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Fax: 724-643-8069December 20, 2011
L-11-393

10 CFR 50.73

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001SUBJECT:
Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
LER 2011-002-00

Enclosed is Licensee Event Report (LER) 2011-002-00, "Failure to Comply with Technical Specifications 3.7.5 Due to the Inoperability of Two Trains of the Auxiliary Feedwater System." This event is being reported in accordance with 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. Darin M. Benyak, Manager, Regulatory Compliance at 724-682-4284.

Sincerely,


Paul A. Harden

Enclosure – BVPS Unit 1 LER 2011-002-00

c: Mr. W. M. Dean, NRC Region I Administrator
Mr. D. I. Spindler, NRC Senior Resident Inspector
Ms. N. S. Morgan, NRR Project Manager
INPO Records Center (via electronic image)
Mr. L. E. Ryan (BRP/DEP)IE22
NRR

NRC FORM 366 (10-2010)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104	EXPIRES 10/31/2013
LICENSEE EVENT REPORT (LER) <small>(See reverse for required number of digits/characters for each block)</small>		Estimated burden per response to comply with this mandatory information collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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.	

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4. TITLE
Failure to Comply with Technical Specifications 3.7.5 Due to the Inoperability of Two Trains of the Auxiliary Feedwater System

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
12	13	2010	2011	002	00	12	20	2011	None	
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
10. POWER LEVEL 100	<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)
	<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 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 Darin M. Benyak, 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

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

On November 4, 2011, plant personnel identified that a maintenance activity performed on December 13, 2010, may have resulted in non-compliance with the Required Actions of Technical Specification (TS) 3.7.5. Specifically, on December 13, 2010, the Beaver Valley Power Station Unit Number 1 (BVPS-1) "A" Train Motor Driven Auxiliary Feedwater (AFW) system pump (1FW-P-3A) was removed from service and declared inoperable at 0339 hours to perform maintenance. TS 3.7.5 Condition B for one AFW Train being inoperable was entered due to removal of 1FW-P-3A pump from service. The turbine driven AFW pump (1FW-P-2) remained aligned to the "A" train supply header as required by TS 3.7.5 Required Action B.1. This Required Action applies when both AFW supply headers are Operable. With the 1FW-P-3A pump inoperable and the 1FW-P-2 pump aligned to the "A" supply header, the automatic open signal timing circuit for the Train "A" AFW flow throttle valves was de-energized as part of a clearance to perform a calibration on relay 62-AFPA at 0950 hours on December 13, 2010, and was not re-energized until 1642 hours on December 13, 2010. Although the Train "A" AFW flow throttle valves were in the open position, this action resulted in the inability to meet TS Surveillance Requirement 3.7.5.3 and, therefore, resulted in Train "A" AFW flow throttle valves being inoperable. TS 3.7.5 Condition D for two AFW trains being inoperable was not applied when the automatic open signal timing circuit for the Train "A" flow throttle valves was de-energized. As a result, the required action of TS 3.7.5 Condition D to place the plant in Mode 3 within the following six hours was not met. This event is reportable per 10 CFR 50.73(a)(2)(i)(B) (Operations or Condition prohibited by TS) due to two trains of AFW being inoperable for greater than six hours while the BVPS-1 was operating in Mode 1.

The Apparent Cause of this event was the lack of knowledge/correct interpretation of the auto-open feature and its impact on operability by the on-shift crew tasked with approving and issuing the clearance for posting. The safety significance of the event was very low.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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NARRATIVE

Energy industry identification system (EIS) codes are identified in the text using the format [XX].

CONDITIONS PRIOR TO OCCURRENCE

Unit 1: Mode 1 at 100 percent power

There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event other than as described below.

DESCRIPTION OF EVENT

On October 21, 2011, during the review of a clearance to be used to support maintenance on the "B" Auxiliary Feedwater (AFW) [BA] Train relay 62-AFPB [RLY] at Beaver Valley Power Station Unit Number 1 (BVPS-1), Operations personnel identified that the Train "B" AFW flow throttle valves [HCV] auto-open feature would be disabled as a result of the planned maintenance activities which could impact AFW system operability. A determination was then completed regarding the operability status of the "B" Train AFW flow throttle valves during this planned maintenance activity. This evaluation determined that the "B" Train AFW flow throttle valves would be inoperable while the auto-open feature is disabled even though the valves were in the open position. The removal of the auto-open signal to these flow throttle valves would remove the ability to meet Surveillance Requirement (SR) 3.7.5.3 and requires the AFW "B" Train Supply Header flow throttle valves to be declared inoperable. SR 3.7.5.3 requires periodic verification that each automatic AFW valve that is not secured in position actuates to the correct position on an actual or simulated actuation signal. Based on this information, a review of past performances of the relay calibration procedure for the "A" and "B" AFW trains was conducted to determine if Technical Specification (TS) 3.7.5 titled "Auxiliary Feedwater (AFW) System" Required Actions were previously not met within the past three years during the performance of this relay calibration procedure. The "A" Train relay calibration performed on December 13, 2010 (described in more detail below) was identified on November 4, 2011, as a previously performed plant maintenance activity that may have resulted in non-compliance with the Required Actions of TS 3.7.5.

On December 13, 2010, BVPS-1 "A" Train motor driven Auxiliary Feedwater (AFW) system pump (1FW-P-3A) [P] was removed from service and declared inoperable at 0339 hours to perform maintenance. Technical Specification 3.7.5 Condition B for one AFW Train being inoperable was entered due to removal of 1FW-P-3A from service. The "B" Train motor driven AFW pump (1FW-P-3B) [P] remained Operable throughout this event. The turbine driven AFW pump (1FW-P-2) [P] remained aligned to the "A" train supply header as required by TS 3.7.5 Required Action B.1. This Required Action applies when both supply headers are Operable.

During the period of time when 1FW-P-3A pump was inoperable and the 1FW-P-2 pump was aligned to the "A" supply header, the automatic open signal timing circuit for the Train "A" AFW flow throttle valves was de-energized as part of a clearance to perform a calibration on relay 62-AFPA [RLY]. The automatic open signal timing circuit for the Train "A" AFW flow throttle valves was de-energized at 0950 hours on December 13, 2010, and was re-energized at 1642 hours on December 13, 2010. Therefore, the automatic open signal was defeated on the Train "A" AFW flow throttle valves for approximately 6 hours and 52 minutes. When the Train "A" automatic open signal timing circuit was de-energized, one additional train of AFW was rendered inoperable. The 1FW-P-3A pump was previously inoperable due to planned maintenance activities and the 1FW-P-2 pump became inoperable due to it being aligned to the inoperable

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Train "A" AFW flow throttle valves. TS 3.7.5 Condition D for two AFW trains being inoperable was not recognized nor applied when the automatic open signal timing circuit for the Train "A" AFW flow throttle valves were de-energized. As a result, the required action of TS 3.7.5 Condition D to place the plant in Mode 3 within the following six hours was not met. BVPS-1 remained at approximately 100 % power during the 6 hours and 52 minutes that the automatic open signal to the AFW flow throttle valves was defeated.

The calibration procedure for relay 62-AFPA was also performed in 2005 while BVPS-1 was in Mode 1. The automatic open signal timing circuit was inoperable for a period of approximately 3 hours and 19 minutes during the relay maintenance activities. The TS condition for two AFW trains being inoperable was not recognized nor applied when the automatic open signal timing circuit for the Train "A" AFW flow throttle valves were de-energized with the 1FW-P-3A pump inoperable due to maintenance activities, and the 1FW-P-2 pump aligned to the "A" AFW Supply Header. The time period where the automatic open signal timing circuit was inoperable did not result in non-compliance with the AFW TS Required Actions for two inoperable AFW trains which required the plant to be in Mode 3 within six hours. A review of previous performances of calibration procedure for relays 62-AFPA and 62-AFPB found no other instances where Technical Specifications 3.7.5 Required Actions were not met. This review was performed from 2005 to the time of this event.

CAUSE OF EVENT

During the clearance preparation for the December 13, 2010 Train "A" AFW system maintenance activities, Work Task documents identified that Work Group Clearance, 1WG-24-REL-001, would remove the Auto-Open feature for the "A" train AFW flow throttle valves, MOV-1FW-151B, D and F [HCV]. This information was identified on the clearance "Cautions" section. Plant personnel did not recognize that removal of the auto-open feature for these valves would render these valves inoperable. The Train "A" AFW flow throttle valves, MOV-1FW-151B, D, and F, remained energized and in their full-open positions. With these valves being in the full-open, normal system alignment, and desired accident mitigation automatic initiation position, the AFW flow throttle valve operability was not questioned and the preventive maintenance task was allowed to proceed. The 1FW-P-2 pump is normally lined up to the "A" AFW Supply Header and remained in that configuration when the 1FW-P-3A pump was removed from service. It was not recognized during these clearance activities that with 1FW-P-2 pump aligned to the "A" Train AFW Supply Header, the 1FW-P-2 pump was inoperable based on the removal of the auto-open feature for the "A" train AFW flow throttle valves. With the 1FW-P-2 pump inoperable along with the 1FW-P-3A pump, only one AFW train remained operable.

The Apparent Cause of this event was the lack of knowledge/correct interpretation of the auto-open feature and its impact on operability by the on-shift crew tasked with approving and issuing the clearance for posting. This was not recognized by the two Senior Reactor Operators or the Shift Technical Advisor on duty at the time of this event. The clearance was approved for posting based on an assessment of the impact on the AFW System following removal of the auto-open feature, not on the loss of the auto-open feature and its impact on the valves' operability.

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ANALYSIS OF EVENT						
<p>The AFW System automatically supplies feedwater to the Steam Generators (SGs) [SG] to remove decay heat from the Reactor Coolant System [AB] upon the loss of normal feedwater supply. The design basis of the AFW System is to supply water to the SGs to remove decay heat and other residual heat by delivering at least the minimum required flow rate to the SGs. In addition, the AFW System must supply enough makeup water to replace the SG secondary inventory lost as the unit cools to Mode 4 conditions. Sufficient AFW flow must also be available to account for flow losses such as pump recirculation and line breaks.</p>						
<p>The flow path from the primary plant demineralized water storage tank [KC] to the SGs consists of individual supply lines to each of the three AFW pumps. Each motor driven AFW pump is connected to its train related supply header. In addition, the turbine driven pump can be aligned to either the Train "A" or "B" supply header, though it is normally aligned to the "A" Train supply header. The Train "A" and "B" supply headers branch out to each of the three SG feedwater lines via three normally open AFW flow throttle valves per train. These AFW flow throttle valves are motor operated valves that fail in the "as is" position on a loss of power. The normal system alignment for the AFW flow throttle valves is the full open position. These AFW flow throttle valves are manually modulated from the control room by plant operators in order to maintain the desired SG level following system initiation on an Engineered Safety Features Actuation System (ESFAS) [JE] signal. The individual Train "A" and "B" supply header flow paths are then combined downstream of the AFW flow throttle valves into one common feedwater line injection header for each of the three SGs. The AFW flow throttle valves receive an automatic full open signal for approximately 30 seconds following an AFW pump start as a result of the closure of an auxiliary contact on the motor driven AFW pump breaker or as a result of a limit switch on one of the two steam supply trip valves to the turbine driven AFW pump not being in the full closed position. The AFW System actuates automatically on the following TS 3.3.2 ESFAS signals: 1) SG water level – low low, 2) Undervoltage –RCP bus (turbine driven AFW pump only), 3) Safety injection, and 4) Trip of all running MFW pumps (motor driven AFW pumps only).</p>						
<p>The "A" train AFW supply header throttle valves remained in their normal system arrangement of being in the full open position during this event which is the initial accident assumption position. The Updated Final Safety Analysis Report (UFSAR) safety analysis assumptions that rely on AFW flow to the SGs therefore continued to be met while the automatic open signal was defeated on the Train "A" flow throttle valves assuming no additional single failure. An additional single failure is not required to be postulated because the unit had entered the TS for an inoperable motor driven AFW pump. The Train "B" AFW motor driven pump and supply header flow throttle valves remained Operable during this event. The ability of the plant operators to fully open the "A" train AFW flow throttle valves and control AFW flow to the SGs from the Control Room was not affected during this event. The "A" train motor driven AFW pump and the relay circuit for the automatic opening of the "A" Train supply header flow throttle valves were removed from service per plant procedures. No adverse conditions were found during these December 13, 2010, AFW system maintenance activities that would have resulted in this plant equipment being otherwise declared inoperable.</p>						
<p>The plant risk associated with the BVPS-1 preventative maintenance activities performed on the "A" train AFW system on December 13, 2010, is considered to be very low. This is based on the analyzed plant configuration risk, and that the "A" train AFW flow throttle valves remained open and were fully capable of being operated from the control room during the maintenance activities. Therefore, the safety significance of the event was very low.</p>						

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This event is reportable per 10 CFR 50.73(a)(2)(i)(B) (Operations or Condition prohibited by TS) due to two trains of AFW being inoperable for greater than six hours while the plant was operating in Mode 1. As a result, the Required Action of TS 3.7.5 Condition D to place the plant in Mode 3 within six hours of two AFW trains being inoperable was not met.

This event is not reportable per 10 CFR 50.72 or other 10 CFR 50.73 criteria based on the turbine driven AFW pump and the Train "B" motor driven AFW pump remaining capable of performing their intended safety function(s) assuming no additional single failure. Two motor driven AFW pumps (or one motor driven AFW pump and one turbine driven AFW pump) are required to supply sufficient flow to the SGs to remove core decay heat based on the limiting design basis that assumes AFW flow to the SGs.

CORRECTIVE ACTIONS

1. A notation was added in the Clearance Program Equipment Database for 4KVS-1AE-1E16 and 4KVS-1DF-1F16 to indicate that when relays 62-AFPA and 62-AFPB are de-energized, the respective train Auxiliary Feedwater Valves are inoperable.
2. This event will be reviewed by the Operations Training Committee to determine the best method to provide training regarding the recognition of the valve operability in a future Licensed Operator Training Session. This will include the causes of this event, reinforcement of the intent of Surveillance Requirement 3.0.1 and needed improvements in the clearance process and template generation.

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

PREVIOUS SIMILAR EVENTS

A review of previous BVPS LERs for approximately the previous three years determined that there was one LER that involved a similar event.

BVPS-1 LER 2009-001-00, "Surveillance Test Inadvertently Violates Technical Specification 3.6.1 for Containment Operability."

The cause cited was less than adequate change management in revising the performance mode of the test. Narrow focus by the procedure preparers, review organizations and end users on the most obvious TS requirement resulted in a failure to identify a more limiting TS requirement.

LER 2009-001-00 involved not recognizing the procedure's effect on a second TS requirement, which could have been understood by the procedure performers. This event involves a different plant system and was caused by a lack of knowledge/correct interpretation of the auto-open feature and its impact on operability.

CR 2011-04934