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December 22, 2008

L-08-386

10 CFR 50.73

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

SUBJECT:  
Beaver Valley Power Station, Unit No. 2  
Docket No. 50-412, License No. NPF-73  
LER 2008-003-00

Enclosed is Licensee Event Report (LER) 2008-003-00, "Low Head Safety Injection Pump Inoperable Longer Than Allowed By Technical Specifications." This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A) and 10 CFR 50.73(a)(2)(i)(B).

There are no regulatory commitments contained in this submittal. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and are not regulatory commitments.

If there are any questions or if additional information is required, please contact Mr. Colin P. Keller, Manager, Regulatory Compliance at 724-682-4284.

Sincerely,



Peter P. Sena III

Attachment

cc: Mr. S. J. Collins, NRC Region I Administrator  
Mr. D. L. Werkheiser, NRC Senior Resident Inspector  
Ms. N. S. Morgan, NRR Project Manager  
INPO Records Center (via electronic image)  
Mr. L. E. Ryan (BRP/DEP)

JE22  
NRR

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Beaver Valley Power Station Unit Number 2	<b>2. DOCKET NUMBER</b> 05000412	<b>3. PAGE</b> 1 of 5
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**4. TITLE**  
Low Head Safety Injection Pump Inoperable Longer Than Allowed by Technical Specifications

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	23	2008	2008	- 003	- 00	12	22	2008	None	
									FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>									
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
<b>10. POWER LEVEL</b>  100 %	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(a)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Colin P. Keller, Manager, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) (724) 682-4284
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	BP	P	E334	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE). <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b> MONTH: DAY: YEAR:
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**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 19, 2008 at Beaver Valley Power Station Unit No. 2 (BVPS-2) during routine preventative maintenance on the Train "A" Low Head Safety Injection Pump, mechanical maintenance personnel noticed that the pump unexpectedly would not rotate by hand. During subsequent investigation and pump disassembly, it was discovered that the outboard pump casing wear ring and the impeller wear ring were in direct contact, which resulted in galling of the pump's 316 stainless steel wear rings. Due to the projected work scope for this unanticipated repair of pump wear rings and post-maintenance testing, a Notice of Enforcement Discretion (NOED) was requested by FirstEnergy Nuclear Operating Company. The Nuclear Regulatory Commission granted the NOED at 1105 on October 22 to not comply with BVPS-2 Technical Specification 3.5.2 Action B for an additional 36 hours in order to allow time to complete the pump repair actions without shutting down the plant. Additional unexpected difficulties delayed the reassembly of the pump, and a plant shutdown to Mode 4 was performed.

This is reportable as a condition prohibited by BVPS-2 Technical Specification 3.5.2, pursuant to 10 CFR 50.73(a)(2)(i)(B), and as a completion of a plant shutdown required by the plant's Technical Specification, pursuant to 10 CFR 50.73(a)(2)(i)(A). The cause of this event resulting in the pump work extending beyond the allowed component out-of-service time was inadequate part dedication. The safety significance of this event was very low.

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**NARRATIVE**

There were no structure, components, or systems that were inoperable at the start of the event that contributed to the event. Energy Industry Identification System (EIIIS) codes are identified in the text as [XX].

**DESCRIPTION OF EVENT**

On October 19, 2008 at 2326, with Beaver Valley Power Station Unit No. 2 (BVPS-2) operating at 100 percent power, the Train "A" Low Head Safety Injection Pump (LHSI), 2SIS-P21A, was declared inoperable for the posting of a clearance in order to perform routine preventive maintenance on this pump. 2SIS-P21A is one of the two low pressure emergency core cooling system pumps [BP]. BVPS-2 entered Technical Specification 3.5.2 Action A which required that this train of Emergency Core Cooling System be returned to operable status within the next 72 hours.

During performance of this preventive maintenance early on October 20, which included changing oil and lubricating the coupling, mechanical maintenance personnel noticed that the pump unexpectedly would not rotate by hand. The motor and pump were subsequently uncoupled and the motor rotated freely. The pump would then turn only approximately 270 degrees of rotation when a rubbing sound was heard and the shaft could no longer be rotated by hand. Continued attempts to manually rotate the shaft resulted in no more pump rotation. The pump was disassembled and a problem solving team formed to diagnose the problem with the pump.

Pump disassembly found evidence of galling of the pump's 316 stainless steel wear rings with some shiny metal particles found on outboard side of the pump volute. The problem solving team determined that the cause of the initial pump binding was the pump impeller centralization in the casing being left in the low end of the acceptance range. When the mechanics rotated the pump by hand, there was no differential pump pressure to provide additional separation of the pump's wear rings which allowed the wear rings to touch and resulted in galling of the pump's 316 stainless steel wear rings. Since the mechanics were able to turn the pump at least a half turn of rotation by hand using an 18 inch strap wrench, it is highly probable this galling occurred during the hand rotation and the shiny metal particles found on the outboard side of the pump volute were the result of the galling and not pre-existing foreign material. Thus it was concluded that the pump was operable prior to being cleared for maintenance on October 19 at 2326.

Due to the projected work scope for this unanticipated repair of pump wear rings and post-maintenance testing, FirstEnergy Nuclear Operating Company (FENOC) requested a Notice of Enforcement Discretion (NOED) from the Nuclear Regulatory Commission at 0930

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NARRATIVE

DESCRIPTION OF EVENT (continued)

on October 22 to not comply with BVPS-2 Technical Specification 3.5.2 Action B for an additional 36 hours when Action A expired at 2326 on October 22. After reviewing FENOC's request including planned corrective actions, compensatory measures and risk assessment, the NRC determined that FENOC's request provided an adequate technical basis and granted a NOED at 1105 on October 22 to provide up to an additional 36 hours before BVPS-2 would have to comply with Technical Specification 3.5.2 Action B (which requires the plant be placed in Mode 3 within 6 hours and in Mode 4 within 12 hours). Thus, Action B would not need to be entered based on the NOED until 1126 on October 24.

After a new pump wear ring was installed made of a harder material (to reduce the potential for future galling) and the pump's centralization addressed, pump binding during hand rotation continued to be exhibited. Several actions were initiated to address the binding problem, resulting in multiple pump disassemblies and re-assemblies.

Since additional unexpected difficulties delayed the restoration of the pump, FENOC decided to proactively commence an orderly shut down of BVPS-2 beginning at 1800 on October 23. While at this time, it was believed that pump reassembly and testing to restore operability may still have been completed by the end of the enforcement discretion period, FENOC management determined it was more prudent to shutdown the unit so that the Operations crews were not placed under undue time pressure to reach Mode 3 conditions. BVPS-2 entered Mode 3 at 0519 on October 24, as part of the planned controlled shutdown. On October 24 at 0600, the NOED was exited and Technical Specification 3.5.2 Condition B was entered based on a determination at that time that the projected work completion time for restoring the pump to operable status would not meet the conditions of the NOED such that the work would be completed within the 36 hours provided by the NOED. The plant entered Mode 4 at 1211 on October 24. The pump was returned to operable status at 1220 on October 26.

CAUSE OF EVENT

The cause of this event resulting in the pump work extending beyond the Technical Specification-allowed component out-of-service time and beyond the NOED-allowed out-of-service time was the inboard case wear ring anti-rotation lug length dimension (ear) was not machined correctly and the dedication process not recognizing this length dimension as a critical characteristic. After a new wear ring was obtained and installed, the pump would still not rotate. A re-check of the BVPS-2 and vendor critical dimensions for the new wear ring showed that the problem was not the wear ring, leading the problem solving team to evaluate for other issues. However, it was found at 0800 on October 24 that

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**NARRATIVE**

**CAUSE OF EVENT (continued)**

the anti-rotation lug on the new wear ring was slightly too long, which when installed and the pump casing closed, caused pump rotation friction. Since the wear ring was initially ruled out as a potential cause, this initially led to other corrective actions being pursued not related to this cause. Thus, the pump wear ring anti-rotation lug dimensions need to be listed as a critical dimension in the part dedication process for the BVPS-2 LHSI pump wear rings to ensure proper pump rotation.

**ANALYSIS OF EVENT**

By granting the NOED, the NRC determined that it would not enforce compliance with Technical Specification 3.5.2 Action B from the period of 2326 on October 22 until 1126 on October 24. The NOED did not supersede the requirements of Technical Specification 3.5.2 or provide exemption from the reporting requirements of 10CFR 50.73. Thus when Technical Specification 3.5.2 Action A expired at 2326 on October 22, and BVPS-2 was not in Mode 3 within 6 hours as required by Action B, this was a condition prohibited by BVPS-2 Technical Specification 3.5.2, and is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

An information-only verbal notification was provided to the NRC at 1825 on October 23, 2008 describing the proactive BVPS-2 plant shutdown that had commenced (Event Notification Number 44537). A second notification was provided to the NRC at 0922 on October 24, 2008 pursuant to 10 CFR 50.72(b)(2)(i) for BVPS-2 commencing a Technical Specification required plant shutdown (Event Notification Number 44537, update).

Since the resultant BVPS-2 shutdown to Mode 4 was required by Technical Specification 3.5.2, Action B (after the NOED became invalid), this event involved a completion of a plant shutdown required by the plant's Technical Specification, and is reportable pursuant to 10 CFR 50.73(a)(2)(i)(A).

The safety significance associated with the unavailability of the Train A LHSI pump 2SIS-P21A during the period of October 19 at 2326 until the Unit entered MODE 4 on October 24 at 1211 is considered to be very low. This is based on the incremental core damage probability and incremental large early release probability for the event when considering the actual PRA-modeled component unavailabilities that were present and the duration of the event.

There was no loss of safety function for the containment pursuant to 10CFR 50.73(a)(2)(v) since the LHSI pump on the opposite train remained operable during the entire time that the Train "A" Low Head Safety Injection Pump was not operable.

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**NARRATIVE**

**CORRECTIVE ACTIONS**

1. FENOC will ensure that the dimensions of the casing wear ring lug are included as a critical characteristic to ensure proper component dedication for the BVPS-2 LHSI pumps.
2. The vendor (Enertech) who performed the pump casing wear ring dedication entered the lack of consideration of the lug ring dimension as a critical characteristic into their corrective action program.
3. The site procedure for the BVPS-2 LHSI Pump Overhaul will be revised to verify proper casing wear ring lug fit during installation.
4. The vendor tech manual information for 2SIS-P21A and 2SIS-P21B will be revised to provide further guidance on bearing housing to bearing cap fit, pump casing shimming, and acceptable casing to impeller wear ring clearances.
5. An operating experience will be evaluated for issuance to the industry describing this event.

Completion of the above and other corrective actions are being tracked through the BVPS corrective action program.

**PREVIOUS SIMILAR EVENTS**

A review found no prior BVPS Unit No. 1 or BVPS-2 Licensee Event Reports within the last three years for an event involving Low Head Safety Injection Pump maintenance.

CR 08-48160