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December 10, 1981

Mr. Robert L. Tedesco
Assistant Director of Licensing
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Response to Request for
Additional Information -
Reactor Systems

Dear Mr. Tedesco:

In a letter dated October 30, 1981, we provided responses to your concerns in the area of reactor systems. Subsequent review of our responses by your reviewer resulted in the need for additional clarification of one item. This letter forwards our response to this item. It is our intention to incorporate this response in a subsequent amendment to our Final Safety Analysis Report.

Very Truly Yours,

Dalwyn R. Davidson

Dalwyn R. Davidson
Vice President
System Engineering and Construction

DRD: mlb

Attachment

cc: M. D. Houston
G. Charnoff, Esq.
NRC Resident Inspector

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440.19 Response to the following TMI action items are required by to complete the review of Section 5.4.6.

(a) TMI Item II.K.1.22 - Auxiliary Heat Removal

A plant specific response describing Perry design provisions is required. References to BWR Owners' position and NEDO-25224 are not sufficient.

(b) We request that the applicant submit an acceptable response to the requirements included in Action Plan item II.K.3.13, possible need for separation of RCIC and HPCS initiation levels and restart capability of RCIC on low water lever (NUREG-0737)

(c) We request that the applicant submit an acceptable response for Item II.K.3.15, provisions for preventing inadvertent RCIC system isolation or trip.

Response

(a) Item II.K.1.22

Initial Core Cooling

Following a loss of feedwater and reactor scram, a low reactor water level signal (level 2) will automatically initiate main steam line isolation valve closure. At the same time this signal will put the HPCS and RCIC Systems into the reactor coolant make-up injection mode. These systems will continue to inject water into the vessel until a high water level signal (level 8) automatically trips the system.

Following a high reactor water level 8 trip, the HPCS System will automatically re-initiate when reactor water level decreases to low water level 2. The RCIC System will automatically re-initiate after a high water level 8 trip. (See response to II.K.3.13).

The HPCS and RCIC Systems have redundant supplies of water. Normally they take suction from the condensate storage tank (CST). The HPCS System suction will automatically transfer from the CST to the suppression pool if the CST water is depleted or the suppression pool water level increases to a high level.

The RCIC System suction is automatically transferred from the CST to the suppression pool, when the CST low level is reached.

The operator can manually initiate the HPCS and RCIC Systems from the control room before the level 2 automatic initiation level is reached. The operator has the option of manual control after automatic initiation and can maintain reactor water level by throttling system flow rates. The operator can verify that these systems are delivering water to the reactor vessel by:

a. Verifying reactor water level increases when systems initiate.
b. Verify systems flow using flow indicators in the control room.
c. Verify system flow is to the reactor by checking control room position indication of motor-operated valves. This assures no diversion of system flow to the reactor.

Therefore, the HPCS and RCIC can maintain reactor water level at full reactor pressure and until pressure decreases to where low pressure systems such as Low Pressure Core Spray (LPCS) or Low Pressure Coolant Injection (LPCI) can maintain water level.

Steam Condensing

This mode of RHR operation is manually initiated. Reactor pressure provides the head to supply steam to the RHR (A or B) heat exchangers via the RCIC steam lines. In the RHR heat exchangers, the steam is condensed by Emergency Service Water passing through the heat exchanger tubes. The condensate can be sent either to the suppression pool or the suction of the RCIC pump to maintain reactor vessel level. This mode of reactor water cooling is used to maintain the reactor in either a hot standby condition or to take it to a cold shutdown condition.

Containment Cooling

After reactor scram and isolation and establishment of satisfactory core cooling, the operator would start containment cooling. This mode of operation removes heat resulting from safety relief valve (SRV) discharge and RCIC turbine exhaust to the suppression pool. This would be accomplished by placing the Residual Heat Removal (RHR) System in the containment (suppression pool) cooling mode, i.e., RHR suction from and discharge to the suppression pool.

The operator could verify proper operation of the RHR system containment cooling function from the control room by:

a. Verifying RHR and Emergency Service Water (ESW) system flow using system control room flow indicators.

b. Verify correct RHR and ESW system flow paths using control room position indication of motor-operated valves.

c. On branch lines that could divert flow from the required flow paths, close the motor-operated valves and note the effect on RHR and ESW flow rate.

Even though the RHR is in the containment cooling mode, core cooling is its primary function. Thus, if a high drywell pressure signal or low reactor water level is received at any time during the period when the RHR is in the containment cooling mode, the RHR system will automatically revert to the LPCI injection mode. The Low Pressure Core Spray (LPCS) system would automatically initiate and both the LPCI and LPCS systems would inject water into the reactor vessel if the reactor pressure is below system discharge pressure.

Extended Core Cooling

When the reactor has been depressurized, the RHR system can be placed in the long term shutdown cooling mode. The operator manually terminates the containment cooling mode of one of the RHR containment cooling loops and places the loop in the shutdown cooling mode.

In this operating mode, the RHR system can cool the reactor to cold shutdown. Proper operation and flow paths in this mode can be verified by methods similar to those described for the containment cooling mode.

(b) Item II.K.3.13

CEI has endorsed the position of the BWR Owners' Group delineated in the letter from Mr. R. H. Buchholz to Mr. D. G. Eisenhut dated October 1, 1980. That portion is basically that "...the current design is satisfactory, and a significant reduction in thermal cycles is not necessary; "and" ...no significant reduction in thermal cycles is achievable by separating the setpoints."

Modification of the initiation logic for automatic restart of the RCIC system on low water level is being incorporated into the Perry design and will be incorporated in a later amendment.

(c) Item II.K.3.15

The BWR Owners' Group has evaluated this issue and has recommended the addition of a time delay to the HPCI/RCIC break detection circuitry. CEI has contracted with General Electric to provide this change to the RCIC steam line break detection circuitry. A description of this change will be included in a later amendment.