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L-08-387

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 2008-001-00

Enclosed is Licensee Event Report (LER) 2008-001-00, "Control Room Envelope Intake During Normal Operation Higher Than Assumed in Design Basis Accident Dose Calculations." 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)

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/31/2010

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.

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Control Room Envelope Air Intake During Normal Operation Higher Than Assumed In Design Basis Accident Dose Calculations

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
11	10	2008	2008	- 001 -	00	01	09	2009	Beaver Valley Pwr Station Unit 2	05000412
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100 %

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(a)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Colin P. Keller, Manager, Regulatory Compliance	(724) 682-4284

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	VI	DMP	S420	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 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 November 10, 2008, the results of the Control Room Envelope (CRE) tracer gas in-leakage testing for the Beaver Valley Power Station Unit 1 and Unit 2 combined control room were reported. The measured CRE in-leakage value for the Unit 1/Unit 2 Control Room Emergency Ventilation System (CREVS) Pressurization Mode used following an accident was 0 cubic foot per minute (cfm), which is below the design basis dose calculation limit. However, the routine intake of outside unfiltered fresh air into the combined Unit 1/Unit 2 CRE during normal plant operation was measured to be above the design basis dose calculation assumption of 500 cfm maximum. This was caused, in part, due to a corrosion hole in a normally closed Unit 1 control room ventilation purge damper. This higher-than-assumed normal intake air flow rate resulted in a calculated post-accident dose higher than the current bounding design basis control room dose. This represents an inadequate, and inoperable CRE boundary. This is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by plant Technical Specifications.

The cause of this event was less than adequate CRE boundary definition stated in site procedures which resulted in the failure to ensure adequate maintenance and surveillance activities on appropriate CRE components. 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 (other than the control room envelope boundaries described below). Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

DESCRIPTION OF EVENT

Beaver Valley Power Station (BVPS) has a common air envelope boundary which encompasses both Unit 1 and Unit 2 control rooms. A separate Control Room Emergency Ventilation System (CREVS) is provided on each side of the joint Unit 1/Unit 2 Control Room Envelope (CRE) which will isolate both Units' normal CRE ventilation penetrations and will draw outside air into the CRE through filters to pressurize the CRE following actuation.

On November 10, 2008, the results of the CRE tracer gas in-leakage testing for the BVPS Unit 1 and Unit 2 combined control room [VI] were reported, which was performed per Technical Specification Surveillance Requirement 3.7.10.4. The measured CRE in-leakage value for the Unit 1 CREVS Pressurization Mode was 0 cubic foot per minute (cfm). The measured CRE in-leakage value for the Unit 2 CREVS Pressurization Mode was also 0 cfm. These values are less than the design basis dose calculation assumption of a maximum of 30 cfm unfiltered in-leakage during a design basis accident (DBA) following CREVS initiation.

However, the routine intake of outside unfiltered fresh air into the combined Unit 1/Unit 2 CRE during normal plant operation was measured to be 1257 cfm plus/minus 101 cfm, (the initial preliminary value). This exceeded the design basis dose calculation assumption of a maximum of 500 cfm (nominally 300 cfm intake from the Unit 1 ventilation system and 200 cfm from the Unit 2 ventilation system) used in the dose calculations for all DBAs described in both Units' Updated Final Safety Analyses Reports (UFSARs). The normal air intake into the CRE at each Unit is controlled by a manual throttle damper, which is isolated by two upstream in-series safety-related dampers when CREVS is initiated. The CREVS filtered air intake is through a separate pathway. [Note: control room charcoal/HEPA air filters are located only on each Unit's CREVS intake flow path; there are no charcoal/HEPA filters on either of the Units' control room recirculation flow paths.]

Each of the two Units' intake throttle dampers were found to be partially degraded and part of the excessive normal intake flow was determined to be due to a corrosion hole in the BVPS Unit 1 normally-closed control room purge intake damper blade, which is in parallel to the normal intake throttle damper in the normal air intake duct path. This purge intake damper is normally closed and is designed only to be opened at the conclusion of a DBA when the control room would need to be purged with a very large outside air flow rate.

DESCRIPTION OF EVENT (Continued)

The subject CRE tracer gas in-leakage testing also identified that the inleakage during the control room recirculation ventilation mode (outside air is isolated, but CREVS fans have not yet been manually started) was 292 +/- 23 cfm, which could be slightly above the assumed design value of 300 cfm if the full tolerance of +23 cfm is assumed.

The limiting BVPS Unit 1/Unit 2 calculated control room dose which credits CREVS occurs during a DBA Loss of Coolant Accident (LOCA). Although the normal unfiltered intake flow value may only be utilized for a very short time in the limiting LOCA dose calculation (i.e., the first 77 seconds - time for full CRE isolation as initiated by a Containment Isolation-Phase B signal), the contribution of normal unfiltered intake flow to the calculated control room operator post-DBA dose is not insignificant for all DBA dose calculations.

There was no need to credit CREVS actuation for some DBAs described in the Units' UFSARs since assuming continuous normal control room intake for 30 days post-DBA yielded acceptable calculated control room doses. The effect of an excessive normal intake flow rate is more pronounced for those DBAs which do not credit CREVS initiation in their control room design basis dose calculation than for the DBAs which do credit CREVS initiation. For example, the current BVPS Unit 1 Steam Generator Tube Rupture (SGTR) DBA dose calculated for the control room operator does not credit any CRE isolation or CREVS operation and produced a calculated control room dose which was smaller than the limiting LOCA control room dose which does credit CREVS operation. However, re-calculating control room dose using the recently measured excessive normal operation air intake value would cause the BVPS Unit 1 SGTR DBA control room dose to exceed the value currently listed in the UFSAR for SGTR and also above the current limiting LOCA calculated control room dose. Thus, the excessive normal operation air intake value creates an inadequate CRE boundary since it, by itself, invalidates the bounding control room dose calculation by resulting in a calculated control room dose which exceeds the current BVPS Unit 1 and Unit 2 bounding control room dose. An inadequate CRE boundary represents a condition prohibited by plant Technical Specification 3.7.10 for CREVS.

CAUSE OF EVENT

The cause of this event was less than adequate (LTA) CRE boundary definition stated in site procedures which resulted in the failure to ensure adequate maintenance and surveillance activities on appropriate CRE components.

The three different modes of the control room ventilation operation (i.e., Normal, Recirculation, and Pressurization Modes) and their effect on the CRE boundary (as addressed by Technical Specification 3.7.10) was not described in site procedures. The

CAUSE OF EVENT (Continued)

current site procedures are inadequate since they mainly describe only the CRE building structure components. As a result of this LTA CRE boundary definition, the function of the event related dampers to establish a CRE in-leakage boundary in the Normal Mode of operation had not been clearly recognized as a critical aspect of CREVS operability. In the Pressurization Mode of operation (i.e., post-DBA), two upstream series isolation dampers are closed to form the ventilation boundary - not the event related (normal intake throttle) dampers. The common site understanding of the definition of the CRE boundary was typically associated with the Pressurization Mode of operation. Therefore, the need to establish periodic preventative maintenance tasks and/or flow measurements to maintain normal intake flow rates within limits for the event-related dampers was not recognized until after the dampers degraded to the point that the in-leakage flow rates in the normal mode of operation exceeded the maximum value of 500 cfm.

ANALYSIS OF EVENT

The BVPS Unit 1 intake purge damper (1VS-D-40-1G) was degraded by a hole created by corrosion (which was subsequently determined to have been potentially accelerated by ice-removal material spread for winter walkway clearance). Corrosion is a slow process which does not occur in a short time frame. Hence, this was firm evidence that the abnormally high CRE intake flow, exacerbated by the 1VS-D-40-1G pathway hole, existed prior to the recent tracer gas testing. This flow rate through the closed purge damper would have been in addition to any flow via the normal intake pathways, and would have exceeded the licensing basis analyses limit for the total normal intake flow rate assumed in the dose calculations of record (less than 500 cfm total intake limit). This would have caused a higher-than-bounding CRE dose and hence, an insufficient CRE boundary. Technical Specification 3.7.10 Action B applies for an inoperable CRE boundary and contains three Required Actions with Completion Times ranging from 'Immediately' to '90 days'. The inadequate CRE boundary would have been a condition prohibited by plant Technical Specifications for greater than the time frames allowed by Technical Specification Action B completion times. Therefore, this is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

The potential higher than design inleakage during the control room recirculation ventilation mode (292 cfm +/- 23 cfm) was not caused by the 1VS-D-40-1G corrosion hole, and thus, it was not a firm pre-existing condition. Therefore, this was not reportable pursuant to 50.73(a)(2)(i)(B).

An evaluation was performed to assess the impact of the changes in the control room ventilation intake/inleakage flows measured by the tracer tests on the control room

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NARRATIVE

ANALYSIS OF EVENT (Continued)

operator dose following a design basis accident. The evaluation determined that the regulatory limit of 5 REM TEDE would not be exceeded following any DBA. Therefore, no significant impact on the control room operators to perform their duties following postulated design basis accidents are expected, and this event is considered to have very low safety significance.

There was no loss of safety function for the CRE pursuant to 10CFR 50.73(a)(2)(v) since the largest increase in calculated control room dose resulting from the measured increase in normal intake air flow would not have exceeded the General Design Criteria 19 regulatory limit of 5 REM TEDE, even though the dose increase would have been more than the bounding value currently listed in the Unit's UFSAR.

CORRECTIVE ACTIONS

1. Immediate actions included closing both Units' CREVS isolation dampers to reduce the normal intake of unfiltered air to a value less than assumed in the DBA dose calculations.

2. The CRE dampers were repaired and the subsequent normal in-leakage rate was satisfactory.

3. A site document will be developed to clearly define the CRE boundary to also include boundaries used during normal and recirculation modes of control room ventilation modes of operations, and not just the post-CREVS initiation pressurization mode of operation.

4. Periodic preventative maintenance and periodic intake flow measurements will be incorporated for the normal CRE intake dampers.

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 Unit No. 2 Licensee Event Report within the last three years for an event involving the control room boundary/envelope.

CR 08-49260