August 27, 2002

Mr. William R. Kanda
Vice President - Nuclear, Perry
FirstEnergy Nuclear Operating Company
P.O. Box 97, A200
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT - REQUEST FOR ADDITIONAL INFORMATION (RAI) FOR THE REVIEW OF INCLINED FUEL TRANSFER SYSTEM (IFTS) (TAC. NO. MB4694)

Dear Mr. Kanda:

By letter dated March 14, 2002, FirstEnergy Nuclear Operating Company, requested a license amendment for the Perry Nuclear Power Plant allowing removal of the IFTS blind flange for a limited time during power operation. The proposed license amendment request is considered risk-informed.

During the review, the Nuclear Regulatory Commission staff has identified that additional information is needed in order to complete the review. Specific questions are presented in the enclosed RAI.

The enclosed questions have already been discussed with your staff. Please respond to this RAI by September 30, 2002. If you have any questions concerning our review, or additional time is needed to respond to the RAI, please contact me at (301) 415-3154.

Sincerely,

/RA/

Stephen P. Sands, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosure: RAI

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION
FOR INCLINED FUEL TRANSFER SYSTEM (IFTS)
AT PERRY NUCLEAR POWER PLANT
DOCKET NO. 50-440

1. Based on the discussion in page 7 of Attachment 2, there will be sufficient water inventory for the suppression pool makeup system without taking credit of the water in the IFTS upper pool after the upper pool IFTS gate is installed. Page 6 of Attachment 2, indicates that an increase in lower-pool water level can be used indirectly to monitor the upper IFTS pool water level when the IFTS is in service and the lower pool gates must be removed. Why must the lower-pool gates be removed and the upper IFTS pool water level be monitored?

   Removing the lower gates accelerates IFTS water leakage, and depletion of water from the IFTS creates a potential containment bypass. Does the procedure of removing lower-pool gates worsen the problem of water leakage? If not, explain why.

2. Following a loss-of-coolant accident inside the containment with IFTS flange removed, the staff believes that it is important to hold the water seal in the IFTS as long as it could to avoid a containment bypass. Page 6 of Attachment 2, indicates that the water leakage can be detected in the control room by high-water-level annuciation for the fuel handling building. Following the leakage detection, what are the procedures and corrective actions for the operators to stop the leakage and mitigate the accident?

3. Page 10 of Attachment 2, indicates that there is a commitment established related to Amendment No. 88 requiring an assessment of drywell bypass leak tightness once per cycle. If the leak rate is exceeded, further investigation is required to ensure that the drywell integrity has not degraded. The acceptance criterion for this assessment is less than 1 percent of the design allowable drywell bypass leakage value of approximately 58,000 scfm. Please clarify the limit of 58,000 scfm. Is it the same as the limit specified in the Perry Nuclear Power Plant technical specifications?

   If the leak rate is exceeded, what are the actions that will be required and procedures that will be followed in the “further investigation?” Are there any procedures to alert warn the operators before opening the IFTS flange that higher risks may be associated with the high drywell leakage?

4. In order to assess the structural capability of the IFTS in beyond-design-basis events, please provide the following information:

   a. the safety class, design pressure, and estimated ultimate pressure capacity of the structures and components comprising the IFTS pressure boundary, specifically, the transfer tube, bellows, upper and bottom gate valves (1F42-F002 and 1F42-F004), drain line, and drain line isolation valves (1F42-F003 and 1G41-F607),

   b. clarification regarding the seismic qualification of the IFTS components (Note: on page 5 of 18 it is stated that the IFTS components (including IFTS tube, bottom valve, fill valve, vent tube, and drain valve) have been seismically-qualified, but on page 7 of 18 it is stated that these components are non-seismic),

c. the fragility curves (probability of failure as a function of containment pressure) for the major containment structures and penetrations (including the drywell, containment cylinder and dome, personnel airlocks, equipment hatches, and IFTS),

d. the composite fragility curve for the containment for the cases with the blind flange installed and the blind flange removed,

e. the seismic fragilities (e.g., the high confidence in low probability of failure values) of the IFTS-related structures (transfer tube, bellows, drain line, sheave box, and connected valves) and a comparison to the fragilities of the containment structure and penetrations, and

f. confirmation that the IFTS tube and connected components (including the bellows and lower gate valve) will have a greater ultimate pressure capacity than the containment even when the hydrostatic head of water on the IFTS tube is taken into consideration.

5. Provide separately for the IFTS bottom gate valve, the IFTS drain valves, and the flap valve, an estimate of the number of hours that each valve is expected to be open during the period while the blind flange is removed. Indicate how this time is apportioned: (a) among the major IFTS operations (e.g., system testing and maintenance, training of operating crews, and transferring new fuel into the containment storage pool prior to start of refueling outages, if applicable), and (b) over the proposed 60 day period when the blind flange is removed.

6. Although the proposed license amendment request does not provide for the movement of fuel, the flooding analysis discussion indicates that the bottom gate valve may be opened while the blind flange is removed. It is possible that the IFTS bottom gate valve would be open at the onset of a severe accident, with the fuel transfer carriage or cables part way through the open valve. Justify that an open bottom gate valve would be promptly closed in risk-significant events, thereby restoring containment leak-tight integrity. In this regard please provide the following:

a. identify systems required to move the fuel transfer carriage and close the IFTS bottom gate valve, and discuss the availability of these systems (or manual back-up systems) in frequency-dominant sequences,

b. provide an estimate of the core damage frequency (CDF) for those events that involve loss of systems needed to operate the carriage or close the valve, based on the latest probabilistic safety assessment (PSA),

c. confirm whether and how the carriage can be moved and the open valve can be closed in the frequency-dominant core damage events at Perry, including events that involve loss of power to the carriage or valve and loss of lighting, and

d. identify any plant procedures that would govern such actions.

7. In the flooding analysis, failure of the sheave box was “conservatively” modeled by postulating a circular opening equivalent to a hole of approximately 3 inches in diameter. Please explain why a 3-inch diameter opening is considered conservative given that spurious actuation of the flap valve would result in a much larger flow area. Discuss the impact on the flooding analysis (including operator actions) if the flow rate is based on spurious actuation of the flap valve rather than a 3-inch diameter opening.

8. With the blind flange removed there is typically only a single barrier to fission product release (not including the water seal, which would clear in many beyond-design-basis events), and the plant is more susceptible to upper pool drain down and uncontrolled releases. A commitment to maintain the IFTS upper gate valve and both IFTS drain line valves closed during periods when the IFTS is not operating (such as nights and weekends) would enhance defense-in-depth with regard to containment integrity. Please address the merits and rationale for not incorporating such a commitment.

9. Please discuss the support systems required to ensure the availability of the fuel handling building area exhaust system, and whether these systems would be available in the frequency dominant core damage sequences, including loss of offsite power and station blackout events.

10. Please provide and discuss the accident frequency on which the increase in CDF of 3.0E-9 per reactor-year (on page 13 of 18) is based.