



**Duquesne Light**

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February 10, 1997  
NPD2VPO:0605

*Beaver Valley Power Station, Unit No. 2*  
*Docket No. 50-412 License No. NPF-73*  
LER 97-002-00

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 97-002-00, 10 CFR 50.73(a)(2)(i) and 10 CFR 50.73(a)(2)(ii), "Technical Specification Required Shutdown Due to Missing or Degraded Recirculation Spray System Pump Flood Seals."

R. L. LeGrand  
Division Vice President  
Nuclear Operations

LB/ds

Attachment

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), 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.

**LICENSEE EVENT REPORT (LER)**

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

FACILITY NAME (1) Beaver Valley Power Station Unit 2										DOCKET NUMBER (2) 05000412		PAGE (3) 1 OF 4	
TITLE Technical Specification Required Shutdown Due to Missing or Degraded Recirculation Spray System Pump Flood Seals													
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 Beaver Valley Power Station Unit 1		DOCKET NUMBER 05000334		
01	11	97	97	002	00	02	10	97	N/A				
OPERATING MODE (9)		3	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)				
POWER LEVEL (10)		0%	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				
			20.405(a)(1)(iii)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in abstract below and in Text NRC Form 366A)				
			20.405(a)(1)(iv)		X 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 R. L. LeGrand, Vice President Nuclear Operations and Plant Manager									TELEPHONE NUMBER (include Area Code) (412) 393-7622				
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			
E/B	NF	SEAL	N/A	N									
SUPPLEMENTAL REPORT EXPECTED (14)									EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (if yes, complete EXPECTED SUBMISSION DATE)				X NO									

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

On January 11, 1997, at 1550 hours, while in Mode 3 at 0% reactor power, Beaver Valley Power Station (BVPS) Unit 2 entered Technical Specification 3.0.3 for a cooldown to Mode 5. Based on engineering review, it was determined that design basis requirements for flood protection were not maintained. It was identified that Recirculation Spray System (RSS) Safeguards Room flood protection seals were not in accordance with the Updated Final Safety Analysis Report (UFSAR). External penetration seals were missing for all 4 RSS pumps and 3 of 4 internal penetration seals were degraded. Given the condition of these flood protection seals, equipment in the Safeguards Building required for long-term recirculation following a Design Basis Accident (DBA) may not be capable of performing its intended function, assuming a design basis flood (Probable Maximum Flood) event occurred.

The causes of the non-conforming condition of the RSS flood seals were determined to be incomplete construction contractor documentation and the lack of overall knowledge of flood protection by the RSS flood seal installation crew.

The plant was cooled down to Mode 5 on January 12, 1997 at 2205 hours. The missing external RSS flood protection seals were installed. The degraded internal RSS flood protection seals were repaired. An extensive walkdown and inspection of selected Unit 1 and 2 flood protection hydrostatic seals was performed. The RSS pump cubicle deep manway hatch flood protection seals were identified as degraded during the walkdown and were subsequently repaired.

An immediate report of this condition was made on January 11, 1997, at 1741 hours, pursuant to the requirements of 10CFR50.72(b)(1)(i)(A) and 10CFR50.72(b)(2)(i). This report is being made pursuant to the requirements of 10CFR50.73(a)(2)(i)(A), 10CFR50.73(a)(2)(i)(B), and 10CFR50.73(a)(2)(ii)(A).

The plant was cooled down to Mode 5 based upon a conservative management decision. It was decided that, although the flood seal repairs could have been made in Mode 3, cooldown to Mode 5, where the RSS is not required to be operable, was the appropriate, conservative approach. There was no potential or actual threat of a flood when this condition was identified or at any time during the plant shutdown and seal repairs. The occurrence of a DBA followed by a Probable Maximum Flood is considered an extremely low probability scenario. There were no safety implications to the health and safety of the public as a result of this event.

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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 (PWR)

Recirculation Spray System (RSS) {BE}\*

Safeguards Building {NF}\*

Safeguards Building Floor Penetration Seals Penetrations OP-001, 002, 003 and 004 {NF/SEALS}\*

RSS Pumps 2RSS-21A, 2RSS-21B, 2RSS-21C and 2RSS-21D {BE/P/B26}\*

\* Energy Industry Identification System (EIIS) Component and Manufacturer Codes are identified in the text as {EIIS:SS/CCC/MMM}.

**CONDITIONS PRIOR TO OCCURRENCE**

Unit 1: Mode 1, 100% Reactor Power

Unit 2: Mode 3, 0% Reactor Power

**DESCRIPTION OF EVENT**

On January 11, 1997, at 1550 hours, while in Mode 3 at 0% reactor power, Beaver Valley Power Station (BVPS) Unit 2 entered Technical Specification 3.0.3 for a cooldown to Mode 5. Based on engineering review, it was determined that design basis requirements for flood protection were not maintained. It was identified that Recirculation Spray System (RSS) {EIIS:BE} Safeguards Room flood protection seals {EIIS: NF/SEALS } were not in accordance with the Updated Final Safety Analysis Report (UFSAR). External penetration seals were missing for all 4 RSS pumps {EIIS:BE/P/B26} and 3 of 4 internal penetration seals were degraded. Given the condition of these flood protection seals, equipment in the Safeguards Building required for long-term recirculation following a Design Basis Accident (DBA) may not be capable of performing its intended function, assuming a design basis flood (Probable Maximum Flood ) event occurred. There was no potential or actual threat of a flood when this condition was identified.

Probable Maximum Flood (PMF) protection was not provided, because there was no external seal (boot) between 4 of 4 of the 42" RSS pipe sleeves and the ring plates on the concrete floor. The lack of sealing would violate Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.6.1 should the river water level at the intake structure exceed 695' mean sea level. In addition, degraded inner boot seals at 3 of 4 RSS pipe sleeve penetrations could permit internal water that accumulates at elevation 718'-6" to cascade down to lower pump cubicles.

The plant was cooled down to Mode 5 on January 12, 1997 at 2205 hours. The missing external RSS flood protection seals were installed. The degraded internal RSS flood protection seals were repaired. An extensive walkdown and inspection of selected Unit 1 and 2 flood protection hydrostatic seals was performed. The RSS pump cubicle deep manway hatch flood protection seals were identified as degraded during the walkdown and were subsequently repaired.

**CAUSE OF EVENT**

The original penetration sealing efforts appear to have overlooked the need to seal between the pump casing and the concrete floor. Since root cause investigation identified that the "Penetration Listing" did not specifically identify the rodofom-filled

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opening between the Safeguards Building foundation mat and the pipe sleeve, "confusing or incomplete administrative controls" was identified as a root cause for this event. Furthermore, since the investigation identified that the need to install the seal between the sleeve and the floor only appeared on a concrete design drawing, it is postulated that penetration seal contractor personnel did not recognize the significance of the unfastened flange ring(s) for the external seals. As a result, "knowledge-based decision required" was identified as the other root cause of this event.

**ANALYSIS OF EVENT**

Unit 2 UFSAR, section 3.4, "Water Level (Flood) Design," states that flood protection for the site is in compliance with Regulatory Guide (R.G.) 1.102, "Flood Protection for Nuclear Power Plants," Revision 1. Additionally, the determination of the PMF originating external to plant structures is in compliance with R.G. 1.59, "Design Basis Floods for Nuclear Power Plants," Revision 2. UFSAR section 2.4.1.1, "Site and Facilities," states: "All Seismic Category I structures are protected from the probable maximum flood (PMF) level of 730.0 feet as described in section 3.4.1. All safety related equipment and connecting piping and wiring is either located above elevation 730 feet or adequately protected so that its function is unaffected by a flood to elevation 730 feet." UFSAR section 3.4.1, "Flood Protection," states: "Safety related systems and components are protected from external floods by locating them in Seismic Category I buildings." This would include the Safeguards Building.

The flexible boot seals which were not installed in the Safeguards Building are at an elevation of 718.5 feet. These flexible boots were designed to protect equipment in the Safeguards Building against the effects of the PMF.

The basis for the operability determination that was ultimately made regarding the identified nonconforming RSS flood seals, to conservatively declare both trains of the RSS inoperable and consequently enter the action statement for Technical Specification 3.0.3, focused upon the ability of the system to satisfy the long term (30 day) post accident cooling requirements. Unit 2 UFSAR, section 6.2.2.1, "Design Bases," states: "The RSS of the containment depressurization system is capable of operating in the post-accident environment to maintain a subatmospheric pressure for 30 days following a DBA." If a design basis Loss of Coolant Accident (LOCA) were to occur, the RSS and other Emergency Core Cooling Systems (ECCS) could perform their intended safety functions. However, if a PMF (design basis flood) were to subsequently occur, the ability of the RSS to maintain long term cooling could be impacted due to the missing flood protection seals. The recirculation spray suction valves could be immersed in water and their ability to remain open would be questionable. Although these valves are designed for water spray, they are not designed for submergence. Thus it was determined that the operability of the RSS to provide long term cooling cannot be guaranteed if a design basis flood were to occur within 30 days of the design basis LOCA. Although this is seen as an extremely low probability scenario, the requirement to demonstrate protection against a flood during the recovery period from a LOCA is clearly established by the UFSAR and the cited regulatory guides.

**CORRECTIVE ACTIONS**

1. The degraded condition of the internal penetration seals for 2RSS-P21A, 2RSS-P21C and 2RSS-P21D was repaired by January 13, 1997.
2. The external penetration seals for 2RSS-P21A, 2RSS-P21B, 2RSS-P21C and 2RSS-P21D were restored to their design condition by January 13, 1997.
3. The degraded deep pit manway hatch sealing gaskets for the 2RSS-P21B and 2RSS-P21C pump cubicles were repaired by January 13, 1997.
4. Quality Services Department performed a walkdown and inspection of selected Unit 1 and Unit 2 hydrostatic penetration seals to verify that the seals were installed and no apparent damage is evident. A total of 78 Unit 2 seals and 183 Unit 1 seals were inspected and found acceptable as of January 12, 1997.

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5. A protective cover will be designed and installed for the RSS penetration seals for 2RSS-P21A, P21B, P21C and P21D. This will be completed by June 20, 1997.
6. Nuclear Engineering Department will develop a periodic inspection program for flood seals for both units by June 20, 1997.
7. Nuclear Engineering Department will provide assurance that the design control procedures address installation and removal of flood seals by March 14, 1997.

**REPORTABILITY**

An immediate report of this condition was made on January 11, 1997, at 1741 hours, pursuant to the requirements of 10CFR50.72(b)(1)(i)(A) and 10CFR50.72(b)(2)(i). This report is being made pursuant to the requirements of 10CFR50.73(a)(2)(i)(A), 10CFR50.73(a)(2)(i)(B), and 10CFR50.73 (a)(2)(ii)(A).

**SAFETY IMPLICATIONS**

The plant was cooled down to Mode 5 based upon a conservative management decision. It was decided that, although the flood seal repairs could have been made in Mode 3, where there is significantly less potential for a Design Basis Accident (DBA) than during power operation, cooldown to Mode 5, where the RSS is not required to be operable, was the appropriate, conservative approach. There was no potential or actual threat of a flood when this condition was identified or at any time during the plant shutdown and seal repairs. The occurrence of a DBA followed by a Probable Maximum Flood is considered an extremely low probability scenario. Based upon the above information, there were no safety implications to the health and safety of the public as a result of this event.

**SIMILAR EVENTS**

A review of Beaver Valley Power Station Licensee Event Reports for the past two years did not identify any similar events.