UNITED STATES
**NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

December 11, 1998

MEMORANDUM TO: Loren R. Plisco, Director
Division of Reactor Projects, RII

FROM: Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II

SUBJECT: TASK INTERFACE AGREEMENT (TIA 98-003) CRYSTAL RIVER UNIT 3 LOW PRESSURE INJECTION SYSTEM VALVE CONFIGURATION (TAC NO. MA2125)

By memorandum dated June 12, 1998, the Division of Reactor Projects, Region II, requested the assistance of the NRR in evaluating certain aspects of the Crystal River Unit 3 (CR-3) low pressure injection (LPI) system design. Specifically, NRR was asked to:

1. Evaluate the licensee's conclusion's as it relates to the normal standby position of the LPI discharge valves, ascertain the appropriate normal position for these valves, and take the appropriate licensing action if that position is normally open.

2. Ascertain whether the present design of the LPI system, 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 operation.

The NRR Reactor Systems Branch (SRXB) reviewed a number of documents that relate to this issue. The Attachment lists these documents and provides our responses to the two questions. SRXB concluded that there was no technical concern with the normally closed position of the LPI discharge valves nor was there a basis for taking licensing action to change the valve position. In addition, our review of the issue indicated that the normally closed position for these valves was consistent with the CR-3 licensing basis. With regard to the second question, SRXB concluded that reliance on manual action during the "piggy back" mode of operation to be acceptable.

If you have questions concerning the positions in the attachment, please contact Len Wiens at (301) 415-1495.

Docket No. 50-302

Attachment: SRXB Evaluation

cc: C. W. Hehl, Region I
G. E. Grant, Region III
T. P. Gwynn, Region IV

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**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

December 1, 1998

MEMORANDUM TO: Leonard A. Wiens, Project Manager
Project Directorate II-3
Division of Reactor Projects

FROM: Eric W. Weiss, Chief
Pressurized Water Reactor Section
Reactor Systems Branch
Division of Systems Safety and Analysis

SUBJECT: TASK INTERFACE AGREEMENT (TIA) 98-003 CRYSTAL RIVER 3, LOW PRESSURE INJECTION EMERGENCY CORE COOLING SYSTEM VALVE CONFIGURATIONS (TAC No. MA2125)

In TIA 98-003, dated June 12, 1998, Region II requested NRR's position on the adequacy of aspects of the Crystal River Unit 3 (CR-3) low pressure injection (LPI) system. The TIA specifically asks two questions. The first question relates to the normal position of the LPI discharge valves. The second question relates to the need to rely on manual operator action to throttle LPI flow while in the LPI to high pressure injection (HPI) or "piggy back" flow path configuration.

Issue 1 of TIA 98-003 requests that NRR, "ascertain the appropriate normal position of the LPI discharge valves and take appropriate licensing action if that position is normally open." The Reactor Systems Branch (SRXB), through interactions with the licensee and a review of some of the documented information on the subject, concludes that the normally closed position of the LPI discharge valves is not inappropriate and that no licensing action is warranted. The staff bases this conclusion on the following information. Although some of the correspondence during the original licensing process, referenced in the TIA, indicates that the licensee stated that valve would be normally open, the normal valve position was never changed to be open. A letter from the licensee, dated October 22, 1998 with the subject, "Low Pressure Injection Engineering Study," stated that maintaining the valves closed is consistent with licensing basis. The staff attempted to verify that by reviewing some of the licensing documentation. In 1980, the staff had a generic safety concern with regard to the likelihood of an intersystem loss-of-coolant accident (LOCA). The staff issued a Generic Letter (GL) dated February 23, 1980 and requested licensees evaluate specific vulnerable configurations associated with the likelihood of an intersystem LOCA. The correspondence associated with the licensee response to that GL and the subsequent NRC order confirm that at that time the valve position was normally closed. The staff concluded, with the normally closed valves, the high pressure/low pressure isolation with additional leakage testing specifications was adequate. The normally closed discharge valve reduces the likelihood of an intersystem LOCA. Additionally, this plant configuration, with the LPI discharge valves closed is an acceptable configuration described in section 6.3 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear

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415-2947

Power Plants," since an engineered safeguards actuation system signal opens these closed discharge valves and assures the required emergency core cooling system function following an accident while meeting the single failure criteria. As a result, the staff has not identified a technical concern with the normally closed position of the LPI discharge valves and does not believe there is a basis for taking licensing action to change the valve position.

Issue 2 of TIA 98-003 requests that NRR "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." The determination of LPI system operability is the responsibility of the licensee rather than the staff, however, the staff has reviewed the information in the TIA and some additional supporting information. Although the LPI flow controllers were intended to prevent the operators from needing to manually throttle the LPI flow, the NRC has accepted manual operator action to initiate sump recirculation. The CR3 design already requires manual swapover to the sump recirculation flow path. As a result, relying on manual operator action under these circumstances is acceptable. The staff has reviewed Inspection Report (IR) No. 50-302/98-02 where Region II concluded that, "the licensee had adequate technical justification for operating in the piggyback mode." Although SRXB has not evaluated the operators ability to perform these specific tasks, the staff finds the Region II conclusion reasonable, based, in part, on the operators ability to establish the necessary LPI flow by manually throttling the necessary valves during a simulator scenario (also described in the IR). Additionally, the licensee has indicated that they intend to add additional valves to the LPI system that will preclude the operators need to continually manually throttle the LPI flow. They would only have to reset the flow at which the flow controller regulates flow. Although this modification has not been reviewed by the staff, it should enhance the system and reduce the reliance on the operators to complete the safety function. In conclusion, although the Standard Review Plan and staff practice emphasize the minimization of required operator actions, it is recognized and accepted that establishment and maintenance of ECCS sump recirculation requires manual operator action.

This completes SRXB action on TAC No. MA2125.

References:

1. Memorandum, Plisco, Loren, "Task Interface Agreement (TIA 98-003) Crystal River Unit 3: Low Pressure Injection Emergency Core Cooling System Valve Configurations," dated June 12, 1998.

2. Letter, Holden, J. J., "Low Pressure Injection Engineering Study," dated October 22, 1998.

3. Generic Letter to All LWR Licensees, Eisenhut, D. G. , "LWR Primary Coolant System Pressure Isolation Valves," dated February 23, 1980.

4. Letter, Bright, Ronald, M., "Crystal River Unit No. 3, Docket No. 302, Operating License No. DPR-72, Letter to All LWR Licensees from D. G. Eisenhut dated 2-23-80 - LWR Primary Coolant System Pressure Isolation Valves," dated March 14, 1980.

5. Letter, Stolz, John, F., "Order for Modification of License Concerning Primary Coolant System Pressure Isolation Valves," dated April 20, 1981.

6. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," dated June 1987.

7. Inspection Report No. 50-302/98-02, dated March 16, 1998.