

**Richard D. Bologna**  
Site Vice President

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September 26, 2018  
L-18-229

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  
BV-2 Docket No. 50-412, License No. NPF-73  
LER 2018-001-00

Enclosed is Licensee Event Report (LER) 2018-001-00, "Technical Specification Required Shutdown due to Loss of the 2P 480 Volt Emergency Bus". This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A) and 10 CFR 50.73(a)(2)(i)(B).

There are no regulatory commitments contained in this submittal. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and are not regulatory commitments.

If there are any questions or if additional information is required, please contact Mr. Brian D. Kremer, Manager, Regulatory Compliance, at 724-682-4284.

Sincerely,



Richard D. Bologna  
Site Vice President

Enclosure – Unit 2 LER 2018-001-00

cc: Mr. D. C. Lew, NRC Region I Administrator  
Mr. J. A. Krafty, NRC Senior Resident Inspector  
Ms. J. Tobin, NRC Project Manager  
INPO Records Center (via INPO Consolidated Event System)  
Mr. L. Winker (BRP/DEP)

JEZZ  
NRR

Enclosure  
L-18-229

Unit 2 LER 2018-001-00

Technical Specification Required Shutdown due to Loss of 2P 480 Volt Emergency Bus

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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.



# LICENSEE EVENT REPORT (LER)

(See Page 2 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/>)

<b>1. Facility Name</b> Beaver Valley Power Station, Unit 2	<b>2. Docket Number</b> 05000 412	<b>3. Page</b> 1 OF 3
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**4. Title**  
Technical Specification Required Shutdown due to Loss of 2P 480 Volt Emergency Bus

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
8	12	2018	2018-	001	- 00				N/A	05000
									N/A	05000

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

**12. Licensee Contact for this LER**

<b>Licensee Contact</b> Brian D. Kremer, Manager, Regulatory Compliance	<b>Telephone Number (Include Area Code)</b> 724 682 4284
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**13. Complete One Line for each Component Failure Described in this Report**

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
X	ED	50	I005	Yes					

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

**Abstract** (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)  
 At 0158 on August 12, 2018 Beaver Valley Power Station (BVPS) Unit 2 experienced a loss of the 2P 480 Volt Emergency Bus. The loss of the bus was due to a failed over current relay on the "C" phase of the incoming power supply. Per operating procedures this was considered a Loss of Safety Function. The same procedure directed entry into Technical Specification (TS) 3.0.3. At 0358, TS 3.8.4, DC Sources-Operating, Condition D was entered due to the inoperability of the "B" train battery chargers. This required a shutdown to Mode 3 in 6 hours and Mode 5 in 36 hours if not corrected. A reactor shutdown was commenced at 0410. Unit 2 entered Mode 3 at 0843. Unit 2 entered Mode 4 at 1445. At 1824, the affected relay had been replaced. The 2P Emergency bus was tested and returned to service by 2011. At 0212, on August 13, 2018, the normal battery chargers were placed in service to restore the batteries to their required parameters. It was determined that the complete charging of the batteries would take longer than the allowed TS completion time of 36 hours to be in Mode 5. At 1130 on August 13, a Notice of Enforcement Discretion (NOED) to allow Unit 2 to remain in Mode 4 for an additional 18 hours was requested. At 1203, the NOED was verbally granted. The "B" train of batteries was restored by 2253 on August 13, at which time the NOED was terminated. This was just under 7 hours into the extension period granted by the NRC per NOED 18-1-01.

This event is being reported as: the completion of a plant shutdown required by the plant's Technical Specifications, 10 CFR 50.73(a)(2)(i)(A) and a condition prohibited by Technical Specifications, 10 CFR 50.73(a)(2)(i)(B).

**LICENSEE EVENT REPORT (LER) (Continued)**

**REQUIRED NUMBER OF DIGITS/CHARACTERS  
FOR EACH BLOCK**

BLOCK NUMBER	NUMBER OF DIGITS/CHARACTERS	TITLE
1	UP TO 120 / 2 LINES	FACILITY NAME
2	8 TOTAL 3 IN ADDITION TO 05000	DOCKET NUMBER
3	VARIES	PAGE NUMBER
4	UP TO 230 / 2 LINES	TITLE
5	8 TOTAL 2 FOR MONTH 2 FOR DAY 4 FOR YEAR	EVENT DATE
6	9 TOTAL 4 FOR YEAR 3 FOR SEQUENTIAL NUMBER 2 FOR REVISIONS NUMBER	LER NUMBER
7	8 TOTAL 2 FOR MONTH 2 FOR DAY 4 FOR YEAR	REPORT DATE
8	UP TO 37 -- FACILITY NAME 8 TOTAL -- DOCKET NUMBER 3 IN ADDITION TO 05000	OTHER FACILITIES INVOLVED
9	1	OPERATING MODE
10	3	POWER LEVEL
11	VARIES CHECK ALL BOXES THAT APPLY	REQUIREMENTS OF 10 CFR
12	UP TO 100 FOR NAME 10 FOR TELEPHONE	LICENSEE CONTACT
13	CAUSE VARIES (UP TO 10) 2 FOR SYSTEM (UP TO 10) 4 FOR COMPONENT (UP TO 10) 4 FOR MANUFACTURER (UP TO 10) ICES VARIES (UP TO 10)	EACH COMPONENT FAILURE
14	1 CHECK BOX THAT APPLIES	SUPPLEMENTAL REPORT EXPECTED
15	8 TOTAL 2 FOR MONTH 2 FOR DAY 4 FOR YEAR	EXPECTED SUBMISSION DATE
16	1400 OR 14 LINES OF TYPING	ABSTRACT



**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/>)

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 Information Services Branch (T-2 F43), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Beaver Valley Power Station, Unit 2	05000- 412	2018	001	00

**NARRATIVE**

Energy Industry Identification System (EIIS) Codes identified in the text as [XX]

**CONDITIONS PRIOR TO OCCURRENCE:**

Beaver Valley Power Station, Unit 2 was in Mode 1 at 100 percent power.

There were no Structures, Systems or Components (SSCs) that were inoperable at the start of the event that contributed to the event.

**DESCRIPTION OF EVENT:**

At 0158 on August 12, 2018 Beaver Valley Power Station (BVPS) Unit 2 experienced a loss of the 2P 480 Volt Emergency Bus [BU]. The loss of the bus was due to a failed over current relay [50] on the "C" phase of the incoming power supply. Due to the loss of the 2P bus the "B" train Emergency Diesel Generator [DG] and the Residual Heat Release Valve [RV] were declared inoperable. Per operating procedures this was considered a Loss of Safety Function. Operating Manual 1/2OM-48.1.I, Technical Specification Compliance, states that a condition in which any of the three Steam Generator Atmospheric Steam Dump Valves [RV] or the Residual Heat Release Valve is inoperable concurrent with an Emergency Diesel Generator constitutes a loss of safety function as the steam generator tube rupture analysis would not be met.

The same procedure states that if a loss of safety function is determined to exist, the shutdown actions of Technical Specification (TS) Limiting Condition of Operation (LCO) 3.0.3 shall be performed. This event was initially reported (EN 53548) as an initiation of a plant shutdown required by the plant's Technical Specifications, 10 CFR 50.72(b)(2)(i), Loss of Safety Function 10 CFR 50.72 (b)(3)(v)(B) & (D) and an Unanalyzed Condition 10 CFR 50.72(b)(3)(ii)(B). A subsequent engineering evaluation determined that a loss of safety function did not exist during this event. This has been entered in the Corrective Action Program. A revised Event Notification was made at 1424 on August 16, 2018 retracting the Loss of Safety Function and Unanalyzed Condition event classifications.

At 0358 on August 12, 2018, TS 3.8.4, DC Sources-Operating, Condition D was entered due to the inoperability of the "B" train battery chargers [BYC]. This required a plant shutdown to Mode 3 in 6 hours and Mode 5 in 36 hours if not corrected. A reactor [RCT] shutdown was commenced at 0410. Unit 2 entered Mode 3 at 0843. The "A" train source range nuclear instrument [DET] did not respond due to a failed detector. Unit 2 entered Mode 4 at 1445. At 1824, the affected relay had been replaced. The 2P Emergency bus was tested and returned to service by 2011. At 0212 on August 13, 2018 the normal battery chargers were placed in service to restore the batteries to their required parameters. It was determined that the complete charging of the batteries would take longer than the allowed TS completion time of 36 hours to be in Mode 5. At 1130 on August 13, a Notice of Enforcement Discretion (NOED) to allow Unit 2 to remain in Mode 4 for an additional 18 hours was requested. At 1203, the NOED was verbally granted. The "B" train of batteries were restored to operable status by 2253 on August 13, and the NOED was terminated. This was just under 7 hours into the extension period granted by the NRC per NEOD 18-1-01. The "A" train source range nuclear instrument was restored to Operable at 2040 on August 14, 2018.

**CAUSE OF EVENT:**

It has been determined through troubleshooting that the BV-50-VF211C, "C" phase over current protection relay had failed. Testing has concluded that this failure was caused by the failure of 1N4744 15V Zener diode located in the power supply circuit of this relay.



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CONTINUATION SHEET**

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1. FACILITY NAME Beaver Valley Power Station, Unit 2	2. DOCKET NUMBER 05000- 412	3. LER NUMBER		
		YEAR 2018	SEQUENTIAL NUMBER 001	REV NO. 00

**NARRATIVE**

**ANALYSIS OF EVENT:**

The plant risk associated with the BVPS Unit 2 loss of 2P 480 Volt Emergency Bus is considered to be very low. This is based on the change in core damage frequency derived using the conditional core damage probability, and the change in large early release frequency derived using conditional large early release probability for the observed condition and exposure time.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(A), Plant Shutdown Required by Technical Specification. Technical Specification 3.8.4, DC Sources-Operating, Condition D requires a shutdown to Mode 3 in 6 hours and Mode 5 in 36 hours if one or two batteries on one train are not restored to Operable in 2 hours.

This event is also being reported pursuant to 10 CFR 50.73(a)(2)(i)(B), Operation or Condition Prohibited by Technical Specification. A NOED was requested and granted by the NRC on August 13, 2018 to allow Unit 2 to stay in Mode 4 an additional 18 hours beyond the required completion time.

**CORRECTIVE ACTIONS:**

- 1) Relay BV-50-VF211C, series 238, was replaced with a new series 468 relay.
- 2) We will assess the series 238 relay Preventative Maintenance strategy and evaluate its design to mitigate failure vulnerability.
- 3) Operating Procedure 1/2OM-48.1.I will be revised to clarify wording regarding a "Loss of Safety Function" as it applies to the operability of the Unit 2 atmospheric steam dump valves and their corresponding power supplies.

**PREVIOUS SIMILAR EVENTS:**

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

CR 2018-07138  
CR 2018-07251