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December 21, 2012

L-12-453

10 CFR 50.73

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001**SUBJECT:**Beaver Valley Power Station, Unit Nos. 1 and 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
LER 2012-003-00

Enclosed is Licensee Event Report (LER) 2012-003-00, "Mode 3 Entered with Both Trains of Turbine Trip Circuitry Inoperable." 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 – LER 2012-003-00

cc: Mr. W. M. Dean, NRC Region I Administrator
Mr. D. I. Spindler, NRC Senior Resident Inspector
Mr. P. J. Bamford, NRR Project Manager
INPO Records Center (via INPO Consolidated Event System)
Mr. L. E. Ryan (BRP/DEP)IE22
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 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
Mode 3 Entered with Both Trains of Turbine Trip Circuitry Inoperable

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	30	2012	2012	003 - 00		12	21	2012	Beaver Valley Unit 1	05000334
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 3	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
	<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)						
10. POWER LEVEL 000	<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
 YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 30, 2012 at approximately 1027 hours, Operations personnel identified that Beaver Valley Power Station Unit 2 (BVPS-2) was operating in Mode 3 with both trains of turbine trip actuation relays inoperable. The DC breakers that power the turbine trip actuation relays were open for turbine trip circuitry testing during plant start-up from a refueling outage. Technical Specification (TS) Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation, Function 5.a requires two trains of turbine trip actuation relays in Mode 3 unless the main feedwater lines are isolated and the valves deactivated. The main feedwater lines were isolated, but the valves were not deactivated. TS 3.0.3 was entered as this condition did not meet the requirements of TS Table 3.3.2-1 Function 5.a and no associated action exists for this condition. Also, the requirements of TS 3.0.4 were not met since the plant transitioned from Mode 4 to Mode 3 without meeting the stated exceptions of TS 3.0.4. At approximately 1045 hours, TS 3.3.2 was met and TS 3.0.3 was exited when the main feedwater isolation valves were deactivated in the closed position.

It was also identified that two similar events occurred at Beaver Valley Power Station Unit 1 (BVPS-1). On May 9, 2012, and October 31, 2010, BVPS-1 entered Mode 3 with the DC breakers that power the turbine trip actuation relays open for turbine trip circuitry testing.

The root cause was determined to be an inaccurate perception of the applicability of the turbine trip TS in combination with less than adequate information in plant documents. Corrective actions planned include additional training, revisions to procedures, and enhancing plant documents and processes.

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Energy-Industry Identification System (EIS) codes are identified in the text as [XX].

CONDITIONS PRIOR TO AND DURING EVENTS

Mode 4, Hot Shutdown, to Mode 3 (approximately 550 degrees and 2235 psig)

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

DESCRIPTION OF EVENTS

On October 30, 2012 at approximately 0326 hours, Beaver Valley Power Station Unit 2 (BVPS-2) entered Mode 3 during plant start-up from the sixteenth refueling outage (2R16). During this refueling outage, the DC power supply [EI] breakers (PNL-DC2-02 BKR 8-21 and PNL-DC2-03 BKR 8-21) for the actuation relays for the turbine trip solenoid operated valves (SOVs) [TG] were opened per plant procedure(s) to perform functional testing of the turbine trip circuitry. These power supply breakers remained open during the transition from Mode 4 to Mode 3. With these power supply breakers open, both trains of the turbine trip actuation relays were rendered inoperable. Technical Specification (TS) Limiting Condition for Operation (LCO) 3.3.2, Engineered Safety Feature Actuation System (ESFAS) [JE] Instrumentation, Table 3.3.2-1 Function 5.a (Turbine Trip and Feedwater Isolation Automatic Actuation Logic and Actuation Relays), requires two trains of the turbine trip actuation relays to be Operable in Mode 3 except when all main feedwater [SJ] lines are isolated by either closed and deactivated main feedwater isolation valves (MFIVs), or main feedwater regulating valves (MFRVs) and associated bypass valves, or closed manual valves. When Mode 3 was entered, the main feedwater lines were isolated with closed automatic isolation valves. However, the isolation valves were not deactivated.

On October 30, 2012 at approximately 1027 hours, Operations personnel identified that BVPS-2 was operating in Mode 3 with both trains of turbine trip actuation relays inoperable and main feedwater was not isolated in the manner specified by TS. This action resulted in a condition prohibited by TS since LCO 3.3.2 Table 3.3.2-1, Function 5.a was not met. With LCO 3.3.2 not met, an inadvertent entry into TS LCO 3.0.3 occurred as there was no associated action provided for the condition of having two trains of actuation relays inoperable. Additionally, the requirements of LCO 3.0.4 were not met since the plant transitioned from Mode 4 to Mode 3 with Mode 3 required equipment inoperable without meeting the stated exceptions of LCO 3.0.4. At approximately 1045 hours, LCO 3.3.2 was met and LCO 3.0.3 was exited when the MFIVs were deactivated in the closed position.

On November 14, 2012, during an extent of condition review performed as part of the root cause investigation of the October 30, 2012 event, two previous similar events were discovered to have occurred at Beaver Valley Power Station Unit 1 (BVPS-1) within the past three years. For these events, the applicable TS LCOs and associated actions are common between BVPS-1 and BVPS-2.

On May 9, 2012, during the BVPS-1 twenty-first refueling outage (1R21) the DC power supply [EI] breakers (PNL-DC1-2-7 and PNL-DC1-3-7) to the actuation relays for the turbine trip SOVs [TG] were open to conduct functional testing on the turbine trip circuitry. During the transition from Mode 4 to Mode 3 the power supply breakers remained in the open position. With these breakers open, both trains of the turbine trip actuation relays were inoperable. The main feedwater lines were not isolated at the time. The entry into Mode 3, with both trains of turbine trip actuation relays inoperable and feedwater not isolated in the

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manner specified by TS, resulted in a condition prohibited by TS since LCO 3.3.2 was not met. With LCO 3.3.2 not met, an inadvertent entry into TS LCO 3.0.3 occurred as there is no associated action provided for the condition of having two trains of actuation relays inoperable. Additionally, the requirements of LCO 3.0.4 were not met since the plant transitioned from Mode 4 to Mode 3 with Mode 3 required equipment inoperable without meeting the stated exceptions of LCO 3.0.4. Both trains of turbine trip actuation relays were restored to Operable status within approximately 25 hours after entering Mode 3.

On October 31, 2010, BVPS-1 was in the twentieth refueling outage (1R20). Similar to the 1R21 event, PNL-DC1-2-7 and PNL-DC1-3-7 were open during the transition from Mode 4 to Mode 3. With these breakers open, both trains of the turbine trip actuation relays were inoperable. The main feedwater lines were not isolated at the time. The entry into Mode 3, with both trains of turbine trip actuation circuits inoperable and feedwater not isolated in the manner specified by TS, resulted in a condition prohibited by TS since LCO 3.3.2 Table 3.3.2-1, Function 5.a was not met. With LCO 3.3.2 not met, an inadvertent entry into TS LCO 3.0.3 occurred as there is no associated action provided for the condition of having two trains of actuation relays inoperable. Additionally, the requirements of LCO 3.0.4 were not met since the plant transitioned from Mode 4 to Mode 3 with Mode 3 required equipment inoperable without meeting the stated exceptions of LCO 3.0.4. Both trains of turbine trip actuation relays were restored to Operable status within approximately 53 hours after entering Mode 3.

CAUSE OF EVENTS

Each of these events occurred during refueling outages where work activities were in progress that removed power from both trains of turbine trip actuation relays. These conditions were not identified prior to transitioning plant modes during start-up due to less than adequate mode change reviews and weaknesses in work order and clearance processes.

The root cause evaluation of the BVPS-2 October 30, 2012, event determined the direct cause to be approved work activities on the turbine trip circuits that removed power from two circuits, rendering both required trains of the turbine trip actuation relays inoperable. The power to these turbine trip circuits was not restored prior to entry into Mode 3. These circuits are required to be Operable in Mode 3 per ESFAS Instrumentation TS Table 3.3.2-1 Function 5.a unless feedwater is isolated by deactivated automatic valves or closed manual valves. The root cause was determined to be an inaccurate perception of the applicability of TS Table 3.3.2-1 Function 5.a requirements in combination with less than adequate information on TS impact stated in related plant documents. The causes of the BVPS-1 events on May 9, 2012, and October 31, 2010, are similar to the BVPS-2 October 30, 2012 event.

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

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ANALYSIS OF EVENTS

The primary functions of the turbine trip and feedwater isolation actuation circuitry are to prevent damage to the turbine due to water in the steam lines, and to stop the excessive flow of feedwater into the steam generators. During these events both trains of the turbine trip actuation relays were inoperable after entering Mode 3 for periods of approximately 7 hours (BVPS-2), 25 hours (BVPS-1, 1R21) and 53 hours (BVPS-1, 1R20) respectively. The feedwater isolation function remained Operable.

The safety significance associated with the entry into Mode 3 with both trains of the turbine trip actuation relays inoperable that occurred at BVPS-2 on October 30, 2012, is considered to be very low. The main feedwater system and the turbine generator were not in service, and the main feedwater isolation valves were confirmed to be closed, but not deactivated, during this event. Therefore, the conditions that were present during this event would have prevented the excessive flow of main feedwater into the steam generators, which could cause damage to the turbine due to water in the steam lines and excessive cooldown of the primary system.

The safety significance associated with the entry into Mode 3 with both trains of turbine trip actuation relays inoperable that occurred at BVPS-1 on May 9, 2012, is considered to be very low. The feedwater Isolation signal remained functional throughout the event. In addition, Reactor Coolant System (RCS) [AB] boron concentration of approximately 2575 ppm was maintained which would prevent the possibility of reactor criticality due to lower RCS temperature caused by excessive cooldown of the secondary side. Therefore, the conditions that were present during this event would have prevented the excessive flow of main feedwater into the steam generators, which could cause damage to the turbine due to water in the steam lines and excessive cooldown of the primary system. Even if excessive cooldown occurred, the boron concentration present in the RCS at the time would have prevented criticality.

The safety significance associated with the entry into Mode 3 with both trains of turbine trip actuation relays inoperable that occurred at BVPS-1 on October 31, 2010, is also considered to be very low. The main feedwater system and the turbine generator were not in service, and the main feedwater isolation valves were confirmed to be closed, though not deactivated, during this event. Therefore, the conditions that were present during this event would have prevented the excessive flow of main feedwater into the steam generators, which could cause damage to the turbine due to water in the steam lines and excessive cooldown of the primary system.

Each event resulted in not meeting the requirements of TS as described above and are thus reportable per 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications.

The turbine trip function that was inoperable during these events is not credited to mitigate the consequences of an accident described in BVPS-1 or BVPS-2 Updated Final Safety Analysis Report (UFSAR). Therefore, these events did not result in an event or condition that could have prevented fulfillment of a safety function and are not reportable under 10CFR50.72(b)(3)(v)(D) or 10CFR50.73(a)(2)(v)(D).

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CORRECTIVE ACTIONS

1. The applicable maintenance procedures and work management plans, of both units, will be revised to include a reference to TS 3.3.2 Table 3.3.2-1 Function 5.a.
2. This event will be recommended for inclusion in Operations training and SOER 10-2 training.
3. Notes to reference TS 3.3.2 Table 3.3.2-1 Function 5.a will be added to components that disable the turbine trip function in the BVPS-1 and BVPS-2 clearance tracking program.

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

PREVIOUS SIMILAR EVENTS

A review of BVPS LERs from approximately the previous three years determined that the two LERs listed below involve a similar event.

- BVPS-1 LER 2011-002-01, "Failure to Comply with Technical Specifications 3.7.5 Due to the Inoperability of Two or More Trains of the Auxiliary Feedwater System"

The cause was determined to be a 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.

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

The causes cited were: (1) less than adequate change management in revising the performance mode of the test, and (2) 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.

CR 2012-17172 / 18018