

**L. William Pearce**  
Site Vice President

724-682-5234  
Fax: 724-643-8069

July 9, 2004  
L-04-100

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**  
**Inservice Testing Programs, Proposed Revisions 1K and 2I, Addenda 1**

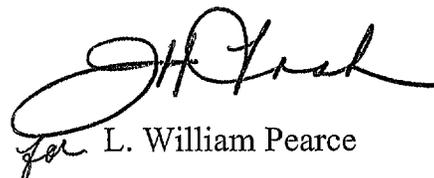
On May 21, 2004, FirstEnergy Nuclear Operating Company (FENOC) submitted proposed Revisions 1K and 2I to the Beaver Valley Power Station Unit 1 (BVPS-1) and Unit 2 (BVPS-2) Inservice Testing (IST) Programs. Both proposed revisions include a Pump Relief Request (No. 8) for use of alternate ASME XI ranges for vibrations for all IST pumps with measured reference values below 0.05 in/sec.

Attached for NRC review and approval is Addendum 1 to each of those proposed revisions. These addenda incorporate a list of Unit 1 and Unit 2 pumps where relief is currently required. These proposed revisions are being submitted for NRC review and approval in accordance with 10 CFR 50.55a(a)(3)(i).

This relief is requested for the duration of the current ten-year testing intervals. BVPS Units 1 and 2 are in the third and second ten-year inservice testing intervals, respectively, using the 1989 Edition of ASME Code, Section XI.

There are no new regulatory commitments contained in this letter. If you have any questions concerning this matter, please contact Mr. Larry R. Freeland, Manager, Regulatory Affairs/Performance Improvement at 724-682-5284.

Sincerely,



for L. William Pearce

Attachment

Beaver Valley Power Station, Unit No. 1 and No. 2  
Inservice Testing Programs, Proposed Revisions 1K and 2I, Addenda 1  
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Page 2

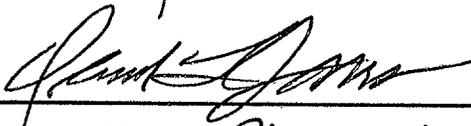
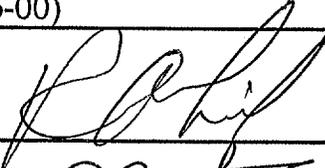
c: Mr. T. G. Colburn, NRR Senior Project Manager  
Mr. P. C. Cataldo, NRC Sr. Resident Inspector  
Mr. H. J. Miller, NRC Region I Administrator

# Beaver Valley Power Station

## Unit 1

### INSERVICE TESTING (IST) PROGRAM FOR PUMP AND VALVES

Proposed Revision 1K (Addendum 1)

Preparer		Date:	6/29/04
IQR (RAD #04-01015-00)	Joann H. West	Date:	6-29-04
Owner Approval		Date:	7/1/04
Approval Authority		Date:	7/1/4

This "Proposed Revision" was made against Revision 11 of the present Unit 1 IST Program.

(PROPOSED REVISION 1K, Addendum 1)

**PUMP RELIEF REQUEST 8**

<b>Pump Asset No(s):</b>	1CH-P-2A	1QS-P-4C	1WR-P-1C	<b>Code Class: <u>2, 3</u></b>
	1CH-P-2B	1QS-P-4D	1EE-P-1A	
	1RH-P-1A	1FW-P-3A	1EE-P-1B	
	1RH-P-1B	1FW-P-3B	1EE-P-1C	
	1QS-P-4A	1WR-P-1A	1EE-P-1D	
	1QS-P-4B	1WR-P-1B		

**System:** Various

**Function:** Various

**Test Requirement:** Per OM-6, Part 4, "Testing Requirements", Paragraph 4.3, "Reference Values", Reference values shall be determined from the results of preservice testing or from the results of the first inservice test. Reference values shall be at points of operation readily duplicated during subsequent tests. All subsequent test results shall be compared to these initial reference values or to new reference values established in accordance with Paragraphs 4.4 and 4.5.

Per OM-6, Part 5, "Testing Methods", Paragraph 5.2(d), "Test Procedure", Vibration (velocity) shall be determined and compared with corresponding reference values. All deviations from the reference values shall be compared with the limits given in Table 3a and corrective actions taken as specified in Paragraph 6.1.

**Basis for Relief:** In accordance with 10CFR50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety.

The above pumps in the BVPS-1 IST Program have at least one vibration reference value ( $V_r$ ) that is currently less than 0.05 in/sec. A small value for  $V_r$  produces a small acceptable range for pump operation. The ASME XI Acceptable Range limit for pump vibrations from Table 3a of OM-6 is  $\leq 2.5 V_r$ . Based on a small acceptable range, a smooth running pump could be subject to unnecessary corrective action if it exceeds this limit. Per OM-6, Paragraph 6.1, "Acceptance Criteria", if deviations fall within the alert range of Table 3a, the frequency of testing shall be doubled until the cause of the deviation is determined and the condition corrected.

For very small reference values for vibrations, flow variations, hydraulic noise and instrument error can be a significant portion of the reading and affect the repeatability of subsequent measurements. Also, experience gathered by the BVPS Predictive Maintenance (PdM) Group has shown that changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

In order to avoid unnecessary corrective actions, a minimum value for  $V_r$  of 0.05 in/sec is proposed. This minimum value would be applied to individual vibration locations for those pumps with reference vibration values less than 0.05 in/sec. Therefore, the smallest ASME XI Acceptable Range limit for any IST pump vibration location would be no lower than 2.5 times  $V_r$ , or 0.125 in/sec, which is within the "fair" range of the "General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc. Likewise, the smallest ASME XI Alert Range limit for

## **PUMP RELIEF REQUEST 8**

**Basis for Relief:** any IST Pump vibration location for which the pump would be inoperable would be no lower than 6 times  $V_r$ , or 0.300 in/sec.

ASME XI, Table IWP-3100-2, "Allowable Ranges of Test Quantities", specifies a vibration Acceptable Range limit of 1.0 mil for a displacement reference value  $\leq 0.5$  mils. In velocity units, a displacement reference value of 0.5 mils is equivalent to 0.047 in/sec for an 1800 rpm pump and 0.094 in/sec for a 3600 rpm pump. The effective minimum reference value proposed (0.05 in/sec) for smooth-running pumps is roughly equal to the ASME XI IWP reference value for an 1800 rpm pump and more conservative than the reference value for a 3600 rpm pump. Without this relief, the ASME XI Acceptable Range limit for some extremely smooth running pumps is reduced by as much as a factor of 10.

In addition to the requirements of OM-6 for IST, the pumps in the BVPS-1 IST Program are also included in the BVPS PdM Program. The BVPS PdM Program currently employs predictive monitoring techniques such as: vibration monitoring and analysis beyond that required by OM-6, bearing temperature trending, oil sampling and analysis, and/or thermography analysis as applicable.

If the measured parameters are outside the normal operating range or are determined by analysis to be trending toward an unacceptable degraded state, appropriate actions are taken that may include: increased monitoring to establish a rate of change, review of component specific information to identify cause, and removal of the pump from service to perform maintenance.

It should be noted that all of the pumps in the IST Program will remain in the BVPS PdM Program even if certain pumps have very low vibration readings and are considered to be smooth running pumps. Using the provisions of this relief request as an alternative to the specific requirements of OM-6 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

**Alternate Test:** Pumps with a measured reference value below 0.05 in/sec for a particular vibration measurement location will have subsequent test results for that location compared to an ASME XI Acceptable Range limit of 0.125 in/sec and an ASME XI Alert Range limit of 0.300 in/sec (based on a minimum reference value 0.05 in/sec).

In addition to the Code requirements, all pumps in the BVPS-1 IST Program are included in and will remain in the BVPS PdM Program regardless of their smooth running status.

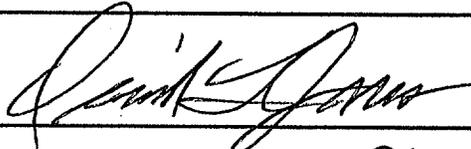
**References:** OM-6, Paragraphs 4.3, 4.4, 4.5 and 6.1, and Table 3a.  
General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc.

# Beaver Valley Power Station

## Unit 2

### INSERVICE TESTING (IST) PROGRAM FOR PUMP AND VALVES

#### Proposed Revision 2I (Addendum 1)

Preparer		Date:	6/29/04
IQR (RAD #04-01015-00)		Date:	6-29-04
Owner Approval		Date:	7/1/04
Approval Authority		Date:	7/1/04

This "Proposed Revision" was made against Revision 9 of the present Unit 2 IST Program.

(PROPOSED REVISION 2I, Addendum 1)

PUMP RELIEF REQUEST 8

Pump Asset No(s):	2CHS*P21C	2QSS*P24A	2EGF*P21B	Code Class: <u>2, 3</u>
	2CHS*P22A	2FWE*P23A	2EGF*P21C	
	2CHS*P22B	2SWS*P21B	2EGF*P21D	
	2RHS*P21A	2EGF*P21A		

System: Various

Function: Various

Test Requirement: Per OM-6, Part 4, "Testing Requirements", Paragraph 4.3, "Reference Values", Reference values shall be determined from the results of preservice testing or from the results of the first inservice test. Reference values shall be at points of operation readily duplicated during subsequent tests. All subsequent test results shall be compared to these initial reference values or to new reference values established in accordance with Paragraphs 4.4 and 4.5.

Per OM-6, Part 5, "Testing Methods", Paragraph 5.2(d), "Test Procedure", Vibration (velocity) shall be determined and compared with corresponding reference values. All deviations from the reference values shall be compared with the limits given in Table 3a and corrective actions taken as specified in Paragraph 6.1.

Basis for Relief: In accordance with 10CFR50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety.

The above pumps in the BVPS-2 IST Program have at least one vibration reference value ( $V_r$ ) that is currently less than 0.05 in/sec. A small value for  $V_r$  produces a small acceptable range for pump operation. The ASME XI Acceptable Range limit for pump vibrations from Table 3a of OM-6 is  $\leq 2.5 V_r$ . Based on a small acceptable range, a smooth running pump could be subject to unnecessary corrective action if it exceeds this limit. Per OM-6, Paragraph 6.1, "Acceptance Criteria", if deviations fall within the alert range of Table 3a, the frequency of testing shall be doubled until the cause of the deviation is determined and the condition corrected.

For very small reference values for vibrations, flow variations, hydraulic noise and instrument error can be a significant portion of the reading and affect the repeatability of subsequent measurements. Also, experience gathered by the BVPS Predictive Maintenance (PdM) Group has shown that changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

In order to avoid unnecessary corrective actions, a minimum value for  $V_r$  of 0.05 in/sec is proposed. This minimum value would be applied to individual vibration locations for those pumps with reference vibration values less than 0.05 in/sec. Therefore, the smallest ASME XI Acceptable Range limit for any IST pump vibration location would be no lower than 2.5 times  $V_r$ , or 0.125 in/sec, which is within the "fair" range of the "General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc. Likewise, the smallest ASME XI Alert Range limit for any IST Pump vibration location for which the pump would be inoperable would be no lower than 6 times  $V_r$ , or 0.300 in/sec.

## **PUMP RELIEF REQUEST 8**

**Basis for Relief:** ASME XI, Table IWP-3100-2, "Allowable Ranges of Test Quantities", specifies a vibration Acceptable Range limit of 1.0 mil for a displacement reference value  $\leq 0.5$  mils. In velocity units, a displacement reference value of 0.5 mils is equivalent to 0.047 in/sec for an 1800 rpm pump and 0.094 in/sec for a 3600 rpm pump. The effective minimum reference value proposed (0.05 in/sec) for smooth-running pumps is roughly equal to the ASME XI IWP reference value for an 1800 rpm pump and more conservative than the reference value for a 3600 rpm pump. Without this relief, the ASME XI Acceptable Range limit for some extremely smooth running pumps is reduced by as much as a factor of 10.

In addition to the requirements of OM-6 for IST, the pumps in the BVPS-2 IST Program are also included in the BVPS PdM Program. The BVPS PdM Program currently employs predictive monitoring techniques such as: vibration monitoring and analysis beyond that required by OM-6, bearing temperature trending, oil sampling and analysis, and/or thermography analysis as applicable.

If the measured parameters are outside the normal operating range or are determined by analysis to be trending toward an unacceptable degraded state, appropriate actions are taken that may include: increased monitoring to establish a rate of change, review of component specific information to identify cause, and removal of the pump from service to perform maintenance.

It should be noted that all of the pumps in the IST Program will remain in the BVPS PdM Program even if certain pumps have very low vibration readings and are considered to be smooth running pumps. Using the provisions of this relief request as an alternative to the specific requirements of OM-6 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

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In addition to the Code requirements, all pumps in the BVPS-2 IST Program are included in and will remain in the BVPS PdM Program regardless of their smooth running status.

**References:** OM-6, Paragraphs 4.3, 4.4, 4.5 and 6.1, and Table 3a.  
General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc.