August 30, 1999

Mr. Guy G. Campbell, Vice President - Nuclear
FirstEnergy Nuclear Operating Company
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 IPEEE - REQUEST FOR ADDITIONAL INFORMATION (TAC NO. M83613)

Dear Mr. Campbell:

We have reviewed your August 21, 1998, response to our March 18, 1998, request for additional information (RAI), and have determined that we need additional information to complete our review. A supplemental RAI related to the fire and seismic analyses of the individual plant examination for external events (IPEEE) is enclosed. The RAI on fire was developed by our contractor, Sandia National Laboratories (SNL); the RAI in the seismic area was developed by Brookhaven National Laboratory (BNL). All questions were reviewed by the Senior Review Board (SRB). The SRB is comprised of NRC staff and consultants with expertise in probabilistic risk assessment for external events.

These questions were discussed with Mr. D Wuokko, et. al., of your staff on August 3, 1999. As was agreed to by your staff, please provide a response to these questions within 60 days. If you find that additional work is required to answer these questions (i.e., additional plant walk-downs), within 60 days please provide your schedule for completing this work. If you have any questions concerning our review, or if you determine that you can not provide the requested information within 60 days, please contact me at (301) 415-1321.

Sincerely,
Original Signed By
Stewart N. Bailey, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: As stated

cc w/encl: See next page

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NAME	SBailey		EBarnhill		ARubin*		AMendiola	
DATE	8/26/99		8/26/99		/ /99		8/27/99	

*concur by memo dated 4/6/99

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Request for Additional Information (RAI) on Davis-Besse Individual Plant Examination of External Events (IPEEE)

Fire

1. Original RAI No. 7:

In the event of a control room (CR) fire, re-entry is credited for the operation of long-term decay heat removal functions (provided associated controls are not damaged) which would not be required for several hours. It is assumed that operators could re-occupy the control room "within no more than a few hours (nominally 1 to 3 hours) after the evacuation." It is also stated in Section 4.2.6.3 that "it was assumed that there was negligible probability that the Control Room could not be occupied before long-term actions to preserve core cooling (those that would be relevant 12 to 24 hours after the Control Room was evacuated) would be needed." In the Control Room Summary (Section 4.2.6.6) it is noted that even if the Control Room must be evacuated, options for core cooling remain available. The re-occupation of the Control Room is again assumed "such that additional options could be implemented for long-term cooling."

Please discuss the basis for assuming that the Control Room could be re-entered in the event of a fire. Include a description of the fire scenarios which are dependent on this assumption. For each scenario, describe the systems that would be available, consistent with the associated fire suppression time and assumed damage, for successfully maintaining long-term core cooling. In the analysis, consider available systems and controls inside or outside the Control Room, and discuss the potential for success of the options available for each scenario.

Licensee Response/Evaluation:

The response stated that no CR actions that would be needed within the first several hours after a fire were credited in the fire analysis. It was further assumed that equipment failed by a fire in a CR cabinet would not be recoverable even if the CR was re-occupied. The response discussed the limited number of long-term actions that were credited in the analysis. Descriptions of the relevant scenarios, including systems involved, were provided. In general, CR reentry requirements and actions, and actions outside the CR were discussed in general terms. Except for one scenario, the approximate times required to implement the required actions for each scenario were provided. However, important issues affecting the likelihood of success of the scenarios were not discussed in the response.

Supplemental RAI:

For the scenarios discussed in your original response, please discuss the assumptions made concerning the availability of the necessary equipment, either inside or outside the CR, at the time of reentry into the CR. The response to the original RAI stated that it was assumed that equipment failed by a fire in a CR cabinet would not be recoverable even if the CR was re-occupied. To complete the response, please provide the following:

ENCLOSURE

(a) The assumptions used in the analysis concerning the effects of fire and fire fighting actions on the required equipment during the time the CR is unoccupied.

(b) Based on the assumptions in (a), a discussion of the availability of the equipment credited in the recovery analysis after the CR is re-entered and recovery is initiated.

(c) The extent to which the actions necessary to insure success, i.e., maintain long-term core cooling, have been proceduralized

2. Original RAI No. 6:

It is important that the human error probabilities (HEPs) used in the screening phase of the analysis properly reflect the potential effects of fire (e.g., smoke, heat, loss of lighting), even if these effects do not directly cause equipment damage in the scenarios being analyzed. If these effects are not treated, the HEPs may be optimistic and result in the improper screening of scenarios. Note that HEPs which are conservative with respect to an internal events analysis could be non-conservative with respect to a fire risk analysis.

Please identify: a) the scenarios screened out from further analysis whose quantification involved one or more HEPs, b) the HEPs (descriptions and numerical values) for each of these scenarios, and c) how the effects of the postulated fires were treated.

Licensee Response/Evaluation:

The response stated that when human recovery actions were applied during review of the cut sets, the intent had been to not credit human actions that would be impacted by a fire or human action that would be ineffective due to equipment failure. However, a review of the cut sets revealed that credit for human actions had been taken inappropriately in some cases. All human actions were then reviewed, and justification for credit taken was documented. The review was based on criteria for CR events, long-term events (4 hours after scenario initiation), and actions that are not long term but are performed in areas not affected by the fire.

The review determined that some events used in the screening had used IPE values which did not meet the above criteria. Five areas comprising 17 compartments were found to be affected. The core damage frequencies (CDFs) for these compartments were recalculated using a probability of 1.0 for short-term actions that must be performed in the fire compartment or require the operator to travel through the affected compartment. Except for one compartment (service water valve room), the CDFs all remained below the 1E-6/yr screening value. For the service water valve room it was found that the failure of a valve in the open position due to a hot short had a significant effect on the CDF. The human action involving isolation of the service water was reevaluated considering that the required action, though less preferred and more complex, could be taken outside the fire area. Using this approach, the CDF was reduced from the original HEP adjusted value of 1.1E-5/yr to 7.4E-7/yr. However, the response did not indicate if the actions that resulted in the change in CDF had been incorporated into the plant procedures.

Supplemental RAI:

Please discuss the extent to which the actions necessary to insure success, (i.e., isolate service water) using the alternate method described in the RAI response have been incorporated into plant procedures.

Seismic

Since Davis Besse was identified as a "0.3g Focused Scope Plant" in NUREG-1407, the staff's expectation was that a plant high-confidence low probability of failure (HCLPF) capacity would be calculated in the seismic IPEEE. FirstEnergy has indicated that the Unresolved Safety Issue (USI) A-46 program and the seismic IPEEE were conducted concurrently. Additional items were included in the USI A-46 safe shutdown equipment list (SSEL) to create a combined SSEL, applicable to IPEEE also. Review of the Davis Besse USI A-46 Seismic Evaluation Report and responses to the USI A-46 RAI indicates that the seismic demand predominately used in the USI A-46 evaluation was obtained by scaling recently generated IPEEE in-structure response spectrum (IRS). The IPEEE IRS were based on the NUREG/CR-0098 median spectral shape anchored at 0.3g peak ground acceleration (PGA) and an updated seismic analysis of the plant building structures (Reactor Building; Auxiliary Building; Areas 6, 7, and 8; and Intake Structure). The identified scale factor is 0.697 which translates to a PGA of about .21g. For the IPEEE, building structures were screened using Electric Power Research Institute (EPRI) NP-6041 Table 2-3. Masonry block walls were identified to have very little capacity margin above the Davis Besse design basis seismic input.

Please provide the following information and an estimate of the plant HCLPF capacity based on the IPEEE review level earthquake (RLE):

1) HCLPF capacity for building structures

2) Minimum HCLPF capacity for the SSEL (including tanks), both after resolution of USI A-46 outliers, and after implementation of any additional IPEEE-related plant improvements

3) Minimum HCLPF capacity for masonry block walls which may seismically interact with SSEL items

Please also provide a description of the methodology used to estimate these HCLPF capacities.

High Wind, Flood and Other External Events (HFO)

There is no RAI in the HFO area.