BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

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METROPOLITAN EDISON COMPANY, ET AL.

Docket No. 50-289

(Three Mile Island, Unit 1)

NRC STAFF RESPONSE TO INTERROGATORIES (SECOND SET) SUBMITTED BY ANTI-NUCLEAR GROUP REPRESENTING YORK

Enclosed are answers to the second set of interrogatories propounded by Anti-Nuclear Group Representing York (ANGRY) to the NRC Staff dated February 25, 1980. Each interrogatory has been restated and a response provided. Those individuals who have answered the interrogatories have also attached an affidavit verifying their answers.

The personal qualifications statement of Jack Roe, who prepared the answer to Interrogatory 7, has not been included in this set of responses because it was previously sent as part of "NRC Staff Responses To Interrogatories Of Intervenor ANGRY To NRC Staff," dated February 11, 1980.

Respectfully submitted,

List (. Singel

Lisa N. Singer Counsel for NRC Staff

Dated at Bethesda, Maryland this 17th day of March, 1980



Anti-Nuclear Group Representing York Interrogatory 6

- Does the staff agree or disagree with the conclusion of the NRC/TMI Special Inquiry Group that "the design bases of TMI's radwaste system were exceeded" during the accident (Vol. 2, Pt. 2, p. 70). Explain fully the reasons for any disagreement.
 - a If there is agreement, identify precisely each component of TMI's radwaste system for which the quoted conclusion applies, state the precise extent to which the design basis of every such component was exceeded, and describe the modifications, if any, being made to the TMI-1 radwaste system to take account of such unforeseen demand.

Response

6

The Rogovin Report, Section II.B.2 (g), points out that based on the high activities in the radwaste system components after the accident, on the large volume of water resulting in overflow of liquid tanks, and on the overpressurization of components due to gaseous fission products, that the design basis of the radwaste systems were exceeded. The staff agrees with this conclusion of the Rogovin Report. The design basis for storage of processed liquids sutside of containment is the volume needed to accommodate liquid inputs from normal operation and anticipated operational occurrences. The types of accidents which have been postulated in accident analysis demonstrate the potential for releases of large quantities of water inside the containment, but do not result in leakage of large volumes of water outside of containment. During the accident at TMI-2, the large quantities of water and large quantities of radioactivity reaching the auxiliary building enceeded those levels which the radwaste systems were designed to handle and process. However, as is also pointed out in the Rogovin Report in II.B.2 (g) and on page 70 revenced in Interrogatory 6, "although the design basis of the Three Mile Island Station's radwaste systems were exceeded, the systems as operating at the time of the accident provided significant mitigation of the release of radioactive materials to the environment."

TMI-1 will be required to implement appropriate sections of the additional system requirements required by the NRC in NUREG-0578 and in the NRC Action Plans Developed as a Result of the TMI-2 Accident, NUREG-0660, to reduce the potential for the radwaste system being overloaded and the design basis being exceeded as occurred during the accident at TMI-2.

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of METROPOLITAN EDISON COMPANY, et al. Docket No. 50-289 (Three Mile Island, Unit 1)

AFFIDAVIT OF FRANCIS P. CARDILE

I, Francis P. Cardile, being duly sworn, do depose and state:

- 1. I am a Nuclear Engineer in the Office of Standards Development of the United States Nuclear Regulatory Commission. I am generally responsible for standards related to waste management. Previously, however, I was a Nuclear Engineer in the Office of Nuclear Reactor Regulation. I was responsible for review and evaluation of radwaste treatment systems and for the calculation of releases of radioactivity from nuclear power reactors. My professional qualifications statement is attached.
- 2. The answers to Lewis interrogatories 12, 13, 16, 17, 22, 28, 32c, 35; CEA interrogatories 6-8, 6-10; and ANGRY interrogatory 6 were prepared by me. I certify that the answers given are true and accurate to the best of my knowledge.

Frences P. Contile

Francis P. Cardile

Subscribed and sworn to before me this 17th day of

March, 1980 March, 1980 Motary Public

My Commission expires: July 1, 1982

Francis P. Cardile Professional Qualifications Office of Nuclear Reactor Regulation

My name is Francis P. Cardile. I am a Senior Nuclear Engineer in the Effluent Treatment Systems Branch, Division of Site Safety and Environmental Analysis, Office of Nuclear Reactor Regulation.* I attended the University of Notre Dame and received a Bachelor of Science Degree in Mechanical Engineering in 1969. I attended the University of Illinois and received a Master of Science Degree in Nuclear Engineering in 1970.

After graduation I worked for the Bechtel Power Corporation which is an architect/engineering company engaged in the design and constuction of nuclear power plants. I was responsible for accessing the effects of plant radioactive effluents on the environment and the preparation of Safety Analysis Reports and Environmental Reports. I also was responsible for the design of process systems and writing specifications for process equipment. My experience included work on both pressurized and boiling water reactors.

In 1974, I joined the Nuclear Regulatory Commission (formerly AEC) as a nuclear engineer in the Effluent Treatment Systems Branch. In this position I am responsible for the review and evaluation of radwaste treatment systems and for the calculation of releases of radioactivity from nuclear power reactors. I have participated in generic studies of the relationship between reactor operation and radwaste generation and in the preparation of staff papers related to effluent control technology.

^{*} Since February 1980, I have held the position of Nuclear Engineer in the Fuel Process Systems Standards Branch, Division of Engineering Standards, Office of Standards Development. In that position I am responsible for the development of standards related to reactor waste management.

RESPONSE TO ANTI-NUCLEAR GROUP REPRESENTING YORK INTERROGATORY TO NRC STAFF (SECOND SET)

Interrogatory 7

Identify by name and agency affiliation each member of the Regional Advisory Committee that will review Pennsylvania state and local emergency response plans for their conformance to NRC concurrence standards.

a. What is the present timetable for such review?

Response

The Regional Advisory Committee (RAC) membership is attached. The RAC has scheduled the completion of the preliminary review of the Pennsylvania state and local emergency response plans for April 15, 1980.

REGIONAL ADVISORY COMMITTEE

Federal Emergency Management Agency

EMA Region III	Chairman	Palmer C. Scarnecchia Acting Chief, Population Preparedness Branch Plans & Preparedness Division FEMA, Region III Federal Regional Center Olney, Maryland 20832	
	Alternate	Michael S. Pawlowski Health Physicist a/above	
Department of Energy			
	Manhau	N	

Member Mr. Wayne Smalley Assistant for Emergency Preparedness Oak Ridge Operations Department of Energy Post Office Box E Oak Ridge, Tennessee 37830

Department of Transportation

Mr. John Porco Regional Emergency Transportation Representative Federal Highway Administration U.S. Department of Transportation 31 Hopkins Plaza - Room 1621 Baltimore, Maryland 21201

Environmental Protection Agency

Member

Member

Dr. David Lanford (3RA00) Regional Radiation Representative Environmental Protection Agency Curtis Building Sixth & Walnut Streets Philadelphia, Pennsylvania 19106 Food and Drug Administration

Member

Mike Terpilak Food & Drug Administration Bureau of Rad. Health 12720 Twinbrook Parkway Rockville, MD 20857

Public Health Services

Member

Mr. Louis Donofrio Chief, Emergency Medical Services Systems Public Health Service P.O. Box 13716 Philadelphia, Pennsylvania 19101

Nuclear Regulatory Commission

Member

Mr. Thomas C. Elssner State Liaison Officer U.S. Nuclear Regulatory Commission Region 1 631 Park Avenue King of Prussia, Pennsylvania 19406

Alternate

Dale Donaldson Radiation Specialist

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Docket No. 50-289

AFFIDAVIT OF JACK ROE

I, Jack Roe, being duly sworn, do depose and state:

- 1. I am a Emergency Planning Analyst, Office of Nuclear Reactor Regulation of the United States Nuclear Regulatory Commission. I am responsible for reviewing the emergency planning of assigned nuclear power plants, including Three Mile Island, Unit 1 Restart Program.
- 2. The answer to ANGRY Interrogatory 7 (Second Set) was prepared by me. I certify that the answers given are true and accurate to the best of my knowledge.

ck W. Roe

Subscribed and sworn to

before me this 17 day of

ried the Shop My Commission expires: July 1, 1982

ANGRY - Second Set - #8

Analyze the following TMI-2 related accident sequences with respect to the need for their inclusion in TMI's design basis accident analysis:

- a. Assume failure to close PORV block valve at 142 minutes into the accident causing production of increased quantities of non-condensable hydrogen gas and corresponding increased difficulty in establishing adequate core cooling both through natural circulation or through operation of reactor coolant pumps.
- b. Assume exhaustion of borated water storage tank water supply due to heavy operation of make-up/let-down system, resultant use of highly contaminated water from containment sump in said system, and further resultant impairment of containment spray system due to inadequate radiation shielding. Such impairment may be considered to be caused either by direct effect of water contamination or by high-radiation-level caused inaccessibility precluding repair of other malfunction.
- c. Assume increase of PORV set-point to 2450 psig. Assume further loss of main and auxiliary feedwater. Finally assume operator failure to manually open PORV to lower primary pressure and allow actuation of HPI system. Such operator failure may be considered to have been caused by either misleading pressurizer level indication, inadequate or confusing procedures, or inability to properly diagnose plant status.

Discussion

The design requirement for the emergency core cooling system is specified by General Design Criterion No. 35. This criterion specifies that the system safety function be accomplished for onsite and offsite electric power system operation assuming a single failure. The acceptance criteria for the emergency core cooling systems are specified in 10CFR50.46. Furthermore, the break spectrum to be analyzed for loss of coolant accidents is specified in Section I.C.1 of Appendix K 10CFR50.

With respect to the specific analyses discussed in items a, b and c above, the staff has no information related to these accident scenarios. However, analyses of ten alternate accident sequences related to TMI-2 are provided in NUREG/CR-1219, "Analyses of the Three Mile Island Accident and Alternative Sequences," January 1980. This report was prepared for the Three Mile Island Special Inquiry Group, NRC.

This response was prepared by Paul E. Norian.

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(Three Mile Island, Unit 1)

Docket No. 50-289

AFFIDAVIT OF PAUL E. NORIAN

Paul E. Norian deposes and says under oath as follows:

- I am Section Leader of the Systems Analysis Section, Analysis Branch, Division of Systems Safety. I am responsible for supervising the review of reactor vendor transient and LOCA analysis methods, the improvement of NRC analysis methods used in related accident analyses, and the performance of staff audit calculations for transients and accidents. My professional qualifications statement is attached.
- The answers to the Steven C. Sholly, Second Set 07-002, 07-003, and ANGRY No. 8 were prepared by me. I hereby certify that the answers given by me are true and accurate to the best of my knowledge.

Paul & norea

Subscribed and sworn to before me this 13 day of 7

My Commission Expires: July 1997

PAUL E. NORIAN

PROFESSIONAL QUALIFICATIONS

I am Section Leader of the Systems Analysis Section, Analysis Branch, Division of Systems Safety. I have held this position since 1975 and am responsible for supervising the review of reactor vendor transient and LOCA analysis methods, the improvement of NRC analysis methods used in related accident analyses, and the performance of staff audit calculations for transients and LOCAs. From June through December 1979, I was assigned to the Bulletins and Orders Task Force as a member of the Analysis Group. I served as Alternate Group Leader and coordinated the reviews of small break loss-of-coolant accidents (LOCA) and transient analyses submitted by the vendor owner's groups since the Three Mile Island accident.

I graduated from Lehigh University in June 1955 with a Bachelor of Science Degree in Engineering Physics. I also attended Drexel Institute of Technology, Catholic University of America, and the University of Maryland where I have taken various graduate courses in mathematics, physics, and electrical engineering.

In July 1955, I began work as a physicist with the duPont Company at the Savannah River Plant in Aiken, South Carolina. From that time until March 1962, I worked in the Works Technical Department on operational physics problems associated with the heavy water production reactors at Savannah River. This work included such assignments as the development of monitoring systems, performance of physics calculations required in reactor operation and in the development of new fuel elements, the review of operating procedures, and the analysis of various operating problems. In March 1962, I was transferred to the duPont Company's Chestnut Run Laboratories in Wilmington, Delaware, and worked for its Film Department on the development of industrial applications for plastic films.

In December 1963, I accepted a position with the Division of Reactor Licensing of the U.S. Atomic Energy Commission, and was project leader in the construction permit review of Consolidated Edison's Indian Point No. 2 reactor and Wisconsin-Michigan's Point Beach No. 1 reactor. I was assigned as a nuclear engineer in the Systems Performance Branch of the Division of Reactor Standards in March 1967. My responsibilities included analyzing and evaluating the performance of engineered safety systems and performing computer calculations for the evaluation of containment response and loss-of-coolant accidents. In March 1971, I participated in the Regulatory Task force reappraisal of emergency core cooling systems for light water reactors. My main responsibility for the task force was the review of computer codes and input assumptions for LOCA analyses. In May 1973, I was assigned to the Core Performance Branch in the Directorate of Licensing. I served as Section Leader in the Thermal Hydraulics Section and supervised the review of portions of reactor vendor model changes to conform with the new requirements for LOCA models specified in Appendix K to 10 CFR Part 50.