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L-00-053

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334 License No. DPR-66
LER 2000-003-00

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

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

LER 2000-003-00, 10 CFR 50.73(a)(2)(i), "Failure to Comply with Technical Specifications Due to Inoperability of One Subsystem of the Containment Recirculation Spray System."


Lew W. Myers

Attachment



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L-00-053

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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: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.

FACILITY NAME (1)
Beaver Valley Power Station (BVPS) Unit 1

DOCKET NUMBER (2)
05000334

PAGE (3)
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TITLE (4)
Failure to Comply with Technical Specifications Due to Inoperability of One Subsystem of the Containment Recirculation Spray System

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 NAME	DOCKET NUMBER
3	23	2000	2000	003	00	4	24	2000	N/A	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)											
5	000	20.2201(b)	20.2203(a)(1)	20.2203(a)(2)(i)	20.2203(a)(2)(ii)	20.2203(a)(2)(iii)	20.2203(a)(2)(iv)	20.2203(a)(2)(v)	20.2203(a)(2)(vi)	20.2203(a)(2)(vii)	20.2203(a)(2)(viii)	20.2203(a)(2)(ix)	20.2203(a)(2)(x)

LICENSEE CONTACT FOR THIS LER (12)

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	BE	P	B260	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 3/23/2000 while in Mode 5 during refueling outage 1R13, ASME Section XI in-service testing (IST) of BVPS Unit 1 Inside Containment Recirculation Spray Pump RS-P-1A revealed that the pump discharge pressures and flows were below the minimum test acceptance criteria. Slightly higher than normal pump motor amperage and vibration were also noted. The pump was not required to be operable during Mode 5. The pump was disassembled and an inspection revealed two 2" X 4" wooden blocks (each approximately 6" long) on the bottom of the pump suction well and a fragmented piece of wood (approximately 6" long) in the pump second stage impeller. This event is reportable per 10CFR50.73(a)(2)(i)(B).

The root cause of the wood in the pump suction well and impeller is inadequate foreign material exclusion (FME) control during installation of a design change package in February 1982.

The wood was removed and two pump wear rings and one shaft bushing were replaced due to damage. Additional pump components were also replaced as part of good maintenance practices. The pump suction well of the other inside containment recirculation spray (RS) pump and the suction piping of the outside RS pumps and the low head safety injection pumps were inspected. Subsequent testing of RS-P-1A showed the pump met IST acceptance criteria and it was determined to be operable. The BVPS Unit 2 Containment sump and suction piping will be inspected during the next refueling outage (2R08).

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

PLANT AND SYSTEM IDENTIFICATION

Westinghouse Pressurized Water Reactor System
Containment Recirculation Spray System (RS) {BE}
RS Inside Containment Recirculation Spray Pump RS-P-1A {BE/P}

CONDITIONS PRIOR TO EVENT

Unit 1: Mode 5 - refueling outage 1R13

EVENT DESCRIPTION

On March 23, 2000, during the thirteenth refueling outage (1R13), ASME Section XI in-service testing (IST) of BVPS Unit 1 Inside Containment Recirculation Spray pump RS-P-1A revealed that the pump discharge pressures and flows were below the minimum test acceptance criteria. Slightly higher than normal pump motor amperage and vibration were also noted during the test. The pump was not required to be operable in Mode 5. This test is performed once/18 months during refueling outages, per procedure 1BVT 1.13.5, "Inside Recirculation Spray Pump Test."

The pump was disassembled and an inspection was conducted, which revealed two 2" X 4" wooden blocks (each approximately 6" long) on the bottom of the pump suction well and a fragmented piece of wood (approximately 6" long) in the pump second stage impeller. One of the blocks had two nails, which were bent flush with the board. It is apparent that at one time both blocks were nailed together to form a "T" shape, based on corresponding nail holes found in the other board. The wood was most likely used as cribbing during a design change installed in 1982.

A multi-disciplined Event Response Team was formed to investigate the event.

REPORTABILITY

This condition is reportable per 10 CFR 50.73(a)(2)(i)(B), as a failure to comply with the requirements of Technical Specifications (TS). This is because one subsystem of the four Recirculation Spray (RS) subsystems (required to be operable in Modes 1-4 per TS 3.6.2.2) was inoperable greater than the allowable seven (7) days. This reportability is based on judgement that the as-found condition of the pump existed prior to refueling outage 1R13.

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CAUSE OF THE EVENT

The degraded performance of RS-P-1A was a direct result of the wood found in the pump second stage impeller and the pump suction well.

The root cause of the wood in the pump suction well and impeller is inadequate foreign material exclusion (FME) control during installation of a design change package (DCP) in February 1982. The DCP added flow anti-vortexing devices (cruciforms) for the inside containment RS pumps RS-P-1A and 1B (see Figure 1), the outside containment RS pumps, and the Low Head Safety Injection (LHSI) pumps. It is believed the wood in RS-P-1A had been used as support cribbing during installation of the DCP. Installation of the DCP required temporary removal of the inner most circular protective screening for the RS and LHSI pumps (see Figure 2 pertaining to RS-P-1A and 1B). However, following completion of the DCP work, the wood was not removed due to inadequate FME control. Due to the presence of the wood inside the pump protective screens since 1982, the possibility exists that pump degradation could have occurred if the pump would have been required to operate following a of Loss of Coolant Accident.

The wood was likely drawn into the pump during the performance of the in-service test during 1R13. This in-service test is performed during refueling outages, beginning in October 1984. During this testing, a temporary dam is built and flooded around the pumps to provide a water source for the test (see Figures 2 and 3). The pump flow is circulated through an installed test line and back to the confines of the temporary dam.

These conclusions are based on:

- A review of historical documentation of pump maintenance/work activity, which shows the DCP installed in 1982 involved the most recent removal of the pump circular protective screen.
- The as-found condition of the protective screens around the pumps, which would have prevented the passage of the wood into the pump suction well from outside the screens.
- The belief that the wood was obscured by the protective screens around the pump and would not have been readily detected during containment inspections.
- The results of in-service testing of the pump during refueling outages 1R4 through 1R12, which has noted no significant anomalies in pump performance.

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SAFETY IMPLICATIONS

Evaluation of the effects of the wood present in the pump suction area and impeller of Recirculation Spray Pump RS-P-1A indicate that for the most probable sequence of events, acceptable performance of the system would have occurred considering actual system parameters and historical river water temperatures. The evaluation considered other potential system impacts including pump motor performance, pump available NPSH, heat exchanger flow blockage, spray nozzle plugging, and potential effects from the nails found in one of the blocks of wood. Measured pump performance indicated a degraded condition resulting in reduced flow for the affected spray train. This reduction in flow would have been compensated for by available margin in analyzed tube plugging levels in the RS system heat exchangers and lower river water temperatures. Additional degradation of approximately 10% in system flow for this train could have occurred before challenging design basis requirements for containment de-pressurization or peak pressure. Further degradation in excess of this acceptable value was unlikely based on observations of the pump condition, the characteristics and condition of the wood found, and the time element involved with the testing. It is apparent that either interactions between the pump impeller and the wood of sufficient magnitude to break off substantial fragments were infrequent, or the result of these interactions was fragments small enough to pass through the impeller. In either event, further pump degradation was not considered probable or, not probable in a time frame which would result in system degradation to the point where design basis functions would not have been met. Since the system remained functionally available, there was no resultant increase in core damage frequency or plant risk, based on the NRC Significance Determination Process.

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CORRECTIVE ACTION

1. The wood was removed from the RS-P-1A pump suction well and impeller. The pump suction well was pumped out and inspected. A small amount of debris, consisting of nuts, bolts, washers, and wire was removed from the suction well. Some of this debris was from the pump removal for inspection and disassembly during 1R13. Two pump wear rings and one shaft bushing were replaced due to damage. Additional pump components were also replaced as part of good maintenance practices. Subsequent testing showed the pump met IST acceptance criteria and the pump was determined to be operable.
2. Boroscopic examinations of the pump suction well of inside containment RS pump RS-P-1B and the suction piping of the outside containment RS pumps and the LHSI pumps were conducted. Fine silt-like deposits were found in the suction piping to the outside containment RS pumps and the LHSI pumps. The deposits were evaluated as not affecting operability of the pumps and vacuuming was performed in an effort to remove the deposits. From this evaluation it was determined that no additional action is required regarding the deposits and their effect upon the outside containment RS pumps and the LHSI pumps.
3. The procedure used for the DCP installation in 1982 contained limited FME controls. Since this time, site FME controls have been improved to incorporate industry good practices. An evaluation of the current FME and housekeeping program, based on this event, will be conducted to determine if further enhancements are needed.
4. An inspection of the BVPS Unit 2 Containment sump and suction piping will be conducted during the next refueling outage (2R08).

The above actions will be tracked and completed as part of the corrective action program.

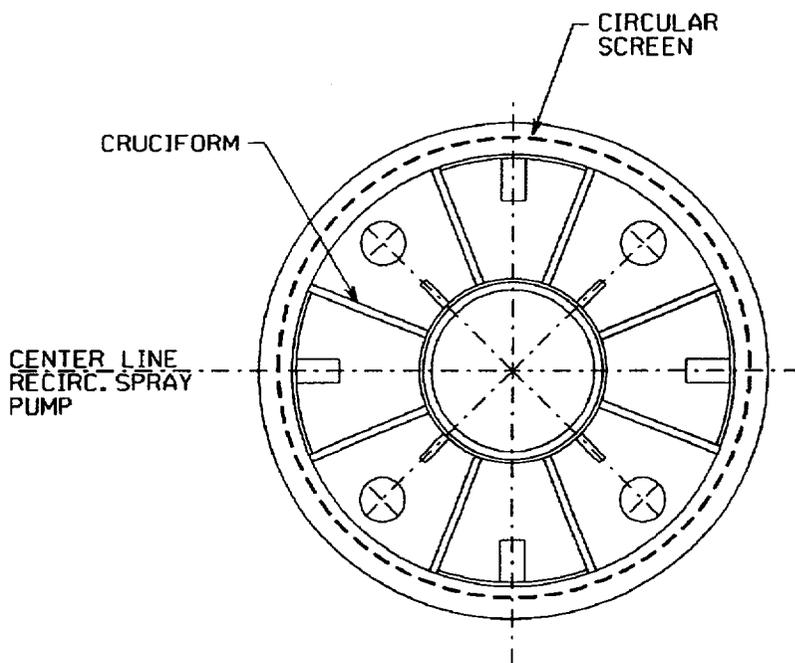
PREVIOUS SIMILAR EVENTS

A review of LERs for BVPS Unit 1 and Unit 2 for the past two years did not reveal a previous similar event involving debris or foreign material intrusion, which rendered a subsystem of an engineered safety feature system inoperable.

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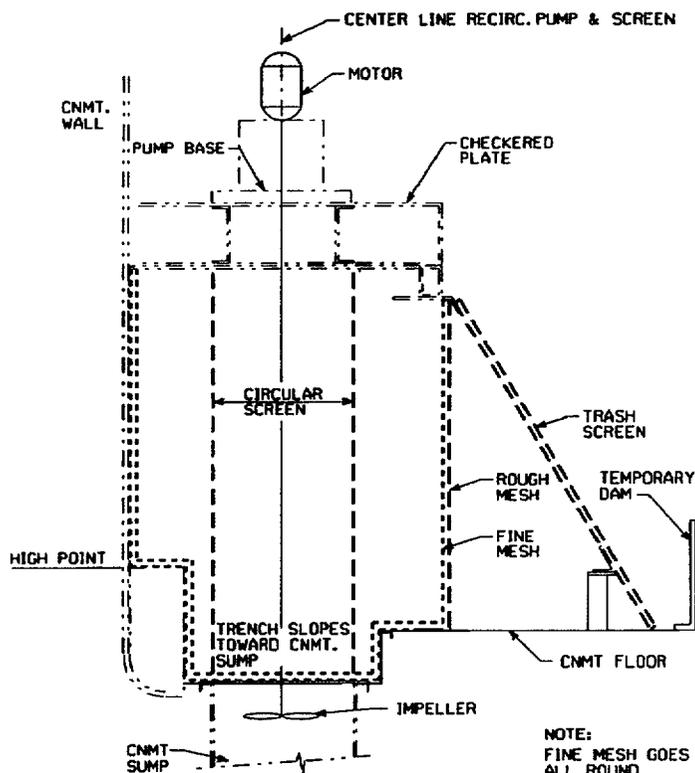
PLAN VIEW
OF PUMP RS-P-1A
CIRCULAR SCREEN, CRUCIFORM
& PUMP SHAFT

FIGURE 1

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NOTE:
FINE MESH GOES ALL ROUND SUMP PUMP
TEMPORARY DAM INSTALLED DURING OUTAGES ONLY

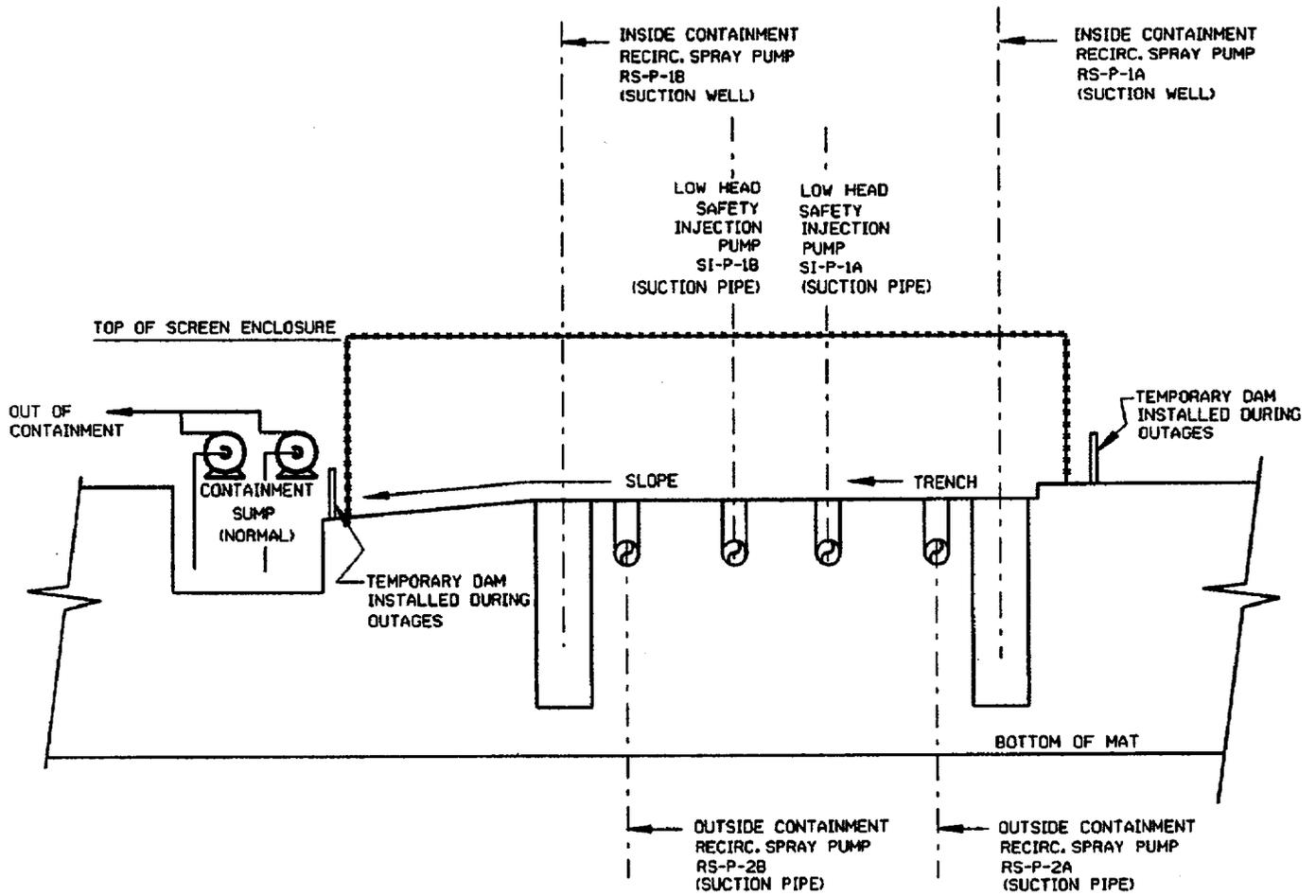
ELEVATION DEPICTION OF PUMP RS-P-1A/1B
CIRCULAR SCREEN, CRUCIFORM AND PUMP SHAFT
FIGURE 2

FIGURE 2

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CONTAINMENT SUMP CROSS SECTION

FIGURE 3