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February 23, 2005
L-05-010

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Response to Request for Additional Information in Support of LAR No. 309 and No. 181 to Increase Surveillance Test Interval for Reactor Trip System and Engineered Safety Features Actuation System Instrumentation

This letter provides the FirstEnergy Nuclear Operating Company (FENOC) response to an NRC request for additional information (RAI) dated December 14, 2004, relating to FENOC letter L-04-077 dated June 2, 2004.

FENOC letter L-04-077 submitted License Amendment Request (LAR) No. 309 for Beaver Valley Power Station (BVPS) Unit No. 1 and LAR No. 181 for BVPS Unit No. 2. This amendment request proposed changes to the BVPS Unit No. 1 and Unit No. 2 Technical Specifications that would increase the surveillance test interval from monthly to quarterly for certain Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS) instrumentation.

The FENOC response to the request for additional information is provided with this letter as an enclosure.

The information provided with this submittal does not change the evaluations or conclusions of the No Significant Hazards Consideration presented in FENOC letter L-04-077. No new regulatory commitments are included in this submittal. If there are any questions concerning this matter, please contact Mr. Henry L. Hegrat, Supervisor - Licensing, at 330-315-6944.

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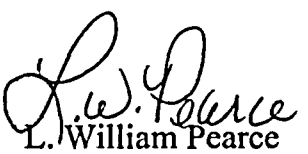
I declare under penalty of perjury that the foregoing is true and correct. Executed on February 23, 2005.

Sincerely,



L. William Pearce

Enclosure and Attachments:

FENOC Response to the Request for Additional Information

Attachments to Enclosure

1. Conduct of Maintenance Procedure (1/2-ADM-0817)
2. Beaver Valley Units 1 and 2 Drift Evaluation Results for RTS/ESFAS Relay Instrumentation (Calculation Number 10080-DEC-0222, Revision 0, dated October 16, 2000)
3. Evaluation for Extension of Selected RPS and ESFAS Technical Specification Channel Functional Test from Monthly to Quarterly (TER 13477)
4. Beaver Valley Unit 2 - 4.16KV Emergency Bus Undervoltage - Degraded Voltage (Calculation Number 10080-DEC-0211, Revision 1, dated March 16, 2004)

c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, NRC Sr. Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP (w/o Enclosure, Attachments 1, 2, 3 and 4)
Mr. L. E. Ryan (BRP/DEP) (w/o Enclosure, Attachments 1, 2, 3 and 4)

Enclosure to Letter L-05-010

BEAVER VALLEY POWER STATION, UNIT NO. 1 AND NO. 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)
RELATED TO INCREASE SURVEILLANCE TEST INTERVAL FOR SELECTED
REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES
ACTUATION SYSTEM INSTRUMENTATION

By letter dated June 2, 2004, FirstEnergy Nuclear Operating Company (the licensee) requested an amendment to the BVPS-1 and BVPS-2 Technical Specifications (TSs) to increase the surveillance test interval for selected reactor trip system and engineered safety features actuation system instrumentation. The Nuclear Regulatory Commission (NRC) staff has determined that the additional information below is needed to complete its review of the licensee's application.

1. The procedure for conducting an RTS surveillance should require an evaluation of any RTS channel test failure to determine if that failure could result in a common-cause failure. The Nuclear Regulatory Commission (NRC) staff would need to verify this by reviewing the licensee's procedure or have the licensee demonstrate how the licensee's procedure determines if the failure could be a common-cause failure.

Response:

A copy of the Conduct of Maintenance procedure (1/2-ADM-0817) is provided as Attachment 1 to this enclosure. Section 7.4.5.7, Common Cause Evaluation for Reactor Protection System / Engineered Safety Feature (RPS/ESF) Channel Failure, requires an evaluation documented through the Condition Report process to consider whether the failure was caused by a condition which could also exist in redundant channels.

2. The licensee evaluated the setpoint drift for these relays using data from past calibrations and surveillances in a year-2000 study. The NRC staff requests that the licensee provide its year-2000 study and supporting analysis and justification that concludes that the extended surveillance interval is adequately accounted for in the instrument setpoint drift calculations for undervoltage and underfrequency RTS relays and undervoltage and degraded voltage ESFAS relays. If the proposed extended surveillance is based on any new setpoint calculations not previously approved, the NRC staff requests the licensee provide the methodology and calculations for review or otherwise confirm that no new setpoint methodologies or calculations form the basis for the requested surveillance extension.

Response:

The Year 2000 setpoint drift calculation entitled "Beaver Valley Units 1 and 2 Drift Evaluation Results for Reactor Trip System / Engineered Safety Features Actuation System (RTS/ESFAS) Relay Instrumentation" (Calculation Number 10080-DEC-0222, Revision 0) is provided as Attachment 2 to this enclosure. This calculation used trended Beaver Valley

drift data to calculate a new drift term for the affected relays in support of the proposed quarterly calibrations.

Provided as Attachment 3 is an Evaluation for Extension of Selected Reactor Protection System and Engineered Safety Feature Actuation System (ESFAS) Technical Specification Channel Functional Test from Monthly to Quarterly (Technical Evaluation Report [TER] 13477). TER 13477 compared the existing drift terms for the affected relays from the existing setpoint calculation to the new drift terms from the Year 2000 setpoint drift calculation. In all cases but one, the newly calculated drift terms were less than the existing drift terms for the affected relays, or the effect on margin was negligible. The one exception was the drift term associated with the setpoint calculated for BVPS-2 Functional Unit 6.b (4.16kv Emergency Bus Degraded Voltage).

Setpoint calculation 10080-DEC-0211, Revision 1, for BVPS-2 Functional Unit 6.b was revised only to reallocate margin. The setpoint was not changed as a result of this calculation. Calculation 10080-DEC-0211, Revision 1, is provided as Attachment 4. No other setpoint calculations and no new setpoint methodologies were prepared or revised to provide a basis for the proposed surveillance extension.

The TER 13477 evaluation dated October 16, 2000 concluded that sufficient margin exists to extend the Technical Specification Surveillance Requirements for the evaluated functions from monthly to quarterly. Evaluated functions include undervoltage and underfrequency Reactor Trip System relays and undervoltage and degraded voltage ESFAS relays. It was confirmed in March of 2004 that the results of this evaluation (TER 13477) are still valid for all the affected relay functions, and are still valid to support a license amendment submittal requesting surveillance extensions.

3. Regarding applicability of the generic analysis to BVPS-1 and 2, the licensee stated that the remaining changes have been analyzed by Westinghouse using the methodology employed by WCAP-10271. The NRC staff requests the licensee discuss in greater detail the applicability of WCAP-10271 to its facilities.

Response:

The remaining changes have been evaluated by Westinghouse using the approach employed by WCAP-10271 and WCAP-14333. The approach employed in WCAP-14333 is consistent with the approach established in WCAP-10271 (i.e. the use of fault tree models, signals, component reliability database, etc.).

Signals associated with the remaining changes were not specifically included in the generic work documented in WCAP-10271 with Supplements 1 and 2. The remaining changes, including Refueling Water Storage Tank (RWST) functional units and Loss of Power functional units, were evaluated to demonstrate that the WCAP-10271 (plus Supplements 1 and 2) surveillance test intervals are applicable to these plant-specific signals.

REFUELING WATER STORAGE TANK LEVEL FUNCTIONAL UNITS
1.1.c (BVPS-1) and 1.1.b (BVPS-2)

Evaluation of the RWST functional units was required because WCAP-10271 and supplements only evaluated an RWST level coincident with a high containment sump and Safety Injection signal. The BVPS configurations do not contain a signal input from the containment sump.

RWST functional units were evaluated using similarity arguments. Similarity arguments compared the type of logic cabinet, the type of channel logic, number of slave relays and number of master relays for the configurations being analyzed for BVPS to the configurations that were analyzed and approved by the NRC in WCAP-10271 and WCAP-14333. For the RWST signals, the acceptance criteria is based on Regulatory Guide (RG) 1.174 which states that increases in Core Damage Frequency (CDF) of less than 1E-06/yr are considered small and acceptable.

The impact of the RWST transfer to recirculation signal unavailability was analyzed by comparison of the BVPS signal logic and parameters to those of the AFWPS (Auxiliary Feedwater Pump Start w/Common Cause Failures) case as analyzed in WCAP-14333.

A comparison of the BVPS RWST signal with the AFWPS signal on steam generator low-low signal with a 2/4 signal logic and with Solid State Protection System logic cabinets analyzed in WCAP-14333 concluded that the two channels shared enough similarity to be acceptable for comparison. Because BVPS-2 contains an extra slave relay, the BVPS-2 RWST signal was used as the basis for the assessment since it will produce a more conservative result with a higher failure probability. In addition, because BVPS allows an RWST channel to be placed in bypass for an unlimited length of time, the analysis was performed assuming one channel in bypass and a 2/3 logic for the entire fuel cycle. This results in a more conservative analysis.

Analysis of the RWST signals resulted in an increase in CDF of 1.41E-07. This is considered to be a very small impact on CDF as defined in RG 1.174 (less than 1E-06/yr). Based on the limited increase in CDF it is concluded that the increase in surveillance test intervals is acceptable for the RWST transfer to recirculation signal at BVPS Units 1 and 2.

LOSS OF POWER FUNCTIONAL UNITS
6.a (BVPS-1), 6.b (BVPS-1), 6.a.1 (BVPS-2), 6.a.2 (BVPS-2), 6.b (BVPS-2), and 6.c (BVPS-2)

Evaluation of the Loss of Power functional units was required because WCAP-10271 and supplements evaluated the Loss of Power function relays for a 4 channels/bus configuration, which is different from the BVPS configurations.

Loss of power functional units were evaluated using a fault tree analysis. The increase in the signal failure probability resulting from the increased surveillance test interval is compared with the failure probability of the component being actuated. If it is judged that the impact on signal failure probability is small, in comparison to the failure probability of the actuated component, then the surveillance test interval changes are acceptable. Fault tree models were developed consistent with the fault tree models developed in

WCAP-10271 and WCAP-14333. Data for component failure probabilities are taken from appropriate sources including plant-specific data.

Fault trees were developed and quantified using the failure probabilities provided for both the pre-Technical Specification Optimization Program (Pre-TOP) and Proposed cases. The same fault tree logic was used for both of the Pre-TOP and Proposed cases, but quantified with different failure probabilities due to the increase in the surveillance test interval, and changes in AOTs and bypass test times. The analysis considered operator action as a backup to the automatic signals. The increase in signal failure probability resulting from the increased surveillance test interval was compared with the failure probability of the component being actuated. The general guidance used was that the impact on the signal failure probability should be at least two orders of magnitude lower than the failure probability of the actuated component. A change this small in magnitude will have a negligible impact on the reliability of the associated mitigation component and system, and essentially no impact on plant risk.

BVPS-1: 4kV Emergency Bus Undervoltage- Loss of Voltage (trip feed and start DG)-functional unit 6.a.

The signals for both the "trip of the normal electrical power to the emergency bus" and "start the diesel on the emergency bus" functions were evaluated by fault tree analysis. The increase in the signal unavailability was obtained by calculating the difference between the pre-Technical Specification Optimization Program (TOP) case and the Proposed Case. Signal unavailability results are as follows:

Trip the normal electrical power	Pre-TOP case is 5.274E-03 Proposed case is 5.281E-03 Increase in signal to start (automatic or operator action) = 7E-06
Start the diesel	Pre-TOP case is 3.703E-03 Proposed case is 3.710E-03 Increase in signal to start (automatic or operator action) = 7E-06

The diesel generator failure to start probability for BVPS-1 is 9.92E-03/demand. The impact of the changes on the signal unavailability is 7E-06. The small increase in failure probability due to the proposed changes is acceptable based on the negligible impact on the probability of the diesel generator failing to start, and therefore, the negligible impact on plant risk.

BVPS-1: 4kV and 480V Emergency Bus Undervoltage- Degraded Voltage-functional unit 6.b.

The signals for the 4kV and 480V degraded voltage functions were evaluated by fault tree analysis. The increase in the signal unavailability was obtained by calculating the difference between the pre-Technical Specification Optimization Program (TOP) case and the Proposed Case. Signal unavailability results are as follows:

Start the diesel	Pre-TOP case is 3.606E-03 Proposed case is 3.616E-03 Increase in signal to start (automatic or operator action) = 1.0E-05

The diesel generator failure to start probability for BVPS-1 is 9.92E-03/demand. The impact of the changes on the signal unavailability is 1.0E-05. This represents a very small impact on the reliability of successfully starting the diesel generator; therefore, it is concluded that this change will have a negligible impact on probability of the diesel generator failing to start and negligible impact on plant risk.

BVPS-2: 4kV Emergency Bus- Undervoltage (trip feed) – functional unit 6.a.1.

The signals for the "trip of the normal electrical power to the emergency bus" functions were evaluated by fault tree analysis. The increase in the signal unavailability was obtained by calculating the difference between the pre- Technical Specification Optimization Program (TOP) case and the Proposed Case. Signal unavailability results are as follows:

Trip the normal electrical power	Pre-TOP case is 4.700E-03 Proposed case is 4.714E-03 Increase in signal to start (automatic or operator action) = 1.4E-05

The diesel generator failure to start probability for BVPS-2 is 2.78E-03/demand. The impact of the changes on the signal unavailability is 1.4E-05. The small increase in failure probability due to the proposed changes is acceptable based on the negligible increase in the probability of the diesel generator failing to start, and therefore, the negligible impact on plant risk.

BVPS-2: 4kV Emergency Bus- Undervoltage (start diesel) – functional unit 6.a.2.

The signals for the "start the diesel" functions were evaluated by fault tree analysis. The increase in the signal unavailability was obtained by calculating the difference between the pre- Technical Specification Optimization Program (TOP) case and the Proposed Case. Signal unavailability results are as follows:

Start the diesel	Pre-TOP case is 7.600E-04 Proposed case is 7.672E-04 Increase in signal to start (automatic or operator action) = 7.2E-06

The diesel generator to start probability for BVPS-2 is 2.78E-03/demand. The impact of the changes on the signal unavailability is 7.2E-06. The small increase in failure probability due to the proposed changes is acceptable based on the negligible impact on the probability of the diesel generator failing to start, and therefore, negligible impact on plant risk.

BVPS-2: 4kV and 480V Emergency Bus- Degraded Voltage- functional units 6.b and 6.c.

The signals for the 4kV and 480V degraded voltage signal were evaluated by fault tree analysis. The increase in the signal unavailability was obtained by calculating the difference between the pre-Technical Specification Optimization Program (TOP) case and the Proposed Case. Signal unavailability results are as follows:

Start the diesel	Pre-TOP case is 7.643E-03 Proposed case is 7.652E-03 Increase in signal to start (automatic or operator action) = 9E-06

The diesel generator failure to start probability for BVPS-2 is 2.78E-03/demand. The impact of the changes on the signal unavailability is 9E-06. This represents a very small impact on the probability of the diesel generator failing to start; therefore, it is concluded that this change will have a negligible impact on diesel start reliability and a negligible impact on plant risk.