



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Comm
conr

December 5, 1979

Dr. Joel Yellin
Associate Professor, M.I.T.
John F. Kennedy School of Government
Harvard University
79 Boylston Street
Cambridge, Massachusetts 02138

Dear Dr. Yellin:

This is in response to your letter of July 31, 1979.

The advice given to Governor Thornburgh on March 30, 1979 regarding possible evacuation distances in the event of a major release of radioactivity at Three Mile Island was not explicitly derived from specific event sequences in WASH-1400 or NUREG-0396. However, my advice took into account my general understanding of core melt consequence modeling and analyses of the type relied on in both of these reports as well as some recollections of similar dose modeling in the WASH-740 study.

The Commission did consult subsequently with members of the staff of the Offices of Nuclear Reactor Regulation, Nuclear Regulatory Research, Inspection and Enforcement and State Programs in attempting to understand the possible extent of evacuations that might be shown to be necessary if the accident were to become more serious or produce consequences beyond those already experienced by March 30, 1979. A table developed on April 1, 1979 giving recommended actions for various contingencies, which was developed under the direction of Commissioner Gilinsky and given to State representatives on the same date, is enclosed together with a markup of an initial draft of longer term contingencies.

As reflected in the March 31 transcript at the pages you cite (27-29), the 20 miles was meant as a rough estimate of a worst case situation, even though, as noted in NUREG-0396, a 10-mile evacuation would be sufficient for most of the severe core melt consequence scenarios. As you surmise, my response to Governor Thornburgh's question was made without "extensive consideration of the technical arguments."

Sincerely,

Joseph M. Hendrie

- Enclosures:
1. Table
 2. Draft Markup

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July 31, 1979

The Hon. Joseph Hendrie
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Hendrie:

In connection with our ongoing research on nuclear safety, we have a number of questions relating to the Three Mile Island accident.

You advised Governor Thronburgh, on March 30, 1979, that in the event of a major release of radioactivity, evacuation out to 20 miles from the Three Mile Island generating station would be called for. What was the technical basis for that advice?

Did you consult with members of the Regulatory Staff, or with your colleagues on the Commission concerning the "worst case" evacuation distance estimates? If so, with whom and when?

Were you influenced, in giving that advice, by information presented in WASH-1400, or by the material presented in NUREG-0396, the NRC-EPA emergency planning document? If so, what specific information did you use?

Did you receive, or have you received since, private memoranda from the Staff or from your colleagues concerning the appropriate evacuation distance in the event of a major release? If so, we would like copies of that material.

The colloquy in the NRC transcript of March 31 (pp.28-29) suggests that your selection of a 20-mile distance was not the result of an extensive consideration of the technical arguments, but was in fact an extempore response. Is that a fair evaluation?

We look forward to hearing from you.

Sincerely yours,

Joel Yellin
Joel Yellin
Associate Professor, M.I.T.

cc: Cong. M.K. Udall
Sen. Gary Hart
Prof. P.L. Joskow

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Entire document previously
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ANO 7908060423

No. of pages: 50

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MEMORANDUM FOR: Roger S. Boyd, Director, Division of Project
Management, NRR

FROM: Norman C. Moseley, Director, Division of Reactor
Operations Inspection, IE

SUBJECT: PUBLIC SERVICE ELECTRIC AND GAS COMPANY
SALEM UNIT 2

We have been informed by our Region I Office, based on their inspection findings, that construction and preoperational testing of the subject facility have been completed in substantial agreement with docketed commitments and regulatory requirements, with the exceptions listed in the enclosures. The Office of Inspection and Enforcement has no further items which would preclude issuance of an Operating License to permit facility operation up to its full design rating. It is recommended that the operating license be conditioned with the information contained in the enclosures.

We have reviewed the licensee's preparations for implementation of the Quality Assurance Program for Operations, and have found that they meet the requirements of 10 CFR 50, Appendix 3, as specified in the licensee's Quality Assurance Program (Appendix D of the FSAR), which was reviewed by the Office of Nuclear Reactor Regulation.

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Norman C. Moseley
Director
Division of Reactor
Operations Inspection
Office of Inspection
and Enforcement

Enclosures:

- A. Items to be Completed Before Fuel Loading
- B. Items to be Completed Before Mode 2

50-311

cc: See next page

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3/16/79	3/ 179	3/ 179	3/ 179	3/ 179	3/ 179

Roger S. Boyd

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ENCLOSURE A

Items to Complete Before Loading Fuel

The following items shall be completed prior to loading fuel in the Salem Unit 2 reactor core. All items will be verified complete through inspection by NRC:Region I inspectors.

1. Complete the review of all Phase II testing.
2. Complete the following Phase II tests:
 - a. SUP 51 Integrated Test of Engineered Safeguards and Emergency Power System
 - b. SUP 20.2 Reactor Protection Operational Check
 - c. SUP 10.4 Boric Acid Blender Performance Test
 - d. SUP 21 Radiation Monitoring: Complete for the following channels:
 - Local indication and alarm (8).
 - Local and remote indication and alarm (8).
 - e. SUP 20.3 Safeguards System Operational Test
 - f. SUP 48 Preservice Test of Pumps and Valves
 - g. SUP 49 Emergency Lighting
 - h. SUP 24 Nuclear Instrumentation
 - i. SUP 17.1 Manipulator Crane Indexing
 - j. SUP 17.4 Fuel Handling Tools and Fixtures
 - k. SUP 17.5 Fuel Transfer System
 - l. SUP 18.1 Containment Spray System
 - m. SUP 19.1 Auxiliary Building Ventilation System
 - n. SUP 19.2 Containment Iodine Removal
 - o. SUP 19.6 Control Room Ventilation
 - p. SUP 19.7 Chilled Water System
 - q. SUP 19.8 Fuel Handling Building Ventilation
 - r. SUP 20.1 Reactor Protection/Emergency Safeguards Time Response Measurement

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- s. SUP 20.5 Reactor Plant Systems Setpoint Verification
 - t. SUP 23 Communications System
 - u. SUP 25B Heat Tracing System-Vital
 - v. SUP 26 Computer Input and Data Printout Verification (NSSS only)
 - w. SUP 28 Energizing Electrical Buses - General
 - x. SUP 32 Service Water System
 - y. SUP 38 115 VAC System
- 3. Complete data review of Containment Integrated Leak Rate Test.
 - 4. Complete Pre Operational Test and Turnover (POTT) of the following systems:
 - a. Control Air
 - b. Auxiliary Building-General
 - c. Auxiliaries Controlled Systems
 - d. Chemical and Volume Control System
 - e. Communications
 - f. Containment
 - g. Containment Spray
 - h. Demineralized Water
 - i. Fire Protection - Water
 - j. Fire Protection - CO2
 - k. Incore Instrumentation
 - l. Lighting
 - m. Nuclear Instrumentation
 - n. Radiation Monitoring
 - o. Rod Control
 - p. Security Systems
 - q. Control and Relay Room HVAC
 - 5. Prepare and issue Core Loading Procedure and Startup and Low Power Ascension Test Procedures for tests identified in the FSAR.
 - 6. Update Emergency Plan and implementing Procedures and conduct emergency drill from Unit 2 Control Room
 - 7. Submit satisfactory response to IE Bulletin 77-04 (Containment sump pH control).
 - 8. Complete stem-mounted limit switch modifications per ECN's 35195 and 35294 (Containment isolation valves).
 - 9. Verify anchor bolt embedment acceptability (Containment structures).

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10. Revise Performance Department Manual to address:

- a. Qualification of Performance Supervisor-HP and Chemistry
- b. Designation of Corporate Health Physicist
- c. Qualifications of Technicians-Nuclear (ANSI 18.1-1971)

11. Prepare and issue procedures to address the following health physics areas:

- a. MPC-Hour Accountability
- b. Extremity Monitoring
- c. Beta Dose Rate Determination
- d. Overexposure Investigation
- e. Lost, Damaged, or Off-Scale Dosimeter or TLD Evaluation
- f. Bioassay
- g. Nasal Smears
- h. Respiratory Protection Procedures
- i. Decontamination of Personnel

12. Prepare and issue revisions to health physics procedures to address the following:

- a. 15.3.009 - Form NRC-5 applicability
- b. 15.4.008 and 15.4.009 - Relate air samples to exposure
- c. 15.3.009 - Address current requirements of 49 CFR and 10 CFR 71

13. Revise, issue and implement procedures or changes as necessary, to address the following in Station Administrative Procedures:

- a. AP-2 - Define organization as specified by ANSI N18.7-1976
- b. Prepare summary document required by ANSI N18.7-1976 Section 5.1
- c. Define the six specific operator responsibilities listed in ANSI N18.7-1976 in station procedures.
- d. AP-13 - document verification of jumper placement.
- e. Maintenance procedure A-5 - make consistent with AP-13 regarding temporary jumpers.
- f. AP-1 - Include method of assuring that department manuals are consistent with Station Administrative Procedures.
- g. Issue and implement draft Station Administrative Procedures which reflect requirements of ANSI N18.7-1976.
- h. Establish preventive maintenance program via Inspection Order system for Unit 2.
- i. Maintenance Procedure A-3 - Include ANSI N18.1-1971 minimum qualification requirements for Level I maintenance personnel.
- j. AP-5 - Clarify authority to use Night Order Book to promulgate temporary procedures.
- k. Clarify control of temporary changes to system valve lineups.
- l. Include procedure adherence requirements of ANSI N18.7-1976 in station procedures.

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- m. Establish a system for documented periodic review of Administrative Procedures.
 - n. Establish system for periodic review of Station Plant Manual procedures.
 - o. Establish consistent format requirements for Emergency and Operating Instructions.
 - p. Provide approval status documentation for refueling instructions in Station Plant Manual.
 - q. Issue and implement Unit 2 Reactor Engineering Manual.
14. Issue and implement operating procedures or changes to existing procedures to address the following areas listed in Regulatory Guide 1.33:
- a. Operation at Hot Standby
 - b. Pressurizer Pressure and Spray Control System
 - c. Reactor Control and Protection System
 - d. Loss of Condenser Vacuum
 - e. Loss of Service Water (present procedure covers only partial loss of service water)
 - f. Loss of Protective System Channel (present procedure covers only loss of nuclear instrumentation)
 - g. Malfunction of Pressure Control System
15. Issue and implement Station procedures for Unit 2 covering the following areas:
- a. Alarm procedures of the Station Plant Manual
 - b. Mode 3 and Mode 4 Surveillance Checkoff Lists of OI 1-3.2 (including 500KV and 13KV systems)
 - c. Maintenance Department Manual revisions required for consistency with station procedures.
 - d. Fire Fighting and Organization Manual and associated Surveillance Procedures.
16. Issue and implement Surveillance Procedures covering the following surveillance requirements in the proposed facility Technical Specifications:
- | | |
|-------------------|----------------|
| a. 4.1.1.5.b | j. 4.8.1.1.2.a |
| b. 4.1.3.5 | k. 4.8.2.3.2.b |
| c. 4.4.9.3.2 | l. 4.8.2.5.2.b |
| d. 4.5.3.2. | |
| e. 4.7.1.2 | |
| f. 4.7.10.1.1,2,3 | |
| g. 4.7.10.3 | |
| h. 4.7.10.4 | |
| i. 4.7.11 | |

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17. Issue and implement the following station Plant Manual Operating Instructions (OI's):

- a. II - 1.3.5, RC Leak Detection;
- b. II - 4.3.1, Safety Injection System - Normal Operation;
- c. II - 5.3.1, Fill and Vent the CS System;
- d. II - 9.3.1, Manipulation Crane;
- e. II - 9.3.2, Fuel Transfer System;
- f. II - 9.3.3, Control Rod Shaft Unlatching Tool;
- g. II - 9.3.5, Thimble Plug Handling Tool;
- h. II - 9.3.10, RCC Changing Fixture;
- i. II - 9.3.11, Burnable Poison Rod Assembly Handling Tool;
- j. II - 9.3.12, New Fuel Assembly Handling Fixture;
- k. II - 9.4.1, Fuel Transfer System;
- l. II - 8.3.3, Filling the Reactor Refueling Cavity;
- m. II - 8.3.4, Draining the Reactor Refueling Cavity;
- n. II - 10.3.2, Gas Analyzer Operation;
- o. II - 11.3.1, Waste Holdup Tanks - Normal Operation;
- p. II - 14.3.1, Containment Drains System Operation;
- q. II - 15.3.1, Hydrogen Recombiner - Normal Operation;
- r. II - 15.3.2, Personnel Locks and Containment Entry;

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- s. II - 17.3.1, Auxiliary Building Ventilation Operation;
 - t. III - 13.3.1, Draining the Steam Generator;
 - u. IV - 1.3.1A and B, 500 KV - Normal Operation;
 - v. IV - 3.3.1 13 KV - Normal Operation;
 - w. IV - 4.3.3 A and B, 4 KV Group Busses - Normal Operation;
 - x. IV - 5.3.1, Battery Ground Detection;
 - y. IV - 5.3.2, Battery Charger Operation;
 - z. IV - 6.3.2, Operation of the Axial Flux Deviation System;
 - aa. IV - 7.3.1, Flux Mapping System - Normal Operation;
 - ab. IV - 11.3.1, Area Radiation Monitors - Normal Operation;
 - ac. IV - 11.3.2, Process Filters Radiation Monitors-Normal Operation;
 - ad. IV - 11.3.3, Process Radiation Monitor-Normal Operation;
 - ae. IV - 11.3.4, Operation of the Control/Plant Ventilation Sampler;
 - af. V - 1.3.1, Service Water - Normal Operation;
 - ag. V - 3.3.1, Fire Protection System Operation;
 - ah. v - 3.3.2, Refilling Liquid Foam Storage Tank;
 - ai. V - 3.3.4, Notification of Impairment to the Fire Protection System;
 - aj. V - 9.3.k, Chilled Water System - Normal Operation.
18. Define the functions and responsibilities of the off-site QA engineer.
19. Complete all construction and testing open items identified in SMII-6 (Salem Unit 2 - Startup Manual Implementing Instruction - 6 Outstanding Item List) Currently tracking items required to be completed prior to core load. Justification for listed items deferred to a milestone beyond core load will be subject to review by NRC Region I inspectors.

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20. Complete installation and construction testing of the Radiation Monitoring System. Inspection of this item by NRC Region I will complete the required construction inspection program.
21. Modify emergency diesel generator controls to bypass additional trips on emergency (Safeguard equipment control) start in accordance with the application as amended.

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Enclosure B

Items to be Completed Before Achieving Mode 2

1. Complete the following Phase II tests:
 - a. SUP 6C Compressed Air System - Automatic Start
 - b. SUP 16.2 Liquid Waste Processing - Waste Evaporator
 - c. SUP 16.4 Resin Removal System
 - d. SUP 16.6 Gaseous Waste Processing
 - e. SUP 10.3 Boron Recycle Process
 - f. SUP 16.1 Liquid Waste Receipt and Storage
 - g. SUP 20.4 Control System Test for Turbine Runback
 - h. SUP 21 Radiation Monitoring
 - i. SUP 7 Control Air System
 - j. SUP 42 Hydrogen Recombiner
2. Complete Emergency Diesel Generator reliability testing.
3. Demonstrate ability to provide alternate source of Auxiliary Feedwater within 30 minutes.
4. Complete all construction and testing open items identified in SMII-6 Open Items List for completion by Mode 2 or initial criticality. All listed items deferred to a milestone beyond criticality will be subject to inspection and review by NRC Region I inspectors.
5. Issue chlorination and chemical inventory procedures.
6. Install control board information placards similar to those in place at Salem 1.

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