



FirstEnergy Nuclear Operating Company

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L-07-075

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

**Subject: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Response to Request for Additional Information
Regarding March 28, 2007 Proposed Alternatives and Relief Requests
(TAC Nos. MD5120, MD5121, MD5122, MD5125, MD5128, and
MD5130)**

FirstEnergy Nuclear Operating Company (FENOC) submitted thirteen (13) 10 CFR 50.55a requests associated with pump testing requirements (including the Pump Relief Request 1 [PRR1]), and one 10 CFR 50.55a request associated with valve test requirements in a March 28, 2007 letter (Number L-07-056). A copy of the fourth ten-year interval update of the Beaver Valley Power Station Unit No. 1 Inservice Testing Program for Pumps and Valves, Issue 4, Revision 0, was also provided for information.

Additional information was requested by the NRC staff in order to complete its review of proposed alternatives and relief requests submitted with the March 28, 2007 FENOC letter. FENOC provides the attached response to the NRC staff's request for additional information dated June 14, 2007.

In addition, FENOC hereby withdraws the proposed alternative identified as Pump Relief Request 1 (PRR1). Based upon further evaluation it has been determined that proposed alternative PRR1, submitted with the March 28, 2007 letter, is not required.


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There are no regulatory commitments contained in this letter. If you have questions or require additional information, please contact Mr. Thomas A. Lentz, Manager - Licensing, at (330) 761-6071.

Sincerely,


James H. Lash

Attachment:

Response to June 14, 2007 Request for Additional Information

c: Ms. N. S. Morgan, NRR Project Manager
Mr. D. L. Werkheiser, NRC Senior Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. J. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

Attachment to Letter L-07-075

Beaver Valley Power Station, Unit No. 1

Response to June 14, 2007 Request for Additional Information

By letter dated March 28, 2007, Agencywide Documents Access and Management System (ADAMS) accession number ML070890491, FirstEnergy Nuclear Operating Company (FENOC, licensee) requested approval of 14 proposed alternatives and relief requests associated with the inservice testing (IST) program fourth 10-year interval update for the Beaver Valley Power Station, Unit No. 1 (BVPS-1).

The Nuclear Regulatory Commission (NRC) staff is reviewing the submittal and has the following requests for information (shown in bold type). Each request for information is followed by the FENOC response.

Relief Request PRR3:

- 1. The staff realizes that Code Case OMN-9 is not applicable to the code edition that you are using. However, please state if your proposed alternative testing meets the requirements of Code Case OMN-9. If it does not meet the requirements, please state the differences.**

Response:

The methodology for development and use of pump curves meets the requirements of Code Case OMN-9.

Relief Request PRR4:

- 2. Please verify that the proposed alternative includes a minimum pump time of 2 minutes, in order to achieve stable performance parameters before recording data during the test.**

Response:

The Fuel Oil Transfer Pumps [1EE-P-1A, 1B, 1C and 1D] are considered as "Group B" pumps; therefore, a 2-minute run time is not required during the quarterly Group B test. However, a 2-minute pump run time is required by ISTB-5100, Paragraph (a)(1), when performing the biennial Comprehensive pump test and will be specified in the surveillance procedure controlling these testing activities.

Relief Request PRR5:

- 3. The basis given for the relief request is NUREG-1482, Rev. 1, Section 5.6 "Operability Limits of Pumps." Section 5.6 references ISTB-5220, which is applicable to vertical line shaft centrifugal pumps, not positive displacement pumps. Please provide a basis for relief applicable to positive displacement pumps.**

Response:

NUREG-1482, Rev. 1, Section 5.6 was referenced in the "Reason for Request" section of PRR5 to support the conclusion that relief must be obtained if expanded ranges are needed. In NUREG-1482, Rev. 1, Section 5.6, the sentence following reference to ISTB-5220 states, "Licensees must obtain relief if expanded ranges are needed outside the scope of ***ISTB acceptance criteria, sections, tables and figures.***" [emphasis added] This sentence does not specify any particular Subsection of ISTB. Therefore, Section 5.6 is not just pertaining to vertical line shaft centrifugal pumps (ISTB-5220), but to all pumps discussed in ISTB. To further support this conclusion, the "Basis for Recommendation" discussion in Section 5.6 indicates that the Code acceptable range for differential pressure is 0.93-1.03, which is the Comprehensive pump test acceptable range for centrifugal pumps. Vertical line shaft centrifugal pumps have an acceptable range for differential pressure from 0.95 to 1.03. Therefore, Section 5.6 uses vertical line shaft pumps as the example, but applies to ISTB acceptance criteria, sections, tables and figures for all pumps (including positive displacement pumps).

Relief Request PRR8:

- 4. In the last paragraph of the Components Affected Section, the licensee states, "This Request for Relief may also be applied to any pump in the IST Program scope should a vibration reading of <0.05 in/sec be obtained as a new reference value subsequent to repair or replacement." NUREG/CP-152, "Smooth-Running Pumps," Session 4, Pages 4-32, July 1996, states, "If the licensee intend [sic] to submit alternative requests to use minimum reference values, the request should be pump specific and include justification as to how the current inservice testing methodology will detect pump degradation." The NRC staff position is to review relief requests on a case-by-case basis for a specific requirement of the Code. Generic relief for all pumps cannot be authorized. Generic changes to Code requirements can be achieved through the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants (OM Code)* committee. Therefore, please revise the relief request to delete the last paragraph from the "Component Affected" Section. Also, future relief requests may be submitted to NRC, if historical data of the pump shows that reference value of vibration is less than 0.05 in/sec.**

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Response:

Relief Request PRR8 is hereby revised by deleting the last paragraph from the "Component(s) Affected" section. The deleted paragraph is shown below.

This Request for Relief may also be applied to any pump in the IST Program scope should a vibration reading of <0.05 in/sec be obtained as a new reference value subsequent to repair or replacement.

- 5. The licensee is requesting relief for various pumps at BVPS-1. The ASME OM Code acceptance criteria of vibration for various pumps are different for various type of pumps, as specified in various Tables ISTB-5100-1, ISTB-5200-1, and ISTB-5300-1. The various pumps are (1) Centrifugal pump (except vertical line shaft centrifugal pumps) and (2) Vertical line shaft centrifugal pumps; and positive displacement pumps (except reciprocating). Therefore, please provide the type of each pump listed in the relief request.**

Response:

The type of each pump listed in the "Components(s) Affected" section of Relief Request PRR8 is provided in the "Pump Outline Tables" (pages 21- 49) of the IST Program submitted with the March 28, 2007 FENOC letter.

- 6. Please provide the following information related to each pump: (a) system in which pump is installed; (b) description of pump; and (c) Group A or Group B (pump's group based on its function as specified in ASME OM Code).**

Response:

The requested information for each pump listed in the "Component(s) Affected" section of Relief Request PRR8 is provided in the "Pump Outline Tables" (pages 21- 49) of the IST Program submitted with the March 28, 2007 FENOC letter.

- 7. The relief request does not address pump operating speed. Pump operating speed is a critical component in the vibration acceptance criteria. Please provide operating speed of each pump listed in the relief request.**

Response:

The pump operating speed for each pump listed in the "Component(s) Affected" section of Relief Request PRR8 is provided in the table below.

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Pump	Description	Speed
1CH-P-2A 1CH-P-2B	Boric Acid Transfer Pumps	3510 rpm/ 1765 rpm
1RH-P-1A 1RH-P-1B	Residual Heat Removal Pumps	1200 rpm
1QS-P-4A 1QS-P-4B 1QS-P-4C 1QS-P-4D	Chemical Injection Pumps	1170 rpm
1FW-P-3A 1FW-P-3B	Motor Driven Auxiliary Feedwater Pumps	3580 rpm
1WR-P-1A 1WR-P-1B 1WR-P-1C	River Water Pumps	1185 rpm
1EE-P-1A 1EE-P-1B 1EE-P-1C 1EE-P-1D	Diesel Generator Fuel Oil Transfer Pumps	1150 rpm

Relief Request PRR11:

8. Please provide shutoff head data from the manufacturer for the two inside recirculation pumps and two outside recirculation pumps. The manufacturer pump curves attached to the relief request do not include pump head data at zero flow rate.

Response:

The manufacturer's shutoff head at zero gpm flow rate is provided as follows for the Inside Recirculation Spray Pumps (1RS-P-1A and 1B) and Outside Recirculation Spray Pumps (1RS-P-2A and 2B):

<u>Pump</u>	<u>Shutoff Head</u>
1RS-P-1A	393.1 feet
1RS-P-1B	389.7 feet
1RS-P-2A	404.9 feet
1RS-P-2B	407.0 feet

9. **The licensee states that as an alternative to measuring at least five points for the preservice test, over a range from pump minimum flow rate to at least pump design flow rate, as required by ISTB-3100(b) and ISTB-5210(a), the five points will be obtained within approximately 41 percent of the design flow rate and within approximately 38 to 40 percent of the maximum required accident flow rates. From this statement, it is not clear that licensee will measure pressure at the pump minimum flow rate. If data will not be taken at pump minimum flow rate, please provide the basis.**

Response:

FENOC hereby modifies the first sentence of the "Proposed Alternative and Basis for Use" presented in PRR11 to read as follows:

As an alternative to measuring at least five points for the preservice test over a range from pump minimum flow rate to at least pump design flow rate as required by ISTB-3100(b) and ISTB-5210(a), the pump data (five flow points) will be obtained over the range from a pump minimum flow rate to approximately 41 percent of the design flow rate and approximately 38 to 40 percent of the maximum required accident flow rates. The pump vendor provided a pump minimum flow rate of 1400 gpm for these four pumps.

In accordance with the above proposed alternative, pressure will be measured at or as close as practicable to the pump minimum flow rate.

Relief Request PRR13:

10. **Why is replacing transmitter LR-1CW-101 with level indication calibrated to 0.5% considered a hardship or unusually difficult? Are there any temporary flow instruments that have the accuracy required for the comprehensive or preservice tests?**

Response:

To achieve a loop accuracy of 0.5 percent would require replacing the 1.0 percent accurate transmitter and the 1.5 percent accurate recorder with a 0.35 percent or more accurate transmitter and a 0.35 percent or more accurate recorder in order to give an overall loop accuracy of 0.5 percent. Although this may be burdensome, FENOC has determined that the proposed alternative should be modified and that only 10 CFR 50.55a(a)(3)(i) should be referenced. FENOC hereby deletes reference to 10 CFR 50.55a(a)(3)(ii) from Relief Request PRR13 including the sentence under the heading "Reason for Request" that is shown below, and replaces the first paragraph of the "Proposed Alternative and Basis for Use" section of Relief Request PRR13 with the paragraphs shown underlined below. The availability of more accurate temporary flow and pressure instruments was not investigated further, since the proposed alternative below provides an acceptable level of quality and safety.

REASON FOR REQUEST

The BVPS-1 River Water Pumps are vertical line-shaft pumps that receive their suction from a pit that communicates with the Ohio river. Differential pressure is calculated using Pump Discharge Pressure Indicator [PI-1WR-101A, B and C] and the calculated suction pressure using river water elevation from Ohio River Level Recorder [LR-1CW-101], local. The transmitter associated with [LR-1CW-101] is calibrated to 1.5% of full scale and the recorder is calibrated to 1.0% of full scale resulting in a loop accuracy of 1.8% of full scale. The overall loop accuracy is greater than the 0.5% required by Table ISTC-3500-1 when performing a Comprehensive or Preservice test. ~~Replacing [LR-1CW-101] with level indication calibrated to 0.5% is considered a hardship or unusual difficulty without a compensating increase in the level of quality or safety.~~

Typical Ohio River elevation is between 665 and 667 feet resulting in a small variance between calculated suction pressure when determined by the calculational method provided by the procedure. However, it should be noted that during the spring, river elevations may be higher due to rain. This condition is evaluated with the test results to ensure operational readiness of the pumps.

PROPOSED ALTERNATIVE AND BASIS FOR USE

~~BVPS-1 proposes to use existing level instrumentation when determining differential pressure during Comprehensive and Preservice testing, with a calibrated loop accuracy of 1.80% full scale, in lieu of replacing existing instrumentation to satisfy the 0.5% accuracy requirement for pressure instrumentation, as specified in Table ISTC-3500-1. BVPS-1 considers the level of accuracy of existing instrumentation sufficient for determining pump operational readiness and provides an acceptable level of quality and safety.~~

FENOC proposes to use a 0 to 100 psig, 0.1 percent accurate test pressure gauge in place of the installed discharge pressure indicator.

The suction pressure reading over the range of the installed instruments is within 0.504 psig (28 psig x 1.8 percent). Twenty-eight (28) psig represents the suction pressure on the pump impeller when the river water level instrument is reading at its full scale upper limit. The 0 to 100 psig, 0.1 percent accurate, test pressure gauge (to be used in place of the installed discharge pressure indicator) provides a discharge pressure reading over the range of the instrument within 0.1 psig. Adding this to the installed 1.8 percent accurate suction pressure instrument would yield an overall error of 0.604 psig (0.1 psig plus 0.504 psig).

When the Table ISTB-3500-1 required instrument accuracy of plus or minus 0.5 percent is applied to the river level readings, the suction pressure reading over the range of the instrument would be expected to be within 0.14 psig (28 psig x 0.5 percent). Adding this to the allowable 0.5 percent accurate discharge pressure instrument error would yield an overall worst case (allowed) error of 0.64 psig (0.14 psig plus 0.5 psig).

Therefore, using the 0.1 percent accurate test gauge in place of the installed discharge pressure indicator will yield an overall differential pressure reading (considering both suction and discharge instrumentation together) better than the plus or minus 0.5 percent instrument accuracy required by Table ISTB-3500-1 for Comprehensive pump testing.

Other activities are implemented at BVPS-1, in addition to those required by the ASME OM Code that enhances the ability to detect pump degradation. As part of the BVPS-1 Predictive Maintenance Program, spectral analysis may be used to determine the mechanical condition of a pump. Spectral data can provide information to determine if misalignment, unbalance, resonance, looseness or a bearing problem is present. Through a review of the spectral data over a period of time, any change in condition of the pump may also be determined. Additionally, as part of the BVPS-1 Preventive Maintenance Program, the pump motors are inspected, lubricated, and tested every 144 weeks. The pump and motor are completely overhauled every 312 weeks. Motor overhaul includes sending it to the vendor. This frequency is based on the expected condition of the pumps as a result of historical overhauls and was established to allow overhaul prior to the point of degradation resulting in questionable operational readiness.

Using the provisions of this relief request as an alternative to the accuracy requirements of Table ISTB-3500-1, when performing Comprehensive or Preservice tests, provides an acceptable level of quality and safety. It is requested that the NRC evaluate this determination pursuant to 10 CFR 50.55a(f)(6)(i) and grant relief from the identified ISTB Code requirements.

11. Please provide the river water pumps suction static pressure.

Response:

The suction static pressure based on a normal river elevation (665-666 feet above sea level) above the pump suction impeller elevation (640 feet 7 inches above sea level) is approximately 11 psig for each River Water Pump (1WR-P-1A, 1B and 1C).

12. Please provide the river water pumps discharge pressure and the accuracy of the discharge pressure gauge.

Response:

The three River Water Pumps have a normal discharge pressure reading of 50 to 54 psig. After correction for gauge elevation the discharge pressure reading is typically between 80 to 84 psig. The installed discharge pressure indicators (0 to 100 psig) for each pump are accurate to plus or minus 0.5 percent.