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May 22, 2009

L-09-147

10 CFR 50.73

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

## SUBJECT:

Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334, License No. DPR-66  
LER 2009-001-00

Attached is Licensee Event Report (LER) 2009-001-00, "Surveillance Test Inadvertently Violates Technical Specification 3.6.1 for Containment Operability." 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. 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)  
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 1	<b>2. DOCKET NUMBER</b> 05000334	<b>3. PAGE</b> 1 of 7
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**4. TITLE**  
Surveillance Test Inadvertently Violates Technical Specification 3.6.1 for Containment Operability

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
03	26	2009	2009	- 001	- 00	05	22	2009	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 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>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO			

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

Beaver Valley Power Station (BVPS) Unit 1 commenced the performance of a Recirculation Spray System (RSS) flow test surveillance on one of the two outside RSS pumps. To perform this test while in Mode 1, the suction and discharge containment isolation valves (CIVs) on this RSS train of piping were closed (but not de-energized) and the RSS pump piping and casing was filled with water through the pump's casing manual drain valve since the RSS train is normally maintained dry. After successfully running the pump on recirculation flow, it was recognized during the pump draining operation that the CIVs on this RSS train's piping needed to be de-energized in order to maintain containment operability. These CIVs receive an 'open' signal following a containment isolation-Phase B signal, and not the typical 'close' signal. Thus, if a design basis accident was postulated to have occurred when the pump casing's manual valves were open, containment operability would be compromised with the CIVs going open and pressurizing the pump casing. This is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by plant Technical Specifications (TS).

The cause of this event was determined to be less than adequate change management in revising the performance mode of the test without adequate evaluation of the impact on Technical Specification requirements. Narrow focus by procedure preparers, review organizations and end users on the most obvious TS requirement (Recirculation Spray System) resulted in a failure to identify that a more limiting TS requirement (Containment operability) was impacted by the test. This event is considered to have very low safety significance.

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**NARRATIVE**

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

**DESCRIPTION OF EVENT**

On 03/26/2009 while operating in Mode 1, Beaver Valley Power Station (BVPS) Unit 1 commenced the performance of a Recirculation Spray System (RSS) flow test, pursuant to Technical Specification Surveillance 3.6.7.2 for one of the two outside RSS pumps [BE]. See the simplified drawing included at the end of this report. This containment spray system is normally maintained in a dry condition during power operation with its suction containment isolation valve (MOV-1RS-155B) and its discharge containment isolation valve (MOV-1RS-156B) open. This surveillance procedure, which previously was normally performed in Modes 5 and 6, was recently revised to allow performance in all modes.

Technical Specification (TS) 3.6.7 requires four RSS subsystems be operable while in Modes 1 through 4. The TS Required Action (restore an inoperable subsystem within 7 days) was entered at the start of the surveillance procedure since the one applicable RSS subsystem was being made inoperable during the surveillance procedure. To perform this test while in Mode 1, the suction and discharge containment isolation valves (CIVs) on this RSS train of piping were closed (but not de-energized) and the RSS 2B pump piping and casing were filled with water through the pump casing manual drain valve and manual valves connected at the top of the pump casing were opened to provide a vent path. Filling operation was performed for 7 hours and 11 minutes. Filling operation was suspended until the next day when an additional 9 hours and 27 minutes of filling was performed on 03/27/2009.

After the filling operation was complete, the pump was successfully run on recirculation flow to complete the flow test portion of the surveillance procedure. Water was then drained from the pump and piping by connecting pressurized air to one vent and draining the water out the casing drain line to a local sump. Draining was performed for 7 hours and 5 minutes through the night.

At 04:18 on 03/28/2009 during the draining operation, the Shift Manager recognized that the CIVs on this RSS train's piping needed to be de-energized while closed since the RSS pump's vent and drain valves were open. These CIVs receive an 'open' signal following a containment isolation-Phase B (CIB) signal during a design basis Loss-of-Coolant-Accident (LOCA), and not the typical 'close' signal. In the configuration with open manual valves on the pump's casing, containment operability would have been compromised if a LOCA were to occur pressurizing containment. Since this RSS train's CIVs (the containment pressure boundary during the surveillance) remained energized, they would have automatically

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**NARRATIVE**

**DESCRIPTION OF EVENT (Continued)**

opened following a CIB signal, and resulted in a path to pressurize the pump's casing. The two CIVs on this RSS piping train were immediately de-energized, removing this portion of the RSS piping from potentially becoming an extension of the containment boundary.

Although the Required Action for TS 3.6.7 for one inoperable RSS subsystem was entered at the start of the surveillance procedure, it was not recognized that TS 3.6.1 for Containment operability was also being entered whenever a normally-closed manual drain/vent valve on the pump's casing was opened by the surveillance procedure while this train's CIVs were energized.

**ANALYSIS OF EVENT**

The Recirculation Spray System is designed to operate following a design basis LOCA. The RSS pumps do not immediately start following a LOCA, but start only when sufficient water has been injected into containment to allow an appropriate level of water to accumulate in the containment sump for proper RSS pump operation. The RSS normally-open CIVs receive a signal to automatically open following a containment isolation-Phase B signal. The RSS piping will thus initially experience direct containment pressure following a LOCA, which makes this piping an extension of containment pressure boundary.

TS 3.6.1 requires that Containment shall be operable in Modes 1 through 4. The Bases for TS 3.6.1 states that "All penetrations required to be closed during accident conditions are either 1) capable of being closed by an operable automatic containment isolation system or 2) closed by manual valves, blind flanges, or de-activated automatic valves secured in their closed positions." The RSS pump casing drain/vent penetrations are required to be closed during accident conditions, but were not adequately isolated from containment pressure during this surveillance procedure by appropriate automatic or passive isolation function when the RSS pump drain/vent manual valves were open with the RSS CIV's remaining energized while in Mode 1. TS 3.6.1 Required Action A requires that an inoperable containment be restored with one hour and Required Action B requires the Unit be in Mode 3 within 6 hours when Completion Time for Required Action A is not met. Thus, non-compliance with TS 3.6.1 occurs when the containment (i.e., penetrations in this case) is inoperable longer than 7 hours. A RSS pump casing drain/vent valve was open for more than 7 hours during both the filling operation and the draining operation. Thus, when this RSS pump flow surveillance procedure was being performed, BVPS Unit 1 inadvertently did not comply with TS 3.6.1, which was a condition prohibited by the plant's Technical Specifications and is reportable pursuant to 10CFR50.73(a)(2)(i)(B).

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**ANALYSIS OF EVENT (Continued)**

An engineering evaluation was performed to assess the impact of the containment bypass path that existed during the surveillance procedure on the potential radiological doses following a postulated design basis accident (i.e., LOCA). This assessment determined that neither the licensing bases dose values nor the regulatory dose limits would have been exceeded. Additionally, based on the small unisolated valve openings and the maximum calculated flow rates through the flow path, this event is not expected to impact the Large Early Release Frequency (LERF). Therefore, this event is considered to have very low safety significance.

There was no loss of safety function for the Containment pursuant to 10 CFR 50.73(a)(2)(v) since the evaluation described above concluded that neither the licensing bases radiological dose values nor the regulatory radiological dose limits would have been exceeded if a LOCA were postulated to have occurred during the time that the drain/vent valves were open (providing potential leak paths from the containment) when this surveillance procedure was being performed.

**CAUSE OF EVENT**

The root cause of this event was determined to be less than adequate change management in revising the performance mode of the test without adequate evaluation of the impact on Technical Specification requirements. Narrow focus by procedure preparers, review organizations and end users on the most obvious TS requirement (Recirculation Spray System) resulted in a failure to identify that a more limiting TS requirement (Containment operability) was impacted by the test.

A contributing cause was that components associated with the Recirculation Spray System pump (vents, drains, pump seal, etc) were not consistently identified in site procedures as potential impacts on containment operability.

**CORRECTIVE ACTIONS**

1. The subject Recirculation Spray System surveillance procedures will be revised to include reference to Containment Technical Specification 3.6.1 and the necessary steps to ensure compliance, such as maintaining the suction and discharge CIVs in the de-energized and closed position.

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**CORRECTIVE ACTIONS (Continued)**

2. Various other routine Recirculation Spray System pump procedures will be reviewed and revised as appropriate at both BVPS units to include a reference to Technical Specification 3.6.1 for Containment, and to verify that sequence of steps are appropriate to ensure compliance while in Modes 1 through 4.
3. A training needs analysis will be performed for the licensed operator initial and continuing training programs based on this event. This analysis will consider if current training material adequately emphasizes that the Outside Recirculation Spray System components (vents, drains, pump seal, etc) at both units are an extension of the Containment boundary, and the need to take a broad view of affected Technical Specifications when procedure changes are made such as changing the mode of performance.
4. A training needs analysis will be performed for Engineering training programs based on this event. This analysis will consider if current training material adequately emphasizes that the Outside Recirculation Spray System components (vents, drains, pump seal, etc) at both units are an extension of the Containment boundary, and the need to take a broad view of affected Technical Specifications when procedure changes are made such as changing the mode of performance.
5. The training program for the independent procedure reviewers (IQR) will be updated to include lessons learned from this event with emphasis on the responsibility of the IQR to ensure compliance with applicable Technical Specifications.

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

**PREVIOUS SIMILAR EVENTS**

A review found two prior BVPS Unit No. 1 and one prior BVPS Unit No. 2 Licensee Event Report within the last three years for an event involving an actual or potential breach of containment integrity or events involving recent procedure changes for tests being conducted during power operation.

- BVPS Unit 1 LER 2006-003, "Inadvertent Technical Specification Noncompliance Due to Inoperable Containment Isolation Valve". This LER involved not closing a containment isolation valve on a clearance boundary as expected, due to a combination of human error and inadequate supervision oversight.

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**PREVIOUS SIMILAR EVENTS (Continued)**

- BVPS Unit 2 LER 2008-002, "Containment Air Lock Equalization Valve Inadvertently Left Open Following Routine Containment Entry". This LER involved not closing a containment isolation valve following a routine containment entry as required by the procedure, due to inappropriate procedure format.
- BVPS Unit 1 LER 2007-001, "Valve Testing Program Change Inadvertently Leads to Condition Beyond Design Basis During Test". This LER involved a weakness of the procedure change process.

Both of the first two LERs were not similar to this LER because appropriate procedural steps and practices were not followed. In this 2009 Unit 1 LER, adequate containment isolation procedural guidance was not provided.

The third LER involved not recognizing the procedure change's effect on the design basis safety analysis which would not have been reasonably evident to the procedure performers. This 2009 Unit 1 LER involved not recognizing the procedure change's effect on a second Technical Specification requirement, which could have been understood by the procedure performers.

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NARRATIVE

Simplified Drawing  
BVPS Unit 1 Recirculation Spray System Outside Pump Subsystem  
Test Configuration

