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February 19, 1990
ND3MNO:3103

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
LER 91-004-00

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

In accordance with Appendix A, Beaver Valley Technical Specifications, the following Licensee Event Report is submitted:

LER 91-004-00, 10 CFR 50.73.a.2.i, "Containment Liner Test Channel Vents Found Unplugged".

Very truly yours,

T. P. Noonan
General Manager
Nuclear Operations

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Attachment

cc: Mr. T. T. Martin, Regional Administrator
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NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Beaver Valley Power Station Unit 1	0 5 0 0 0 3 3 4	1 OF 0 5

TITLE (4)
Containment Liner Test Channel Vents Found Unplugged

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 1	2 2	9 1	9 1	0 0 4	0 0	0 2	1 9	9 1	N/A	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify, in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
T.P. Noonan, General Manager Nuclear Operations	4 1 2 6 4 3 - 1 2 5 8

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	B D	X X X X	X X X X	N							

SUPPLEMENTAL REPORT EXPECTED (14)

	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO			

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

During a maintenance outage on 1/22/91, station personnel working in containment discovered a containment liner test channel vent line unplugged. Further inspections were initiated and found a total of 27 plugs missing. An additional 11 plugs, while in place, were found to be degraded due to corrosion. All the missing or degraded plugs were for test channels located on the liner floor. Twelve of the vent lines for these channels extended approximately two and a half feet above the floor, while the other 26 vent lines ended flush with the floor. All 26 of the channel vent lines that ended flush with the floor were sampled for liquid or corrosion products. Minor amounts of moisture (two to three drops) were found in two of the 26 channels. No indication of moisture was found in the other channels. Chemistry personnel verified that the two samples had neutral pH, but were unable to perform additional analysis due the limited sample quantity. No indications of liner corrosion or degradation were noted. All 38 vent lines were plugged with stainless steel plugs. An engineering analysis has been initiated to determine the potential for any effects to the containment liner due to this event.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Beaver Valley Power Station Unit 1	0 5 0 0 0 3 3 4	9 1	0 0 4	0 0	0 2 OF 0 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Description of Event

In January 1991, the unit was shutdown to Operational Mode 5 (Cold Shutdown) for a maintenance outage. On January 22, personnel working in containment noted that a vent line for a containment floor liner test channel was unplugged. These personnel were sensitive to the need for these vents to be plugged due to a recent event at Beaver Valley Unit 2 (LER 90-015) that involved missing plugs. An inspection of all the vent line plugs for the floor liner test channels was performed and discovered that twenty-seven vents were not plugged. Additionally, there were eleven additional vents that were found to have their plugs degraded by corrosion. All these vents were for test channels located on the liner floor.

Containment Construction

The concrete reactor containment building was constructed with a steel liner to ensure the structure would have minimum air leakage. The liner was made of preformed steel plates welded together. The liner test channels, also made of steel, were welded over the liner plates seam welds. (See Figure 1) The channel vents were then used to pressure test the channels to verify weld reliability. After the liner was completed, a protective coating was applied to the liner to prevent corrosion. But, as the test channels were still in place, no coating could be applied over the seam welds. The test channels were therefore sealed shut with vent plugs (allen head bolts) to ensure that corrosion would not occur on the uncoated parts of the liner. Also, after the liner was completed, reinforced concrete was poured inside the liner to a depth of approximately two feet for the containment's floor.

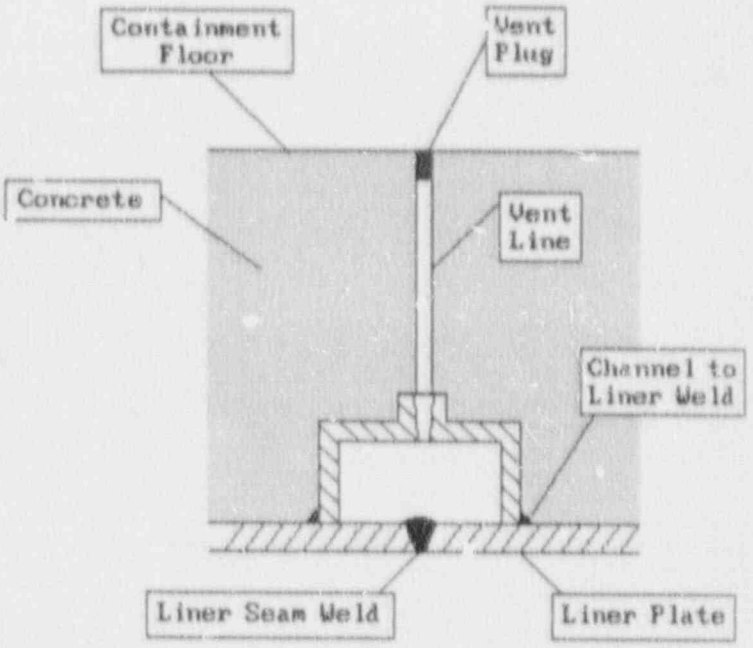

Figure 1

Simplified Test Channel

Cause of Event

The apparent cause of the missing vent plugs is a failure to install the plugs during construction. The plugs are screwed flush into the threaded termination of the vent lines and not susceptible to becoming loose due to casual contact during maintenance or refueling activities. One unplugged vent line that terminated flush to the floor was completely covered over with floor joint caulking. This indicates that the vent had been left unplugged during construction activities. The station has performed five containment structural integrity inspections (one pre-operational, four operational) that verify several items, including vent plug installations. During these previous inspections, apparently only the vent plugs for the test channels on the walls were checked. The test procedure did not alert the personnel performing the inspections that there were test channels for the welds on the floor of the liner.

Eleven of the vent plugs were degraded due to corrosion. These plugs were all positioned flush to the floor and located near the containment sump. The plugs had been in place for at least 16 years. Due to their location, they were frequently exposed to moisture. Even when the sump area was dry, moisture would remain for long periods in the allen head of the plugs, eventually causing the plugs to corrode.

Previous Similar Events

Review of station documents showed two previous similar events. Beaver Valley Unit 1 LER 82-013 involved the discovery of two missing vent plugs for test channels on the containment liner wall. The channels were removed and a protective coating applied to the liner seam weld. Beaver Valley Unit 2 LER 90-015 involved an event where 25 containment liner test channel vent plugs were discovered missing. After a containment Type A leakage rate test verified that the liner was intact under the channels, the vents were plugged.

Corrective Actions

As stated above, a total of 27 vents were discovered with missing plugs. Fifteen of these vents were constructed so that their terminations were flush with the containment floor. The other twelve unplugged vent lines extended approximately two and a half feet above the containment floor along concrete columns. Additionally, there were eleven installed plugs mounted flush to the floor that were discovered to be corroded. Based on these discoveries, the following actions were taken or initiated:

1) An inspection was initiated to find if any moisture had entered the eleven vents with degraded plugs or the fifteen unplugged vents that were flush with the floor. The unplugged vents were partially blocked at their floor level opening by sand/dirt type debris. This was removed with an awl. A flexible plastic tube was inserted down the vent lines into the channels. Minor resistance was encountered while inserting the tube into the vent lines, apparently due to small amounts of additional debris. Once the tube was inserted, a vacuum pump was attached to the tubing and used to draw a sample of any liquid present in the test channels. Twenty-four of the channels were dry. Minor amounts of moisture (two to three drops) were obtained from the other two channels. Chemistry personnel verified that these samples were of neutral pH, but were unable to perform further analysis due to the limited sample quantity.

2) All twenty-seven unplugged vents were sealed with stainless steel plugs. The eleven corroded plugs were replaced with stainless steel plugs.

3) An engineering analysis has been initiated to determine the potential for any long-term effects to the containment liner due to this event.

4) The Containment Structural Integrity Inspection procedure is being revised to specify examination of vent plugs for test channels located on the liner floor.

5) The station's existing surveillance requirements specify that the channel must be removed if found unplugged. Based on the minimal amount of moisture found in the channels, the station has obtained a temporary waiver of compliance regarding this requirement (reference: Edward G. Greenman, Acting Assistant Director for Region I Reactors Division of Reactor Projects letter dated 1/25/91). A request for a Technical Specification change based on standard Technical Specifications has been initiated to allow continued operation until the next Type A Containment Leakage Rate test.

Safety Evaluation

There were no safety implications due to this event. The primary function of the vent plugs is to prevent moisture from entering the test channels. Inspection verified that no significant amount of moisture was present in the channels. A successful type A containment leakage rate test performed in December 1989 verified there was no liner degradation at that time. All vent lines discovered unplugged or with degraded plugs have been sealed with stainless plugs. A vendor analysis has verified that the test channels are capable of withstanding all loads that might be imposed on them during normal test and upset conditions and provide containment leak protection.