February 2, 2000

Mr. W. R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3 RE: HIGH PRESSURE COOLANT INJECTION SYSTEM REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MA4451, MA4452, AND MA4453)

Dear Mr. McCollum:

By letter dated December 16, 1998, Duke Energy Corporation submitted a proposed amendment for the Oconee Nuclear Station, Units 1, 2, and 3 High Pressure Coolant Injection System Technical Specifications. Subsequent information has been supplied by letters dated January 1, August 5, and October 4, 1999. We have reviewed this information and determined that additional information is needed before our review can be completed. Our specific questions are contained in the enclosure. As discussed with your staff, we request that your response be submitted by March 16, 2000.

Sincerely,

/RA/

David E. LaBarge, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosure: Request For Additional Information

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

HIGH PRESSURE INJECTION (HPI) SYSTEM

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

1. The revision to the Small Break Loss of Coolant Accident (SBLOCA) analyses has been proposed to credit three operator actions in the SBLOCA mitigation strategy. These actions are: (1) in the event one HPI train fails to automatically actuate, cross-connecting the HPI discharge headers within 10 minutes in order to provide HPI flow through a second HPI train; (2) feeding the steam generators (SGs) to the loss of sub-cooled margin setpoint with emergency feedwater; and (3) depressurizing and steaming the SGs using the atmospheric dump valves (ADVs). Operator action to cross-connect the HPI discharge headers was previously reviewed and approved by the staff in a Safety Evaluation dated December 13, 1978. The submittal indicates that the revised SBLOCA analysis does not revise in any way this operator action.

   Operator action is required to initiate Emergency Feedwater (EFW) flow and raise SG levels to the loss of subcooling margin setpoint if either Low Pressure Injection header flow indicates less than 1000 gallons per minute (gpm) flow. The "Full Power, Two HPI Pump Analyses" assume operator actions to begin to manually increase SG levels to the loss of subcooling margin setpoint will occur within 20 minutes of reactor trip for one SG and within 30 minutes for the second SG. The "Reduced Power, One HPI Pump Analyses" take credit for operator action to provide EFW flow to one SG within 20 minutes and to provide cooldown of one SG within 25 minutes. The submittal indicates that direction to initiate EFW flows to raise SG levels to the loss of subcooling margin setpoint is provided in the Emergency Operating Procedures (EOPs), and subcooling margin and low pressure injection (LPI) header flows can be monitored from the front control board using QA-1 instruments. Success is verified by monitoring increasing SG levels using Extended Startup Range Level Instrumentation.

   Information needed:

   The submittal indicates that operator action to perform this function has been validated though simulator exercise. The submittal does not provide any details concerning the validation process. Please provide sufficient details concerning the simulator exercises to substantiate that the validation process provides reasonable assurance that the operator actions can be performed within the allowed times in a reliable manner (e.g., how many crews were tested, the test conditions and assumptions, the range of completion times observed, and the acceptance criteria that was used). NRC Information Notice 97-78: "Crediting of Operator Actions In Place of Automatic Actions and Modifications of Operator Actions, Including Response Times" contains a listing of the items that the NRC typically reviews.

2. As stated in the Attachment 4, Enclosure 3 of the December 16, 1998, submittal:

   The reduced power SBLOCA analyses credit operator action to depressurize the SGs by the ADV opening flow paths. These analyses assume operator action within 25 minutes of

reactor trip. The following factors have been provided in the evaluation of the acceptability of crediting operator action:

a. Step 4.1 of CP-602 “SG Cooldown with Saturated RCS” directs the operators to maintain SG pressure less than RCS pressure. If SG pressure does not decrease as Turbine Bypass Valve (TBV) demand is increased, the EOP directs use of the ADVs.

b. The valves that must be operated to open flow paths for the ADVs are outside the control room but readily accessible (i.e., the valves are on the fifth floor of the turbine building, the same level as the control room. The valves are not expected to be in a harsh or inhospitable environment during a SBLOCA.

c. Two non-licensed operators (NLOs) are initially required to open the ADV flow path, but only one operator is required to throttle flow. One operator will be dedicated to throttling flow after initial opening of the valve. No additional support personnel or equipment are required.

d. Operators will communicate with the control room via hand held radio.

e. An EOP upgrade will require operators to check TBV operability as part of the second step of the Subsequent Actions sections of the EOP. If the TBVs are inoperable the NLOs will be dispatched immediately to prepare for steaming the generators with the ADVs.

f. An expert panel of representatives from Operations, Operator Training, Engineering, and Licensing reviewed the EOP and operator action and concluded that past Job Performance Measures (JPMs) and simulator cases for the relevant SBLOCAs support the adequacy of the assumed 25 minutes.

Information needed:

a. The submittal does not address whether the panel’s assessment assumed minimum staffing and the impact of any other tasks the assigned personnel may be required to perform for mitigating this event. The submittal should address these issues.

b. The submittal should address how much margin is available between the observed times in JPMs and simulator scenarios and the assumed 25 minutes available for this action. Some of this information was addressed in the October 4, 1999, submittal that described a validation effort involving simulator exercises. However, the submittal did not provide sufficient detail concerning the simulator exercises. Sufficient detail is needed for the staff to make a determination that the validity of the evaluation to determine the operators’ ability to reliably perform the actions within the time available. As described in the information needs described above, these details might include how many crews were tested, the test conditions and assumptions (e.g., minimum staffing, delays in personnel availability), the range of completion times observed, and the acceptance criteria that was used.

c. Regarding the October 4, 1999, submittal, it was not clear how many simulator runs were completed as part of the validation effort and how 2 crews were run on multiple scenarios. However, the crews were described as having no prior knowledge of the scenarios.

d. The October 4, 1999, submittal described transit times for the NLOs, but did not provide sufficient detail to determine if the transit times addressed the potential for the operators to be responding from remote areas of the plant. In addition, the submittal did not address whether the calculations of time for the NLOs to respond considered the possibility that those operators may be engaged in an activity that would require time for them to place a system or equipment in a safe state before they could respond to the event.

3. As stated in Attachment 4, Enclosure 2 of the December 16, 1998, submittal:

- The ADV flow path consists of the atmospheric dump block valve bypass (a 1" bypass), the atmospheric vent valve (a 12" block valve), the atmospheric dump control valve (a throttle valve), and the atmospheric vent block valve (an isolation). The throttle valve and isolation valve are in parallel and are located downstream of the atmospheric vent valve.

- The valves are not necessarily the same type from unit to unit or SG to SG on a given unit. The valves are clearly visible with labels identifying the valves in a manner consistent with the valve designations referenced in the EOP.

- Each of the valves is chain operated and none are reverse acting. The valves do not possess position indicators.

- The ADV should be opened prior to opening the throttle valve or isolation valve but there is no consequence of opening the valves out of sequence.

Information needed:

The submittal should address the ability to recover from credible errors or complications in performance of the task. For example, it would appear that the error of opening the throttle valve or the isolation valve before opening the block valve would delay/prevent pressure equalization across the block valve and could delay depressurizing the SGs. A potential complication would be operator difficulty in obtaining sufficient break-away force to unseat one of the chain operated valves.

4. Risk Analysis information needed:

a. Risk insights indicate that, during the proposed Limiting Conditions for Operation (LCOs), the risk associated with common cause failure(s) of the HPI system pumps and valves is an important consideration. If common cause failure(s) of HPI pump(s) and valve(s) exist during the proposed LCOs, the risk would be substantial. Discuss measures taken to decrease the risk due to potential common cause failure(s) if the proposed LCOs are entered for corrective maintenance reasons.

b. Would the Turbine Bypass System (TBS) function be protected during the proposed LCOs? Would a check on the TBS operability be made if the proposed LCOs were to be entered? Please discuss.

c. Provide assurance that there is procedural guidance for using Probabilistic Risk Assessment (PRA) techniques, as appropriate, to assess combinations of multiple equipment out of service simultaneously, and not only for pairs of systems/components as done in the Risk Assessment Matrix. Discuss the current practice of assessing combinations of multiple equipment out of service simultaneously using PRA techniques as appropriate.

d. Indicate how each of the Configuration Risk Management Program (CRMP) provisions (a) through (e) in RG 1.177 are met (e.g., applicable procedural guidance for each provision).

e. Although the limiting location SBLOCA initiator is not modeled in the Oconee PRA, this initiating event needs to be considered in CRMP assessments. Provide assurance that this initiator will be included in CRMP assessments as appropriate.

f. Discuss your assessment of the Incremental Large Early Release Probability for the SG tube rupture and the limiting location SBLOCA sequences if the proposed LCOs are entered for corrective maintenance reasons.

g. The HPI system is ranked for the Maintenance Rule Program as “high safety significance” and “low risk” because the Oconee PRA indicated a Risk Achievement Worth (RAW) of less than two. Discuss why the HPI system RAW is less than two. How does consideration of the limiting location SBLOCA initiator affect the HPI system RAW, and thus its Maintenance Rule Program relative risk ranking?

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