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 50-251 Turkey Point Plant, Unit 4, Florida Power and Light C. 05000251
 AUTH. NAME: ONCAVAGE, M.P. AUTHOR AFFILIATION: Affiliation Unknown
 RECIP. NAME: Division of Licensing

SUBJECT: Forwards comments to NUREG-0743, DES for steam generator repairs at facilities by intervenor MP Oncavage, J. Lorton, T. Brown, W. Goldberg, J. Allen, KZ Morgan & G Minor. Extension to 810302 for submission granted.

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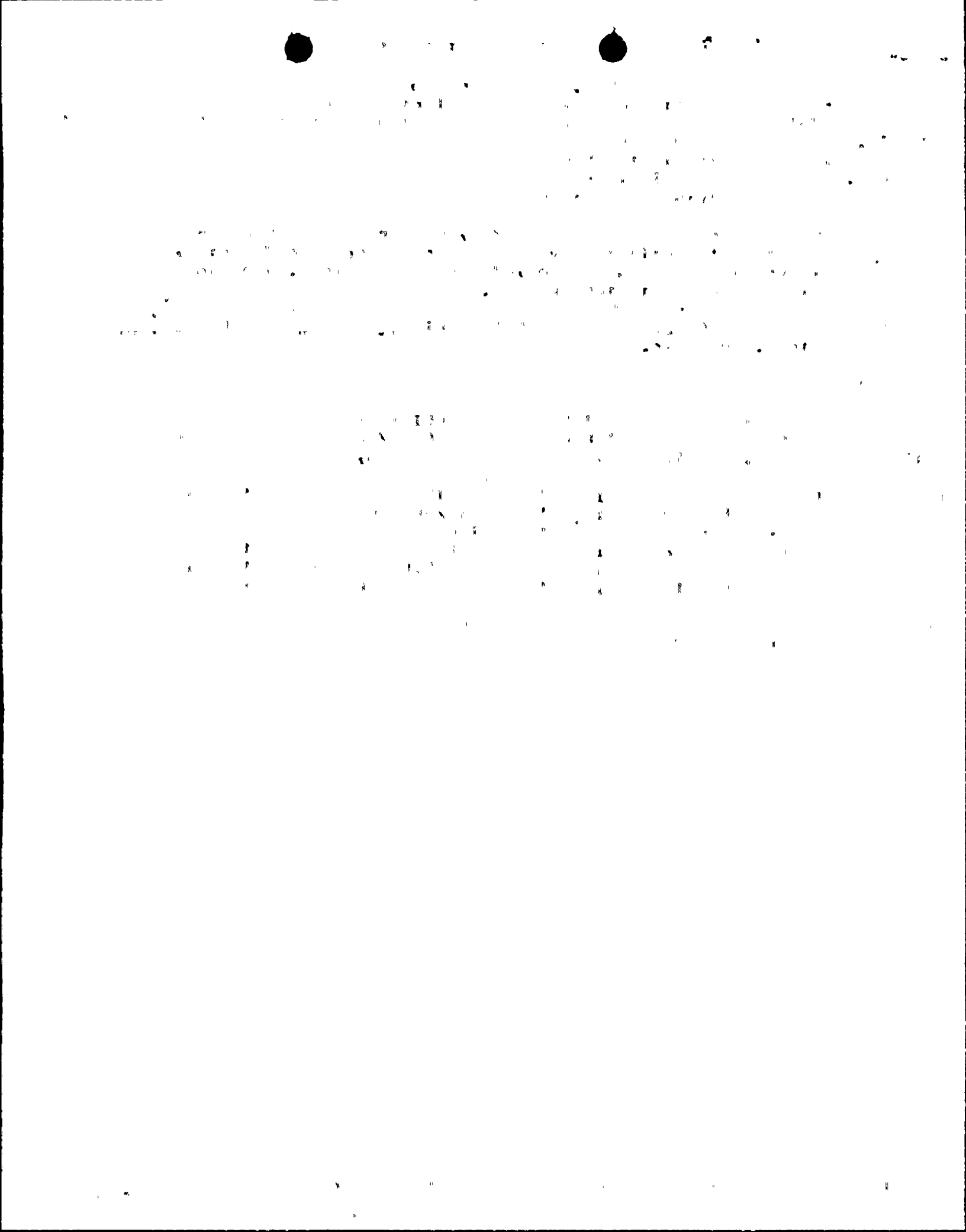
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RB



Mark P. Oncavage
12200 S.W. 110th Ave.
Miami, Florida 33176

Director, Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Enclosed are comments to NUREG-0743, Draft Environmental Statement for steam generator repairs at the Turkey Point Nuclear Power Plant, units nos. 3 and 4.

Included are comments by Mark P. Oncavage, Intervenor, Ms. Joette Iorion, Dr. Jerry Brown, Dr. Walter Goldberg, Mrs. June Allen, Dr. Karl Z. Morgan, and Mr. Gregory Minor.

An extension to March 2, 1981 has been granted for the submission of these comments.

Very truly yours,



Mark P. Oncavage

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COMMENTS ON NUREG-0743

SUBMITTED BY GREGORY C. MINOR
MHB TECHNICAL ASSOCIATES

AT THE REQUEST OF MARK ONCAVAGE

&

FLORIDIANS UNITED FOR SAFE ENERGY

REGULATORY DOCKET FILE COPY

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION .

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

FLORIDA POWER AND LIGHT COMPANY
Turkey Point Nuclear Generating Units 3 & 4
Docket Nos. 50-250-SP
50-251-SP

AFFIDAVIT OF
GREGORY C. MINOR

On Behalf Of
FLORIDIANS UNITED FOR SAFE ENERGY

February 26, 1981

100



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AFFIDAVIT OF GREGORY C. MINOR

Concerning
REVIEW OF DRAFT ENVIRONMENTAL STATEMENT
RELATED TO STEAM GENERATOR REPAIR AT
TURKEY POINT PLANT UNITS 3 AND 4

STATE OF CALIFORNIA)
)
COUNTY OF SANTA CLARA) ss.

GREGORY C. MINOR deposes and says under oath as follows:

I. BACKGROUND OF AUTHOR

1. My name is Gregory C. Minor. I have twenty years of experience in the design, development, research, start-up, and management of nuclear reactor systems. I worked for sixteen years for the General Electric Company in their Nuclear Energy



Division and for the past four years as an independent technical consultant. I am a founder in 1976 and vice president of MHB Technical Associates. I received a B.S. in electrical engineering from the University of California, Berkeley, and an M.S. in electrical engineering from Stanford University. Since 1976, I have participated in a variety of reactor studies addressing nuclear safety issues. I am presently a consultant on several nuclear plant cases concerning the adequacy of plants and systems to meet current regulations. I am a member of the Nuclear Power Plant Standards Committee for the Instrument Society of America. Also, I have recently participated in a Peer Review Group of the NRC/TMI Special Inquiry Group, under the direction of Mitchell Rogovin. My complete experience record is appended to this affidavit as Attachment A.

II. INTRODUCTION

2. The Draft Environmental Statement Related to Steam Generator Repair at Turkey Point Plant Units 3 and 4 (NUREG-0743, December, 1980), has been reviewed and found deficient in its coverage of several issues. The following sections describe the concerns related to radiation exposure, uncertainty of resolution of the problem, and accidents resulting from security deficiencies.

III. OCCUPATIONAL RADIATION EXPOSURE UNCERTAINTY

3. The draft Environmental Statement describes numerous

estimates of occupational radiation exposure resulting from the repairs. These estimates range between 1300 to 4700 person-rem/unit. The lowest value was Florida Power and Light's (FP&L) estimate and appears to be overly optimistic as to the effectiveness of their ALARA efforts. In light of the actual values experienced in the replacement of Surry Steam Generators, FP&L raised their estimate to a value of 2100, still less than the actual value from Surry.

4. The FP&L exposure estimate is for an unproven approach involving cutting the steam generator lower assembly at a point below the tube sheet; a different approach than that used at Surry, the reference plant.

5. FP&L also estimate that sand abrasive decontamination (grit blast) techniques may reduce the exposure of workers, but they did not address the possible difficulties in cleanup and increased exposures that might result in a complicated cleanup process of the abrasive from the primary loop.

6. In the repair of the steam generators there will be some tasks which require more highly skilled labor, such as code welders. There is no discussion in the Environmental Statement of the availability of these critical personnel, their accumulated exposure history to date and what effect their unavailability or burn-out may have on the length of the outage and/or amount of rework required. Extending the outage time results in a more costly repair in dollars and, very likely, occupational

exposure as well.

IV. UNCERTAINTY IN THE EFFECTIVENESS OF THE SOLUTION

7. Despite the statement that the steam generator repair will use a new tubing design employing "state-of-the-art internals and tubes" (ES, p. 5-2), there is no clear evidence that the problem will not reoccur in the future. Whereas Westinghouse was confident the now-faulty steam generator would last the life of the plant, they are now confident that the new design will solve the problems encountered in the old design. However, there is no data base or long-term experience to show that new design will definitely improve the situation or that the new design will not degrade and need to be replaced a few years hence. In fact, the Westinghouse plant at Prairie Island, which uses an AVT approach, has experienced steam generator tube degradation after only a few years of operation. Neither the financial or occupational exposure values included consideration of possible additional future replacements. Based on the experience to date, additional steam generator repair is likely, even on the new Turkey Point design.

V. ACCIDENTS RESULTING FROM REDUCED SECURITY DURING CONSTRUCTION

8. The steam generator repair program represents a strong challenge to the functioning of the plant security system. Not only will the number of people on site be dramatically increased,

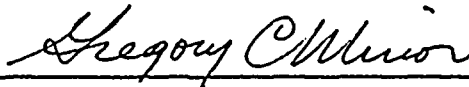


but there will also be a larger number of people with a lower level of awareness concerning radiological hazards. The risks include accidents (and possible sabotage) of spent fuel, systems, and components of both the operating unit and the unit under repair.

9. The Environmental Statement refers only to the normal construction related accidents, (e.g., lifting accidents, release of radiation during decontamination). The Environmental Statement is deficient in not considering additional accidents of a more serious nature which could result from lax security during construction.

VI. CONCLUSIONS

10. The draft Environmental Statement (E.S.) fails to address some of the important considerations of the environmental effects of the repair program for the Turkey Point Steam Generators. It does not address the uncertainties in the occupational exposure, the possibilities of more serious accidents resulting from the necessarily reduced security during a construction program, or the fundamental question of whether the repair is a true solution of the problem or just an interim step which may need to be repeated in the not too distant future. Each of these issues should be addressed in the E.S.



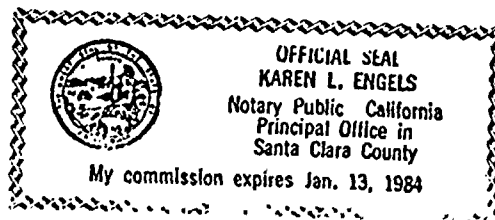
GREGORY C. MINOR

Subscribed and sworn to before
me this 26th day of February, 1981



NOTARY PUBLIC

My Commission Expires: 1-13-84



PROFESSIONAL QUALIFICATIONS OF GREGORY C. MINOR

GREGORY C. MINOR
MHB Technical Associates
1723 Hamilton Avenue
Suite K
San Jose, California 95125
(408) 266-2716

EXPERIENCE:

1976 - PRESENT

Vice-President - MHB Technical Associates, San Jose, California.
Engineering and energy consultant to state, federal, and private organizations and individuals. Major activities include studies of safety and risk involved in energy generation, providing technical consulting to legislative, regulatory, public and private groups and expert witness in behalf of state organizations and citizens' groups. Was co-editor of a critique of the Reactor Safety Study (WASH-1400) for the Union of Concerned Scientists and co-author of a risk analysis of Swedish reactors for the Swedish Energy Commission. Served on the Peer Review Group of the NRC/TMI Special Inquiry Group (Rogovin Committee). Actively involved in the Nuclear Power Plant standards Committee work for the Instrument Society of America (ISA).

1972 - 1976

Manager, Advanced Control and Instrumentation Engineering,
General Electric Company, Nuclear Energy Division, San Jose,
California.

Managed a design and development group of thirty-four engineers and support personnel designing systems for use in the measurement, control and operation of nuclear reactors. Involved coordination with other reactor design organizations, the Nuclear Regulatory Commission, and customers, both overseas and domestic. Responsibilities included coordinating and managing the design and development of control systems, safety systems, and new control concepts for use on the next generation of reactors. The position included responsibility for standards applicable to control and instrumentation, as well as the design of short-term solutions to field problems. The disciplines involved included electrical and mechanical engineering, seismic design and process computer control/programming.



1970 - 1972

Manager, Reactor Control Systems Design, General Electric Company, Nuclear Energy Division, San Jose, California.

Managed a group of seven engineers and two support personnel in the design and preparation of the detailed system drawings and control documents relating to safety and emergency systems for nuclear reactors. Responsibility required coordination with other design organizations and interaction with the customer's engineering personnel, as well as regulatory personnel.

1963 - 1970

Design Engineer, General Electric Company, Nuclear Energy Division, San Jose, California.

Responsible for the design of specific control and instrumentation systems for nuclear reactors. Lead design responsibility for various subsystems of instrumentation used to measure neutron flux in the reactor during startup and intermediate power operation. Performed lead system design function in the design of a major system for measuring the power generated in nuclear reactors. Other responsibilities included on-site checkout and testing of a complete reactor control system at an experimental reactor in the Southwest. Received patent for Nuclear Power Monitoring System.

0 - 1963

Advanced Engineering Program, General Electric Company; Assignments in Washington, California, and Arizona.

Rotating assignments in a variety of disciplines:

- Engineer, reactor maintenance and instrument design, KE and D reactors, Hanford, Washington, circuit design and equipment maintenance coordination.
- Design engineer, Microwave Department, Palo Alto, California. Worked on design of cavity couplers for TWT's.
- Design engineer, Computer Department, Phoenix, Arizona. Design of core driving circuitry.
- Design engineer, Atomic Power Equipment Department, San Jose, California. Circuit design and analysis.
- Design engineer, Space Systems Department, Santa Barbara, California. Prepared control portion of satellite proposal.



- Technical Staff - Technical Military Planning Operation. (TEMPO), Santa Barbara, California. Prepare analysis of missile exchanges.

During this period, completed three-year General Electric program of extensive education in advanced engineering principles of higher mathematics, probability and analysis. Also completed courses in Kepner-Tregoe, Effective Presentation, Management Training Program, and various technical seminars.

EDUCATION

University of California at Berkeley, BSEE, 1960.

Advanced Course in Engineering - three-year curriculum, General Electric Company, 1963.

Stanford University, MSEE, 1966.

HONORS AND ASSOCIATIONS

- Tau Beta Pi Engineering Honorary Society.
- Co-holder of U.S. Patent No. 3,565-760, "Nuclear Reactor Power Monitoring System," February, 1971.
- Member: American Association for Advance of Science.
- Member: Nuclear Power Plant Standards Committee, Instrument Society of America.

PERSONAL DATA

Born: June 7, 1937

Married, three children

Residence: San Jose, California



PUBLICATIONS AND TESTIMONY

1. G.C. Minor, S.E. Moore, "Control Rod Signal Multiplexing," IEEE Transactions on Nuclear Science, Vol. NS-19, February, 1972.
2. G.C. Minor, W.G. Milam, "An Integrated Control Room System for a Nuclear Power Plant," NEDO-10658, presented at International Nuclear Industries Fair and Technical Meetings, October, 1972, Basle, Switzerland.
3. The above article was also published in the German Technical Magazine, NT, March, 1973.
4. Testimony of G.C. Minor, D.G. Bridenbaugh, and R.B. Hubbard before the Joint Committee on Atomic Energy, Hearings held February 18, 1976, and published by the Union of Concerned Scientists, Cambridge, Massachusetts.
5. Testimony of G.C. Minor, D.G. Bridenbaugh, and R.B. Hubbard before the California State Assembly Committee on Resources, Land Use, and Energy, March 8, 1976.
6. Testimony of G.C. Minor and R.B. Hubbard before the California State Senate Committee on Public Utilities, Transit, and Energy, March 23, 1976.
7. Testimony of G.C. Minor regarding the Grafenrheinfeld Nuclear Plant, March 16-17, 1977, Wurzburg, Germany.
8. Testimony of G.C. Minor before the Cluff Lake Board of Inquiry, Regina, Saskatchewan, Canada, September 21, 1977.
9. The Risks of Nuclear Power Reactors: A Review of the NRC Reactor Safety Study WASH-1400 (NUREG-75/0140), H. Kendall, et al, edited by G.C. Minor and R.B. Hubbard for the Union of Concerned Scientists, August, 1977.
10. Swedish Reactor Safety Study: Barsebäck Risk Assessment, MHB Technical Associates, January, 1978. (Published by Swedish Department of Industry as Document SdI 1978:1)
11. Testimony by G.C. Minor before the Wisconsin Public Service Commission, February 13, 1978, Loss of Coolant Accidents: Their Probability and Consequence.
12. Testimony by G.C. Minor before the California Legislature Assembly Committee on Resources, Land Use, and Energy, AB 3108, April 26, 1978, Sacramento, California.

PUBLICATIONS AND TESTIMONY

13. Presentation by G.C. Minor before the Federal Ministry for Research and Technology (BMFT), Meeting on Reactor Safety Research, Man/Machine Interface in Nuclear Reactors, August 21, and September 1, 1978, Bonn, Germany.
14. Testimony by G.C. Minor, D.G. Bridenbaugh, and R.B. Hubbard, before the Atomic Safety and Licensing Board, September 25, 1978, in the matter of the Black Fox Nuclear Power Station Construction Permit Hearings, Tulsa, Oklahoma.
15. Testimony of G.C. Minor, ASLB Hearings, Related to TMI-2 Accident, Rancho Seco Power Plant, on behalf of Friends of the Earth, September 13, 1979.
16. Testimony of G.C. Minor before the Michigan State Legislature, Special Joint Committee on Nuclear Energy, Implications of Three Mile Island Accident for Nuclear Power Plants in Michigan, 10/15/79.
17. A Critical View of Reactor Safety, by G.C. Minor, paper presented to the American Association for the Advancement of Science, Symposium on Nuclear Reactor Safety, January 7, 1980, San Francisco, California.
18. The Effects of Aging on Safety of Nuclear Power Plants, paper presented at Forum on Swedish Nuclear Referendum, Stockholm, Sweden, March 1, 1980.
19. Minnesota Nuclear Plants Gaseous Emissions Study, MHB Technical Associates, September, 1980, prepared for the Minnesota Pollution Control Agency, Roseville, MN.
20. Testimony of G.C. Minor and D.G. Bridenbaugh before the New York State Public Service Commission, Shoreham Nuclear Plant Construction Schedule, in the matter of Long Island Lighting Company Temporary Rate Case, September 22, 1980.
21. Testimony of G.C. Minor and D.G. Bridenbaugh before the N.J. Board of Public Utilities, Oyster Creek 1980 Refueling Outage Investigation, in the matter of Jersey Central Power and Light Rate Case, February 19, 1981.



COMMENTS ON NUREG-0743

SUBMITTED BY DR. JERRY BROWN

PRESIDENT
FLORIDIANS UNITED FOR SAFE ENERGY



Comments on Draft Environmental Statement
related to steam generator repair at
Turkey Point Plant, Units 3 and 4
Florida Power and Light Company

I have reviewed the Draft Environmental Statement (DES)
and found it to be defficient in several key areas:

1) Misleading Information as to Cost of Repair

(re: DES 4.2 Economic Costs of Steam Generator Repair)

The DES seriously underestimates the total cost of the
repair project by at least \$228,400,000.

According to the DES "the total project cost is therefore
about \$270,000,000."

However, according to FP&L data on capital costs and U.S.
NRC data on replacement power costs, an accurate estimate of the
total cost would be \$498,400,000 (see Table 1 attached).*

Considering that: (1) these costs will be born by
consumers; (2) an accurate representation of these repair costs
is essential to evaluating the cost/benefits and net dollar
savings associated with these repairs; and (3) that the steam
generator problem is a generic problem, it is evident that the
DES is defficient because it provides misleading information on
the total cost of the repair.

*This table is from a paper by J. B. Brown and M. P. Oncavage
on "Steam generator degradation and nuclear power costs: a
generic problem," presented to the 3rd Miami International
Conference on Alternative Energy Sources, Miami Beach, Florida,
December 1980.



2) Inadequate Discussion of Alternatives

(re: DES 4.2 Economic Costs of Steam Generator Repair)

The DES is inadequate because it does not make any analysis of the cost/benefits of all viable alternatives to the repair (including energy management, conservation and/or renewable sources of energy) as required by NEPA.

In FP&L "Petition for Approval of Revised Energy Management Plan" submitted to the Florida Public Service Commission (12/29/80), the company argued that an estimated company expenditure of \$712,000,000 for energy management programs could lead to a total system reduction of 1,874 MW. This is significantly larger than the 1,332 MW maximum dependable capacity of Turkey Point Units 3 and 4.

The \$/kw cost of replacement power generated through energy management is therefore $\$712,116,000 \div 1,874,000 \text{ kw}$, or \$379.7/kw of generated capacity.

The total cost/kw of the steam generator repair at Turkey Point can be calculated as follows: $\$498,400,000 \div 1,132,200 \text{ kw}$ (666 MW-mdc/unit x 2 units x .85 capacity factor) = \$440.2/kw.

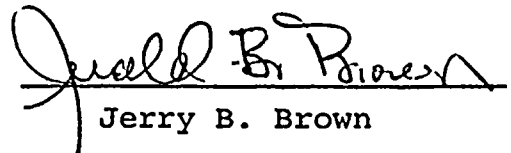
Therefore, there is a prima facie case indicating that the capacity of Turkey Point could be replaced by an FP&L energy management program that would be \$60.5/kw cheaper than the cost of the proposed repair.

In addition, it is a fact that neither the DES or FP&L's Steam Generator Repair Report, as revised, make any cost/benefit analysis of conservation and/or renewable sources of energy as alternatives to the repair.

In this respect the DES is seriously deficient and apparently in violation of the NEPA.

Prepared and submitted by Jerry B. Brown, Ph.D., Associate Professor of Environmental Studies, Florida International University, Tamiami Trail, Miami, Florida 33199.

Signed:


Jerry B. Brown

February 17, 1981

Attachment (1)

TABLE 1.

Estimated capital costs and replacement power costs associated with lower assembly steam generator replacement of FP&L Turkey Point units 3 and 4 (1981).

A. Capital Costs

1) Cost of steam generators	\$ 25,000,000
2) Engineering costs	5,200,000
3) Field costs	58,300,000
4) Power resources costs	3,200,000
5) FP&L support costs	4,300,000
6) Construction & engineering fees	2,400,000
7) Allowance for funds used during construction	11,000,000
8) Contingency	9,000,000
9) Storage	3,000,000
10) Demineralizer	9,000,000
11) Condensor retubing	8,000,000

Subtotal: Capital Costs	\$138,400,000
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B. Replacement Power Costs	\$360,000,000
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Total:	<u>\$498,400,000</u>
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Sources: Capital Costs - FP&L, Steam Generator Repair Report, Revision 7, March 1980, Table 7.4-2.
Replacement Power Costs - U.S. Nuclear Regulatory Commission, NUREG-0685, August 1980, p. 14.

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COMMENTS ON NUREG-0743

SUBMITTED BY DR. KARL Z MORGAN

AT THE REQUEST OF MARK ONCAVAGE

&

FLORIDIANS UNITED FOR SAFE ENERGY

SCHOOL OF NUCLEAR ENGINEERING

Atlanta, Georgia 30332

(404) 894-3720

February 6, 1981

Ms. Joette Lorion
Floridians United for Safe Energy, Inc.
7210 Red Road
Room 208
Miami, Florida 33143

Dear Ms. Lorion:

Thank you for your letter of January 20, 1981. I would indeed like to assist you in the program of FUSE and your efforts to reduce the radiation damage during the replacement of the six steam generators in units 3 and 4 at Turkey Point. I have the highest admiration of persons like you and Mark Oncavage. However, I am running far behind on firm commitments and can make only a few hurried comments after glancing through the material you sent as follows:

A. Comments on the Demands for Negotiations

1. I think each reactor should be shutdown completely for at least six months before beginning a replacement operation. If this is not done item 1 would be a mistake because the generators should cool down (radioactively) before leaving the plant storage facility.
2. Item 8 must involve especially trained personnel at a local hospital and preparations to receive contaminated persons at this hospital.
3. Regarding item 13, it is probable that the University of Florida at Gainesville is better prepared for such survey than the University of Miami or Florida Southern University.
4. Regarding item 23, every welding operation should be demonstrated on a mockup before a welder does the same job on the hot steam generator.
5. Regarding item 28, each worker on a hot operation should bring in a urine sample (collected at home) when he reports to work each day. He should have nasal smears taken following each hot operation and if readings are positive, he should furnish a fecal sample for analysis also.
6. Regarding item 29, each worker should wear also two or three TLD meters and finger meters.

B. Comments on NUREG-0743

1. (p-1) The impacts are outweighed by the benefits only because a low dollar value is placed on a human life.
2. p-(3-1) The denting and corrosion problems will be reduced but may not be eliminated by the proposed actions. It is even likely that other

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Ms. Joette Lorion
February 6, 1981
Page 2

serious problems will develop with the repaired steam generators.

3. p (3-4) No refurbishing or other hot operations should be done in high background areas.

4. (p 4-1) The upper dose estimate of 9.4×10^3 person rem for the six generators will cost seven lethal cancers and 14 total cancers by my estimate. This is a mean value between the highest and lowest estimates.

It is extremely important that the radiation workers be properly educated and informed regarding the cancer risk. A trust fund should be established to compensate the radiation workers who die of cancer.

5. (p 4-3) Comparison with the high doses received from normal PWR operation is no justification of this repair operation. NRC must abide by its ALARA principles.

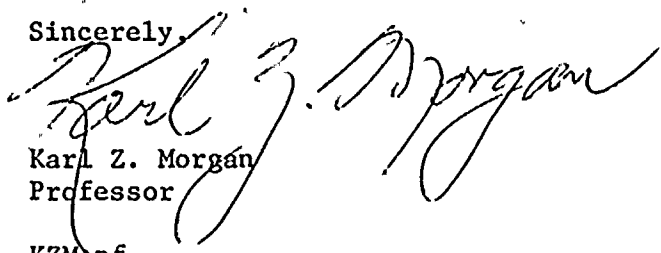
6. (p 4-5) I do not believe the VEPCO operation was carried out with only 2140 person rem. I mistrust their data.

7. (p 4-5) BEIR-III, WASH-1400, etc. greatly underestimate the radiation risk (see reprints sent under separate cover).

8. (p 4-10) A shipping accident with the waste or generator could cause the population dose estimates to be much too low.

9. (p 5-4) I believe it was a serious mistake not to have selected the replacement option. In such an option greater advantage could be taken of shielding and remote operations.

Sincerely,


Karl Z. Morgan
Professor

KZM:pf

2-15



Georgia Institute of Technology

BIOGRAPHICAL SKETCH

MORGAN, KARL Z. - Neely Professor

Education

A.B., University of North Carolina	1929
M.A., Physics, University of North Carolina	1930
Ph.D., Physics, Duke University	1934

Employment History

Lenoir Rhyne College, Chairman, Physics Department	1934-1943
University of Chicago, Metallurgical Laboratory	1943
Oak Ridge National Laboratory	
Director, Health Physics Division	1943-1972
Georgia Institute of Technology, Neely Professor	1972-Present

Experience Summary: During the period as Chairman of the Physics Department at Lenoir Rhyne College research in cooperation with Duke University in the field of cosmic ray showers, meson lifetime, etc. was carried out. While at the University of Chicago, Morgan was one of a group of six persons who developed and established the new science and profession of health physics. At Oak Ridge National Laboratory he was Director, Health Physics Division from its inception. He directed over 200 persons engaged in research, engineering, and applied activities. At Georgia Tech Morgan teaches courses in health physics, works with M.S. and Ph.D. students on their thesis programs, and is in charge of developing an undergraduate health physics curriculum.

Current Fields of Interest

Health Physics, radiation protection, diagnostic x-ray exposure, internal dose from radionuclides, environmental exposure, radiation protection standards, nonionizing radiation, safe operation of the nuclear energy industry.

Major Reports and Publications

Over 300 papers and publications have been written. Those of major importance over the past few years are as follows:

1. "Common Sources of Human Exposure to Ionizing Radiation in the United States," American Engineer, July 1968
2. "Ionizing Radiation: Benefits Versus Risks," Annual Meeting of the Health Physics Society, June 16-20, 1968, Denver, Colorado; and published in Health Physics, Vol. 17, No. 4
3. "Assumptions Made by the Internal Dose Committee of the International Commission on Radiological Protection," Sixth Annual Meeting of the Gesellschaft fur Nuclearmedizin, Wiesbaden, Germany, September 26-28, 1968; Published in Proceedings, 1969
4. "Redirecting Health Physics Studies to Areas of Greatest Interest," First European Congress of the International Radiation Protection Association, Menton, France, October 9-11, 1968; Published in Proceedings, 1968
5. "Development of Health Physics as a Profession," Proceedings of First International Congress of Radiation Protection, Rome, Italy, Vol. 1, 3, Pergamon Press, 1968

Major Reports and Publications (continued)

6. "The Need for Standardization Procedures in the Application of Ionizing Radiation to Medical and Dental Patients," Seminar sponsored by the National Center for Radiological Health, Rockville, Maryland, November 15, 1968, Seminar Paper 003
7. "The Proper Working Level of Radon and Its Daughter Products in the Uranium Mines of the United States," Hearing on Radiation Standards for Mines, Washington, D.C., November 20, 1968; Congressional Record, 1968
8. "Supplemental Statement on the Proper Working Level of Radon and Its Daughter Products in the Uranium Mines of the USA," Supplement to Testimony presented on November 20, 1968, Washington, D. C.; Congressional Record, 1968
9. "Future Opportunities in Health Physics," Health Physics Society Mid-year Topical Symposium, Los Angeles, California, January 29-31, 1969
10. "Risks from Diagnostic X-Rays," Yale Scientific, Vol. XLII No. 5, February 1969; Reprinted from Yale Scientific in the Journal of the American Radiography Technologists, Vol. XIV, No. 4, Winter 1969
11. "Radiation Standards for Reactor Siting," Testimony presented before the Joint Committee on Atomic Energy at its Hearings on Environmental Effects of Producing Electrical Power, Phase 2, January 1970; Congressional Record
12. "Energy Pollution of the Environment," Midyear Symposium of the Health Physics Society, Louisville, Kentucky, January 28, 1970; Proceedings published in USPHS-BRH Series, BRH/DEP-70-26 Oct. 1970
13. "A Time of Challenge to the Health Physicist," Presidential Address presented before the Second International Congress on Radiation Protection, May 8, 1970, Brighton, England; Health Physics, Vol. 20, May 1971, pp. 491-498
14. "My Opinion--You Can Drastically Cut X-Ray Exposure Below Today's Levels," Consultant, March/April 1970
15. "History of the Health Physics Society," published as part of the RSNA Symposium on the Critical History of American Radiology (Nov. 1970)
16. "Standard Man-Standard Patient," Medical Radioisotopes: Radiation Dose and Effects, AEC Series 20, p. 87, June 1970
17. "History of the International Radiation Protection Association," published in Proceedings of the RSNA Symposium on the Critical History of American Radiology, November 1970
18. "Criteria for the Control of Radioactive Effluents," IAEA Symposium on Environmental Aspects of Nuclear Power Stations, UN Building, New York, August 1970, Proceedings published, this paper is IAEA-SM-146/10; synopsis published also in Environmental Studies, 1971
19. "Maximum Permissible Levels of Exposure to Ionizing Radiation," International Summer School on Radiation Protection, Boris Kidric Institute of Nuclear Sciences, Cavtat, Yugoslavia, September 20-30, 1970; Proceedings published in 1971 under title of "Radiation Dosimetry"
20. "President's Report to the General Assembly of IRPA," Brighton, England, May 1970, Health Physics, Vol. 20, No. 5, 1971



Major Reports and Publications (continued)

21. "History of Radiation Protection " Symposium Commemorating the 75th Anniversary of the Discovery of X-Rays, Milwaukee, November 13-14, 1970; Materials Evaluation, Vol. XXIX, No. 3, March 1971
22. "Why the 1968 Act for Radiation Control for Health and Safety Is Required," Radiology, Vol. 99, No. 3, pages 569-588, June 1971
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Professional Activities, Memberships, and Honors

Member:

Health Physics Society, First President in 1956
 International Commission on Radiological Protection, Chairman for 20 years of committee publishing present and past Recommendations on Maximum Permissible Internal Dose of Radioisotopes
 National Council on Radiation Protection, Chairman for 20 years of committee publishing present and past Recommendations on Maximum Permissible Dose for Internal Radiation
 American Association for the Advancement of Science
 American Industrial Hygiene Association
 Research Society of America
 Radiation Research Society
 American Association of Physics Teachers
 International Radiation Protection Association, First President, 1968

Associate Fellow: American College of Radiology

Fellow: American Physical Society and American Nuclear Society

Awarded the first gold medals for meritorious work in the field of radiation protection by the Royal Academy of Science of Sweden in 1962 jointly with Walter Binks (England), 1962

Distinguished Alumni Award and Honorary Doctor of Science Degree from Lenoir Rhyne College, 1964 and 1967

Honorary membership in Sigma Pi Sigma, the physics honor society, from Berea College, 1957

Professional Activities, Memberships, and Honors (continued)

First Distinguished Service Award of the Western Chapter of the Health Physics Society, 1968

Distinguished Achievement Award, Health Physics Society, 1973

Honorary member of Fachverband für Strahlenschutz, 1973

Editor-in-Chief, Journal HEALTH PHYSICS

Consultant on Radiation and Reactor Problems with a number of Government agencies including the Nuclear Regulatory Commission, Environmental Protection Agency, Bureau of Radiological Health, HEW, and the joint Committee on Atomic Energy of Congress of the United States and a member of President Carter's Panel on Energy Policy.

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
related to the steam generator repair at

Turkey Point Plant Units #3 and #4

Prepared and submitted by

JOETTE LORION

by Joette Lorion

Executive Director of Floridians United for Safe Energy

MARCH 1981

COMMENTS ON NUREG - 0743

PURPOSE OF COMMENTS

SOUTH FLORIDA ENVIRONMENT MUST BE PROTECTED

SHORTCOMINGS OF DEIS

A. NRC CONCLUSION BASED ON INSUFFICIENT EVIDENCE

B. COMMENTOR CONCLUSION

NATIONAL ENVIRONMENTAL POLICY ACT

A. NEPA REQUIREMENTS

B. DOES NRC MEET REQUIREMENTS?

DIRECT AND SPECIFIC COMMENTS ON THE DEIS - ENVIRONMENTAL IMPACT OF
RADIATION EXPOSURE



PURPOSE OF COMMENTS



PURPOSE OF COMMENTS

The Draft Environmental Impact Statement on Turkey Point is fundamentally flawed in that it fails to address significant, long term environmental hazards that could have harmful effects on the health and safety of the people in Dade County.

As a citizen of Dade County, I have the right and responsibility to point out areas of this DEIS that do not comply with the National Environmental Policy Act and specifics of the repair plan that could indeed jeopardize the future of Dade County.

I do not question the integrity or scientific ability of the people who prepared the DEIS. I feel that they did their best with the resources available to them. But it will be apparent to anyone who reads the NRC's DEIS that it is little more than a technical appraisal of the repair process that outlines the possible options that FPL will take with waste disposal and radiation exposure, while failing to address the long term health, economic and environmental effects that this repair could have on the people of Dade County.

.... THE DEIS IS LIMITED IN SCOPE.....

It limits itself to worker safety and fails to address the importance of what the future effect that cumulative impact of radiation will have on the population. The NRC limits the scope of the environmental impact to unacceptable means. It deletes crucial details on which a benefit vs. risk decision would be based, which is whether or not the repair would be in the best interest of the public.. How can the NRC conclude that the repair is in the best interest of the citizens of Dade County when they don't know.

How can the NRC really judge the environmental impact of the repair without knowing what method FPL will use to get rid of the radioactive waste? Obviously, storing these generators on site would create a nuclear waste site in Dade County and an environmental problem.

How can the NRC decide that the repair to Turkey Point is in the best interest of the citizens of Dade County when they have not even done a true cost benefit analysis of alternatives to the repair, even though the NRC cannot guarantee that the repair will work?

Does the NRC have sufficient expertise in the areas of environmental impact and know enough about the unique hydrology and geology of South Florida to be able to honestly appraise the impact that releasing large amounts of radioactivity would have in both the long and short term?

Has the NRC, in keeping with NEPA guidelines, adequately addressed all of the real costs of repairing Turkey Point sufficiently enough to be able to make a decision to conclude that the repair will, in fact, have no significant effect on the environment or population?

PURPOSE OF COMMENTS con't

The purpose of my comments is to address areas of concern and demand answers to unanswered questions so that the final EIS will be a true EIS, in order that environmental problems can be addressed in a preventive rather than a remedial context, which should be the real aim of environmental protection.

The inconsistencies and contradictions of the DEIS report clearly illustrate the confusion and uncertainty of those preparing the report. The Commission will be required to resolve these issues before it can make meaningful judgements about the safety and feasibility of the Turkey Point Steam Generator Repair Project.



SOUTH FLORIDA ENVIRONMENT MUST BE PROTECTED..

.. FRAGILE ENVIRONMENT REQUIRES COMPREHENSIVE

EIS FOR PROTECTION



FRAGILE SOUTH FLORIDA ENVIRONMENT REQUIRES COMPREHENSIVE EIS FOR PROTECTION

Can the NRC alone adequately address the environmental problems that the steam generator repair may cause in this unique and sensitive area?

1. GEOGRAPHICAL LOCATION

Turkey Point Nuclear Power Plant is located in Dade County, Florida. Dade County is located in the Southeast part of the Southeast Peninsula and is part of the largest southern metropolitan area in the United States. The population has recently reached 1.8 million people.

2. HYDREOLOGY

The hydrology of South Florida is characterized by an extremely productive unconfined surface aquifer, (Biscayne Aquifer) located over another confined aquifer that is under Artesian Pressure (Floridian Aquifer).

The Biscayne Aquifer underlies the entirety of Dade County and serves as the only source of drinking water. This aquifer is composed mainly of limestone and sand and is extremely porous. The likeliness or unlikeliness of polluting this drinking water source should be addressed in any environmental impact statement prepared for this area.

3. BISCAYNE BAY

The Biscayne Bay environment, which Turkey Point sits adjacent to, is a source of food, recreation and aesthetic beauty to both tourists and residents. In addressing possible environmental effects of the repair process, any threat to the endangered species, lobster sanctuaries, fish spawning grounds, Homestead Bayfront Park and Biscayne National Monument must be studied in full for both long and short term effects. It is well known amongst hydrologists, geologists and biologists that this is one of the most environmentally sensitive areas in the world. The fragile ecology of Biscayne Bay must be protected from possible irreverisble damage.



A rare glimpse of the "Swiss cheese" limestone that underlies most of Florida. Wastes stored on the surface or injected underground may travel rapidly through large cavities filled with sand or water, to contaminate drinking water sources.

Photo: Bill Wisner, Fla. DOT



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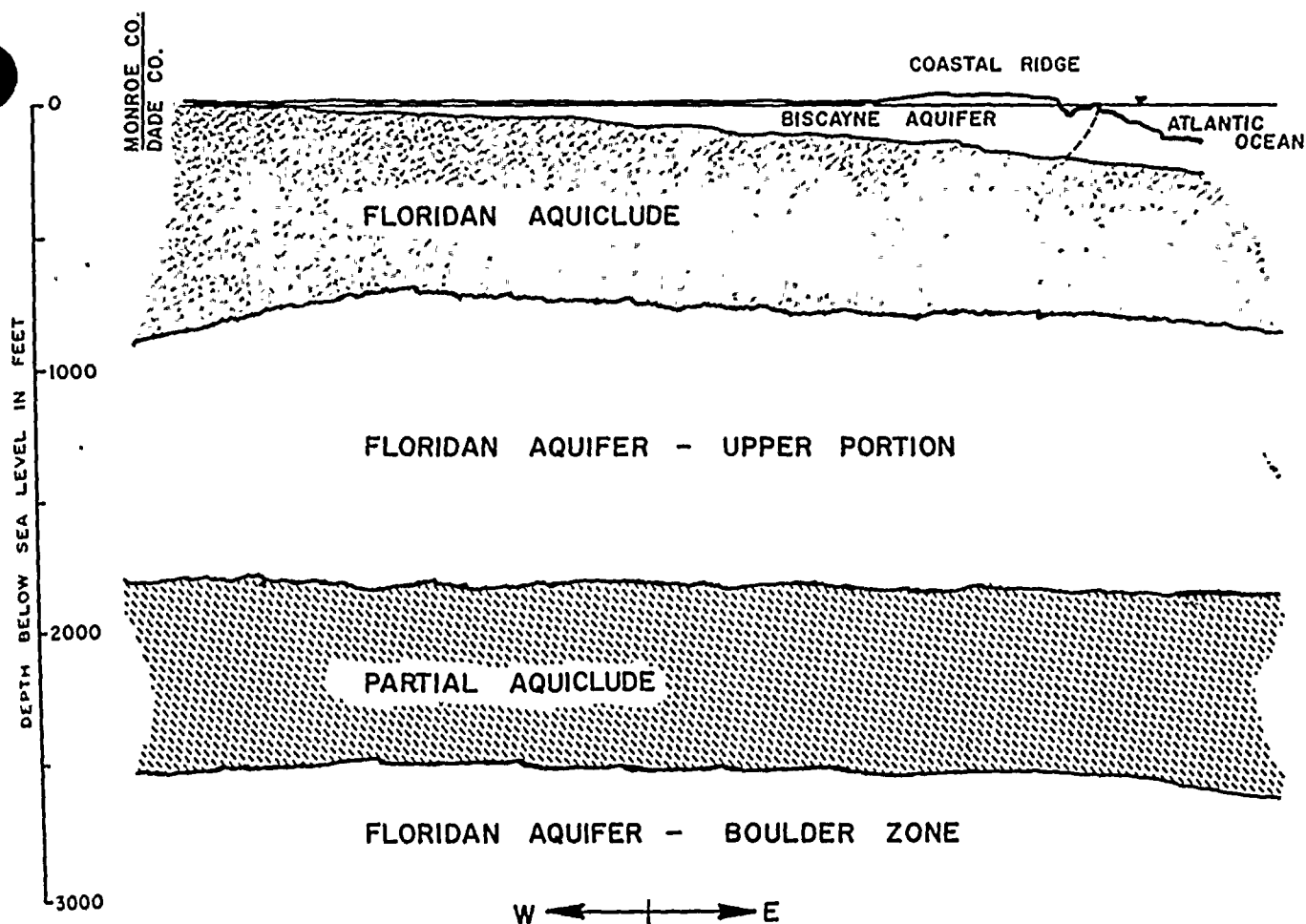


Fig. 2 Generalized hydrogeologic cross-section along the Tamiami Canal.

The Biscayne Aquifer underlies the entirety of Dade County, much of Broward County, and a small portion of extreme southeast Palm Beach County. The area distribution and depth are shown in Figure 3.

The Aquifer is composed mostly of limestone and sand. The generally high porosity and the many passages through the solution riddled limestone offer very little resistance to flow. The result is one of the most permeable aquifers in the world, which responds quickly to slight differences in the water table, with the following consequences:

- The water table is relatively flat.
- The yields of wells are large.
- The ground and surface water regimens have an uncommonly high interrelationship.
- The water table reacts quickly to rainfall. There is a high rate of rainfall penetration and surface water infiltration and, although annual rainfall is high, there is relatively little run-off as compared with other locales.

- The coastal areas, which are exposed to Biscayne Bay and the Atlantic Ocean, are highly susceptible to saltwater intrusion.

Figure 4 shows a more detailed cross section of the Biscayne Aquifer, through the Miami area, typical for the area along the Tamiami Trail.

The depth of the wedge shaped Aquifer, as illustrated on Figure 4 varies from about zero near the western border of the County to between 100 and 200 feet along Biscayne Bay. The water table, which is close to sea level, generally resides in the Miami Oolite, a porous limestone which forms the top "crust" of the Aquifer. As much as six feet of mud, peat and muck cover the oolite rock in the Everglades. Outcroppings of oolite and sand combine to form the Atlantic Coastal Ridge.

The Floridan Aquiclude is composed of deposits of dense marls, clays and sands with an average thickness of approximately 700 feet. In portions of southern Florida west of Dade County, including the area of big Cypress Swamp, its top lies near the surface.

MAIN SHORTCOMINGS OF DEIS



Main Shortcomings of DEIS

1. IGNORES IMPORTANT TOPICS

The DEIS is narrowly confined in scope to worker exposure and does not address the facts that radiation effects can be individually limited, but cumulatively considerable.

2. CONTAINS LAPSES IN DISCLOSURE

There is no concrete answer as to what FPL plans to do with the nuclear waste produced from this repair. The health, safety, and environmental effects that on site storage at Turkey Point would mean in terms of a local nuclear waste dump are played down in the DEIS.

3. UNSUPPORTED IN FACT

The DEIS offers assumptions but not facts. The NRC assumes that FPL will achieve ALARA. The NRC assumes that FPL will dispose of the nuclear waste safely. The NRC assumes that there will be no significant risk to public health and safety. However, concrete proof for these assumptions is not found in the report.

4. INCOMPREHENSIBLE AND FAULTY IN FORM

The DEIS does not contain information in a comprehensible form that is of quality and scope sufficient to serve as a general document that can be used for wide distribution to the government and public in order to facilitate a better understanding of the repair process.

5. DOES NOT ADEQUATELY ADDRESS ALTERNATIVES

The DEIS does not consider existing and technically feasible alternatives to the Turkey Point repair such as conservation and solar. It failed to examine the alternative of derating Turkey Point while replacing the electrical power with a stringent conservation and solar heating program. It failed to address the null alternative of not repairing Turkey Point.

6. NARROW SCOPE AND WEAK EVIDENCE

It did not provide evidence that a detailed study of the Physical, Biological and Cultural Environment of Dade County, including geology, hydrology, food chains, recreation use, etc. had been studied.

CONCLUSION:

That the DEIS on Turkey Point, in its failure to address these issues, is incomplete, narrow in scope, and cannot be used for the basis to conclude that the benefits of the steam generator repair outweigh the risks; that there will be no significant effects on the environment; and that there is no alternative to the repair.



CONCLUSION con't

It appears that further study is needed. Perhaps this study would be in the form of a geographically focused statement if prepared in connection with other agencies, both Federal (EPA, USGS, DOT) and State (DER, DNR, Governor's Energy Office, PSC) so that all areas of enviornmental impact can be adequately addressed.

NRC CONCLUSION BASED ON INSUFFICIENT EVIDENCE

The NRC has used the DEIS to conclude that the environmental effect that the repair to Turkey Point will have on the environment and public health and safety will be "insignificant".

This commentor feels that before such a concrete conclusion can be drawn, all possible radiation pathways to the environment and man must be considered on a much more broad and consistent basis than the NRC has used. The following areas must be addressed more sufficiently:

- 1) The sensitivity of dose site factors should be evaluated
- 2) The environmental dose commitment must be quantified
- 3) Quantification of the population dose and related benefits in return for radiation risk must be concrete evaluations

This citizen requests that the NRC commission the Environmental Protection Agency to perform a field study in the areas around Turkey Point to assess exactly how much and what types of radioactive isotopes are present; and, also that the radiation released during the repair process will not increase the current levels of radiation around Turkey Point beyond EPA's designated acceptable limits.

This citizen also requests that before the NRC or any Government Agency states that the repair to Turkey Point will not endanger the environment or create a risk to public health and safety, that the agency making this statement support their position with detailed evidence based on scientific fact.

COMMENTOR CONCLUSION

The repair to the steam generators at Turkey Point is a unique and hazardous undertaking that has the potential of irreversibly contaminating the fragile South Biscayne Bay Environment and endangering public health and safety. In order to protect public health and safety and the environment, the Final Environmental Impact Statement issued on Turkey Point must go beyond mere NRC assertions based on NRC assurances and PROVE that the Turkey Point repair will present an "insignificant" risk. This can only be achieved if the Final EIS complies with the requirements of the National Environmental Policy Act of 1969.

The Draft Environmental Impact Statement, while a fine technical document and excellent report on the repair proposal, is woefully inadequate and bears little resemblance to an Environmental Impact Statement under NEPA. Yet only by addressing areas that impact on the human environment will the public be able to assess whether the benefit of repairing Turkey Point will truly outweigh the risks that the repair will entail.

If the NRC finds that it is unable to comply with NEPA in the Final EIS, perhaps it should refer to NEPA SECTION 103, which requires that all agencies review their present statutory authority, administrative regulations, and current policies and procedures for the purpose of determining whether there are any deficiencies or inconsistencies therein that prohibit full compliance with NEPA.

IN SHORT, this commentor feels that the DEIS released on the Turkey Point Nuclear Power Plant is grossly inadequate and disappointing, and that it precludes meaningful analysis of either it or the action it addresses.

A comprehensive study, much broader in scope than the DEIS, must be issued if the NRC is to fulfill its role of protecting public health and safety in support of Part 50 10 CFR.



NATIONAL ENVIRONMENTAL POLICY ACT

"We do not inherit the earth from our parents; we borrow it
from our children."

NATIONAL ENVIRONMENTAL POLICY ACT - 1969 - and Council on Environmental Quality

Guidelines were passed to ensure that balanced decision making in project planning includes consideration of environmental and social factors along with technical and economic factors so as to assure that decisions made will be in the public's best interest.

NEPA REQUIREMENTS

The National Environmental Policy Act of 1969 requires that the NRC give "appropriate consideration to the environmental impact of its major action." The licensing of the steam generator repair at Turkey Point constitutes such an action.

Since the repair to the steam generators at Turkey Point have the potential of significantly affecting the quality of the human environment, a detailed environmental impact statement that complies with NEPA must contain the following:

1. The environmental impact of the proposed action.
2. Any adverse environmental effects that cannot be avoided should the proposal be implemented.
3. Alternatives to the proposed action.
4. The relationship between local short term uses of man's environment and the maintenance and enhancement of long term productivity.
5. Discussion of any irreversible and irretrievable commitment of resources involved in the proposed action should it be implemented.

In that the purpose of NEPA is to assure that environmental amenities are given consideration along with technical and economic considerations, the DEIS appears to be wholly inadequate in that it displays serious lapses of disclosure by ignoring important topics such as long term exposure of the public to radio-nuclides and inconclusive evidence on safe nuclear waste disposal.

NATIONAL ENVIRONMENTAL POLICY ACT con't

Inadequacies in the following areas may suggest noncompliance with NEPA

1. THE ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

The DEIS fails to adequately address the impact of the steam generator repair on the human environment because it tends to explore the positive effects that the repair will have, while downplaying the negative impact. It does not sufficiently explore the pathways that radioactive isotopes could take, and how this effects man both in the short and the long term.

It barely mentions, let alone describe in detail the consequences that could result to workers and the public from accidents during the repair or a nuclear waste shipment.

The main shortcoming is failure to calculate the long term "environmental dose commitment" that will result from the presence of released radioactive isotopes such as strontium 90 and cesium 137. While it is true that much of the radiation that will be released during the repair is short lived, it is also true that some of the radioactive materials will exist in the living environment for decades and centuries. According to the Environmental Protection Agency, one can calculate the dose that is delivered to the population by long lived radionuclides traveling through the food chain. This "environmental dose commitment" is calculated for a specific dose at a specific time and obtained by summing the dose to the population delivered by the release in each of the years following the initial release until the material has decayed away to safe levels or has been permanently removed from the living environment.

RADIONUCLIDES such as STRONTIUM 90 and CESSIUM 137 that will be released during the repair must be considered for the long term dose that they will give to present and future generations. Failure to address these long term sources of radioactive pollution is scientifically indefensible.

2. ANY ADVERSE ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED SHOULD THE TURKEY POINT PROPOSAL BE IMPLEMENTED.

Radiation exposure to individual workers, population, and land and water environment cannot be avoided during the repair because of the radioactive effluents that will be released. The cutting, welding, and sand blasting that will take place during the repair will be very effective at carrying radiation offsite. Thus, again, both long and short term effects to both workers and the public must be adequately addressed and so must the fact that cancers and genetic effects can result from exposure.



The NRC has failed to mention whether or not any member of the population could contract cancer as a result of this repair. Nor have they mentioned the fact in computing population dose that the people in Florida City and Homestead will have a much larger radiation dose than those living fifty miles away and with that comes a greater chance of cancer.

In the case of the workers on the repair, the NRC has calculated less than one cancer will result from the repair. Yet in a letter to me from Dr. Karl Morgan, the father of health physics, he has stated that the upper dose estimate of 9.4×10^3 person rem for the six generators will cost seven lethal cancers and 14 total cancers by his estimate. Less conservative estimates would push this figure to fifty to sixty cancers.

This extremely important negative impact that will result from the repairs to both workers and the public must be brought up front. Dr. Morgan has suggested that radiation workers at Turkey Point be properly informed regarding this cancer risk and that a cancer fund be established to compensate the radiation workers who die of cancer. Perhaps this suggestion could be expanded to include the population also.

Other negative impacts that could occur such as a waste dump in tourist oriented Dade County and a huge economic cost resulting from the repairs that will be passed to the consumer, must also be considered by the NRC staff.

3. ALTERNATIVES TO THE PROPOSED ACTION

The NRC performed an inadequate cost benefit analysis of the alternatives to the Turkey Point repair and failed to consider two distinct alternatives to this repair.

- 1) Turkey Point nuclear power plant could be derated and phased out while a stringent conservation and solar energy program is instituted in Dade County to replace the electricity lost. These alternatives exist today and are a feasible and economic solution that has not been explored.
- 2) The NRC did not consider the NO-ACTION or NO-PROJECT alternative which requires the NRC to predict what the future environment .. social, economic, physical, etc., would be like without Turkey Point repair project.

AN INADEQUATE COST BENEFIT ANALYSIS OF THESE TWO REALISTIC AND FEASIBLE ALTERNATIVES is a serious flaw in the DEIS.



NATIONAL ENVIRONMENTAL POLICY ACT con't

4. THE RELATIONSHIP BETWEEN LOCAL SHORT TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The purpose of this NEPA requirement is to remind us of the fact that we are trustees of the environment for future generations. Will the Turkey Point repair jeopardize the Biscayne Bay Environment in such a way that our children will be precluded from use of it... for food, recreation, and cultural enrichment? Could fish supplies become contaminated as radioactive isotopes are recycled and magnified in the food chain?

The NRC's failure to address the fact that there is a possibility that the area around Turkey Point could be drastically changed is obvious and indefensible. And most indefensible is the fact that it brushes off the option of a nuclear waste site at Turkey Point as "insignificant". It is not insignificant to the people of Dade County that a nuclear waste site may exist where one did not exist previously. And it is an oversight, to say the least, to not address long term "perpetual care" of such a waste facility and the fact that it will exist to endanger our children.

Placing a nuclear waste site at Turkey Point is a short term use of our environment that could permanently prohibit the future use of both Biscayne National Monument and Homestead Bayfront Park, but more importantly, could wreak havoc with environmental and economic development to say nothing of the grave effects regarding health. The waste site issue alone should require that an EIS is issued to assess it's environmental impact on present and future generations.

This area needs much work by the NRC in weighing the long term impacts of such short term actions.

5. DISCUSSION OF ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Biscayne Bay, Biscayne National Monument and the plant and animal species that inhabit these areas could suffer irreversible contamination from the effluents released by the repair (both radioactive and chemical). These effluents released will be thrown into Turkey Point's cooling canals, which are nothing more than canals dug into the porous limestone, and they have a good chance of seeping into the bay.

The water in this area is an important resource for recreation, fishing, fish spawning, bird nesting and even contains rare and endangered species. The most prominent are the crocodiles residing in the cooling canals.

Again the NRC passes off the impact on these resources as "insignificant", without taking into account the fact that certain radionuclides could have a long term and serious damaging effect on the Biscayne Bay environment and our use of this resource.



NATIONAL ENVIRONMENTAL POLICY ACT con't

The NRC staff fails to consider that a nuclear waste building next to Biscayne Bay will cause a definite change in land usage and could affect the tourism, agriculture and fishing economy in these areas. The NRC fails to consider the fact that Biscayne National Monument is a historic site and must be protected.

The NRC refuses to understand that irretrievable resources also include monetary expenditures that the citizens of Dade County will have to pay for this expensive steam generator repair. And the fact that there is no scientific evidence that the repair will work means that the citizens may not even receive the benefit of nuclear electricity in return for the risks they are being asked to take. And should the repair fail to work, there will not be any more money left to finance an alternative to Turkey Point.

The loss in terms of land usage, cultural features, and human and monetary expenditures that will result from the Turkey Point repairs is a significant and potential threat that must be studied in more detail, and a true benefit risk assessment must be performed.

CONCLUSION:

The DEIS issued by the NRC on the matter of the environmental impact that the Turkey Point repair will have on Dade County demonstrates a reluctance to comply with the National Environmental Policy Act of 1969.



Survey Finds Environmental Protection Still Supported

A national public opinion survey, released by the President's Council on Environmental Quality (CEQ), found that national efforts to control pollution, regulate new chemicals, develop environmentally safe energy sources, and protect endangered species are all supported by a majority of the American public.

As "environment" became a familiar word, some people believed that "public enthusiasm was a fad that would die as soon as the cost of pollution control programs became apparent." However, the survey, commissioned by the CEQ, the Department of Agriculture, Department of Energy, and the Environmental Protection Agency, found that "environmental protection enjoys continued strong backing."

Resources for the Future, a nonprofit research organization, conducted the survey with the assistance of the Roper Organization and Cantril Research, Inc. They attempted to make the survey a realistic test of public opinion by including a number of questions with difficult tradeoffs. The intensity of public concern about environmental protection has lessened somewhat since the peak on Earth Day, 1970, and other problems, such as national defense and inflation, were perceived as more urgent. Nonetheless, the survey found that the answers showed "abiding public support for national efforts to protect environmental quality."

Some of the findings included:

- Of those surveyed, 42% felt that "protecting the

environment is so important that requirements and standards cannot be too high, and continuing improvement must be made regardless of cost."

- The percentage expressing sympathy with the environmental movement was 62, while only 4% considered themselves unsympathetic.

- A large majority, 83%, said that the government should screen new chemicals for safety before they are allowed on the market.

- Solar energy was chosen by 61% of the respondents as the energy source which the nation should "concentrate on most."

- Only 20% of the respondents agreed with the statement: "We must relax environmental standards in order to achieve economic growth."

- Seventy-three percent of those polled felt that "an endangered species must be protected, even at the expense of commercial activity."

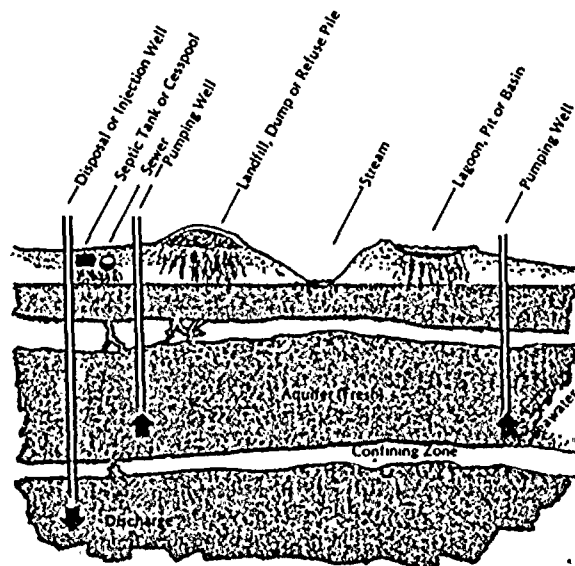
- A majority of respondents, 65%, said that marshes and swamps should be preserved in their natural state instead of drained for development.

Gus Speth, Chairman of the CEQ, described the poll as "one of the most extensive and probing surveys on environmental issues conducted to date." He also said that the "results of the poll should be useful to government officials and citizens alike as we work together to build an environmentally sound and sustainable future for our nation." □

Ground Water: An Important Resource

Ground water is the least understood of our major natural resources. In both fiction and courts of law traditionally it has been erroneously described and treated as "underground streams." Despite the general lack of awareness and understanding surrounding it, ground water is an important source of the nation's water supply. Its use has grown sharply over the recent years, but its availability is being jeopardized by pollution. The diagram at right identifies how contamination can occur.

In Florida, ground water is still a high quality, inexpensive and readily available source of water. Our use statistics reveal that some 92% of Florida's population depend on ground water for their drinking water. In keeping with the legislative charge of the Department, the Groundwater Section has set as their goal: the prevention, reduction and elimination of pollution to the groundwater resources of the state from current or potential contamination induced directly or indirectly by man-made activities. The Groundwater Section is headed by Dr. Rodney S. DeHan. For further information on the above, he may be reached at (904) 488-3601. □



How Waste Disposal Practices May Contaminate the Ground Water System



DIRECT AND SPECIFIC COMMENTS ON THE DEIS

ENVIRONMENTAL IMPACT OF RADIATION EXPOSURE



ENVIRONMENTAL IMPACT OF RADIATION EXPOSURE

DIRECT AND SPECIFIC COMMENTS ON THE DEIS

The repair of the steam generators in Turkey Point Units #3 and #4 could lead to unnecessary exposure to radioactive materials and could cause irreversible contamination of the Biscayne Bay environment by radionuclides.

The principal potential impact of radionuclides is the induction of deleterious health effects in man. Since both somatic and genetic effects to human health are likely to result from increased exposure to radiation, it is necessary to look at the potential impact from radioactive effluents from three different perspectives. These potential impacts are:

1. MAXIMUM RADIATION DOSE TO INDIVIDUALS: This involves the effect that both external and internal radiation exposure will have on radiation workers exposed under controlled occupational conditions; and also individual doses to members of the population. While this is very important in making certain that ALARA limits are maintained, attention to individual exposure alone leads to inadequate control of releases of long lived radioactive materials. These releases may give rise to substantial long term impacts on the population while contributing only small increases to annual individual exposure.

In limiting the DEIS to worker safety and external exposure, it greatly underestimates health effects on the population that may result from the repair.

2. POPULATION DOSE: This involves summing the annual radiation dose to each of the members of the population to measure population impact. Calculation of the population dose by the NRC fails to take into account the fact that the people who live in Homestead and Florida City will have a much higher individual dose than people who live fifty miles away from Turkey Point. Thus, the dose to members of the population could be low, while the dose to the residents around Turkey Point could be very significant indeed.
3. ENVIRONMENTAL DOSE COMMITMENT ; This involves taking into account the fact that much of the radiation released during the repair will be short lived and removed from the environment within the year; but there will be a few radioactive materials, such as strontium 90 and cesium 137, will deliver doses to the environment for hundreds of years as they migrate through the food chain.

The environmental dose that these radioactive materials must be calculated in order to adequately appraise the real individual and population doses that the repair will incur. in the long term.

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- * A reasonable approach for limiting long lived radioactive materials that could enter the human environment could be to limit the total of radioactivity produced by the repair by computing environmental dose commitments and health effects and then deciding specific radiation limits and describing what methods will be used to enforce these limits.



4.0 ENVIRONMENTAL IMPACTS OF STEAM GENERATOR ~ Worker Exposure

1. (4-5) How can radiation doses received during normal PWR operation be used to justify radiation doses that will be incurred by an unusual and experimental repair.
2. (4-6) The NRC staff states that risks due to occupational exposure will be controlled and limited so as not to exceed limits in 10 CFR Part 20, yet the NRC does not say how they plan to achieve this goal and how they will enforce these limits. Also, what will happen if limits are exceeded during the repair operation?
3. (4-6) Since it takes 5 - 20 years for cancers to show up in workers as a result of radiation doses, it seems that before a conclusion can be reached that the risks to nuclear plant workers from the steam generator repair is comparable to the risk associated with other occupations the NRC would have to institute a follow up study on Surry and Turkey Point workers.

The NRC's estimate of one cancer has been disputed in the case of Surry by Dr. Sternglass who testified that the steam generator repair at Surry will result in 50 cancers and in the case of a more conservative estimate by Dr. Karl Morgan that states that the repair at Turkey point will result in seven lethal and 14 total cancers.

It seems, as usual that there is controversy over the occupational risk involved and the NRC must take this into account before comparing a disputable degree of risk.

4. (4-7) The NRC's conclusion that FPL's estimate of 2,084 man-rem per unit is accurate and will result in an insignificant health impact must be reviewed taking into account mathematical analysis by revered health physicists such as Dr. Morgan, so that an accurate radiological health impact assessment on workers can be arrived at.

Also, FPL's statement that they will use experienced personnel from Surry as a key ingredient in their ALARA program is not reassuring. Many scientists, including Dr. Karl Morgan, mistrust the accuracy of VEPCO data that says the Surry operation was carried out with only 2140 person rem.

IN CONCLUSION: Based on comments received from Dr. Karl Morgan, Georgia I Institute of Technology and lack of a clear plan by the NRC to show that ALAR goal will be reached and how does not appear to justify the NRC Staff conclusion that FPL in making the steam generator repairs at Turkey Point will meet (1) 10 CFR Part 20 limits and requirements to keep radiation exposure to workers as low as reasonably achievable (ALARA).



4.0 ENVIRONMENTAL IMPACTS OF STEAM GENERATOR - Public Exposure

1. (4.1.2) The major sources of radiation exposure and environmental pathways that were considered in this section are primitive and do not take into account the long term environmental dose that may result to the public by the BIOLOGICAL MAGNIFICATION of radionuclides in the food chain.

BIOLOGICAL MAGNIFICATION

Biological magnification is based on the principal that predators always consume many times their own body weight. If the prey happens to contain some substance that is stored in the body without becoming excreted; it follows that the predator will end up with a much higher concentration of this substance (e.g. radioactivity) than the prey it consumed. Thus, biological organisms can concentrate substances like strontium 90 to a dangerous level and these substances will appear in ever increasing concentrations as they go up the food chain, and finally return to man. Thus, these radionuclides could be a source of radioactive pollution long after the initial releases at Turkey Point.

Many of the organisms effective at concentrating radionuclides, such as algae and fish, are present in the areas around Turkey Point. These organisms can concentrate radioactive isotopes from slightly contaminated waters 100,000 times. Thus, while the water in the cooling canals is within permissible limits, the fish could become too radioactive to eat.

Birds also concentrate radioactivity and being higher up on the food chain, they also end up with correspondingly higher concentrations. Birds may carry 75,000 times the ambient level, because they feed on algae which in turn concentrate the substance 2,000 times above the level in the water.

SINCE MANY OF THE RADIONUCLIDES RELEASED DURING THE REPAIR HAVE LONG HALF-LIVES THEIR PRESENCE IN THE ENVIRONMENT WILL BE ESSENTIALLY CUMULATIVE.

IT IS THEREFORE IMPORTANT TO NOTE WHAT THE LONG TERM IMPACT OF SMALL DOSES OF RADIATION WILL BE ON THE PUBLIC HEALTH AND SAFETY, AS A RESULT OF THE STEAM GENERATOR REPAIR AT TURKEY POINT.

Note: x-rays can be avoided; food cannot !

2. (4.1.2.1.) DOSES FROM EFFLUENTS released during the Turkey Point repair could have a major impact on workers, population and the environment. The DEIS in using the Turkey Point FES limits in forming the conclusion that the dose to offsite population due to radioactive effluents is flawed. Turkey Point FES (table v-6) indicates that airborne effluents contribute a small fraction of dose to the individual. According to the Environmental Protection Agency, 40 CFR 190, the largest potential contributor of radiation to the individual is via airborne releases. In an EPA analysis of all pathways to the environment (1977), including air, water and foodstuffs, the EPA justified the fact that over 90% of all pathways result from airborne transport of effluent. They also found that doses due to such releases usually fall off to 10% of their value within 10-20 kilometers.



Thus we see that the downplaying of air transport as an effective method for radionuclides to be transported to man could result in increased radiation exposure to the public. This would be true especially in the areas directly adjacent to Turkey Point, such as Homestead and Florida City, where radioactivity would be most concentrated.

The FPL method of steam generator repair and the cutting, welding, grinding and sandblasting that it involves could have grave health and safety impacts on the persons and animals in the vicinity of the Turkey Point site. To downplay the air transport vehicle is misleading and must be corrected.

NOTE: It is interesting to note that the people in Homestead, who will be asked to risk the most during the repair in terms of radiation exposure; do not purchase electricity from FPL. They are being asked to bear the risk and will receive no benefit from the Turkey Point repair.

2. (4.1.2.2) IMPACTS FROM SOLID WASTES ; To adequately measure the true impact of solid wastes on the environment; all sources of solid waste (including steam generators) should be considered together.

The decision of the NRC Staff put forth in the DEIS that since the estimated activity of wastes from normal operations and the estimated activity of wastes from the repair are comparable is sufficient basis to conclude that the impact from solid wastes isn't significant, is sheer sophistry.

To double the amount of radioactive wastes produced at Turkey Point is doubling the nuclear waste problem. Both NRC and FPL are well aware that Barnwell, South Carolina has already reduced the amount of waste that they will receive from Turkey Point by half starting February 1981. Creating any wastes above and beyond normal operation is compounding the HUGE PROBLEM of what is FPL going to do with their solid waste???

As for long term storage on site at Turkey Point, will or won't the generators and other wastes be stored on site at Turkey Point. Who will pay for the perpetual care of this nuclear gravesite?

Neither the NRC or FPL can state with certainty that a hurricane or flood could not result in radioactive effluent escaping offsite. Nor can they say with certainty that the chemical activity within the stored steam generators might not result in a chemical reaction with the building materials causing cracks and fissures. that would allow wastes to escape.

CREATING A WASTE DUMP IN FLORIDA IS SOMEBODY'S RESPONSIBILITY: DOES IT NOT REQUIRE AN ENVIRONMENTAL IMPACT STATEMENT OR APPRAISAL?



3. (4.1.2.3.) IMPACTS FROM SOLID WASTES (STEAM GENERATOR ASSEMBLIES)
In calculated the radiation dose to the population that will be caused by shipping the steam generators, the NRC has not considered shipping accidents. Dr. Karl Morgan has commented that a shipping accident would cause the population dose estimates to be much too low. A scenerio of accident during shipment should be constructed.

4. (4.1.2.4) DOSES FROM ONSITE STORAGE OF STEAM GENERATORS

There are many people in the State of Florida that would argue with the NRC Staff conclusion that the impact of storing six 200 ton radioactive steam generators in an area of porous limestone, hurricanes, flooding and salt water intrusion will not pose both grave environmental and public image problems. Let's face it, a nuclear waste site in Dade County would not be a great tourist attraction.

An interagency task force report on the problems of low-level waste in Florida that was submitted last year points to the fact that Dade County is both geologically and hydreologically unsuited for a nuclear waste facility. South Florida's porous limestone and single source of drinking water, the Biscayne Aquifer, make this proposal a very bad idea.

THE QUESTION REMAINS: WHO IS RESPONSIBLE FOR LICENSING SUCH A FACILITY- THE STATE OF FLORIDA OR THE NRC? IS NOT AN EIS REQUIRED BEFORE A LICENSE CAN BE ISSUED?

A nuclear waste site at Turkey Point would require perpetual care and maintenance of a storage building and the possibility of future repairs or accidents requiring an expensive clean up operation.

DECISIONS TO LICENSE A NUCLEAR WASTE SITE IN DADE COUNTY CANNOT BE IMPLEMENTED IN AN OFFHAND MANNER WITHOUT PUBLIC INPUT IN THE DECISION MAKING PROCESS. THE PUBLIC MAY NOT AGREE WITH THE NRC STAFF THAT THE EFFECTS OF ON-SITE STORAGE OF NUCLEAR WASTE WILL BE "ENVIRONMENTALLY INSIGNIFICANT."

5. (4.1.2.5) EFFECT OF REPAIR ON FUTURE NORMAL OPERATION

Gregory C. Minor of MHB TECHNICAL ASSOCIATES, and DR. Karl Morgan, health physicist, have both stated in their comments submitted to the NRC that there is no "proof" that the repair to Turkey Point will work. in the words of Dr. Morgan, "The denting and corrosion problems will be reduced but may not be eliminated by the proposed actions. It is even likely that other serious problems will develop with the steam generators."

The DEIS is faulted in stating that the quantity of radioactive materials released after the repair will not be greater than the present impact, because there is no scientific or technical evidence that exists to actually prove that the repair will work and that expensive repairs will not again result somewhere down the line.

Robert Pollard of the Union of Concerned Scientists recently sent me a letter pointing out the fact that the NRC was first informed of the steam generator problem by Westinghouse in 1975. It seems that this generic "unresolved safety" issue has not been adequately dealt with or studied by the NRC.



6. (4.1.2.6.) SUMMARY RADIOLOGICAL IMPACT ON PUBLIC

The NRC Staff conclusion that the "offsite releases resulting from the steam generator repair will be less than those from recent plant operation" is faulted for the following reasons:

1. It fails to look at long term cumulative environmental impact caused by biological magnification.
2. It does not acknowledge the fact that air transport will be a main pathway to the environment.
3. It fails to point out the fact that there is absolutely no technical evidence to prove that the repair will work and that new and more serious problems will not result.

Thus, the citizens of Dade County may have to face grave risks to their health and environment in return for no benefits (no electricity) if the repair does not work. The impact on the public could be CONSIDERABLE.

4.2 ECONOMIC COSTS OF THE REPAIR

I will not comment on exact calculations in this section except to say that the mathematical calculations with which it is lavishly embellished do not always correspond with reality. Economic issues that should be considered are:

1. The cost of the repair to the consumer in fuel adjustment. (past, present)
2. Cost of "perpetual care" and maintenance of nuclear waste site.
3. Cost of possible accidents during Turkey both in terms of real estate and tourism.
4. Past costs for maintenance and inspections caused by the breakdown of the steam generators.

NOTE: If this repair does not work, the consumer will not receive the benefit of electricity in return for the monetary and health risk they will have to take. It would be safe to assume in this case that the economic and societal benefit of Turkey Point would be a negative value.

4.3 NONRADIOLOGICAL ASSESSMENT

1. (4.3.1.) CONSTRUCTION IMPACTS

The nonradiological assessment does not consider the fact that run off from the construction site could provide another pathway for radionuclides to enter the water environment around Turkey Point. Thus, any "insignificant" nonradiological damage caused by runoff could result in a significant movement of radionuclides into the environment.

It is difficult to imagine how laundry water used to launder radioactive materials can also be considered a nonradiological assessment. Dumping these radioactive laundry wastes into the cooling canal could endanger the Crocodile and other fish and plants that are contained therein. As stated earlier, these radioactive pollutants can be concentrated to alarming degrees.

A similar radiological problem could result from radionuclides carried into the East Canal and Loch Rosetta, which FPL states could become turbid. Again, radionuclides in this stagnant water could concentrate in the biological organisms in this water and reach alarming rates.

It is difficult to see how radiological and nonradiological factors can be calculated separately because together they can cause grave environmental problems. The NRC would be wise to study the interrelationship between radiological and nonradiological factors that could combine to cause significant impacts on the environment.

2. (4.3.3.) ENDANGERED AND THREATENED SPECIES

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2. (4.3.3.) ENDANGERED AND THREATENED SPECIES

There are species within the area of Turkey Point that are threatened and endangered. These species, such as the American Crocodile, are protected by the Endangered Species Act. Their environment must not be significantly altered. The NRC should wait until it receives comments from the Fish and Wildlife Service before it reaches the conclusion that "no destruction or modification of the designated critical habitat will occur from the repairs."

Local environmental groups, such as Tropical Audubon, should also be consulted as to the danger to these species. The DEIS should be rewritten in comprehensible terms so that people other than nuclear engineers are able to read it and understand exactly what will be put into the Biscayne Bay environment as a result of the repair. Species, such as the crocodile, play a significant role in maintaining the quality of the environment and must be protected from radioactive and chemical pollutants.

Note: In speaking with a biologist recently at the Rosensteil School, I was told that the crocodile eggs are not hatching normally. Since signs, such as this, could point to deterioration of their environment (the cooling canals) it would be wise to investigate this further.

It is difficult to understand how the NRC could conclude that dumping hundreds of thousands of gallons of radioactive laundry water and partially "decontaminated" primary coolant will not significantly alter the crocodile's environment. Other opinions must be commissioned to prove this assertion.

"In wildness lies the preservation of man." Thoreau



4.4 ENVIRONMENTAL IMPACT OF POSTULATED ACCIDENTS

This entire section is inadequate and does not provide the risk factor of various accidents during the repair; nor does it lay out the real cost in human health and environmental damage that would result from accidents during the nine month project at Turkey Point. Dropping a 200 ton radioactive steam generator from a crane is not an unrealistic accident appraisal, as any crane operator could point out.

The steam generator repair at Turkey Point will involve many hazardous cutting, welding and construction operations. It is important in protecting public health and safety to:

1. Develop a mathematical framework for assessing the probability of possible accidents, such as steam generator drop.
2. Calculate the worst case scenerio that could result from each accident and use this to calculate radiation doses to workers and the population. (In the case of the steam generator drop; radiation from the drop would have to be calculated along with dose from natural background and in addition to the dose from the other operating reactor unit and the dose being emitted from the breached containment on the Unit being repaired.)
3. After, the combination of doses for analysis of an accident. (e.g. steam generator drop) is calculated, the environmental long term dose from radioactive substances, such as cobalt 60, should be calculated before assuming that the risk to the public concerning environmental impact of postulated accidents is small.

Radiation released from an accident, radiation released from the normally operating nuclear unit, natural background radiation; if each source is considered seperately could pose an insignificant risk to the environment. However, it must be remembered that radiation is cumulative and that these sources of radiation in combination could indeed pose a "significant" risk to public health and safety and the environment. The fact that radiation doses from individual source are additive and their effect cumulative must be considered in computing radiation dose.

NUCLEAR TERRORISM OR PROLIFERATION

One factor not even considered by the NRC or FPL has been mentioned by Gregory Minor of MHB Associates and that is the fact that lax security and the hiring of many "transient workers" could make both nuclear materials and the Turkey Point facility targets for nuclear sabotage, terrorism, or proliferation. Considering the presence of many terrorist factions in Miami and the fact that a plastic explosive was found at Turkey Point in 1978 (built in the machine shop); this potential source of accidents must be explored.

Note: The 1978 bomb found at Turkey Point was a practical joke constructed by an employee. What if it wasn't ?

5.0 IMPACTS OF ALTERNATIVES

The alternatives in this section are mostly alternative methods for repairing Turkey Point. The reason for assessing alternatives in an EIS is to consider whether or not there are not safer and more cost effective alternatives to the repair proposal. This would require that the DEIS perform a full cost benefit analysis of realistic alternative technologies that would serve the same function as the technology under consideration.

These alternatives to the Turkey Point repair have been completely overlooked by the NRC staff and warrant consideration and detailed analysis:

1. PHASE OUT TURKEY POINT BY DERATING THE UNITS AND REPLACING THE ELECTRICAL POWER WITH A STRINGENT CONSERVATION AND SOLAR PROGRAM.

This alternative would be both economical and environmentally sound. Also, a planned phase out of Turkey Point and replacing of the power in an orderly fashion would not cause undue economic hardship.

2. CONSIDER THE NO PROJECT ALTERNATIVE.

A recent study by the Union of Concerned Scientists shows that it would be cheaper to shut down the degraded nuclear units at Indian Point instead of going into the costly business of repairing this plant. An economic analysis on not repairing Turkey Point should be performed.

3. ALTERNATIVE SITING

Since the Turkey Point repair will cost anywhere from 500 million to a billion dollars, it would be wise to study the possibility of building a new generating unit away from the heavily populated area of Miami. This would be in keeping with recent NRC suggestions that nuclear power plants be built away from large population centers.

NRC ALTERNATIVES

The alternatives considered by the NRC, such as retubing, methods of contamination etc.) do not warrant comment or consideration until alternative methods of electrical generation are adequately considered in a full blown cost benefit analysis. In this vague area of unproven steam generator technology, it would make sense to study the existing proven technologies (e.g. solar, conservation, cogeneration) before deciding that the Turkey Point Steam Generator Repair is the only feasible alternative for electrical generation in South Florida.

6.0 CONCLUSION

In reviewing the NRC conclusions that the repair to Turkey Point will have benefits that outweigh the risk involved and that it is the only feasible alternative, I would remind the NRC that the Council for Environmental Quality guidelines state that Federal Agencies should keep in mind the fact that environmental impact statements are to serve as a means of assessing environmental impact of proposed actions, rather than as a justification for decisions already made.

I would hope that the NRC will use this and other constructive criticism from outside sources in order to prepare a Final Environmental Impact Statement laden with qualitative and quantitative evidence to support their DEIS conclusion or alternative conclusion that they reach.

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