

September 24, 2004

Mr. L. William Pearce  
Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
Post Office Box 4  
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2) -  
REQUEST FOR ADDITIONAL INFORMATION (RAI) - EXTENSION OF  
EMERGENCY DIESEL GENERATOR (EDG) ALLOWED OUTAGE TIME (AOT)  
(TAC NOS. MC3331 AND MC3332)

Dear Mr. Pearce:

The Nuclear Regulatory Commission (NRC) staff has reviewed the information provided in your May 26, 2004, license amendment application to extend the BVPS-1 and 2 EDG AOTs to 14 days. The NRC staff has determined that the additional information (RAI) contained in the enclosure to this letter is needed to complete its review. As discussed with your staff, we request your response by October 29, 2004, in order for the NRC staff to complete its scheduled review of your submittal.

Sincerely,

**/RA/**

Timothy G. Colburn, Senior Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosures: RAI

cc w/encl: See next page

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ACCESSION NO. ML042600183

\*Input received. No substantive changes made

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DATE	9/20/04	08/31/2004	9/21/04

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REQUEST FOR ADDITIONAL INFORMATION  
RELATED TO FIRSTENERGY NUCLEAR OPERATING COMPANY (FENOC)  
BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2)  
EMERGENCY DIESEL GENERATOR (EDG) ALLOWED OUTAGE TIME (AOT)  
DOCKET NOS. 50-334 AND 50-412

1. Section 4.3.2 of the license amendment request (LAR) states that the BVPS-1 and 2 probabilistic risk assessment (PRA) models underwent a Westinghouse Owners' Group Peer Review in July 2002. Please provide the following information: (Regulatory Guide (RG) 1.174, Section 2.2.3; RG 1.177, Section 2.3.1)
  - a. The LAR states that the Peer Review focused primarily on the Unit 2 PRA, but the Review Team was provided with Unit and PRA modeling differences. Please provide a summary of the differences between Unit 1 and 2, and the impact these differences have on the risk assessment of the proposed EDG AOT extension.
  - b. The LAR states that seismic and fire risk are directly included with the internal events and internal flood initiators in the BVPS-1 and 2 PRA models. The Westinghouse Peer Review process utilizes NEI 00-02, which addresses at-power, internal events PRAs. For seismic and fire risk, please describe your quality activities to ensure that the PRA is adequate for the present application in terms of scope, level of detail, and technical acceptability and provide a summary of any peer reviews, comparison studies, or similar evaluation of the seismic and fire modeling.
2. FENOC provided a summary of the BVPS-2 Peer Review Findings and Observations (F&Os) in a previous letter (Pearce/USNRC, Beaver Valley Power Station, Unit No. 2, BV-2 Docket No. 50-412, License No. NPF-73, Response to a Request for Additional Information in Support of License Amendment Requests [sic] No. 180, dated October 24, 2003, Serial L-03-160). Please provide additional information related to the EDG AOT extension request as follows: (RG 1.174, Section 2.2.3; RG 1.177, Section 2.3.1)
  - a. Corrective Action 02-09042-13 resolved an F&O involving comparative failure probabilities between EDGs and related circuit breakers. Please provide the original and updated failure probabilities for the affected component failure modes, for both BVPS-1 and 2 PRA models.
  - b. Corrective Action 02-09042-15 involved BVPS-1 EDG unavailability during outages and the impact on credit for the station blackout (SBO) cross-tie to supply BVPS-2. The resolution states that BVPS-1 EDG unavailability during shutdown was subsequently included. Has BVPS-2 EDG unavailability during

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shutdown been included in the BVPS-1 PRA modeling of the SBO cross-tie from BVPS-2?

- c. For any F&Os unique to BVPS-1, provide a summary of the F&O and its resolution. Please provide confirmation that all Category A and B F&Os on BVPS-1 were resolved prior to the risk assessment of the proposed EDG AOT extension or provide a justification that the resolution is not a significant issue related to the requested EDG AOT change.
3. The LAR states that the electric power recovery model "... credits more scenarios with recovery of the fast bus transfer breakers, emergency diesel generators, and the offsite grid." Please describe the model or method used to recover EDGs, including whether this involves repair of emergency diesel generators during the accident sequence. Please explain how the non-repair probabilities were derived. How was the EDG recovery model adjusted to account for the increasing the EDG AOT to 14 days? (RG 1.174, Section 2.2.2; RG 1.177, Section 2.3)
4. Section 3.3 of the LAR discusses the SBO cross-tie circuitry in the context of station blackout, stating that the BVPS-1 and 2 normal 4KV buses can be cross-tied to allow an EDG from one unit to power SBO loads at both units. Please provide the following information: (RG 1.174, Section 2.2.2; RG 1.177, Section 2.3)
  - a. What is the basic human error probability and importance (e.g., Fussell-Vesely) for the operator action to cross-tie the buses? How is dependency among operator actions within a given scenario/sequence addressed when failure to cross-tie is part of the sequence? Describe the operator training content and periodicity for this action. Has the cross-tie capability ever been demonstrated?
  - b. How is the smaller capacity of the BVPS-1 EDGs compared to BVPS-2's (2850kW versus 4535kW) addressed in the PRA modeling?
5. Is the BVPS non-safety-related diesel generator credited in the PRA models? If "yes," please provide the basic human error probability and importance (e.g., Fussell-Vesely) of this credit for BVPS-1 and 2. (RG 1.174, Section 2.2.2; RG 1.177, Section 2.3)
6. Please show how the additional 184.4 hours (BVPS-1) and 126.33 hours (BVPS-2) of EDG unavailability were derived, including breakdown by surveillance testing, preventive maintenance (PM) and corrective maintenance (CM). Explain why BVPS-1 and 2 numbers are different.
7. The LAR states, in the discussion of Tier 1, that "... past corrective maintenance repair durations were increased by the ratio of the proposed AOT increase when estimating corrective maintenance durations under the proposed AOT." Is this increased duration included in the increase in mean EDG unavailability used to calculate the Case 2 risk? How was the difference in treating common cause failure between CM and PM accounted for in Case 1 and Case 2? (RG 1.174 Section 2.2.1; RG 1.177 Section 2.3.3.1)

8. Please provide a discussion on the effects of the proposed AOT extension on dominant accident sequences (sequences that contribute more than 5% to risk, for example) to show that the proposed change does not create risk outliers or exacerbate existing risk outliers. Please provide core damage contributions by initiating event (including seismic and fire) and by sequence type for Cases 1 and 2. (RG 1.174, Section 3.3.1)
9. Commitment # 3 in Attachment C to the May 26, 2004 application states: "If an EDG is unavailable, an EDG on the opposite unit will be removed from service only for corrective maintenance ...." Under the proposed 14-day AOT, it would appear that one EDG from one unit could be out-of-service for PM and one EDG from the other unit could be out-of-service for CM for almost the full 14 days. The risk assessment for this scenario was not included in the submittal. Please provide a risk assessment for the case where one EDG from one unit is in PM and one from the other unit is in CM at the same time or provide justification to prevent such an occurrence. (RG 1.174, Section 2.2.2; RG 1.177 Section 2.3)
10. The LAR says that Table 5 was developed using Cases 3, 4, 5 and 6. If Case 5 is compared to Case 1, the incremental conditional core damage probability (ICCDP) over 12 hours would appear to be  $4.3\text{E-}7$  (BVPS-1) and  $2.7\text{E-}6$  (BVPS-2) compared to  $4.75\text{E-}8$  and  $4.93\text{E-}7$ , respectively, shown in Table 5. Please explain how Table 5 was developed. (RG 1.174, Section 2.2.2; RG 1.177 Section 2.3)
11. Please explain the following with respect to the risk assessment: (RG 1.174, Section 2.2.2; RG 1.177 Section 2.3)
  - a. Why is BVPS-2 core damage frequency (CDF) so much more sensitive to EDG dependability than BVPS-1? Example 1: Table 2 shows delta CDF for BVPS-2 is  $1.24\text{E-}6$  greater than BVPS-1 delta CDF, even though the increase in EDG unavailability is smaller for BVPS-2. Example 2: Table 1 indicates a greater percent increase in BVPS-2 CDF than BVPS-1 for Cases 2 through 6.
  - b. Why is BVPS-2 large early release frequency (LERF) less sensitive to EDG dependability than BVPS-1? Example: The percent increase in LERF for Cases 5 and 6 is much smaller for BVPS-2 than for BVPS-1?
  - c. Why is BVPS-2 LERF for Cases 3 and 4 less than Case 1, even though the respective CDF values are greater than Case 1?
  - d. Why is Unit 1 Case 6 LERF higher than Case 5 LERF, when the corresponding CDF is lower?
  - e. In Tier 1 of the LAR, the BVPS-2 EDG unavailability is estimated to increase to 156.8 hours per year per EDG. Table 3 shows a total of 389.7 hours per year EDG unavailability, which corresponds to 194.85 hours per year per EDG. Please explain this difference in estimated unavailability.
  - f. In Table 4 of the LAR, please explain why BVPS-2 incremental conditional large early release probability (ICLERP) is "risk neutral" with an EDG out of service, but BVPS-1 demonstrates an increase under the same conditions?

12. Discuss and provide information on the reliability and availability of offsite power sources relating to the proposed change. Provide the basis the loss of offsite power (LOOP) frequencies and non-recovery probabilities used in the PRA models. Were they adjusted as a result of the New York area blackout of August, 2003? If not, why not? How is the potential for loss of offsite power given a non-LOOP initiating event (e.g., "consequential LOOP") modeled in the BVPS-1 and 2 PRA models? (RG 1.174, Section 2.2.2; RG 1.177 Section 2.3)
13. The LAR proposes to change footnote (1) of Technical Specification (TS) 3.8.1.1 as follows: "Required actions may be delayed for up to 7 days if the diesel generator(s) is inoperable solely due to the fuel oil contained in the storage tanks not meeting the properties in accordance with [TSs] 4.8.1.1.2.d.2 or 4.8.1.1.2.e." This proposed change appears to have two impacts: (1) Extends from 24 hours to 7 days the actions to verify operability of the other diesel or determine that no common mode failure is present; and (2) The time to return the fuel oil to within specifications is not longer explicitly stated and could be interpreted as up to 21 days (i.e., 7 + 14).

Please clarify the intent of the proposed change to this footnote. What experience has the site had with fuel oil not meeting the surveillance requirements in TS 4.8.1.1.2.d.2 or TS 4.8.1.1.2.e? Is there an increasing trend in failure to meet these specifications? (RG 1.174, Section 2.2.2; RG 1.177 Section 2.3)

Beaver Valley Power Station, Unit Nos. 1 and 2

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