environmental Statement (FES) adequately considers the extent or effect of the facilities' thermal plume on the environment, as to:
 - A. Whether the mouth of Diablo Canyon is the point of discharge.
 - B. Modeling of heat transfer to the atmosphere.
 - C. Quantitative data on turbidity.
 - D. Quantitative data on sublethal thermal effects.
 - E. Winds and currents causing recirculation.
 - F. Impingement and entrainment of organisms.
 - G. Species losses and regeneration of significant marine breeding areas including larval abalone.
 - H. Size of the 4-degree isotherm.
 - I. Procedures to ensure that the plume will not exceed predicted values.
 - J. Growth and concentration of bull kelp, as affected by heat, chlorine, and foam emitted from the Diablo Canyon discharge structures, and its effect on abalone which feed on it.

Cost-Benefit

2. Whether the NEPA cost-benefit analysis improperly assesses the benefits to the plant by improper assumptions on:
 - B. Plant malfunctions, breakdowns, downtime, or reduced operational efficiency causing a low reliability factor.

Copper Discharge

3. Whether adverse environmental effects are being or will be experienced by abalone due to residual particulate copper from previously installed condenser tubing.

Low-Level Radiation

4. Whether the FES and amendment inadequately consider as environmental costs the doses and effects of low-level radiation as to:
 - C. Somatic effects, including incidences of human cancers, leukemias, and infant mortalities and genetic effects of routine releases on the population within a 50-mile radius of the plant.
 - D. Somatic and genetic effects on plant personnel including inadvertent ingestion of radioactive materials.

Controverted Contentions

Cost-Benefit

2. Whether the NEPA cost-benefit analysis improperly assesses the benefits to the plant by improper assumptions on:
 - A. Nuclear fuel shortages.
 - B. ECCS deficiencies causing added expenditures.

Low-Level Radiation

4. Whether the FES and amendment inadequately consider as environmental costs the doses and effects of low-level radiation as to:
 - A. Buildup of concentration of radioisotopes in the food chain.
 - B. Number of nuclear reactors planned for the State.

9. On September 1, 1976, the Board issued an order providing that evidence would be received at the environmental hearing on the following contentions: 1.A. through 1.J.; 2.A.; 3.; 4.A., 4.C., 4.D. Contention 4.B. was also accepted modified to refer to the number of reactors under construction or currently in operation in California. In connection with contention 3 the Board stated it would also hear evidence on titanium raised by Scenic Shoreline Preservation Conference, Inc., in its motion dated June 8, 1975. In an order dated October 4, 1976, the Board accepted the nonseismic aspects of contention 2.B.

10. On September 7, 1976, Intervenor filed a motion to add three new contentions relating to (a) environmental impacts from earthquake-induced accidents, (b) the nuclear fuel cycle, including reprocessing and disposal of nuclear fuel wastes, and (c) energy conservation.

11. Their bases for showing good cause to allow the contentions were (a) the recent retention by Intervenor of counsel and experts, (b) the relevance

of the proposed contentions to NEPA and Part 51 of the Commission's regulations, and (c) certain information was not available to the Intervenor at the time original contentions were drawn. Both the Staff and the Applicant opposed the addition of new contentions. In an order dated October 12, 1976, this Board denied Intervenor's motion to add new contentions, concluding that the recent entry of counsel and experts does not establish good cause for adding contentions which readily could have been submitted at an earlier date.⁴

12. On September 7, 1976, Staff filed a motion for summary disposition with respect to substantially all of the contentions admitted by the Board.⁵ Applicant on September 7, 1976, also moved for summary disposition with respect to contentions 1.A. through J. Intervenor opposed both motions. By order dated November 5, 1976, the Board denied both the motion of Staff and the motion of Applicant except insofar as they pertained to contentions 1.A., 1.B., and 4.B. The motions were granted for contentions 1.A., 1.B., and 4.B.

13. On September 15, 1976, Intervenor petitioned for reconsideration of the Board's order of September 1, 1976, which admitted certain contentions into controversy. Both the Staff and Applicant opposed the petition. By order dated October 4, 1976, the Board granted Intervenor's petition to the extent that the nonseismic aspects of contention 2.B. would be considered at the environmental hearing.⁶

D. Evidentiary Hearing

14. The evidentiary hearing was held December 7-10, and 13-17, 1976, in San Luis Obispo. A local public interest radio station broadcasted the entire proceeding. In order to accommodate those persons who became interested in making a limited appearance because of the broadcast, the Board accepted limited appearance statements at the beginning of each morning and

⁴The Board noted in its order that the seismic issues raised by one of Intervenor's new contentions would be addressed in the health and safety hearings on admitted health and safety contentions. The Board further noted the contention pertaining to nuclear fuel cycle will enter this proceeding as a result of recent court decisions and the Commission's generic treatment of the nuclear fuel cycle.

⁵Staff did not move to dispose of contentions 1.H. and I., 3.B., and 4.D.

⁶On November 17, 1976, Intervenor also moved for reconsideration of their motion to add new contentions. At the environmental hearing the Board denied the motion in part (Tr. 1609-11). It did admit the following contention to be considered at the safety hearing: Whether the Final Environmental Statement adequately assesses all adverse environmental impacts that could occur from possible earthquake-caused accidents, including, but not limited to, Class 9 accidents, given the high potential seismicity of the Diablo Canyon site and the current design and construction of the Diablo Canyon Nuclear Plant.

afternoon session throughout the proceeding. There were a total of 105 limited appearance statements. Responses by PG&E, Intervenor, and Staff are on transcript pages 1541 to 1549.

The following numbered exhibits were either accepted, rejected, not proffered, or officially noticed.

PG&E Exhibits

| | | |
|---|--|--|
| 1 | Environmental Report and eight supplements | Accepted (Tr. 1615) |
| 2 | 2-page working paper prepared by Dr. Finston | Not Proffered (Identified Tr. 2668) |
| 3 | Four documents re Federal Water Pollution Control Act Permit | Accepted (Tr. 2874) |
| 4 | Letter re Order 76-11, NPDES permit | Accepted (Tr. 2875) |

Intervenor's Exhibits

| | | |
|----|---|----------------------------|
| 1 | Article in <i>Scientific America</i> by John Clark, March 1969 | Not Proffered (Tr. 1681) |
| 2 | "Survival of Copepods Passing Through a Nuclear Power Station on Northeastern Long Island Sound, USA" by Carpenter, <i>et al.</i> , pp. 49-55, <i>Marine Biology</i> , Vol. 24, No. 1, 1974 | Accepted (Tr. 1699) |
| 3 | Nuclear News, July 1975, pp. 52-57 | Rejected (Tr. 1862) |
| 4 | Nuclear News, May 1975, pp. 35-37 | Rejected (Tr. 1862) |
| 5 | Nuclear News, July 1975, p. 49 | Rejected (Tr. 1862) |
| 6 | Nuclear News, September 1975, pp. 54-56 | Rejected (Tr. 1862) |
| 7 | Nuclear News, November 1975, pp. 52-54 | Rejected (Tr. 1862) |
| 8 | Nuclear News, January 1976, p. 54 | Rejected (Tr. 1862) |
| 9 | Nuclear News, March 1976, pp. 57-58 | Rejected (Tr. 1862) |
| 10 | WASH-1139(74), pp. 23-35 | Official Notice (Tr. 1884) |
| 11 | Barilotti Letter of 12/9/76 | Withdrawn (Tr. 2212) |

New

- | | | |
|----------|--|---------------------|
| 11 (new) | "Power Plant Performance" by Komanof | Accepted (Tr. 2293) |
| 12 | Pp. 231, 242, 243, J. Martin Brown/ <i>Journal of Health Physics</i> | Accepted (Tr. 2566) |
| 13 | Pp. 60, 61, Vol. 262, <i>Nature</i> , July 1, 1976 | Accepted (Tr. 2566) |

Staff's Exhibits

- | | | |
|---|--|--------------------------|
| 1 | FES | Accepted (Tr. 2725) |
| 2 | FES Addendum | Accepted (Tr. 2725) |
| 3 | California Fish and Game Letter re NRC FES Addendum | Not Proffered (Tr. 2956) |
| 4 | NRC Response December 14, 1976, to Staff Exhibit 3 | Not Proffered (Tr. 2956) |
| 5 | Fliegal Map | Accepted (Tr. 2965) |
| 6 | Fliegal Schematic of Diablo Canyon Plume | Accepted (Tr. 2965) |
| 7 | Power Plant Entrainment Study | Accepted (Tr. 2975) |
| 8 | Samworth Rebuttal Testimony to Affidavit of Dr. Leslie Grimm | Accepted (Tr. 3014) |

II. CONSIDERATIONS BY THE BOARD

A. Issues

1. Compliance With the Federal Water Pollution Control Act Amendments of 1972

15. On October 19, 1971, the California Regional Water Quality Control Board-Central Coast Region (CWCBC) issued to the Applicant a certification pursuant to §21(b) of the Federal Water Pollution Control Act, as amended.⁷ With the passage of the Federal Water Pollution Control Act Amendments of 1972 (FWPCA),⁸ the Applicant made application for a §401 certificate (to be issued by CWCBC) and a National Pollutant Discharge Elimination System (NPDES) permit pursuant to the provisions of the FWPCA. Under Section 402(b), the State of California applied for and re-

⁷P.L. 91-224, April 3, 1970.

⁸P.L. 92-500 (33 U.S.C. §1371).

ceived authority to issue NPDES permits. Subsequent to numerous discussions between the Applicant and CWCB and the issuance of various provisional NPDES permits, CWCB issued a §401 certificate on February 15, 1975, and an NPDES permit on April 9, 1976 (Applicant Exs. 3 and 4). The §401 certificate requires that any discharge from the construction or operation of the facility must comply with the applicable provisions of §§301, 302, 306, and 307 of the FWPCA and not violate the applicable water quality standards of the State of California as approved by the Environmental Protection Agency. The Board finds that this certification satisfies the requirements of the FWPCA.

16. The Board notes, however, that the conditions contained in the NPDES permit include restrictions on radioactive discharges which are outside the jurisdiction of the State of California to impose (Applicant Ex. 4, Appendix A, General Conditions G-2 and G-24). Jurisdiction over the discharge of radioactive effluents composed of source, special nuclear, or byproduct material is preempted by the Nuclear Regulatory Commission, and therefore any attempt by the State of California to impose conditions on radioactive releases is without force and must be disregarded by this Board (see *Northern States Power Company v. Minnesota*, 447 F.2d 1143 (8th Cir. 1971), *aff'd.*, 405 U.S. 1035 (1972)).⁹ This Board, accordingly, finds that any operating licenses issued for Diablo Canyon Nuclear Power Station shall be conditioned as follows:

Any discharge resulting from the construction of this facility will comply with the conditions contained in the National Pollutant Discharge Elimination System permit issued for the facility as presently approved or as later modified or renewed, except for those conditions relating to the discharge of the radiological effluents. Those conditions shall be modified to regulate only radioactive effluents other than byproduct material, source material, and special nuclear material as they are defined in 10 CFR Parts 30, 40, and 70.

17. In the event of any modification of the NPDES permit while the operating licenses are extant, the Licensee shall analyze any associated changes in or to the facility, its components, its operation or in the anticipated discharge of effluents therefrom, and if such change would warrant any modification of these operating licenses, or present an unreviewed safety question or involve an adverse environmental impact significantly greater than analyzed in the Final Environmental Statement as sup-

⁹The U.S. Supreme Court recently affirmed the exclusive jurisdiction of the NRC over source, special nuclear, and byproduct material (*Train, Administrator, Environmental Protection Agency, et al. v. Colorado Public Interest Research Group, Inc., et al.*, 426 U.S. 1, 48 L. Ed. 2d 434 (1976)).

plemented, the Licensee shall file with the NRC, as applicable, an appropriate analysis of any such change of facility safety, and/or an analysis of any such change of the environmental impacts and of the overall cost-benefit balance for facility operation set forth in the Final Environmental Statement as modified and supplemented by this Decision.

2. Environmental Impact Statement

18. As required by 10 CFR Part 51, the Applicant submitted with its application an Environmental Report (ER) dated July 1971. The ER, as amended, was received into evidence as Applicant's Exhibit No. 1. Based on the environmental information submitted by the Applicant in the ER, as supplemented, and on its independent analysis and review, the Staff prepared a Draft Environmental Statement (DES) which was issued December 12, 1972. By a notice of availability published December 12, 1972, the public was invited to comment on the DES (37 Fed. Reg. 26459). Copies of the DES were also provided to appropriate Federal, State, and local agencies for their comment. In June 1973, the Staff published its Final Environmental Statement (FES) which included, among other things, the full text of all comments received with respect to the DES (Appendix 14-1) as well as the Staff's responses to these comments. By a notice of availability published May 30, 1973, the Final Environmental Statement was also made available to various agencies and to the public (38 Fed. Reg. 14183). The Final Environmental Statement was received into evidence as Staff Exhibit No. 1. In May 1976, Staff prepared an addendum to the FES. By notice of availability published June 7, 1976, the addendum was made available to various agencies and to the public (41 Fed. Reg. 22895). The addendum was received into evidence as Staff Exhibit No. 2.

19. The Staff concluded, on the basis of its analysis and evaluation set forth in the FES and addendum, that after weighing the environmental, economic, technical, and other benefits of the facilities against their environmental and other costs, that the action called for under the National Environmental Policy Act of 1969 and 10 CFR Part 51 is the issuance of operating licenses. Intervenor took issue with certain conclusions reached by Staff in arriving at this position. This Board, in performing its analysis of the environmental impacts of the Diablo Canyon facilities, must consider the contentions raised by Intervenor and the evidence submitted in support and in opposition to them.

3. Contested Issues

20. In order to better understand the contentions and the positions of the parties, a brief description of the method of cooling and the relevant en-

vironment around the Diablo Canyon facilities is necessary. Each unit at Diablo Canyon must dissipate 2,409 MW of the 3,568 MW of heat being produced. To do this, each unit will utilize once-through cooling, transferring the waste heat into the water of the Pacific Ocean. The cooling water will be discharged into Diablo Cove. Diablo Cove is approximately 30 acres in area and opens to the Pacific Ocean (Staff Ex. 1 at 3-5).

21. The condensers for the facilities will take water from an intake structure on the shore just south of Diablo Cove in an area which has been designated as South Cove. Breakwaters were constructed to protect the intake structure from ocean waves and also to minimize the possibility of recirculation of cooling water to the condenser from the discharge structure (Staff Ex. 1 at 3-7).

22. Each unit will have two cooling water pumps with a capacity of 433, 500 gal/min at low tide. Inside the opening of the intake structure are three principal water entrances, each covered by a traveling screen equipped with 3/8-inch openings. Water velocity at the intake structure is restricted to 1.10 ft/s in front of the traveling screens.

23. With the physical description of Diablo Cove in mind, we now turn to a discussion of the contentions and the evidence presented at the hearing.

1. Whether Information Developed Subsequent to the Commission Hearing in September 1973 Demonstrates That the Staff's FES Adequately Considers the Extent or Effect of the Facilities' Thermal Plume on the Environment, as to:

1.C. Turbidity

24. Intervenors contended that the NRC Staff had inadequately considered quantitative data on turbidity in the Diablo Cove. They apparently maintain that the discharge of cooling water into Diablo Cove will increase to an unacceptable level the turbidity already in the cove, thus having an unacceptable effect upon biota in that area.

25. NRC Staff testimony showed that turbidity is an optical property of water which is caused by the presence of suspended matter such as clay, silt, finely divided organic matter, plankton, and other microscopic organisms (Samworth testimony at 2 following Tr. 2978).

26. Various sources of suspended matter were considered by the Staff in its analysis of whether turbidity would be a problem at Diablo Canyon once the cooling water pumps were fully operational. Prior to the construction of the station, Diablo Cove was essentially free of silt because of ocean turbulence and the naturally flushing geological structure. The Staff's expert felt that the natural flushing of the cove would not be diminished by con-

struction of the plant but rather would be increased by it (Samworth at 4 following Tr. 2978).

27. Silt accumulated in the intake cove during construction of the intake structure had previously been a source of suspended solids in Diablo Cove and thus could have been a source of turbidity. However, after removal of the temporary cofferdam needed to build that structure and after completion of initial cleanup, it was expected that no more turbidity would be present from that source (Samworth at 5 following Tr. 2978).

28. The Applicant has measured suspended solids concentration monthly from July 1974 through June 1975 (ER Supp. 6, p. 4; Wells, Figures 2, 3). Data prior to November 1974 illustrate variability of suspended solids at each of the stations with the circulating water pumps operating. Data collected after November 1974 show conditions at the same stations with the pumps off. The variation in suspended solids concentration at each station exceeds variation among the stations and exceeds variation at any station with pumps on or off. From these data, Staff and Applicant concluded that suspended solids concentration, and operation of the Diablo Canyon Plant would, therefore, have no adverse environmental effect on the station operation (Samworth at 4 following Tr. 2978; Samworth at 2-4 following Tr. 3014; Staff Ex. 8; Wells at 4, 5 following Tr. 1644; Tr. 2980, 2981, 3009-3013). The Board finds this conclusion to be reasonable and in accord with the weight of the evidence in the record.

1.D. Sublethal Thermal Effects

29. Intervenors contend that the FES and addendum have inadequately assessed the impact of sublethal thermal effects on marine biota.

30. Both the Applicant (ER supplements) and the NRC Staff (FES addendum) presented evidence concerning both lethal and sublethal thermal effects on abalone and bull kelp which are the most plentiful and important (as defined by Regulatory Guide 4.2) species in Diablo Cove. Applicant also presented evidence concerning sublethal thermal effects on some plankton.

31. No direct evidence was offered concerning the temperature tolerance of fish or fish larvae in Diablo Cove. The Staff concluded that adult fish should not be adversely affected by the thermal plume as they can avoid it when the plume temperature exceeds their "preferred" temperature (Cain at 6 following Tr. 2973). Some species of fish may be denied access to the cove because of higher than preferred temperatures. The Board finds that this is an unavoidable adverse impact which will affect up to 20 acres of Diablo Cove.

32. The Staff reviewed data concerning the effects of temperature on the mortality of red abalone and concluded that abalone can be acclimated to

temperatures up to 72°F and that they should be able to survive exposure to constant temperatures up to 70°F. Unfavorable thermal conditions might be experienced from 1 to 3 weeks per year when ambient temperatures are highest in the cove. Even then there should be no adverse thermal effects on abalone outside the 10°F Delta T isotherm on the bottom of the cove because maximum temperatures occur in the cove only a few hours each day, and abalone can withstand maximum temperatures in excess of 72°F for short periods of time (Cain at 7 following Tr. 2973).

33. Although little data is available on the sublethal effects of the thermal plume on bull kelp, kelp canopies and tissue begin to decline when ambient water temperatures exceed 58-62°F. Even though kelp canopies had increased considerably in recent years, the Staff estimated that 10-20 acres of Diablo Cove would be unproductive for bull kelp due to increased water temperatures occasioned by plant operation. Those losses were not thought to be severe, however, since sufficient quantities of kelp are available in the northern part of the cove or in nearby coves to support the existing abalone population (Cain at 9 following Tr. 2973).

34. Evidence presented by the Intervenors was not radically at odds with that of the Staff (Barilotti at 2 following Tr. 2224). Dr. Barilotti suggested that aerial surveys of nearby kelp canopies would be an excellent control upon which to base ecological studies designed to measure changes in kelp coverage in Diablo Cove after plant operation. Such aerial surveys have been and will be routinely performed by the Applicant (Barilotti at 6 following Tr. 2224).

35. The California Department of Fish and Game noted aberrant embryo development and feeble ciliary movement as sublethal thermal effects on larval abalone. According to Applicant's cross-condenser mortality tests, the principal sublethal effect on zooplankton was impairment of swimming ability.

36. While the evidence on lethal and sublethal thermal effects on the biota of Diablo Cove is not taxonomically comprehensive, it does appear to be adequate for present purposes. The Board finds the weight of this evidence to point to the loss of 10-20 acres of the cove from kelp productivity. This is an adverse but not unacceptable environmental impact. In order to further quantify the losses predicted here, the Board will require post operational monitoring by the Applicant of the kelp and abalone populations in the cove.

1.E. Recirculation

37. Intervenors contended that the Staff and Applicant have inadequately assessed the possibility of shoreward wind and currents causing re-

circulation of cooling water, thus increasing the thermal effects on biota in the area of the plant discharge. However, the only evidence presented on the subject of recirculation was by the NRC Staff and the Applicant.

38. Physical model tests conducted by the Applicant showed no recirculation for any of the conditions tested. These conditions included no current, upcoast and downcoast currents situations. Expert opinion showed that prevailing coastal currents at the site do not cause recirculation since they are parallel to the coast and not perpendicular. While shoreward winds might generate waves traveling toward the coast, waves primarily transport energy rather than mass. When waves reach the shoreline, they create alongshore currents. Waves and the resulting alongshore currents were included in the physical model testing and showed no recirculation (Fliegel and Hulman at 6 following Tr. 2965).

39. Other facts which argued against recirculation were the fact that waves create turbulence, which results in a mixing of plume and ambient waters, thus reducing plume temperatures, and the fact that physical model testing showed that the plume will be carried well out of the discharge cove so that even with a downcoast current the plume will be mostly away from the shore near the intake cove and structure. In addition, since the thermal plume is a surface phenomenon and the Diablo Canyon intake structure draws water from below the surface, the possibility of recirculation is further reduced (Wells at 6 following Tr. 1644; Fliegel and Hulman at 6 following Tr. 2965).

40. Based on the uncontested evidence at the hearing, the Board finds that recirculation is not likely to occur at Diablo Canyon once operation is begun.

1.F. Impingement and Entrainment

Impingement

41. Operation of the once-through cooling system has the potential for the impingement of fish from the intake cove on the intake or traveling screens. Applicant has submitted preliminary impingement data collected during pump testing of Unit 1 (ER Supp. 8). The impingement rate for a 47-day period (December 3, 1975, to February 27, 1976) was 1.51 fish per day averaging 4 ounces. A total of 71 fish representing 30 species were recorded (Adams at 8 following Tr. 1673). During the period from December 10, to December 19, 1975, the Unit 1 pump was operated with a full water flow of 3,283 m³/min for 15 minutes every 2 hours. A total of 53 fish representing 23 species was collected, giving an average of 2.3 fish per day picked up on the traveling screens (Cain at 13, 14 following Tr. 2973).

The Intervenor presented no evidence on impingement but note in their proposed findings (doc. dated April 6, 1977) that the studies cited above were done during winter months, and they allege that "seasonal variations in fish counts show winter to be the season having the smallest fish population."

42. While the evidence presented was admittedly preliminary and inconclusive, it provides at least an indication of what might be expected during full power operation of Diablo Units 1 and 2. The Board finds no basis in the evidence presented for concluding that impingement during operation of the Diablo Canyon Nuclear Power Plant would kill or injure significant numbers of fish. The Applicant, however, will be required to monitor impingement routinely during the first years of operation to provide data on the actual numbers, species, and weight of fish impinged on the traveling screens.

Entrainment

43. Organisms too small to be impinged on the traveling screens may pass through the 3/8-inch openings in the screen and be carried through the cooling water system of pumps, pipes, condenser, and discharge structure. Plankton, larvae, and early life stages of fish or shellfish thus entrained with the circulating cooling water are exposed to sudden pressure and temperature changes and to various potentially injurious mechanical effects. The principal area of testimony concerned the plankton mortality rate due to entrainment, *i.e.*, the percentage of entrained plankton killed by mechanical damage or other causes.

44. Testimony presented by the Intervenor referenced a work by Dr. E. J. Carpenter which pointed out that tests conducted at the Millstone reactor located on Long Island Sound showed that entrainment losses of certain zooplankton, *i.e.*, copepods, was 70% and could approach 100% (Enright testimony at 3 following Tr. 2039; Intervenor's Exhibit 2; Tr. 2058). Intervenor maintained that this study cast doubt upon the entrainment studies done by the Applicant's consultant and thus were indicative of greater environmental damage than had heretofore been predicted.

45. Cross-examination revealed certain shortcomings in the Carpenter study. For one thing, there are errors in the published version of the study (Tr. 2054, 2062). For another, the 7-page article was too short to describe in detail many of the methods used in the test (Tr. 2050, 2060-61, 2064, 2078), and therefore, the test could not and has not been replicated or statistically verified by other scientists (Tr. 2067).

46. The NRC Staff reviewed tests on the thermal tolerance of various animal embryos and veliger larvae of abalone by the California Department

of Fish and Game. Those tests simulated entrainment and found no mortality or significant delayed mortality when the test organisms were exposed to the elevated temperatures which might be expected at the plant (Cain at 11 following Tr. 2973). Applicant's tests on veliger larvae of red abalone also showed insignificant mortality when exposed to temperatures close to the maximum ambient temperatures which might be expected at Diablo (Cain at 11 following Tr. 2973; Adams at 7 following Tr. 1673). In addition, neither the Applicant nor any other investigator has found delayed mortality in zooplankton, including copepods, due to entrainment.

47. Other tests by the Applicant at its Morro Bay Plant showed insignificant delayed mortality of entrained copepods 5 days after passing through the plant's condensers (Adams at 7, 8 following Tr. 1673; Cain at 12 following Tr. 2973; Staff Ex. 2 at 2-19). Based on the studies reviewed, Staff concluded that abalone embryos and larvae as well as some other plankton should survive entrainment and passage through the plant cooling water condensers (Cain at 11 following Tr. 2973).

48. As there are no data available on entrainment mortality of fish eggs or larvae, Staff has assumed that all entrained fish eggs and larvae would be killed and admitted that the significance of such losses is difficult to estimate as little is known about the population dynamics of the species that might be affected (Cain at 13 following Tr. 2973). Applicant's 15-month survey of larvae fish and fish eggs indicates, as stated in the FES addendum, that the average density of fish eggs and larvae ($0.359/\text{m}^3$) is about one-third the density value ($1.11/\text{m}^3$) used to estimate potential impact in the original FES (Adams at 8, 9 following Tr. 1673; Staff Ex. 2, p. 5-5).

49. Other testimony presented by the NRC Staff showed that controversy exists in the area of the effects of entrainment on zooplankton and casts further doubt upon the Carpenter study. A 2-year Federal study of the Crystal River Power Station, Units 1 and 2, in Florida showed no significant latent mortality of zooplankton 5-7 days after passing through the power plant. The Crystal River study was of a longer duration than the Carpenter study, and it was replicated, statistically analyzed, and involved juveniles as well as adult zooplankton species (Staff Ex. 7). Moreover, the Staff pointed out, that even though the Carpenter study predicted 70-100% mortality of copepods, his paper also reports that only about 0.1 to 0.3% of the zooplankton production of eastern Long Island Sound was lost due to power plant operation (Cain rebuttal at 2 following Tr. 2973).

50. The Board recognizes the difficulties and uncertainties involved in attempting to quantify the mortality rates for entrained organisms. It appears reasonable to expect mortality rates of 25% to 50% for entrained zooplankton although the possibility of higher mortality rates cannot be ruled out. The total numbers of zooplankton that could be entrained,

however, represent no more than 2% of the available population (Cain rebuttal at 4 following Tr. 2973), and losses expected, even at 100% mortality, could be replaced by open ocean recruitment. Considering this evidence the Board finds no reason to expect serious ecological impacts as a result of entrainment losses of zooplankton at the Diablo site.

1.G. Species Losses and Breeding Areas

51. Intervenors contend that the FES and its addendum are inadequate in that they fail to assess the loss of species and of significant breeding areas in Diablo Cove due to distortion of normal ocean currents by the discharge of cooling water into the cove. This general subject area is considered in the FES addendum 2.7.2 and 5.3.2.

52. Intervenors maintained that the normal distribution of plankton would be disrupted due to increased water currents, thus causing significant impacts on nearshore and intertidal biota (Enright following Tr. 2039; Barilotti following Tr. 2224). Staff testimony showed that water in the areas around the discharge from Diablo Canyon would be characterized by high velocities and high temperatures (Cain at 15 following Tr. 2973), and estimated that some 20 acres of Diablo Cove would be lost to fish. The Staff predicted that while cold water fish would avoid these hot discharge areas, ambient temperatures could result in changes of benthic species as cold water fish are replaced by warm water fish (Cain at 16 following Tr. 2973). The Staff also concluded that the loss of as much as 10-20 acres of bull kelp in Diablo Cove would not adversely affect the regional marine life that is dependent upon kelp.

53. Due primarily to factors other than plant construction, the population of abalone and sea urchins in Diablo Cove has already been reduced to a small fraction of their total abundance (Adams at 10-13 following Tr. 1673; Staff Ex. 2, pp. 2-2, 2-10). Evidence was presented to the effect that the species found in Diablo Cove would not be prevented from breeding in similar areas nearby and that Diablo Cove is only a small part of the available coastal breeding area (Cain at 15-17 following Tr. 2973).

54. In regard to description of currents which recruit new zooplankton and larvae from ocean areas, a Staff analysis of the 8-year San Onofre study, which concerns a worse case than Diablo Cove since the coastal shelf there is much nearer the surface, showed that there were actually increases in zooplankton in the area near the discharge (Cain rebuttal at 7 following Tr. 2973). The thermal plume, which is expected to cover only the top 10 feet of the current, will move in the direction of the prevailing current, allowing the coastal current to continue to resupply the area with

zooplankton as it flows underneath and through the plume (Cain rebuttal at 7 following Tr. 2973; Staff Ex. 5).

55. Based on the evidence presented the Board finds that the FES and its addendum do provide an adequate consideration of the probable biotic effects of nearshore current disruption due to cooling water discharge. The evidence before us indicates that the serious effects of near-shore current alteration due to cooling water discharge on the distribution and breeding success of species populations would most likely be confined to Diablo Cove, a relatively small part of the near-shore marine environment.

1.H. Size of the 4-Degree Isotherm

56. The Intervenors contend that the NRC Staff had inadequately assessed the size of the 4-degree isotherm which would be created by the cooling water discharge plume from the Diablo Canyon plant. Evidence on this matter was presented by only the NRC Staff and the Applicant.

57. The physical model results included predicted thermal plumes obtained under a variety of heat load, ocean current, tidal, and cooling water system flow conditions. The model results, the ER supplements, and the FES addendum all agree that when Units 1 and 2 are operating at full load the 2°C (3.6°F) isotherm may cover all of Diablo Cove under most oceanographic conditions and as much as a mile to sea, enclosing up to 400-500 acres. A number of naturally occurring factors including air/water interactions, ocean turbulence, and vertical upwellings mixings are not susceptible to physical modeling. However, these factors will serve to reduce the area enclosed by a particular prototype isotherm below the levels predicted by the models. In any event, the environmental effects of the 2°C isotherm are minimal, and thus more exact estimates of its size are not warranted (Fliegel and Hulman at 7, 8 following Tr. 2965; Wells at 6, 7 following Tr. 1644; Staff Ex. 2, p. 2-10).

1.I. Plume Monitoring

58. The Intervenors contended that the Staff had failed to propose adequate procedures to ensure that the cooling water plume will not exceed predicted values.

59. Based on model tests at 19°F and 22°F Delta T's across the condenser, no differences in isotherm patterns were produced. Therefore, the Staff was able to conclude that the surface plumes produced by operation of the plant at 22°F Delta T would create no differences in plume characteristics than those at 19°F Delta T, provided there was no increase in plant heat output (Fliegel and Hulman at 10-11 following Tr. 2965; Wells at

6-8 following Tr. 1644). Based on these calculations and tests, the Board sees little possibility of a large variance between predicted and actual plume sizes.

60. The Applicant is actively engaged in monitoring and study work in connection with an FWPCA §316(a) water quality standard exemption request from EPA and the State of California (Tr. 1650, 1662). The 316(a) demonstration by the Applicant will have to show that current water quality standards (including those on heat) are "more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is made." The Board considers this program to be an adequate measure to insure that the ocean environment is not despoiled by isotherm values which are much larger than those assessed at this hearing. Accordingly, the Board hereby requires that copies of the Applicant's 316(a) demonstration reports be sent to the NRC and requires that the Applicant report to the NRC if plume sizes exceed predicted values when plant operation is commenced.

1.J. Bull Kelp

61. Intervenors contend that information developed subsequent to 1973 demonstrates that the Staff has not adequately considered the effects of chlorine, heat, and foam on the growth and biomass of bull kelp and on the abalone which feed on the kelp. They claim that chlorine levels caused by defouling procedures, and the synergistic effects of heat, foam, and chlorine, will have a significant detrimental impact on bull kelp in Diablo Cove.

a. Chlorine

62. Testimony presented by the Staff showed that the National Pollution Discharge Elimination System permit issued by the State of California prohibits the discharge of chlorine at a concentration in excess of the following.

| | |
|----------------------------|---------------|
| Total available chlorine | 0.1 mg/l |
| Free available chlorine | 0.02 mg/l |
| Total chlorine use per day | 110.0 lb/unit |

63. Continuous exposure for 5 days to a concentration of 1.0 ppm chlorine had no effect on giant kelp (Staff Ex. 1, p. 5-15), the response of bull kelp should be similar. Each pump system will be treated for only 10 minutes per day rather than continuously as in the experiment. The chlorine

discharge limit specified above is one-tenth the experimental level cited above and the discharge steam is, of course, diluted by mixing with seawater in the cove (Adams at 14 following Tr. 1673; Samworth at 5, 6 following Tr. 2978; Tr. 2981, 3008).

64. The Staff reviewed, and found acceptable, tests performed by the Applicant on transparent shrimp, abalone, turban snails, black abalone, and purple sea urchins at chlorine concentration levels at least five times the Diablo Canyon permitted level. In the case of abalone, tests were conducted by the Applicant in its biology laboratory at chlorine levels 100 times that permitted by the NPDES (Adams at 17 following Tr. 1673). The tested abalone were able to survive a continuous 30-day exposure to free residual chlorine at a level of .5 mg/l. In addition the discharge plume is expected to be primarily a surface phenomenon impinging the bottom of the cove at full concentration only near the discharge structure.

65. Applicant's review of the data available on sublethal thermal effects indicates that as much as a 10-20-acre area of Diablo Cove will be unproductive for bull kelp, and that kelp in the rest of the cove may be less productive than in areas outside the cove. However, the loss of 10-20 acres of bull kelp probably would not be significant to the regional kelp population or to the populations of organisms dependent on kelp for habitat, as kelp will be available in northern Diablo Cove and in nearby coves in quantities sufficient to support present abalone populations (Cain at 9 following Tr. 2973; Adams at 5, 6 following Tr. 1673; Cain at 6-10, 18 following Tr. 2973). Based on the unrebutted testimony of Staff and Applicant, the Board foresees no significant undesirable impact of chlorine discharge on kelp or abalone.

b. Foam

66. Intervenor contended that the Staff has inadequately considered the effect of foam emitted from Diablo Canyon discharge structures on the growth and concentration of bull kelp and the effect on abalone which feed on the kelp. They contend that the FES has failed to examine the degree of reduction of light penetration due to foam and the effect foam will have on the cove's environment.

67. Foam is present in the cove not only because of the plant but because it occurs naturally by wave action. The NRC Staff has acknowledged that there could be an adverse effect on Diablo Cove caused by foam from the cooling water discharge plume. Because of technological limitations regarding the assessment of this novel problem, the cause and biological effect are not well understood, and a method for control of foam is not now available (Samworth at 7, 8 following Tr. 2978). Information reviewed by the Staff

indicated that the foam is not toxic, but it could affect the environment of the cove by reducing light to marine biota. When the plant is operating, foam is expected to cover no more than 50% of Diablo Cove (Samworth at 9, 10 following Tr. 2978).

68. As part of the NPDES monitoring program aerial photographs have been taken of the kelp beds. These photographs, verified by on-ground inspection, reveal a normal pattern of bull kelp growth in Diablo Cove for the years 1974-1976, including the area of Diablo Cove affected by the foam from the discharge. The kelp canopy has increased in each of the years in question, and this supports the conclusion that the foam has not affected the growth and development of the kelp beds. PG&E has developed and is following a plan for the study of foam, including the study of mitigative measures. This study is to be completed near the end of 1978 (Adams at 14-16 following Tr. 1673; Samworth at 8-10 following Tr. 2978; Tr. 3006; Staff Ex. 2, pp. 5-1, 5-2).

69. The effects of concentrated sea foam on black abalone and sea urchins have also been studied at PG&E's laboratory. These animals were able to live in a 100% solution of foam concentrate for the duration of the 96-hour static bioassay (Adams at 17 following Tr. 1673).

70. The Board finds that while the effects of plant-created foam might be undesirable and that up to 50% of the Cove might be impacted by natural and man-created foam when the plant operates, there is no evidence that the overall effect on biota is likely to constitute a significant environmental impact. Because of the state of the art concerning the effect of foam on biota, the Board will require the Applicant to continue its studies as a condition of its operating license and to continue its efforts to work with the State of California to determine, first, whether the presence of foam has an adverse biotic effect, and second, to find a means for mitigation if adverse effects are demonstrated.

c. Heat

71. Intervenor's contend that the NRC Staff has inadequately considered the effect heat would have upon bull kelp and the abalone which feed upon it.

72. Evidence presented by the Applicant showed that while large amounts of kelp were currently present in the cove probably none would grow in the 10 to 20-acre area most affected by the cooling water discharge (Adams at 13-14, following Tr. 1673). Sporophyte generation occurs in northern and central California waters during March and April, and thus coincides with the time of upwelling of the lowest ambient temperatures in the water of the cove (45-49°F). Maturation takes place during the fall when

the highest ambient temperatures (63°F) are experienced. Since bleaching and degeneration can take place when temperatures are in excess of 64°F, bull kelp could survive in areas where the plume did not reach (*i.e.*, the bottom and northern parts of the cove) for most of the year. In addition, detached sori from mature plants might be introduced to the cove to compensate for kelp depletion due to thermal effects (Adams at 11-13 following Tr. 1673).

73. Data concerning the thermal tolerance of giant kelp, *Macrocystis pyrifera*, show a decline in the plant at temperatures in excess of 68°F. Based on the 68°F data and the ambient temperatures in the cove together with the results of the thermal model testing, the Staff concluded that with a downcoast current, which typically occurs during the summer, the northern part of the cove is expected to experience little temperature rise and therefore little loss of kelp would occur there. During upcoast current conditions, which generally occur during the months of December, January, and February after the kelp has died, part of the northern portion of the cove would be affected. Since the thermal plume is a surface phenomenon, the bottom of the cove was expected to be less affected by the higher temperatures. The Staff estimated that about 15 acres of the cove would be affected by temperatures in excess of 68°F for 2 months of the year (September and October). Based on this analysis, it was the Staff's opinion that several acres of kelp in the northern part of the cove would probably survive plant operation (FES addendum, Staff Ex. 2 at 5-3, 4).

74. Evidence presented by the Intervenors on the effects of heat on bull kelp was a little more pessimistic than that of the Applicant and Staff. Based on information available to them, Intervenors maintained that bull kelp (*Nereocystis luetkeana*) might be exterminated from Diablo Cove due to operation of the plant since that species is at the southern end of its geographical range and may have a lower maximum temperature tolerance than giant kelp (Barilotti at 6 following Tr. 2224).

75. The Board finds that the loss of kelp and its associated animal populations, abalone in particular, from Diablo Cove, even to the extent that it has already occurred, is an adverse environmental impact. Further losses due to plant operation would be similarly adverse, but not so great to tip the cost-benefit analysis. This conclusion is further supported by the high probability that sea otter predation has played an important role in the virtual elimination of abalone from Diablo Cove (Adams at 10 following Tr. 1673), and the fact that Applicant has committed to spend \$375,000 in reparation for their part in the decimation of the Diablo Cove abalone population (see 3.A., Copper Discharge) by establishing abalone beds elsewhere off the California coast (Tr. 1710).

2. Whether the NEPA Cost-Benefit Analysis Improperly Assesses the Benefits to the Plant by Improper Assumptions On:

2.A. Nuclear Fuel Shortages

76. Analysis of uranium resources and their availability has been carried out by the government since the late 1960's. For many years this work was done by the AEC; in 1975 this activity was made part of ERDA (Patterson at 1 following Tr. 3068).

77. Almost the entire supply of uranium resources known to exist in the United States as proven reserves is located in the western sandstone deposits, primarily in the States of Wyoming, Colorado, New Mexico, Utah, and Texas. In addition, the vast majority of the estimated but as yet undiscovered uranium resources are also located in the western sandstone deposits (Tr. 3109-10).

78. Uranium ore occurring in western sandstone deposits is of relatively high grade. Most of it is above .1% U_3O_8 by weight while very little is below .05% U_3O_8 by weight (Lieberman at 5 following Tr. 2203; Patterson at Fig. 7 following Tr. 3068). Although other types of high and middle-grade ore (above .03% U_3O_8) are known to exist in other parts of the world, virtually no discoveries of these high and middle-grade nonwestern sandstone ores have been found in the United States (Tr. 3108; Lieberman at 4 following Tr. 2203).

79. Two types of low-grade uranium resource, phosphate and Chattanooga shale, are known to exist in the United States (Patterson at Fig. 7 following Tr. 3068). However, phosphate can contribute only marginally to U.S. uranium fuel supply while shale can make no contribution in the foreseeable future. Even optimistic ERDA uranium resource supply estimates predict only 3,250 ST of U_3O_8 each year could be obtained from phosphate, with production of the amount commencing in the early 1980's at the soonest (Lieberman at 23 following Tr. 2203). As for Chattanooga shale, experts believe that the energy, economic, and environmental costs will prevent Chattanooga shale from being a significant source of uranium reactor fuel (Lieberman at 24-25 following Tr. 2203).

80. Uranium deposits exist in several foreign countries, primarily Australia, Canada, South Africa, and Sweden. However, the United States may not be able to obtain uranium to fuel reactors from any of these nations. First, Sweden's uranium is contained in low-grade deposits and, consequently, Sweden will not be a major uranium exporter (Patterson at 22 following Tr. 3068; Tr. 3098). Furthermore, political factors may prevent Sweden from exporting any uranium at all. Canada will have only limited exporting capacity because that nation commits most of its resources to its

own domestic uranium needs. The political situation in South Africa could deny that country's uranium to the United States market. Government uncertainties regarding uranium export in Australia and political pressures against export in the nation might also restrict U.S. access to Australian uranium. Furthermore, even if an unfettered world market in uranium, one not restricted by cartels or export policies of national governments, does develop, foreign uranium requirements could outstrip foreign uranium supply by the mid-1980's, thereby making foreign uranium availability to the United States uncertain (Lieberman at 26 following Tr. 2203).

81. In view of the above testimony, the Board believes that the prudent course to follow in this determination is to consider only resources in the United States. We note, however, that future availability of foreign ores, while speculative, is certainly possible.

a. U.S. Resource Position

82. Resources designated as ore reserves have the highest assurance regarding their magnitude and economic availability based upon the very conservative methods used in so classifying them. Resources that do not meet the stringent requirements of reserves are classed as potential resources, which in turn are subdivided into three categories: probable, possible, and speculative. Since the geology of the United States as it relates to mineral deposits can never be completely known in detail, it will not be possible to produce a truly complete appraisal of domestic uranium resources. However, so far as the overall appraisal is concerned, it is more likely that the total resources eventually will prove larger than present estimates rather than less (Patterson at 2-4 following Tr. 3068; Witzig at 8 following Tr. 1958).

83. Conversion of presently estimated potential resources into ore reserves will take many years and will cost several billion dollars. The conversion of potential resources to ore reserves and expansion of production facilities can be accomplished when required as markets expand and production is needed (Patterson at 4, 5 following Tr. 3068).

84. Increasing production costs have an impact on resource availability. Higher prices are needed to produce ores of lower quality and those with more difficult mining or milling characteristics. Such reserves, though well delineated, are not available if prices are too low. The domestic uranium industry has, over most of its lifetime, been concerned with discovery and production of uranium at costs in the range of \$8 to \$10 per pound, or less. In view of the economic acceptability of higher cost uranium in reactors, resource estimates by ERDA in recent years have included resources that would be available at \$15 and \$30 "production cutoff costs," which are ar-

bitrary reference costs and not prices. At cost levels above \$30 per pound, there has been little effort at appraisal of resources or in exploration. Therefore, these resources are poorly known at present, although efforts are being made to appraise them. Based upon a preliminary national uranium resource evaluation ERDA estimates resources of 3.7 million tons (U_3O_8 ore in the ground) at a production cost of up to \$30 per ton. Of this amount, 640,000 tons are in the ore reserve category and an estimated additional 140,000 tons is attributed to byproduct material through the year 2000. Probable resources amount to 1,060,000 tons of U_3O_8 (Patterson at 5-8, Fig. 2 following Tr. 3068; Witzig at 8, Table 3 following Tr. 1958). ERDA's estimates are based on detailed studies of actual and possible mining, transportation, and milling costs and techniques according to consistent engineering, geologic, and economic criteria used over the past 20 years. Quantitative estimates are made by considering the extent of the identified favorable areas and by comparing their geologic characteristics with those associated with known ore deposits (the geologic analogy method) (Patterson at 1, 2 following Tr. 3068).

85. To support their position that there will be a shortage of nuclear fuel for the operation of the facilities during the expected life of the facilities, Intervenor offered the testimony of Dr. M. A. Lieberman (Lieberman testimony following Tr. 2203).¹⁰ Using a procedure developed to measure petroleum reserves, the so-called "discovery rate method," Dr. Lieberman estimated uranium reserves to be 150,000 short tons (Lieberman at 33).

86. After review of the entire record relating to uranium resources (Lieberman following Tr. 2203; Patterson following Tr. 3068; Patterson rebuttal following Tr. 3069; Witzig following Tr. 1958), the Board has reservations about the quantitative validity of either method of resource determination. The ERDA method depends to a significant extent upon subjective, albeit expert opinion. The "discovery rate method" must rely upon historical data which is to a great extent nonexistent or incomplete, and is very sensitive to the method of including and interrelating a number of time-dependent variables. ERDA has done a review of work using this method and has concluded that it is of limited usefulness, at least at the present state of the art (Patterson following Tr. 3069).

87. The conclusion to which the Board is led is that the only touchstone which can be applied to the merits here is the test of time; that is, which will be proven right, wrong, or somewhere in between through future endeavor.

¹⁰The Board notes that Dr. Lieberman's testimony was placed into the record by stipulation of the parties. Dr. Lieberman was not available for cross-examination. Rebuttal testimony on behalf of the Staff was offered by J.A. Patterson of the Energy Research and Development Administration (Patterson testimony following Tr. 3068).

In the meantime, the Board believes that the weight of the evidence contained in the record strongly supports the ERDA method of resource estimation. The Board therefore finds that it is reasonable to accept the ERDA energy resource estimations in this determination of the adequacy of uranium fuel supply for the Diablo plant.

b. U.S. Demand for U_3O_8

88. The demand for uranium that nuclear reactors used to generate electricity will create depends upon three important factors; the installed generating capacity of nuclear reactors, the fuel duty the reactors achieve, and the availability of uranium recycle.

89. Installed capacity generally is expressed as the total megawattage of all operating nuclear plants. Presently, United States utilities have 238 nuclear units in operation, under construction, ordered, or planned (Krug, Appendix 1 following Tr. 3197). ERDA, in its moderate low-growth scenario, predicts that 340,000 megawatts of nuclear generating capacity will be on line by 1990 (Witzig, Table 1 following Tr. 1958).

90. The amount of uranium that will be required to generate each megawatt of electricity depends to a substantial degree on the average fuel duty achieved by U.S. reactors. In fact, fuel duty is defined as the amount of electricity generated by one ton of U_3O_8 fuel, usually expressed in terms of millions of kilowatt-hours per ton. An inverse linear relationship exists between fuel duty and resource needs such that a 20% reduction in fuel duty will cause a 20% increase in uranium requirements (Tr. 1968; Witzig, Table 2 following Tr. 1958).

91. A major determinant of fuel duty is fuel burnup (Bu). Fuel burnup is generally expressed as the ratio of megawatt-days thermal per metric ton of uranium, abbreviated as MWD/MTU (Krug at 2-3 following Tr. 3197). Because fuel burnup is a value in the denominator of the equation for fuel duty the two concepts are linearly related (Witzig at 4 following Tr. 1958; Krug, Appendix II following Tr. 3197). Thus, if fuel burnup falls by 20% fuel duty will decline by the same percentage (Tr. 1971).

92. Fuel burnups for PWR's generally have run around 20,000 MWD/MTU (Tr. 1971). While burnups should improve somewhat in later cores, it is unrealistic to assume that ideal burnups of 32,600 MWD/MTU for PWR's and 27,500 MWD/MTU for BWR's will be achieved because all problems which reduce fuel burnup have not been solved and, perhaps even more importantly, because economic and load-planning reasons for reducing burnup also will continue to exist (Tr. 3040, 3052; Krug testimony following Tr. 3197). Consequently, a reduction in burnup of at least 5% from ideal levels, as allowed by Krug (Krug at 16 and Table 6 following Tr. 3197), should be used in uranium resource demand analysis. This prudent

burnup reduction will decrease fuel duty and therefore increase uranium fuel demand by a corresponding 5%

93. Uranium recycle also has a substantial effect on uranium fuel demand. If uranium recycle is not implemented, uranium fuel demand will increase by over 20% (Krug at 16 and Table 6 following Tr. 3197; Witzig at 7 following Tr. 1958; Tr. 1972). Opposition to recycle on grounds of its potential health, safety, and environmental hazards makes its implementation uncertain, as even strong proponents of uranium recycling admit (Tr. 1973). Present government policy does not allow recycle (Tr. 3211). Consequently, prudent fuel resource planning at this time should not consider uranium recycling in its analysis of demand.

94. Applicant's witness Warren F. Witzig testified that in his opinion there was enough uranium to fuel the Diablo facilities throughout their expected life (Witzig at 9 following Tr. 1958). Mr. Witzig accepted ERDA's estimates of uranium resources and then used burnup rates of 27,500 MWD/MTU for BWR's and 32,000 MWD/MTU for PWR's as the values for duty factors (Witzig at 6 following Tr. 1958). Using conservative values for these duty factors and capacity factors of both 60% and 80%, Dr. Witzig calculated uranium needs for various projected installed electrical capacities (Witzig at Table 2 following Tr. 1958). Using the information, data curves were plotted which showed uranium megawatts over time for various capacity factors and burnup rates (Witzig, Fig. 1 following Tr. 1958). Dr. Witzig assumed no uranium or plutonium recycle. Whether a fuel assembly will generate the amount of energy it was designed to generate must be also considered. Intervenor's offered no testimony on this issue.

95. High uranium utilization is dependent upon achieving design burnup. Fuel failures have resulted in early discharge of fuel assemblies and consequently low burnup. Both the mechanical and the nuclear design aspects of fuel rods have been considered by the Staff. The ability to maintain cladding integrity is a mechanical/chemical design feature of a fuel rod. Three basic mechanisms have been identified that account for practically all cladding failures. They are (1) hydriding, (2) pellet/cladding interaction, and (3) fuel densification with cladding collapse.

96. Hydride failures are due to hydrogenous impurities sealed in a fuel rod, e.g., moisture or oil. Failures are caused by the formation in the cladding of massive zirconium hydride zones which initiate at defects or discontinuities which in turn often leads to blistering. Eventually the hydride zone cracks either from a phase change volume expansion or from operational stresses leading to through-wall penetration (Houston at 3 following Tr. 3037).

97. Pellet/cladding interaction (PCI) has some probability of leading to fuel rod failure. It is due to the fuel pellet having a greater thermal expan-

sion than the cladding. As the fuel temperature increases, the pellets expand, filling the radial pellet-to-cladding gap, physically locking with the cladding as the gap closes and stretching the cladding as the pellet continues to expand. PCI is often manifested by cladding elongation, ridging of the cladding at pellet interfaces, or longitudinal splits in the cladding. The degree of PCI depends upon fuel pellet and rod design, absolute fuel rod power, rate of power change, differential power change, and irradiation exposure (Houston at 4 following Tr. 3037).

98. Fuel densification problems are caused mainly by the use of unstable low-density fuel in unpressurized zircaloy cladding in pressurized water reactors.¹¹ The effects of fuel densification on the fuel rod may increase the stored energy, will increase the linear thermal output, and will increase the probability of cladding collapse and local power spikes from axial gaps (Houston at 5 following Tr. 3037).

99. These mechanical failures have either been eliminated or reduced to the point where their effects on fuel burnup are minimal. Hydriding is prevented by the use of higher purity fuel and/or by the addition of a hydrogen getter inside the fuel rod to tie up the impurity. Reactor operational procedures have been established to minimize or eliminate the occurrence of PCI failures. These procedures require a gradual rise to power, reconditioning periods for fuel at various power levels, and limitations on power differentials as a function of absolute power. In addition, fuel vendors have introduced new fuel designs that have smaller-diameter pellets and rods, which operate at lower linear heat generation rates and lower average fuel temperatures. For pressurized water reactors these designs have a 17 x 17 or 16 x 16 fuel rod array and for boiling water reactors an 8 x 8 array. To eliminate fuel densification with cladding collapse fuel is now manufactured to be thermally stable and fuel rods are internally pressurized to appropriate levels that restrict cladding collapse (Houston at 3, 5, and 7 following Tr. 3037).

100. With respect to the nuclear design of fuel the Staff presented testimony on uranium fuel efficiency (Krug at 1 following Tr. 3197). Uranium fuel efficiency is the number of kilowatt-hours-electrical produced per short ton of U_3O_8 (kWhe/STU $_3O_8$), sometimes referred to as "duty factor."¹²

101. Staff's projection of uranium requirements utilized a computer

¹¹Cladding collapse had not been observed in fuel rods in boiling water reactors. This is probably because the core coolant pressure is lower in a BWR than it is in a PWR.

¹²When forecasting lifetime uranium requirements for a population of reactors a proper analysis allows for first core inventory requirements and consideration of residual uranium left in the reactors after the forecast period. The duty factors calculated and presented by Staff are based on an equilibrium situation which takes such factors into proper account.

model developed by ERDA called NUFUEL. The model is basically a book-keeping system. It utilizes a schedule of reactor startups arrived at by a forecasting process of examining announced plans for construction of plants, progress of plants being licensed and built and other inputs such as schedules for enrichment services. After a reactor startup schedule is developed, assumptions based upon experience are made as to the phasing of natural uranium concentrates (U_3O_8) procurement with reactor startup date.

102. Next, a model for the reactors is needed which has the necessary information to determine fuel requirements. The model used had equilibrium values for fuel exposure of 32,600 MWD/MTU for PWR's and 27,500 MWD/MTU for BWR's.

103. When forecasting U_3O_8 requirements, the code converts quantities of enriched uranium (U) and associated enrichments into tons of U_3O_8 using a tails assay specified by the user. The NUFUEL code keys the U_3O_8 requirements to the reactor startup schedule using a phasing diagram, reactor building schedule, and capacity factor and adds up the requirements for each calendar quarter. It then creates a cumulative requirement sum. Enriched uranium requirements are then converted into uranium requirements.

104. The model has taken the following losses into account: 1% loss in processing enriched uranium hexafluoride (UF_6) into finished fuel; 5% loss for the conversion of U_3O_8 to natural UF_6 ; and, when considering recycle, a 1% loss attributable to reprocessing. The model uses an average capacity factor of 66%. Applying the NUFUEL model and assuming no recycle of uranium results in a total requirement of U_3O_8 for a population of 236 reactors of 1,577,000 short tons (Krug at Table 6 following Tr. 3197).

105. The Board concludes that the model as modified and utilized by the Staff is acceptable and further concludes that the results are reasonable and accepts them. The Board notes that Dr. Witzig's method for determining whether there will be sufficient fuel is also reasonable. Either method results in substantially the same conclusion. Comparing the results from the Staff's model or Dr. Witzig's calculations with the results of the ERDA projections or uranium resources at \$30 cutoff costs shows that it is highly unlikely that the Diablo Canyon facilities will suffer from nuclear fuel shortages and the Board so finds. Consequently, the Board finds that the Staff did not improperly assess the benefits to the plant in its cost-benefit analysis by making improper assumptions concerning nuclear fuel availability.

2.B. Plant Reliability

106. Intervenor's contend that the capacity factor¹³ used by the Staff in the FES is not borne out by experience and that in fact experience shows that it is much lower. Two of Intervenor's witnesses, Messrs. Komanoff and Moody, estimated that Units 1 and 2 at Diablo Canyon could expect capacity factors of 52.9% and 57.1% respectively for the first 10 years of commercial operation. These figures are the midpoints of the following ranges of capacity factors for each unit: 33% to 73% for Unit 1 and 37% to 77% for Unit 2. Messrs. Komanoff and Moody made no predictions beyond 10 years (Moody and Komanoff at 4 following Tr. 2292).

107. Another witness for Intervenor's, Mr. Dale Bridenbaugh, estimated that the capacity factors for both units would be in the range of 50% to 60% for the lifetime of the plant and, if plant performance continues to deteriorate after 10 to 15 years, the capacity factors will be less than 50% (Bridenbaugh at 12, 13 following Tr. 2431).

108. Using data from the NRC Gray Book series, industry, and other NRC publications, Komanoff and Moody used a regression analysis to derive predictions of 10-year levelized plant capacity factors for plants of various sizes. For pressurized water reactors of the size 1,084 MWe to 1,106 MWe, Intervenor's calculations indicate capacity factors of 49.87% and 49.130% respectively (Moody and Komanoff at 8 following Tr. 2292). These conclusions are based upon a study, *Studies—Council on Economic Priority—Power Plant Performance—Nuclear and Coal Capacity Factors and Economics*, published by Mr. Komanoff and introduced as Intervenor's Exhibit Number (new) 11.

109. The Board has reviewed the study and testimony given in connection with it and has a number of observations. The primary purpose for the study was to gather relevant data on power plant performance and to test these hypotheses: that power plant performance improved with age; that power plant performance for newer plants was better than for earlier installed plants; and that if larger plants performed worse than smaller plants, this was a function of the youth of the plants, and not their size (Tr. 2287 and Tr. 2386). This is significant for it has a direct bearing on why a regression analysis was used. Mr. Komanoff states "the focus of the regression

¹³Staff defines capacity factor to mean the ratio for a specified time period of the actual electrical energy generated divided by the electrical energy which could have been generated if the unit were operated at 100% power for the entire specified time period (Krug supp. testimony at 1 following Tr. 3200). The Board accepts this definition.

equations was to test these three hypotheses" (Tr. 2386). The Board further notes that the R^2 value, the extent of correlation of the regression equations to data used, was .21 or 21% (Moody and Komanoff at 7 following Tr. 2292).

110. Both in the study and prepared testimony, Intervenor acknowledges the limited value of the study to predict future capacity factors (Moody and Komanoff at 8 following 2292 and at 2 and 19, Intervenor Ex. 11). One of the recognized difficulties is the scarcity and scatter of available data.

111. Mr. Bridenbaugh's projected capacity factor was not based upon any specific mathematical calculation or analysis but upon "engineering judgment" (Tr. 2437). That judgment, in turn, took into consideration (a) his past experience with General Electric as an engineer dealing with many aspects of nuclear reactors (mostly BWR's), (b) the Komanoff study, (c) data found in the NRC "Gray Book Series," and (d) various other studies and publications in the field (Tr. 2439-40). Although applying no specific quantitative value to them, Mr. Bridenbaugh indicated that the following factors were considered in his analysis: the large size of Diablo Canyon; that Diablo Canyon is a first generation plant which has not benefited from improvements gained through experience; the difficulties experienced with Westinghouse turbines; the performance of plants similar to Diablo Canyon; an indication that radiation buildup causes delays in maintenance; and finally, the apparent increase in problems which occur due to plant aging (Bridenbaugh at 2, 4, 6, 8, and 10 following Tr. 2431; Tr. 2506-10).

112. The Applicant, through Mr. James C. Carroll, offered testimony that the expected capacity factor was 74% based on a combined uprated capability of 2,290 MWe net for both units (Carroll at 2 following Tr. 1755). Applicant indicated a number of reasons why it believed a 74% capacity factor could be attained. Modifications to the plant as a result of experience gained from similar units is one reason (Carroll at 4 following Tr. 1755). The more significant modifications include reblading of the turbine generator, modifications to the water-cooled generator stator coils, re-tubing the condenser, a change to an all-volatile chemistry in the steam generators, and a modification of the cladding on the tube support plate in the steam generator (Tr. 1903-5). Another reason is the financial incentive, due to the increased price of oil, to reduce reliance on oil-fired units by reducing the downtime of nuclear units (Carroll at 5 following Tr. 1755).

113. Staff's approach was to use a frequency distribution of capacity factors to project what may be expected in the future. This approach was favored over a regression analysis on the theory that when data on a given characteristic do not show a clear tendency to congregate around a central value, as is the case for present capacity factor values, the arithmetic mean

is not a particularly useful measure of the characteristic. Staff projections indicate that for the years 1974-75 the most frequent value of capacity factors for all commercial reactors was in the 75.01%-100% range (Krug at 2 following Tr. 3200). Staff evaluation indicates that the cumulative average capacity factor for Westinghouse units is about 65%, which is higher than the cumulative industrial average (Krug at 6 following Tr. 3197). The Staff's analysis also shows that capacity factors for nuclear power plants are comparable to capacity factors for fossil-fired plants. The Staff believes that Diablo Canyon can operate at a capacity factor of approximately 75% (Tr. 3199).

114. The Board finds the Staff's and the Applicant's approaches reasonable and accepts their projection that the units at Diablo Canyon can achieve and maintain capacity factors of approximately 75%. There are several reasons for rejecting Intervenor's calculations and conclusions (provided by Messrs. Komanoff and Moody) regarding capacity factors. First, the Board agrees that, given the dearth of available data, the use of a regression analysis is questionable. This is especially so where present trends indicate that shutdowns are likely to decrease. We here have in mind the testimony of Dean Houston concerning the resolution of mechanical fuel failure problems, and the data presented by the Staff which shows capacity factors increasing, especially the data pertaining to only Westinghouse reactors. Also relevant are the changes already made to the Diablo facilities which represent lessons learned from experience. It is the opinion of the Board that Mr. Bridenbaugh did not give sufficient weight to the improvements made at Diablo Canyon and therefore his range of 50%-60% is unreasonably low.

3. Whether Adverse Environmental Effects Are Being or Will Be Experienced by Abalone Due to Residual Particulate Copper From Previously Installed Condenser Tubing:

3.A. Copper Discharge

115. Intervenor Cornwell contended that residual and particulate copper from formerly installed copper cooling water piping will continue to have an adverse effect on bull kelp and the abalone which feed upon it. However, no evidence was presented by any intervenor on this subject.

116. In 1974, a discharge of copper into Diablo Cove occurred during initial operation of the cooling water system due to an accumulation of dissolved copper in the copper-alloy condenser tubes. PG&E measured levels of copper in Diablo Cove both September 4, 1974, and October 31, 1975. The 1975 sample contained two orders of magnitude less copper than the plants analyzed from the 1974 samples at the same location and no more

than plants from uncontaminated areas (Adams at 18 following Tr. 1673; Samworth at 11, 12 following Tr. 2978).

117. Concentrations of copper in red and black abalone were collected in September 1974, and in black abalone in 1976. Red abalone were not collected in 1976 because a statistically meaningful sample would have seriously depleted the population. The levels of copper in the black abalone were about the same in 1976 as in 1974 (Adams at 18; 19 following Tr. 1673). While copper is present in the sediment at the bottom of the cove, it would have to be redissolved to impact abalone through gill tissue. The absence of significant copper in kelp is evidence that significant redissolution is not occurring, and it leads to the expectation of negligible impact on abalone through uptake through gill tissue (Samworth at 12 following Tr. 2978).

118. The evidence clearly indicates that residual copper in Diablo Cove is not being taken up by bull kelp or by the abalone which feed on it and that no further biotic impact from the 1974 copper discharge is to be expected so long as the residual copper remains undissolved in the sediment, and the Board so finds.

3.B. Titanium Tubing

119. Intervenors (Scenic Shoreline) contend that the Diablo Canyon titanium tubing will have an adverse effect on the environment because of its tendency to foul, thus requiring defouling by heat, chlorine, or rapid flow rate.

120. PG&E expects no new or unusual problems with biological fouling of condenser tubes due to the use of titanium. Biological fouling is an expected condition for condenser tubes operating in a seawater cooling water environment. An allowance is made in the condenser design to assure that design heat exchange capacity can be achieved with some degree of fouling present and with some condenser tubes intentionally plugged. At Diablo Canyon, PG&E intends to control biological fouling of condenser tubes by chlorination. There are some data which indicate that titanium is not as resistant to biological fouling as are copper-alloy materials, and thus more frequent chlorination may be required for titanium tubes. If operating experience at Diablo Canyon shows that this is required, it will be accomplished without exceeding the limits set in the Environmental Technical Specifications or the limits set by the California NPDES. However, PG&E's operating experience to date indicates there is no significant difference in resistance to biological fouling between titanium and copper alloy condenser tubes (Lindblad at 4, 5 following Tr. 1655; Tr. 1656).

121. Staff also expressed the opinion that the use of chlorine is the only practical means of defouling and that adhering to the limits set for chlorine discharge by the California NPDES would preclude the possibility of substantial harm to the environment (Samworth at 13-14 following Tr. 2978).

122. The Board concludes that no adverse environmental effects will result from the installation or use of titanium tubing.

4. Whether the FES and Amendments Inadequately Consider as Environmental Costs the Doses and Effects of Low-Level Radiation as to:

4.A. Buildup of Concentration of Radioisotopes in the Food Chain

123. In response to a Staff motion for summary disposition, Intervenor submitted the affidavit of Dr. Leslie Grimm who stated, *inter alia*, that the Staff had improperly calculated bioaccumulation factors. However, this information was not presented on the record at the hearing and the only testimony presented on radionuclides in the food chain was by the Staff (Parson's testimony at 2-4 following Tr. 2897; Staff Ex. 1 at 5-60 to 65). No evidence contrary to the Staff position on concentration of radioisotopes in the food chain was brought out on cross-examination.

124. While the Intervenor did question the amounts of radionuclide releases which would be produced by the Diablo plant (Finston testimony at 3 following Tr. 2552), and the buildup of radiation in a reactor (Tr. 2569), no evidence was presented concerning the question of the adequacy of the Staff's evaluation of radionuclide buildup in the food chain. Accordingly, in response to the Staff motion for summary disposition which was renewed at the evidentiary hearing, the Board granted summary disposition on this issue.

4.C. Somatic and Genetic Effects of Radiation¹⁴

Somatic Effects

125. Testimony presented by the NRC Staff assessed the potential somatic effects of proposed routine radionuclide releases from the Diablo Canyon Nuclear Station by (a) considering these releases to constitute an increase in natural background radiation and (b) then estimating the possible

¹⁴The Board deferred consideration of a part of Intervenor's contention on the environmental effects of radiation releases due to seismic accidents until the safety hearings. The record was also specifically held open for receipt of the new S-3 generic tables on the environmental effect of the fuel cycle when the Commission's Interim Rule is in place (Tr. 1581, 1603-12).

effects of these releases on the cancer statistics which could normally be expected in the human population residing within a 50-mile radius of the plant (Goldman at 3 following Tr. 2741). The projected 1980 population within a 50-mile radius of Diablo Canyon was 260,000. Based on an estimated 115 mrem per person per year the natural background radiation rate for this population would be $(.115 \times 260,000 = 29,900)$, or approximately 30,000 mrem per year. Based on an estimated rate of 89 cancer deaths per year per million mrem, it was estimated that approximately 3 cancer deaths per year would be expected due to natural background radiation. This was compared to an expected total cancer death rate of 444 per year in a population of 260,000 (U.S. average based on Census data). Since the Staff had estimated that Diablo Canyon's radiological releases would result in a dose of 0.3 mrem per year (Intervenors did not contest this figure and the Board knows of no information which would show it to be incorrect) the 444 cancer deaths which could be expected to occur in a population of 260,000 would be expected to increase to only 444.00003 due to the plant. Thus, the Staff's expert believed the somatic risk which would be occasioned by the plant would be negligible. Based on the dose expected from the plant and the cancer rate per million mrem (*i.e.*, $0.3 \times 89 \times 10^{-6}$), he described the risk of the possibility of a cancer-induced death caused by the plant to be 2.7×10^{-5} (Goldman at 3-6 following Tr. 2741).

126. Applicant's testimony followed a similar pattern using the same values for the population within a 50-mile radius of the plant (260,000 in 1980) and for the annual population dose rate (0.3 mrem) due to routine radionuclide releases from the plant but relying on different estimates of the cancer death rates per million mrem (172 per million, based on the BEIR Report) and the expected cancer death rate, from all causes, per 100,000 population (*i.e.*, 160 cancer deaths per 100,000 population, based on 1973 Census data for San Luis Obispo County). Based on the estimated rates used by Applicant (Whipple following Tr. 2847), the risk of cancer-induced death due to normal operation of the plant would be $(0.3 \times 172 \times 10^{-6} = 5.16 \times 10^{-5})$, or approximately 5.2×10^{-5} . The number of cancer deaths expected to occur in the population within a 50-mile radius of the plant would be increased from $(260,000 \times [160/100,000] = 416)$ 416 to 416.000052. Assuming a 40-year life for the plant, the cumulative death rate expected from cancer would increase from $(40 \times 416 =)$ 16,640 to 16,640.00206 (Whipple at 5, 6 following Tr. 2847).

127. Intervenors' witness (Finston following Tr. 2552), using an estimate of 82 mrem per year (based on a survey of the Santa Barbara area) calculated the background radiation dose to the population within a 50-mile radius of the plant as approximately $(82 \text{ mrem per year} \times 260,000 \text{ persons} = 21,320)$ 21,000 mrem per year. Taking the median of the BEIR Report's

estimate of the radiation-induced cancer death rate (152-204 deaths per million mrem), he estimated the risk of cancer death due to operation of the plant as $(0.3 \times 152 \text{ to } 204 \times 10^{-6}) 5.3 \times 10^{-5}$ which is about twice as high as the estimate put forth by the Staff but approximately the same as the estimate (given above) based on the input values favored by Applicant. To "conservatize" the BEIR Report, Dr. Finston (at 7 following Tr. 2552) suggests that this estimate should be doubled to 1.1×10^{-4} . Dr. Finston goes on to say (at 8, 9 following Tr. 2552) that, "Although the radiation risk may still be negligible (*i.e.*, 444 cancer deaths increased to 444.00011 deaths due to operation of the plant), this increased risk factor, when combined with emissions from other sources (accidents, waste, transportation) should be considered in the FES."

128. Based on the evidence presented by Staff, Applicant, and Intervenor, the Board perceives a difference of opinion concerning rates of natural background radiation (115 mrem per year preferred by Staff and Applicant vs. 82 mrem per year set forth by Intervenor), death rates due to radiation-induced cancer (Staff: 89 per million mrem; Applicant: 172; Intervenor: 152-204), and the expected cancer death rate applicable to the projected population (260,000) within a 50-mile radius of the plant (Staff and Intervenor: 444; Applicant: 416). There is, however, no controversy regarding the conclusion, as all three parties regard the risk of cancer due to routine radionuclide releases from the plant, whether it is calculated to be 2.7×10^{-5} or 1.1×10^{-4} , as negligible and the Board so finds. In addition, the Board considers this testimony to be dispositive of the issue raised by the Intervenor in a motion dated March 6, 1975, which sought this Board to require the Applicant to collect "baseline" statistics on cancers and leukemias. The uncontradicted evidence adduced at the hearing showed that such studies would be meaningless in view of the fact that possible increases in cancer incidences due to the plant are likely to be smaller than normal variations in the cancer death rate and therefore impossible to detect. Accordingly, that motion is hereby denied.

Genetic Effects

129. The NRC Staff witness testified that the genetically significant dose is the dose absorbed by the gonads over the reproductive period of a generation, a period which roughly coincides with the operating life of the plant. He testified that the mutational effects of irradiation are dose-dependent, with the yield of genetic effects being lower at low dose rates (Goldman at 6 following Tr. 2741).

130. Staff testimony also included the information that there are about 52,000 spontaneous or naturally occurring genetic defects per million live

births in the United States. At the Appendix I limit of 5 mrem per year, multiplied by the 30 years of generation of radionuclides, the genetics effects of 52,000 per million would be raised to 52,006 in the first generation (Goldman at 7 following Tr. 2741). In terms of risk, the normal risk of naturally induced genetic effects would be increased from 0.052 (52,000 divided by 1,000,000) to 0.052006 in the first generation. In terms of the dose actually calculated for Diablo Canyon, if the nearest individual to the plant (1.5 miles) received the continuous total body and gonadal dose of 0.03 mrem per year estimated by the Staff, the risk to his progeny of genetic effects would be 0.052000035 as opposed to the naturally induced risk of 0.052. Thus, the maximum change which the Staff estimated would occur genetically from the Diablo Canyon plant is one genetic effect in a million per generation and presented no unacceptable health risk (Goldman at 7, 8 following Tr. 2741).

131. Evidence provided by the Applicant's radiological expert generally supported the conclusions reached by the NRC Staff. The Applicant's expert estimated the incidence of spontaneous genetic effects to 0.06 per live birth, with 15,600 spontaneous genetic effects on children within the 260,000 population within 50 miles of Diablo Canyon (Whipple at 6 following Tr. 2847). This would add 0.000504 genetic effects after 40 years of plant operation to the 15,600 spontaneous effects and would be, in the opinion of the Applicant's expert, insignificant (Whipple at 6 following Tr. 2847).

132. Testimony by the Intervenors maintained that since the occupational dose for Diablo Canyon plant workers had been underestimated by the Staff, the additional exposure of the plant would increase genetic effects from the 0.2% increase estimated by the Staff to 1.1% as estimated by the Intervenors (Finston at 13 following Tr. 2552). While occupational doses (discussed below) may vary according to the amount of repair work done on the plant after it is put in operation, the Board believes that Intervenors incorrectly conclude that a 2.7 times increase in doses to *plant workers* will occur, and this dose will result in a 2.7 times increase in genetic effects in the population in San Luis Obispo area as a whole. While exposure to the workers at Diablo Canyon could result in an increase in genetic defects among the persons of that group, the effect on the population at large would be greatly diluted. The Board finds no evidence on the record as a whole to support the conclusion that increases in genetic effects could be of the order of magnitude predicted by the Intervenors. The Board finds the preponderance of the evidence to show that the Diablo Canyon plant will cause no significant risk or increase of genetic defect incidence in the population of San Luis Obispo area during its projected 30 years of operation.

4.D. Occupational Doses to Workers

133. Intervenors contended that the FES and its amendment had inadequately considered as environmental costs the somatic and genetic effects from doses of low-level radiation on plant personnel, including inadvertent ingestion of radioactive materials. Although no evidence was produced by the Intervenors as to the inadvertent uptake of radioactive materials, considerable controversy did exist as to the method of computing occupational doses to plant workers.

134. The radiological impact of plant operation to onsite personnel is measured by the man-rem occupational dose which results principally from maintenance and repair work done in high dose-rate areas (Nehemias testimony at 3 following Tr. 2897). Since a large number of variables enter into calculating occupational doses, such as dose rates, occupancy times, and maintenance frequencies, the Staff approach is to use actual measured past exposure from operating nuclear power stations as a guide for predicting the occupational doses which might be expected from a plant such as the Diablo Canyon plant (Nehemias at 3 following Tr. 2897).

135. Actual historical occupational doses at various plants have ranged from a low of 18 man-rem to a high of 5,134 man-rem per year. The NRC Staff has chosen a value of 500 man-rem per year per unit (from NUREG-0109), roughly the average dose to all onsite personnel at currently operating reactors. This figure is used as the best projection of the total average annual occupational dose per reactor (Nehemias at 4, supp. testimony at 1, Tr. 2897). The reasonableness of the 500 man-rem figure is corroborated by the fact that of the 44 plants in operation between 1969 and 1975, only 11 experienced average annual doses in excess of 500 man-rem and only 2 in excess of 750 man-rem (Nehemias supp. testimony at 3, Tr. 2897).

136. Intervenors' witness rejected, without explanation, the 1975 figure of 0.74 man-rem per megawatt-year and obtained an average of 1.45 man-rem per megawatt-year for PWR reactors operating between 1969 and 1974. These he normalized to an 85% capacity factor (Finston at 11 following Tr. 2552; Tr. 2583, 2584). The resulting 2,700 man-rem per year-site occupational dose was thought by the Intervenors' witness to be a more accurate reflection of the environmental effect on plant workers than the Staff's conservative average of 1,000 man-rem for the Diablo Canyon site because Intervenors theorized¹⁵ that radiation builds up on reactor components with age, thus causing higher occupational doses when maintenance is performed (Tr. 2569-71, 2615).

¹⁵Intervenors admitted that there is not enough data yet available to support the contention that reactors get dirty with age (Tr. 2612). Exposure rates from PWR's decreased from 1974 to 1975 (Tr. 2614).

137. While the Board has no difficulty accepting the proposition that the radioactivity of reactor components increases with age, it believes that Intervenor's method of estimating occupational doses based on dose per unit of power output is erroneous because most occupational doses occur during maintenance downtimes when capacity factors are zero instead of being linked to megawattage output. A case in point is the Indian Point plant where the largest occupational exposure of over 5,000 man-rem occurred during a period of downtime for maintenance (Tr. 2619; Tr. 2646). Using Intervenor's occupational dose computation for this reactor would have resulted in an infinite occupational dose in man-rem (Tr. 2619, Tr. 2642). Intervenor's witness was not able to quantify which portion of a 4,000-man-rem increase from 1972 to 1973 at Indian Point was attributable to increased maintenance and which part was attributable to increased plant age (Tr. 2646-48), thus casting doubt on his method of using man-rem per megawatt-year as an occupational dose predictive tool.

4. Additional Radiological Matters

Appendix I

138. Staff testimony showed that the proposed Diablo Canyon station meets the design objective doses contained in paragraphs II.A, II.B, and II.C of Appendix I to 10 CFR Part 50. Intervenor presented no evidence which showed noncompliance with Appendix I or Part 20 (Tr. 2621). The Applicant chose to dispense with the cost-benefit analysis required by paragraph II.D of Appendix I by satisfying instead the Concluding Statement of Position of the Regulatory Staff (Docket No. RM-50-2) and Guides on Design Objectives for Light-Water-Cooled Nuclear Power Reactors proposed by the Regulatory Staff in the rulemaking proceeding on Appendix I¹⁶ (Parsont and Boegli at 1-2 following Tr. 2897).

139. Radioactive waste management systems for the Diablo Canyon station are described in Section 3.4 of the FES (Staff Ex. 1) and Chapter 11 of the Staff SER. By taking into account the equipment installed at the Diablo Canyon station, the Staff was able to estimate the source terms (releases) of liquid and gaseous effluents which could be anticipated from the plant. Calculated releases per year are as listed in Tables 1 and 2, following.

¹⁶The September 4, 1975, amendment to Appendix I provides that an applicant who has filed an application for a construction permit for a light-water-cooled nuclear power reactor which was docketed between January 2, 1971, and June 4, 1976, may dispense with the cost-benefit analysis by exercising this option.

TABLE 1
CALCULATED RELEASES OF RADIOACTIVE MATERIALS
IN LIQUID EFFLUENTS
FROM DIABLO CANYON, UNIT NOS. 1 AND 2

| Nuclide | Ci/yr/reactor | Nuclide | Ci/yr/reactor |
|---------------------------------|------------------------|---------------------------|---------------|
| Corrosion & Activation Products | | Fission products (cont'd) | |
| Cr-51 | 3.3(-4) ^{a,b} | Te-127 | 8(-5) |
| Mn-54 | 1.1(-3) | Te-129m | 2.7(-5) |
| Fe-55 | 5(-4) | Te-129 | 1.7(-4) |
| Fe-59 | 2.2(-4) | I-130 | 4(-5) |
| Co-58 | 8(-3) | I-131 | 7.5(-2) |
| Co-60 | 9.3(-3) | Te-132 | 2.8(-2) |
| Zr-95 | 1.4(-3) | I-132 | 1.7(-3) |
| Nb-95 | 2(-3) | | |
| Fission Products | | | |
| | | I-133 | 1.1(-2) |
| Br-83 | 1(-4) | Cs-134 | 8.4(-2) |
| Rb-86 | 9(-5) | I-135 | 1.9(-3) |
| Sr-89 | 8(-5) | Cs-136 | 9.6(-3) |
| Y-91 | 2(-5) | Cs-137 | 7.6(-2) |
| Zr-95 | 1(-5) | Ba-137m | 4.9(-2) |
| Nb-95 | 2(-5) | Ba-140 | 2(-5) |
| Mo-99 | 7.5(-4) | La-140 | 2(-5) |
| Tc-99m | 8.2(-4) | Ce-141 | 1(-5) |
| Ru-103 | 1.5(-4) | Ce-144 | 5.2(-3) |
| Ru-106 | 2.4(-3) | All Others | 7(-5) |
| Ag-110m | 4.4(-4) | Total (except H-3) | 3.4(-1) |
| Te-127m | 8(-5) | H-3 | 710 |

^aExponential notation; 1(-4) = 1×10^{-4}

^bNuclides whose release rates are less than 10^{-5} Ci/yr/reactor are not listed individually but are included in the category "All Others."

TABLE 2
CALCULATED RELEASES OF RADIOACTIVE MATERIAL
IN GASEOUS EFFLUENTS FROM
DIABLO CANYON, UNIT NOS. 1 and 2

Ci/yr/reactor

| Radio-nuclide ^d | Reactor Building | Auxiliary Building | Turbine Building | Air Ejector | Decay Tanks | Total |
|----------------------------|------------------|--------------------|------------------|-------------|-------------|---------|
| Kr-83m | a | a | a | a | a | a |
| Kr-85m | 2 | 2 | a | 1 | a | 5 |
| Kr-85 | 6 | a | a | a | 250 | 260 |
| Kr-87 | a | 1 | a | a | a | 1 |
| Kr-88 | 2 | 4 | a | 3 | a | 9 |
| Kr-89 | a | a | a | a | a | a |
| Xe-131m | 10 | a | a | a | 22 | 32 |
| Xe-133m | 20 | 2 | a | 1 | a | 23 |
| Xe-133 | 1,900 | 110 | a | 68 | 170 | 2,300 |
| Xe-135m | a | a | a | a | a | a |
| Xe-135 | 10 | 6 | a | 4 | a | 20 |
| Xe-137 | a | a | a | a | a | a |
| Xe-138 | a | a | a | a | a | a |
| I-131 | 2.6(-3) | 4.4(-2) | 1(-3) | 2.8(-2) | a | 7.6(-2) |
| I-133 | 2.8(-3) | 6.2(-2) | 1.2(-3) | 3.9(-2) | a | 1(-1) |
| Mn-54 | 2.4(-6) | 1.8(-4) | c | c | 4.5(-5) | 2.3(-4) |
| Fe-59 | 8.3(-7) | 6(-5) | c | c | 1.5(-5) | 7.6(-5) |
| Co-58 | 8.3(-6) | 6(-4) | c | c | 1.5(-4) | 7.6(-4) |
| Co-60 | 3.8(-6) | 2.7(-4) | c | c | 7(-5) | 3.4(-4) |
| Sr-89 | 1.9(-7) | 1.3(-5) | c | c | 3.3(-6) | 1.6(-5) |
| Sr-90 | 3.3(-8) | 2.4(-6) | c | c | 6(-7) | 3(-6) |
| Cs-134 | 2.4(-6) | 1.8(-4) | c | c | 4.5(-5) | 2.3(-4) |
| Cs-137 | 4.2(-6) | 3(-4) | c | c | 7.5(-5) | 3.8(-4) |
| H-3 | 710 | c | c | c | c | 710 |
| C-14 | 1 | a | a | a | 7 | 8 |
| Ar-41 | 25 | c | c | c | c | 25 |

^aLess than 1.0 Ci/yr/reactor for noble gases and carbon-14, less than 10⁻⁴ Ci/yr/reactor for iodine

^bExponential notation; 1.4(-2) = 1.4 x 10⁻²

^cLess than 1% of total for this nuclide

^dRadionuclides not listed are released in quantities less than those specified in notes a and c from all sources

140. The dispersion of the radionuclides listed above and the disposition of radionuclides from the atmosphere were then calculated by the Staff. These dispersions and depositions were then used to evaluate the doses to humans from liquid and gaseous effluents (Parsont and Boegli at 3 following Tr. 2897).

Doses from Liquid and Gaseous Effluents

141. The Staff's dose assessment divided radioactive effluents into three categories of sources:

1. liquid effluents released to the Pacific Ocean
2. noble gases released to the atmosphere
3. radioiodines, particulates, carbon-14, and tritium released to the atmosphere

(Parsont and Boegli at 3 following Tr. 2897).

142. The dose evaluation of pathways associated with liquid effluents was based on the maximum exposed individual. The dietary and living habits for an adult individual included the consumption of 21 kg/yr of fish harvested in the immediate vicinity of the discharge into Diablo Cove and recreational use of its shoreline for 10 hr/yr. There are no drinking water sources receiving Diablo Canyon station liquid effluents, so none were used.

143. The dose evaluation of noble gases released to the atmosphere included a calculation of beta and gamma air doses at the site boundary and total body and skin doses at the residence having the highest dose. The maximum air doses at the site boundary were found at 0.5 mile NNW relative to Diablo Canyon. The location of maximum total body and skin doses were determined to be at a residence at 1.5 miles NNW of the station.

144. The dose evaluation of pathways associated with radioiodine, particulates, carbon-14, and tritium released to the atmosphere was also based on the maximum exposed individual. This individual is a child whose diet included the consumption of 41 kg/yr of beef from an animal grazing year-round at 0.5 mile NNW of Diablo Canyon (Parsont and Boegli at 4, following Tr. 2897).

145. The following (Table 3) are the results of the Staff's assessment of the liquid, gas and radioiodine, and other radionuclide doses when compared to the Appendix I design criteria.

TABLE 3
COMPARISON OF DIABLO CANYON, UNIT NOS. 1 and 2, WITH
APPENDIX I TO 10 CFR PART 50, SECTIONS II.A, II.B, AND II.C (MAY 5, 1975)^a AND
SECTION II.D, ANNEX (SEPTEMBER 4, 1975)^b

| Criterion | COLUMN 1 Appendix I ^a Design Objectives | COLUMN 2 Annex ^b Design Objectives ^c | COLUMN 3 Calculated Doses Unit Nos. 1 or 2 |
|--|--|--|---|
| Liquid Effluents | | | |
| Dose to total body all pathways | 3 mrem/yr/unit | 5 mrem/yr/site | 0.024 mrem/yr/unit ^f |
| Dose to any organ from all pathways | 10 mrem/yr/unit | 5 mrem/yr/site | 0.077 mrem/yr/unit ^f |
| Noble Gas Effluents^d | | | |
| Gamma dose in air | 10 mrad/yr/unit | 10 mrad/yr/site | 0.22 mrad/yr/unit |
| Beta dose in air | 20 mrad/yr/unit | 20 mrad/yr/site | 0.51 mrad/yr/unit |
| Dose to total body of an individual | 5 mrem/yr/unit | 5 mrem/yr/site | 0.016 mrem/yr/unit |
| Dose to skin of an individual | 15 mrem/yr/unit | 15 mrem/yr/site | 0.043 mrem/yr/unit |

TABLE 3—Continued

| Criterion | COLUMN 1 Appendix I ^a Design Objectives | COLUMN 2 Annex ^b Design Objectives ^c | COLUMN 3 Calculated Doses Unit Nos. 1 or 2 |
|--|--|--|---|
| Radioiodines and Other Radio- nuclides Released to the Atmosphere ^e | | | |
| Dose to any organ from all pathways | 15 mrem/yr/unit | 15 mrem/yr/site | 1.04 mrem/yr/unit |

^aFEDERAL REGISTER, V. 40, p. 19442, May 5, 1975.

^bFEDERAL REGISTER, V. 40, p. 40816, September 4, 1975.

^cDesign Objectives given on a site basis. Therefore, those design objectives apply to two units at the site.

^dLimited to noble gases only.

^eCarbon-14 and tritium have been added to this category.

^for mrem/yr/site.

146. From the table presented above, it is apparent to the Board that the individual doses from Diablo Canyon meet the Appendix I dose design criteria contained in paragraphs II.A, II.B, and II.C of that appendix. In addition, the expected quantity of radioactive materials will be 0.34 Ci/yr/reactor (less than the 5 Ci/yr/reactor cited in paragraph II.D of Appendix I) and the total annual quantity of iodine-131 will be 0.076 Ci/yr/reactor. Thus, the plant complies with the design criteria of RM-50-2 and the alternative provisions of paragraph II.D of Appendix I (Parsont and Boegli at 4 following Tr. 2897). The Intervenor's witness did not contest this fact, nor was any contrary evidence presented showing noncompliance (Tr. 2621). The Board accordingly finds compliance with Appendix I. The Board also finds that compliance with the sections of the NRC's regulations mentioned above indicates that the liquid and gaseous rad-waste systems will reduce radioactive materials in effluents to "as low as is reasonably achievable" in accordance with 10 CFR §50.34a and RM-50-2.

III. CONCLUSIONS OF LAW

147. The Board has given careful consideration to all the documentary and oral evidence produced by the parties. Based upon our review of the entire record in this proceeding and upon the foregoing findings of fact, the Board concludes as follows.

- (1) The requirements of NEPA (Sections 102(2)(C) and (D)) and the Commission's regulations (Appendix D, section B of 10 CFR Part 50) have been complied with.
- (2) The environmental review conducted by the Staff in this proceeding pursuant to the National Environmental Policy Act of 1969 has been adequate.
- (3) That the certification procedures of the Federal Water Pollution Control Act of 1972 have been complied with.
- (4) That as a matter of law no serious environmental issues remain to be settled.

148. Having independently considered the final balance among the various factors contained in this proceeding after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, the Board concludes that the final environmental balance weighs in favor of the licensing of Diablo Canyon, Units 1 and 2, subject to the following conditions for the protection of the environment.

- (1) In the event of any modification of the NPDES permit or of any alternative effluent limitation established pursuant to Section 316, the Licensee shall expeditiously file with the NRC Staff an analysis of such changes and shall specify whether any such change would entail any change to this license, or any technical specifications which are part of this license, or any change to the FSAR or the Applicant's Environmental Report. If there is such a change, the Licensee shall file an analysis of any such change on facility safety, if any, and an analysis of any such change on the environmental impacts and on the overall cost-benefit balance for facility operation set forth in the NRC Staff Final Environmental Statement and addendum in the captioned proceeding (Staff Exs. 1 and 2), as modified by (a) the Initial Decision of this Licensing Board and (b) any further modification resulting from review by the Appeal Board and by the Commission, if any.
- (2) NPDES chemical and thermal limits were incorporated by reference (but not specifically written into) in the NRC's technical specifications.
- (3) The Applicant will continue to work on and, if necessary, mitigate foaming problems in Diablo Cove.
- (4) Copies of the Applicant's reports and demonstrations for EPA's 316(a) and (b) demonstration program will be furnished to the NRC as they are sent to EPA.
- (5) Fish impingement by traveling screen operation will be investigated by the use of impingement studies. Screen operation methods will be developed which will minimize impingement if they are deemed necessary by the Staff.
- (6) The Staff will maintain its close liaison with the EPA in connection with the upcoming 316(a) and (b) exemption request.
- (7) The Applicant will continue to record and monitor the size of kelp canopies and abalone populations in the Diablo Cove area for 3 years from the start of commercial operation of either Diablo Canyon Unit 1 or 2.¹⁷

THE ATOMIC SAFETY AND LICENSING BOARD

¹⁷This Partial Initial Decision is being issued only because of the inordinate delay due to the seismic issue. It will be incorporated into the Final Initial Decision which will recite an appropriate order.

Glenn O. Bright, Member

William E. Martin, Member

Elizabeth S. Bowers, Chairman

**Dated at Bethesda, Maryland,
this 12th day of June 1978.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Marshall E. Miller, Chairman
Edward Luton
Elizabeth A. Bowers

In the Matter of

Docket No. P-564A

PACIFIC GAS &
ELECTRIC COMPANY

(Stanislaus Nuclear Project,
Unit 1)

June 13, 1978

The Licensing Board denies a motion by the State of California Department of Water Resources for a protective order sustaining objections to interrogatories.

RULES OF PRACTICE: DISCOVERY

In modern administrative and legal practice, pretrial discovery is liberally granted to enable the parties to ascertain the facts in complex litigation, refine the issues, and prepare adequately for a more expeditious hearing or trial.

RULES OF PRACTICE: DISCOVERY

The scope of discovery under the Commission's Rules of Practice is similar to discovery under the Federal Rules of Civil Procedure.

RULES OF PRACTICE: DISCOVERY

To determine subject-matter relevance for discovery purposes, it is first necessary to examine the issues involved. In an antitrust proceeding, a discovery request will not be denied where the interrogatories are relevant only to proposed license conditions and not to whether a situation inconsistent with the antitrust laws exists.

ATOMIC ENERGY ACT: PRELICENSING ANTITRUST REVIEW

One of the purposes of a prelicensing antitrust review is to enable an applicant to decide whether or not to pursue a construction permit or build a nuclear plant, with foreknowledge of what antitrust conditions would be imposed on its license. *Houston Lighting & Power Company* (South Texas Project, Units 1 and 2), CLI-77-13, 5 NRC 1303, 1314-16 (1977).

RULES OF PRACTICE: DISCOVERY

Since written answers to interrogatories under oath as provided by 10 CFR §2.740(b) are binding upon a party and may be used in the same manner as depositions, the authority of the person signing the answers may be ascertained through discovery.

RULES OF PRACTICE: DISCOVERY

In an antitrust proceeding, where a State agency has asked for consideration of its own special problems in seeking joint participation in a nuclear project, it is not unreasonable for an applicant to probe through interrogatories the State agency's status and its relationships to other State agencies and officials.

ORDER CONCERNING MOTION FOR PROTECTIVE ORDER OF STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES

On May 15, 1978, the State of California Department of Water Resources (DWR) filed a motion for a protective order sustaining its objections to interrogatories 7, 8, 15, 16, 17, 18, 19, 22, 23, and 28 of the second set of interrogatories which had been propounded to it on April 13 by the Applicant (PG&E). These specified interrogatories, which will be considered in more detail *infra*, follow a general pattern of asking DWR's position on the need for the Stanislaus nuclear plant, whether it will vigorously support the licensing efforts or securing necessary cooling water, and its authority to make binding commitments involving its participation in the project. DWR objected on the grounds that the information sought was neither relevant nor reasonably calculated to lead to the discovery of admissible evidence, and that it was entitled to be protected from annoyance, embarrassment, oppression, and undue burden. The Staff supported the motion, while PG&E contended that the subject matter had been put in issue and such discovery was necessary in the preparation of its case. The motion of DWR is denied.

In modern administrative and legal practice, pretrial discovery is liberally granted to enable the parties to ascertain the facts in complex litigation, refine the issues, and prepare adequately for a more expeditious hearing or trial. In its classic description of the purposes of the analogous Federal Rules of Civil Procedure, the Supreme Court stated:

The various instruments of discovery now serve (1) as a device, along with the pretrial hearing under rule 16, to narrow and clarify the basic issues between the parties, and (2) as a device for ascertaining the facts, or information as to the existence or whereabouts of facts, relative to those issues. Thus civil trials in the Federal courts no longer need be carried on in the dark. The way is now clear, consistent with recognized privileges, for the parties to obtain the fullest possible knowledge of the issues and facts before trial . . . the deposition-discovery rules are to be accorded a broad and liberal treatment. No longer can the time-honored cry of "fishing expedition" serve to preclude a party from inquiry into the facts underlying his opponent's case.¹

The scope of discovery is similar under the Commission's Rules of Practice, which provide in pertinent part as follows:

Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the proceeding, whether it relates to the claim or defense of the party seeking discovery or to the claim or defense of any other party. . . . It is not ground for objection that the information sought will be inadmissible at the hearing if the information sought appears reasonably calculated to lead to the discovery of admissible evidence. [10 CFR §2.740(b)(1).]

One of the principal objections of the proponents of the motion is that the information sought by these interrogatories is neither relevant nor reasonably calculated to lead to the discovery of admissible evidence. To determine subject-matter relevance for discovery purposes, it is first necessary to examine the issues involved. By our Order Regarding Identification of Issues (July 14, 1977), two ultimate issues were recognized. The first issue involves the question whether PG&E's activities under the license would create or maintain a situation inconsistent with the policies of the specified antitrust laws, and contains a large number of subissues related to this liability issue. It is probable that these interrogatories are not relevant to this issue, because DWR's position on the nuclear project, its status, or its own amenability to the antitrust laws have no bearing on whether PG&E

¹*Hickman v. Taylor*, 329 U.S. 495, 501, 507 (1947). Accord: *United States v. Procter & Gamble Company*, 356 U.S. 677 (1958); *Miner v. Atlass*, 363 U.S. 641 (1960).

has conducted its operations in a manner inconsistent with the antitrust laws, as the Staff contends (NRC Staff's Answer, p. 3).

However, the oppositions filed by DWR and the Staff tend to ignore the relevancy implications involved in ultimate issue two. That issue concerns the license conditions which would be appropriate to remedy the anticompetitive situation, if such be found, taking into consideration both antitrust and such other public interest factors as might be involved. Although the proposed license conditions are treated rather meagerly in Sections X and XI of the Statement of Issues, some light is shed by DWR's petition to intervene dated October 14, 1976. In its petition DWR, as an agency of the State of California, asked for the imposition of license conditions which would permit it to become a joint participant in the Stanislaus Nuclear Project (pp. 3, 9), to have joint ownership of transmission lines and all other electrical facilities (pp. 10, 13), coordinated planning and development (pp. 9-10), interconnection and reserve coordination including joint planning of future resources (pp. 11-12), and other types of coordinated operation and development (pp. 8-14).

This description of the relief sought by DWR demonstrates that it has in mind the wide range of electric utility supply and distribution arrangements which have been considered under the shorthand term of "coordination." The former Federal Power Commission has defined coordination as the "joint planning and operation of bulk power facilities by two or more electric systems for improved reliability and increased efficiency which would not be attainable if each system acted independently."² It was noted that most electric utilities are too small by themselves to construct and take full advantage of the largest nuclear-fueled generating units, so they are able to obtain their economic benefits only by joining with neighboring systems in coordinating arrangements. The report also stated:

There are thousands of arrangements among systems from all segments of the industry providing for various degrees and methods of electrical coordination. These variations reflect differences in load density, characteristics of generating resources, geography, and climate. They are also a product of managerial views with respect to planning, marketing, competition, and retention of prerogatives.³

The Appeal Board, in its landmark *Midland* decision, has also analyzed extensively the many complicated aspects of coordination and coordinated services among electric utilities.⁴

²FPC 1970 *National Power Survey*, p. I-17-1.

³*Id.*

⁴*Consumers Power Company* (Midland Plant, Units 1 and 2), ALAB-452, 6 NRC 892, 950-57, 971-76, 1004-05, 1046-64 (1977).

It is apparent that utilities which engage in a wide variety of coordination for economic and reliability reasons must develop a close degree of cooperation and reliance upon the reciprocal performance of their coordinating partners. The successful establishment of an operating and planning coordination system brings into play the highest expertise at technical, engineering, planning, and managerial levels. There are also obvious aspects of confidentiality in sharing sensitive data and information, as well as future planning and financial information. The capabilities, reliability, and sincerity of a coordinating partner must be taken into consideration. These considerations are relevant whether joint participation is to be achieved by contractual negotiations, as DWR suggests (Motion, pp. 1, 3-6), or by the imposition of license conditions as requested by DWR. If they are relevant for one purpose, they are equally relevant for another, and certainly such matters would have to be evaluated by the Board if it determined that any license conditions were appropriate. Even in a "shotgun marriage" it is not unreasonable for one partner to be interested in the health, pedigree, and marital intentions of the other partner.

Interrogatories 7 and 8

Interrogatory 7 inquires whether it is DWR's position that the Stanislaus plant is needed and is an appropriate addition to the electrical generation capacity of California. Interrogatory 8 asks whether DWR will vigorously support the licensing effort at both State and Federal levels, if it can acquire the percentage of participation it seeks. DWR objects because questions of continued reliance on nuclear power to meet future electrical demand are topics of intense political debate in California, and it urges that these interrogatories are attempts "to embarrass the State and its administration on this politically sensitive question in an election year" (DWR Motion, p. 3).

This objection involves a question which has previously surfaced in this proceeding; namely, the status of DWR and its relationship to the State of California. PG&E previously asked to have a document preservation order (and inferentially document discovery requests) made applicable to the offices of the Governor, the Secretary of Resources, and the Energy Resources Conservation and Development Commission of the State of California. DWR objected on the grounds that it was a State agency separate and apart from the State itself.⁵ It urged that it was a distinct legal entity with the right to sue and be sued, that it was seeking to protect its own interest in this proceeding, and that this distinction demonstrated "the legal and practical impossibility of its acting in this case as a spokesman for Cali-

⁵DWR Brief in Opposition to Motion, etc. (November 1, 1977), pp. 2, 4-10.

fornia or State government as a whole" (Brief p. 6). The State was deemed to be entitled to choose the manner in which it was to be organized, and its right to do so must be respected by Federal instrumentalities under the Tenth Amendment to the U. S. Constitution. DWR anticipated that the division of responsibilities among other agencies and officers could result in disparate and conflicting positions in various State and Federal fora, stating:

DWR does not coordinate its positions in this litigation with other State agencies, whose interests may or may not coincide with DWR's. DWR appears before this board as a separate legal entity whose interest in the proceeding derives not from the general interests of the people of California, but rather from its status as a major user and producer of electricity and a customer and potential competitor of PG&E. Other State agencies are charged with responsibilities over which DWR has no statutory mandate. DWR is in no position to represent their interests [Brief, p. 7].

This picture of a semiautonomous State agency was somewhat tempered by DWR's further statement:

It is true that there are executive—as well as legislative and judicial—officers of State government who can exert influence on DWR's program. Indeed, the same officers may determine the testing of PG&E's resource development program. But under analogous Federal rules, the test is not whether a third party controls a party to the case, but rather whether the party controls the third person, in determining whether the third person may himself be treated as a party for discovery purposes [Brief, p. 14].

PG&E contended that DWR was not a discrete entity intervening only in its own behalf, stating:

PG&E has a legitimate and significant interest in a determination that the entire State of California Executive Branch is subject to discovery and process in this proceeding. First of all, DWR's entire basis for participation here lies largely in its asserted interest in becoming a joint venturer in nuclear power plants. Since DWR cannot, as a practical matter, participate in such profits without the approval and support of the Governor and Secretary of Resources, the true nature and extent of DWR's interest in the Stanislaus and other nuclear projects can be determined only through discovery that includes those offices [PG&E's Reply, pp. 2-3].

Although DWR's status was deemed to be ambiguous and the question a close one, on balance, the Board held that it was a separate entity for in-

tervention and discovery purposes. However, there was an express caveat that such ruling was without prejudice to PG&E's right to raise the question again if necessary to avoid basic unfairness or impairment of procedural or substantive due process (Tr. 735-38).

Some of the issues underlying the present motion were thus foreshadowed by earlier positions taken by the parties. DWR clearly anticipated that it might take positions in this proceeding which were in conflict with those of other elements of the State government. There was no suggestion that such a result would cause undue embarrassment to anyone, or that DWR should receive preferential treatment in discovery because of that possibility. Any political or other embarrassment which might result from discovery is the result of the manner in which the State of California has exercised its Tenth Amendment right to organize itself, rather than the licensing procedures followed by this Federal instrumentality. The Board has no desire or intention of becoming involved in California politics, whether or not it is an election year. By the same token, it has no intention of permitting the political apprehensions of others to circumscribe or prevent a full, fair antitrust review under Section 105c.

Interrogatory 7 asks for DWR's position regarding the need for the Stanislaus project, and whether it is an appropriate addition to generating capacity in California. Only DWR's position is involved; there is no suggestion that it can bind other elements of the State government. Such information is relevant in evaluating the intentions and capabilities of a proposed coordination partner. The Commission has also made it clear that one of the purposes of a prelicensing antitrust review is to enable an applicant to decide whether or not to pursue a construction permit or build a nuclear plant, with foreknowledge of what antitrust conditions would be imposed on its license.⁶ The anticipatory nature of such an antitrust review, which would then enable private utility investors to proceed "with their eyes open," was also set forth in the legislative history of Section 105c.⁷ To enable PG&E to decide whether or not to continue to seek a construction permit which might be freighted with antitrust conditions, it is not unreasonable for it to seek information both about the extent of the proposed conditions, as well as the present and future intentions, plans, and reliability of prospective joint participants via the license conditions route.

Interrogatory 8 asks whether DWR will vigorously support the licensing efforts if it obtains a percentage of participation. Ascertaining the inten-

⁶*Houston Lighting & Power Company, et al.* (South Texas Project, Unit Nos. 1 and 2), CLI-77-13, 5 NRC 1303, 1314-16 (1977).

⁷Hearings on Preliminary Antitrust Review of Nuclear Power Plants, 91st Cong., 2d Sess., p. 37-38 (1970).

tions and degree of commitment of a coordination partner is not unreasonable. It is not enough for DWR to suggest that such questions should be considered in the course of negotiations for a participation agreement, and that vigorous support would be part of the consideration for an agreement. There are no such negotiations, as the parties have indicated, and license conditions are being sought in lieu thereof. The same questions are material and relevant, regardless of the route followed.

Interrogatories 15 and 16

These interrogatories relate to whether or not DWR "will fully and affirmatively cooperate in efforts to secure necessary cooling water for the power plant," if it obtains joint participation in the project. Our discussion above regarding relevancy in terms of negotiations versus license conditions, as well as possible political ramifications, applies to these interrogatories as well. The availability and terms or conditions of a cooling water supply involve integral questions bearing upon the viability and licensability of the proposed Stanislaus project. The intentions and contemplated actions of a State agency which seeks joint participation as a coordination partner appear to have subject-matter relevancy for discovery purposes.

Interrogatories 17, 18, 19, and 28

Interrogatory 17 concerns identification of official action by DWR authorizing the signing of answers to these interrogatories. Since written answers under oath as provided by 10 CFR §2.740(b) are binding upon a party and may be used in the same manner as depositions, the Applicant is entitled to have the authority of the person signing the answers established clearly in the record. Statements of counsel in briefs or argument do not satisfy the requirements of these discovery rules.

Interrogatory 18 asks whether there is any agency or officer of the State which could overrule DWR's decision to participate in this project, and Interrogatory 19 seeks an explanation of an affirmative answer. In view of the ambiguous nature of the status of DWR and its relationship to other elements of the State government discussed above, PG&E is entitled to a full and accurate description under oath of the power of others to veto or modify the decisions or actions of DWR in this regard. The nature and extent of the powers of other ". . . officers of State government who can exert influence on DWR's program" (DWR Brief in Opposition to Motion, November 1, 1977, p. 14) should be candidly set forth by responsive answers.

Interrogatory 28 asks the extent to which any commitment made by DWR to participation in the project will be binding on DWR and the State of California should there be changes in the management of DWR or in the State administration. It is undisputed that the Director of Water Resources can be removed at the pleasure of the Governor (Cal. Gov. Code, Section 3002) or by the Legislature (Cal. Wat. Code, Sections 120, 122), that he is an integral part of the Executive Branch (Cal. Wat. Code, Section 124), and that both the Governor and the Legislature must approve the State budget. DWR has attacked the proposed conditions (Statement of Commitments) negotiated by the Department of Justice and PG&E, in part because the requirement that an agreement to participate must be fully consummated within 1 year of the offer is unreasonable and is practically impossible for DWR because of the requirements for action by other State agencies under the California Environmental Quality Act (DWR Petition to Intervene, p. 10, as amended; Response of DWR to the Summary Disposition Motion of PG&E, pp. 46-47). Since DWR has asked for consideration of its own special problems in seeking joint participation in the project, it is not unreasonable for PG&E to probe into DWR's status and its relationship to other State agencies and officials, in terms of its ability and intention to seek meaningful joint ownership of generating and transmission facilities. License conditions, if imposed, would be for the life of the plant. No one can say with assurance what the economic and technical situation will be in 30 years in the electric utility industry. It is therefore all the more important to obtain as much information as possible now with regard to the intentions, plans, and durability of present decisions of a prospective coordination partner.

Interrogatories 22 and 23

Interrogatory 22 asks whether it is the position of DWR that it is immune from the antitrust laws, and Interrogatory 23 asks for the facts regarding its connection with the State upon which the claim of immunity is premised. These interrogatories are relevant because the information sought could shed some light on the status of DWR and its relationship to the State, if valid governmental action is the basis for any claimed immunity. Responses should be made within the context of the recent Supreme Court decision in *City of Lafayette v. Louisiana Power and Light Company*, 46 U.S.L.W. 4265 (March 29, 1978).

PG&E is granted an extension of time within which to file a motion to compel further answers to the second set of interrogatories propounded to DWR, to and including ten (10) days after the date of this Order.

IT IS SO ORDERED.

**THE ATOMIC SAFETY
AND LICENSING BOARD**

Elizabeth A. Bowers, Member

Edward Luton, Member

Marshall E. Miller, Chairman

**Dated at Bethesda, Maryland,
this 13th day of June 1978.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Samuel W. Jensch, Chairman
R. Beecher Briggs
Franklin C. Daiber

In the Matter of

Docket No. 50-247
OL No. DPR-26

CONSOLIDATED EDISON
COMPANY OF NEW
YORK, INC.

(Determination of
Preferred Alternative
Closed-Cycle
Cooling System)

(Indian Point Station,
Unit No. 2)

June 14, 1978

The Licensing Board grants the Hudson River Fishermen's Association's renewed motion for a determination that all governmental approvals have been received for the construction of an alternative closed-cycle cooling system for Indian Point Unit 2.

**ORDER GRANTING MOTION AND DETERMINING THAT
ALL GOVERNMENTAL APPROVALS HAVE BEEN RECEIVED FOR
CONSTRUCTION OF CLOSED-CYCLE COOLING TOWER SYSTEM**

Hudson River Fishermen's Association (HRFA) has renewed its motion requesting a determination that all governmental approvals have now been received for the construction of the alternate cooling system for the Indian Point nuclear generating facility No. 2. The alternate cooling system has previously been determined to be a closed-cycle cooling tower system.

The HRFA motion also seeks a modification of the existing license condition which is as follows:

The Nuclear Regulatory Commission previously determined that the finality of the May 1, 1979, date for termination of once-through cooling was grounded on a schedule under which the licensee, acting with due diligence, obtained all governmental approvals required to proceed with construction of the closed-cycle system by December 1, 1975. In the event the licensee had acted with due diligence in seeking such govern-

mental approvals but had not obtained such approvals by December 1, 1975, then the May 1, 1979, date should be postponed accordingly. *The Commission has determined* that the licensee has acted with due diligence and *that all governmental approvals* required to proceed with construction of the closed-cycle system *have not been received pending further proceedings with respect to the Village of Buchanan Zoning approval.* The Commission has also determined that the reasonable date for termination of once-through cooling is now May 1, 1982. [Emphasis added.]

The stated basis for the HRFA motion, dated April 10, was failure of the Village of Buchanan to act, within the time prescribed by the Appeal Board, on a request by Consolidated Edison Company of New York, Inc., (Con Ed or Licensee) for a variance from its building code to permit construction of a cooling tower for Unit No. 2. The Regulatory Staff supported the HRFA motion. Con Ed argues in its reply that the motion should be denied as moot. Copies of a letter from Carl R. D'Alvia, village attorney, and minutes of a meeting of the Zoning Board of Appeals of the village, which showed that the requested variance was granted on April 13, 1978, were included to support this position.

The consideration of the request filed with Village of Buchanan for a variance from its building code to permit the construction of cooling towers for a closed-cycle cooling system has extended for a substantial period of time. Hearings have been held before the Nuclear Regulatory Commission Atomic Safety and Licensing Board, and the Appeal Board has twice considered the issue. Several aspects of the contentions of the parties have received broad review, including assertions that the Federal law had preempted the village¹ and State laws and claims of arbitrary action by the vil-

¹The Licensing Board did not attribute substantiality to the assertion of preemption by the Federal law (National Environmental Policy Act (NEPA)); the *Licensing Board* held: "... that approval by the village is not a governmental approval that is required to proceed with construction of the closed-cycle cooling system" (LBP-76-43, 4 NRC 598 (1976) at p. 604). This ruling was based upon the determination that the law of New York prohibits the village from interfering with the construction of the cooling towers. The Appeal Board held (ALAB-399, 5 NRC 1156 (1977)) that the "... Licensing Board ... erred ... in its method of determining what the New York law is and in its substantive conclusion as to the content of that law" (at p. 1166-67), and the Appeal Board then determined that the Village of Buchanan should be given 45 days to issue regulations for local and incidental conditions relative to construction and that if such were an obstacle or delay to the license condition for a closed-cycle cooling system, then upon that basis, if no action were taken by the village, then the Licensing Board could declare that the Federal law preempted the village ordinances.

(Continued on next page.)

lage in refusing the variance. In addition, the action of refusal by the village has been the subject of an appeal by the Licensee to the State courts of New York, including the court of appeals. That court held that preemption was not an issue and should not have been considered. The court of appeals further held under the New York law that refusal of a variance by the Village of Buchanan was an abuse of discretion under the circumstances. A portion of the opinion of the court of appeals decision is as follows:

At the outset, we note that issues of Federal preemption are raised with differing emphases by the original parties, the intervenor, and amici. *These issues need not and should not be reached. . . . this question is capable of resolution under our own State law*

* * * *

. . . it has long been held that a zoning board may not exclude a utility from a community where the utility has shown a need for its facilities. . . . [Emphasis added.]

In the Matter of Consolidated Edison Company of New York, Inc.,
Respondent,

vs.

Walter Hoffman, &ors., as the Zoning Board of Appeals of the Village
of Buchanan, Appellants,

Hudson River Fisherman's Association, Intervenor-Respondent.

Decision, February 14, 1978.

(Continued from previous page.)

The Appeal Board declared that if the sole issue was the denial by the village, then the Appeal Board ". . . would be compelled to hold that its [the village] power to make a decision is preempted by NEPA" (brackets added). Respecting the necessity for the Zoning Board of the village to issue regulations for local and incidental conditions relative to the construction of the cooling towers, the Appeal Board held: "If the Zoning Board uses this declaration of its power under State law in such a way as substantially to obstruct or to delay the license conditions imposed on Con Ed by this Commission pursuant to NEPA, then its 'regulation' would be preempted by Federal law" (ALAB-399, 5 NRC at 1169).

The New York Court of Appeals held that: ". . . issues of Federal preemption . . . need not and should not be reached. . . . this question is capable of resolution under our own State law . . ." (February 14, 1978, decision, see *infra* p. 1050).

The matter pertaining to the Village of Buchanan was the last remaining item respecting necessary governmental approvals. The court of appeals affirmed the order of the Appellate Division which directed the Zoning Board of Appeals to issue the variance. A variance has been issued. There is no longer any dispute as to whether all necessary governmental approvals have been received. The termination date for operation of Unit No. 2 with once-through cooling has been determined in other proceedings to be May 1, 1982.

The motion of HRFA is granted and the license provision paragraph 2.E.(1)(b) should be modified to declare that all governmental approvals have now been received. The Applicant can now proceed with construction.

WHEREFORE, IT IS ORDERED, in accordance with the Atomic Energy Act, as amended, and the Rules of Practice of the Nuclear Regulatory Commission, that paragraph 2.E.(1)(b) of the Consolidated Edison Company of New York, Inc., Facility Operating License is modified to read in pertinent part as follows:

The Commission has determined that the licensee has acted with due diligence and that all governmental approvals required to proceed with construction of the closed-cycle cooling system have been received. The Commission has also determined that the reasonable date for termination of once-through cooling is now May 1, 1982.

**ATOMIC SAFETY AND
LICENSING BOARD**

R. Beecher Briggs

Franklin C. Daiber

Samuel W. Jensch, Chairman

Issued:

June 14, 1978

Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

John F. Wolf, Chairman
A. Dixon Callihan
Dr. Richard F. Cole

In the Matter of
CAROLINA POWER &
LIGHT COMPANY

Docket Nos. 50-261
(OL Modification)

(H. B. Robinson, Unit
No. 2)

June 16, 1978

In consolidated proceedings involving an operating license amendment and an environmental review pursuant to Section B of Appendix D to 10 CFR Part 50, the Licensing Board issues a Partial Initial Decision and determines that the adverse environmental impacts of the unit, including health effects attributable to increasing the value for radon-222 emissions, are too small to change the cost-benefit balance and declines to modify or withdraw the unit's existing operating license.

EPA AUTHORITY: INTERPRETATION

Although an adverse environmental impact on water quality resulting from a cooling system discharge is an important input in the NEPA cost-benefit balance, a licensing board cannot alter a facility's cooling system if it has been approved by EPA. *Public Service Company of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 23-28 (1978).

**PARTIAL INITIAL DECISION
(Environmental Matters Only)**

Appearances

George F. Trowbridge, Esq., Shaw, Pittman, Potts,
and Trowbridge, Richard E. Jones, Esq., Carolina
Power & Light Company, on behalf of the Applicant

John Whisenhunt, Esq., Bridges and Whisenhunt, on behalf of the Intervenor

David A. Kubichek, Esq., U. S. Nuclear Regulatory Commission, on behalf of the NRC Staff

I. PRELIMINARY STATEMENT

1. This Partial Initial Decision follows a consolidated hearing in two proceedings concerning operating license No. DPR-23, issued to Carolina Power & Light Company ("Applicant")¹ on July 31, 1970, by the Atomic Energy Commission² authorizing the operation of the H. B. Robinson Steam Electric Plant, Unit No. 2, at Applicant's site in Darlington County, South Carolina. The first proceeding involves the Commission's review and determination pursuant to the National Environmental Policy Act of 1969 (NEPA). The second involves Applicant's pending application to the Commission for an amendment to the operating license increasing the authorized maximum power of the Robinson plant from 2,200 to 2,300 MWt.

2. The Robinson facility is subject to the provisions of Section B of Appendix D to 10 CFR Part 50, which sets forth procedures for the environmental review of production and utilization facilities for which construction permits or operating licenses were issued in the period January 1, 1970, to September 9, 1971.³ On July 6, 1973, the Commission issued "Notice of Opportunity for Hearing Pursuant to 10 CFR Part 50, Appendix D, Section B."⁴ Notice was given therein that the Commission was providing an opportunity for hearing with respect to whether, considering the matters covered by Appendix D to 10 CFR Part 50, the existing full term operating license should be continued, modified, terminated, or appropriately conditioned to protect environmental values.

3. On September 6, 1973, an Atomic Safety and Licensing Board designated to rule on petitions for leave to intervene issued a memorandum and order in which it granted the August 16, 1973, petition of John D. Whisenhunt ("Intervenor") of Florence, South Carolina. On September

¹The company is, technically, the "licensee" in one proceeding and an "applicant" in the other. The term "applicant," however, was commonly used at the hearing by all of the parties and will therefore be employed throughout the decision.

²The Energy Reorganization Act of 1974, 42 U.S.C. §5801, *et seq.*, abolished the Atomic Energy Commission and transferred its licensing functions to the Nuclear Regulatory Commission. The term "Commission" is used in this decision to refer to both the AEC and the NRC.

³Pursuant to 10 CFR §51.56, Appendix D to Part 50, rather than Part 51, remains applicable to these proceedings.

⁴38 Fed. Reg. 19148 (July 18, 1973).

28, 1973, that Board issued "Notice of Hearing Pursuant to 10 CFR Part 50, Appendix D, Section B," which gave notice that a hearing would be held and that this Atomic Safety and Licensing Board ("the Board") had been designated to conduct the hearing.⁵

4. In a notice issued on November 13, 1973, the Board scheduled a pre-hearing conference to be held in Hartsville, South Carolina, on November 30, 1973. In a prehearing conference order of January 2, 1974, the Board set forth the actions taken at the conference, which included the approval of stipulations by the parties concerning the scheduling of discovery and the commencement of the evidentiary hearing, the order of appearance of witnesses at the hearing, and the matters in controversy.

5. On April 24, 1974, the Commission issued "Notice of Proposed Issuance of Amendment of Facility License," which gave notice that the Commission was considering the issuance of an amendment to the license which would authorize an increase in maximum steady-state power from 2,200 to 2,300 MWt, in response to Carolina Power & Light Company's application of February 4, 1974.⁶ Notice was given therein that petitions for leave to intervene might be filed in accordance with the Rules of Practice. On May 24, 1974, Mr. Whisenhunt petitioned to intervene in the operating license amendment proceeding, and his petition was granted on July 22, 1974. On the same day the Board issued "Notice of Hearing on Modification of Facility Operating License," which gave notice that a hearing would be held by the Board concerning the license amendment application.⁷

6. Intervenor's contentions were identical in both proceedings and were concerned with the effect of thermal discharges on the recreational use of Lake Robinson and the fish and wildlife therein.

7. On July 22, 1974, the Board referred to the Commission the question of consolidating, pursuant to 10 CFR §2.716, the proceeding pursuant to Section B of Appendix D to 10 CFR Part 50 with the proceeding on the issuance of an amendment to the license. The Board noted that the two proceedings involved the same parties and the same matters in controversy. On September 9, 1974, the Commission ordered the subject proceedings consolidated for hearing and all other purposes.⁸

8. On November 4, 1971, Applicant submitted to the Commission, and subsequently amended on three occasions, an Environmental Report on the Robinson facility.⁹ The Staff's Draft Environmental Statement was issued in April 1973. The notice of availability and request for comments was

⁵38 Fed. Reg. 27433 (October 3, 1973).

⁶39 Fed. Reg. 15061 (April 30, 1974).

⁷39 Fed. Reg. 27748 (July 31, 1974).

⁸8 AEC 373 (1974).

⁹Applicant's Exhibit No. 3.

published in the FEDERAL REGISTER on April 23, 1973.¹⁰ After receipt and consideration of the comments submitted on the Draft Environmental Statement, the Staff prepared and issued a Final Environmental Statement (FES).¹¹ The FES, including a discussion of comments received, was issued in April 1975, and notice of availability was published in the FEDERAL REGISTER on April 21, 1975.¹²

9. Pursuant to notices issued by the Board on July 22, 1975,¹³ and on September 2, 1975,¹⁴ sessions of the evidentiary hearing were held in Harts-ville, South Carolina, on August 12 through 15, and September 23 through 26, 1975. The Board invited the presentation of limited appearance statements pursuant to 10 CFR §2.715(a), but none were presented.¹⁵ The record of the hearing includes the testimony of witnesses for Applicant, the Staff, the Intervenor, officials from the State of South Carolina and from Region IV of the U. S. Environmental Protection Agency (EPA) called by the Board, and exhibits. The testimony includes responses by the Applicant and Staff to numerous questions posed by the Board in the course of the proceeding.

10. The 1975 hearings were primarily concerned with the environmental impacts on Lake Robinson associated with the Robinson plant's once-through cooling system. Lake Robinson is an impounded lake built by Applicant to supply cooling water to Robinson Unit No. 1 (a small coal-fired plant) as well as to Robinson Unit No. 2. Cooling water flows to the plants through an intake structure located near the dam of the lake and is discharged through a canal at the upper end of the lake. The principal environmental concerns of the Board were the impacts of the cooling system and the thermal discharges on aquatic life in the lake including impingement, entrainment, and possible planktonic shifts resulting from heat death of organisms passing through the condenser, and the impact of thermal discharges on the recreational value of Lake Robinson.

11. The parties to the 1975 hearings presented testimony on the circulating-water system, the resulting temperature regime, and effects on the aquatic and terrestrial ecosystem, Applicant's environmental monitoring program, and recreational use of the Lake Robinson impoundment. The Board concluded, however, that there were several deficiencies in the record pertaining principally to the impact of thermal discharges on the aquatic

¹⁰38 Fed. Reg. 10035 (April 23, 1973).

¹¹Staff's Exhibit No. 5.

¹²40 Fed. Reg. 17647 (April 21, 1975).

¹³40 Fed. Reg. 31671 (July 28, 1975).

¹⁴40 Fed. Reg. 42248 (September 11, 1975).

¹⁵Tr. 70.

and terrestrial life of Lake Robinson. The Board so advised all parties by memorandum and order dated March 23, 1976.

12. Following the issuance of the Board's March 23, 1976, order, both the Applicant and the Staff proposed that supplementation of the hearing record be postponed until after the completion by Applicant of its demonstration under Section 316 of the Federal Water Pollution Control Act (FWPCA) in support of its request to EPA for a National Pollution Discharge Elimination System (NPDES) permit authorizing continued use of Robinson's once-through cooling system and until after EPA's review and determination of the request. Applicant explained that the 316 report would cover extensive studies, which had not been completed at the time of the 1975 hearings and which would directly address the matters as to which the Board had found deficiencies in the record. Accordingly, no further hearings were scheduled by the Board until after issuance of EPA's 316 determination late in 1977.

13. On March 24, 1977, Intervenor Whisenhunt advised the Board that he had disposed of the property which gave rise to his knowledge and interest in this matter, and on April 17, 1977, formally moved the Board for an order dismissing him as a party from the proceeding. The Board granted Mr. Whisenhunt's motion to withdraw by memorandum and order dated May 9, 1977.

14. On November 15, 1977, the Regional Administrator of EPA Region IV acted favorably on Applicant's 316 request, by issuing formal findings and a determination that "the protection and propagation of a balanced, indigenous population of fish, shellfish, and other aquatic (sic) organisms in and on Lake Robinson will be assured by the continued operation of the H. B. Robinson Steam Plant in its present once-through mode"¹⁶ and by reissuing an NPDES permit to Applicant authorizing such operation. Copies of the EPA findings and determination and of the reissued NPDES permit¹⁷ were furnished to the Board, along with copies of Applicant's 316 demonstration report and supplements thereto submitted by Applicant to EPA.¹⁸ The NPDES permit sets forth detailed thermal discharge limitations during various seasons of the year applicable to operation at 2,300 MWt.

15. By notice¹⁹ published in the FEDERAL REGISTER for December 28, 1977, the Board scheduled a resumption of the hearing on January 9, 1978, to receive in evidence the EPA documents and other materials supplied to the Board, and to respond to Board questions with respect to these materials.

¹⁶Applicant's Exhibit 17 at 6.

¹⁷Applicant's Exhibit 16.

¹⁸Applicant's Exhibits 12-13.

¹⁹42 Fed. Reg. 64749.

16. Both the Applicant and the Staff presented responses to seven numbered comments contained in the Board's order of March 23, 1976, describing the deficiencies which the Board had found in the 1975 evidentiary record.

17. On May 1, 1978, the Staff offered into evidence a number of items addressing the environmental effects of certain phases of the uranium fuel cycle.²⁰ These exhibits evaluated the radiation doses and the concomitant health effects of radon released to the atmosphere during mining and milling operations within the uranium fuel cycle. Included also is a comparison of health effects to be expected from coal and nuclear fuel cycles.²¹ The radon issue arises now from the necessity of a revision of the "Summary of Environmental Consideration for Uranium Fuel Cycle," Table S-3, 10 CFR Part 51, which, in an earlier form, had appeared as Table 5.8 in the Staff's Final Environmental Statement.²² Table S-3 had previously been addressed by the Commission on April 14, 1978, with the removal of dose estimates of gaseous effluents. Further, health effects of those doses were to be discussed in individual licensing cases.²³

II. FINDINGS OF FACT

18. The FES as supplemented²⁴ covered the environmental effects of facility operation, environmental measurements and monitoring program, environmental impact of postulated accidents, the need for power generating capacity, alternatives to the project, and the radiologic impact of the uranium fuel cycle. Except for the impacts associated with the once-through cooling system and the effects of the fuel cycle, we find the Staff's analyses in the FES to be satisfactory. Our evaluation of the impacts associated with the cooling system and the fuel cycle, however, is based on oral testimony and written evidence in the record.

A. Need for Power

19. The Applicant's objective is to maintain a minimum reserve power margin of 15% to 20% of the predicted annual peakload commensurate with the generally adopted industry "loss-of-load" probability standard whereby a utility fails to meet load demands no more than 1 day in 10

²⁰Staff Exhibits 8-15 received into the record by Board order dated May 15, 1978.

²¹Gotchy, R. L., "Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives," NUREG-0332, September 1977, Staff Exhibit 10.

²²At 5-17, Staff Exhibit 5 admitted at Tr. 1445.

²³Staff Exhibit 9.

²⁴Staff Exhibits 8-15.

years. Further, the Applicant has forecast an average annual growth rate in power load of 5.5% during the interval 1978 to 1997. Absent operation of Unit 2 and assuming new installations retain contemplated schedules, the reserve margin will fall short of the target during most of the above forecast period, reaching a low of 5% in 1983.²⁵

B. Environmental Effects of Construction

20. Clearing the site for Unit 2 and adjacent areas occurred in 1960 and construction of the unit itself was essentially completed in 1970. In the ensuing interval the resulting small, though finite, impact on the environment has been absorbed. The Applicant generally restored areas disturbed by construction of both the generating stations and the associated transmission corridors.²⁶

C. Environmental Impacts of Facility Operation

21. The H. B. Robinson site has been used for the generation of electrical energy for nearly a score of years with Lake Robinson serving as a sink for the thermal discharge. Except for the magnitude and impact of the thermal discharge, discussed elsewhere in this decision, the advent of Unit 2 did little to alter the site environment as it existed as a consequence of the operation of Unit 1.

22. The Staff discussed such effects as land use, noise production, and visual impact at the site in the context of Unit 2 alone as well as the impact of transmission corridors, a requirement common to both generating stations.²⁷

D. Radiologic Impacts of Facility Operation

23. Consideration of the radiation doses and resultant health effects associated with the operation of Unit 2 is divided between those derived directly from the Unit 2 reactor and from the radioactive materials necessarily transported to and from it. A further consideration is the radiologic impact of the operations and material within the uranium fuel cycle.

Consideration by the Staff of the first of these sources appear in the FES and include both gaseous and liquid effluents and their effects on both the

²⁵The need for power consideration was updated by Applicant's Exhibit 20 received into the record by Board order dated May 31, 1978.

²⁶Staff Exhibit 5 at 4-1 *ff.*

²⁷Staff Exhibit 5 at 5-1.

biota and members of the public. The last, in turn, reflects radiation directly received as well as that experienced through the food chain. The average annual dose to an individual residing within 50 miles of the site is less than 0.01 mrem/yr. Integration of these data over the population residing within 50 miles is 3.5 mrem/yr. This result may be compared to 67×10^3 mrem/yr arising from radioactive substances occurring naturally in the vicinity of the Robinson site.²⁸

E. Environmental Impact of Postulated Accidents

24. Realistic estimates by the Staff of the radiologic consequences of postulated accidents in the operation of Unit 2 result in an exposure of an individual, located at the site boundary, no greater than that resulting from an annual exposure to limiting concentrations of radionuclides specified by the Commission in 10 CFR Part 20. Further, such exposure will be less than experienced from background radiation. The estimated exposure potential of postulated accidents occurring during transport of radioactive materials to and from Unit 2 is similarly small.²⁹

F. Alternative to the Proposed Project

25. Because Unit 2 began operating in 1970, many of the possible alternatives to the present plant were reviewed long ago. An exception of current importance is the waste heat dissipation system discussed later in this decision. Alternate modes of energy generation and of transmission characteristics, alternative sites, plant size and type together with conclusions leading to the presently operating facility have been reexamined by the Staff.³⁰

G. Cost-Benefit Considerations

26. Certain unavoidable adverse effects resulted from the construction and operation of Unit 2. For example, clearance of wooded areas for the construction of the discharge canal and the 230 kV transmission lines not only decreased the timber-producing capacity of such areas, but it also changed the habitat for wildlife.³¹

27. The thermal discharge resulting from Unit 2 operation caused a reduction in productivity of fish, phytoplankton, and benthos. It also

²⁸Staff Exhibit 5 at 5-6 ff and Fig. 2.5.

²⁹Staff Exhibit 5 at 7-4.

³⁰Staff Exhibit 5 at 9-1 ff.

³¹Staff Exhibit 5, pp. 4-1, 4-2, 5-1.

caused increased evaporation and consequently a decrease in flow downstream in Black Creek amounting, in summer, to as much as 31% of the downstream flow.³²

28. Some loss of small fish by impingement on the intake screen will occur. Plankton and meroplankton entrained in the circulating water during summer will perish.³²

29. Procedures for disposal of sanitary chemical and radioactive waste reduce adverse impacts from the sources to acceptably low levels.³²

30. Operating Unit 2 results in a small increase in radioactivity in air and water. Fluctuation in natural background radiation exceeds that small increase.

31. The greater part of land used during the plant life can be returned to other uses except, of course, the area beneath the reactor containment, fuel handling, auxiliary buildings, and the turbine structure which would be irreversibly committed. Generally, however, the trade off between the production of electricity and small changes in the local environment is reversible. The benefits to the area served by the production of electricity are large. In comparison, the commitment both reversible and irreversible of resources needed to produce the electricity is small.³³

32. Unit 2 has had a positive socioeconomic effect on Darlington County, South Carolina, in which it is located. It has provided employment for 77 persons with an annual payroll of approximately \$775,000. In addition, it provides about 30% of the property taxes collected by the county. In 1972 its property tax bill amounted to \$1,272,000.³⁴

H. Environmental Impact of the Fuel Cycle

33. The environmental considerations necessary to the uranium fuel cycle for a typical 1,000 MWe light-water reactor, a reference reactor, for 1 year have appeared as Table S-3 of 10 CFR Part 51 entitled "Summary of Environmental Considerations for Uranium Fuel Cycle." Reference to this table appeared in the FES³⁵ issued in 1975. Subsequently, in 1977, the Commission adopted an interim Table S-3 with modification of some earlier environmental impact values.³⁶ More recently, April 1978, Table S-3 has been further addressed by the Commission through, among other matters, a clarification of the considerations of the radiological impact of the radon-222 emitted to the atmosphere from the complex mining-milling

³²Staff Exhibit 5, p. 10-1.

³³Staff Exhibit 5 at 10-4 *ff.*

³⁴Staff Exhibit 5 at 10-3.

³⁵At 5-7, Staff Exhibit 5.

³⁶42 Fed. Reg. 13803, *et seq.*, Staff Exhibit 8.

operations including mining, *per se*, and the disposed milling residues designated as tailings.³⁷ At the present time the environmental effect of radon emission is to be litigated in licensing proceedings on a case-by-case basis. The numerical value of the radon emission has now been deleted from Table S-3.

34. Staff testimony addressed the issue through estimates of the discharge, during underground mining,³⁸ of radon otherwise retained below surface and of the radon emitted in milling operations including that from the accumulation of tailings, both those freshly produced and those of long standing.³⁹ Additionally the Staff has now prepared predictions of the health effects of exposure to the radon arising from the fuel cycle. These emissions, in Ci, are normalized to the annual requirement for fuel necessary for a 1,000 MWe light-water reactor operating at 80% capacity factor.

35. The Staff estimates a radon release to the environment of more than 5 kCi as an immediate consequence of preparing the annual fuel requirement (AFR).⁴⁰

36. After preparation for long-term storage by burial or other stabilization procedures, the yearly emission from the residues from the preparation of the annual fuel supply has been estimated to be 1 to 10 Ci. Further, if by some future action, natural or otherwise, such as erosion during 1,000 years, were to remove the cover, an annual emission of a 100 Ci is expected from the deposit.⁴¹

37. The Staff has translated the radon emissions predicted above into doses and health effects within a stable U. S. population of 300 million in year 2020. The contribution to the total emission by the long-term storage of tailings was taken as 1 Ci/yr per AFR during the first 100 years; 10 Ci/yr per AFR during the next 400 years; and 100 Ci/yr per AFR during times greater than 500 years. In this manner account is taken of potential "un-

³⁷Staff Exhibit 9.

³⁸The analysis by the Staff does not include radon emitted to the environment from open-pit mines (see Staff Exhibit 14 at 7).

³⁹The Commission is promulgating regulations applicable to newly proposed operations and to renewals of existing licenses whereby operators will be required to apply sufficient cover to piles of tailings on the surface to limit the radon emission from the disposed area to no more than twice the emission from local natural soil. It is expected that a 6 to 20 foot-thick cover will be required. Returning tailings into below-grade mined-out areas is a possible alternate. See Staff Exhibit 15 at pp. 8 and 9.

⁴⁰Mining accounts for 4 kCi/AFR (Staff Exhibit 14); active milling—780 Ci/AFR (Staff Exhibit 15); short-term storage of tailings—350 Ci/AFR (Staff Exhibit 15). In earlier versions of Table S-3 an emission of 74 Ci of radon was estimated as arising from active operation of a mill but not including mining and long-term tailings storage as sources (Staff Exhibit 12).

⁴¹Staff Exhibit 15 at 10.

covering" of the deposit. The largest resultant cumulative environmental dose commitment to the population over 100 years is 68 mrem from bone seekers and about 3 mrem whole body. Corresponding commitments to the population from all radiation naturally appearing in the environment based on the same assumed distribution of the population in space and time are more than six orders of magnitude greater than those due to the radon from processing uranium ore. Within these first 100 years an estimated 0.11 cancer mortalities and 0.036 health effects of genetic origin are estimated from the radon emitted from fuel prepared for the 1-year operation of a reactor under the basic conditions assumed.⁴² Although these exposures, and their effects, have been extrapolated well beyond 100 years, unpredictable uncertainties in their bases give the results little meaning.⁴³

I. Environmental Effect of the Thermal Discharge

38. This Board now addresses the discharge of thermal energy into Lake Robinson through the condenser coolant for the two adjacent steam-electric generating plants. As noted elsewhere in this decision, the lake temperature, particularly in the vicinity of the exit of the discharge canal of the once-through cooling system, has been of concern to the Board⁴⁴ and to Intervenor Whisenhunt, now withdrawn. The Applicant prepared a 316 demonstration report⁴⁵ in support of its application for a NPDES permit.⁴⁶ Due consideration by EPA of this and, no doubt, other information culminated in the issuance of NPDES Permit No. SC0002925 on November 15, 1977. Under this permit the Applicant is allowed continuing use of the existing once-through condenser cooling system subject, however, to some restrictions. The permit also places limits on other characteristics of the water such as chemical purity.

39. The permit limits the temperature of the discharge at the mouth of the canal to 44.0°C (111.2°F) during the summer provided the "roving"

⁴²Although the Staff did not consider open-pit mining in its estimates of radon release, the Board has assumed that such release would be approximately the same as emissions from tailings piles ≈ 100 Ci/yr/AFR and that such releases would not modify the Board's conclusions concerning health effects.

⁴³Staff Exhibit 13.

⁴⁴In a limited investigation of alternatives to the existing once-through cooling system, the Board requested the Applicant to provide the results of any study of installing spray cooling in the existing discharge canal. In response the Applicant reported that a study showed the installation cost of sprays to be \$19.5 million with an annual operating requirement of more than \$4.3 million (following Tr. 1637 at 21).

⁴⁵A demonstration of water quality and attendant environmental impacts under Section 316 of the Federal Water Pollution Control Act.

⁴⁶Applicant's Exhibits 12 and 13 admitted at Tr. 1886.

average over any 30-day period in that interval shall not exceed 42.6°C (108.7°F) and the average over 120 days shall not exceed 40.2°C (104.7°F) and similarly for other summer periods. Limitations are also imposed on other segments of the year.⁴⁷

40. Field data obtained during the course of EPA 316 demonstration included temperature measurements along several traverses across the lake and Black Creek as well as vertical temperature profiles within the lake.⁴⁸ Some representative data describing the observed effect of that heat load are noted here. The maximum average daily temperatures at the mouth of the discharge canal during the months July and August 1976 were 42.4°C (108°F). The corresponding average temperature at the spillway of the dam was 34°C (93°F) while the average 2 miles downstream of the dam was 31°C (88°F).⁴⁹ The 42.4°C discharge produced a plume with a surface temperature of 39°C (102°F) extending essentially to the opposite shore.⁵⁰

41. As noted above (paragraph 38, *supra*) EPA has issued to the Applicant a water quality permit sanctioning the continuing operation of once-through condenser cooling system at the Robinson site with the 44°C (111.2°F) limit imposed.⁵¹ The Board retains its belief, however, in the adverse potential on the environment of the discharge into Lake Robinson of cooling water at temperatures considered extremely high by the Board. Although such a discharge temperature is, in the Board's view, an important input into any cost-benefit analysis under NEPA, meaningful consideration of it by the Board is precluded by Commission holding in the Seabrook case.⁵²

42. Under NRC policy, this Board is expected to give considerable weight to the EPA findings of the environmental acceptability of the Robin-

⁴⁷Applicant's Exhibit 16 admitted at Tr. 1886; Tr. 1933.

⁴⁸See, as examples, CP&L Exhibits 2.1, 2.2, and 2.3 as parts of Applicant's Exhibit 13 in this proceeding; see also Attachments D and C to Applicant's Exhibit 14, the latter is a monthly enumeration of the thermal load placed on the cooling system.

⁴⁹Applicant's Exhibit 14 at D-2, D-3, and D-4. The fossil and nuclear-fueled generating stations were operating when these data were taken.

⁵⁰Applicant's Exhibit 14 at 33.

⁵¹I [Regional Administrator] therefore further find that the protection and propagation of a balanced, indigenous population of fish, shellfish, and other aquatic [sic] organisms in and on Lake Robinson will be assured by the continued operation of the H. B. Robinson Steam Plant in its present once-through mode as established in the record.

I further find that the location, design, construction, and capacity of the cooling water intake structures at the H. B. Robinson Steam Plant reflect the best technology available for minimizing adverse environmental impact.
(Excerpt from NPDES Permit No. SC0002025 Findings Under 33 U.S.C. 1326 dated November 15, 1977.) Applicant's Exhibit 17, Tr. 1886.

⁵²*Public Service Company of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), 7 NRC 1 at 23-28 (January 6, 1978).

son Unit 2 cooling system. As in the instant case, where EPA has made the necessary factual findings for approval of a specific once-through cooling system, the adjudicatory boards are expected to accept EPA action and "should not go behind EPA's determinations unless compelled to do so."⁵²

43. Although the Board does not agree with the finding of EPA on the quality of the water in Lake Robinson, it is bound to accept the EPA decision⁵³ as set forth in NPDES Permit No. SC0002925.

J. Response to Board Questions

44. In its order dated March 23, 1976, the Board posed several questions intended to amplify the record. These questions addressed primarily the reactor cooling water discharged into Lake Robinson. Particularly they probed effects of the heated water on aquatic biota with passing inquiry into modeling the temperature pattern in the lake, into the terrestrial ecosystem, and into monitoring programs.

45. Both the Applicant and the Staff responded to the Board's inquiry.⁵⁴ Both sets of responses accent heavily the findings of the Applicant's more recent demonstration to the EPA under Section 316 of the FWPCA. Also in the responses the parties point up the value of field data derived during the operating history of Unit 2.

46. For the purposes of this Partial Initial Decision, the Board's concerns expressed in its March 23, 1976, order have been minimally satisfied by the responses of the parties and, indirectly, by the EPA conclusions leading to the issuance of the water quality permit.

III. CONCLUSIONS OF LAW

47. Based upon a review of the entire record of this proceeding, as thus far completed, and upon the foregoing discussion and findings of fact, this Board concludes the following:

- (a) the environmental review conducted by the Staff pursuant to 10 CFR §51.56, Appendix D to Part 50, has been adequate;
- (b) the requirements of §§102(2)(a), (C), and (E) of NEPA and Appendix D of 10 CFR Part 50 have been complied with in this proceeding;

⁵³Accordingly, the Board was precluded from considering the cost effectiveness of any modifications to the cooling system. The Board's only option was to make the ultimate decision on whether the impacts of the discharge are sufficiently great to counterbalance the investment and benefits of Robinson Unit 2, an on-line power plant, and either permit continued operation or withdraw the license.

⁵⁴Applicant's Exhibit 19 at Tr. 1886 and "NRC Staff's Response. . ." following Tr. 1915.

- (c) operational characteristics influencing the environment, including the radiological impact of the fuel cycle are found to be acceptably small;
- (d) this record shows the population dose and the potential health effects of radon emitted to the environment during that portion of the uranium fuel cycle attributable to Unit 2 are small compared to those effects resulting from exposure to naturally occurring radiation;⁵⁵
- (e) on November 15, 1977, the Applicant was granted by EPA, in accordance with the provisions of the FWPCA, as amended, a permit to discharge to Lake Robinson water carrying the heat from the condensers of the two steam generating stations located at the Robinson site; and
- (f) the environmental impacts under the purview of this Board and reviewed in this proceeding are of insufficient magnitude and import to establish, through a cost-benefit analysis, reasons for modification or withdrawal of the existing operating license.

IV. ORDER

IT IS ORDERED, in accordance with 10 CFR §2.760, §2.762, §2.764, §2.785, and §2.786 of the Commission's Rules of Practice, that this Partial Initial Decision shall become effective immediately and shall constitute with respect to the matters covered therein the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the Commission's Rules of Practice. Exceptions to this Partial Initial Decision may be filed by any party within seven (7) days after service of this Partial Initial Decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff) any party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (twenty (20) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

⁵⁵In this manner the instant Board conforms to the directive of the Commission pursuant to its action on April 11, 1978, whereby reference in Table S-3 to a specific release of radon-222 during fuel preparation was deleted and the environmental effects of radon were to be litigated in individual cases. This Board is aware, however, of the recent issuance of the Appeal Board (ALAB-480) with respect to that Board's consideration of the radon matter in cases pending before it whereby the record and findings in the Perkins construction permit proceeding (*Duke Power Co.* (Perkins Nuclear Station, Units 1, 2, and 3), Docket Nos. STN 50-488, 50-489, 50-490) presently before a licensing board, may be a lead case on which to pattern subsequent actions on the radon issues.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

A. Dixon Callihan, Member

Dr. Richard F. Cole, Member

John F. Wolf, Chairman

**Dated at Bethesda, Maryland,
this 16th day of June 1978.**

CASE NAME INDEX

ATLANTIC RESEARCH CORPORATION, 5390 Charokas Avenue, Alexandria, VA 22314
 ByProduct Material License, Compliance; Initial Decision; Docket
 BML-45-02808-04; ALJ-78-002 (7 NRC 701 (1978))

BOSTON EDISON COMPANY
 Construction Permit (NEPA site suitability); Decision; Docket 50471;
 ALAB-479 (7 NRC 774 (1978))

CAROLINA POWER AND LIGHT COMPANY
 Construction Permit; Initial Decision; Dockets 50400;50401;50402;50403;
 LBP-78-004 (7 NRC 92 (1978))
 Construction Permit; Memorandum and Order; Dockets 50400;50401;50402;50403;
 LBP-78-002 (7 NRC 63 (1978))
 Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
 STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
 STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
 STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
 Operating License; Partial Initial Decision (NEPA Issues); Docket 50261;
 LBP-78-022 (7 NRC 1052 (1978))

CONSOLIDATED EDISON COMPANY OF NEW YORK
 Construction Permit; Order; Docket 50247; LBP-78-021 (7 NRC 1048 (1978))
 Operating License; Decision; Docket-50247; ALAB-453 (7 NRC 31 (1978))

CONSUMERS POWER COMPANY
 Construction Permit; Decision; Dockets 50329;50330; ALAB-458 (7 NRC 155
 (1978))
 Construction Permit; Memorandum and Order; Dockets 50329A;50330A; ALAB-458
 (7 NRC 465 (1978))

DETROIT EDISON COMPANY
 Construction Permit; Decision; Docket 50341; ALAB-470 (7 NRC 473 (1978))
 Construction Permit, Antitrust; Decision; Docket 50341A; ALAB-475 (7 NRC 752
 (1978))
 Construction Permit; Decision; Dockets 50452;50543; ALAB-476 (7 NRC 759
 (1978))
 Construction Permit; Memorandum and Order; Docket 50341; ALAB-466 (7 NRC 457
 (1978))
 Construction Permit; Memorandum and Order; Docket 50341; ALAB-469 (7 NRC 470
 (1978))
 Construction Permit; Memorandum and Order; Dockets 50452;50453; ALAB-472 (7
 NRC 570 (1978))
 Construction Permit, Amendment; Order; Docket 50341; LBP-78-011 (7 NRC 381
 (1978))
 Construction Permit; Order; Docket 50341A; LBP-78-013 (7 NRC 583 (1978))

DUKE POWER COMPANY
 Construction Permit; Decision; Dockets STN-50491;STN-50492;STN-50493;
 ALAB-482 (7 NRC 979 (1978))
 Construction Permit; Memorandum and Order; Dockets 50491;50492;50493;
 ALAB-457 (7 NRC 70 (1978))
 Construction Permit; Memorandum and Order; Dockets STN-50491;STN-50492;
 STN-50493; ALAB-478 (7 NRC 772 (1978))
 Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
 STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
 STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/

CASE NAME INDEX

CASE NAME INDEX

STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

DUQUESNE LIGHT COMPANY
Operating License; Decision; Docket 50334; ALAB-484 (7 NRC 984 (1978))

DUQUESNE LIGHT COMPANY, et al.
Operating License; Initial Decision (Amendment); Docket 50334; LBP-78-016 (7 NRC 811 (1978))

EDLOW INTERNATIONAL COMPANY (Agent for Government of India)
Special Nuclear Materials Export License; Decision; Dockets 702485;702738;
CLI-78-008 (7 NRC 436 (1978))
Special Nuclear Materials, Export License; Opinion Correction; Dockets 702071;702131; CLI-78-002 (7 NRC 153 (1978))
Special Nuclear Materials Export License; Order; Dockets 702485;702738;
CLI-78-004 (7 NRC 311 (1978))
Special Nuclear Materials, Export License; Order; Dockets 702485;702738;
CLI-78-009 (7 NRC 455 (1978))

FLORIDA POWER AND LIGHT COMPANY
Antitrust Review; Memorandum and Order; Docket 50389A; CLI-78-012 (7 NRC 939 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

HOUSTON LIGHTING AND POWER COMPANY;PUBLIC SERVICE BOARD OF SAN ANTONIO;CITY OF AUSTIN;CENTRAL POWER AND LIGHT COMPANY
Operating License; Antitrust; Order; Dockets 50498A;50499A; CLI-78-005 (7 NRC 397 (1978))

J. G. SYLVESTER ASSOCIATES, Inc., 900 Hingham Street, Rockland, MA 02370
Byproduct Material License; Order Accepting Stipulation and terminating proceedings; Docket BML 23-00302-02; ALJ-78-001 (7 NRC 151 (1978))

KANSAS GAS AND ELECTRIC COMPANY;KANSAS CITY POWER AND LIGHT COMPANY
Construction Permit; Decision; Docket STN-50482; ALAB-482 (7 NRC 320 (1978))
Construction Permit; Memorandum and Order; Docket STN-50482; ALAB-477 (7 NRC 766 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

LONG ISLAND LIGHTING COMPANY
Construction Permit; Memorandum and Order; Dockets 50516;50517; ALAB-481 (7 NRC 807 (1978))

LONG ISLAND LIGHTING COMPANY;NEW YORK STATE ELECTRIC AND GAS CORPORATION
Construction Permit; Partial Initial Decision; Dockets 50516;50517;
LBP-78-017 (7 NRC 826 (1978))

METROPOLITAN EDISON COMPANY, et al.
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Operating License; Memorandum and Order; Docket STN-50320; ALAB-454 (7 NRC 39 (1978))
Operating License; NEPA review; Memorandum and Order; Docket 50320; ALAB-456 (7 NRC 63 (1978))
Operating License; Memorandum and Order; Docket 50320; ALAB-465 (7 NRC 377 (1978))
Operating License; Memorandum and Order; Docket 50320; ALAB-474 (7 NRC 746 (1978))
Operating License; Order; Docket 50320; CLI-78-003 (7 NRC 337 (1978))

MIXED OXIDE FUEL
Policy Statement; Decision; Dockets RM505/50201/50332/50564/701327/701432/
701821; CLI-78-010 (7 NRC 711 (1978))

NEW ENGLAND POWER COMPANY
Construction Permit; Order; Dockets STN-50568;STN-50569; LBP-78-018 (7 NRC 932 (1978))

CASE NAME INDEX

NEW ENGLAND POWER COMPANY, et al.
Construction Permit; Order; Dockets STN-50568;STN-50569; LBP-78-009 (7 NRC 271 (1978))

NORTHERN INDIANA PUBLIC SERVICE COMPANY
Construction Permit, Compliance; Memorandum and Order; Docket 50367; CLI-78-007 (7 NRC 429 (1978))

NORTHERN STATE POWER COMPANY, et al.
Construction Permit; Memorandum and Order; Docket STN-50484; ALAB-483 (7 NRC 982 (1978))

NORTHERN STATES POWER COMPANY (MINNESOTA);NORTHERN STATES POWER COMPANY (WISCONSIN)
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338; 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/ STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/ STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/ STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

NORTHERN STATES POWER COMPANY, et al.
Construction Permit; Decision; Docket STN-50484; ALAB-464 (7 NRC 372 (1978))

NORTHERN STATES POWER COMPANY;VERMONT YANKEE NUCLEAR POWER CORPORATION
Operating License (Spent Fuel Pool Modification); Decision; Docket 50282; 50306/50271; ALAB-455 (7 NRC 41 (1978))

NUCLEAR ENGINEERING COMPANY, INC.
Operating License; Decision; Docket 27039; ALAB-473 (7 NRC 737 (1978))

PACIFIC GAS AND ELECTRIC COMPANY
Construction Permit; Order; Docket P564A; LBP-78-020 (7 NRC 1038 (1978))
Operating License; Partial Initial Decision (NEPA findings); Dockets 50275; 50323; LBP-78-019 (7 NRC 989 (1978))

PETITION FOR EMERGENCY AND REMEDIAL ACTION (on Fire Protection for Electrical Systems)
Licensing (Health and Safety); Memorandum and Order; CLI-78-006 (7 NRC 400 (1978))

PHILADELPHIA ELECTRIC COMPANY, et al.
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50339; 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/ STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/ STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/ STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

PUBLIC SERVICE COMPANY OF INDIANA
Construction Permit; Decision; Dockets STN-50546;STN-50547; ALAB-459 (7 NRC 179 (1978))
Construction Permit (LVA-2); Decision; Dockets STN-50546;STN-50547; ALAB-461 (7 NRC 313 (1978))
Construction Permit; Initial Decision; Dockets 50546;50547; LBP-78-012 (7 NRC 573 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338; 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/ STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/ STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/ STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al.
Construction Permit; Decision; Dockets 50443;50444; ALAB-471 (7 NRC 477 (1978))
Construction Permit; Memorandum and Order; Dockets 50443;50444; CLI-78-031 (7 NRC 1 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338; 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/ STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/ STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/ STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Construction Permit; Memorandum and Order; Dockets 50443;50444; CLI-78-014 (7 NRC 952 (1978))

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
Construction Permit; Memorandum and Order; Dockets STN 50477;STN 50478; LBP-78-005 (7 NRC 147 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338; 50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/

CASE NAME INDEX

STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
PUBLIC SERVICE ELECTRIC AND GAS COMPANY;ATLANTIC CITY ELECTRIC COMPANY
Construction Permit; Initial Decision, Second Supplemental; Dockets 50354;
50355; LBP-78-015 (7 NRC 642 (1978))
Construction Permit; Memorandum and Order; Dockets 50354;50355; ALAB-460 (7
NRC 204 (1978))
ROCHESTER GAS AND ELECTRIC CORPORATION, et al.
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
SOUTH CAROLINA ELECTRIC AND GAS COMPANY, et al.
Operating License; Memorandum and Order; Docket 50395; LBP-78-006 (7 NRC 209
(1978))
TENNESSEE VALLEY AUTHORITY
Construction Permit; Decision; Dockets STN-50518;STN-50519;STN-50520;
STN-50521; ALAB-463 (7 NRC 341 (1978))
Construction Permit-Radiological Health and Safety; Initial Decision;
Dockets 50553;50554; LBP-78-001 (7 NRC 73 (1978))
Construction Permit; Memorandum and Order; Dockets STN-50518;STN-50519;
STN-50520;STN-50521; ALAB-467 (7 NRC 459 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Construction Permit; Partial Initial Decision, Limited Work Authorization;
Dockets STN-50566;STN-50567; LBP-78-007 (7 NRC 215 (1978))
TEXAS UTILITIES GENERATING COMPANY, et al.
Operating License, Antitrust Review; Order; Dockets 50445A;50446A;
CLI-78-013 (7 NRC 950 (1978))
TOLEDO EDISON COMPANY, et al.
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
VIRGINIA ELECTRIC AND POWER COMPANY
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Operating License; Memorandum and Order; Dockets 50338 DL;50339 DL;
LBP-78-010 (7 NRC 295 (1978))
Operating License; Order; Dockets 50338;50339; LBP-78-003 (7 NRC 89 (1978))
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
Construction Permit; Memorandum and Order; Dockets 50277;50278/50320/50338;
50339/50354;50355/50389/50400;50401;50402;50403/50443;50444/STN-50482/
STN-50484/STN-50485/STN-50491;STN-50492;STN-50493/50500;50501/50513/
STN-50546;STN-50547/STN-50518;STN-50519;STN-50520;STN-50521/50533;50554/
STN-50566;STN-50567; ALAB-480 (7 NRC 796 (1978))
Construction Permit; Supplemental Initial Decision; Docket 50513; LBP-78-008

CASE NAME INDEX

(7 NRC 254 (1978))

WASHINGTON PUBLIC POWER SUPPLY SYSTEM, et al.

Construction Permit; Decision; Dockets STN-50508; STN-50509; ALAB-485 (7 NRC 986 (1978))

Construction Permit; Initial Decision (Radiological and NEPA issues);

Dockets STN-50508; STN-50509; LBP-78-014 (7 NRC 599 (1978))

LEGAL CITATIONS INDEX

CASES

Aberdeen and Rockfish R. Co. v. S.C.R.A.P., 422 U.S. 289, 320 (1975)
 NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
 Aeschliman v. N.R.C., 547 F.2d 622 (1976)
 burden of proof for site evaluation findings; ALAB-471, B, (7 NRC 477, 489 (1978))
 Aeschliman v. N.R.C., 547 F.2d 622 (D.C. Cir. 1976), cert. granted sub. nom.
 Consumers Power Co. v. Aeschliman, 429 U.S. 1090 (1977)
 Midland 1 and 2 construction permits continuance pending remand for
 environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))
 Aeschliman v. N.R.C., 547 F.2d 622 (D.C. Cir. 1976), rev'd sub nom. Vermont
 Yankee, 55 L.Ed.2d
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
 Alabama ex rel. Baxley v. Corps of Engineers, 411 F.Supp. 1261, 1274 (N.D. Ala.
 1976)
 NEPA balancing of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
 Alabama Power Co. (Farley 1 and 2), ALAB-182, 7 AEC 210 (1974)
 criteria for late antitrust intervention evaluation, good cause; CLI-78-012,
 D, (7 NRC 939, 948 (1978))
 Alabama Power Co. (Farley 1 and 2), LBP-77-024, 5 NRC 804 (1977)
 discretionary intervention in antitrust proceedings, quality of
 contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
 Alabama Power Co. v. Alabama Electric Cooperative, 394 F.2d 672, 675 (5th Cir.
 1968), cert. denied, 393 U.S. 488 (1968)
 intervention petition, antitrust; LBP-78-013, K, (7 NRC 583, 595 (1978))
 Alaska v. Andrus, -F.2d-, 8 ELR 20237 (D.C. Cir. 1978)
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
 Allied General Nuclear Services (Barnwell Separations), ALAB-296, 2 NRC 671,
 680 (1975)
 EIS redrafting, ownership change; ALAB-459, C, (7 NRC 179, 184 (1978))
 Allied-General Nuclear Services (Barnwell Facility), ALAB-296, 2 NRC 671, 680
 (1975)
 role of ASLB, regulatory staff and applicant in alternative site review;
 ALAB-479, H, (7 NRC 774, 792 (1978))
 Allied-General Nuclear Services (Barnwell Fuel Receiving and Storage),
 ALAB-328, 3 NRC 420 (1976)
 rules of practice for discretionary intervention grant; ALAB-473, D, (7 NRC
 737, 741 (1978))
 Allied-General Nuclear Services (Barnwell), ALAB-471, 2 NRC 671 (1975)
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
 American Commercial Lines v. Louisville and Nashville R. Co., 392 U.S. 571, 592
 (1968)
 NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 711, 724 (1978))
 American Meat Institute v. E.P.A., 526 F.2d 442, 450 (7th Cir. 1975)
 weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190
 (1978))
 Arizona Public Service Co. (Palo Verde 1, 2 and 3), 3 NRC 662 (May 24, 1976),
 affd., ALAB-336, 4 NRC 3 (1976)
 construction permit issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599
 (1978))
 Arkansas Power and Light Co. v. F.P.C., 517 F.2d 1233, 1236 (D.C. Cir. 1975)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))

LEGAL CITATIONS INDEX

CASES

- Association of Data Processing Service Organizations v. Camp, 397 U.S. 150, 153 (1970)
 standing to intervene, rules of practice for contentions adequacy; ALAB-473, C, (7 NRC 737, 741 (1978))
- Atlantic Richfield Co. v. F.T.C., 381 U.S. 357 (1965)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 533, 591 (1978))
- Audubon Society of New Hampshire v. U.S., No. 76-1347 (1st Cir., December 17, 1976)
 levels of review in administrative decisions for nuclear licensing (financial qualifications); CLI-78-001, A, (7 NRC 1 (1978))
 suspension of construction activity for Seabrook NEPA inequities; CLI-78-014, C, (7 NRC 952, 960 (1978))
- Babcock and Wilcox (Application for Facility Export License), CLI-77-018, 5 NRC 1332, 1349 (1977)
 Executive branch expressions on foreign policy; CLI-78-010, D, (7 NRC 711, 719 (1978))
- Blockburger v. U.S., 284 U.S. 161, 166 (1977)
 civil penalty assessment, separate violations; ALJ-78-002, B, (7 NRC 701, 704 (1978))
- Boston Edison Co. (Pilgrim 1), ALAB-231, 8 AEC 633 (1974)
 Appellate policy for issues raised first on appeal; ALAB-463, F, (7 NRC 341, 348 (1978))
- Boston Edison Co. (Pilgrim 2), ALAB-479, 7 NRC 774, 794 (1978)
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Boston v. Coleman, 397 F.Supp. 698 (D.Mass. 1975)
 EIS redrafting, ownership change; ALAB-459, C, (7 NRC 179, 184 (1978))
- Bowman Transportation v. Arkansas-East Freight System, 419 U.S. 281, 295 (1974)
 rules of practice for show-cause proceedings, finality of NRC decisions; CLI-78-007, D, (7 NRC 429, 433 (1978))
- Brown v. Ohio, 432 U.S. 161, 166 (1977)
 civil penalty assessment, separate violations; ALJ-78-002, B, (7 NRC 701, 704 (1978))
- California Bankers Assn. v. Shultz, 416 U.S. 21 (1974)
 rules of practice for defense of favorable decision; ALAB-459, H, (7 NRC 179, 202 (1978))
- Calvert Cliffs' Coordinating Committee v. A.E.C., 449 F.2d 1109 (D.C. Cir. 1971)
 NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
 res judicata in administrative proceedings, another agency's findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Calvert Cliffs' Coordinating Committee v. A.E.C., 449 F.2d 1109, 1122-1127 (D.C. Cir. 1971)
 exemptions not allowed from FWPCA 401 compliance; ALAB-459, I, (7 NRC 179, 189 (1978))
- Calvert Cliffs' Coordinating Committee v. A.E.C., 449 F.2d 1109, 1124 (D.C. Cir. 1971)
 NEPA scope of review, end uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Charlton v. F.T.C., 543 F.2d 903, 907 (D.C. Cir. 1976)
 rules of practice, burden of proof; ALAB-463, K, (7 NRC 341, 350 (1978))
- Chicago and Southern Air Lines Co. v. Waterman S.S. Corp., 333 U.S. 103
 NRC relations to executive branch policy; CLI-78-010, C, (7 NRC 711, 713 (1978))
- Chick v. Hills, 528 F.2d 445, 448 (1st Cir. 1971)
 applicant's investment in facility prior to substantive stay; ALAB-458, H, (7 NRC 155, 170 (1978))
- Citizens for Safe Power v. N.R.C., 524 F.2d 1291 (D.C. Cir. 1975)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 43 (1978))
- Citizens for Safe Power v. N.R.C., 524 F.2d 1291, 1294 (D.C. Cir. 1975)
 handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- Citizens for Safe Power v. N.R.C., 524 F.2d 1291, 1294 n.5 (D.C. Cir. 1975)
 EIS responsibility for changed circumstances that mitigate environmental impacts; CLI-78-001, G, (7 NRC 1, 28 (1978))
- City of Fairfax v. Fairfax Hospital Assn., 562 F.2d 280 (4th Cir. 1977)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 533, 591 (1978))

LEGAL CITATIONS INDEX

CASES

- City of Lafayette v. Louisiana Power and Light Co., -U.S.-, 46 U.S.L.W. 4265, 4269 (1978)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 593, 591 (1978))
- City of Lafayette v. Louisiana Power and Light Co., 46 U.S.L.W. 4265 (1978)
 discovery scope in antitrust review, status of state agency; LBP-78-020, D, (7 NRC 1038, 1045 (1978))
- City of New York v. U.S., 337 F.Supp., 150 (E.D.N.Y. 1972)
 NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
- Cleveland Electric Illuminating Co. (Perry 1 and 2), ALAB-298, 2 NRC 730, 736 (1975)
 posthearing resolution of issues; ALAB-461, E, (7 NRC 313, 318 (1978))
- Cleveland Electric Illuminating Co. (Perry 1 and 2), ALAB-443, 6 NRC 741, 757 fn 53 (1977)
 ASLAB authority to take evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
- Cleveland Electric Illuminating Co. (Perry 1 and 2), ALAB-443, 6 NRC 741-48 (1977)
 effects of concurrent state proceeding on NRC licensing proceedings;
 ALAB-464, B, (7 NRC 372, 375 (1978))
- Cleveland Electric Illuminating Co. (Perry 1 and 2), unpublished order of Nov. 6, 1975, explained in ALAB-298, 2 NRC 730 (1975)
 Midland 1 and 2 construction permits continuance pending remand for environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))
- Coalition for Safe Nuclear Power v. A.E.C., 463 F.2d 954, 956 (D.C. Cir. 1972)
 applicant's investment in facility prior to substantive stay; ALAB-458, H, (7 NRC 155, 170 (1978))
- NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 170 (1978))
- Seabrook alternate site review; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Commonwealth Edison Co. (LeSalle 1 and 2), ALAB-193, 7 AEC 423, 425 (1974)
 radon-release impacts, standard of review; ALAB-485, C, (7 NRC 986, 988 fn 4 (1978))
- Commonwealth Edison Co. (Zion 1 and 2), ALAB-226, 8 AEC 381, 382 (1974)
 rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Commonwealth Edison Co. (Zion Station 1 and 2), ALAB-226, 8 AEC 381, 389 (1974)
 rules of practice do not preclude defensive case built on cross examination;
 ALAB-463, G, (7 NRC 341, 356 (1978))
- Conservation Society of Southern Vermont v. Secretary of Transportation, 508 F.2d 927, 936 (2nd Cir. 1974)
 applicant's investment in facility prior to substantive stay; ALAB-458, H, (7 NRC 155, 170 (1978))
- Consolidated Edison Co. (Indian Point 2), ALAB-188, 7 AEC 323, 356 (1974)
 rules of practice, burden of proof; ALAB-463, K, (7 NRC 341, 360 (1978))
- Consolidated Edison Co. (Indian Point 2), ALAB-188, 7 AEC 323, 358 (1974)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Consolidated Edison Co. of New York (Indian Point 1, 2 and 3), CLI-75-008, 2 NRC 173, 175 (1975)
 Director of Regulation role in suspension hearings; CLI-78-007, C, (7 NRC 429, 432 (1978))
- staff role in licensing, separation of functions and suspension hearings;
 CLI-78-007, B, (7 NRC 429, 431 (1978))
- Consolidated Edison Co. of New York (Indian Point 2), ALAB-369, 5 NRC 129, 130 (1977)
 status of limited-appearance participant for decision appeal; ALAB-454, B, (7 NRC 39 (1978))
- Consolidated Edison Co. of New York (Indian Point 2), CLI-74-023, 7 AEC 947, 951 (1974)
 posthearing resolution of issues; ALAB-461, E, (7 NRC 313, 318 (1978))
- Consolidated Edison Co. of New York v. Hoffman et al. (N.Y.C.A., Feb. 14, 1978)
 federal preemption doctrine for cooling tower construction; LBP-78-021, (7 NRC 1048 (1978))
- Consolidated Edison Co. v. Hoffman, 42 N.Y.2d 801 (1977)
 federal preemption for cooling tower design reversed for Indian Point 2;
 ALAB-453, A, (7 NRC 31 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-101, 6 AEC 60, 63 (1973)
 rules of practice for tribunal disqualification; LBP-78-005, B, (7 NRC 147,

LEGAL CITATIONS INDEX

CASES

- 148 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-123, 6 AEC 331, 334 (1973)
- ASLB role in licensing; LBP-78-009, B, (7 NRC 271, 278 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-123, 6 AEC 331, 334 (1973), reversed on other grounds sub nom Vermont Yankee Power Corp. v. N.R.D.C., 435 US -, 55 L.Ed.2d 460 (1978)
- handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-123, 6 AEC 331, 340 (1973)
- ASLB authority to regulate hearings, ACRS letter as evidence; LBP-78-008, (7 NRC 254 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-123, 6 AEC 331, 351 (1973)
- NEPA scope of review, and uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-270, 1 NRC 473 (1975)
- rules of practice, unbrieft exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-282, 2 NRC 9 (1975)
- rules of practice for defense of favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-395, 5 NRC 772, 779 (1977)
- Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-452, 6 NRC 892, 1100 (1977)
- scope of NRC antitrust review; ALAB-475, F, (7 NRC 752, 757 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-452, 6 NRC 892, 907 (1977)
- standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-452, 6 NRC 892, 925 (1977)
- weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-452, 6 NRC 892, 950, 971, 1024, 1046 (1977)
- discovery in antitrust proceedings; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-452, Part VII.F., 6 NRC 892, 1085 (1977)
- antitrust jurisdictional scope over ownership changes; LBP-78-013, D, (7 NRC 583, 587 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-458, 7 NRC 155, 161 (1978)
- NEPA review of Wolf Creek, coal alternatives; ALAB-462, A, (7 NRC 320 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-458, 7 NRC 155, 162 (1978)
- agency responsibilities under NEPA; ALAB-479, E, (7 NRC 774, 778 (1978))
- intervention standing on economic issues, rules of practice; ALAB-473, F, (7 NRC 473, 476 (1978))
- NRC scope of review, ownership changes; LBP-78-013, F, (7 NRC 583, 589 (1978))
- scope of interests protected under Atomic Energy Act, public utility business decisions; ALAB-475, G, (7 NRC 752, 757 (1978))
- Consumers Power Co. (Midland 1 and 2), ALAB-458, 7 NRC 155, 173 (1978)
- Seabrook alternate site review; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Consumers Power Co. (Midland 1 and 2), CLI-74-003, 7 AEC 7, 11 (1974)
- public safety responsibilities of licensee, fire safety; CLI-78-006, G, (7 NRC 400, 418 (1978))
- Consumers Power Co. (Midland 1 and 2), CLI-74-005, 7 AEC 19 (1974)
- burden of proof for site evaluation findings; ALAB-471, B, (7 NRC 477, 489 (1978))
- Consumers Power Co. (Midland 1 and 2), CLI-76-011, 4 NRC 65 (1976)
- rules of practice for construction suspension, relevant equitable considerations; ALAB-458, B, (7 NRC 155, 159 (1976))
- Consumers Power Co. (Midland 1 and 2), CLI-76-014, 4 NRC 163, 167 (1976)
- rules of practice for construction suspension, relevant equitable considerations; ALAB-458, B, (7 NRC 155, 159 (1976))
- Culpeper League v. N.R.C., -F.2d-, 11 ERC 1473 (D.C. Cir. 1978)
- alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Data Processing Service v. Camp, 397 U.S. 150, 153 (1970)
- rules of practice, intervention standing; ALAB-475, C, (7 NRC 752, 755 (1978))
- Detroit Edison Co. (Enrico Fermi 2), ALAB-466, 7 NRC 457 (1978)

LEGAL CITATIONS INDEX

CASES

- role of Director of Nuclear Reactor Regulation in prosecution of alleged NRC rules' violations; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
- Detroit Edison Co. (Enrico Fermi 2), ALAB-469, 7 NRC 470 (1978)
- rules of practice, discretionary intervention with financial assistance request; ALAB-473, E, (7 NRC 737, 743 (1978))
- Detroit Edison Co. (Enrico Fermi 2), ALAB-469, 7 NRC 470, 471 (1978)
- parties responsibilities for timeliness; ALAB-474, B, (7 NRC 746, 749 (1978))
- Detroit Edison Co. (Greenwood 2 and 3), ALAB-247, 8 AEC 936, 944 (1974)
- agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
- Detroit Edison Co. (Greenwood 2 and 3), ALAB-376, 5 NRC 426, 428 (1977)
- discretionary grant of intervention involving financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))
- Double Jeopardy, 65 Yale L.J. 339
- civil penalty assessment, separate violations; ALJ-78-002, 8, (7 NRC 701, 704 (1978))
- Drake v. Detroit Edison Co., 443 F.Supp. 833 (January 19, 1978)(D.C. W.D. Mich.)
- rules of practice for discretionary intervention grant; ALAB-470, C, (7 NRC 473, 475 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 405 fr 19 (1976)
- rules of practice, burden of proof; ALAB-463, K, (7 NRC 341, 366 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 407 (1976)
- need for power standard, scope of forecasts; ALAB-462, B, (7 NRC 320, 326 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 410 (1976)
- forecasting need for power, applicant's burden of proof; ALAB-459, D, (7 NRC 179, 184 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 413 (1976)
- rules of practice, unbrieffed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 415 (1976)
- scope of licensing information required for Class 9 accidents; LBP-78-017, C, (7 NRC 826 (1978))
- Duke Power Co. (Catawba 1 and 2), ALAB-355, 4 NRC 397, 416 (1976)
- legal significance of staff working publications (site evaluation); LBP-78-017, E, (7 NRC 826, 852 (1978))
- role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Duke Power Co. (McGuira 1 and 2), ALAB-143, 6 AEC 623 (1973)
- new evidence disclosure responsibility; LBP-78-002, D, (7 NRC 83, 85 (1978))
- Duke Power Co. (Perkins 1, 2 and 3), ALAB-431, 6 NRC 460, 462 (1977)
- rules of practice for nontimely intervention petitions; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
- Duquesne Light Co. (Beaver Valley 1), ALAB-109, 6 AEC 243 (1943)
- criteria for late antitrust intervention evaluation, good cause; CLI-78-012, D, (7 NRC 939, 948 (1978))
- E.D.F. v. Corps of Engineers, 492 F.2d 1123, 1135 (5th Cir. 1974)
- agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
- E.D.F. v. Froehke, 473 F.2d 346, 353 (8th Cir. 1972)
- agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
- E.P.A. v. Colorado Public Interest Research Group, 426 US 1, 46 L.Ed.2d 434 (1976)
- NRC jurisdiction over water discharge of radioactive effluents; LBP-78-019, B, (7 NRC 989, 999 fn 9 (1978))
- Ecology Action v. A.E.C., 492 F.2d 998, 1001 (2nd Cir. 1974)
- EIS responsibility for changed circumstances that mitigate environmental impacts; CLI-78-001, G, (7 NRC 1, 28 (1978))
- handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- Edlow International (Tarapur), CLI-77-016, 5 NRC 1327 (1977)
- rules of practice for special nuclear materials export licensing, consolidation of proceedings; CLI-78-004, B, (7 NRC 311 (1978))
- Energy Research and Development Administration (Cinch River Breeder), CLI-76-013, 4 NRC 67, 76 (1976)
- forecasting need for power, applicant's burden of proof; ALAB-459, D, (7 NRC 179, 184 (1978))

LEGAL CITATIONS INDEX

CASES

- Environmental Defense Fund v. Corps of Engineers, 348 F.Supp.516, 933 (N.D. Miss. 1972)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Environmental Defense Fund v. E.P.A., 489 F.2d 1247, 1251 fn. 24 (D.C. Cir. 1973)
 NEPA scope of review, and uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Environmental Defense Fund v. Froshike, 368 F.Supp. 231, 237 (4.D. No. 1973), affd. 497 F.2d 1340 (8th Cir. 1974)
 EIS responsibility for changed circumstances that mitigate environmental impacts; CLI-78-001, G, (7 NRC 1, 28 (1978))
- Environmental Defense Fund v. Ruckelshaus, 439 F.2d 584, 594 (D.C. Cir. 1971) (under FIFRA as amended by Federal Environmental Pesticide Control Act of 1972)
 NEPA scope of review, and uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Environmental Defense Fund, CAB Order 76-a-21 at 3 (April 6, 1976)
 res judicata in administrative proceedings, another agency's findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
- Essex City Preservation Assn. v. Campbell, 536 F.2d 956 (1st Cir. 1976)
 EIS redrafting, ownership change; ALAB-459, C, (7 NRC 179, 184 (1978))
- F.T.C. v. Brown Shoe Co., 384 U.S. 316 (1966)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 593, 591 (1978))
- F.T.C. v. Motion Picture Advertising Service Co., 344 and S. 392 (1953)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 593, 591 (1978))
- F.T.C. v. Sperry and Hutchinson Co., 405 U.S. 233, 239, 246 (1972)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 593, 591 (1978))
- F.T.C. v. Texaco, 555 F.2d 862, 879-82, 923-35 (D.C. Cir. 1977) (en banc) (majority, concurring and dissenting opinions)
 res judicata in administrative proceedings, another agency's findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
- Florida Power and Light Co. (St. Lucie 1), ALAB-429, 6 NRC 221 (1977)
 NRC role in antitrust review; CLI-78-012, B, (7 NRC 939, 945 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-290, 2 NRC 3, 4 fn 2 (1975)
 appellate policy for handling issues raised first on appeal; ALAB-463, C, (7 NRC 341, 348 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-335, 3 NRC 836 (1976)
 Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-335, 3 NRC 833, 833 (1976)
 role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-335, 3 NRC 839, 840 (majority opinion), 844-46 (dissenting opinion) (1976), reversed, Hodder v. N.R.C. (D.C. Cir. No. 76-1709, October 21, 1976) (unpublished)
 NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 170 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-404, 5 NRC 1185, 1188 (1977)
 Seabrook alternate site review; CLI-78-014, F, (7 NRC 952, 961 (1978))
 stay pending appeal, prejudicial precedent; ALAB-458, H, (7 NRC 155, 170 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-415, 5 NRC 1435, 1436 (1977)
 NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 170 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-420, 6 NRC 8, 13 (1977)
 appellate rules of practice, discretionary intervention; ALAB-475, G, (7 NRC 752, 757 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-435, 6 NRC 541, 543 (1977)
 alternative site review scope and integrity; ALAB-471, I, (7 NRC 477, 505 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-435, 6 NRC 541, 544 (1977)
 steam generator tube integrity for Wolf Creek; ALAB-462, A, (7 NRC 320 (1978))
- Florida Power and Light Co. (St. Lucie 2), ALAB-435, 6 NRC 541, affirming LBP-77-027, 5 NRC 1038 (1977) (alternate site analysis)
 handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- Florida Power and Light Co. (St. Lucie 2), LBP-77-027, 5 NRC 1038, affirmed,

LEGAL CITATIONS INDEX

CASES

- ALAB-435, 6 NRC 541 (1977) (appeal pending)
handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- g L
- ALAB-454, A, (7 NRC 39 (1978))
- Georgia Power Co. (Vogtle 1 and 2), 2 NRC 404, 412 (1975)
construction permits authorized pending generic resolve of fire protection
systems; LBP-78-014, (7 NRC 599 (1978))
- Georgia Power Co. (Vogtle 1 and 2), ALAB-291, 2 NRC 404, 409 (1975)
record reopening criteria; LBP-78-002, B, (7 NRC 83, 84 (1978))
rules of practice for reopening of proceedings; ALAB-462, F, (7 NRC 320, 337
(1978))
- Greene Co. Planning Board v. F.P.C., 455 F.2d 412, 418 (2nd Cir.), cert.
denied, 409 US 849 (1972)
role of ASLB, regulatory staff and applicant in alternative site review;
ALAB-479, H, (7 NRC 774, 792 (1978))
- Gulf States Utilities Co. (River Bend 1 and 2), ALAB-444, 6 NRC 760 (1977)
scope of NEPA information required for licensing (need for power); ALAB-458,
G, (7 NRC 155, 168 (1978))
- Gulf States Utilities Co. (River Bend 1 and 2), ALAB-444, 6 NRC 760, 765 (1977)
Staff authority for docketing determinations; LBP-78-009, C, (7 NRC 271, 280
(1978))
- Handly's Lessee v. Anthony, 18 U.S. (5 Wheat) 374 (1820)
reopening record for state boundary dispute resolve; ALAB-459, A, (7 NRC 179
(1978))
- Harvey Radio Laboratories, Inc. v. U.S., 289 F.2d 458 (D.C. Cir. 1961)
NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 744, 724 (1978))
- Hawaii v. Standard Oil Co., 405 U.S. 251, 262, 266 (1972)
standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Helvering v. Mitchell, 303 U.S. 371 (1937)
civil penalties program aims; ALJ-78-002, C, (7 NRC 701, 708 (1978))
- Henderson Bridge Co. v. Henderson City, 173 U.S. 592 (1899)
reopening record for state boundary dispute resolve; ALAB-450, A, (7 NRC 179
(1978))
- Hickman Garment Co. v. N.L.R.B., 497 F.2d 1339 (6th Cir. 1974)
exceptions of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315
(1978))
- Hickman v. Taylor, 329 US 495, 501, 507 (1947)
discovery in antitrust proceedings; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
- Hill v. T.V.A., 549 F.2d 1364, 1070 (6th Cir.), cert. granted, 54 L.Ed.2d 312
(1977)
NRC v. DOI obligations under Endangered Species Act; ALAB-463, L, (7 NRC
341, 357 (1978))
- Hodder v. N.R.C. (D.C. Cir. No. 76-1709)
Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Houston Lighting and Power Co. (South Texas 1 and 2), 5 NRC 1303, 1321 (1977)
res judicata in administrative proceedings, another agency's findings;
CLI-78-001, F, (7 NRC 1, 26 (1978))
- Houston Lighting and Power Co. (South Texas 1 and 2), CLI-77-013, 5 NRC 1303
(1977)
NRC role in antitrust review; CLI-78-012, B, (7 NRC 939, 945 (1978))
ownership-change effects on antitrust review; LBP-78-013, B, (7 NRC 583
(1978))
scope of antitrust prelicensing review jurisdiction; LBP-78-013, C, (7 NRC
583 (1978))
- Houston Lighting and Power Co. (South Texas 1 and 2), CLI-77-013, 5 NRC 1303,
1312 fn 8, 1316 (1977)
scope of NRC antitrust review; ALAB-475, D, (7 NRC 752, 756 (1978))
- Houston Lighting and Power Co. (South Texas 1 and 2), CLI-77-013, 5 NRC 1303,
1314 (1977)
discovery in antitrust proceedings; LBP-78-020, E, (7 NRC 1038, 1040 (1978))
- Humphrey's Executor v. U.S., 295 U.S. 602, 628 (1935)
NRC relations to executive branch policy; CLI-78-010, C, (7 NRC 711, 718
(1978))
- I.C.C. v. Jersey City, 322 U.S. 503, 514 (1944)
reconsideration rules of practice; ALAB-477, A, (7 NRC 766 (1978))
- Iannelli v. U.S., 420 U.S. 770, 785 (1974)

LEGAL CITATIONS INDEX

CASES

- civil penalty assessment, separate violations; ALJ-78-002, B, (7 NRC 701, 704 (1978))
- Illinois Power Co. (Clinton 1 and 2), ALAB-340, 4 NRC 27, 32 (1976)
- appellate standard of review, ASLB discretionary power; ALAB-463, H, (7 NRC 341, 356 fn 65 (1978))
- rules of practice, burden of proof; ALAB-463, I, (7 NRC 341, 356 (1978))
- Illinois Power Co. (Clinton 1 and 2), ALAB-340, 4 NRC 27, 43 (1976)
- NEPA land use inquiry, removal of farmland; ALAB-462, E, (7 NRC 320, 335 (1978))
- Illinois Power Co. (Clinton 1 and 2), ALAB-340, 4 NRC 27, 48 (1976)
- NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Indiana v. Kentucky, 136 U.S. 479 (1890)
- reopening record for state boundary dispute resolve; ALAB-459, A, (7 NRC 179 (1978))
- Indiana v. Kentucky, 163 U.S. 520 (1896)
- reopening record for state boundary dispute resolve; ALAB-459, A, (7 NRC 179 (1978))
- International Union (UAW) v. N.L.R.B., 459 F.2d 1329, 1336 (D.C. Cir. 1972)
- evidence inferences; ALAB-471, H, (7 NRC 477, 498 (1978))
- Jackson v. Hensley, 484 F.2d 992 (5th Cir. 1973)
- rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Jaffke v. Dunham, 352 U.S. 280 (1957)
- rules of practice for defense of favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
- Jicarilla Apache Tribe of Indians v. Morton, 471 F.2d 1275, 1286 (9th Cir. 1973)
- NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-279, 1 NRC 559 (1975)
- antitrust intervention petition criteria; LBP-78-013, L, (7 NRC 583, 597 (1978))
- criteria for late antitrust intervention evaluation, good cause; CLI-78-012, D, (7 NRC 939, 948 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-279, 1 NRC 559, 562 (1975)
- appellate rules of practice, discretionary intervention; ALAB-475, G, (7 NRC 752, 757 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-279, 1 NRC 559, 564 (1975)(Wolf Creek 1)
- intervention petition, antitrust; LBP-78-013, K, (7 NRC 583, 595 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-279, 1 NRC 559, 565 (1975)
- rules of practice, antitrust initiation; ALAB-475, B, (7 NRC 752, 755 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-279, 1 NRC 559, 576 (1975)
- rules of practice, party responsibilities; ALAB-469, C, (7 NRC 470 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), ALAB-462, 7 NRC 320, 340 fn 38 (1978)
- parties' rights to reopen on question under NRC review; ALAB-464, A, (7 NRC 372 (1978))
- Kansas Gas and Electric Co. (Wolf Creek 1), CLI-77-001, 5 NRC 1 (1977)
- pre-LWA offsite road building; ALAB-459, A, (7 NRC 179 (1975))
- Kepford v. N.R.C. (No. 78-1160, unpublished order dated March 8, 1978)(D.C. Cir.)
- continuance of operation pending remand, radon release values; ALAB-455, (7 NRC 377 (1978))
- Kessler v. F.C.C., 326 F.2d 673 (D.C. Cir. 1963)
- adjudicatory responsibilities for NRC; CLI-78-010, G, (7 NRC 711, 721 (1978))
- Kleppe v. Sierra Club, 427 U.S. 390 (1976)
- NEPA considerations for spent fuel pool modification need not include ultimate fuel disposal; ALAB-455, B, (7 NRC 41, 48 (1978))
- NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
- Kleppe v. Sierra Club, 427 US 390, 410 fn 21 (1976)
- alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Licenses Authorized to Possess or Transport Strategic Quantities of Special Nuclear Material, CLI-77-003, 5 NRC 16, 20 (1977)

LEGAL CITATIONS INDEX

CASES

- emergency powers over licensee activities, sanctions for violations;
 CLI-78-006, F, (7 NRC 400, 404 (1978))
- Life of the Land v. Brinegar, 485 F.2d 460 (9th Cir. 1973), cert. denied, 416 US 961 (1974)
- alternative site evaluation under NEPA; ALAB-473, C, (7 NRC 774, 778 (1978))
- Life of the Land v. Brinegar, 485 F.2d 460, 472 (9th Cir. 1973)
- NEPA review scope for licensee amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Long Island Lighting Co. (Jamesport 1 and 2), ALAB-292, 2 NRC 631, 630 fn 25 (1975)
- rules of practice, delay consideration in nontimely intervention petitions; ALAB-476, C, (7 NRC 759, 761 (1978))
- Long Island Lighting Co. (Jamesport 1 and 2), ALAB-292, 2 NRC 631, 650 (1975)
- intervention standing, local government; LBP-78-018, C, (7 NRC 932, 934 (1978))
- Long Island Lighting Co. (Jamesport 1 and 2), ALAB-481, 7 NRC 807, 809 (1978)
- radon-release impacts, standard of review; ALAB-485, C, (7 NRC 586, 988 fn 4 (1978))
- Long Island Lighting Co. (Shoreham), ALAB-156, 6 AEC 831, 832 (1973)
- rules of practice, unbrieft exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Long Island Lighting Co. (Shoreham), ALAB-156, 6 AEC 831, 836 (1973)
- NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Long Island Lighting Co. (Shoreham), ALAB-156, 6 AEC 831, 852 (1973)
- NEPA scope of review, and uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Louisiana Power and Light Co. (Waterford 3), ALAB-121, 6 AEC 319 (1973)
- rules of practice for ASLAB authority to strike; ALAB-474, E, (7 NRC 746, 749 (1978))
- Louisiana Power and Light Co. (Waterford 3), CLI-73-007, 6 AEC 48 (1973)(Waterford II)
- antitrust intervention petition criteria; LBP-78-013, L, (7 NRC 583, 597 (1978))
- discretionary intervention in antitrust proceedings, quality of contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
- intervention petition, antitrust; LBP-78-013, K, (7 NRC 583, 595 (1978))
- Louisiana Power and Light Co. (Waterford 3), CLI-73-025, 6 AEC 619 (1973)(Waterford II)
- antitrust intervention petition criteria; LBP-78-013, L, (7 NRC 583, 597 (1978))
- Louisiana Power and Light Co. (Waterford 3), CLI-73-025, 6 AEC 619, 630 (1973)
- scope of NRC antitrust review; ALAB-475, F, (7 NRC 752, 757 (1978))
- Maine Yankee Atomic Power Co. (Maine Yankee), ALAB-161, 6 AEC 1003, 1011-12 (1973)
- NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 49 (1978))
- Maine Yankee Atomic Power Co. (Maine Yankee), ALAB-161, 6 AEC 1003, 1018 (1973)
- rules of practice do not preclude defensive case built on cross examination; ALAB-463, G, (7 NRC 341, 356 (1978))
- Mesa Microwave, Inc. v. F.C.C., 262 F.2d 723 (D.C. Cir. 1958)
- adjudicatory responsibilities for NRC; CLI-78-010, G, (7 NRC 711, 721 (1978))
- Metropolitan Edison Co. (Three Mile Island 2), ALAB-384, 5 NRC 612, 615 (1977)
- rules of practice for nontimely intervention petitions; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
- Metropolitan Edison Co. (Three Mile Island 2), ALAB-456, 7 NRC 63 (1978)
- estimated health effects from coal v. nuclear fuel cycle; LBP-78-008, (7 NRC 254 (1978))
- radon-release impact jurisdiction retained for Cherokee; ALAB-482, A, (7 NRC 979 (1978))
- use of Table S-3 for radon release effects; ALAB-464, A, (7 NRC 372 (1978))
- Metropolitan Edison Co. (Three Mile Island 2), ALAB-456, 7 NRC 63, 67 (1978)
- rules of practice, 10 CFR 51.20, Table S-3 validity; LBP-78-007, A, (7 NRC 215 (1978))
- Metropolitan Edison Co. (Three Mile Island 2), ALAB-456, 7 NRC 63, 68 (1978)
- stay rules of practice; ALAB-481, B, (7 NRC 807 (1978))
- Metropolitan Edison Co. (Three Mile Island 2), ALAB-465, 7 NRC 377 (1978)
- radon release estimates in Table S-3 for WPPSS 3 and 5; LBP-78-014, (7 NRC

LEGAL CITATIONS INDEX

CASES

- 599 (1978))
 Metropolitan Edison Co. (Three Mile Island 2), CLI-78-003, 7 NRC 307 (1978)
 construction permit issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599
 (1978))
 Metropolitan Edison Co. (Three Mile Island 2), CLI-78-003, 7 NRC 307, 309
 (1978)
 use of Table S-3 for radon release effects; ALAB-464, A, (7 NRC 372 (1978))
 Miner v. Atlas, 363 US 641 (1960)
 discovery in antitrust proceedings; LBP-78-020, B, (7 NRC 1338, 1040 (1978))
 Mississippi Power and Light Co. (Grand Gulf 1 and 2), ALAB-133, 6 AEC 423
 (1973)
 antitrust intervention petition criteria; LBP-78-013, L, (7 NRC 583, 597
 (1978))
 criteria for late antitrust intervention evaluation, good cause; CLI-78-012,
 D, (7 NRC 939, 948 (1978))
 Missouri v. Kentucky, 78 U.S. (11 Wall) 395, 401
 reopening record for state boundary dispute resolve; ALAB-459, A, (7 NRC 179
 (1978))
 Monroe Co. Conservation Society v. Volpe, 472 F.2d 693, 697 (2nd Cir. 1972)
 alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
 NEPA review of Wolf Creek, coal alternatives; ALAB-462, A, (7 NRC 320
 (1978))
 Saabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
 Multidistrict Vehicle Air Pollution M.D.L. 31, 481 F.2d 122, 130 (9th Cir.
 1973)
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
 N.R.D.C. v. Callaway, 524 F.2d 79, 92 (2nd Cir. 1975)
 alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
 N.R.D.C. v. Morton, 458 F.2d 827, 834-836 (D.C. Cir. 1972)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
 N.R.D.C. v. Morton, 458 F.2d 827, 836 (D.C. Cir. 1972)
 NEPA balancing of alternatives, financial; ALAB-458, D, (7 NRC 155, 161
 (1978))
 N.R.D.C. v. Morton, 458 F.2d 827, 837 (D.C. Cir. 1972)
 alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
 N.R.D.C. v. N.R.C., 547 F.2d 633 (D.C. Cir. 1976), cert. granted sub. nom.
 Vermont Yankee Nuclear Power Corp. v. N.R.D.C., 429 U.S. 1090 (1977)
 Midland 1 and 2 construction permits continuance pending remand for
 environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))
 N.R.D.C. v. N.R.C., 547 F.2d 633, 639 (D.C. Cir. 1976)
 NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
 N.R.D.C. v. N.R.C., 547 F.2d 633, cert. granted, Vermont Yankee Nuclear Power
 Corp. v. N.R.D.C., 429 U.S. 1090 (1977)
 criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7
 NRC 63 (1978))
 N.R.D.C. v. N.R.C., No. 76-1525, filed D.C. Cir. June 11, 1976
 rules of practice for special nuclear materials export licensing,
 consolidation of proceedings; CLI-78-004, B, (7 NRC 311 (1978))
 Nader v. N.R.C., 513 F.2d 1045, 1052 (1975)
 interpretation of General Design Criteria; CLI-78-006, D, (7 NRC 400, 404
 (1978))
 National Helium Corp. v. Morton, 455 F.2d 650 (10th Cir. 1971)
 NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
 National Wildlife Federation v. Coleman, 529 F.2d 359, 371 (5th Cir.), cert.
 denied, 429 U.S. 979 (1976)
 NRC v. DOI obligations under Endangered Species Act; ALAB-463, L, (7 NRC
 341, 357 (1978))
 New England Power Co. (NEP 1 and 2), ALAB-390, 5 NRC 733 (1977)
 scope of licensing information, evacuation of persons outside LPZ;
 LBP-78-017, E, (7 NRC 826, 852 (1978))
 New England Power Co. (NEP 1 and 2), ALAB-390, 5 NRC 733, 736 (1977)
 role of population density on alternate site considerations; ALAB-471, K, (7
 NRC 477, 508 (1978))
 New York Times Co. v. U.S., 403 U.S. 713 (1971)
 NRC relations to executive branch policy; CLI-78-010, C, (7 NRC 711, 718
 (1978))

LEGAL CITATIONS INDEX

CASES

- Niagara Mohawk Power Corp. (Nine Mile Point 2), ALAB-264, 1 NRC 347, 354 (1975)
ASLB hearing regulation obligations to parties; ALAB-455, L, (7 NRC 41, 56 (1978))
- Niagara Mohawk Power Corp. (Nine Mile Point 2), ALAB-264, 1 NRC 347, 365 (1975)
forecasting need for power, variations; ALAB-477, D, (7 NRC 766, 770 (1978))
- Niagara Mohawk Power Corp. (Nine Mile Point 2), ALAB-264, 1 NRC 347, 365, 367 (1975)
need for power standard, scope of forecasts; ALAB-462, B, (7 NRC 320, 326 (1978))
- Niagara Mohawk Power Corp. (Nine Mile Point 2), ALAB-264, 1 NRC 347, 366 (1975)
forecasting need for power, applicant's burden of proof; ALAB-455, D, (7 NRC 179, 184 (1978))
- Niagara Mohawk Power Corp. (Nine Mile Point 2), CLI-73-028, 6 AEC 995 (1973)
burden of proof for site evaluation findings; ALAB-471, B, (7 NRC 477, 489 (1978))
- Northeast Nuclear Energy Co. (Montague), LBP-75-019, 1 NRC 435, 437 (1975)
ASLB role in licensing; LBP-78-009, B, (7 NRC 271, 278 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-192, 7 AEC 420 (1974)
Midland 1 and 2 construction permits continuance pending remand for environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))
NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 170 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-224, 8 AEC 244, 248 (1974)
rules of practice for unbrieffed exceptions; ALAB-459, J, (7 NRC 179, 203 fn. 44 (1978))
rules of practice, unbrieffed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-224, 8 AEC 244, 267 (1978)
Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-224, 8 AEC 244, 269 (1974)
alternate site evaluation guidance; ALAB-479, F, (7 NRC 774, 791 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-227, 8 AEC 416, 418 (1974)
rules of practice for reopening of proceedings; ALAB-462, F, (7 NRC 320, 337 (1978))
rules of practice for reopening proceedings on new evidence; ALAB-464, D, (7 NRC 372, 374 fn 4 (1978))
- Northern Indiana Public Service Co. (Baillly 1), ALAB-227, 8 AEC 416, 419 (1974)
need for power, scope of cost-benefit considerations; LBP-78-017, G, (7 NRC 826, 869 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-107, 6 AEC 423 (1973)
criteria for late antitrust intervention evaluation, good cause; CLI-78-012, D, (7 NRC 939, 948 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-244, 8 AEC 857, 862 (1974)
NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-244, 8 AEC 857, 864 (1974)
appellate policy for handling issues raised first on appeal; ALAB-463, C, (7 NRC 341, 348 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-244, 8 AEC 857, 869 (1974)
cross examination by intervenors, rules of practice; ALAB-461, C, (7 NRC 313, 316 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-252, 8 AEC 1175 (1975)
rules of practice for defense of favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-252, 8 AEC 1175, 1178 (1975)
cross examination by intervenors, rules of practice; ALAB-461, C, (7 NRC 313, 316 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-284, 2 NRC 197 (1975)
ASLB authority to take evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-343, 4 NRC 169 (1975)
scope of licensing information required at construction permit stage, DBA; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))

LEGAL CITATIONS INDEX

CASES

- steam generator tube integrity for Wolf Creek; ALAB-462, A, (7 NRC 320 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-427, 6 NRC 212 (1977) scope of licensing information required at construction permit stage, DBA; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-427, 6 NRC 213 (1977) steam generator tube integrity for Wolf Creek; ALAB-462, A, (7 NRC 320 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-455, 7 NRC 41 (1978) expansion of spent fuel storage pool for Beaver Valley 1; LBP-78-016, A, (7 NRC 811 (1978))
- spent fuel pool modification for Beaver Valley 1 and 2 affirmed; ALAB-484, (7 NRC 984 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-455, 7 NRC 41, 51 (1978) scope of licensing information at construction permit stage, DBA; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- Northern States Power Co. (Prairie Island 1 and 2), ALAB-455, 7 NRC 41, 54 (1978) appeal rights from ASLAB decisions; ALAB-467, E, (7 NRC 459, 463 (1978))
- Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971), affd. 405 U.S. 1035 (1972) federal preemption vs. states' rights; ALAB-453, B, (7 NRC 31, 35 (1978))
- Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971), affd. 405 U.S. 1035 (1972) NRC jurisdiction over water discharge of radioactive effluents; LBP-78-019, B, (7 NRC 989, 999 fn 9 (1978))
- Northwestern Public Service Co. v. F.P.C., 526 F.2d 454, 459 (D.C. Cir. 1975) NRC scope of review, ownership changes; LBP-78-013, F, (7 NRC 583, 589 (1978))
- Nuclear Engineering Co. (Sheffield Waste Disposal Site), ALAB-473, 7 NRC 737 (1978) rules of practice for discretionary intervention; ALAB-475, H, (7 NRC 752, 758 fn 19 (1978))
- Nuclear Fuel Services (West Valley Reprocessing), CLI-75-004, 1 NRC 273 (1975) rules of practice, nontimely intervention petitions; LBP-78-006, B, (7 NRC 209, 212 (1978))
- Nuclear Fuel Services, Inc. (West Valley Reprocessing), CLI-75-004, 1 NRC 273 (1975) rules of practice for nontimely intervention petitions; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
- Nuclear Regulatory Commission (Financial Assistance to Participants in Commission Proceedings), CLI-76-023, 4 NRC 494 (1976) discretionary grant of intervention involving financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))
- o LBP-78-018, A, (7 NRC 932 (1978))
- Omaha Public Power District (Fort Calhoun 2), LBP-77-005, 5 NRC 437 (1977) co-owners licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
- P.R.D.C. v. Electrical Union, 367 U.S. 396 (1961) construction permits authorized pending generic resolve of fire protection systems; LBP-78-014, (7 NRC 599 (1978))
- P.R.D.C. v. Electrical Workers, 367 U.S. 396, 402 (1961) NRC health and safety licensing responsibilities, electrical specifications; CLI-78-006, B, (7 NRC 400, 404 (1978))
- P.R.D.C. v. Electricians, 367 U.S. 369, 414 (1961) NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 170 (1978))
- P.R.D.C. v. Electricians, 367 U.S. 396, 408 (1961) weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Pacific Gas and Electric Co. (Diable Canyon 2), ALAB-254, 8 P&C 1184, 1191-92 (1975) NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Pacific Gas and Electric Co. (Stanislaus 1), 5 NRC 1017, 1021 (1977) antitrust intervention petition criteria; LBP-78-013, L, (7 NRC 583, 597

LEGAL CITATIONS INDEX

CASES

- (1978))
 Permian Basin Area Rate Cases, 390 U.S. 747, 773 (1968) (Harlan, J.)
 stay rules of practice; ALAB-481, B, (7 NRC 807 (1978))
 Permian Basin Area Rate Cases, 390 U.S. 747, 776 (1968)
 NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 711, 724 (1978))
 Petition for Shutdown of Certain Reactors, CLI-73-031, 6 AEC 1u69, 1071 (1973)
 NRC emergency sanction powers; CLI-78-006, F, (7 NRC 400, 404 (1978))
 Philadelphia Electric Co. (Limerick 1 and 2), ALAB-262, 1 NRC 163, 196 (1975)
 EIS redrafting, ownership change; ALAB-459, C, (7 NRC 179, 184 (1978))
 Philadelphia Electric Co. (Limerick 1 and 2), ALAB-262, 1 NRC 163, 204 (1975)
 criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7 NRC 63 (1978))
 Philadelphia Electric Co. (Peach Bottom 2 and 3), ALAB-480, 7 NRC 796 (1978)
 radon-release impact jurisdiction retained for Cherokee; ALAB-482, A, (7 NRC 979 (1978))
 stay rules of practice; ALAB-481, B, (7 NRC 807 (1978))
 Philadelphia Electric Co. (Peach Bottom 2 and 3), ALAB-480, 7 NRC 796, 799 (1978)
 radon-release impacts for WPPSS 3 and 5; ALAB-485, A, (7 NRC 986 (1978))
 rules of practice for radon-release considerations; ALAB-485, B, (7 NRC 986, 987 (1978))
 Philadelphia Electric Co. (Peach Bottom 2 and 3), ALAB-480, 7 NRC 796, 805 (1978)
 radon-release impact reversed for remand consideration; ALAB-483, (7 NRC 982 (1978))
 Porter Co. Chapter v. A.E.C., 533 F.2d 1011, 1016 (7th Cir. 1976), cert. denied, 429 U.S. 945 (1976)
 role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
 Portland General Electric Co. (Pebble Springs 1 and 2), 4 NRC 610, 613 (1976)
 standing for intervention as ratepayer or member of an electric cooperative; LBP-78-011, C, (7 NRC 381, 385 (1978))
 Portland General Electric Co. (Pebble Springs 1 and 2), CLI-76-027, 4 NRC 610 (1976)
 rules of practice for discretionary intervention grant; ALAB-476, C, (7 NRC 473, 475 (1978))
 rules of practice for intervention, educational level of petitioner for interest requirement; LBP-78-006, C, (7 NRC 209, 212 (1978))
 standing to intervene on economic interests, possible rate increases; LBP-78-013, E, (7 NRC 583, 589 (1978))
 Portland General Electric Co. (Pebble Springs 1 and 2), CLI-76-027, 4 NRC 610, 613 (1976)
 rules of practice for discretionary intervention; ALAB-475, H, (7 NRC 752, 758 fr. 19 (1978))
 rules of practice, intervention standing; ALAB-475, C, (7 NRC 752, 755 (1978))
 standing for intervention, rules of practice; ALAB-473, B, (7 NRC 737, 739 (1978))
 standing to intervene in NRC proceedings; LBP-78-011, B, (7 NRC 381, 385 (1978))
 Portland General Electric Co. (Pebble Springs 1 and 2), CLI-76-027, 4 NRC 610, 614 (1976)
 rules of practice for discretionary intervention grant; ALAB-473, D, (7 NRC 737, 741 (1978))
 rules of practice, discretionary intervention with financial assistance request; ALAB-473, E, (7 NRC 737, 743 (1978))
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
 Portland General Electric Co. (Pebble Springs 1 and 2), CLI-76-027, 4 NRC 610, 616 (1976)
 rules of practice for discretionary intervention, quality of contribution; LBP-78-013, I, (7 NRC 583, 593 (1978))
 Potomac Electric Power Co. (Douglas Point 1 and 2), ALAB-218, 8 AEC 79, 89 (1974)
 criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7 NRC 63 (1978))
 Potomac Electric Power Co. (Douglas Point 1 and 2), ALAB-277, 1 NRC 539 (1975)

LEGAL CITATIONS INDEX

CASES

continuance of administrative review pending site ownership resolve;
 LBP-78-009, A, (7 NRC 271 (1978))
 rules of practice for adjudicatory scheduling of hearings; LBP-78-009, D, (7
 NRC 271, 282 (1978))
 Project Management Corp. (Clinch River Breeder), ALAB-354, 4 NRC 383, 390
 (1976)
 intervention, local government's interest; LBP-78-018, C, (7 NRC 932, 934
 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), 6 NRC 633, 634 (1977)
 stay pending appeal, prejudicial precedent; ALAB-458, H, (7 NRC 155, 176
 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-339, 4 NRC 20, 24
 (1976)
 intervention standing, local government; LBP-78-018, C, (7 NRC 932, 934
 (1978))
 scope of appellate review of intervention grant; ALAB-476, E, (7 NRC 759,
 763 fn 3 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-437, 6 NRC 630, 634
 (1977)
 Seabrook alternate site review; CLI-78-014, F, (7 NRC 952, 561 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-459, 7 NRC 179 (1978)
 completion date slippage effects on Environmental Impact Statement;
 LBP-78-017, H, (7 NRC 826, 928 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-459, 7 NRC 179, 185
 (1978)
 need for power standard, scope of forecasts; ALAB-462, B, (7 NRC 320, 326
 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-459, 7 NRC 179, 185
 (1978)
 scope of appellate review of ASLB scheduling orders; ALAB-458, B, (7 NRC 465
 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-459, 7 NRC 179, 191
 (1978)
 facts used in decision must be introduced into evidence; ALAB-463, D, (7 NRC
 341, 352 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-459, 7 NRC 179, 202
 (1978)
 advisory appellate opinions, exceptions; ALAB-478, B, (7 NRC 772 (1978))
 rules of practice for appellate procedure for exceptions from prevailing
 party; ALAB-461, D, (7 NRC 313, 316 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-461, 7 NRC 313, 315
 (1978)
 rules of practice, briefs in support of exceptions; ALAB-463, D, (7 NRC 341,
 370 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-461, 7 NRC 313, 317
 (1978)
 financial and technical qualifications, effects of ownership and key
 personnel changes; ALAB-464, C, (7 NRC 372, 375 (1978))
 Public Service Co. of Indiana (Marble Hill 1 and 2), ALAB-461, 7 NRC 313, 317
 (1978)(petitions for NRC review pending on other grounds)
 changes in legal relationship of co-applicants and key personnel shifts on
 financial and technical qualifications; ALAB-464, A, (7 NRC 372 (1978))
 Public Service Co. of Indiana (Marble Hill), ALAB-316, 3 NRC 167, 170 (1976)
 role of ASLB in licensing process, jurisdiction; LBP-78-009, B, (7 NRC 271,
 278 (1978))
 Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-271, 1 NRC 478
 (1975)
 antitrust remand scheduling vacated pending Midland settlement agreement;
 ALAB-468, A, (7 NRC 465 (1978))
 Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-338, 4 NRC 10, 14
 (1976)
 appellate authority to grant lesser relief than stay pending appeal;
 ALAB-460, C, (7 NRC 204, 207 (1978))
 Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-349, 4 NRC 235,
 238 (1976)
 weight accorded nuclear waste storage in NEPA cost balancing; ALAB-458, E, .

LEGAL CITATIONS INDEX

CASES

- (7 NRC 155, 163 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-349, 4 NRC 235, 238 (1976), vacated on other grounds, CLI-76-017, 4 NRC 451 (1976)
- criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7 NRC 63 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-349, 4 NRC 235, 258 (1976)
- Midland 1 and 2 construction permits continuance pending remand for environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-349, 4 NRC 235, 261 (1976)
- applicant's investment in facility prior to substantive stay; ALAB-458, H, (7 NRC 155, 170 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-366, 5 NRC 39, 56 (1977), affirmed, CLI-77-008, 5 NRC 503, 505, 545 (1977)
- role of FWPCA 401 certification in LWA and construction permit issuance; ALAB-459, J, (7 NRC 179, 196 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-390, 5 NRC 733 (1977)
- scope of licensing information, evacuation of persons outside LPZ; LBP-78-017, E, (7 NRC 826, 852 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-421, 6 NRC 25, 74 ff (1977), affirmed CLI-78-001, 7 NRC 1, 17-23 (1978)
- financial showing necessary for LWA; ALAB-459, B, (7 NRC 179, 193 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-422, 6 NRC 33 (1977)
- scope of licensing information required at construction permit stage, DBA; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-422, 6 NRC 33, 102 (majority opinion), 113 (concurring opinion) (1977)
- weight accorded nuclear waste storage in NEPA cost balancing; ALAB-458, E, (7 NRC 155, 163 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-422, 6 NRC 33, 42 (1977)
- initial decision format, Hartsville intake grid; ALAB-463, N, (7 NRC 341, 368 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), ALAB-442, 6 NRC 728 (1977)
- scope of licensing information required at construction permit stage, DBA; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- steam generator tube integrity for Wolf Creek; ALAB-462, A, (7 NRC 320 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 521 (1977)
- rules of practice for construction suspension, relevant equitable considerations; ALAB-458, B, (7 NRC 155, 159 (1976))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 522 (1977)
- NEPA review of Wolf Creek, coal alternatives; ALAB-462, A, (7 NRC 320 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 524, 526 (1977)
- Staff authority for docketing determinations; LBP-78-009, C, (7 NRC 271, 290 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 524, 541 (1977)
- role of Regulatory Staff in licensing process, jurisdiction over docketing; LBP-78-009, B, (7 NRC 271, 278 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 528 fn. 25 (1977)
- NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 530 fn. 30 (1977)
- alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503,

LEGAL CITATIONS INDEX

CASES

- 532 (1977)
NEPA scope of review, applicant's investment; ALAB-458, I, (7 NRC 155, 173 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-77-008, 5 NRC 503, 541 (1977)
agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-79-001, 7 NRC 1 (1978)
financial qualifications of applicant, applicable standard; ALAB-462, C, (7 NRC 320, 333 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-79-001, 7 NRC 1, 18 (1978)
applicants' financial qualifications, scope of licensing information; LBP-78-011, H, (7 NRC 381, 392 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 20 (1978)
NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 22 (1978)
co-owners licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 23 (1978)
EPA lead agency authority over water quality matters in reactor licensing; LBP-78-022, B, (7 NRC 1052 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 23-29 (1978)
weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 23-29 (1978), affirming ALAB-422, 6 NRC 33, 39 (1977)
NEPA scope of review, end uses of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 29 fn 43 (1978) (appeal pending)
handling deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- Public Service Co. of New Hampshire (Seabrook 1 and 2), CLI-78-001, 7 NRC 1, 30 fn 44 (1978)
rules of practice for stay pending appeal; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
- Public Service Co. of Oklahoma (Black Fox 1 and 2), ALAB-397, 5 NRC 1143 (1977)
rules of practice for intervention, educational level of petitioner for interest requirement; LBP-78-006, C, (7 NRC 209, 212 (1978))
- rules of practice, discretionary grant of intervention; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
- Public Service Co. of Oklahoma (Black Fox 1 and 2), ALAB-397, 5 NRC 1143, 1145 (1977)
discretionary grant of intervention involving financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))
- rules of practice for discretionary intervention, quality of contribution; LBP-78-013, I, (7 NRC 583, 593 (1978))
- Public Service Electric and Gas Co. (Hope Creek 1 and 2), ALAB-394, 5 NRC 769 (1977)
rules of practice, briefs in support of exceptions; ALAB-463, D, (7 NRC 341, 370 (1978))
- rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Public Service Electric and Gas Co. (Salem 1 and 2), ALAB-426, 6 NRC 206 (1977)
weight accorded nuclear waste storage in NEPA cost balancing; ALAB-459, E, (7 NRC 155, 163 (1978))
- Public Service Electric and Gas Co. (Salem 1 and 2), ALAB-426, 6 NRC 206, 210 (1977)
criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7 NRC 63 (1978))
- Public Service Electric Co. (Salem 1 and 2), ALAB-136, 6 AEC 487, 489 (1973)
rules of practice, party responsibilities; ALAB-469, C, (7 NRC 470 (1978))

LEGAL CITATIONS INDEX

CASES

- Republic of Mexico v. Hoffman, 324 U.S. 30, 35 (1944)
Executive branch expression on foreign policy; CLI-78-010, J, (7 NRC 711, 719 (1978))
- Rex Trailer v. U.S., 350 U.S. 149 (1955)
civil penalties program aims; ALJ-78-002, C, (7 NRC 701, 708 (1978))
- Rhode Island Committee on Energy v. G.S.A., 561 F.2d 397, 404 (1st Cir. 1977)
site ownership requirements; LBP-78-009, E, (7 NRC 271, 282 (1978))
- Safir v. Gibson, 432 F.2d 137, 143 (2nd Cir.) (Friendly, Ch.J.), cert. denied, 400 U.S. 942 (1970)
weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Safir v. Gibson, 432 F.2d 137, 148 (2nd Cir. 1970)
res judicata in administrative proceedings, another agency's findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
- Scientists Institute for Public Information v. A.E.C., 481 F.2d 1079 (D.C. Cir. 1973)
NEPA hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
- Scientists' Institute for Public Information v. A.E.C., 481 F.2d 1079, 1088 (D.C. Cir. 1973)
agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
- Scientists' Institute for Public Information v. A.E.C., 481 F.2d 1079, 1092 (D.C. Cir. 1973)
NEPA review scope for license amendments; ALAB-455, B, (7 NRC 41, 48 (1978))
- Seacoast AntiPollution League v. Costle, 572 F.2d 872 (1st Cir. 1978)
Seabrook site comparison; CLI-78-014, F, (7 NRC 952, 961 (1978))
- Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities, 40 Fed. Reg. 60115 (effective January 1, 1976)
interagency coordination of licensing review (financial qualifications); CLI-78-001, A, (7 NRC 1 (1978))
- Siegel v. A.E.C., 400 F.2d 778, 783 (1968)
NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 711, 724 (1978))
- Sierra Club v. Froehike, 534 F.2d 1289, 1303 (8th Cir. 1976)
NRC v. DOI obligations under Endangered Species Act; ALAB-463, L, (7 NRC 341, 357 (1978))
- Sierra Club v. Model, 544 F.2d 1036, 1043 (9th Cir. 1976)
role of ASLB, regulatory staff and applicant in alternative site review; ALAB-479, H, (7 NRC 774, 792 (1978))
- Sierra Club v. I.C.C., -F.2d-, 11 ERC 1241 (D.C. Cir. 1978)
alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Sierra Club v. Morton, 405 U.S. 727 (1972)
rules of practice, intervention standing; ALAB-475, C, (7 NRC 752, 755 (1978))
- Sierra Club v. Morton, 405 U.S. 727, 739 (1972)
standing to intervene, rules of practice for contentions adequacy; ALAB-473, C, (7 NRC 737, 741 (1978))
- Sierra Club v. Morton, 510 F.2d 813, 818 (5th Cir. 1975)
alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Sierra Club v. Morton, 510 F.2d 813, 825 (5th Cir. 1975)
NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Sierra Club v. Morton, 514 F.2d 836, 878 fn 29 (D.C. Cir. 1975), reversed on other grounds sub. nom. Kieppe v. Sierra Club, 427 U.S. 390 (1976)
applicant's investment in facility prior to substantive stay; ALAB-458, H, (7 NRC 155, 170 (1978))
- Silva v. Lynn, 482 F.2d 1282, 1284 (1st Cir. 1973)
alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Silva v. Lynn, 482 F.2d 1282, 1285 (1st Cir. 1973)
environmental statement, analysis of other agencies' comments; ALAB-479, D, (7 NRC 774, 780 (1978))
- Silva v. Lynn, 482 F.2d 1282, 1287 (1st Cir. 1973)
NRC NEPA responsibilities for informed decisions; ALAB-471, D, (7 NRC 477, 492 (1978))
- Southern California Edison Co. (San Onofre 2 and 3), ALAB-171, 7 AEC 37 (1974)
NRC discretionary authority relative to other governmental agencies' responsibilities; CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))

LEGAL CITATIONS INDEX

CASES

- Southern California Edison Co. (San Onofre 2 and 3), ALAB-248, 8 AEC 957, 961 (1966)
 role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Southern California Edison Co. (San Onofre 2 and 3), ALAB-248, 8 AEC 957, 975 (1974)
 scope of information required for ASLB questions; LBP-78-017, C, (7 NRC 826 (1978))
- Southern California Edison Co. (San Onofre 2 and 3), ALAB-268, 1 NRC 383 (1975)
 role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Southern California Edison Co. (San Onofre 2 and 3), ALAB-308, 3 NRC 20 (1976)
 role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Swift and Co. v. Wickham, 230 F.Supp. 398, 409 (S.D.N.Y. 1964), affirmed, 364 F.2d 241, 245-46 (2nd Cir. 1966), cert. denied, 385 U.S. 1035 (1967)
 weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Tennessee Valley Authority (Browns Ferry 1 and 2), ALAB-341, 4 NRC 95, 96 (1976)
 rules of practice for nontimely intervention; LBP-78-018, B, (7 NRC 932, 933 (1978))
- Tennessee Valley Authority (Hartsville 1A, 2A, 1B and 2B), ALAB-367, 5 NRC 92 (1977)
 estimated health effects from coal v. nuclear fuel cycle; LBP-78-008, (7 NRC 254 (1978))
- Tennessee Valley Authority (Hartsville 1A, 2A, 1B and 2B), ALAB-367, 5 NRC 92, 102 (1977)
 NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
 NEPA review of Wolf Creek, coal alternatives; ALAB-462, A, (7 NRC 320 (1978))
- Tennessee Valley Authority (Hartsville 1A, 2A, 1B and 2B), ALAB-367, 5 NRC 92, 104 fn 59
 rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
- Tennessee Valley Authority (Hartsville 1A, 2A, 1B and 2B), ALAB-467, 7 NRC 459, 462 (1978)
 rules of practice, reconsideration of matter first raised at appeal; ALAB-477, B, (7 NRC 766 (1978))
- Tennessee Valley Authority (Watts Bar 1 and 2), ALAB-413, 5 NRC 1418 (1977)
 rules of practice for discretionary intervention; ALAB-475, E, (7 NRC 752, 758 fn 19 (1978))
 rules of practice for discretionary intervention, quality of contribution; LBP-78-013, I, (7 NRC 583, 593 (1978))
- Tennessee Valley Authority (Watts Bar 1 and 2), ALAB-413, 5 NRC 1418, 1420 (1977)
 rules of practice for discretionary intervention grant; ALAB-470, C, (7 NRC 473, 475 (1978))
 standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Tennessee Valley Authority (Watts Bar 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977)
 standing for intervention on third-party rights; LBP-78-011, E, (7 NRC 381, 386 (1978))
 standing for intervention, third party interest; ALAB-470, B, (7 NRC 473 (1978))
- Tennessee Valley Authority (Watts Bar 1 and 2), ALAB-413, 5 NRC 1418, 1422 (1977)
 discretionary grant of intervention involving financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))
 discretionary intervention in antitrust proceedings, quality of contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
- Texas Utilities Generating Co. (Comanche Peak 1 and 2), ALAB-266, 1 NRC 51, 55 (1975)
 role of ASLB, regulatory staff and applicant in alternative site review; ALAB-479, H, (7 NRC 774, 792 (1978))

LEGAL CITATIONS INDEX

CASES

- Toledo Edison Co. (Davis-Besse 1 and 2), LBP-75-075, 5 NRC 993, 1612 (1975)
expansion of spent fuel storage pool for Beaver Valley 1; LBP-78-016, A, (7
NRC 811 (1978))
- Toledo Edison Co. (Davis-Besse 1, 2 and 3), LBP-77-001, 5 NRC 433 (1977)
discretionary intervention in antitrust proceedings, quality of
contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
- Toledo Edison Co. (Davis-Besse), ALAB-157, 6 AEC 858, 859 (1973)
rules of practice for defense of favorable decision; ALAB-459, H, (7 NRC
179, 202 (1978))
- Toledo Edison Co. (Davis-Besse, Units 1, 2 and 3), ALAB-385, 5 NRC 621, 626
(1977)
stay rules of practice; ALAB-481, B, (7 NRC 807 (1978))
- Train v. N.R.D.C., 421 U.S. 60, 75 (1975)
weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190
(1978))
- Trustees of Columbia University, 4 AEC 680, 681 (1971), *affd. sub nom.*
Morningside Renewal Council v. A.E.C., 482 F.2d 234, 239 (2nd Cir. 1973),
cert. denied, 417 U.S. 951 (1974)
ASLB authority to take evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
- U.S. E.R.D.A. (Clinch River Breeder), CLI-76-013, 4 NRC 67, 83-84 (1976)
interagency coordination of NEPA review responsibilities; CLI-78-001, E, (7
NRC 1, 23 (1978))
- U.S. Energy Research and Development Administration (Clinch River Breeder
Plant), CLI-76-013, 4 NRC 67, 75 (1976)
ASLB role in licensing; LBP-78-009, B, (7 NRC 271, 278 (1978))
- U.S. v. Abilene and S. Py., 265 U.S. 274, 288 (1924) (Brandeis, J.)
rules of practice for evidence; ALAB-459, G, (7 NRC 179, 191 (1978))
- U.S. v. Fung Foo, 369 U.S. 143 (1962)
civil penalty assessment, separate violations; ALJ-78-002, B, (7 NRC 701,
704 (1978))
- U.S. v. Munsingwear, 340 U.S. 36 (1950)
administrative remedy for handling mooted issues with possible precedential
value; ALAB-455, G, (7 NRC 41, 55 (1978))
spent fuel pool capacity modification conditions for ALARA vacated;
ALAB-455, A, (7 NRC 41 (1978))
- U.S. v. Proctor and Gamble Co., 356 US 677 (1958)
discovery in antitrust proceedings; LBP-78-020, E, (7 NRC 1038, 1040 (1978))
- U.S. v. Security National Bank, 546 F.2d 492, 494 (1976)
double assessment for license violations; ALJ-78-002, C, (7 NRC 701, 703
(1978))
- U.S. v. Utah Construction and Mining Co., 384 U.S. 394, 421-22 (1966)
res judicata in administrative proceedings, another agency's findings;
CLI-78-001, F, (7 NRC 1, 26 (1978))
- U.S. v. Vargas, 380 F.Supp. 1162, 1166 (E.D.N.Y. 1974)
weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190
(1978))
- U.S. v. White, 454 F.2d 435, 439 (7th Cir. 1971), cert. denied, 406 U.S. 962
(1972)
rules of practice for unbriefed exceptions; ALAB-459, D, (7 NRC 179, 203 *fn.*
44 (1978))
rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315
(1978))
- Udall v. Tullman, 380 U.S. 1, 16 (1965)
weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190
(1978))
- Union Electric Co. (Callaway 1 and 2), ALAB-347, 4 NRC 216, 217 (1976)
criteria for challenge to regulations (fuel cycle effects); ALAB-456, B, (7
NRC 63 (1978))
- Union Electric Co. (Callaway 1 and 2), LBP-75-020, 1 NRC 438, 441 (1975)
standing to intervene as ratepayer; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Union of Concerned Scientists v. A.E.C., 499 F.2d 1069, 1079 (D.C. Cir. 1974)
NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 711, 724 (1978))
- Union of Concerned Scientists v. A.E.C., 499 F.2d 1069, 1084 *fn* 37 (D.C. Cir.
1974)
applicant's investment in facility prior to substantive stay; ALAB-458, H,
(7 NRC 155, 170 (1978))

LEGAL CITATIONS INDEX

CASES

- Seabrook alternate site review; CLI-78-014, F, (7 NRC 952, 961 (1978))
- United States v. Abilene and S. Ry., 265 U.S. 274, 288 (1924) (Brandeis)
- weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-124, 6 AEC 358 (1973)
- record reopening criteria; LBP-78-002, B, (7 NRC 83, 84 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-138, 6 AEC 520 (1973)
- record reopening criteria; LBP-78-002, B, (7 NRC 83, 84 (1978))
- reopening applicability where sua sponte Board action; LBP-78-002, C, (7 NRC 83, 87 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-138, 6 AEC 520, 523 (1973)
- rules of practice for reopening of proceedings; ALAB-462, F, (7 NRC 320, 337 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-167, 6 AEC 1151 (1973)
- record reopening criteria; LBP-78-002, B, (7 NRC 83, 84 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-179, 7 AEC 159, 175 (1974)
- EIS redrafting, ownership change; ALAB-459, C, (7 NRC 179, 184 (1978))
- NEPA balancing, consideration of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-179, 7 AEC 159, 177 (1974)
- cost-benefit analysis, role of taxes and employment in socioeconomic impact; ALAB-471, J, (7 NRC 477, 509 fn 58 (1978))
- role of population density on alternate site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-194, 7 AEC 431, 449 (1974)
- ASLAB authority to take evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
- Vermont Yankee Nuclear Power Corp. (Vermont Yankee), ALAB-421, 6 NRC 25, 30 (concurring opinion) (1977)
- weight accorded nuclear waste storage in NEPA cost balancing; ALAB-458, E, (7 NRC 155, 163 (1978))
- Vermont Yankee Nuclear Power Corp. v. N.R.D.C., -U.S.-, 46 U.S.L.W. 4361, 4308 (April 3, 1978)
- burden of proof for site evaluation findings; ALAB-471, B, (7 NRC 477, 489 (1978))
- Vermont Yankee Nuclear Power Corp. v. N.R.D.C., -U.S.-, 46 U.S.L.W. 4361, 4308 (April 3, 1978)
- intervention standing on economic issues, rules of practice; ALAB-470, F, (7 NRC 473, 476 (1978))
- Vermont Yankee Nuclear Power Corp. v. N.R.D.C., 435 US -, 55 L.Ed.2d 460, 494 (1978)
- alternative site evaluation under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
- Vermont Yankee Nuclear Power Corp. v. N.R.D.C., 46 L.W. 4361, 4310 (1978)
- expansion of spent fuel storage pool for Beaver Valley 1; LBP-78-016, A, (7 NRC 811 (1978))
- Virginia Electric and Power Co. (North Anna 1 and 2), ALAB-324, 3 NRC 347, 390 fn. 50, modified and affirmed, CLI-76-022, 4 NRC 480 (1976) (appeal pending)
- authority to assess civil penalty against stockholders rests with state regulatory agencies; ALAB-459, K, (7 NRC 179, 198 (1978))
- Virginia Electric and Power Co. (North Anna 1 and 2), ALAB-342, 4 NRC 98, 107 (1976)
- scope of appellate review of intervention grant; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
- Virginia Electric and Power Co. (North Anna 1 and 2), ALAB-363, 4 NRC 631 (1976)
- discretionary grant of intervention involving financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))
- Virginia Electric and Power Co. (North Anna 1 and 2), ALAB-363, 4 NRC 631, 632 (1976)
- standing to intervene on economic interests, possible rate increases; LBP-78-013, E, (7 NRC 583, 589 (1978))
- Virginia Electric and Power Co. (North Anna 1 and 2), ALAB-363, 4 NRC 631, 633

LEGAL CITATIONS INDEX

CASES

- (1976)
 rules of practice for discretionary intervention, quality of contribution; LBP-78-013, I, (7 NRC 583, 593 (1978))
 rules of practice for intervention, educational level of petitioner for interest requirement; LBP-78-006, C, (7 NRC 209, 212 (1978))
 Virginia Electric and Power Co. (North Anna), CLI-76-022, 4 NRC 480, 486, 487 (1976), affirmed, Virginia Electric and Power Co. v. N.R.C., -F.2d- (4th Cir., February 28, 1978)
 public safety responsibilities of licensee, fire safety; CLI-78-006, G, (7 NRC 400, 418 (1978))
 Virginia Petroleum Jobbers Assn. v. F.P.C., 259 F.2d 921, 925 (D.C. Cir. 1958)
 rules of practice for construction suspension, relevant equitable considerations; ALAB-458, B, (7 NRC 155, 159 (1976))
 Warth v. Seldin, 422 U.S. 490 (1975)
 rules of practice, intervention standing; ALAB-475, C, (7 NRC 752, 755 (1978))
 Washington Metropolitan Area Transit Commission v. Holiday Tours, 559 F.2d 841, 844 (D.C. Cir. 1977)
 rules of practice, merits of issues at early litigation stage; ALAB-458, D, (7 NRC 155, 161 (1978))
 Washington Public Power Supply System (Hanford 2), ALAB-113, 6 AEC 251 (1973)
 posthearing resolution of issues; ALAB-461, E, (7 NRC 313, 316 (1978))
 Weiner v. U.S., 357 U.S. 349 (1958)
 NRC relations to executive branch policy; CLI-78-010, C, (7 NRC 711, 718 (1978))
 Wentronics, Inc. v. F.C.C., 331 F.2d 782 (D.C. Cir. 1964)
 NRC authority to terminate hearings; CLI-78-010, H, (7 NRC 711, 724 (1978))
 Westinghouse Electric Corp. (Application for Export of Reactor to Association Nuclear ASCO II, Barcelona, Spain), CLI-76-009, 3 NRC 739, 755 (1976)
 Executive branch expressions on foreign policy; CLI-78-010, D, (7 NRC 711, 719 (1978))
 Whitehead v. Salyer, 346 F.2d 207 (10th Cir. 1965)
 rules of practice, unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))
 Wisconsin Electric Power Co. (Koshkonong 1 and 2), CLI-74-045, 8 AEC 928 (1974)
 NRC discretionary authority relative to other governmental agencies responsibilities; CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))
 Wisconsin Electric Power Co. (Koshkonong 1 and 2), CLI-74-045, 8 AEC 928, 930 (1974)
 continuance of administrative review pending site ownership resolve; LBP-78-009, A, (7 NRC 271 (1978))
 Wisconsin Electric Power Co. (Point Beach 2), ALAB-137, 6 AEC 491, 504 (1973)
 rules of practice do not preclude defensive case built on cross examination; ALAB-463, G, (7 NRC 341, 356 (1978))
 Youngstown Sheet and Tube Co. v. Sawyer, 343 U.S. 579 (1952)
 NRC relations to executive branch policy; CLI-78-010, C, (7 NRC 711, 718 (1978))
 Zerer, R., The Federal Law of Water Pollution Control, pp. 652-791 of Federal Environmental Law (Env. Law Inst. 1974)
 review of Act's workings and problems; ALAB-459, I, (7 NRC 179, 189 (1978))
 Zuber v. Allen, 396 U.S. 168, 193 (1969)
 weight of agency interpretation of its Act; ALAB-459, H, (7 NRC 179, 190 (1978))

LEGAL CITATIONS INDEX REGULATIONS

- 10 CFR 1.32(f)
interpretation of Commission regulations; ALAB-467, F, (7 NRC 459, 463 (1978))
- 10 CFR 2.101(a)
Staff authority for docketing determinations; LBP-78-009, C, (7 NRC 271, 280 (1978))
- 10 CFR 2.102(2)(3)
rules of practice for antitrust hearing initiation at operating stage; CLI-78-005, B, (7 NRC 397, 398 (1978))
- 10 CFR 2.102(a)
Staff authority for docketing determinations; LBP-78-009, C, (7 NRC 271, 280 (1978))
- 10 CFR 2.102(d)(3)
antitrust proceedings initiated for South Texas 1 and 2; CLI-78-005, A, (7 NRC 397 (1978))
- 10 CFR 2.104
ASLB authority to halt Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))
- 10 CFR 2.202(f)
NRC health and safety licensing responsibilities; CLI-78-005, C, (7 NRC 400, 404 (1978))
- 10 CFR 2.203
negotiation of civil penalty size; ALAB-459, K, (7 NRC 179, 198 (1978))
NRC health and safety licensing responsibilities; CLI-78-005, C, (7 NRC 400, 404 (1978))
- 10 CFR 2.204
NRC health and safety licensing responsibilities; CLI-78-005, C, (7 NRC 400, 404 (1978))
- 10 CFR 2.205
NRC health and safety licensing responsibilities; CLI-78-005, C, (7 NRC 400, 404 (1978))
- 10 CFR 2.206
inappropriateness for reconsiderations vehicle; CLI-78-007, D, (7 NRC 429, 433 (1978))
purpose and NRC responsibilities under; CLI-78-007, D, (7 NRC 429, 433 (1978))
standard for initiating show-cause proceeding on health and safety issues; CLI-78-007, C, (7 NRC 429, 432 (1978))
suspension denial affirmed for Bailey; CLI-78-007, A, (7 NRC 429 (1978))
- 10 CFR 2.206(c)
ASLAB jurisdiction over actions of Director of Nuclear Reactor Regulation; ALAB-466, B, (7 NRC 457 (1978))
role of Director of Nuclear Reactor Regulation in prosecution of alleged violations; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
- 10 CFR 2.704(c)
disqualification motion referred to ASLAB following denial; LBP-78-005, A, (7 NRC 147 (1978))

LEGAL CITATIONS INDEX
REGULATIONS

LEGAL CITATIONS INDEX

REGULATIONS

- 10 CFR 2.711(j)
reopening Shearon Harris record by sua sponte ASLB action; LBP-78-002, A, (7 NRC 83 (1978))
- 10 CFR 2.713(b)
discipline for disrespectful and insulting motions; ALAB-474, D, (7 NRC 746, 748 (1978))
- 10 CFR 2.714
antitrust review role of NRC, late intervention petitions; CLI-78-012, B, (7 NRC 939, 945 (1978))
criteria for late antitrust intervention evaluation; CLI-78-012, D, (7 NRC 939, 948 (1978))
intervention denial for ownership amendment to Enrico Fermi 2 construction permit; LBP-78-011, A, (7 NRC 381 (1978))
intervention petition, antitrust; LBP-78-013, K, (7 NRC 583, 595 (1978))
rules of practice for operating license amendment hearings; LBP-78-016, B, (7 NRC 811, 814 (1978))
- 10 CFR 2.714a
acceptance affirmed for unexcusably tardy petition to intervene in Greenwood 2 and 3 CP; ALAB-476, A, (7 NRC 759 (1978))
affirmation of intervention denial on third party interests; ALAB-470, B, (7 NRC 473 (1978))
appeal of denial of intervention grant, reply to staff's opposition; ALAB-473, E, (7 NRC 737, 743 (1978))
appellate review scope for discretionary intervention grant; ALAB-476, B, (7 NRC 759, 763 in 3 (1978))
- 10 CFR 2.714(a)
contentions requirements for intervention standing, discretionary grant; ALAB-473, D, (7 NRC 737, 741 (1978))
delay weighting in nontimely intervention consideration; ALAB-476, C, (7 NRC 759, 761 (1978))
discretionary intervention grant, scope of appellate review; ALAB-476, B, (7 NRC 759, 763 in 3 (1978))
- 10 CFR 2.714a
dismissal of Greenwood intervention appeal on procedural grounds; ALAB-472, A, (7 NRC 570 (1978))
- 10 CFR 2.714(a)
nontimely intervention granted for Summer 1 operating license proceeding; LBP-78-006, A, (7 NRC 209 (1978))
rules of practice for discretionary intervention grant; LBP-78-011, F, (7 NRC 381, 387 (1978))
- 10 CFR 2.714a
rules of practice for intervention appeal; ALAB-472, B, (7 NRC 570 (1978))
- 10 CFR 2.714(a)
rules of practice for intervention, interest requirement for educational level; LBP-78-006, C, (7 NRC 209, 212 (1978))
rules of practice for intervention standing; LBP-78-011, B, (7 NRC 381, 385 (1978))
rules of practice, justification for nontimely intervention petition; LBP-78-006, B, (7 NRC 209, 212 (1978))
standing for intervention as ratepayer or member of an electric cooperative; LBP-78-011, C, (7 NRC 381, 385 (1978))
standing to intervene; ALAB-473, B, (7 NRC 737, 739 (1978))
- 10 CFR 2.714a
standing to intervene, rules of practice for contentions adequacy; ALAB-473, C, (7 NRC 737, 741 (1978))
- 10 CFR 2.714(d)
rules of practice for discretionary intervention grant; LBP-78-011, F, (7 NRC 381, 387 (1978))
standing for intervention on third-party rights; LBP-78-011, E, (7 NRC 381, 386 (1978))
- 10 CFR 2.715(a)
consolidation of intervenors, rules of practice; ALAB-476, D, (7 NRC 759, 763 (1978))
rules of practice for limited appearance statements; LBP-78-018, D, (7 NRC 932, 936 (1978))
- 10 CFR 2.718

LEGAL CITATIONS INDEX

REGULATIONS

- ASLB authority to halt Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))
- rules of practice for review of hearings scheduling; ALAB-459, E, (7 NRC 179, 187 (1978))
- 10 CFR 2.718(e)
- rules of practice for hearings scheduling; LBP-78-009, D, (7 NRC 271, 282 (1978))
- 10 CFR 2.718(f)
- antitrust remand scheduling vacated pending settlement agreement; ALAB-469, A, (7 NRC 465 (1978))
- ASLB authority to halt Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))
- 10 CFR 2.719
- staff role in licensing, separation of functions in suspension hearings; CLI-78-007, B, (7 NRC 429, 431 (1978))
- 10 CFR 2.730(c)
- motion practice before Commission; ALAB-469, B, (7 NRC 470 (1978))
- 10 CFR 2.730(f)
- ASLB authority to halt Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))
- status of relief requests initiated with ASLAB; ALAB-460, B, (7 NRC 204, 207 (1978))
- 10 CFR 2.733
- discipline for disrespectful and insulting motions; ALAB-474, D, (7 NRC 745, 748 (1978))
- 10 CFR 2.740(b)
- appellate authority to modify or set aside ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))
- discovery scope, authority of person signing interrogatories; LBP-78-023, C, (7 NRC 1038, 1045 (1978))
- 10 CFR 2.740(b)(1)
- discovery scope in antitrust proceedings; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
- 10 CFR 2.749
- remand procedure for ASLB; ALAB-459, A, (7 NRC 179 (1978))
- 10 CFR 2.754(a)
- rules of practice, failure to file where not invited by ASLB; LBP-78-016, C, (7 NRC 811, 815 (1978))
- 10 CFR 2.758
- disqualification motions must be filed timely; LBP-78-005, A, (7 NRC 147 (1978))
- 10 CFR 2.758 (1974 rev.)
- challenge to Table S-3 values for radon releases from uranium mill tailings; ALAB-456, B, (7 NRC 63 (1978))
- 10 CFR 2.758(b)
- Commission policy for environmental protection, inadequate rule application; CLI-78-003, C, (7 NRC 307, 308 (1978))
- 10 CFR 2.760(c)
- initial decision format, basis for conclusions; ALAB-463, N, (7 NRC 341, 368 (1978))
- 10 CFR 2.762(a)
- rules of practice for briefs supportive of exceptions; ALAB-463, D, (7 NRC 341, 370 (1978))
- 10 CFR 2.762(b)
- rules of practice for unbriefed exceptions, waiver; ALAB-461, B, (7 NRC 313, 315 (1978))
- 10 CFR 2.762(d)
- rules of practice for unbriefed exceptions, waiver; ALAB-461, B, (7 NRC 313, 315 (1978))
- 10 CFR 2.763
- rules of practice for unbriefed exceptions; ALAB-459, D, (7 NRC 179, 203 fn. 44 (1978))
- 10 CFR 2.764
- applicant's investment in facility under presumptively valid permit; ALAB-458, H, (7 NRC 155, 170 (1978))
- NRC responsibilities, status of permit during remand for Seabrook site alternates; ALAB-471, A, (7 NRC 477 (1978))
- 10 CFR 2.770
- finality of ASLAB decisions; ALAB-467, E, (7 NRC 459, 463 (1978))

LEGAL CITATIONS INDEX

REGULATIONS

- 10 CFR 2.771
finality of ASLAB decisions; ALAB-467, E, (7 NRC 459, 463 (1978))
- 10 CFR 2.785
appellate authority to modify or set aside ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))
- 10 CFR 2.786
rules of practice for Commission review of ASLAB decision; CLI-78-001, I, (7 NRC 1, 30 (1978))
- 10 CFR 2.786(a)
reversal of federal presumption for Indian Point 2 cooling tower design; ALAB-453, A, (7 NRC 31 (1978))
- 10 CFR 2.786(b)
appellate rights from ASLAB factual findings; ALAB-467, C, (7 NRC 459, 461 (1978))
stay pending appeal, rules of practice; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
- 10 CFR 2.788
applicant's investment in facility under presumptively valid permit; ALAB-458, H, (7 NRC 155, 170 (1978))
rules of practice for Commission review of ASLAB decision; CLI-78-001, I, (7 NRC 1, 30 (1978))
- 10 CFR 2.788(a)
stay pending appeal, rules of practice; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
- 10 CFR 2.788(e)
denial of stay for Three Mile Island 2 operating license (radon releases); ALAB-456, A, (7 NRC 63 (1978))
stay rules of practice; ALAB-481, B, (7 NRC 807 (1978))
- 10 CFR 2.788(h)
stay pending appeal, rules of practice; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
- 10 CFR 2(B)
responsibility for enforcement of license conditions; LBP-78-011, D, (7 NRC 381, 386 (1978))
- 10 CFR 20
radiological and health findings for Phipps Band 1 and 2; LBP-78-001, (7 NRC 73 (1978))
vacation of compliance condition for spent fuel pool modification; ALAB-455, A, (7 NRC 41 (1978))
- 10 CFR 20.1(c)
guidelines for ALARA concept application; ALAB-455, F, (7 NRC 41, 57 (1978))
- 10 CFR 20.101
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 20.101 App A
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 21
regulations governing licensee reporting of safety significant events; LBP-78-010, B, (7 NRC 295, 298 (1978))
timeliness of reporting safety-significant events; LBP-78-010, A, (7 NRC 295 (1978))
- 10 CFR 34.27
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 34.33(a)
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 34.43(b)
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 34.43(d)
penalty assessment for Atlantic Research violations; ALJ-78-002, A, (7 NRC 701 (1978))
- 10 CFR 50.10(a)
applicant's burden of proof, need for power forecasts; ALAB-459, D, (7 NRC

LEGAL CITATIONS INDEX

REGULATIONS

- 179, 184 (1978))
- LWA denial affirmed for Pilgrim 2 on deficient site review; ALAB-479, A, (7 NRC 774 (1978))
- LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
- NRC responsibilities under NEPA, alternative sites; ALAB-479, B, (7 NRC 774, 778 (1978))
- NRC responsibilities under NEPA, alternative sites; ALAB-479, C, (7 NRC 774, 778 (1978))
- 10 CFR 50.33
- financial qualifications, scope of information required; LBP-78-011, H, (7 NRC 381, 392 (1978))
- 10 CFR 50.33(d)(4)
- co-owners licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
- 10 CFR 50.33(f)
- financial qualifications criteria for applicant; CLI-78-001, A, (7 NRC 1 (1978))
- reasonable-assurance scope of inquiry for financial qualifications; CLI-78-001, C, (7 NRC 1, 10 fr 14 (1978))
- scope of financial information required for licensing; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))
- scope of information necessary for LWA, financial responsibility; ALAB-459, B, (7 NRC 179, 183 (1978))
- 10 CFR 50.34
- construction licensing for Tyrone 1, NEPA and radiological findings affirmed; ALAB-464, A, (7 NRC 372 (1978))
- construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- 10 CFR 50.34a
- guidelines for ALARA concept application; ALAB-455, F, (7 NRC 41, 57 (1978))
- issuance of construction permits for Hartsville 1A, 2A, 1B and 2B; ALAB-463, A, (7 NRC 341 (1978))
- radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- 10 CFR 50.34a(a)
- guidelines for ALARA concept application; ALAB-455, F, (7 NRC 41, 57 (1978))
- 10 CFR 50.34(c)
- scope of licensing information; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- 10 CFR 50.35(a)(3)
- construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- 10 CFR 50.36a
- guidelines for ALARA concept application; ALAB-455, F, (7 NRC 41, 57 (1978))
- issuance of construction permits for Hartsville 1A, 2A, 1B and 2B; ALAB-463, A, (7 NRC 341 (1978))
- 10 CFR 50.51(a)(1)
- scope of information necessary for LWA, financial responsibility; ALAB-459, B, (7 NRC 179, 183 (1978))
- 10 CFR 50.55a(h)
- fire safety in operating reactors; CLI-78-006, A, (7 NRC 400 (1978))
- 10 CFR 50.55(e)
- regulations governing construction permit reporting of safety significant events; LBP-78-013, B, (7 NRC 295, 298 (1978))
- timeliness of reporting safety-significant events; LBP-78-010, A, (7 NRC 295 (1978))
- 10 CFR 50.80(b)
- antitrust jurisdictional scope; LBP-78-013, D, (7 NRC 583, 587 (1978))
- scope of prelicensing antitrust review jurisdiction; LBP-78-013, C, (7 NRC 583 (1978))
- 10 CFR 50.91
- scope of prelicensing antitrust review jurisdiction; LBP-78-013, C, (7 NRC 583 (1978))
- 10 CFR 60.100
- NRC emergency sanction powers; CLI-78-006, F, (7 NRC 400, 404 (1978))
- 10 CFR 50 App. K
- ECCS conformance for WPPSS 4, nucleate boiling heat transfer; LBP-78-008, (7 NRC 254 (1978))

LEGAL CITATIONS INDEX

REGULATIONS

- 10 CFR 50 App A
construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- fire safety in operating reactors; CLI-78-006, A, (7 NRC 403 (1978))
- 10 CFR 50 App A (GDC 3)
fire safety in operating reactors; CLI-78-006, A, (7 NRC 460 (1978))
- 10 CFR 50 App A (GDC 4)
fire safety in operating reactors; CLI-78-006, A, (7 NRC 400 (1978))
- 10 CFR 50 App B
radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- 10 CFR 50 App C
financial qualifications criteria for applicant; CLI-78-001, A, (7 NRC 1 (1978))
- financial qualifications, scope of inquiry; CLI-78-001, B, (7 NRC 1, 8(1978))
- reasonable-assurance scope of inquiry for financial qualifications;
CLI-78-001, C, (7 NRC 1, 10 fr 14 (1978))
- 10 CFR 50 App C(I)(A)(1)
scope of financial information required for licensing; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))
- 10 CFR 50 App D(B)
NEPA findings for H.B. Robinson 2; LBP-78-022, A, (7 NRC 1052 (1978))
- 10 CFR 50 App E
compliance of Jamesport 1 and 2; LBP-78-017, E, (7 NRC 826, 852 (1978))
- radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- 10 CFR 50 App E(II)
construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- 10 CFR 50 App I
cross examination rules of practice; ALAB-463, I, (7 NRC 341, 356 (1978))
- guidelines for ALARA concept application; ALAB-455, F, (7 NRC 41, 57 (1978))
- issuance of construction permits for Hartsville 1A, 2A, 1B and 2B; ALAB-463, A, (7 NRC 341 (1978))
- radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- validity of Regulatory Guide 1.109 for assuring compliance; ALAB-463, B, (7 NRC 341, 346 (1978))
- 10 CFR 50 App I(II)(C)
infant as standard for thyroid dose estimation; ALAB-463, E, (7 NRC 341, 353 (1978))
- 10 CFR 50 App K
financial qualifications criteria for applicant; CLI-78-001, A, (7 NRC 1 (1978))
- 10 CFR 50 App(H)(12)
denial of motion to disqualify ASLB for joint licensing duties with Offshore Power Systems; LBP-78-005, A, (7 NRC 147 (1978))
- 10 CFR 51
radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- Table S-3 adequacy for radon-222 environmental effects; CLI-78-003, C, (7 NRC 307, 308 (1978))
- Table S-3 radon-222 release data remand; ALAB-465, (7 NRC 377 (1978))
- Table S-3, radon-release considerations standards; ALAB-485, B, (7 NRC 986, 987 (1978))
- Table S-3 remand for radon release effects on Hartsville; ALAB-467, G, (7 NRC 459, 463 (1978))
- 10 CFR 51.5
negative NEPA declaration, rules of practice; LBP-78-016, D, (7 NRC 811, 815 (1978))
- 10 CFR 51.7
negative NEPA declaration, rules of practice; LBP-78-016, D, (7 NRC 811, 815 (1978))
- 10 CFR 51.20
continuance of administrative review pending site ownership resolve;

LEGAL CITATIONS INDEX

REGULATIONS

- LBP-78-009, A, (7 NRC 271 (1978))
- Table S-3 accuracy, LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
- Table S-3, rules of practice for stay based on; ALAB-481, B, (7 NRC 807 (1978))
- 10 CFR 51.20(e)
challenge to Table S-3 values for radon releases from uranium mill tailings; ALAB-456, B, (7 NRC 63 (1978))
- 10 CFR 51.21
challenge to Table S-3 values for radon releases from uranium mill tailings; ALAB-456, B, (7 NRC 63 (1978))
- continuation of administrative review pending site ownership resolve; LBP-78-009, A, (7 NRC 271 (1978))
- 10 CFR 51.26(b)
weight accorded other-agency comments on FES; ALAB-479, D, (7 NRC 774, 780 (1978))
- 10 CFR 51.40(d)
correction process for deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- 10 CFR 51.52(b)
correction process for deficient FES; ALAB-479, E, (7 NRC 774, 782 (1978))
- 10 CFR 51.52(b)(3)
validity of FES modification by adjudicatory decisions; CLI-78-001, G, (7 NRC 1, 28 (1978))
- 10 CFR 51.52(c)
applicant's burden of proof, need for power forecasts; ALAB-459, D, (7 NRC 179, 184 (1978))
- NRC responsibilities under NEPA, alternative sites; ALAB-479, B, (7 NRC 774, 778 (1978))
- NRC responsibilities under NEPA, alternative sites; ALAB-479, C, (7 NRC 774, 778 (1978))
- 10 CFR 73.55
scope of licensing information required for CP stage; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
- 10 CFR 100
construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
- population density compliance criteria, transient populations; LBP-78-017, D, (7 NRC 826, 848 (1978))
- radiological and health findings for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
- site ownership relation to docketing; LBP-78-009, E, (7 NRC 271, 282 (1978))
- 10 CFR 100 App. A
LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
- 10 CFR 100 App. A
construction permits issuance for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
- seismic findings for WPPSS 4; LBP-78-008, (7 NRC 254 (1978))
- 10 CFR 305.3(b)(4)(1977 ed.)
NEPA review of coal alternative for Wolf Creek; ALAB-462, A, (7 NRC 320 (1978))
- 32 Fed Reg 8423
financial qualifications criteria for applicant; CLI-78-001, A, (7 NRC 1 (1978))
- 33 Fed Reg 9704
financial qualifications criteria for applicant; CLI-78-001, A, (7 NRC 1 (1978))
- 40 CFR 125.36 (1976)
collateral estoppel given to findings of another agency; CLI-78-001, F, (7 NRC 1, 26 (1978))
- 42 Fed Reg 34391
scope of review for spent fuel pool modification amendment; ALAB-455, D, (7 NRC 41, 49 (1978))
- 50 CFR 17.3
relation to Endangered Species Act 5, definition of 'harm'; ALAB-463, M, (7 NRC 341, 366 in 114 (1978))

LEGAL CITATIONS INDEX

REGULATIONS

Attorney General's Manual on the Administrative Procedure Act (1947) at 83
ASLAB and NRC authority to modify or set aside findings by ASLB; CLI-78-001,
H, (7 NRC 1, 29 (1978))
Federal Rules of Civil Procedure, 16
discovery scope in antitrust proceedings; LBP-78-020, B, (7 NRC 1038, 1040
(1978))

LEGAL CITATIONS INDEX

STATUTES

Administrative Procedure Act, 5 U.S.C. 551
 staff role in licensing, separation of functions; CLI-78-007, B, (7 NRC 429, 431 (1978))

Administrative Procedure Act, 5 U.S.C. 554
 staff role in licensing, separation of functions; CLI-78-007, B, (7 NRC 429, 431 (1978))

Administrative Procedure Act, 5 U.S.C. 556(b)
 rules of practice for tribunal disqualification; LBP-78-005, B, (7 NRC 147, 148 (1978))

Administrative Procedure Act, 5 U.S.C. 556(c)
 hearing conduct responsibilities, appellate review; ALAB-459, E, (7 NRC 179, 187 (1978))

Administrative Procedure Act, 5 U.S.C. 557(c)
 initial decision formation, basis for conclusions; ALAB-463, N, (7 NRC 341, 358 (1978))

Administrative Procedure Act, 5 U.S.C. 558(b)
 NRC health and safety licensing responsibilities, electrical system; CLI-78-006, C, (7 NRC 400, 404 (1978))

Administrative Procedure Act, 5 U.S.C. 558(c)
 NRC health and safety licensing responsibilities, electrical system; CLI-78-006, C, (7 NRC 400, 404 (1978))

Administrative Procedure Act 7(d)
 decisional requirements for evidence introduction; ALAB-463, D, (7 NRC 341, 352 (1978))

Atomic Energy Act
 antitrust jurisdiction over ownership changes on applications; LBP-78-013, D, (7 NRC 583, 587 (1978))

civil penalties program aims; ALJ-78-002, C, (7 NRC 701, 708 (1978))

discretionary grant of intervention standing; LBP-78-011, F, (7 NRC 381, 397 (1978))

financial qualifications, scope of information needed; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))

intervention standing for cooperative member; ALAB-470, C, (7 NRC 473, 475 (1978))

NRC role for alternative considerations, financial; ALAB-458, D, (7 NRC 155, 161 (1978))

ownership, licensing requirements v. business judgment; LBP-78-013, F, (7 NRC 583, 589 (1978))

sanctions, Commission policy for exercising; CLI-78-006, F, (7 NRC 400, 404 (1978))

scope of financial information needed for licensing; LBP-78-011, H, (7 NRC 381, 392 (1978))

scope of information necessary for LWA, financial responsibility; ALAB-459, B, (7 NRC 179, 183 (1978))

scope of information required for technical and financial qualifications of applicants; ALAB-464, C, (7 NRC 372, 375 (1978))

standing to intervene as taxpayer; LBP-78-011, I, (7 NRC 381, 393 (1978))

standing to intervene in antitrust proceeding, injury in fact; LBP-78-013, E, (7 NRC 583, 589 (1978))

standing to intervene on third-party rights; LBP-78-011, E, (7 NRC 381, 385

LEGAL CITATIONS INDEX
STATUTES

LEGAL CITATIONS INDEX

STATUTES

- (1978))
standing to intervene, zone of interests do not include ratapayer or member of an electric cooperative; LBP-78-011, C, (7 NRC 381, 385 (1978))
zone of interests protected, discretionary grant of intervention; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
Atomic Energy Act, 42 U.S.C. 2011 et seq.
NRC health and safety licensing responsibilities, electrical specifications; CLI-78-006, B, (7 NRC 400, 404 (1978))
Atomic Energy Act, 42 U.S.C. 2155(a)
necessity for public hearings on statutory decisions for SNM export licenses; CLI-78-009, (7 NRC 455 (1978))
Atomic Energy Act, 42 U.S.C. 2236
NRC emergency sanction powers; CLI-78-006, F, (7 NRC 400, 404 (1978))
NRC health and safety licensing responsibilities, electrical system; CLI-78-006, C, (7 NRC 400, 404 (1978))
Atomic Energy Act, 42 U.S.C. 2237
NRC health and safety licensing responsibilities, electrical system; CLI-78-006, C, (7 NRC 400, 404 (1978))
Atomic Energy Act, 42 U.S.C. 2280
NRC emergency sanction powers; CLI-78-006, F, (7 NRC 400, 404 (1978))
Atomic Energy Act, 42 U.S.C. 2282
NRC emergency sanction powers; CLI-78-006, F, (7 NRC 400, 404 (1978))
NRC health and safety licensing responsibilities, electrical system; CLI-78-006, C, (7 NRC 400, 404 (1978))
Atomic Energy Act, 57(c)(1)
relation to Nuclear Non-Proliferation Act; CLI-78-008, (7 NRC 436 (1978))
Atomic Energy Act (42 U.S.C. 2241)
ASLB role in licensing process; LBP-78-009, B, (7 NRC 271, 278 (1978))
Atomic Energy Act (42 U.S.C. 5841(f) and (g))
ASLB role in licensing process; LBP-78-009, B, (7 NRC 271, 278 (1978))
Atomic Energy Act (42 U.S.C. 5843(b)(1) and (2))
Staff authority for docketing determinations; LBP-78-009, C, (7 NRC 271, 250 (1978))
Atomic Energy Act 53
NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
Atomic Energy Act 53(b)
U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
Atomic Energy Act 57
NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
Atomic Energy Act 57(c)(2)
U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
Atomic Energy Act 101
ownership of facilities, licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
statutory construction of 'possess'; ALAB-459, L, (7 NRC 179, 199 (1978))
Atomic Energy Act 103
NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
ownership of facilities, licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
statutory construction of 'possess'; ALAB-459, L, (7 NRC 179, 199 (1978))
Atomic Energy Act 103(b)(3)
U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
Atomic Energy Act 103(d)
U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
Atomic Energy Act 104
NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
Atomic Energy Act 104(d)
U.S. foreign policy considerations in GESMO proceedings, common defense and

LEGAL CITATIONS INDEX

STATUTES

- security; CLI-78-010, B, (7 NRC 711, 718 (1978))
- Atomic Energy Act 105a
 - ownership of facilities, licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
- Atomic Energy Act 105(c)
 - antitrust initiation, Attorney General recommendations; ALAB-475, B, (7 NRC 752, 755 (1978))
 - antitrust remedy; LBP-78-013, M, (7 NRC 583, 597 (1978))
 - scope of antitrust licensing review jurisdiction; LBP-78-013, C, (7 NRC 583 (1978))
 - scope of discovery in antitrust proceedings, applicant commitment; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
 - scope of NRC antitrust licensing review; CLI-78-012, B, (7 NRC 939, 945 (1978))
 - scope of NRC antitrust review; ALAB-475, D, (7 NRC 752, 756 (1978))
 - scope of NRC antitrust review; ALAB-475, F, (7 NRC 752, 757 (1978))
 - scope of relief available from NRC, late intervention; CLI-78-012, C, (7 NRC 939, 947 (1978))
 - standing to intervene as ratepayer in antitrust proceeding; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Atomic Energy Act 105(c)(1)
 - ownership-change effects on antitrust review; LBP-78-013, B, (7 NRC 583 (1978))
- Atomic Energy Act 105(c)(5)
 - rules of practice for antitrust proceeding initiation; CLI-78-005, B, (7 NRC 397, 398 (1978))
- Atomic Energy Act 161
 - NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
- Atomic Energy Act 161(b)
 - U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
- Atomic Energy Act 161(1)(2)
 - U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
- Atomic Energy Act 182(a)
 - flexibility of financial requirements' analysis; CLI-78-001, B, (7 NRC 1, 8(1978))
 - U.S. foreign policy considerations in GESMO proceedings, common defense and security; CLI-78-010, B, (7 NRC 711, 718 (1978))
- Atomic Energy Act 184
 - ownership of facilities, licensing responsibilities; ALAB-459, M, (7 NRC 179, 198 (1978))
- Atomic Energy Act 184, 42 U.S.C. 2234
 - transfer of ownership of utility's share of nuclear plant under licensing requires Commission approval; CLI-78-001, D, (7 NRC 1, 13 (1978))
- Atomic Energy Act 189
 - Judicial review standing of ASLAB decisions; ALAB-467, E, (7 NRC 459, 463 (1978))
- Atomic Energy Act 189(a)
 - NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
 - standing to intervene; ALAB-473, B, (7 NRC 737, 739 (1978))
- Clayton Act 1
 - intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
- Clayton Act 2
 - intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
- Clayton Act 8
 - standing to intervene as ratepayer in antitrust proceeding; LBP-78-013, H, (7 NRC 583, 591 (1978))
- Clayton Act 14
 - intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
- Clayton Act 16

LEGAL CITATIONS INDEX

STATUTES

standing to intervene as ratepayer in antitrust proceeding; LBP-78-013, H, (7 NRC 583, 591 (1978))

Clean Air Act 110
federal preemption vs. states' rights; ALAB-453, B, (7 NRC 31, 35 (1978))

Clean Air Act 112(d)(1)
federal preemption vs. states' rights; ALAB-453, B, (7 NRC 31, 35 (1978))

Clean Air Act 116
federal preemption vs. states' rights; ALAB-453, B, (7 NRC 31, 35 (1978))

Clean Air Act 122(s)
federal preemption vs. states' rights; ALAB-453, B, (7 NRC 31, 35 (1978))

Council on Environmental Quality
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))

Endangered Species Act 7
NRC interactions with Department of Interior; ALAB-463, L, (7 NRC 341, 357 (1978))
obligations of authorizing vs. implementing federal agency; ALAB-463, L, (7 NRC 341, 357 (1978))
protection of endangered species of mussel for Hartsville; ALAB-463, J, (7 NRC 341 (1978))

Endangered Species Act 9, 16 U.S.C. 1538
definition of 'harm', relation with 50 CFR 17.3; ALAB-463, M, (7 NRC 341, 366 fn 114 (1978))

Energy Reorganization Act
NRC authority to terminate license considerations; CLI-78-014, H, (7 NRC 711, 724 (1978))

Federal Insecticide, Fungicide, and Rodenticide Act 7 U.S.C. 136a(c)
scope of NEPA review, and use of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))

Federal Insecticide, Fungicide, and Rodenticide Act 7 U.S.C. 136(bb)
scope of NEPA review, and use of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))

Federal Property and Administrative Services Act (40 U.S.C. 471 et seq.)
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))

Federal Trade Commission Act 5
standing to intervene as ratepayer in antitrust proceeding; LBP-78-013, H, (7 NRC 583, 591 (1978))

Federal Water Pollution Control Act
compliance responsibilities shared with EPA; LBP-78-022, B, (7 NRC 1052 (1978))

Federal Water Pollution Control Act, 33 U.S.C. 1371(a)(2), 511(c)(2)
scope of NEPA review, and use of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))

Federal Water Pollution Control Act 101(f)
interagency coordination, NRC acceptance of EPA determination on aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))
scope of water quality review by NRC and EPA; LBP-78-007, B, (7 NRC 215, 230 (1978))

Federal Water Pollution Control Act 301
interagency coordination, NRC acceptance of EPA determination on aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))

Federal Water Pollution Control Act 301(b)(2)(A)
interagency coordination, NRC acceptance of EPA determination on aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))

Federal Water Pollution Control Act 316
binding effect affirmed for EPA findings for Seabrook; CLI-78-001, A, (7 NRC 1 (1978))
interagency coordination, NRC acceptance of EPA determination on aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))

Federal Water Pollution Control Act 316(a)
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))

Federal Water Pollution Control Act 401
certification role in LWA and construction permit issuance; ALAB-459, J, (7 NRC 179, 196 (1978))
compliance with state limitations and statutes; LBP-78-017, B, (7 NRC 826, 843 (1978))
Marble Hill 1 and 2 compliance findings; LBP-78-012, (7 NRC 573 (1978))

LEGAL CITATIONS INDEX

STATUTES

Federal Water Pollution Control Act 401(a)
certification where state's boundary is disputed; ALAB-459, I, (7 NRC 179, 189 (1978))
weight of subordinate officials' interpretation of agency policy; ALAB-459, H, (7 NRC 179, 190 (1978))
Federal Water Pollution Control Act 402
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))
Federal Water Pollution Control Act 402(s)(2)
scope of water quality review by NRC and EPA; LBP-78-007, E, (7 NRC 215, 230 (1978))
Federal Water Pollution Control Act 511(c)
NRC coordination of NEPA review responsibilities; CLI-78-001, E, (7 NRC 1, 23 (1978))
Federal Water Pollution Control Act 511(c)(2)
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))
scope of water quality review by NRC and EPA; LBP-78-007, B, (7 NRC 215, 230 (1978))
National Environmental Policy Act 102(2)(C)
negative declaration and considerations of cost-benefit and alternatives; LBP-78-016, D, (7 NRC 811, 815 (1978))
National Environmental Policy Act 102(2)(C)(iii)
agency responsibilities for alternative site considerations; ALAB-479, B, (7 NRC 774, 778 (1978))
National Environmental Policy Act (NEPA)
agency responsibilities for informed decision making; ALAB-471, D, (7 NRC 477, 492 (1978))
alternative site findings, applicant's responsibilities; ALAB-471, G, (7 NRC 477, 498 (1978))
analysis of other agencies' comments on draft environmental statement; ALAB-479, D, (7 NRC 774, 780 (1978))
application review pending site ownership; LBP-78-009, A, (7 NRC 271 (1978))
Commission policy for application of inadequate regulations, radon-222 effects; CLI-78-003, C, (7 NRC 307, 308 (1978))
consideration of alternatives for site selection; ALAB-471, C, (7 NRC 477, 491 (1978))
consideration of alternative sites for Seabrook, system reliability and stability; ALAB-471, F, (7 NRC 477, 496 (1978))
consideration of alternative sites, guidelines; ALAB-479, F, (7 NRC 774, 791 (1978))
consideration of alternatives, timing of fuel cycle issue; ALAB-458, F, (7 NRC 155, 165 fn. 31 (1978))
consideration of site alternatives, final licensing approval for another site; ALAB-471, E, (7 NRC 477, 493 (1978))
cost balancing of alternatives, investment weight; ALAB-458, I, (7 NRC 155, 170 (1978))
cost-benefit analysis, ownership effects; LBP-78-011, G, (7 NRC 381, 391 (1978))
cost-benefit balancing, ownership change effects; ALAB-459, C, (7 NRC 179, 184 (1978))
farm land value standard for cost-benefit analysis; ALAB-462, E, (7 NRC 320, 335 (1978))
federal preemption reversed for Indian Point 2 cooling tower design; ALAB-453, A, (7 NRC 31 (1978))
FES modifications for mitigation of negative impacts; CLI-78-001, G, (7 NRC 1, 28 (1978))
hearings requirements; CLI-78-010, I, (7 NRC 711, 728 (1978))
interagency coordination, NRC acceptance of EPA determination on aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))
intervention standing for cooperative member; ALAB-470, C, (7 NRC 473, 475 (1978))
NRC decisional responsibilities, alternate site comparison; CLI-78-014, C, (7 NRC 952, 960 (1978))
NRC responsibilities for alternative sites; ALAB-479, C, (7 NRC 774, 778 (1978))
NRC responsibilities under; CLI-78-007, D, (7 NRC 429, 433 (1978))
NRC role for alternative considerations, financial; ALAB-458, D, (7 NRC 155,

LEGAL CITATIONS INDEX

STATUTES

161 (1978))
radiological and health findings for Phipps Bend 1 and 2 construction permit issuance; LBP-78-001, (7 NRC 73 (1978))
rule of reason for license amendment considerations; ALAB-455, B, (7 NRC 41, 48 (1978))
scope and integrity of alternative site review; ALAB-471, I, (7 NRC 477, 505 (1978))
scope of information needed for licensing, need for power; ALAB-458, G, (7 NRC 155, 168 (1978))
scope of licensing information required, radon-222 effects; ALAB-467, G, (7 NRC 459, 463 (1978))
scope of review authority for NRC and EPA; LBP-78-007, B, (7 NRC 215, 230 (1978))
zone of interests protected, discretionary grant of intervention; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
Natural Gas Act 16
NRC authority to terminate license considerations; CLI-78-010, H, (7 NRC 711, 724 (1978))
Nuclear Non-Proliferation Act of 1978
uranium export application for India; CLI-78-008, (7 NRC 436 (1978))
Rural Electrification Act, 7 U.S.C.A. 504
intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
Sherman Act
standing to intervene as ratepayer in antitrust proceeding; LBP-78-013, H, (7 NRC 583, 591 (1978))
Sherman Act 1
intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
Sherman Act 2
intervention petition for antitrust proceedings; LBP-78-013, K, (7 NRC 583, 595 (1978))
Tennessee Valley Authority Act of 1933, 48 Stat. 58, as amended, 16 U.S.C. 831-831dd (1970) (Supp. V, 1975)
financial qualifications for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))

SUBJECT INDEX

ACCESS ROADS
pre-LWA activity by county under Commission jurisdiction; ALAB-459, A, (7 NRC 179 (1978))

ACCIDENT
postulated LNG accident for Hope Creek; LBP-78-015, A, (7 NRC 642 (1978))

ACCIDENTS
class 9, scope of licensing information required; LBP-78-017, C, (7 NRC 826 (1978))

ADMINISTRATIVE REMEDY
sanctions for license violations; CLI-78-006, F, (7 NRC 400, 404 (1978))

ADMINISTRATIVE REVIEW
rights for factual findings by ASLAB; ALAB-467, C, (7 NRC 459, 461 (1978))

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
findings for WPPSS 4 construction permit; LBP-78-008, (7 NRC 254 (1978))

ALARA CONCEPT
guidelines for ASLB application; ALAB-455, F, (7 NRC 41, 57 (1978))

ANTITRUST
NRC jurisdictional scope over ownership modification; LBP-78-013, D, (7 NRC 583, 587 (1978))

ANTITRUST PROCEEDINGS
administrative remedy, corrective conditions; LBP-78-013, M, (7 NRC 583, 597 (1978))

ASLB jurisdiction over ownership changes; LBP-78-013, C, (7 NRC 583 (1978))

denial for Enrico Fermi 2 intervention standing; ALAB-475, A, (7 NRC 752 (1978))

discovery scope, state agency status and relationship to other political entities; LBP-78-020, D, (7 NRC 1038, 1045 (1978))

economic issues not merely contested ones; CLI-78-012, D, (7 NRC 939, 948 (1978))

hearing schedules vacated in anticipation of Midland settlement agreement; ALAB-468, A, (7 NRC 465 (1978))

initiation for South Texas 1 and 2 operating license; CLI-78-005, A, (7 NRC 397 (1978))

intervention affirmed for late petition for St. Lucie 2; CLI-78-012, A, (7 NRC 939 (1978))

intervention denial for Enrico Fermi 2; LBP-78-013, A, (7 NRC 583 (1978))

intervention petition criteria; LBP-78-013, K, (7 NRC 583, 595 (1978))

intervention petitions rules of practice; LBP-78-013, L, (7 NRC 583, 597 (1978))

motion to dismiss for lack of jurisdiction denied for Enrico Fermi 2; LBP-78-013, A, (7 NRC 583 (1978))

NRC responsibility after Attorney General recommendation; CLI-78-005, B, (7 NRC 397, 398 (1978))

rules of practice for discretionary intervention; ALAB-475, E, (7 NRC 752, 758 fn 19 (1978))

rules of practice for discretionary intervention grant; ALAB-475, H, (7 NRC 752, 758 fn 19 (1978))

rules of practice for initiation of operating license; CLI-78-005, 8, (7 NRC 397, 398 (1978))

rules of practice for initiation, Attorney General recommendations; ALAB-475, B, (7 NRC 752, 755 (1978))

scope of ASLB discretion for regulating hearings and relief for late

SUBJECT INDEX

SUBJECT INDEX

- intervention; CLI-78-012, C, (7 NRC 939, 947 (1978))
- scope of discovery; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
- scope of NRC review covers all; CLI-78-012, D, (7 NRC 939, 948 (1978))
- standing for intervention, on injury in fact; LBP-78-013, E, (7 NRC 583, 589 (1978))
- untimely intervention evaluation criteria; CLI-78-012, D, (7 NRC 939, 948 (1978))
- ANTITRUST REVIEW
 - Attorney General's advice sought for changed circumstance of Comanche Peak; CLI-78-013, (7 NRC 950 (1978))
 - scope of NRC authority; ALAB-475, D, (7 NRC 752, 756 (1978))
 - scope of NRC authority; ALAB-475, F, (7 NRC 752, 757 (1978))
 - scope of NRC licensing authority; CLI-78-012, B, (7 NRC 939, 945 (1978))
 - scope of preclearing jurisdiction; LBP-78-013, C, (7 NRC 583 (1978))
 - scope of preclearing, ownership change; LBP-78-013, B, (7 NRC 583 (1978))
- APPEAL BOARD
 - see Atomic Safety and Licensing Appeal Board
- APPEALS
 - appellate policy for entertaining issues raised first on appeal; ALAB-463, C, (7 NRC 341, 348 (1978))
 - rights for reconsideration of matters raised for first time before ASLB or ASLAB; ALAB-467, D, (7 NRC 459, 462 (1978))
 - rules of practice for interim stay; ALAB-458, C, (7 NRC 155, 160 (1978))
 - rules of practice for nonparty; ALAB-454, B, (7 NRC 39 (1978))
- APPEALS, INTERLOCUTORY
 - appellate rules of practice for relief not sought from ASLB; ALAB-460, B, (7 NRC 204, 207 (1978))
 - status for construction permit refusal prior to loan guarantee; ALAB-461, A, (7 NRC 313 (1978))
 - status of ASLAB first-time findings; ALAB-467, E, (7 NRC 459, 463 (1978))
 - status of intervention where no final ruling on contentions has been made; ALAB-472, B, (7 NRC 570 (1978))
 - status of relief requests sought initially from appeal board; ALAB-460, B, (7 NRC 204, 207 (1978))
- APPELLATE POLICY
 - exceptions unnecessary to defend favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
 - interim relief pending remand, initial requests only; ALAB-460, B, (7 NRC 204, 207 (1978))
 - issues raised first on appeal; ALAB-463, F, (7 NRC 341, 348 (1978))
 - phraseology changes in initial decisions; ALAB-482, B, (7 NRC 979, 980 (1978))
 - procedural conduct for hearings, review limitations; ALAB-459, E, (7 NRC 179, 187 (1978))
 - reopening closed proceedings on new evidence, rules of practice; ALAB-464, D, (7 NRC 372, 374 fn 4 (1978))
 - rules of practice for unbrieft exceptions, waiver; ALAB-461, B, (7 NRC 313, 315 (1978))
 - standard for review of ASLB discretionary power; ALAB-463, H, (7 NRC 341, 356 fn 65 (1978))
- APPELLATE PROCEDURE
 - rules of practice for exceptions from prevailing party; ALAB-461, D, (7 NRC 313, 316 (1978))
- APPELLATE REVIEW
 - appeal from denial of stay pending appeal, rules of practice; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
 - authority to set aside or modify ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))
 - handling of mooted issue with possible precedential value; ALAB-455, G, (7 NRC 41, 55 (1978))
 - rights for factual findings by ASLAB; ALAB-467, C, (7 NRC 459, 461 (1978))
 - rules of practice for Commission review of ASLAB decisions; CLI-78-001, I, (7 NRC 1, 30 (1978))
 - rules of practice, finality of ASLAB decisions; ALAB-467, E, (7 NRC 459, 463 (1978))
 - rules of practice, language substitution lacking exceptions; ALAB-478, B, (7

SUBJECT INDEX

NRC 772 (1978))
 scope for ASLB scheduling orders; ALAB-468, B, (7 NRC 465 (1978))
 scope of jurisdiction over ownership changes in licensed facility; ALAB-459, A, (7 NRC 470 (1978))
APPLICANT
 includes Licensee
 burden of proof standard for power demand forecasting; ALAB-459, D, (7 NRC 179, 184 (1978))
 financial and technical qualifications, scope of review of ownership and personnel; ALAB-464, C, (7 NRC 372, 375 (1978))
 financial investment under presumptively valid construction permit, substantive stay considerations; ALAB-458, H, (7 NRC 155, 170 (1978))
 financial qualifications for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
 financial qualifications' scope of inquiry; CLI-78-001, E, (7 NRC 1, 8 (1978))
 financial qualifications' standard, fuel cycle costs; ALAB-462, C, (7 NRC 320, 333 (1978))
 financial qualifications, scope of licensing information; LBP-78-011, H, (7 NRC 381, 392 (1978))
 financial qualifications, scope of licensing information needed; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))
 financial qualifications, status as regulated public utility; CLI-78-001, C, (7 NRC 1, 10 fr 14 (1978))
 financial status applicability to LWA issuance; ALAB-459, B, (7 NRC 179, 183 (1978))
 ownership change effects on NEPA cost-benefit analysis; LBP-78-011, G, (7 NRC 381, 391 (1978))
 ownership change effects on scope of antitrust review; LBP-78-013, B, (7 NRC 583 (1978))
 ownership change need not necessitate redraft of EIS; ALAB-459, C, (7 NRC 179, 184 (1978))
 ownership changes, NRC jurisdiction over; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
 ownership changes, NRC jurisdiction over; LBP-78-013, D, (7 NRC 583, 587 (1978))
 ownership changes, scope of appellate review; ALAB-469, A, (7 NRC 470 (1978))
 ownership decisions, licensing v. business judgment; LBP-78-013, F, (7 NRC 583, 589 (1978))
 ownership responsibilities, intervention standing on coop members; ALAB-470, C, (7 NRC 473, 475 (1978))
 ownership transfer responsibilities; CLI-78-001, D, (7 NRC 1, 13 (1978))
 party responsibilities for correction of procedural error; ALAB-459, F, (7 NRC 179, 189 (1978))
 party rights where ASLB changes basis for case decision; ALAB-455, E, (7 NRC 41, 56 (1978))
 responsibilities for NEPA alternative site considerations; ALAB-471, G, (7 NRC 477, 498 (1978))
 responsibility for disclosure of new evidence; LBP-78-002, D, (7 NRC 83, 88 (1978))
 role in alternate site consideration; ALAB-479, G, (7 NRC 774, 791 (1978))
 role in alternative site evaluation; ALAB-479, H, (7 NRC 774, 792 (1978))
 role of co-owners in licensing; ALAB-459, M, (7 NRC 179, 198 (1978))
 status and commitment of state agency as co-applicant, discovery in antitrust proceeding; LBP-78-020, D, (7 NRC 1038, 1045 (1978))
ASSESSMENT
 rules of practice for civil penalties; ALJ-78-002, B, (7 NRC 701, 704 (1978))
ATLANTIC NUCLEAR GENERATION STATION, Units 1 and 2
 construction permit, denial of tribunal disqualification motion; LBP-78-005, A, (7 NRC 147 (1978))
ATLANTIC RESEARCH CORPORATION
 byproduct material license, civil penalties imposed for radioactivity overexposure incident; ALJ-78-002, A, (7 NRC 701 (1978))
ATOMIC SAFETY AND LICENSING APPEAL BOARD

SUBJECT INDEX

administrative review rights from factual findings; ALAB-467, C, (7 NRC 459, 461 (1978))
appeal from decisions of first-time raised matters; ALAB-467, D, (7 NRC 459, 462 (1978))
appeal to Commission from denial of stay pending appeal, rules of practice; CLI-78-003, B, (7 NRC 367, 308 fn 2 (1978))
authority for granting lesser relief than stay pending appeal; ALAB-460, C, (7 NRC 204, 207 (1978))
authority to receive evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
authority to set aside or modify ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))
authority to strike on its own initiative, insulting and disrespectful submissions; ALAB-474, E, (7 NRC 746, 749 (1978))
decisional basis must rest on factual introduced evidence; ALAB-463, D, (7 NRC 341, 352 (1978))
finality of decisions for administrative review; ALAB-467, E, (7 NRC 459, 463 (1978))
hearings regulation, rules of practice; LBP-78-009, D, (7 NRC 271, 282 (1978))
jurisdiction over actions of the Director of Nuclear Reactor Regulation; ALAB-466, B, (7 NRC 457 (1978))
review policy for ASLB scheduling orders; ALAB-468, B, (7 NRC 465 (1978))
review standards, stare decisis on uncontested legal issues; ALAB-482, C, (7 NRC 979, 981 fn 4 (1978))
rules of practice for Commission review of decisions; CLI-78-001, I, (7 NRC 1, 30 (1978))
rules of practice for federal presumption findings; ALAB-453, B, (7 NRC 31, 35 (1978))
rules of practice for handling mooted issue with possible precedential value; ALAB-455, G, (7 NRC 41, 55 (1978))
rules of practice for relief not initially sought from ASLB; ALAB-460, B, (7 NRC 204, 207 (1978))
scope of appellate review of discretionary intervention grant; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
scope of review, issue raised first time on appeal; ALAB-463, C, (7 NRC 341, 348 (1978))
scope of review, issues raised first on appeal; ALAB-463, F, (7 NRC 341, 348 (1978))
ATOMIC SAFETY AND LICENSING APPEAL BOARD, JURISDICTION
authority to halt Regulatory Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))
ATOMIC SAFETY AND LICENSING BOARD
abuse of discretion, appellate review standard for hearings conduct challenge; ALAB-459, E, (7 NRC 179, 187 (1978))
advisory opinions, decisional language substitution; ALAB-478, B, (7 NRC 772 (1978))
alternate site considerations; ALAB-479, G, (7 NRC 774, 791 (1978))
appeal from decisions of first-time raised matters; ALAB-467, D, (7 NRC 459, 462 (1978))
consideration of site alternatives, guidelines; ALAB-479, F, (7 NRC 774, 791 (1978))
criteria for reopening hearing record on sua sponte action; LBP-78-002, C, (7 NRC 83, 87 (1978))
decisional basis must rest on factual introduced evidence; ALAB-463, D, (7 NRC 341, 352 (1978))
decisional criteria, applicant's investment under presumptively valid construction permit; ALAB-458, H, (7 NRC 155, 170 (1978))
decisional responsibilities, initial decision format; ALAB-463, N, (7 NRC 341, 368 (1978))
decisional weight accorded radioactive waste storage impacts; ALAB-458, E, (7 NRC 155, 163 (1978))
discretionary authority to set cross-examination scope and parties; ALAB-461, C, (7 NRC 313, 316 (1978))
discretionary grant of intervention, rules of practice; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
discretionary power for intervention grant, scope of appellate review;

SUBJECT INDEX

ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
discretionary power for untimely intervention handling; CLI-78-012, C, (7 NRC 939, 947 (1978))
discretionary power, appellate standard of review; ALAB-463, H, (7 NRC 341, 356 fn 65 (1978))
discretionary powers to regulate hearing, scheduling for remand hearings; ALAB-468, C, (7 NRC 465 (1978))
disqualification rules of practice; LBP-78-005, B, (7 NRC 147, 148 (1978))
enforcement responsibilities for license conditions; LBP-78-011, D, (7 NRC 381, 386 (1978))
finality of findings under ASLAB or NRC review; CLI-78-001, H, (7 NRC 1, 29 (1978))
guidelines for application of ALARA concept in 10 CFR 20.1(c); ALAB-455, F, (7 NRC 41, 57 (1978))
guidelines for site evaluation under NEPA; ALAB-471, F, (7 NRC 477, 496 (1978))
hearing regulation obligations to parties; ALAB-455, E, (7 NRC 41, 56 (1978))
hearings regulation, rules of practice; LBP-78-009, D, (7 NRC 271, 282 (1978))
NEPA alternative site considerations, weight of final approval; ALAB-471, E, (7 NRC 477, 493 (1978))
obligations for endangered species of mussels; ALAB-463, J, (7 NRC 341 (1978))
obligations under Endangered Species Act, Section 7; ALAB-463, L, (7 NRC 341, 357 (1978))
resolution of issues; ALAB-461, E, (7 NRC 313, 318 (1978))
role in alternative site evaluation; ALAB-479, H, (7 NRC 774, 792 (1978))
rules of practice for federal presumption findings; ALAB-453, B, (7 NRC 31, 35 (1978))
weight of alternative site determinations; ALAB-471, C, (7 NRC 477, 491 (1978))

ATOMIC SAFETY AND LICENSING BOARD, JURISDICTION
authority to halt Regulatory Staff review; LBP-78-009, B, (7 NRC 271, 278 (1978))

ATTORNEY GENERAL
NRC responsibilities after antitrust recommendation; CLI-78-005, B, (7 NRC 397, 398 (1978))
weight of antitrust recommendations; ALAB-475, B, (7 NRC 752, 755 (1978))

ATTORNEYS
discipline for disrespect, lawyer v. nonlawyer; ALAB-474, D, (7 NRC 746, 748 (1978))
parties responsibilities, lawyers v. nonlawyers; ALAB-474, B, (7 NRC 746, 748 (1978))

ATWS
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))

BAILLY GENERATING STATION, Nuclear 1
construction permit suspension request denial affirmed; CLI-78-007, A, (7 NRC 429 (1978))

BARNWELL NUCLEAR FUEL PLANT SEPARATIONS FACILITY
policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

BARNWELL PLUTONIUM PRODUCT FACILITY
policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

BARNWELL URANIUM HEXAFLUORIDE FACILITY
policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

BEACHES
dredging and erosion impacts from Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
evacuation plans for persons outside LPZ; LBP-78-017, E, (7 NRC 826, 852 (1978))

BEAVER VALLEY POWER STATION, Unit 1
operating license amendment, affirmation of authorization for spent fuel pool capacity enlargement; ALAB-484, (7 NRC 984 (1978))

SUBJECT INDEX

- operating license amendment, issuance authorized for modification of spent fuel pool capacity; LBP-78-016, A, (7 NRC 811 (1978))
- BRIEFS
 - captions requirements for immediate affirmative relief; ALAB-457, B, (7 NRC 70 (1978))
 - filing responsibilities where ASLB has not requested; LBP-78-016, C, (7 NRC 811, 815 (1978))
 - requirements in support of exceptions; ALAB-463, D, (7 NRC 341, 370 (1978))
 - rules of practice for administrative relief motions; ALAB-457, B, (7 NRC 70 (1978))
 - rules of practice for exceptions; ALAB-459, D, (7 NRC 179, 203 fn. 44 (1978))
 - rules of practice for exceptions format; ALAB-461, B, (7 NRC 313, 315 (1978))
 - waiver of exceptions, rules of appellate practice; ALAB-459, D, (7 NRC 179, 203 fn. 44 (1978))
- BURDEN OF PROOF
 - see Proof, Burden of
- BYPRODUCT MATERIAL LICENSES
 - violations, payment schedule for civil penalties modified for financial considerations; ALJ-78-001, (7 NRC 151 (1978))
- BYPRODUCT MATERIAL LICENSES, PROCEEDINGS
 - civil penalties' payment schedule for Sylvester violations; ALJ-78-001, (7 NRC 151 (1978))
 - mitigating factors for civil penalties resulting from radioactivity overexposure incident; ALJ-78-002, A, (7 NRC 701 (1978))
- CHEROKEE NUCLEAR STATION, Units 1, 2 and 3
 - construction permits, affirmation for all issues except radon-release impacts; ALAB-482, A, (7 NRC 979 (1978))
 - construction permits, procedural rulings for appeal briefs; ALAB-457, A, (7 NRC 70 (1978))
 - construction permits, staff exceptions to otherwise unchallenged decision; ALAB-478, A, (7 NRC 772 (1978))
 - remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
- CHICKEN
 - dose calculations from human consumption; ALAB-463, B, (7 NRC 341, 346 (1978))
- CIVIL PENALTIES
 - assessment, rules of practice; ALJ-78-002, B, (7 NRC 701, 704 (1978))
 - imposition affirmed for pre-LWA activity by Marble Hill applicants; ALAB-459, A, (7 NRC 179 (1978))
 - installment payment plan approved for Sylvester; ALJ-78-001, (7 NRC 151 (1978))
 - mitigating factors for assessment levied for radioactivity overexposure incident; ALJ-78-002, A, (7 NRC 701 (1978))
 - offsite access and road widening by county prior to LWA issuance; ALAB-459, A, (7 NRC 179 (1978))
 - payment by ratepayers vs stockholders rests with regulatory agencies; ALAB-459, K, (7 NRC 179, 198 (1978))
 - program aims under Atomic Energy Act; ALJ-78-002, C, (7 NRC 701, 708 (1978))
 - role of Director of the Office of Enforcement; ALJ-78-002, E, (7 NRC 701, 709 (1978))
- CO-OWNERS
 - licensing responsibilities; ALAB-459, M, (7 NRC 179, 195 (1978))
- COAL
 - alternative findings for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
 - as alternative energy source for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
- COAL FUEL CYCLE
 - comparative environmental effects with nuclear fuel cycle; LBP-78-008, (7 NRC 254 (1978))
- COLLATERAL ESTOPPEL
 - see Res Judicata
- COMANCHE PEAK STEAM ELECTRIC STATION, Units 1 and 2
 - antitrust review, request for Attorney General's advice on changed circumstance; CLI-78-013, (7 NRC 950 (1978))

SUBJECT INDEX

COMMISSION

see Nuclear Regulatory Commission

COMMON DEFENSE AND SECURITY

foreign policy considerations in GESMO termination; CLI-78-010, B, (7 NRC 711, 718 (1978))

COMPUTER CODES

safety related errors, timeliness of North Anna 1 and 2 reporting; LBP-78-010, A, (7 NRC 295 (1978))

CONGRESS

foreign policy, relationship with Administration view; CLI-78-010, D, (7 NRC 711, 719 (1978))

CONSOLIDATION

consideration for hearings on generic issue; ALAB-480, B, (7 NRC 795, 805 (1978))

rules of practice for special nuclear materials export proceedings;

CLI-78-004, B, (7 NRC 311 (1978))

CONSTRUCTION PERMITS

activity continuance during Hope Creek resand with reports directed on 6 month intervals; ALAB-460, A, (7 NRC 204 (1978))

affirmation of Wolf Creek, reconsideration denied; ALAB-477, A, (7 NRC 766 (1978))

amendment for Enrico Fermi 2 ownership, intervention denial affirmed;

ALAB-470, A, (7 NRC 473 (1978))

amendment notice of hearing for Enrico Fermi 2, jurisdictional

considerations; ALAB-466, A, (7 NRC 457 (1978))

amendment to ownership, scope of appellate jurisdiction; ALAB-469, A, (7 NRC 470 (1978))

applicant's investment where substantive stay is sought for presumptively valid permit; ALAB-458, H, (7 NRC 155, 170 (1978))

completion schedule changes, materiality to warrant reopening; LBP-78-002, A, (7 NRC 83 (1978))

effectiveness of Seabrook undisturbed during alternative site resand;

ALAB-471, A, (7 NRC 477 (1978))

enforcement of license conditions; LBP-78-011, D, (7 NRC 391, 386 (1978))

issuance affirmed for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))

issuance authorization affirmed for Hartsville 1A, 1B, 2A and 2B with

environmental reservations; ALAB-463, A, (7 NRC 341 (1978))

issuance authorized for Marble Hill 1 and 2; LBP-78-012, (7 NRC 573 (1978))

issuance authorized for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))

issuance authorized for Shearon Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92

(1978))

issuance authorized for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))

issuance authorized for WPPSS 3 and 5; ALAB-485, A, (7 NRC 986 (1978))

issuance authorized for WPPSS 4; LBP-78-008, (7 NRC 254 (1978))

issuance reaffirmed for Seabrook 1 and 2; CLI-78-001, A, (7 NRC 1 (1978))

NRC licensing responsibilities for health and safety matters; CLI-78-006, C,

(7 NRC 400, 404 (1978))

regulations governing reportable safety significant incidents; LBP-78-010,

B, (7 NRC 295, 298 (1978))

rules of practice for emergency suspension; CLI-78-006, F, (7 NRC 400, 404

(1978))

show-cause proceedings, rules of practice; CLI-78-007, B, (7 NRC 429, 431

(1978))

staff exceptions to unchallenged initial decision; ALAB-478, A, (7 NRC 772

(1978))

substantive stay considerations, applicant's investment under presumptively

valid; ALAB-458, H, (7 NRC 155, 170 (1978))

suspension considerations pending alternate site review correction,

dissenting views; CLI-78-014, F, (7 NRC 952, 961 (1978))

suspension denial affirmed for Bailey; CLI-78-007, A, (7 NRC 429 (1978))

suspension denial affirmed for Midland 1 and 2 pending resand proceedings on

environmental alternatives; ALAB-458, A, (7 NRC 155 (1978))

suspension pending another agency decision, NRC discretionary authority;

CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))

suspension rules of practice following resand order; ALAB-458, B, (7 NRC

155, 159 (1978))

SUBJECT INDEX

CONSTRUCTION PERMITS, AMENDMENTS

co-owner additions for Enrico Fermi 2, intervention denied; LBP-78-011, A, (7 NRC 381 (1978))

CONSTRUCTION PERMITS, APPLICATION

administrative review, docketing rules of practice; LBP-78-009, C, (7 NRC 271, 280 (1978))

docketing rules of practice; LBP-78-009, C, (7 NRC 271, 280 (1978))

CONSTRUCTION PERMITS, PROCEEDINGS

affirmation of all findings except radon-release impacts for Cherokee 1, 2 and 3; ALAB-482, A, (7 NRC 979 (1978))

amendments, scope of NEPA review; ALAB-455, B, (7 NRC 41, 48 (1978))

completion date slippage effect on environmental impact statement;

LBP-78-017, H, (7 NRC 826, 928 (1978))

construction approval reversed for Indian Point 2 closed cycle cooling system; ALAB-453, A, (7 NRC 31 (1978))

construction permit suspension considerations on remand, equitable relevant considerations; ALAB-458, B, (7 NRC 155, 159 (1978))

construction-stage reporting schedule directed pending remand for Hope

Creek; ALAB-460, A, (7 NRC 204 (1978))

continuance of NEP 1 and 2 pending site ownership resolve; LBP-78-009, A, (7 NRC 271 (1978))

disqualification motion denied for Atlantic 1 and 2 tribunal; LBP-78-005, A, (7 NRC 147 (1978))

financial considerations, NEPA vs safety issues; ALAB-459, B, (7 NRC 179, 183 (1978))

financial qualifications for Marble Hill, refusal to issue permit prior to resolve affirmed; ALAB-461, A, (7 NRC 313 (1978))

financial qualifications' findings required; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))

findings for Jamesport except for radon-release impacts; LBP-78-017, A, (7 NRC 826 (1978))

fuel cycle impacts considerations, timeliness; ALAB-458, F, (7 NRC 155, 165 fn. 31 (1978))

Greenwood intervention appeal dismissed on procedural grounds; ALAB-472, A, (7 NRC 570 (1978))

hearings conduct responsibilities rest with presiding tribunal; ALAB-459, E, (7 NRC 179, 187 (1978))

initiation of show-cause, standards for discretionary; CLI-78-007, C, (7 NRC 429, 432 (1978))

intervention procedural rulings for NEP 1 and 2; LBP-78-018, A, (7 NRC 932 (1978))

Jamesport NEPA findings, stay denied; ALAB-481, A, (7 NRC 807 (1978))

Marble Hill co-owner financial qualifications and FWPCA 401 certification findings; LBP-78-012, (7 NRC 573 (1978))

need for power forecasts, scope of applicant's; ALAB-462, B, (7 NRC 320, 326 (1978))

NEPA authority for water quality conditions shared with EPA; LBP-78-007, B, (7 NRC 215, 230 (1978))

notice of hearing reissuance for amendment, jurisdictional considerations; ALAB-466, A, (7 NRC 457 (1978))

NRC health and safety responsibilities; CLI-78-006, B, (7 NRC 400, 404 (1978))

petition to reopen, rules of practice for new material; ALAB-477, C, (7 NRC 766, 770 (1978))

procedural rulings for appeal briefs for Cherokee; ALAB-457, A, (7 NRC 70 (1978))

remand for radon-222 release effects consideration for Hartsville 1A, 2A, 1B and 2B; ALAB-457, A, (7 NRC 459 (1978))

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

reopening for new evidence, applicant's responsibilities for disclosure;

LBP-78-002, D, (7 NRC 83, 85 (1978))

reopening of Marble Hill LWA record for boundary issue; ALAB-459, A, (7 NRC 179 (1978))

reopening rules of practice; ALAB-462, F, (7 NRC 320, 337 (1978))

reopening Shearon Harris 1, 2, 3 and 4 record for new evidence on site geology, load forecasts, and construction schedule; LBP-78-002, A, (7 NRC

SUBJECT INDEX

83 (1978))
reopening tests' applicability where sua sponte Board action; LBP-78-002, C, (7 NRC 83, 87 (1978))
role of FWPCA 401 certification; ALAB-459, J, (7 NRC 179, 196 (1978))
rules of practice for emergency suspension on health and safety matters; CLI-78-006, F, (7 NRC 400, 404 (1978))
rules of practice for reopening of new evidence; ALAB-464, D, (7 NRC 372, 374 fn 4 (1978))
rules of practice for show-cause; CLI-78-007, B, (7 NRC 429, 431 (1978))
scope of cooling system remand for Seabrook 1 and 2; CLI-78-014, A, (7 NRC 952 (1978))
scope of information required on financial and technical qualifications of applicants; ALAB-464, C, (7 NRC 372, 375 (1978))
scope of licensing information required, security plans for sabotage; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
scope of prelicensing antitrust jurisdiction; LBP-78-013, C, (7 NRC 583 (1978))
Seabrook alternative site findings remanded; ALAB-471, A, (7 NRC 477 (1978))
standard for meeting power demand forecasting burden of proof; ALAB-459, D, (7 NRC 179, 184 (1978))
standing to intervene, rules of practice; LBP-78-011, B, (7 NRC 381, 385 (1978))
CONTENTIONS
standing for intervention; ALAB-473, D, (7 NRC 737, 741 (1978))
COOLING SYSTEMS
environmental impacts from entrainment and impingement from Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
COOLING TOWERS
environmental impacts from Seabrook; ALAB-471, A, (7 NRC 477 (1978))
federal preemption doctrine's applicability to village zoning variance; LBP-78-021, (7 NRC 1048 (1978))
COOLING WATER SUPPLY
findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
CROSS EXAMINATION
see also Testimony
see also Witnesses
burden of proof rules of practice; ALAB-463, I, (7 NRC 341, 356 (1978))
rules of practice, intervenor's right to build defensive case; ALAB-463, G, (7 NRC 341, 356 (1978))
rules of practice, scope and parties; ALAB-461, C, (7 NRC 313, 316 (1978))
DAVIS-BESSE NUCLEAR POWER STATION, Units 2 and 3
remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
DECISION
basis rests on factual introduced evidence; ALAB-463, D, (7 NRC 341, 352 (1978))
finality of ASLAB for appellate purposes; ALAB-467, E, (7 NRC 459, 463 (1978))
format responsibilities under NEPA; ALAB-471, D, (7 NRC 477, 492 (1978))
DECISION, FINAL
finality following administrative and judicial appeal; CLI-78-007, D, (7 NRC 429, 433 (1978))
rules of practice for Commission review of ASLAB decision; CLI-78-001, I, (7 NRC 1, 30 (1978))
DECISION, INITIAL
basis rests on factual introduced evidence; ALAB-463, D, (7 NRC 341, 352 (1978))
format for appellate review, standard for ASLB discretionary power; ALAB-463, H, (7 NRC 341, 356 fn 65 (1978))
format for decisional basis for material issues of fact, law, or discretion; ALAB-463, N, (7 NRC 341, 368 (1978))
presumptive validity of alternate site findings (Seabrook 1 and 2); CLI-78-001, A, (7 NRC 1 (1978))
DEFINITIONS
'harm' in Section 9 of Endangered Species Act; ALAB-463, M, (7 NRC 341, 366 fn 114 (1978))
DELAY

SUBJECT INDEX

weight for discretionary intervention grant on untimely petitions; ALAB-476, C, (7 NRC 759, 761 (1978))

DEPARTMENT OF THE INTERIOR
interaction with Nuclear Regulatory Commission under Endangered Species Act; ALAB-463, L, (7 NRC 341, 357 (1978))

DEWATERING
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))

DIABLO CANYON NUCLEAR POWER PLANT, Units 1 and 2
operating licenses, NEPA and radiological findings, excluding seismically related issues; LBP-78-019, A, (7 NRC 989 (1978))

DIRECTOR OF NUCLEAR REACTOR REGULATION
actions subject to review by NRC rather than ASLAB; ALAB-466, B, (7 NRC 457 (1978))
enforcement responsibilities for license conditions; LBP-78-011, D, (7 NRC 381, 386 (1978))
role in show-cause proceedings initiation; CLI-78-007, C, (7 NRC 429, 432 (1978))

DIRECTOR OF OFFICE OF ENFORCEMENT
role in civil penalties assessment; ALJ-78-002, E, (7 NRC 701, 709 (1978))

DISCIPLINE
lawyers v. nonlawyers' conduct in NRC proceedings; ALAB-474, D, (7 NRC 746, 748 (1978))

DISCOVERY
rules of practice for antitrust proceedings; LBP-78-020, B, (7 NRC 1038, 1040 (1978))
rules of practice, authority of person signing interrogatories; LBP-78-020, C, (7 NRC 1038, 1045 (1978))
scope in antitrust proceedings, co-applicant state agency status and commitment to facility; LBP-78-020, D, (7 NRC 1038, 1045 (1978))

DISQUALIFICATION
rules of practice for adjudicatory tribunal challenge; LBP-78-005, B, (7 NRC 147, 148 (1978))

EARTHQUAKES
potential for Yellow Creek 1 and 2, LWA findings; LBP-78-007, A, (7 NRC 215 (1978))

ECONOMIC CONSIDERATIONS
guidelines for ASLB application; ALAB-455, F, (7 NRC 41, 57 (1978))

ECONOMIC INTERESTS
protection under Atomic Energy Act; LBP-78-011, C, (7 NRC 381, 385 (1978))

EDLOW INTERNATIONAL COMPANY
export license proceedings for Tarapur consolidated; CLI-78-004, A, (7 NRC 311 (1978))

EFFLUENTS, CHEMICAL
compliance findings for Jamesport 1 and 2; LBP-78-017, B, (7 NRC 826, 843 (1978))
water quality compliance for Jamesport 1 and 2; LBP-78-017, B, (7 NRC 826, 843 (1978))

EFFLUENTS, RADIOACTIVE
findings for Diablo Canyon; LBP-78-019, A, (7 NRC 989 (1978))
findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
overexposure incident, mitigating factors for penalty assessment; ALJ-78-002, A, (7 NRC 701 (1978))
radiation dosimetry pathways, standards and models; ALAB-463, A, (7 NRC 341 (1978))
radon-222 and Table S-3 values for Tyrone 1; ALAB-464, A, (7 NRC 372 (1978))
radon-222 environmental effects, remand for Hartsville consideration; ALAB-467, A, (7 NRC 459 (1978))
radon-222 release, ASLAB directed to consider environmental effects; CLI-78-003, A, (7 NRC 307 (1978))
radon-222 releases from WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
radon-222, LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
radon-release impacts, generic resolve rules of practice; ALAB-480, B, (7 NRC 796, 805 (1978))
ultimate disposal of spent fuels need not be considered for licensing increased storage capacity; ALAB-455, D, (7 NRC 41, 49 (1978))

SUBJECT INDEX

EFFLUENTS, THERMAL

aquatic impacts from nuclear power plant, interagency coordination of regulation and review; CLI-78-001, E, (7 NRC 1, 23 (1978))
water quality compliance for Jamesport 1 and 2; LBP-78-017, B, (7 NRC 826, 843 (1978))

ELECTRIC COOPERATIVE

membership status for intervention in NRC proceedings; LBP-78-011, C, (7 NRC 381, 385 (1978))

ELECTRIC UTILITY INDUSTRY

management decisions, scope of NRC antitrust review; ALAB-475, G, (7 NRC 752, 757 (1978))

ELECTRICAL EQUIPMENT

qualification specifications, review of NRC program directed; CLI-78-006, A, (7 NRC 400 (1978))

ELECTRICITY

see also Energy Conservation

findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
forecasting future demand, variations; ALAB-477, D, (7 NRC 766, 770 (1978))
load forecasts for Shearon Harris, materiality to warrant reopening to receive new evidence; LBP-78-002, A, (7 NRC 83 (1978))
need considerations, applicable standards; LBP-78-017, G, (7 NRC 826, 869 (1978))
need for power considerations, end-use societal impacts; ALAB-458, J, (7 NRC 155, 174 (1978))
need for, construction permit findings for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
need for, scope of construction permit forecasts; ALAB-462, B, (7 NRC 320, 326 (1978))
need forecasting standard for applicant's burden of proof; ALAB-459, D, (7 NRC 179, 184 (1978))
weight of genuine need in cost-benefit balancing; ALAB-458, G, (7 NRC 155, 168 (1978))

EMERGENCY CORE COOLING SYSTEM

WPPSS 4 conformance with App. K, nucleate boiling heat transfer; LBP-78-005, (7 NRC 254 (1978))

EMERGENCY PLANS

evacuation of persons outside LPZ, Jamesport beach location; LBP-78-017, E, (7 NRC 826, 852 (1978))
findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
for transient populations; LBP-78-017, D, (7 NRC 826, 848 (1978))
reopening motion for Three Mile Island 2; ALAB-474, A, (7 NRC 746 (1978))
status of deficient reopening motions; ALAB-474, C, (7 NRC 746, 748 (1978))

EMPLOYMENT OPPORTUNITIES

considerations in cost-benefit balance for power plant; ALAB-471, J, (7 NRC 477, 509 fn 58 (1978))

ENDANGERED SPECIES

definition of 'harm' in Section 9 of Act; ALAB-463, M, (7 NRC 341, 366 fn 114 (1978))
interagency obligations under statute, NRC vs. DOI; ALAB-463, L, (7 NRC 341, 357 (1978))
mussels in Cumberland River, Tennessee; ALAB-463, A, (7 NRC 341 (1978))

ENERGY CONSERVATION

coal alternatives for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))

ENRICO FERMI ATOMIC POWER PLANT, Unit 2

antitrust proceedings, intervention standing denial affirmed; ALAB-475, A, (7 NRC 752 (1978))
antitrust, intervention denial member/ratepayer of distribution cooperative; LBP-78-013, A, (7 NRC 583 (1978))
construction permit amendment for ownership, intervention denial affirmed; ALAB-470, A, (7 NRC 473 (1978))
construction permit amendment, co-owner additions; LBP-78-011, A, (7 NRC 381 (1978))
construction permit amendment, notice of hearing reissuance; ALAB-466, A, (7 NRC 457 (1978))
construction permit, ownership changes status for initiating notice of

SUBJECT INDEX

hearing; ALAB-469, A, (7 NRC 470 (1978))
 ENVIRONMENTAL CONSIDERATIONS
 affirmation of Tyrone 1 findings; ALAB-464, A, (7 NRC 372 (1978))
 agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
 alternative site considerations under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
 alternative site review scope and integrity; ALAB-471, I, (7 NRC 477, 505 (1978))
 cost balancing alternatives, weight of construction work accomplished prior to review; ALAB-458, I, (7 NRC 155, 170 (1978))
 cost benefit balancing of interim fuel cycle impacts, radioactive waste storage; ALAB-458, E, (7 NRC 155, 163 (1978))
 cost benefit balancing, effects from change in ownership; ALAB-453, C, (7 NRC 179, 184 (1978))
 cost-benefit analysis, land use inquiry of farmland removal; ALAB-452, E, (7 NRC 320, 335 (1978))
 cost-benefit balance, role of taxes and increased employment opportunities; ALAB-471, J, (7 NRC 477, 509 fn 58 (1978))
 cost-benefit considerations of need for power; LBP-78-017, G, (7 NRC 826, 869 (1978))
 cost-benefit effects of radon releases on Robinson 2 operating impacts; LBP-78-022, A, (7 NRC 1052 (1978))
 endangered species of mussels, protection requirements; ALAB-463, J, (7 NRC 341 (1978))
 findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
 interagency coordination of regulation and review, aquatic impacts; CLI-78-001, E, (7 NRC 1, 23 (1978))
 negative NEPA determinations, licensing considerations following; LBP-78-016, D, (7 NRC 811, 815 (1978))
 NEPA balancing need not include societal costs from and use of electricity; ALAB-458, J, (7 NRC 155, 174 (1978))
 NEPA cost balancing of alternatives, financial; ALAB-458, D, (7 NRC 155, 161 (1978))
 NEPA cost balancing of providing genuine electricity need; ALAB-458, G, (7 NRC 155, 168 (1978))
 NEPA cost-balancing authority for water quality conditions, EPA v. NRC; LBP-78-007, B, (7 NRC 215, 230 (1978))
 NEPA does not require public hearings nor prevent termination; CLI-78-010, I, (7 NRC 711, 728 (1978))
 NEPA review scope for operating license amendment; ALAB-455, C, (7 NRC 41, 46 fn 4 (1978))
 NRC responsibilities under NEPA for informed decisionmaking; ALAB-471, D, (7 NRC 477, 492 (1978))
 operations impacts, timeliness for alternatives considerations; ALAB-458, F, (7 NRC 155, 165 fn. 31 (1978))
 ownership change effects on cost-benefit balance; LBP-78-011, G, (7 NRC 391, 391 (1978))
 permit suspension to protect alternative site selection for Seabrook 1 and 2; CLI-78-014, C, (7 NRC 952, 960 (1978))
 radioactive waste storage, cost balancing under interim fuel cycle rule; ALAB-458, E, (7 NRC 155, 163 (1978))
 radon releases from uranium mill tailings denied as stay basis for Three Mile Island 2 operating license; ALAB-456, A, (7 NRC 63 (1978))
 radon-222 environmental effects consideration directed; CLI-78-003, A, (7 NRC 307 (1978))
 remand for Seabrook alternative site evaluation; ALAB-471, I, (7 NRC 477 (1978))
 remand to consider radon-222 releases from Hartsville; ALAB-467, G, (7 NRC 459, 463 (1978))
 res judicata applicability to other agency findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
 scope of information necessary for Class 9 accident probability; LBP-78-017, C, (7 NRC 826 (1978))
 scope of information required for license amendment (spent fuel pool); ALAB-455, B, (7 NRC 41, 48 (1978))
 termination of hearings; CLI-78-010, I, (7 NRC 711, 728 (1978))

SUBJECT INDEX

- ultimate disposal of radioactive wastes not required for spent fuel pool modification amendment; ALAB-455, D, (7 NRC 41, 49 (1978))
- uranium fuel cycle effects from WPPSS 4; LBP-78-008, (7 NRC 254 (1978))
- weight of system reliability and stability in site evaluation; ALAB-471, F, (7 NRC 477, 496 (1978))
- ENVIRONMENTAL PROTECTION AGENCY
 - policy for administering FWPCA, weight in NRC licensing cases; ALAB-459, H, (7 NRC 179, 190 (1978))
 - relationship with NRC, aquatic impacts from nuclear power plant cooling systems; CLI-78-001, E, (7 NRC 1, 23 (1978))
 - res judicata applicability for NEPA findings in NRC licensing; CLI-78-001, F, (7 NRC 1, 26 (1978))
 - role in water quality determinations for reactor licensing; LBP-78-022, B, (7 NRC 1052 (1978))
 - scope of review scope under NEPA, water quality; LBP-78-007, B, (7 NRC 215, 230 (1978))
- ENVIRONMENTAL STATEMENT
 - effects of completion date slippage; LBP-78-017, H, (7 NRC 826, 928 (1978))
 - modification by other agency adjudication; CLI-78-001, G, (7 NRC 1, 23 (1978))
 - NEPA requirements for terminated federal action; CLI-78-010, I, (7 NRC 711, 728 (1978))
 - ownership change need not necessitate redraft; ALAB-459, C, (7 NRC 179, 184 (1978))
 - procedural handling where changed circumstances mitigate impacts; CLI-78-001, G, (7 NRC 1, 28 (1978))
 - rules of practice for handling deficient; ALAB-479, E, (7 NRC 774, 782 (1978))
 - weight of other agencies' comments on draft; ALAB-479, D, (7 NRC 774, 780 (1978))
- ERRATA
 - SNM export license opinion for Tarapur, NRC decision basis; CLI-78-002, (7 NRC 153 (1978))
- EVIDENCE
 - see also Testimony
 - see also Witnesses
 - applicant's responsibility for disclosure of new; LBP-78-002, D, (7 NRC 83, 88 (1978))
 - ASLAB authority to receive; ALAB-467, B, (7 NRC 459, 461 (1978))
 - burden of going forward, rules of practice for defensive cross examination case; ALAB-463, G, (7 NRC 341, 356 (1978))
 - decisional basis for NRC and other Federal agencies; ALAB-463, K, (7 NRC 341, 360 (1978))
 - inferences from failure to produce that in your control; ALAB-471, H, (7 NRC 477, 498 (1978))
 - necessity for introduction of all facts used in decision; ALAB-463, D, (7 NRC 341, 352 (1978))
 - receipt where significance where neither findings nor conclusion are altered; LBP-78-002, D, (7 NRC 83, 88 (1978))
 - relevance and materiality of new information requested by adjudicatory board; LBP-78-002, D, (7 NRC 83, 88 (1978))
 - rules of practice for ex parte communications; ALAB-459, G, (7 NRC 179, 191 (1978))
 - rules of practice for reopening on changed or new; ALAB-464, D, (7 NRC 372, 374 fn 4 (1978))
- EXCEPTIONS
 - requirements for supportive briefs; ALAB-463, O, (7 NRC 341, 370 (1978))
 - rules of practice for appellate procedure for prevailing party; ALAB-461, D, (7 NRC 313, 316 (1978))
 - rules of practice for defense of favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
 - rules of practice for unbriefed; ALAB-459, D, (7 NRC 179, 203 fn. 44 (1978))
 - rules of practice for waiver of unbriefed; ALAB-461, B, (7 NRC 313, 315 (1978))
 - rules of practice, change of language in decision; ALAB-478, B, (7 NRC 772 (1978))

SUBJECT INDEX

EXPORT LICENSING PROCESS

decisional basis for Commission license approval, errata for safeguards from diversion; CLI-78-002, (7 NRC 153 (1978))

FACILITY

see specific facilities

FARM LAND

value standard for cost-benefit analysis; ALAB-462, E, (7 NRC 320, 335 (1978))

FEDERAL PPREMPTION DOCTRINE

concurrent State regulatory proceedings, effects on NRC administrative proceedings; ALAB-464, B, (7 NRC 372, 375 (1978))
governmental approvals for Indian Point 2 alternate closed-cycle cooling tower; LBP-78-021, (7 NRC 1048 (1978))
rules of practice for federal tribunals gives state courts first interpretation of conflict; ALAB-453, B, (7 NRC 31, 35 (1978))

FEDERAL REGISTER

non receipt as good cause for untimely intervention petition; LBP-78-018, B, (7 NRC 932, 933 (1978))

FINANCIAL ASSISTANCE

intervenor status for discretionary intervention grant; ALAB-473, E, (7 NRC 737, 743 (1978))

FINANCIAL CONSIDERATIONS

applicant's investment under presumptively valid construction permit, substantive stay considerations; ALAB-458, H, (7 NRC 155, 170 (1978))
NEPA cost balancing alternatives, NRC obligations; ALAB-458, D, (7 NRC 155, 161 (1978))
role in LWA vs safety findings in construction permit proceedings; ALAB-459, B, (7 NRC 179, 183 (1978))
scope of information necessary for LWA; ALAB-459, B, (7 NRC 179, 183 (1978))
weight accorded investment at time of NEPA alternative balancing; ALAB-459, I, (7 NRC 155, 170 (1978))

FINANCIAL QUALIFICATIONS

applicant, scope of fuel cycle costs; ALAB-462, C, (7 NRC 320, 333 (1978))
consideration in enforcement of civil penalties judgment for BML license violations; ALJ-78-001, (7 NRC 151 (1978))
construction permit findings for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
effects from Tyrone ownership changes; ALAB-464, A, (7 NRC 372 (1978))
findings for construction permit issuance for WPPSS 4; LBP-78-008, (7 NRC 254 (1978))
findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
findings for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
Marble Hill co-owner findings; LBP-78-012, (7 NRC 573 (1978))
refusal to authorize construction permits prior to REA grant affirmed for Marble Hill; ALAB-461, A, (7 NRC 313 (1978))
relation with safety; CLI-78-001, A, (7 NRC 1 (1978))
rulesmaking initiation directed for factual, legal and policy aspects; CLI-78-001, A, (7 NRC 1 (1978))
scope of information needed for applicant; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))
scope of information required for licensing, ownership changes; ALAB-464, C, (7 NRC 372, 375 (1978))
scope of inquiry; CLI-78-001, B, (7 NRC 1, 8 (1978))
scope of inquiry for new vs. established entity; CLI-78-001, C, (7 NRC 1, 10 fr 14 (1978))
scope of licensing information for applicant; LBP-78-011, H, (7 NRC 381, 392 (1978))
scope of NRC responsibility for commercial power reactor licensing; CLI-78-001, A, (7 NRC 1 (1978))

FINDINGS OF FACT

appellate review rights; ALAB-467, C, (7 NRC 459, 461 (1978))
authority of review bodies to modify or set aside decisions by ASLB; CLI-78-001, H, (7 NRC 1, 29 (1978))
precedential value of nonadversary presentations on generic matters; ALAB-485, C, (7 NRC 986, 988 fn 4 (1978))

FINDINGS OF FACT AND LAW

SUBJECT INDEX

default, rules of practice for filing; LBP-78-016, C, (7 NRC 811, 815 (1978))

FIRE PROTECTION
 electrical system safety specifications, review of NRC program directed; CLI-78-006, A, (7 NRC 400 (1978))
 site suitability findings for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))

FIRES, ELECTRICAL
 health and safety aspects of electrical system design; CLI-78-006, A, (7 NRC 400 (1978))

FOREIGN POLICY
 considerations in GESMO proceedings termination; CLI-78-010, B, (7 NRC 711, 718 (1978))
 executive branch expressions, weight accorded by NRC; CLI-78-010, C, (7 NRC 711, 718 (1978))
 executive branch relation with NRC; CLI-78-010, D, (7 NRC 711, 719 (1978))

FUEL
 see Reactor Fuels

FUEL CYCLE
 alternatives to plutonium recycle, NRC considerations in GESMO; CLI-78-010, E, (7 NRC 711, 720 (1978))
 scope of NRC regulatory review, GESMO termination; CLI-78-010, G, (7 NRC 711, 721 (1978))

GENERAL DESIGN CRITERIA
 interpretation; CLI-78-006, D, (7 NRC 400, 404 (1978))
 regulatory guides' status for interpreting; CLI-78-006, E, (7 NRC 400, 404 (1978))

GENERIC ENVIRONMENTAL STATEMENT ON MIXED OXIDE FUEL
 policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

GEOLOGICAL FAULTS
 materiality to warrant reopening to receive new evidence; LBP-78-002, A, (7 NRC 83 (1978))

GOOD CAUSE
 criteria for evaluating untimely intervention in antitrust proceedings; CLI-78-012, D, (7 NRC 939, 948 (1978))
 untimely intervention petitions, Federal Register receipt; LBP-78-018, B, (7 NRC 932, 933 (1978))

GOVERNMENT AGENCIES
 see also specific agencies
 NRC discretionary authority relative to other agencies decisional areas; CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))
 status of documents issued by other agencies, show-cause proceedings; CLI-78-007, C, (7 NRC 429, 432 (1978))
 weight accorded other agencies' comments on FES; ALAB-479, D, (7 NRC 774, 780 (1978))

GREENWOOD ENERGY CENTER, Units 2 and 3
 construction permit, intervention appeal dismissed for procedural grounds; ALAB-472, A, (7 NRC 570 (1978))
 construction permit, untimely intervention grant affirmed; ALAB-476, A, (7 NRC 759 (1978))

H.B. ROBINSON STEAM ELECTRIC PLANT, Unit 2
 operating license, amendment for power increase plus environmental impacts from fuel cycle; LBP-78-022, A, (7 NRC 1052 (1978))

HARTSVILLE NUCLEAR PLANT, Units 1A, 2A, 1B and 2B
 construction permit remand for radon-222 release effects; ALAB-467, A, (7 NRC 459 (1978))
 construction permit, issuance affirmed except for location of stream discharge diffuser; ALAB-463, A, (7 NRC 341 (1978))
 remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

HEALTH AND SAFETY
 see also Emergency Plans
 affirmation of Tyrone 1 findings; ALAB-464, A, (7 NRC 372 (1978))
 comparative coal v. nuclear fuel cycle effects; LBP-78-008, (7 NRC 254 (1978))
 guidelines for ASLB application; ALAB-455, F, (7 NRC 41, 57 (1978))
 NRC licensing responsibilities; CLI-78-006, B, (7 NRC 400, 404 (1978))

SUBJECT INDEX

- NRC licensing responsibilities; CLI-78-006, C, (7 NRC 400, 404 (1978))
personnel exposure during spent fuel pool modification; ALAB-455, F, (7 NRC 41, 57 (1978))
relief valve control system modification timing; LBP-78-001, (7 NRC 73 (1978))
standard for initiation of show-cause proceedings; CLI-78-007, C, (7 NRC 429, 432 (1978))
- HEARING RECORD
reopening criteria for new information; LBP-78-002, B, (7 NRC 83, 84 (1978))
reopening criteria where sua sponte Board action; LBP-78-002, C, (7 NRC 83, 87 (1978))
- HEARINGS
see also Construction Permits, Proceedings
see also Licensing Proceedings
see also Operating Licenses, Proceedings
conduct responsibilities generally rest with ASLB; ALAB-459, E, (7 NRC 179, 187 (1978))
consolidation considerations for generic issue; ALAB-480, B, (7 NRC 795, 805 (1978))
fairness standard for parties, ASLB obligations when deciding case on basis different from initial; ALAB-455, E, (7 NRC 41, 56 (1978))
limited appearance procedures for 394 petitioners; LBP-78-018, D, (7 NRC 932, 936 (1978))
NRC authority to terminate; CLI-78-010, H, (7 NRC 711, 724 (1978))
parties responsibilities, timeliness; ALAB-474, B, (7 NRC 746, 748 (1978))
regulations and statutes governing initiation; LBP-78-009, E, (7 NRC 271, 282 (1978))
reopening for new evidence receipt; LBP-78-002, D, (7 NRC 83, 84 (1978))
rules of practice for tribunal scheduling; LBP-78-009, D, (7 NRC 271, 282 (1978))
scheduling errors, appellate policy for handling; ALAB-459, F, (7 NRC 179, 189 (1978))
scheduling orders, scope of appellate review; ALAB-468, B, (7 NRC 465 (1978))
- HEARINGS REGULATION
discretionary authority of presiding officer; ALAB-461, C, (7 NRC 313, 316 (1978))
- HEARINGS, NOTICE OF
jurisdiction of ASLB over reissuance; ALAB-466, A, (7 NRC 457 (1978))
ownership changes in licensed facility do not require new; ALAB-469, A, (7 NRC 470 (1978))
- HOPE CREEK GENERATING STATION, Units 1 and 2
construction permits, LNG postulated accident; LBP-78-015, A, (7 NRC 642 (1978))
construction permits, reporting schedule set by appellate authority pending remand; ALAB-460, A, (7 NRC 204 (1978))
remand for radon-release impacts; ALAB-460, A, (7 NRC 796 (1978))
- IC CHIP EVENT
safety related failure, timeliness of North Anna 1 and 2 reporting; LBP-78-010, A, (7 NRC 295 (1978))
- INDIA
SNM export license for Tarapur, opinion correction; CLI-78-002, (7 NRC 153 (1978))
XSNM-1060 and XSNM-1222 applications for Tarapur consolidation; CLI-78-009, (7 NRC 455 (1978))
- INDIAN POINT, Unit 2
construction permit, governmental approvals for closed-cycle cooling system; LBP-78-021, (7 NRC 1048 (1978))
construction permits, approval for construction of closed-cycle cooling system reversed pending judicial decision; ALAB-453, A, (7 NRC 31 (1978))
- INITIAL DECISION
see Decision, Initial
- INTERLOCUTORY APPEALS
see Appeals, Interlocutory
- INTERROGATORIES
discovery scope applicable to person signing; LBP-78-020, C, (7 NRC 1038,

SUBJECT INDEX

1045 (1978))
scope allowable for Stanislaus; LBP-78-020, A, (7 NRC 1038 (1978))

INTERVENORS
ability to contribute to decisionmaking; LBP-78-013, J, (7 NRC 583, 594 (1978))
consolidation, rules of practice; ALAB-476, D, (7 NRC 759, 763 (1978))
intervention standing as ratepayer or electric power consumer; LBP-78-013, H, (7 NRC 583, 591 (1978))
party responsibilities for correction of procedural error; ALAB-459, F, (7 NRC 179, 189 (1978))
party rights where ASLB changes basis for case decision; ALAB-455, E, (7 NRC 41, 56 (1978))
responsibilities when filing motions pro se; ALAB-469, C, (7 NRC 473 (1978))
right to build defensive case on cross examination; ALAB-463, G, (7 NRC 341, 356 (1978))
rights to engage in cross examination of witnesses; ALAB-461, C, (7 NRC 313, 316 (1978))
standing on broad public interests; ALAB-473, B, (7 NRC 737, 739 (1978))
status for discretionary grant when requesting financial assistance; ALAB-473, E, (7 NRC 737, 743 (1978))

INTERVENTION
antitrust petition criteria; LBP-78-013, K, (7 NRC 583, 595 (1978))
appeal from denial, rules of practice; ALAB-472, B, (7 NRC 570 (1978))
appellate review scope for discretionary grant; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
denial for ownership amendment to Enrico Fermi 2 construction permit; LBP-78-011, A, (7 NRC 381 (1978))
discretionary grant rule of practice; LBP-78-013, I, (7 NRC 583, 593 (1978))
discretionary grant, rules of practice for delay factor weighting; ALAB-476, C, (7 NRC 759, 761 (1978))
discretionary grant, rules of practice for quality of contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
discretionary, rules of practice; ALAB-475, E, (7 NRC 752, 758 fn 19 (1978))
economic interests of ratepayers and electric cooperative members not protected under Atomic Energy Act; LBP-78-011, C, (7 NRC 381, 385 (1978))
granted on untimely petition for NEP 1 and 2 construction permit proceedings; LBP-78-018, A, (7 NRC 932 (1978))
local government standing; LBP-78-018, C, (7 NRC 932, 934 (1978))
nontimely petition granted for Summer 1 operating license proceeding; LBP-78-006, A, (7 NRC 209 (1978))
operating license amendments, rules of practice for hearing initiation; LBP-78-016, B, (7 NRC 811, 814 (1978))
rules of practice for acceptance of nontimely; LBP-78-018, B, (7 NRC 932, 933 (1978))
rules of practice for antitrust petitions; LBP-78-013, L, (7 NRC 583, 597 (1978))
rules of practice for determining discretionary grant; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
rules of practice for discretionary; ALAB-475, H, (7 NRC 752, 758 fn 19 (1978))
rules of practice for discretionary grant; LBP-78-011, F, (7 NRC 381, 397 (1978))
rules of practice for limited appearance; LBP-78-018, D, (7 NRC 932, 936 (1978))
rules of practice for motion filing; ALAB-469, C, (7 NRC 470 (1978))
rules of practice for standing; LBP-78-011, B, (7 NRC 381, 385 (1978))
rules of practice, discretionary grant; ALAB-473, E, (7 NRC 737, 743 (1978))
rules of practice, injury in fact; LBP-78-013, E, (7 NRC 583, 589 (1978))
rules of practice, interest requirements for education; LBP-78-006, C, (7 NRC 209, 212 (1978))
rules of practice, nontimely intervention petition justification; LBP-78-006, B, (7 NRC 209, 212 (1978))
rules of practice, standing; ALAB-473, B, (7 NRC 737, 739 (1978))
rules of practice, standing for third-party interests; ALAB-470, B, (7 NRC 473 (1978))
standing denial for Enrico Fermi antitrust; ALAB-475, A, (7 NRC 752 (1978))

SUBJECT INDEX

- standing for NRC proceedings, zone of interests protected; LBP-78-011, C, (7 NRC 381, 385 (1978))
- standing for purely economic personal concerns as member of cooperative purchasing power from co-owner; ALAB-470, C, (7 NRC 473, 475 (1978))
- standing in antitrust proceedings; ALAB-475, C, (7 NRC 752, 755 (1978))
- standing of ratepayer or consumer of electricity; LBP-78-013, H, (7 NRC 583, 591 (1978))
- standing of taxpayer for interest protection under Atomic Energy Act; LBP-78-011, I, (7 NRC 381, 393 (1978))
- standing on economic interests of consumer and utility; ALAB-470, F, (7 NRC 473, 476 (1978))
- standing on potential economic injury claims; LBP-78-013, (7 NRC 583, 589 (1978))
- standing on third-party rights, rules of practice for discretionary grant; LBP-78-011, E, (7 NRC 381, 386 (1978))
- standing, rules of practice; ALAB-473, C, (7 NRC 737, 741 (1978))
- standing, rules of practice, contentions; ALAB-473, D, (7 NRC 737, 741 (1978))
- status of limited-appearance participation for appeals from decision; ALAB-454, B, (7 NRC 39 (1978))
- untimely antitrust petitions, criteria for evaluation of good-cause factor; CLI-78-012, D, (7 NRC 939, 948 (1978))
- untimely antitrust, scope of ASLB discretion for relief; CLI-78-012, C, (7 NRC 939, 947 (1978))
- untimely grant affirmed for Greenwood 2 and 3; ALAB-476, A, (7 NRC 759 (1978))
- IODINE**
 - cow-milk-thyroid dose calculations; ALAB-463, A, (7 NRC 341 (1978))
 - infant as standard for radiation dose estimation to thyroid; ALAB-463, E, (7 NRC 341, 353 (1978))
- ISSUES**
 - posthearing resolution by staff discouraged; ALAB-461, E, (7 NRC 313, 318 (1978))
 - staff analysis of generic, status in show-cause proceedings; CLI-78-007, C, (7 NRC 429, 432 (1978))
- J.G. SYLVESTER ASSOCIATES, INC.**
 - byproduct material license enforcement proceedings, civil penalties payment schedule; ALJ-78-001, (7 NRC 151 (1978))
- JAMESPORT NUCLEAR POWER STATION, Units 1 and 2**
 - construction permits, initial decision covering all issues except radon-release impacts; LBP-78-017, A, (7 NRC 826 (1978))
 - construction permits, stay denied for NEPA findings; ALAB-491, A, (7 NRC 807 (1978))
- JURISDICTION**
 - see Atomic Safety and Licensing Appeal Board, Jurisdiction
 - see Atomic Safety and Licensing Board, Jurisdiction
 - see Nuclear Regulatory Commission, Jurisdiction
 - denied for issuance of new notices of hearing for licensed facility; ALAB-469, A, (7 NRC 470 (1978))
 - NRC discretionary authority to reserve unto itself reinstatement decision for permit suspension; CLI-78-014, E, (7 NRC 952, 961 fn 9 (1978))
 - NRC preemption for radioactive effluent discharge; LBP-78-019, B, (7 NRC 989, 999 fn 9 (1978))
- LAND USE**
 - agricultural impact findings for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
- LEGAL ASPECTS**
 - State vs. NRC regulatory laws; ALAB-464, B, (7 NRC 372, 375 (1978))
- LICENSE TO OPERATE**
 - see Operating Licenses
- LICENSEE**
 - see Applicant
- LICENSEES**
 - responsibilities for safety design and review; CLI-78-006, G, (7 NRC 400, 418 (1978))
- LICENSING BOARD**

SUBJECT INDEX

- see Atomic Safety and Licensing Board
- LICENSING PROCEEDINGS
 - see also Construction Permits, Proceedings
 - see also Hearings
 - see also Operating Licenses, Proceedings
 - co-owners as co-applicants; ALAB-459, M, (7 NRC 179, 198 (1978))
 - Commission policy for non-rigid application of inadequate regulations; CLI-78-003, C, (7 NRC 307, 308 (1978))
 - docketing rules of practice; LBP-78-009, C, (7 NRC 271, 280 (1978))
 - jurisdictional roles of ASLB, ASLAB and Regulatory Staff; LBP-78-009, B, (7 NRC 271, 278 (1978))
 - remand hearing scheduling during settlement negotiations; ALAB-468, C, (7 NRC 465 (1978))
 - terminated actions, necessity for environmental statement; CLI-78-01J, I, (7 NRC 711, 728 (1978))
- LIMITED APPEARANCE
 - rules of practice for intervention; LBP-78-018, D, (7 NRC 932, 936 (1978))
- LIMITED WORK AUTHORIZATION
 - affirmation for Marble Hill 1 and 2; ALAB-459, A, (7 NRC 179 (1978))
 - continuance during reopening of boundary issue for Marble Hill; ALAB-459, A, (7 NRC 179 (1978))
 - denial affirmed for Pilgrim 2, deficient site review; ALAB-479, A, (7 NRC 774 (1978))
 - findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
 - offsite power transmission line scope; LBP-78-007, A, (7 NRC 215 (1978))
 - role of FWPCA 401 certification; ALAB-459, J, (7 NRC 179, 196 (1978))
 - scope of financial information necessary for issuance; ALAB-459, B, (7 NRC 179, 183 (1978))
 - status pending proceedings on remand for procedural error; ALAB-459, J, (7 NRC 179, 196 (1978))
- LOCAL GOVERNMENTS
 - standing to intervene; LBP-78-018, C, (7 NRC 932, 934 (1978))
- LOW POPULATION ZONE
 - evacuation plans for persons outside perimeter; LBP-78-017, E, (7 NRC 926, 852 (1978))
- MARBLE HILL NUCLEAR GENERATING STATION, Units 1 and 2
 - construction permit, co-owner financial qualifications and FWPCA 401 certification findings; LBP-78-012, (7 NRC 573 (1978))
 - construction permit, LWA affirmation; ALAB-459, A, (7 NRC 179 (1978))
 - construction permits, LWA-2 affirmed with agreement amendments; ALAB-461, A, (7 NRC 313 (1978))
 - remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
- MIDLAND PLANT, Units 1 and 2
 - antitrust, scheduling orders vacated anticipatory of settlement agreement; ALAB-468, A, (7 NRC 465 (1978))
 - construction permit, suspension unwarranted pending remand NEPA considerations; ALAB-458, A, (7 NRC 155 (1978))
- MOTIONS
 - petition to reopen on safety matters, timeliness concern; ALAB-474, C, (7 NRC 746, 748 (1978))
 - rules of practice before NRC; ALAB-469, B, (7 NRC 470 (1978))
 - rules of practice for obtaining immediate administrative relief; ALAB-457, B, (7 NRC 70 (1978))
- MUSSELS
 - endangered species in Tennessee, radioactivity affects on; ALAB-463, A, (7 NRC 341 (1978))
 - protection requirements for endangered species, Hartsville; ALAB-463, J, (7 NRC 341 (1978))
- NATURAL GAS
 - conversion alternatives to coal for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
- NEED FOR POWER
 - forecasting future demand, variations; ALAB-477, D, (7 NRC 766, 770 (1978))
- NEP, Units 1 and 2
 - construction permit, intervention grant for nontimely petition; LBP-78-018, A, (7 NRC 932 (1978))

SUBJECT INDEX

construction permits, hearings continuance pending site ownership resolution; LBP-78-009, A, (7 NRC 271 (1978))

NORTH ANNA NUCLEAR POWER STATION, Units 1 and 2

operating license, amendment to hot-standby status pending resolve of reportable safety instances; LBP-78-003, (7 NRC 89 (1978))

operating licenses, reaffirmation of authorization following safety-reporting timeliness; LBP-78-010, A, (7 NRC 295 (1975))

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

NRC REGULATIONS

see Nuclear Regulatory Commission

see Rules and Regulations

NUCLEAR FUEL RECOVERY AND RECYCLING CENTER

policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

NUCLEAR REGULATORY COMMISSION

administration decisional basis rests on preponderance of evidence; ALAB-463, K, (7 NRC 341, 360 (1978))

agency responsibilities under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))

antitrust responsibilities after Attorney General recommendations; CLI-78-005, B, (7 NRC 397, 398 (1978))

antitrust review scope; ALAB-475, D, (7 NRC 752, 756 (1978))

appeal from appellate decision, rules of practice; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))

authority to impose financial qualifications; CLI-78-001, B, (7 NRC 1, 8 (1978))

authority to set aside or modify ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))

autonomy, executive branch policy for plutonium recycle; CLI-78-010, C, (7 NRC 711, 718 (1978))

decisional basis for SNM export license, Tarsapur opinion errata; CLI-78-003, (7 NRC 153 (1978))

discretionary authority relative to other governmental agencies; CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))

enforcement of license conditions, responsibility delegations; LBP-78-011, D, (7 NRC 381, 386 (1978))

foreign policy, relationship with Administration view; CLI-78-010, D, (7 NRC 711, 719 (1978))

health and safety licensing responsibilities; CLI-78-006, C, (7 NRC 400, 404 (1978))

health and safety responsibilities in licensing; CLI-78-006, E, (7 NRC 400, 404 (1978))

interaction with Department of Interior under Endangered Species Act; ALAB-463, L, (7 NRC 341, 357 (1978))

jurisdiction lacking for civil penalty payment control; ALAB-459, K, (7 NRC 179, 198 (1978))

jurisdiction over actions of the Director of Nuclear Reactor Regulation; ALAB-466, B, (7 NRC 457 (1978))

jurisdiction over applicant's ownership modifications; LBP-78-013, D, (7 NRC 583, 587 (1978))

jurisdiction over facility ownership changes; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))

jurisdiction over general studies (GESMO) unrelated to licensing; CLI-78-010, F, (7 NRC 711, 724 (1978))

jurisdiction over offsite road construction by county; ALAB-459, A, (7 NRC 179 (1978))

jurisdiction over radioactive effluent discharges; LBP-78-019, B, (7 NRC 939, 999 fn 9 (1978))

jurisdiction reserved in Saabrook suspension for alternative site comparison; CLI-78-014, E, (7 NRC 952, 961 fn 9 (1978))

jurisdiction to halt Regulatory Staff review; LBP-78-009, B, (7 NRC 271, 278 (1975))

personal division of responsibilities, role of Director of Nuclear Reactor Regulation in show-cause proceedings; CLI-78-007, C, (7 NRC 429, 432 (1978))

policy for environmental protection, inadequate regulations; CLI-78-003, C, (7 NRC 307, 308 (1978))

SUBJECT INDEX

policy invalidation change forum; ALJ-78-002, D, (7 NRC 701, 709 (1978))
 regulations challenge impermissible; ALAB-456, B, (7 NRC 63 (1978))
 regulations for coordination of review; CLI-78-001, A, (7 NRC 1 (1978))
 regulations interpretation of General Design Criteria; CLI-78-006, D, (7 NRC 400, 404 (1978))
 regulations, official interpretation requests; ALAB-467, F, (7 NRC 459, 463 (1978))
 relations with State regulatory agencies; ALAB-464, B, (7 NRC 372, 375 (1978))
 relationship with EPA, aquatic impacts from nuclear power plant cooling system; CLI-78-001, E, (7 NRC 1, 23 (1978))
 review authority over Director of Nuclear Reactor Regulation's administrative handling of alleged violations; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
 role in antitrust review; CLI-78-012, B, (7 NRC 939, 945 (1978))
 role in safety review; CLI-78-006, G, (7 NRC 400, 418 (1978))
 role in water quality determinations for reactor licensing; LBP-78-022, B, (7 NRC 1052 (1978))
 rules of practice for ASLAB decision review or stay; CLI-78-001, I, (7 NRC 1, 30 (1978))
 scope of adjudicatory review, GESMO termination; CLI-78-010, G, (7 NRC 711, 721 (1978))
 scope of antitrust review; ALAB-475, F, (7 NRC 752, 757 (1978))
 scope of antitrust review, public utility management decisions; ALAB-475, G, (7 NRC 752, 757 (1978))
 scope of licensing requirements; LBP-78-013, F, (7 NRC 583, 589 (1978))
 scope of review scope under NEPA, water quality; LBP-78-007, B, (7 NRC 215, 230 (1978))
 staff role in alternate site considerations; ALAB-479, G, (7 NRC 774, 791 (1978))
 staff role in licensing, adversary position; CLI-78-007, B, (7 NRC 429, 431 (1978))

NUCLEAR REGULATORY COMMISSION, PERSONNEL
 Office of the General Counsel, duties for regulation interpretation; ALAB-467, F, (7 NRC 459, 463 (1978))
 role of Director of Nuclear Reactor Regulation in administrative prosecution of rules violations; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
 role of Director of Office of Enforcement in civil penalties assessment; ALJ-78-002, E, (7 NRC 701, 709 (1978))
 Staff role in licensing process; LBP-78-009, B, (7 NRC 271, 278 (1978))

NUCLEAR REGULATORY STAFF
 role in alternative site evaluation; ALAB-479, H, (7 NRC 774, 792 (1978))

OPERATING LICENSES
 amendment to North Anna 1 and 2, hot-standby status pending further order; LBP-78-003, (7 NRC 89 (1978))
 antitrust remedy; LBP-78-013, H, (7 NRC 583, 597 (1978))
 continuance pending remand for radon-release calculations; ALAB-465, (7 NRC 377 (1978))
 enforcement of license conditions; LBP-78-011, D, (7 NRC 381, 386 (1978))
 issuance authorization reaffirmed in reopened hearing on North Anna timeliness of safety reporting; LBP-78-010, A, (7 NRC 295 (1978))
 NRC licensing responsibilities for health and safety matters; CLI-78-006, C, (7 NRC 400, 404 (1978))
 regulations governing reportable safety significant incidents; LBP-78-010, B, (7 NRC 295, 298 (1978))
 stay denied for Three Mile Island 2 relative to radon releases; ALAB-456, A, (7 NRC 63 (1978))

OPERATING LICENSES, AMENDMENTS
 Beaver Valley spent fuel pool enlargement authorization affirmed; ALAB-484, (7 NRC 984 (1978))
 increased power authorized for Robinson 2; LBP-78-022, A, (7 NRC 1052 (1978))
 modification of spent fuel pool capacity for Beaver Valley 1; LBP-78-016, A, (7 NRC 811 (1978))
 review scope mandated by NEPA; ALAB-455, C, (7 NRC 41, 46 fn 4 (1978))
 rules of practice for intervention; LBP-78-016, B, (7 NRC 811, 814 (1978))

SUBJECT INDEX

spent fuel pool capacity modification affirmed for Vermont Yankee and
Prairie Island 1 and 2; ALAB-455, A, (7 NRC 41 (1978))

OPERATING LICENSES, PROCEEDINGS

amendments, scope of NEPA review; ALAB-455, B, (7 NRC 41, 48 (1978))

antitrust hearings initiated for South Texas 1 and 2; CLI-78-005, A, (7 NRC
337 (1978))

antitrust review sought from Attorney General on changed circumstances for
Comanche Peak; CLI-78-013, (7 NRC 950 (1978))

financial qualifications' findings required; ALAB-462, D, (7 NRC 320, 324 fn
30 (1978))

findings for Diablo Canyon 1 and 2; LBP-78-019, A, (7 NRC 989 (1978))

intervention granted for Summer 1; LBP-78-006, A, (7 NRC 209 (1978))

intervention matters for Sheffield, Illinois, low-level waste disposal site;
ALAB-473, A, (7 NRC 737 (1978))

nonparty appeal from Three Mile Island 2 initial decision denied; ALAB-454,
A, (7 NRC 39 (1978))

NRC health and safety responsibilities; CLI-78-006, B, (7 NRC 400, 404
(1978))

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

remand for radon-release review of Three Mile Island 2; ALAB-465, (7 NRC 377
(1978))

reopening motion (emergency plans) for Three Mile Island 2; ALAB-474, A, (7
NRC 746 (1978))

rules of practice for initiation for amendments; LBP-78-016, B, (7 NRC 811,
814 (1978))

stay pending appeal denied for Three Mile Island; CLI-78-003, A, (7 NRC 307
(1978))

OTHER GOVERNMENTAL AGENCIES

relation with NRC, jurisdiction over general plutonium recycle studies;
CLI-78-010, F, (7 NRC 711, 724 (1978))

OWNERSHIP

change effect on NEPA cost-benefit analysis; LBP-78-011, G, (7 NRC 391, 391
(1978))

change effects on environmental impact statement; ALAB-459, C, (7 NRC 179,
184 (1978))

change effects on scope of antitrust review; LBP-78-013, B, (7 NRC 583
(1978))

changed circumstances require Commission approval; CLI-78-001, D, (7 NRC 1,
13 (1978))

changes effects on need-for-power findings; ALAB-483, (7 NRC 982 (1978))

licensing responsibilities for multiple; ALAB-459, M, (7 NRC 179, 198
(1978))

scope of licensing requirements; LBP-78-013, F, (7 NRC 583, 589 (1978))

statutory construction of Atomic Energy Acts 101 and 103; ALAB-459, L, (7
NRC 179, 199 (1978))

PEACH BOTTOM ATOMIC POWER STATION, Units 2 and 3

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

PHIPPS BEND NUCLEAR PLANT, Units 1 and 2

construction permit, issuance authorized after radiological health and
safety findings; LBP-78-001, (7 NRC 73 (1978))

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

PILGRIM NUCLEAR GENERATING STATION, Unit 2

construction permit, LVA denial affirmed on deficient site review; ALAB-479,
A, (7 NRC 774 (1978))

PLUTONIUM RECYCLE

Administration v. Congress' policy; CLI-78-010, D, (7 NRC 711, 719 (1978))

policy statement reasons for GESMO termination; CLI-78-010, A, (7 NRC 711
(1978))

POLICY STATEMENTS

fuel cycle effects, GESMO proceeding termination rationales; CLI-78-010, A,
(7 NRC 711 (1978))

plutonium-recycle, GESMO proceeding termination rationales; CLI-78-010, A,
(7 NRC 711 (1978))

POPULATION DENSITY

alternative site considerations; ALAB-471, K, (7 NRC 477, 508 (1978))

compliance findings for Janssop 1 and 2; LBP-78-017, E, (7 NRC 826, 852

SUBJECT INDEX

(1978))
emergency plans for transient populations; LBP-78-017, D, (7 NRC 826, 848 (1978))
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
status of staff working publication for site evaluation; LBP-78-017, E, (7 NRC 826, 852 (1978))
POSSESS
congressional intent of meaning in Atomic Energy Acts 101 and 103; ALAB-459, L, (7 NRC 179, 199 (1978))
POWER NEEDS
see Electricity
PRAIRIE ISLAND NUCLEAR GENERATING PLANT, Units 1 and 2
operating license, ALARA compliance condition vacated for spent fuel pool modification; ALAB-455, A, (7 NRC 41 (1978))
operating license, spent fuel pool modification affirmed; ALAB-455, A, (7 NRC 41 (1978))
PRESIDENT OF U.S.
issuance decision for XSNM-1060 for India Tarapur deferred from NRC;
CLI-78-008, (7 NRC 436 (1978))
weight accorded foreign policy expressions; CLI-78-010, C, (7 NRC 711, 718 (1978))
PROOF, BURDEN OF
alternative site evaluation, rests with proponent of licensing proposal; ALAB-471, B, (7 NRC 477, 489 (1978))
decisional basis for NRC and other Federal agencies; ALAB-463, K, (7 NRC 341, 360 (1978))
intervenor's right to build defensive case on cross examination; ALAB-463, G, (7 NRC 341, 356 (1978))
rules of practice for cross examination; ALAB-463, I, (7 NRC 341, 356 (1978))
rules of practice for site evaluation facts; ALAB-471, B, (7 NRC 477, 489 (1978))
rules of practice for stay pending appeal; ALAB-458, C, (7 NRC 155, 160 (1978))
standard for power demand forecasting; ALAB-459, D, (7 NRC 179, 184 (1978))
QUALITY CONTROL
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
timeliness of North Anna's reporting incidents of safety significance; LBP-78-010, A, (7 NRC 295 (1978))
RADIOACTIVE EFFLUENTS
see Effluents, Radioactive
RADIOACTIVE MATERIALS TRANSPORTATION
security plans, scope of construction permit stage information; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
RADIOACTIVE WASTE STORAGE
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
RADIOACTIVE WASTES
security plans during transportation and storage activity; LBP-78-017, F, (7 NRC 826, 857, 866 (1978))
RADIOLOGICAL CONSIDERATIONS
guidelines for ASLB application; ALAB-455, F, (7 NRC 41, 57 (1978))
RADON
adequacy of considerations for WPPSS release impacts; ALAB-485, A, (7 NRC 986 (1978))
environmental impacts, stay denied pending generic resolve for Jamesport; ALAB-481, A, (7 NRC 807 (1978))
release impacts, rules of practice for appellate resolve; ALAB-480, B, (7 NRC 796, 805 (1978))
releases from Three Mile Island 2 denied as operation stay basis; ALAB-456, A, (7 NRC 63 (1978))
rules of practice for release-impact considerations; ALAB-435, B, (7 NRC 986, 987 (1978))
validity of values assigned in 10 CFR 51.20(a), Table S-3; ALAB-456, B, (7 NRC 63 (1978))
RADON-222
environmental effects from fuel cycle releases; CLI-78-003, C, (7 NRC 307,

SUBJECT INDEX

308 (1978))
 environmental effects from Hartsville, remand ordered to consider; ALAB-467, G, (7 NRC 459, 463 (1978))
 environmental effects from releases, Hartsville remand; ALAB-467, A, (7 NRC 459 (1978))
 environmental impacts from H.B. Robinson 2; LBP-78-022, A, (7 NRC 1052 (1978))
 environmental impacts from, precedential value of findings in nonadversary presentation; ALAB-485, C, (7 NRC 986, 988 fn 4 (1978))
 radiological health effects findings for WPPSS 4; LBP-78-008, (7 NRC 254 (1978))
 release effects from Tyrone 1; ALAB-464, A, (7 NRC 372 (1978))
 remand hearings directed for Three Mile Island 2; ALAB-465, (7 NRC 377 (1978))

RATEPAYER
 standing to intervene; LBP-78-011, C, (7 NRC 381, 385 (1978))

REACTOR COMPONENTS
 cooling water intake system, LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
 cooling water system for WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
 pressure relief underdrain system for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
 relief valve control system design for Phipps Bend 1 and 2; LBP-78-001, (7 NRC 73 (1978))
 replication, findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))

REACTOR COOLING SYSTEMS
 discharge diffuser location for Hartsville; ALAB-463, A, (7 NRC 341 (1978))
 environmental impacts from Seabrook; ALAB-471, A, (7 NRC 477 (1978))
 findings for Diablo Canyon 1 and 2; LBP-78-019, A, (7 NRC 989 (1978))
 intake pipe grids for Hartsville; ALAB-463, A, (7 NRC 341 (1978))
 NRC authority to alter EPA approved design; LBP-78-022, B, (7 NRC 1052 (1978))
 radiological health hazards from gaseous mixing with water vapor; ALAB-463, A, (7 NRC 341 (1978))
 scope of remand for Seabrook 1 and 2; CLI-78-014, A, (7 NRC 952 (1978))

REACTOR FUEL CYCLE
 coal v. nuclear comparative environmental effects; LBP-78-008, (7 NRC 254 (1978))
 cost balancing of radioactive waste storage; ALAB-458, E, (7 NRC 155, 163 (1978))
 environmental impacts from H.B. Robinson 2; LBP-78-022, A, (7 NRC 1052 (1978))
 error in Table S-3, effects on stay granting considerations; CLI-78-003, D, (7 NRC 307, 309 (1978))
 findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
 radon-222 releases, inadequacy of 10 CFR 51, Table S-3 values; CLI-78-003, C, (7 NRC 307, 308 (1978))
 scope of information necessary for financial qualifications' findings at construction vs. operating stage; ALAB-462, D, (7 NRC 320, 324 fn 30 (1978))
 Table 3, LWA findings for Yellow Creek 1 and 2; LBP-78-007, A, (7 NRC 215 (1978))
 Table S-3 values for radon-222, Tyrone 1; ALAB-464, A, (7 NRC 372 (1978))
 timeliness of operating impact consideration; ALAB-458, F, (7 NRC 155, 165 fn. 31 (1978))
 utilization efficiency for uranium in Diablo Canyon; LBP-78-019, A, (7 NRC 989 (1978))

REACTOR FUEL POOLS
 capacity modification affirmed for Prairie Island 1 and 2 and Vermont Yankee; ALAB-455, A, (7 NRC 41 (1978))
 capacity modification, administrative scope of review; ALAB-455, D, (7 NRC 41, 49 (1978))
 capacity modification, scope of NEPA review for; ALAB-455, B, (7 NRC 41, 48 (1978))
 enlargement of Beaver Valley spent storage, affirmation; ALAB-464, (7 NRC

SUBJECT INDEX

984 (1978))
reck disposal methods during modification, ALARA guidelines for; ALAB-455, F, (7 NRC 41, 57 (1978))

REACTOR FUELS
coal as alternative energy source; LBP-78-017, A, (7 NRC 826 (1978))
safeguards for diversion, errata for SNM export licensing process; CLI-78-002, (7 NRC 153 (1978))
spent fuel pool modification authorized for Beaver Valley; LBP-78-016, A, (7 NRC 811 (1978))
spent pool modification affirmed for Prairie Island 1 and 2 and Vermont Yankee; ALAB-455, A, (7 NRC 41 (1978))

RECONSIDERATION
inappropriateness of 10 CFR 2.206 as vehicle for; CLI-78-007, D, (7 NRC 429, 433 (1978))
raising matters for the first time before ASLB and ASLAB; ALAB-467, D, (7 NRC 459, 462 (1978))
rules of practice, matters first raised; ALAB-477, B, (7 NRC 766 (1978))

RECORD
reopening for new evidence on Harris geologic fault, load forecast change and construction schedule; LBP-78-002, A, (7 NRC 83 (1978))

RECYCLE FUELS PLANT
policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC 711 (1978))

REGULATORY GUIDES
cow-milk-thyroid radiiodine calculations; ALAB-463, A, (7 NRC 341 (1978))
radiation dose calculations, meat and poultry consumption; ALAB-463, B, (7 NRC 341, 346 (1978))
status in licensing, violations; CLI-78-006, E, (7 NRC 400, 404 (1978))
validity for calculating exposure doses in compliance with 10 CFR 50 App. I; ALAB-463, B, (7 NRC 341, 346 (1978))

REGULATORY STAFF
see Nuclear Regulatory Commission, Personnel

RELEASES, LIQUID
see Effluents, Radioactive
see Effluents, Thermal

REMAND
ASLB responsibility for scheduling remand hearings pending settlement agreement; ALAB-468, C, (7 NRC 465 (1978))
scope of issues appropriate for changed-ownership hearings; ALAB-483, (7 NRC 982 (1978))

REOPENING
criteria where sua sponte Board action; LBP-78-002, C, (7 NRC 83, 87 (1978))
rules of practice for new material; ALAB-477, C, (7 NRC 766, 770 (1978))

RES JUDICATA
applicability to other agency findings for shared NEPA responsibilities; CLI-78-001, F, (7 NRC 1, 26 (1978))
rules of practice for generic resolve of radon release impacts; ALAB-430, B, (7 NRC 796, 805 (1978))

RULEMAKING
termination of GESHO proceedings; CLI-78-010, A, (7 NRC 711 (1978))

RULES AND REGULATIONS
absence for site ownership prior to hearing schedules; LBP-78-069, E, (7 NRC 271, 282 (1978))
criteria for challenge during individual licensing actions; ALAB-456, B, (7 NRC 63 (1978))
error in fuel cycle Table 3-3, effects on stay considerations; CLI-78-003, D, (7 NRC 307, 309 (1978))
forum for challenge; ALJ-78-002, D, (7 NRC 701, 709 (1978))
governing regulations for reportable safety incidents under construction permit; LBP-78-010, B, (7 NRC 295, 298 (1978))
interpretation of General Design Criteria; CLI-78-006, D, (7 NRC 400, 404 (1978))
official interpretation rights; ALAB-467, F, (7 NRC 459, 463 (1978))

RULES OF PRACTICE
see also Licensing, Procedure
administrative application of undisputed regulation inadequacy, radon

SUBJECT INDEX

releases in fuel cycle, 10 CFR 51, Table S-3; CLI-78-003, C, (7 NRC 397, 308 (1978))
 administrative fairness, timely filing; ALAB-474, B, (7 NRC 746, 749 (1978))
 administrative review of licensing application, docketing; LBP-78-009, C, (7 NRC 271, 280 (1978))
 antitrust operating license proceedings initiation; CLI-78-005, B, (7 NRC 397, 398 (1978))
 antitrust proceedings initiation, Attorney General recommendations; ALAB-475, B, (7 NRC 752, 755 (1978))
 appeals by nonparty with limited-appearance status; ALAB-454, B, (7 NRC 39 (1978))
 appellate handling of mooted issue with possible precedential value; ALAB-455, G, (7 NRC 41, 55 (1978))
 appellate policy for handling procedural errors, scheduling; ALAB-459, F, (7 NRC 179, 189 (1978))
 appellate procedure for defending a favorable decision; ALAB-459, N, (7 NRC 179, 202 (1978))
 appellate procedure for exceptions from prevailing party; ALAB-461, D, (7 NRC 313, 316 (1978))
 appellate review of ASLB scheduling determinations; ALAB-468, B, (7 NRC 465 (1978))
 appellate review rights on findings of fact; ALAB-467, C, (7 NRC 459, 461 (1978))
 appellate review scope for discretionary intervention grant; ALAB-476, B, (7 NRC 759, 763 fn 3 (1978))
 appellate review standards for uncontested legal issues; ALAB-482, C, (7 NRC 979, 981 fn 4 (1978))
 appellate review status of decisional wording; ALAB-482, B, (7 NRC 979, 980 (1978))
 ASLAB authority to grant lesser relief than stay pending appeal; ALAB-460, C, (7 NRC 204, 207 (1978))
 ASLAB authority to receive evidence; ALAB-467, B, (7 NRC 459, 461 (1978))
 ASLAB authority to strike insulting and disrespectful submissions; ALAB-474, E, (7 NRC 746, 749 (1978))
 assessment of civil penalties for license violations; ALJ-78-002, B, (7 NRC 701, 704 (1978))
 authority of Appeal Board to set aside or modify ASLB findings; CLI-78-001, H, (7 NRC 1, 29 (1978))
 briefing deferral motions, rules of practice; ALAB-457, B, (7 NRC 70 (1978))
 briefs, requirements in support of exceptions; ALAB-463, D, (7 NRC 341, 370 (1978))
 burden of proof for stay pending appeal; ALAB-458, C, (7 NRC 155, 160 (1978))
 burden of proof in site evaluation; ALAB-471, B, (7 NRC 477, 489 (1978))
 burden of proof, cross examination; ALAB-463, I, (7 NRC 341, 356 (1978))
 Commission review of ASLAB decision; CLI-78-001, I, (7 NRC 1, 30 (1978))
 comparative methodology for alternative sites; ALAB-479, F, (7 NRC 774, 791 (1978))
 consolidation of intervenors; ALAB-476, D, (7 NRC 759, 763 (1978))
 consolidation of special nuclear material export proceedings; CLI-78-004, B, (7 NRC 311 (1978))
 construction permit suspension, relevant equitable considerations; ALAB-458, B, (7 NRC 155, 159 (1978))
 contentions requirements for intervention standing; ALAB-473, D, (7 NRC 737, 741 (1978))
 correction process for deficient environmental statement; ALAB-479, E, (7 NRC 774, 782 (1978))
 criteria for reopening of evidentiary record; LBP-78-002, B, (7 NRC 83, 84 (1978))
 decisional responsibilities for findings, conclusions and rulings; ALAB-463, N, (7 NRC 341, 368 (1978))
 deficient motions concerning emergency plans; ALAB-474, C, (7 NRC 746, 748 (1978))
 discipline for disrespect, lawyer v. nonlawyer; ALAB-474, D, (7 NRC 746, 748 (1978))
 discovery in antitrust proceedings; LBP-78-020, B, (7 NRC 1338, 1040 (1978))

SUBJECT INDEX

discovery interrogatories, authority of person signing; LBP-78-020, C, (7 NRC 1038, 1045 (1978))
 discretionary grant of intervention; LBP-78-011, F, (7 NRC 381, 387 (1978))
 discretionary grant of intervention; ALAB-473, E, (7 NRC 737, 743 (1978))
 discretionary intervention grant; LBP-78-013, I, (7 NRC 583, 593 (1978))
 discretionary intervention grant, delay factor in untimely petition; ALAB-476, C, (7 NRC 759, 761 (1978))
 discretionary intervention grant, quality of contribution; LBP-78-013, J, (7 NRC 583, 594 (1978))
 discretionary intervention in antitrust proceedings; ALAB-475, E, (7 NRC 752, 758 fn 19 (1978))
 discretionary intervention in antitrust proceedings; ALAB-475, H, (7 NRC 752, 758 fn 19 (1978))
 disqualification of adjudicatory tribunal; LBP-78-005, B, (7 NRC 147, 148 (1978))
 due process denial by scheduling errors; ALAB-459, F, (7 NRC 179, 139 (1978))
 due process denial, appellate policy for challenge; ALAB-459, E, (7 NRC 179, 187 (1978))
 evidence introduction; ALAB-459, G, (7 NRC 179, 191 (1978))
 exceptions filed by prevailing party; ALAB-459, N, (7 NRC 179, 202 (1978))
 expert witness, weight of testimony; LBP-78-015, B, (7 NRC 642, 647 fn 8 (1978))
 failure to file where ASLB has not requested briefs or proposed findings; LBP-78-016, C, (7 NRC 611, 615 (1978))
 hearings scheduling by adjudicatory boards; LBP-78-009, D, (7 NRC 271, 282 (1978))
 initiation of health and safety show-cause proceedings; CLI-78-007, C, (7 NRC 429, 432 (1978))
 initiation of hearings prior to site ownership; LBP-78-009, E, (7 NRC 271, 282 (1978))
 interlocutory appeals, status of requests initiating with ASLB; ALAB-460, B, (7 NRC 204, 207 (1978))
 intervenor's right to build defensive case on cross examination; ALAB-463, G, (7 NRC 341, 356 (1978))
 intervention denial appeal; ALAB-472, B, (7 NRC 570 (1978))
 intervention in operating license amendments hearings; LBP-78-016, B, (7 NRC 611, 614 (1978))
 intervention interest requirements, educational level; LBP-78-006, C, (7 NRC 209, 212 (1978))
 intervention petitions for antitrust proceedings; LBP-78-013, L, (7 NRC 583, 597 (1978))
 intervention standing in antitrust proceedings; ALAB-475, C, (7 NRC 752, 755 (1978))
 intervention standing on economic interests; ALAB-470, F, (7 NRC 473, 476 (1978))
 intervention standing on potential economic injury, ownership changes; LBP-78-013, (7 NRC 583, 589 (1978))
 intervention standing on third-party rights, discretionary factors; LBP-78-011, E, (7 NRC 381, 386 (1978))
 intervention standing, injury in fact for ratepayer in antitrust proceeding; LBP-78-013, E, (7 NRC 583, 589 (1978))
 jurisdiction of Appeal Board; ALAB-466, B, (7 NRC 457 (1978))
 language substitution in decision, lacking exceptions; ALAB-478, B, (7 NRC 772 (1978))
 local government's standing to intervene; LBP-78-018, C, (7 NRC 932, 934 (1978))
 mooted issue handling by vacation of that partial decision where possible precedential value; ALAB-455, G, (7 NRC 41, 55 (1978))
 motions; ALAB-469, B, (7 NRC 470 (1978))
 negative NEPA declaration, licensing considerations; LBP-78-016, D, (7 NRC 611, 615 (1978))
 new material between briefing appeal and the appellate decision; ALAB-477, C, (7 NRC 766, 770 (1978))
 non timely intervention petition justification; LBP-78-006, B, (7 NRC 209, 212 (1978))

SUBJECT INDEX

NRC decisionmaking relative to other agencies; CLI-78-014, B, (7 NRC 952, 957 fn 5 (1978))
 party responsibilities for correction of procedural error; ALAB-459, F, (7 NRC 179, 189 (1978))
 posthearing resolution of issues, ASLE discretion; ALAB-461, E, (7 NRC 313, 318 (1978))
 radon-release impacts, fuel cycle rule standards; ALAB-485, B, (7 NRC 986, 987 (1978))
 reconsideration, matters first raised; ALAB-477, B, (7 NRC 756 (1978))
 remand hearing regulation in light of settlement negotiations; ALAB-468, C, (7 NRC 465 (1978))
 reopening construction permit proceedings; ALAB-462, F, (7 NRC 320, 337 (1978))
 reopening of proceedings for new evidence; ALAB-464, D, (7 NRC 372, 374 fn 4 (1978))
 res judicata applicability to other agency findings; CLI-78-001, F, (7 NRC 1, 26 (1978))
 res judicata effect on appellate remedy for generic resolve of radon-release impact; ALAB-480, B, (7 NRC 796, 805 (1978))
 responsibilities of parties, motions filing; ALAB-469, C, (7 NRC 470 (1978))
 scheduling of hearings, appellate policy for challenge; ALAB-459, E, (7 NRC 179, 187 (1978))
 scope of and parties to cross examination; ALAB-461, C, (7 NRC 313, 316 (1978))
 scope of inquiry for financial qualifications of applicant; CLI-78-001, B, (7 NRC 1, 8(1978))
 scope of inquiry for financial qualifications of old vs. established entities; CLI-78-001, C, (7 NRC 1, 10 fr 14 (1978))
 show-cause proceeding initiation; CLI-78-007, D, (7 NRC 425, 433 (1978))
 standing for intervention; ALAB-473, B, (7 NRC 737, 739 (1978))
 standing for intervention on discretionary grant; ALAB-470, D, (7 NRC 473, 475 fn 2 (1978))
 standing to intervene; ALAB-473, C, (7 NRC 737, 741 (1978))
 standing to intervene in NRC proceedings; LBP-78-011, B, (7 NRC 331, 385 (1978))
 standing to intervene, third-party interests; ALAB-470, B, (7 NRC 473 (1978))
 stay granting criteria; ALAB-481, B, (7 NRC 807 (1978))
 stay pending appeal from appellate decision; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))
 stay pending appeal, burden of proof; ALAB-458, C, (7 NRC 155, 160 (1978))
 stay pending appeal, error in fuel cycle rule; CLI-78-003, D, (7 NRC 307, 309 (1978))
 suspension of permits on emergency health and safety considerations; CLI-78-006, F, (7 NRC 400, 404 (1978))
 untimely intervention petitions, delay factor weight; ALAB-476, C, (7 NRC 759, 761 (1978))
 untimely intervention petitions, Federal Register receipt; LBP-78-018, B, (7 NRC 932, 933 (1978))
 waiver of unbriefed exceptions; ALAB-459, D, (7 NRC 179, 203 fn. 44 (1978))
 waiver of unbriefed exceptions; ALAB-461, B, (7 NRC 313, 315 (1978))

SABOTAGE

scope of plans required for construction permit stage; LBP-78-017, F, (7 NRC 826, 857, 856 (1978))

SAFETY

see Emergency Plans
 see Environmental Considerations
 see Health and Safety
 applicant's responsibilities for internal and regulatory communications of potentially reportable items; LBP-78-003, (7 NRC 89 (1978))
 relation to applicant's financial status; ALAB-459, B, (7 NRC 179, 183 (1978))
 relation with financial responsibilities; CLI-78-001, A, (7 NRC 1 (1978))
 reportable events under construction permit, governing regulations; LBP-78-010, B, (7 NRC 295, 298 (1978))
 reportable events under operating license, governing regulations;

SUBJECT INDEX

LBP-78-010, B, (7 NRC 295, 298 (1978))
rules of practice for deficient motions concerning emergency plans;
ALAB-474, C, (7 NRC 746, 748 (1978))

SANCTIONS
NRC exercise for license violations; CLI-78-006, F, (7 NRC 400, 404 (1978))

SEABROOK STATION, Units 1 and 2
construction permit, issuance affirmation reaffirmed; CLI-78-001, A, (7 NRC 1 (1978))
construction permit, reinstatement affirmed; CLI-78-001, A, (7 NRC 1 (1978))
construction permits, alternative site findings remanded with permits undisturbed; ALAB-471, A, (7 NRC 477 (1978))
construction permits, cooling system remand scope modification; CLI-78-014, A, (7 NRC 952 (1978))
remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

SECURITY PLANS
scope of licensing information needed during construction permit stage;
LBP-78-017, F, (7 NRC 826, 857, 866 (1978))

SHEARON HARRIS NUCLEAR POWER PLANT, Units 1, 2, 3 and 4
construction permit, issuance authorized subject to conditions; LBP-78-004, (7 NRC 92 (1978))
construction permits, reopening evidentiary record for new evidence on site geology, load forecasts, and construction schedule; LBP-78-002, A, (7 NRC 83 (1978))
remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

SHEFFIELD, ILLINOIS, LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE
operating license, intervention matters; ALAB-473, A, (7 NRC 737 (1978))

SHOW-CAUSE PROCEEDINGS
rules of practice for initiation; CLI-78-007, D, (7 NRC 429, 433 (1978))
rules of practice for initiation for alleged violations; ALAB-470, E, (7 NRC 473, 476 fn 3 (1978))
standard for initiation; CLI-78-007, C, (7 NRC 429, 432 (1978))

SITE EVALUATION
alternative comparisons for Seabrook, interim permit suspension; CLI-78-014, C, (7 NRC 952, 960 (1978))
alternative considerations under NEPA; ALAB-479, C, (7 NRC 774, 778 (1978))
alternative considerations under NEPA, system reliability and stability; ALAB-471, F, (7 NRC 477, 496 (1978))
alternative evaluation scope under NEPA; ALAB-479, B, (7 NRC 774, 778 (1978))
alternative findings remanded for Seabrook; ALAB-471, A, (7 NRC 477 (1978))
alternative NEPA considerations, applicant's responsibilities; ALAB-471, G, (7 NRC 477, 498 (1978))
alternative review roles of staff, ASLB and applicant; ALAB-479, H, (7 NRC 774, 792 (1978))
burden of proof on factual findings rests with proponent; ALAB-471, B, (7 NRC 477, 489 (1978))
deficiency of alternative review for Pilgrim 2; ALAB-479, A, (7 NRC 774 (1978))
findings for Harris 1, 2, 3 and 4; LBP-78-004, (7 NRC 92 (1978))
guidelines for alternatives consideration; ALAB-479, G, (7 NRC 774, 791 (1978))
NEPA alternative considerations, final ASLB approval; ALAB-471, E, (7 NRC 477, 493 (1978))
NEPA responsibilities for consideration of alternatives; ALAB-471, C, (7 NRC 477, 491 (1978))
ownership relation to hearings initiation; LBP-78-009, E, (7 NRC 271, 282 (1978))
ownership status required for construction permit application; LBP-78-009, A, (7 NRC 271 (1978))
population density considerations; ALAB-471, K, (7 NRC 477, 508 (1978))
rules of practice for comparing alternatives; ALAB-479, F, (7 NRC 774, 791 (1978))
scope and integrity of Staff review; ALAB-471, I, (7 NRC 477, 505 (1978))
seismic design criteria and fault capability of WPPSS 3 and 5; LBP-78-014, (7 NRC 599 (1978))
seismological considerations, LWA findings for Yellow Creek 1 and 2;

SUBJECT INDEX

LBP-78-007, A, (7 NRC 215 (1978))
 suspension considerations for Seabrook NEPA correction, dissenting views;
 CLI-78-014, F, (7 NRC 952, 961 (1978))

SOCIOECONOMIC CONSIDERATIONS
 end-use of electricity and its impact on society, NEPA scope of review;
 ALAB-458, J, (7 NRC 155, 174 (1978))
 findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
 guidelines for ASLB application; ALAB-455, F, (7 NRC 41, 57 (1978))
 role of taxes and employment opportunities in cost-benefit balancing;
 ALAB-471, J, (7 NRC 477, 509 fn 58 (1978))

SOUTH TEXAS PROJECT, Units 1 and 2
 antitrust proceedings initiated at operating stage; CLI-78-005, A, (7 NRC 397 (1978))

SPECIAL NUCLEAR MATERIALS EXPORT LICENSES, PROCEEDINGS
 consolidation of Edlow's Tarapur XSNM-1060 and -1222; CLI-78-004, A, (7 NRC 311 (1978))
 consolidation rules of practice; CLI-78-004, B, (7 NRC 311 (1978))

SPECIAL NUCLEAR MATERIALS, EXPORT LICENSES
 oral hearings denied for XSNM-1060; CLI-78-009, (7 NRC 455 (1978))
 relation to Nuclear Non-Proliferation Act of 1978; CLI-78-008, (7 NRC 436 (1978))
 XSNM-160 for India Tarapur, decision deferred to President of U.S.;
 CLI-78-008, (7 NRC 436 (1978))

SPENT FUELS
 rack disposal methods during pool modification, ALARA guidelines for
 personnel exposure; ALAB-455, F, (7 NRC 41, 57 (1978))
 ultimate disposal considerations for pool capacity modification; ALAB-455,
 D, (7 NRC 41, 49 (1978))

ST. LUCIE PLANT, Unit 2
 antitrust hearing, intervention affirmed for late petition; CLI-78-012, A,
 (7 NRC 939 (1978))
 resand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

STANISLAUS NUCLEAR PROJECT, Unit 1
 construction permit, scope of discovery interrogatories; LBP-78-020, A, (7
 NRC 1038 (1978))

STARE DECISIS
 appellate review standards for uncontested legal issues; ALAB-482, C, (7 NRC
 979, 981 fn 4 (1978))

STATES
 boundary dispute effects on FWPCA 401 certification; ALAB-459, I, (7 NRC
 179, 189 (1978))
 conflict of statutes with federal licensing, federal tribunal
 responsibilities; ALAB-453, B, (7 NRC 31, 35 (1978))
 discovery status of agency status and relationship as co-applicant;
 LBP-78-020, D, (7 NRC 1038, 1045 (1978))
 governmental approvals for Indian Point 2 alternate closed-cycle cooling
 tower; LBP-78-021, (7 NRC 1048 (1978))
 relations with NRC over regulatory laws; ALAB-464, B, (7 NRC 372, 375
 (1978))

STATUTE INTERPRETATIONS
 meaning of word possess in Atomic Energy Acts 101 and 103; ALAB-459, L, (7
 NRC 179, 199 (1978))

STATUTES
 deference to agency interpretations, subordinate personnel; ALAB-459, H, (7
 NRC 179, 190 (1978))

STAY
 pending appeal, burden of proof; ALAB-458, C, (7 NRC 155, 160 (1978))
 review directive for stay granting criteria; CLI-78-001, A, (7 NRC 1 (1978))
 rules of practice for Commission review of ASLB decision; CLI-78-001, I, (7
 NRC 1, 30 (1978))
 rules of practice for granting on generic issues; ALAB-481, B, (7 NRC 807
 (1978))
 substantive construction-permit, applicant's sunk costs consideration;
 ALAB-458, H, (7 NRC 155, 170 (1978))

STAY PENDING APPEAL
 appellate authority for interim protection, construction-stage reporting

SUBJECT INDEX

schedule; ALAB-460, A, (7 NRC 204 (1978))
ASLAB authority to grant lesser relief; ALAB-460, C, (7 NRC 204, 207 (1978))
effects from admitted error in fuel cycle rule; CLI-78-003, D, (7 NRC 307, 309 (1978))
rules of practice, appeal from appellate decision; CLI-78-003, B, (7 NRC 307, 308 fn 2 (1978))

STEAM GENERATOR TUBES
integrity findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
integrity findings for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))

STIPULATIONS
payment schedule for civil penalties; ALJ-78-001, (7 NRC 151 (1978))

TARAPUR ATOMIC POWER STATION
export license proceedings consolidated for XSNM-1060 and XSNM-1222; CLI-78-004, A, (7 NRC 311 (1978))
export license XSNM-1060 deferred to President of U.S.; CLI-78-008, (7 NRC 436 (1978))

TAXES
considerations in cost-benefit balance for power plant; ALAB-471, J, (7 NRC 477, 509 fn 58 (1978))

TAXPAYER
status for intervention under Atomic Energy Act; LBP-78-011, I, (7 NRC 381, 393 (1978))

TECHNICAL QUALIFICATIONS
effects from Tyrone key personnel shifts; ALAB-464, A, (7 NRC 372 (1978))
scope of information required for licensing, key personnel shifts; ALAB-464, C, (7 NRC 372, 375 (1978))

TECHNICAL SPECIFICATIONS
governing regulations for reportable safety incident under operating license; LBP-78-010, B, (7 NRC 295, 298 (1978))

TESTIMONY
see also Witnesses
weight accorded expert v. amateur witness; LBP-78-015, B, (7 NRC 642, 647 fn 6 (1978))

THERMAL EFFLUENTS
see Effluents, Thermal

THREE MILE ISLAND NUCLEAR STATION, Unit 2
operating license, appeal from limited-appearance participant denied; ALAB-454, A, (7 NRC 39 (1978))
operating license, continuance during radon release remand proceedings; ALAB-465, (7 NRC 377 (1978))
operating license, issuance stay on generic regulation challenge denied; ALAB-456, A, (7 NRC 63 (1978))
operating license, motion to reopen (emergency plans) accepted; ALAB-474, A, (7 NRC 746 (1978))
operating license, stay pending appeal denial for radon effects; CLI-78-003, A, (7 NRC 307 (1978))
remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

THYROID
radiation dose estimation standard for radioactive iodine; ALAB-463, E, (7 NRC 341, 353 (1978))

TIMELINESS
affirmative relief grant, movant's responsibility for brief captions; ALAB-457, B, (7 NRC 70 (1978))
consideration of fuel cycle effects during construction permit stage; ALAB-458, F, (7 NRC 155, 165 fn. 31 (1978))
intervention petition, rules of practice; LBP-78-006, B, (7 NRC 209, 212 (1978))
parties responsibilities, lawyers v. nonlawyers; ALAB-474, B, (7 NRC 746, 748 (1978))
reportable safety related incidences for North Anna 1 and 2; LBP-78-010, A, (7 NRC 295 (1978))
requirements for disqualification of adjudicatory tribunal; LBP-78-005, B, (7 NRC 147, 148 (1978))

TRANSMISSION LINES
environmental impacts from Seabrook; ALAB-471, A, (7 NRC 477 (1978))
findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))

SUBJECT INDEX

offsite LWA authority limited to construction power line right-of-way
 preparation; LBP-78-007, A, (7 NRC 215 (1978))
 TRANSPORTATION OF RADIOACTIVE MATERIALS
 see Radioactive Materials Transportation
 TYRONE ENERGY PARK, Unit 1
 construction permit, affirmation of partial initial decisions on
 radiological and environmental findings but remand on financial and
 technical qualifications; ALAB-464, A, (7 NRC 372 (1978))
 remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
 scope of remand issues in ownership change; ALAB-483, (7 NRC 982 (1978))
 UNION OF CONCERNED SCIENTISTS
 safety specifications for electrical system fire protection; CLI-78-005, A,
 (7 NRC 400 (1978))
 URANIUM
 environmental effects from mining and milling; ALAB-456, B, (7 NRC 63
 (1978))
 fuel cycle availability for Wolf Creek 1; ALAB-462, A, (7 NRC 320 (1978))
 fuel cycle effects denied as stay basis; ALAB-456, A, (7 NRC 63 (1978))
 validity of values assigned in 10 CFR 51.20(a), Table S-3; ALAB-456, B, (7
 NRC 63 (1978))
 VALVES
 control system design for Phipps Bend 1 and 2 containment; LBP-78-001, (7
 NRC 73 (1978))
 VERMONT YANKEE NUCLEAR POWER STATION
 operating license, spent fuel pool modification affirmed; ALAB-455, A, (7
 NRC 41 (1978))
 VILLAGES
 governmental approvals for Indian Point 2 alternate closed-cycle cooling
 tower; LBP-78-021, (7 NRC 1048 (1978))
 VIRGIL C. SUMNER NUCLEAR STATION, Unit 1
 operating license, intervention granted for nontimely petitioner;
 LBP-78-006, A, (7 NRC 209 (1978))
 WASTE
 see also Effluents, Radioactive
 see also Radioactive Waste
 WATER QUALITY
 findings for Diablo Canyon 1 and 2; LBP-78-019, A, (7 NRC 939 (1978))
 findings for Jamesport 1 and 2; LBP-78-017, A, (7 NRC 826 (1978))
 FWPCA 401 compliance findings for Marble Hill 1 and 2; LBP-78-012, (7 NRC
 573 (1978))
 radioactive effluent discharge, NRC jurisdiction; LBP-78-019, B, (7 NRC 989,
 999 fn 9 (1978))
 role of FWPCA 401 certification; LBP-78-017, B, (7 NRC 826, 843 (1978))
 scope of NEPA review authority shared by NRC and EPA; LBP-78-007, B, (7 NRC
 215, 230 (1978))
 state boundary dispute effects on FWPCA 401 certification; ALAB-459, I, (7
 NRC 179, 189 (1978))
 WEST VALLEY REPROCESSING PLANT
 policy statement, reasons for termination of hearings; CLI-78-010, A, (7 NRC
 711 (1978))
 WITNESSES
 see also Cross Examination
 see also Testimony
 cross examination by parties not initiating inquiry; ALAB-461, C, (7 NRC
 313, 316 (1978))
 expertise standard for radiation effects testimony; ALAB-463, A, (7 NRC 341
 (1978))
 testimony weight of expert; LBP-78-015, B, (7 NRC 642, 647 fn 8 (1978))
 WOLF CREEK GENERATING STATION, Unit 1
 construction permit affirmation, reconsideration denied; ALAB-477, A, (7 NRC
 766 (1978))
 construction permit, issuance affirmed after NEPA and financial
 qualifications review; ALAB-462, A, (7 NRC 320 (1978))
 remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
 WPPSS NUCLEAR PROJECT, Unit 4
 construction permit issuance authorized; LBP-78-008, (7 NRC 254 (1978))

SUBJECT INDEX

remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))
WPPSS NUCLEAR PROJECT, Units 3 and 5
construction permits, authorization of issuance; ALAB-485, A, (7 NRC 986
(1978))
construction permits, issuance authorized; LBP-78-014, (7 NRC 599 (1978))
YELLOW CREEK NUCLEAR POWER PLANT, Units 1 and 2
construction permits, LWA findings; LBP-78-007, A, (7 NRC 215 (1978))
remand for radon-release impacts; ALAB-480, A, (7 NRC 796 (1978))

FACILITY INDEX

APPLICATION TO EXPORT SPECIAL NUCLEAR MATERIAL; Dockets 7C2485;702738
 Special Nuclear Materials Export License; 04-24-78; Decision; CLI-78-008 (7 NRC 436 (1978))
 Special Nuclear Materials, Export License; 04-24-78; Order; CLI-78-009 (7 NRC 455 (1978))
 ATLANTIC NUCLEAR GENERATING STATION, Units 1 and 2; Dockets STN 50477;STN 50478
 Construction Permit; 01-25-78; Memorandum and Order; LBP-78-005 (7 NRC 147 (1978))
 ATLANTIC RESEARCH CORPORATION; Docket BML-45-02808-04
 ByProduct Material License, Compliance; 04-06-78; Initial Decision; ALJ-78-002 (7 NRC 701 (1978))
 BAILY GENERATING STATION, Nuclear 1; Docket 50367
 Construction Permit, Compliance; 04-20-78; Memorandum and Order; CLI-78-007 (7 NRC 429 (1978))
 BARNWELL NUCLEAR FUEL PLANT SEPARATIONS FACILITY; Docket 50332
 Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
 BARNWELL PLUTONIUM PRODUCT FACILITY; Docket 701327
 Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
 BARNWELL URANIUM HEXAFLUORIDE FACILITY; Docket 50564
 Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
 BEAVER VALLEY POWER STATION, Unit 1; Docket 50334
 Operating License; 05-04-78; Initial Decision (Amendment); LBP-78-016 (7 NRC 811 (1978))
 Operating License; 06-07-78; Decision; ALAB-484 (7 NRC 984 (1978))
 CHEROKEE NUCLEAR STATION, Units 1, 2 and 3; Dockets 50491;50492;50493
 Construction Permit; 01-30-78; Memorandum and Order; ALAB-457 (7 NRC 70 (1978))
 Construction Permit; 05-17-78; Memorandum and Order; ALAB-478 (7 NRC 772 (1978))
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
 Construction Permit; 06-07-78; Decision; ALAB-482 (7 NRC 979 (1978))
 COMANCHE PEAK STEAM ELECTRIC STATION, Units 1 and 2; Dockets 50445A;50446A
 Operating License, Antitrust Review; 06-21-78; Order; CLI-78-013 (7 NRC 950 (1978))
 DAVIS-BESSEE NUCLEAR POWER STATION, Units 2 and 3; Docket 50500;50501
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
 DIABLO CANYON NUCLEAR POWER PLANT, Units 1 and 2; Dockets 50275;50323
 Operating License; 06-12-78; Partial Initial Decision (NEPA findings); LBP-78-019 (7 NRC 989 (1978))
 ENRICO FERMI ATOMIC POWER PLANT, Unit 2; Docket 50341
 Construction Permit; 04-07-78; Memorandum and Order; ALAB-466 (7 NRC 457 (1978))
 Construction Permit; 04-07-78; Order; LBP-78-013 (7 NRC 583 (1978))
 Construction Permit; 04-26-78; Decision; ALAB-470 (7 NRC 473 (1978))
 Construction Permit; 04-26-78; Memorandum and Order; ALAB-469 (7 NRC 470 (1978))
 Construction Permit, Amendment; 03-21-78; Order; LBP-78-011 (7 NRC 381 (1978))
 Construction Permit, Antitrust; 05-09-78; Decision; ALAB-475 (7 NRC 752 (1978))

FACILITY INDEX

FACILITY INDEX

GENERIC ENVIRONMENTAL STATEMENT ON MIXED OXIDE FUEL; Dockets RM505
 Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
 GREENWOOD ENERGY CENTER, Units 2 and 3; Dockets 50452;50453
 Construction Permit; 04-28-78; Memorandum and Order; ALAB-472 (7 NRC 570 (1978))
 Construction Permit; 05-11-78; Decision; ALAB-476 (7 NRC 759 (1978))
 H.B. ROBINSON STEAM ELECTRIC PLANT, Unit 2; Docket 50261
 Operating License; 06-16-78; Partial Initial Decision (NEPA Issues); LBP-78-022 (7 NRC 1052 (1978))
 HARTSVILLE NUCLEAR PLANT, Units 1A, 2A, 1B and 2B; Dockets STN-50518;STN-50519;STN-50520;STN-50521
 Construction Permit; 03-17-78; Decision; ALAB-463 (7 NRC 341 (1978))
 Construction Permit; 04-19-78; Memorandum and Order; ALAB-467 (7 NRC 459 (1978))
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
 HOPE CREEK GENERATING STATION, Units 1 and 2; Dockets 50354;50355
 Construction Permit; 02-17-78; Memorandum and Order; ALAB-460 (7 NRC 204 (1978))
 Construction Permit; 04-13-78; Initial Decision, Second Supplemental; LBP-78-015 (7 NRC 642 (1978))
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
 INDIAN POINT, Unit 2; Docket 50247
 Construction Permit; 06-14-78; Order; LBP-78-021 (7 NRC 1048 (1978))
 Operating License; 01-11-78; Decision; ALAB-453 (7 NRC 31 (1978))
 JAMESPORT NUCLEAR POWER STATION, Units 1 and 2; Dockets 50516;50517
 Construction Permit; 05-09-78; Partial Initial Decision; LBP-78-017 (7 NRC 826 (1978))
 Construction Permit; 05-31-78; Memorandum and Order; ALAB-491 (7 NRC 807 (1978))
 MARBLE HILL NUCLEAR GENERATING STATION, Units 1 and 2; Dockets STN-50546;STN-50547
 Construction Permit; 02-16-78; Decision; ALAB-459 (7 NRC 179 (1978))
 Construction Permit; 04-04-78; Initial Decision; LBP-78-012 (7 NRC 573 (1978))
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
 Construction Permit (LWA-2); 03-01-78; Decision; ALAB-461 (7 NRC 313 (1978))
 MIDLAND PLANT, Units 1 and 2; Dockets 50329;50330
 Construction Permit; 02-14-78; Decision; ALAB-458 (7 NRC 155 (1978))
 Construction Permit; 04-19-78; Memorandum and Order; ALAB-468 (7 NRC 465 (1978))
 NEP, Units 1 and 2; Dockets STN-50568;STN-50569
 Construction Permit; 02-21-78; Order; LBP-78-009 (7 NRC 271 (1978))
 Construction Permit; 05-25-78; Order; LBP-78-018 (7 NRC 932 (1978))
 NORTH ANNA NUCLEAR POWER STATION, Units 1 and 2; Docket 50338;50339
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-490 (7 NRC 796 (1978))
 Operating License; 01-13-78; Order; LBP-78-003 (7 NRC 89 (1978))
 Operating License; 02-27-78; Memorandum and Order; LBP-78-010 (7 NRC 295 (1978))
 NUCLEAR FUEL RECOVERY AND RECYCLING CENTER; Docket 701432
 Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
 PEACH BOTTOM ATOMIC POWER STATION, Units 2 and 3; Dockets 50277;50278
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-490 (7 NRC 796 (1978))
 PHIPPS BEND NUCLEAR PLANT, Units 1 and 2; Docket 50533;50554
 Construction Permit; 05-30-78; Memorandum and Order; ALAB-490 (7 NRC 796 (1978))
 Construction Permit-Radiological Health and Safety; 01-12-78; Initial Decision; LBP-78-001 (7 NRC 73 (1978))
 PILGRIM NUCLEAR GENERATING STATION, Unit 2; Docket 50471
 Construction Permit (NEPA site suitability); 05-25-78; Decision; ALAB-479 (7 NRC 774 (1978))
 PRAIRIE ISLAND NUCLEAR GENERATING PLANT, Units 1 and 2; Docket 50282;50306

FACILITY INDEX

Operating License (Spent Fuel Pool Modification); 01-27-78; Decision;
ALAB-455 (7 NRC 41 (1978))

RECYCLE FUELS PLANT; Docket 701821
Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))

SEABROOK STATION, Units 1 and 2; Dockets 50443;50444
Construction Permit; 01-06-78; Memorandum and Order; CLI-78-001 (7 NRC 1 (1978))
Construction Permit; 04-28-78; Decision; ALAB-471 (7 NRC 477 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-430 (7 NRC 796 (1978))
Construction Permit; 06-30-78; Memorandum and Order; CLI-78-014 (7 NRC 952 (1978))

SHEARON HARRIS NUCLEAR POWER PLANT, Units 1, 2, 3 and 4; Dockets 50400;50401;50402;50403
Construction Permit; 01-12-78; Memorandum and Order; LBP-78-002 (7 NRC 83 (1978))
Construction Permit; 01-23-78; Initial Decision; LBP-78-004 (7 NRC 92 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))

SHEFFIELD, ILLINOIS, LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE; Docket 27033
Operating License; 05-03-78; Decision; ALAB-473 (7 NRC 737 (1978))

SOUTH TEXAS PROJECT, Units 1 and 2; Dockets 50498A;50499A
Operating License; Antitrust; 04-05-78; Order; CLI-78-005 (7 NRC 397 (1978))

ST. LUCIE PLANT, Unit 2; Docket 50389A
Antitrust Review; 06-21-78; Memorandum and Order; CLI-78-012 (7 NRC 939 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-430 (7 NRC 796 (1978))

STANISLAUS NUCLEAR PROJECT, Unit 1; Docket P564A
Construction Permit; 06-13-78; Order; LBP-78-020 (7 NRC 1038 (1978))

STERLING POWER PROJECT, Nuclear 1; Docket STN-50485
Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))

TARAPUR ATOMIC POWER STATION, Units 1 and 2; Dockets 702071;702131
Special Nuclear Materials, Export License; 02-03-78; Opinion Correction; CLI-78-002 (7 NRC 153 (1978))
Special Nuclear Materials Export Licenses; 03-06-78; Order; CLI-78-004 (7 NRC 311 (1978))

THREE MILE ISLAND NUCLEAR STATION, Unit 2; Docket 50320
Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))
Operating License; 01-23-78; Memorandum and Order; ALAB-454 (7 NRC 39 (1978))
Operating License; 03-02-78; Order; CLI-78-003 (7 NRC 307 (1978))
Operating License; 03-27-78; Memorandum and Order; ALAB-465 (7 NRC 377 (1978))
Operating License; 05-05-78; Memorandum and Order; ALAB-474 (7 NRC 746 (1978))
Operating License, NEPA review; 01-27-78; Memorandum and Order; ALAB-456 (7 NRC 63 (1978))

TYRONE ENERGY PARK, Unit 1; Docket STN-50484
Construction Permit; 03-17-78; Decision; ALAB-464 (7 NRC 372 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-430 (7 NRC 796 (1978))
Construction Permit; 06-07-78; Memorandum and Order; ALAB-493 (7 NRC 982 (1978))

UNION OF CONCERNED SCIENTISTS;
Licensing (Health and Safety); 04-13-78; Memorandum and Order; CLI-78-006 (7 NRC 400 (1978))

VERMONT YANKEE NUCLEAR POWER STATION; Docket 50271
Operating License (Spent Fuel Pool Modification); 01-27-78; Decision; ALAB-455 (7 NRC 41 (1978))

VIRGIL C. SUMNER NUCLEAR STATION, Unit 1; Docket 50395
Operating License; 02-03-78; Memorandum and Order; LBP-78-006 (7 NRC 239 (1978))

FACILITY INDEX

WEST VALLEY REPROCESSING PLANT; Docket 50201
Policy Statement; 05-08-78; Decision; CLI-78-010 (7 NRC 711 (1978))
WOLF CREEK GENERATING STATION, Unit 1; Docket STN-50482
Construction Permit; 05-17-78; Memorandum and Order; ALAB-477 (7 NRC 766 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-490 (7 NRC 796 (1978))
Construction Permit; 3-09-78; Decision; ALAB-462 (7 NRC 320 (1978))
WPPSS NUCLEAR PROJECT, Unit 4; Docket 50513
Construction Permit; 02-17-78; Supplemental Initial Decision; LBP-75-008 (7 NRC 254 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-490 (7 NRC 796 (1978))
WPPSS NUCLEAR PROJECT, Units 3 and 5; Dockets STN-50508; STN-50509
Construction Permit; 04-10-78; Initial Decision (Radiological and NEPA issues); LBP-78-014 (7 NRC 599 (1978))
WPPSS, Nuclear 3 and 5; Dockets STN-50508; STN-50509
Construction Permit; 06-07-78; Decision; ALAB-485 (7 NRC 996 (1978))
YELLOW CREEK NUCLEAR POWER PLANT, Units 1 and 2; Dockets STN-50566; STN-50567
Construction Permit; 02-03-78; Partial Initial Decision, Limited Work Authorization; LBP-78-007 (7 NRC 215 (1978))
Construction Permit; 05-30-78; Memorandum and Order; ALAB-480 (7 NRC 796 (1978))

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