UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-3415

June 12, 1998

MEMORANDUM TO: John A. Zwolinski, Deputy Director
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

FROM: Loren Plisco, Director
Division of Reactor Projects

SUBJECT: TASK INTERFACE AGREEMENT (TIA 98-003) CRYSTAL RIVER UNIT 3; LOW PRESSURE INJECTION EMERGENCY CORE COOLING SYSTEM VALVE CONFIGURATIONS

During an emergency operating procedures inspection at Crystal River from October 20, 1997 to January 30, 1998 the NRC team identified two questions associated with valves in the low pressure injection (LPI) portion of the emergency core cooling system (ECCS). The purpose of this TIA is to request NRR answers to these questions. Answers to these questions will help disposition an unresolved item docketed in Inspection Repon No. 98-02.

Issue #1 - Normal Position of the LPI Discharge Valves

As part of the licensing review for Crystal River, the NRC issued a request for information on 12/8/75 regarding the ECCS analysis. One question specifically addressed the normal position of valves DH-V4A and DH-V4B, the LPI injection valves. Question 2c stated "FSAR Figure 9-6 shows LPI valves DH-V4A and DH-V4B to be normally closed. To allow low pressure injection subsequent to a CFT {Core Flood Tank} line break and a single active component failure, these valves must be required by Station Technical Specifications to be open, power removed, and breakers locked open. ... These changes provide assurance that abundant core cooling is available for a CFT line break and further minimize the potential for a LOCA outside containment."

The license applicant responded to the question in a letter dated 1/13/76 which stated, in part: "Valves DH-V4A and DH-V4B will be placed in the normally open position. FSAR Figure 9-6 will be revised in Amendment No. 48 to indicate this revision to the Decay Heat Removal System. However, as previously committed to and accepted by the NRC and ACRS, power must be available to these valves as they are required to be throttled in order to split the decay heat (LPI) flow. The Low Pressure Injection System is provided with a crossover line to permit one LPI string flow of 3000 gpm to be split equally, thus providing a minimum of 1500 gpm flow to both core flooding injection nozzles simultaneously should a core flooding line or one LPI pump fail. The LPI crossover injection mode of operation is accomplished by opening the crossover line, provided with a two-way flow element, and remotely adjusting the flow through the crossover line to 1500 by throttling the two electric motor operated valves DH-V4A and DH-V4B. Acceptance of this mode of operation by the NRC is further exemplified in the staff's SER on page 6-13 and 6-14, Section 6.3.2 System Design. Therefore, valves DH-V4A and DH-V4B will be placed in the normally open position..."

On 3/15/76 the applicant submitted FSAR Amendment 48 without indicating the injection valves as normally open or changing operating procedures. Subsequently, an operating license was granted on 12/3/76 which considered the information contained in Amendments 1 through 49 as

a description of the facility. At no time since license approval had the LPI injection valves been "normally open," nor has the FSAR ever shown them as open.

This matter was presented before an enforcement panel. The panel concluded that enforcement action was not appropriate and NRR should be formally contacted to provide resolution. Also, in a letter to the NRC dated February 6, 1998, the licensee indicated that the normal position of these valves would be included in a review of emergency core cooling system performance. The letter stated that the review was forecasted to be completed by October 16, 1998. Therefore, NRR is requested to evaluate the licensee's conclusions as it relates to these valves, ascertain the appropriate normal position for the LPI discharge valves and take the appropriate licensing action if that position is normally open.

Issue #2 - Operability of the LPI Flow Control Valves

Technical Specification (TS) 3.5.2 requires two operable ECCS trains. The Background Section for TS 3.5.2 states in part "The HPI {high pressure injection} pumps cannot take suction directly from the sump. If HPI is still needed, a cross connect from the discharge side of the LPI pump to the suction of the HPI pumps would be opened. This is known as "piggy backing" HPI to LPI, and enables continued HPI to the RCS {reactor coolant system}, if needed, after the BWST {borated water storage tank} is emptied to the switch over point." One of the surveillance requirements for ECCS operability is TS Surveillance Requirement 3.5.2.6. This requires verification that the flow controllers for the LPI throttle valves DHV-110 and 111 operate properly. The Bases for surveillance requirement 3.5.2.6 states in part that it is to ensure "that the flow controllers for the LPI throttle valves will automatically control the LPI train flow rate in the desired range and prevent LPI pump run out as RCS pressure decreases after a LOCA." However, the flow sensing device, which provides the feedback signal for the position of the flow control valves to protect against LPI pump run out, is located in the LPI discharge piping downstream of the connection to the suction of the HPI pump. Consequently, the 600 gpm flow from the LPI pump to the suction of the HPI pump is not monitored by the flow controller. To compensate for the actual LPI discharge flow being significantly greater than that monitored by the flow control circuit, emergency operating procedures presently direct throttling the LPI discharge valves, DHV-5 or 6, (to < 2200 gpm as indicated at the instrument providing feedback to the flow controllers) to prevent pump run out.

The NRC Safety Evaluation Report, Supplement 3, dated 12/30/76 stated, in part:

> "As a consequence of our review Florida Power Corporation modified the system to include automatic flow controllers in the discharge of the decay heat pumps to preclude the need for operator action to control pump run out which could result in insufficient net positive suction head for the pumps when the operator shifts to the long-term recirculation mode of operations following a postulated loss-of-coolant accident.
>
> While we concluded that the modification to include automatic flow controllers as described above is acceptable, we determined that the operating range of the controllers (3000-3300 gallons per minute) must be narrowed to provide an adequate margin for net positive suction head. Florida Power Corporation proposed adjusting the operating range to 2800-3100 gallons per minute in order to assure adequate margin. We have reviewed the acceptability of the operating range and concur that the proposed range is acceptable..."

NRR is requested to ascertain whether the present design of the ECCS, specifically the location of the flow sensing device providing feedback to valves DHV-110 or DHV-111, renders the LPI system inoperable in that operator action instead of the flow controllers is necessary to preclude possible LPI pump run out conditions in the "piggy back" mode of ECCS operation.

These issues were discussed with the Crystal River Project Manager in May 1998. If you have any questions concerning this request, please contact W. Rogers at (404) 562-4619.

Docket No: 50-302
License No: DPR-72

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