February 16, 1983

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

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

LICENSEE'S TESTIMONY OF

GARY R. CAPODANNO AND RICHARD J. CHISHOLM

IN RESPONSE TO ALAB-708 ISSUE NO. 8

(SAFETY-GRADE STATUS OF EMERGENCY FEEDWATER SYSTEM)

SUMMARY

This testimony addresses the Appeal Board's request for clarification of the safety-grade classification of the emergency feedwater system components generally, and of the new manual control stations in particular. The testimony reports that there have been no changes in the status of the safety-grade classification of the EFW system from that previously submitted to the Licensing Board and the Appeal Board. The testimony also provides a detailed description of the new EFW manual control stations and concludes that, while this modification is highly reliable, it cannot be considered safety-grade.

INTRODUCTION

This testimony by Gary R. Capodanno, Fluid Systems Director, GPU Nuclear Corporation, and Richard J. Chisholm, Manager of Electric Power and Instrumentation, GPU Nuclear Corporation, is addressed to Issue No. 8 of the Appeal Board's Memorandum and Order of December 29, 1982 (ALAB-708), which seeks:

> 8. Clarification of the apparent inconsistencies and confusion concerning the safety-grade status of components in the EFW system (from the licensee and the staff).

Mr. Capodanno was a witness earlier in these proceedings on the EFW system. He sponsored Licensee's Exhibit 15 which describes the EFW system at the time TMI-1 last operated, the modifications being made to the system prior to restart, and long-term modifications planned for the future. The status of modifications to the EFW system to be completed prior to restart was also addressed by Licensee in submittals of August 12, 1982, and November 22, 1982, in response to Appeal Board requests for information of July 14 and November 5, 1982, respectively.

BY WITNESSES CAPODANNO AND CHISHOLM:

We have reviewed Licensee's Exhibit 15 as well as pages 9 through 13 of Licensee's August 12, 1982 response to the Appeal Board, and pages 9 through 15 of Licensee's November 22, 1982 response to the Appeal Board. That review has been conducted to determine whether there are any inconsistencies or confusing

statements regarding the safety-grade status of equipment prior to restart which should be corrected for the Appeal Board and to determine whether there are any items projected to be safety-grade prior to restart which may not actually be so, or items not intended to be safety-grade by restart that may be so. The review has considered the capability of equipment to respond to either a loss of main feedwater or a small break loss of coolant accident (SBLOCA).

Our review confirms that statements by Licensee regarding the safety-grade status of equipment in the EFW system and modifications to that system at the time of restart are consistent and appear to be clear. At the time of restart, the EFW system will be safety-grade for purposes of responding to either a loss of main feedwater or SBLOCA. The present status of EFW modifications to be completed prior to restart has not been altered. Those items anticipated to be safety-grade prior to restart will be safety-grade for the accidents under consideration; those items expected not to be safety-grade will not be so qualified prior to restart.

The review has also considered any known inconsistencies or apparent inconsistencies between Licensee's and the Staff's descriptions of the safety-grade status of equipment in the EFW system. We are aware of only one such inconsistency -- the one pointed out by the Appeal Board in ALAB-708 related to the manual control stations.

BY WITNESS CHISHOLM:

An alternate manual control capability for the EFW flow valves has been installed which is independent of the ICS. It consists of manual control (loader) stations, one for each steam generator, in the control room which the operator can activate by means of selector switches to manually provide control signals to the emergency feedwater control valves. Operation of the selector switches also transfers the power supplies for the remote voltage/pressure transducers from an ICS derived power supply to an independent power supply. The new manual control circuits are supplied from a battery-backed, 115 volt 60 hertz power supply. The power comes from an inverter which is normally fed from the Red train 1E AC power system and backed up by the Red battery. If voltage from the inverter is lost, an automatic transfer switch will switch to a regulated voltage source which is derived from the Green 1E AC power system. The manual control circuits utilize highly reliable industrial grade components and the design is such that no single failure in the control circuits will result in a loss of system function. This manual control feature by itself is highly reliable but not "safety-grade" as we have applied that term throughout our review.

BY WITNESSES CAPODANNO AND CHISHOLM:

The functional objective of the EFW system for SBLOCA or loss of main feedwater events is to provide adequate flow to either of the steam generators. The function can be termed safety-grade if it has the following attributes:

1. Capable of performing in the accident or transient environment.

2. Capable of performing its function following a loss of off-site power.

3. Satisfies the necessary provisions of the approved QA program.

4. Can perform its function following the worst single failure in active mechanical or active or passive electrical components.

5. Adequate time is available for manual control functions.

The components of the EFW system can collectively meet these criteria.

The manual control station is highly reliable but can fail as a result of certain single power supply distribution component failures. A single failure in one of these components will not disable the system function, however, since the operator dispatched to the vicinity of the EFW control valves in the intermediate building on each EFW demand can manually manipulate the valves with the local hand wheel. Since there is adequate time for this operator action, system function is

achieved. Thus there are no single failures which can prevent the accomplishment of the safety function.

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Education: B.S., Mechanical Engineering, Fairleigh Dickinson University, 1967.

M.S., Mechanical Engineering, Newark College of Engineering, 1974.

Experience: Fluid Systems Director, GPU Nuclear Corporation, 1982 to present. Responsible for technical and administrative direction of the mechanical and radwaste engineering sections of the Engineering and Design Department with responsibility for secondary plant, reactor plant and radwaste systems and components within GPU Nuclear plants. Directs, through the Mechanical Systems, Mechanical Components, and Radwaste Systems section managers, the engineering for fluid system designs, modification of existing plant systems, operations and maintenance review and troubleshooting for plant systems, and preparation and review of responses to inquiries of regulatory agencies. Directs the reviews and approvals of work done by outside engineering firms to assure conformance to GPU Nuclear criteria and standards. Directs the review of engineering standards and procedures, plant operating and emergency procedures and technical support to the plants during plant outages.

Manager of Mechanical Systems Engineering, GPU Service Corporation/GPU Nuclear Corporation, 1978 to 1982. Responsible for technical and administrative direction of the activities of company mechanical and nuclear engineers in the design of new power plants and major modifications to existing power plants for the three operating companies that comprise the GPU Sytem. Also responsible for directing these engineers in the review of work being done for GPU and the operating companies by architect-engineering firms.

Lead Systems Engineer, Ebasco Services, Inc., April 1978 to July, 1978. Work on the Synthesis Gas Demonstration Plant Program for W. R. Grace Company and the United States Department of Energy. Responsible for plant arrangements and system design work. Directed mechanical engineers in the design of steam, cooling water and materials handling systems for a plant that was to use coal as a feedstock for the preparation of anhydrous ammonia and the production of elemental sulfur or sulfuric acid as a by-product.

Mechanical Group Supervisor, Burns and Roe, Inc., 1974 to 1978. Engineering supervisor responsible for the technical and administrative direction of project engineers in the development of: plant general arrangements, system flow diagrams, engineering calculations, equipment specifications, bid evaluations, construction liaison, and licensing activities for nuclear power plants.

Mechanical Engineer, Burns and Roe, Inc., 1971 to 1974. Responsible for design engineering of nuclear and conventional mechanical equipment and systems for nuclear power stations. This included preparation of specifications and system flow diagrams, evaluation of equipment proposals, performance of design calculations, construction liaison activities and activities related to governmental licensing of nuclear power plants.

Design Engineer, Foster Wheeler Corporation, 1969 to 1971. Responsible for design and development engineering of fossil fuel firing equipment and systems for electric generating plant steam generators, preparation of engineering standards, evaluation of vendor equipment, and engineering assistance to company project site personnel.

Mechanical Engineer, Consolidated Edison Company, 1967 to 1969. Responsible for design and applications engineering of mechanical equipment and systems for nuclear and conventional electric generating stations.

Professional Affiliations: Licensed Professional Engineer -- New York, New Jersey and Pennsylvania

Member -- American Nuclear Society

Member -- National Society of Professional Engineers

Publications: "New Approach to Optimization of the Multistage Flash Desalination Process", Summer Simulation Conference, San Diego, 1972.

RICHARD J. CHISHOLM

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Parsippany, New Jersey 07054

Education: B.E.E., Manhattan College, 1948

M.B.A., Fairleigh Dickinson University, 1971.

Post-graduate courses in Electrical Engineering, New York University and New Jersey Institute of Technology.

Experience: Manager, Electrical Power and Instrumentation, GPU Nuclear Corporation/GPU Service Corporation, 1980 to present. Manager of engineering section responsible for design activities for plant systems related to electrical power and instrumentation.

Senior Electrical Engineer, GPU Service Corporation, 1971 to 1980. Lead engineer for all instrumentation and control design activities for nuclear and fossil plants.

Manager of Electrical Design, Curtus-Wright Corporation, Electronics Division, 1966 to 1971. Responsible for engineering group involved in design of instrumentation and control equipment for Navy nuclear program.

Chief Engineer of a small company engaged in the manufacturing of I&C equipment for industrial and shipboard applications. 1958 to 1966.

Project Engineer with manufacturer of control equipment. 1951 to 1958.

Consolidated Edison Company. Design of instrumentation and control systems for power plants and substations. 1948 to 1951.