energy harbor

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January 17, 2022
L-21-294

10 CFR 50.73

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
LER 2021-005-00

Enclosed is Licensee Event Report (LER) 2021-005-00, "Manual Reactor Trip and Auxiliary Feedwater Actuation due to trip of a Main Feedwater Pump." This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no regulatory commitments contained in this submittal. Any actions described in this document represent intended or planned actions and are described for information only.

If there are any questions or if additional information is required, please contact Mr. Steve Sawtschenko, Manager, Regulatory Compliance and Emergency Response, at 724-682-4284.

Sincerely,

John J. Grabnar

Enclosure: Beaver Valley Power Station, Unit 2 LER 2021-005-00

cc: Mr. D. C. Lew, NRC Region I Administrator
NRC Senior Resident Inspector
Ms. S. Goetz, NRC Project Manager
INPO Records Center (via INPO Industry Reporting and Information System)
Mr. L. Winker (BRP/DEP)

Enclosure
L-21-294

Beaver Valley Power Station, Unit 2 LER 2021-005-00

NRC FORM 366 (08-2020) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2023

1. Facility Name	2. Docket Number	3. Page
Beaver Valley Power Station, Unit 2	05000 412	1 OF 3

4. Title
Manual Reactor Trip and Auxiliary Feedwater Actuation due to trip of a Main Feedwater Pump

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
11	17	2021	2021	- 005 -	00	01	17	2022		05000
									Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
1	100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	☐ 50.36(c)(2)	☑ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(4)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(1)(i)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(i)
☐ 20.2203(a)(2)(iii)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(iv)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	

☐ **OTHER** (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Steve Sawtschenko, Manager, Regulatory Compliance and Emergency Response	724-682-4284

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS		Cause	System	Component	Manufacturer	Reportable to IRIS

14. Supplemental Report Expected		15. Expected Submission Date	Month	Day	Year
☑ No	☐ Yes (If yes, complete 15. Expected Submission Date)				

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 1313 on November 17, 2021, the Beaver Valley Power Station, Unit No. 2 (BVPS-2) reactor was manually tripped while at approximately 100 percent power following a trip of a main feedwater pump (MFP) caused by a loss of adequate suction pressure. A transient in the Heater Drain System occurred from a level increase in a Second Point Heater Drain Receiver Tank. The level fluctuation resulted in an unexpected actuation of the tank's low-low level switch, which tripped the Train A Heater Drain and Separator Drain Receiver Drain Pumps. The trip of these pumps reduced flow and lowered MFP suction pressure. The standby condensate pump was not available to automatically start on low MFP pressure. When the MFP tripped, operators manually tripped the reactor per procedure. With the spare condensate pump unavailable, MFP suction pressure was unable to be restored and the manual reactor trip was procedurally required.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in a manual actuation of the Reactor Protection System, 10 CFR 50.73(a)(2)(iv)(B)(1), and an automatic actuation of the Auxiliary Feedwater System, 10 CFR 50.73(a)(2)(iv)(B)(6). Corrective actions include changes to procedural controls for conditional single point vulnerabilities and condensate pump alignments above 40% power.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Beaver Valley Power Station, Unit 2	05000- 412	2021	- 005	- 00

NARRATIVE

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

BACKGROUND

The heater drain pumps and separator drain receiver drain pumps along with the condensate pumps provide flow at sufficient pressure to the suction of the Main Feedwater Pumps (MFPs). BVPS-2 requires two condensate pumps in service at full power to provide adequate MFP suction pressure. A third standby condensate pump provides redundancy for any MFP suction flow transients that could challenge MFP operation and is normally aligned to auto-start on low MFP suction pressure.

DESCRIPTION OF EVENT

At 1313 on November 17, 2021 while at approximately 100 percent power, the BVPS-2 reactor was manually tripped following a trip of the 21B MFP [SJ] due to a loss of suction pressure. A transient in the Heater Drain System [SN] commenced at 1300 due to a level increase in the 21A Second Point Heater Drain Receiver Tank. The level fluctuation resulted in high tank level alarms in the control room at 1310, and due to the system perturbations an unexpected actuation of the tank's low-low level switch occurred at 1312, which by design tripped the 21A Heater Drain Pump and the 22A Separator Drain Receiver Drain Pump. The trip of these two pumps reduced flow and lowered MFP suction pressure. The standby third condensate pump [SD] was out of service for maintenance since prior to startup from refueling outage 2R22 on November 12, 2021, and was not available to automatically start on low MFP pressure. When the 21B MFP tripped on low suction pressure at 1313, Control Room operators recognized the loss of a running MFP outside of procedural requirements and manually tripped the reactor.

The trip was not complicated and the plant was stabilized in Mode 3. All control rods [AA] fully inserted into the reactor core. The Auxiliary Feedwater System (AFW) [BA] automatically actuated on low steam generator [SJ] water level as expected, and the AFW system performed as designed. There was no safety-related equipment inoperable at the start of the event that contributed to the event. The standby third condensate pump was unavailable at the start of the event and this did contribute to the event.

CAUSE OF EVENT

The direct cause of the need to perform the manual reactor trip was the loss of MFP suction pressure resulting in an automatic trip of a running MFP.

The apparent cause of this event is additional mitigating actions were not taken when the third condensate pump motor was not returned from the vendor as scheduled. Had the standby third condensate pump been available, it would have auto-started on low MFP suction pressure, preventing the trip of the running MFP, thus a manual reactor trip would not have been necessary. Not having the standby condensate pump available created a conditional single point vulnerability within the Condensate [SD] and Heater Drains systems that were not identified or mitigated.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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		YEAR	SEQUENTIAL NUMBER	REV NO.
Beaver Valley Power Station, Unit 2	05000- 412	2021	- 005	- 00

NARRATIVE

ANALYSIS OF EVENT

The event was reported per Event Notification 55586 as an event that resulted in the actuation of the reactor protection system, 10 CFR 50.72(b)(2)(iv)(B), and a specific system actuation, 10 CFR 50.72(B)(3)(iv)(A). This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in a manual actuation of the Reactor Protection System, 10 CFR 50.73(a)(2)(iv)(B)(1), and the automatic actuation of the Auxiliary Feedwater System, 10 CFR 50.73(a)(2)(iv)(B)(6).

The plant risk associated with the BVPS-2 reactor trip on November 17, 2021, is considered to be very low. This is based on the change in average core damage frequency derived using the conditional core damage probability and change in average large early release frequency derived using conditional large early release probability for the event. Therefore, this event had very low safety significance.

CORRECTIVE ACTIONS

Completed Actions:

1) The standby third condensate pump was returned to service on November 20, 2021.

Planned Actions:

1) Revise the risk management procedure to require additional risk management actions and to reassess conditional single point vulnerabilities that remain out of service when exiting an outage.

2) Revise the maintenance notification screening procedure to incorporate conditional single point vulnerability screening guidance.

3) Verify that planned maintenance strategies for the Unit 2 condensate pumps minimize out of service time when greater than 40 percent power.

4) Revise the startup procedure that if the standby condensate pump is not available, enter an evaluation process prior to power ascension above 40 percent power.

PREVIOUS SIMILAR EVENTS

A review of the previous three years identified that no similar events have occurred at BVPS.