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September 20, 1995  
ND3MNO:3716

*Beaver Valley Power Station, Unit No. 1*  
*Docket No. 50-334, Licensee No. DPR-66*  
*LER 95-007-00*

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 95-007-00, 10 CFR 50.73.a.2.ii.B, "Residual Heat Removal System Overpressure  
Protection Deficiency".

L. R. Freeland  
General Manager  
Nuclear Operations

JGT/jcd

Attachment



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The Nuclear Professionals

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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 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.

FACILITY NAME (1)

Beaver Valley Power Station Unit 1

DOCKET NUMBER (2)

05000334

PAGE (3)

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## Residual Heat Removal System Overpressure Protection Deficiency

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
08	21	95	95	-- 007 --	00	09	20	95	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 20 CFR § (Check one or more) (11)			
POWER LEVEL (10)	100	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
		20.405(a)(1)(iii)	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

L. R. Freeland, General Manager Nuclear Operations

TELEPHONE NUMBER (include Area Code)

(412) 643-1258

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	BP	XXXX	XXXX	N			

## SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On 8/21/95, a review of a vendor advisory letter identified a potential weakness in overpressure protection involving the residual heat removal (RHR) system. The RHR system design pressure is 600 psig. Overpressurization analysis allows up to 110 percent of design pressure for design basis overpressure transient events. The RHR system relief valve is located downstream of the RHR pumps and heat exchangers with a nominal setpoint of 600 psig. An overpressure condition can potentially occur if the RHR system pressure is raised to its design maximum at the inlet to the RHR pumps. The relief valve is assumed to be relieving at 110 percent of design pressure (660 psig, which corresponds to 600 psig setpoint and 10 percent accumulation). This corresponds to an inlet heat exchanger pressure of 690 psig, if it is conservatively assumed that a pressure restriction of approximately 30 psig is provided by the RHR heat exchangers. This potential pressure will exceed the design rating of the heat exchanger. The cause for this event is a design error. Administrative controls have been established governing the RHR and Overpressure Protection systems (OPPS). Safety implications were limited. During RCS heatup and cooldowns, there was a 21 degree range during which RHR may have been in service without OPPS, however the RHR relief valve was not challenged during these evolutions.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

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 (MNRB 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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Beaver Valley Power Station	05000334	95	007	00	2 OF 3

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

**DESCRIPTION OF EVENT**

On 8/21/95, a review of a vendor advisory letter, NSAL-95-003 "Potential to Exceed 110% of RHRs Design Pressure", identified an overpressure protection deficiency involving the residual heat removal (RHR) system and relief valve located on the discharge side of the RHR pumps. The BVPS RHR system design pressure is 600 psig. Overpressurization analysis allows up to 110 percent of design pressure for design basis overpressure transient events. The BVPS RHR system relief valve is located downstream of the RHR pumps and heat exchangers with a nominal setpoint of 600 psig. An overpressure condition can potentially occur if a design basis transient raises pressure at the inlet to the RHR relief valve to its setpoint. The relief valve is assumed to be passing design flowrate due to the design basis transient occurring. The relief valve is designed to reach rated relief capacity with 10% accumulation (i.e. 660 psig, which corresponds to 600 psig setpoint and 10 percent accumulation). Accounting for a conservative estimate of a pressure restriction of approximately 30 psig provided across the RHR heat exchangers by the operating RHR pump, the inlet heat exchanger pressure would be 690 psig. This potential pressure will exceed the design pressure allowance of the heat exchanger during the design basis event. Refer to Figure 1.

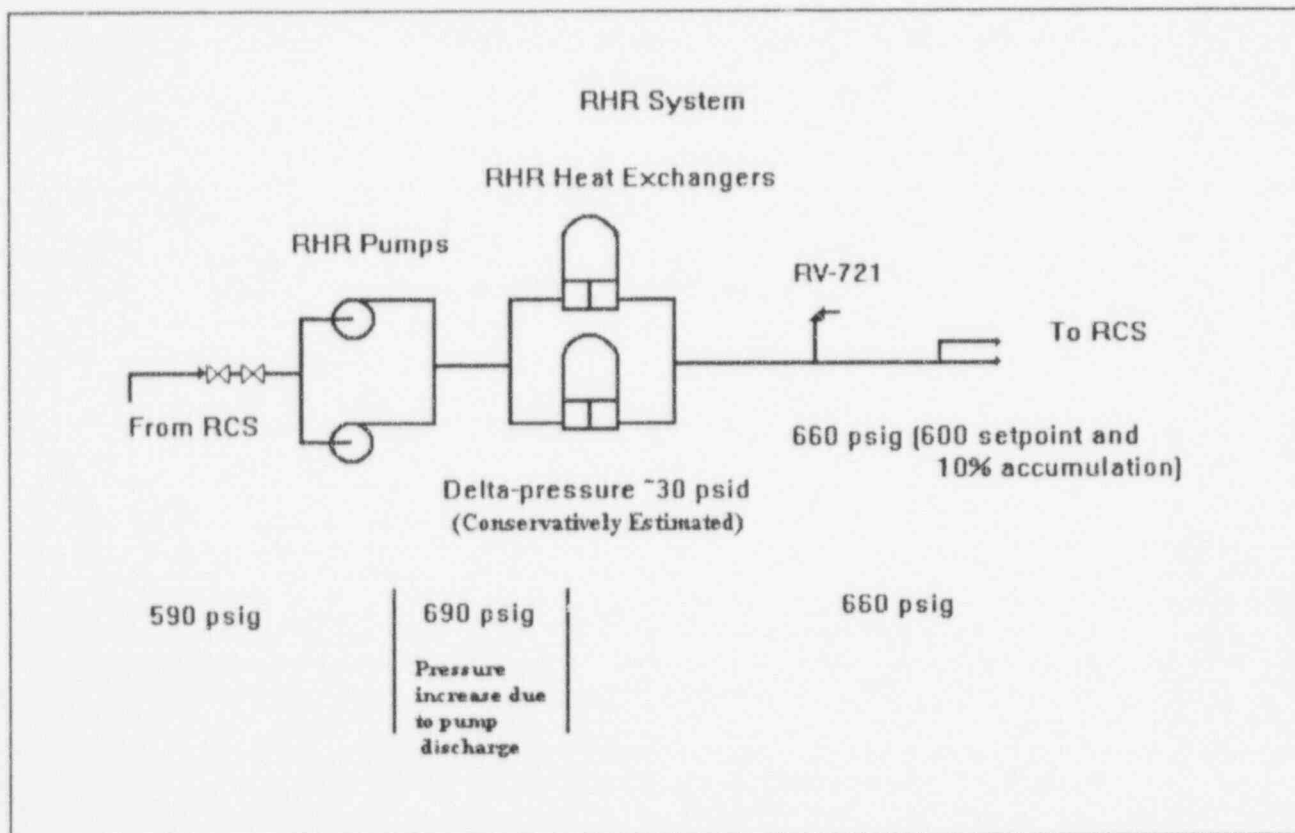


Figure 1

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**CAUSE OF THE EVENT**

The cause of the event is inadequate consideration of operating conditions during the initial design and analysis of the RHR overpressure protection system. The design basis pressure for the RHR system, including piping and all components downstream of the RHR pumps, is 600 psig. The RHR overpressure protection system is required by ASME to prevent pressure from exceeding 660 psig (110 percent of design). It appears that the initial design completed during the construction of the station may not have recognized that RHR flow-induced pressure drop across the RHR heat exchanger, which is generated during normal RHR system operation, needed to be considered in the relief valve setpoint calculation.

**CORRECTIVE ACTIONS**

1. The station shutdown and startup procedures have been revised to require the RCS overpressure protection system (OPPS) to be placed into service whenever the RHR system is in service. OPPS will provide adequate overpressure protection for the RHR system.
2. The Unit 2 RHR system design was reviewed for applicability. This review determined that this potential condition does not apply for Beaver Valley Power Station Unit 2, which has the relief valve located on the suction side of the RHR pump.
3. An operating experience entry describing this event will be issued on the Nuclear NETWORK system.

**REPORTABILITY**

This event is being reported in accordance with 10CFR50.a.2.ii.B, as a event or condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

**SAFETY IMPLICATIONS**

There were minimal safety implications as a result of this event. During previous RCS heatups and cooldowns at BVPS, there was a 21 degree range during which RHR could have been in service without OPPS being in service. It was in this 21 degree range where RHR system overpressure protection had not been previously assured. RHR pressure never challenged the RHR relief valve during these heatup and cooldown periods.

**PREVIOUS SIMILAR EVENTS**

There are no previously reported events involving the design of the residual heat removal system.