



Beaver Valley Power Station
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Site Vice President

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September 8, 2022
L-22-205

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 2022-001-00

Enclosed is Licensee Event Report (LER) 2022-001-00, "Unit 2 Operation or Condition Prohibited by Technical Specification and Loss of Safety Function due to Emergency Diesel Generator Fuel Oil Intrusion into Lube Oil." This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), 10 CFR 50.73(a)(2)(v)(A), and 10 CFR 50.73(a)(2)(v)(D).

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,

A handwritten signature in blue ink, appearing to read "John J. Grabnar", written over a horizontal line.

John J. Grabnar

Enclosure: Beaver Valley Power Station, Unit No. 2 LER 2022-001-00

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

**Enclosure
L-22-205**

Beaver Valley Power Station, Unit No. 2 LER 2022-001-00



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/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to InfoCollect.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk at: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Beaver Valley Power Station, Unit No. 2	2. Docket Number 05000	3. Page 1 OF 3
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4. Title Unit 2 Operation or Condition Prohibited by Technical Specification and Loss of Safety Function due to Emergency Diesel Generator Fuel Oil Intrusion into Lube Oil
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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
07	13	2022	2022	- 001 -	00	09	08	2022	Facility Name	05000
									Facility Name	Docket Number
										05000

9. Operating Mode 1	10. Power Level 100
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)				
<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> OTHER (Specify here, in abstract, or NRC 366A).				

12. Licensee Contact for this LER	
Licensee Contact Steve Sawtschenko, Manager, Regulatory Compliance and Emergency Response	Phone Number (Include area code) 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
D	DC	DRN	F010	Yes					

14. Supplemental Report Expected		15. Expected Submission Date		Month	Day	Year
<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)					

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

On July 13, 2022 while Beaver Valley Power Station, Unit No. 2 was operating at 100 percent power, fuel oil intrusion was identified in the lube oil for emergency diesel generator (EDG) 2-2 following a declining trend in lube oil viscosity. Based on the fuel intrusion degrading the quality of the lube oil viscosity, it was determined that EDG 2-2 would not be able to meet its mission time of 30 days and EDG 2-2 was declared inoperable. The lube oil was changed and EDG 2-2 was declared operable on July 16, 2022. The gravity drain from the fuel oil injection pumps to the underground tank was found to have been air bound since the October 2021 refueling outage, which prevented excess fuel oil from the fuel oil injection pumps from draining back to the fuel oil storage tank and allowed for intrusion into the lube oil.

The direct cause was a lack of guidance in station procedures to proactively open the gravity drain line vent valve(s) during filling of the fuel oil storage tank. The root cause was that the organization did not recognize the need to proactively open the gravity drain line vent valve(s) every time fuel oil is added to the fuel storage tank. Corrective actions include revising the station procedures used during the fuel oil tank drain and fill activity to provide guidance for venting the gravity drain lines after filling the tanks. This event is being reported as a condition prohibited by Technical Specifications per 10 CFR 50.73(a)(2)(i)(B) and as a loss of safety function under 10 CFR 50.73(a)(2)(v)(A) and (D).

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Beaver Valley Power Station, Unit No. 2	05000-412	2022	001	00

NARRATIVE

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

BACKGROUND

Beaver Valley Power Station, Unit No. 2 (BVPS-2) has two separate trains of emergency diesel generators (EDGs) [EK], both of which are required to be operable in mode 1 by Technical Specification (TS) 3.8.1, AC Sources - Operating. Condition B for one EDG inoperable requires a surveillance to be performed for the operable offsite circuit(s) within 1 hour and then once every 8 hours, as well as restoration of the EDG to operable status within 72 hours.

Additionally, TS 3.8.1 condition E with two EDGs inoperable requires one to be restored to operable status within 2 hours. Condition G requires shutdown of the Unit if the Required Action and Completion Time are not met.

The EDG fuel oil injection pumps [DC-P] have a gravity drain to the underground fuel oil storage tank [DE-TK] which allows excess fuel oil from the pumps to return to the tank. This is routed such that there is an inverted U-shaped section of the piping which can trap air if drained. A normally closed vent valve is located on this section of pipe to release any trapped air.

DESCRIPTION OF EVENT

On July 13, 2022, while BVPS-2 was operating at 100 percent power, fuel oil intrusion was identified in the lube oil for EDG 2-2 following a declining trend in lube oil viscosity. Based on the information available at the time, there was reasonable assurance that EDG 2-2 would be able to fulfill its safety function and meet its mission time, and a follow-up operability determination was requested. During the follow-up operability determination, it was determined that EDG 2-2 would not be able to meet its mission time of 30 days based on the fuel oil intrusion degrading the quality of the lube oil, and EDG 2-2 was declared inoperable on July 13, 2022 at 2055 hours.

During the investigation, the gravity drain from the fuel oil injection pumps to the underground tank was found to be air bound, which prevented excess fuel oil from the pumps from flowing back to the tank and allowed for intrusion into the lube oil [LA]. Three of these pumps were replaced and the gravity drain line was vented by opening the vent valve. The air bound condition existed since the most recent refueling outage in October 2021 following a required surveillance to empty, clean, and refill the EDG fuel oil storage tanks. Due to the decreasing viscosity of the lube oil as a result of the fuel oil intrusion, past operability is not supported for the approximate nine months from October 2021 to July 16, 2022.

This condition was identified on the opposite train EDG 2-1 during the outage following a post-maintenance test (PMT) and corrected, therefore this condition did not exist on EDG 2-1 during the time period since the outage. EDG 2-2 did not show similar symptoms during its PMT and so was not investigated for a similar condition.

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

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Beaver Valley Power Station, Unit No. 2	05000-412	2022	001	00

NARRATIVE**CAUSE OF EVENT**

The direct cause was a lack of guidance in station procedures to proactively open the gravity drain line vent valve(s). This resulted in the gravity drain line from EDG 2-2 to the fuel oil tank becoming air bound while being refilled in the October 2021 outage, allowing fuel to build up during operation in the fuel pump push rod cavities until fuel was being introduced to the engine lube oil, which resulted in a loss of lube oil viscosity to the point where EDG 2-2 was declared inoperable.

The root cause was that the organization did not recognize the need to proactively open the gravity drain line vent valve(s) each time fuel is added to the fuel oil storage tank.

ANALYSIS OF EVENT

This event is reportable as a condition prohibited by TS per 10 CFR 50.73(a)(2)(i)(B) as EDG 2-2 was inoperable for approximately nine months. This is also reportable as a loss of safety function under 10 CFR 50.73(a)(2)(v)(A) and (D) for the numerous occasions during this period of inoperability that the opposite train EDG was also inoperable for routine maintenance and testing.

Based on the oil dilution analysis it was determined that the rate of fuel oil intrusion into the lube oil of EDG 2-2 was such that at the time the issue was identified, the EDG would still have been capable of operating for greater than its PRA mission time of 24 hours. For the entire period of time over which the identified condition existed, EDG 2-2 remained capable of running more than long enough to satisfy its PRA success criterion and is considered to have remained fully available for the PRA. As such, this condition is determined to have no impact on the PRA and is therefore considered to be of very low safety significance.

CORRECTIVE ACTIONS**Completed:**

The EDG 2-2 lube oil was changed, and the air was vented from the gravity drain line to allow for normal drainage.

Follow up lube oil samples were obtained after the oil change and gravity drain venting, and the results confirmed that the cause of the fuel oil intrusion was corrected.

Planned:

Station procedures used during the fuel oil tank drain and fill activity will be revised to provide guidance for venting the gravity drain line vent valves after filling the tanks.

PREVIOUS SIMILAR EVENTS

A review of greater than three years found that no similar events have occurred at BVPS.