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**DUKE POWER**

April 15, 1994

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: McGuire Nuclear Station  
Special Report Number 94-03  
Problem Investigation Process No.: 0-M94-0248

Gentlemen:

Attached is Special Report Number 94-03. This report is being submitted to the NRC pursuant to Final Safety Analysis Report Selected Licensee Commitment 16.9-7, Standby Shutdown System. This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'T.C. McMeekin'.

T.C. McMeekin

RJD/bcb

Attachment

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MCGUIRE SAFETY REVIEW GROUP

SPECIAL REPORT

1. REPORT NUMBER: 94-03 TO: NRC
2. DATE OF REVIEW: October 1991 through March 1994
3. SUBJECT DESCRIPTION: This Special Report is being submitted to the NRC pursuant to Final Safety Analysis Review (FSAR) Selected Licensee Commitment 16.9-7, Standby Shutdown System (SSS).
4. EVALUATION AND COMMENT:

BACKGROUND: The SSS provides a means of achieving and maintaining either one or both units in Hot Standby mode for 72 hours when the Control Room and Auxiliary Shutdown Panels are unavailable as a result of a security or fire event. The Reactor Coolant Pressure Boundary must be maintained in order to meet the function of the SSS. The Standby Makeup Pump is the only means of Reactor Coolant Seal Injection and Reactor Coolant Makeup during an SSS event. These pumps are tested to  $\geq 26$  gpm injection flow at normal Reactor Coolant System (RCS) pressure. Of the available 26 gpm, 18 gpm is directed to the Reactor Coolant Pump Seals while 8 gpm is available for Reactor Coolant System makeup. To ensure RCS inventory during an SSS event, the Pressurizer Power Operated Relief Valves (PORVs) are de-energized via a manual disconnect which allows for valve closure under spring force alone.

The SSS is required to be operable in Modes 1 (Power Operation), 2 (Startup), and 3 (Hot Shutdown).

IMPROVING PORV RELIABILITY: On February 10, 1994, PORV 1NC-34A was cycled during testing directed at improving PORV reliability. The testing included cycling of the valve during Mode 5 (Cold Shutdown) without air/nitrogen assistance to the valve actuator. During this testing the valve was observed to "hang open" in the absence of air-assisted closure. The spring loaded actuator is designed such that the valve should close under spring force alone.

Based on the test results of 1NC-34A, which indicated that the valve did not close under spring force alone, Engineering personnel initiated an evaluation of the possible implications with regard to operability of the SSS. Neither the PORVs (air assisted closure) nor the corresponding block valves can be controlled from the Standby Shutdown Facility (SSF). Likewise, the valves supplying assured power (nitrogen) to the PORVs from Cold Leg Accumulators are not controlled from the SSF. Since air assist can not be assured

during security or fire events, the PORVs must be capable of closing under spring force alone. The Standby Makeup Pump is not designed to inject sufficient volume into the RCS to maintain Hot Standby conditions with an open PORV. Problem Investigation Report number 0-M94-0248 was issued on February 17, 1994 to track and trend the progress of this issue.

CAUSE OF INOPERABILITY: It was subsequently determined on March 17, 1994, that there has been incomplete testing of the PORVS. During investigation aimed at improving the reliability of the PORVs, it was discovered that Compensatory measures (in place to maintain the operability of the SSS due to a similar concern in October 1987) had been inappropriately removed on October 24, 1991 at 1800 hrs. These measures had been deleted based on the determination that the PORVs met the understood licensing basis as verified by testing and due to upgrades to the PORVs and associated piping (e.g. upgrade to seismic air line, larger size instrument air tubing installation, relocation of control air system solenoid to top of air cylinder actuator).

5. IMMEDIATE CORRECTIVE ACTIONS: After reviewing the impact of the PORV spring close function on the SSS, it was determined that the boundaries of the SSS would have to be extended to maintain the operability and design basis of the system. Compensatory measures were reanalyzed and reestablished addressing the fire and security issues. These measures were implemented at or before the time that the PORVS were declared Conditionally Operable as follows:

Unit 1 - February 22, 1994 (2245 hrs) Mode 4

Unit 2 - February 18, 1994 (0900 hrs) Mode 1

6. LONG TERM RESOLUTION: A series of diagnostic tests will be performed on the PORVs during Units 1 and 2 End of Cycle 9, to develop improvements to ensure PORV closure capability without air assist. A Design Basis Document (DBD) specific to the Standby Shutdown System will be issued by December 31, 1995, to address the components and equipment required for the SSS to perform its intended function of maintaining Hot Standby conditions. The DBD will be a tool for improving licensing basis understanding for station personnel.