UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DUKE POWER COMPANY	)	Docket Nos. 50-369
	)	50-370
(William B. McGuire Nuclear	)	
Station, Units 1 and 2)	)	

TESTIMONY OF K.S. CANADY, L.A. REED, R.A. MUENCH AND H. B. BARRON REGARDING MCGUIRE NUCLEAR STATION OPERATION RELATING TO ECCS TERMINATION

1. Q. What is the scope of this testimony?

A. This testimony addresses the actions that an operator would take in the event of conditions caused by the incredible accident scenario which assumes improper operator termination of the emergency core cooling system ("ECCS") during an assumed TMI-type accident at McGuire.

As discussed in previous testimony, Duke Power Company has taken extensive measures to prevent the operator from improperly terminating the ECCS. In the event of an accident at McGuire, the operators will be using revised emergency procedures to diagnose initial indications, evaluate the event, and, if appropriate, terminate ECCS operation. The operators have been trained in the use of these procedures and in the anticipated plant response.

Prior to terminating the ECCS the operator must assure that each of the four following criteria are met:

(1) Reactor coolant system pressure is greater than a specified minimum value and increasing, and

(2) Pressurizer level is greater than a specified minimum value, and

(3) The reactor coolant system is subcooled by greater than 50°F, and

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(4) Adequate auxiliary feedwater flow for core heat removal is injected into at least one non-faulted steam generator.

If the above four criteria are met an inadequate core cooling situation cannot exist, and thus, generation of excessive hydrogen is impossible.

The operators in the control room must verify that the above four separate and independent parameters are within their acceptable ranges before terminating the ECCS. Further, the emergency procedures state that the four noted parameters should be checked "continuously in the event of accident conditions". Thus, an accident scenario which assumes premature termination of ECCS operation during a loss of coolant accident is not credible. However, solely for the purpose of this testimony the assumption will be made that there will be improper operator interference with the ECCS.

2. Q. Assuming hypothetically that an operator was to improperly terminate ECCS operation during a postulated TMI-type accident at McGuire, how much time would the operator have to reinitiate ECCS operation prior to generating hydrogen in excess of quantities associated with a 2% zirconium-water reaction?

A. Based on a conservative analysis, in the event of such a hypothetical situation occurring while operating at 100% power, the operator would have over 2 hours to reinitiate ECCS operation before generating an amount of hydrogen in excess of a 2% zirconium-water reaction. This time is dependent upon the power level of the plant and, thus, if the plant was at a significantly reduced power level (e.g., 50%, 35%, or 5%) this time would be substantially increased.

3. Q. In the event that a TMI-type accident was postulated at the McGuire Nuclear Station, and hypothetically assuming that ECCS operation was improperly terminated, what operator actions would prevent excessive hydrogen generation?

A. As previously noted, if hypothetically assuming improper termination of ECCS operation, there will be over 2 hours available for operator reinitiation of ECCS operation prior to generating an amount of hydrogen in excess of a 2% zirconium-water reaction. It should be noted that a 2% zirconium-water reaction is within the conservative regulatory limits for hydrogen generation specified in 10 CFR §50.44. During the period following operator termination of the ECCS, emergency procedures require continuous monitoring of the parameters specified in the termination criteria. Specifically, emergency procedures require logging of the parameters used in the ECCS termination/reinitiation criteria each 15 minutes for the two hour period following ECCS termination. In addition, emergency procedures require that each such log entry be independently verified. If any of the log entries are above specified criteria, emergency procedures require reinitiation of ECCS operation.

In short, after termination of ECCS operation, emergency procedures require that two operators verify and log the termination criteria readings every 15 minutes. If one of the readings are not within acceptable ranges, the operator is required to reinitiate ECCS operation.

4. Q. Assuming a hypothetical premature operator termination of ECCS is it credible to assume that the ECCS would not be reinitiated prior to generation of hydrogen in excess of that amount corresponding to a 2% zirconium-water reaction?

A. No. As previously stated, an accident scenario which assumes that an operator would prematurely terminate ECCS operation during a loss of coolant accident at McGuire is so extremely remote that it is not a credible scenario. Further, given the incredible accident scenario that a condition of improper ECCS termination exists, it is also incredible to assume that ECCS operation would not be reinitiated prior to hydrogen generation in excess of a 2% zirconium-water reaction.

Professional Qualifications
of
K. S. CANADY
Manager, Project Coordination and Licensing Section
Steam Production Department
Duke Power Company

My name is K. S. Canady. I am Manager, Project Coordination and Licensing Section, Steam Production Department, Duke Power Company. My business address is 442 South Church Street, Charlotte, North Carolina, 28242.

I graduated from North Carolina State University in 1963 with a Bachelor of Science Degree in Nuclear Engineering. I also did graduate work in Electrical Engineering at North Carolina State from 1965 to 1968. From June, 1963 to January, 1965, I was employed by the Lockheed Georgia Company, Marietta, Georgia, and participated in their electrical design of C-130 aircraft. From January, 1965 to July, 1968, I was employed by the Research Triangle Institute, Research Triangle Park, North Carolina. My work at RTI included assignments as project engineer on galvano diffusion devices and gold thin films for measuring partial pressures of oxygen on NASA contract work.

From August, 1968 to present, I have been employed by Duke Power Company in the Steam Production Department. Assignments have been in test engineering work and nuclear licensing work on nuclear generating plants. In November, 1974, I was promoted to Manager, Project Coordination and Licensing, which includes responsibility for obtaining operating licenses for Duke's nuclear power plants, providing operating experience feedback from operating stations for input into new designs, and project coordination on capital improvement projects on existing generating stations.

Professional Qualifications
of
LARRY A. REED
Senior Instructor, Plant Operations
Steam Production Department
Duke Power Company

My name is Larry A. Reed. I am a Senior Instructor in the Steam Production Department, Duke Power Company. My business address is 442 South Church Street, Charlotte, North Carolina, 28242.

From 1959 to 1964 I was employed by the United States Navy. During this period I held numerous positions relating to nuclear power operations. Upon being honorably discharged from the Navy in 1964, I began employment with Carolina-Virginia Nuclear Power Associates where I was qualified as a Reactor Operator for the Carolinas-Virginia Tube Reactor.

I have been employed by Duke Power Company since 1974. During this period the positions I have held include Control Room Operator, Shift Supervisor and Assistant Operating Engineer. In my current position as Senior Instructor, I am responsible for, among other things, the development and conduct of the Reactor Operator Training Program for the McGuire Nuclear Station.

I have held the following licenses or certifications regarding operations of a nuclear power plant:

(1) Reactor Operator: A1W, United States Navy
(2) Reactor Operator: S5W, United States Navy
(3) Engineering Laboratory Technician: Submarine Qualified, United States Navy
(4) Reactor Operator: Carolinas-Virginia Tube Reactor
(5) Senior Reactor Operator: Saxton Nuclear Facility
(6) Senior Reactor Operator: Oconee Nuclear Station, Units 1 and 2
(7) Senior Reactor Operator: Zion Nuclear Station

Professional Qualifications
of
HENRY B. BARRON
Operating Engineer
McGuire Nuclear Station
Duke Power Company

My name is Henry B. Barron. I am an Operating Engineer at the McGuire Nuclear Station, Duke Power Company. My business address is: McGuire Nuclear Station, P.O. Box 488, Cornelius, North Carolina, 28031.

I graduated from the University of Virginia in 1972 with a Bachelor of Science degree in Nuclear Engineering, with distinction.

In 1972 I was employed by Duke Power Company as a Staff Engineer at the Oconee Nuclear Station. In this position my responsibilities included operator training, new fuel handling and preoperational test coordination. In 1974 I transferred to the McGuire Nuclear Station as a Reactor Engineer responsible for development of reactor physics tests. In this position I participated in the Oconee Units 2 and 3 zero power physics and power escallation testing program. At McGuire I also held the position of Performance Engineer responsible for preoperation and performance testing of various systems. I am currently an Operating Engineer at McGuire responsible for procedure development and coordination of Units 1 and 2 start-up activities.

I have held the following licenses regarding operations of a nuclear power plant:

(1) Reactor Operator: Oconee Nuclear Station
(2) Senior Reactor Operator: McGuire Nuclear Station

I am a registered Professional Engineer in North Carolina.

Professional Qualifications
of
Richard A. Muench
Westinghouse Water Reactors Division
Westinghouse Power Systems Company
Westinghouse Electric Corporation

My name is Richard A. Muench. My business address is Westinghouse Electric Corporation, P.O. Box 355, Pittsburgh, Pennsylvania, 15230. I am employed by Westinghouse Electric Corporation as Manager of Safeguards Analysis within the Nuclear Safety Department of the Nuclear Technology Division. I am responsible for analyzing the thermal hydraulic behavior of the reactor coolant system following postulated loss-of-coolant accidents mainly to demonstrate the integrity of the reactor fuel. Such analysis includes the amount of zirconium which would react with the coolant in the event of a loss-of-coolant accident.

I attended the University of Kentucky from 1968 through 1972. I received a Bachelor of Science Degree in Mechanical Engineering.

In 1972, I joined Westinghouse Electric Corporation as an engineer in Safeguards Analysis/with responsibility for performing loss-of-coolant accident analyses. I have remained in this area, becoming Manager of Safeguards Analysis in 1978.

I was a member of the Industry Advisory Group responding to the Three-Mile Island accident and during the accident, worked on projects designed to provide input into plant recovery operations.