



Beaver Valley Power Station  
P.O. Box 4  
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**John J. Grabnar**  
Site Vice President

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December 17, 2021  
L-21-278

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 2021-003-00

Enclosed is Licensee Event Report (LER) 2021-003-00, "Indications Identified During Reactor Vessel Head Inspection." This event is being reported in accordance with 10 CFR 50.73(a)(2)(ii)(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,

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

John J. Grabnar

Enclosure: Beaver Valley Power Station, Unit 2 LER 2021-003-00

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

Enclosure  
L-21-278

Beaver Valley Power Station, Unit 2 LER 2021-003-00



## 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 [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: [oir\\_submission@omb.eop.gov](mailto: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	2. Docket Number	3. Page
Beaver Valley Power Station, Unit 2	05000 412	1 OF 3

4. Title
Indications Identified During Reactor Vessel Head Inspection

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
10	22	2021	2021	003	00	12	17	2021	Facility Name	05000
									Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
Defueled	0

## 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 type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 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)	<input type="checkbox"/> 10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input 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)	<input type="checkbox"/> 10 CFR Part 50	<input checked="" 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	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
B	AB	RPV	C490	Yes					

## 14. Supplemental Report Expected

## 15. Expected Submission Date

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

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

On October 22, 2021, during the Beaver Valley Power Station, Unit No. 2 (BVPS-2) twenty-second refueling outage (2R22), it was determined that the results of ultrasonic examinations performed on Penetrations 28 and 40 of the reactor vessel head did not meet the applicable acceptance criteria. The indications were not through-wall and there was no evidence of leakage at Penetrations 28 and 40 based on inspections performed on top of the reactor vessel head. Because the indications could not be dispositioned as acceptable per American Society of Mechanical Engineers (ASME) Code Section XI in a Reactor Coolant System pressure boundary, it was reported per Event Notification 55540 as a degraded condition per 10 CFR 50.72(b)(3)(ii)(A) and is being reported under 10 CFR 50.73(a)(2)(ii)(A).

Primary Water Stress Corrosion Cracking (PWSCC) of the Alloy 600 penetration tube material was determined to be the cause of the identified flaws. Reactor vessel head Penetrations 28 and 40 were repaired in accordance with the applicable embedded flaw repair methodology approved by the Nuclear Regulatory Commission (NRC) for use at BVPS-2. A weld overlay of PWSCC resistant material was performed to isolate the indications from the borated water. The safety significance of these indications was very low.



## LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Beaver Valley Power Station, Unit 2	05000- 412	YEAR 2021	SEQUENTIAL NUMBER 003	REV NO. 00

### NARRATIVE

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

#### DESCRIPTION OF EVENT

BVPS-2 was in a Defueled Mode. There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event.

On October 22, 2021, during the BVPS-2 twenty-second refueling outage (2R22), it was determined that the results of ultrasonic examinations performed on Penetrations 28 and 40 of the reactor vessel head [AB-RPV] did not meet the applicable acceptance criteria. The indications were not through-wall and there was no evidence of leakage at Penetrations 28 and 40, based on inspections performed on top of the reactor vessel head. The examinations were being performed to meet the requirements of 10 CFR 50.55a(g)(6)(ii)(D) for reactor vessel head inspections. The intent is to identify potential flaws/indications well before the structural integrity of the reactor vessel head pressure boundary is significantly challenged.

The ultrasonic examination determined that the circumferential indication on Penetration 28 of the reactor vessel head was between the 25.5 to 30.0 degree location with a maximum depth of 0.223 inches into the penetration tube.

The ultrasonic examination determined that the axial indication on Penetration 40 of the reactor vessel head was at the 22.5 degree location with a maximum depth of 0.163 inches into the penetration tube.

The reactor vessel head inspection is a requirement of 10 CFR 50.55a(g)(6)(ii)(D) which invokes ASME Code Case N-729-6. Ultrasonic examinations or eddy current examinations (as applicable) are performed on each of the 66 vessel head penetrations on the BVPS-2 head during each refueling outage until head replacement activities are completed in the future. Head Penetrations 28 and 40 were repaired as required prior to plant startup from 2R22. Ultrasonic examination results for the other 64 vessel head penetrations were acceptable.

The indications identified on Penetrations 28 and 40 of the reactor vessel head were reported to the NRC per 10 CFR 50.72(b)(3)(ii)(A) on October 22, 2021. (Event Notification 55540).

#### CAUSE OF EVENT

PWSCC of the Alloy 600 penetration tube material was determined to be the cause of the identified flaws. The failure mechanism is a known issue that is addressed by the requirements of 10 CFR 50.55a(g)(6)(ii)(D). The repairs to Penetrations 28 and 40 utilized an embedded flaw repair process that was approved under NRC Relief Request 2-TYP-4-RV-04.

#### ANALYSIS OF EVENT

Indications that cannot be dispositioned as acceptable per ASME Code Section XI in a Reactor Coolant System (RCS) [AB] pressure boundary are reportable under 10 CFR 50.73(a)(2)(ii)(A) as a degraded condition.



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Beaver Valley Power Station, Unit 2	05000-412	YEAR	SEQUENTIAL NUMBER	REV NO.
		2021	003	00

### NARRATIVE

#### ANALYSIS OF EVENT (Cont.)

The plant risk associated with the BVPS-2 ultrasonic indications identified on Penetrations 28 and 40 of the reactor vessel head is considered to be very low. This is based on the fact that the indications were not through-wall and there was no indication of RCS leakage. 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, are very small. Therefore, the safety significance of the indications identified on Penetrations 28 and 40 was very low.

#### CORRECTIVE ACTIONS

Completed Action

Reactor vessel head Penetrations 28 and 40 were repaired in accordance with the applicable embedded flaw repair methodology approved by the NRC for use at BVPS-2. The repairs were completed by November 04, 2021.

Planned Action

Additional surface examinations are planned for Penetrations 28 and 40 in the two following outages (2R23 and 2R24) in accordance with the requirements of relief request 2-TYP-4-RV-04.

#### PREVIOUS SIMILAR EVENTS

Similar reactor vessel head indications were found and repaired during the previous BVPS-2 refueling outages in 2020, 2018, 2014, 2012, 2009, 2008, and 2006.

Condition Reports 2021-07969, 2021-07970