



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
475 ALLENDALE RD, STE 102  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 8, 2023

Barry Blair  
Site Vice President  
Energy Harbor Nuclear Corporation  
Beaver Valley Power Station  
P.O. Box 4, Route 168  
Shippingport, PA 15077-0004

**SUBJECT: BEAVER VALLEY POWER STATION, UNITS 1 AND 2 – INTEGRATED  
INSPECTION REPORT 05000334/2023001 AND 05000412/2023001**

Dear Barry Blair:

On March 31, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Beaver Valley Power Station, Units 1 and 2, and on April 20, 2023, discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; and the NRC Resident Inspector at Beaver Valley Power Station, Units 1 and 2.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Matt R. Young, Chief  
Projects Branch 2  
Division of Operating Reactor Safety

Docket Nos. 05000334 and 05000412  
License Nos. DPR-66 and NPF-73

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: BEAVER VALLEY POWER STATION, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000334/2023001 AND 05000412/2023001 DATED MAY 8, 2023

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000334 and 05000412

License Numbers: DPR-66 and NPF-73

Report Numbers: 05000334/2023001 and 05000412/2023001

Enterprise Identifier: I-2023-001-0032

Licensee: Energy Harbor Nuclear Corporation

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA

Inspection Dates: January 1, 2023 to March 31, 2023

Inspectors: B. Towne, Senior Resident Inspector  
R. Rolph, Resident Inspector  
E. Brady, Resident Inspector

Approved By: Matt R. Young, Chief  
Projects Branch 2  
Division of Operating Reactor Safety

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Beaver Valley Power Station, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### List of Findings and Violations

Untimely Corrective Action Resulting in Plant Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000334/2023001-01 Open/Closed	[H.13] - Consistent Process	71153
A Green self-revealing finding was identified for the licensee’s failure to correct a condition adverse to quality with the heater drain tank level control valve in a timely manner as required by NOP-LP-2001, “Corrective Action Program.”			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000334/2022-001-00	LER 2022-001-00 for Beaver Valley Power Station, Unit 1, Manual Reactor Trip and Auxiliary Feedwater Actuation due to Heater Drain System Valve Failure	71153	Closed

## **PLANT STATUS**

Unit 1 began the inspection period at rated thermal power. On March 13, 2023, the unit was down powered to 69 percent due to a loss of the condensate flow to the heater drain system. The unit was returned to rated thermal power on March 15, 2023, and remained at or near rated thermal power for the remainder of the inspection period.

Unit 2 operated at or near rated thermal power for the entire inspection period.

## **INSPECTION SCOPES**

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## **REACTOR SAFETY**

### 71111.01 - Adverse Weather Protection

#### Impending Severe Weather (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated readiness for impending adverse weather for a high wind advisory on March 3, 2023.

### 71111.04 - Equipment Alignment

#### Partial Walkdown (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2, 'A' closed cooling pump train while work is being performed on the 'B' train, January 10 and 13, 2023
- (2) Unit 1, auxiliary feedwater system in standby lineup at-power, February 2, 2023
- (3) Unit 2, 21C service water pump alignment while 21B service water pump is out for replacement and bay is out of service for cleaning, March 2, 2023
- (4) Unit 2, emergency diesel generator 2-1 air start system, March 3, 2023

## 71111.05 - Fire Protection

### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Unit 2, 735' primary auxiliary building, 2PFP-AXLB-735, January 4, 2023
- (2) Units 1 and 2, guardhouse building, 1/2PFP-GRDH-GUARDHOUSE BUILDING, January 9, 2023
- (3) Unit 1, emergency switchgear room, elevation 713', fire areas 1-ES-1 and 1-ES-2, February 4, 2023
- (4) Unit 2, diesel generator 2-1 room, elevation 732', fire compartment 2-DG-2, February 23, 2023
- (5) Unit 1, safeguards building, auxiliary feedwater and quench spray pump rooms, elevation 735', fire area 1-QP-1, February 28, 2023

### Fire Brigade Drill Performance (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated fire brigade performance on February 28, 2023.

## 71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

### Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (2 Samples)

- (1) The inspectors observed Unit 1 operations personnel during the emergency diesel generator monthly surveillance test while relay testing was being performed concurrently on March 1, 2023.
- (2) The inspectors observed Unit 1 operations personnel during an unplanned power reduction when they lost condensate flow to the heater drain system and steam generator levels decreased on March 13, 2023.

### Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed a Unit 1 simulator evaluation that included a failed pressurizer pressure transmitter, a failed turbine governor valve and load reject, and a faulted steam generator with the steam leak outside of containment on February 7, 2023.

## 71111.13 - Maintenance Risk Assessments and Emergent Work Control

### Risk Assessment and Management (IP Section 03.01) (5 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 2, elevated risk and risk management actions during scheduled monthly operational test of the 2-2 emergency diesel generator, January 11, 2023

- (2) Unit 2, elevated risk and risk maintenance actions during scheduled loop 'C' steam line pressure protection channel IV test, February 6, 2023
- (3) Unit 1, elevated risk and risk management actions for repair of a steam leak on the 'A' heater drain pump seal return line, February 9, 2023
- (4) Unit 1, elevated risk and mitigating actions during scheduled monthly operational test of the 1-2 emergency diesel generator in conjunction with diesel start/loss of voltage relay testing, March 1, 2023
- (5) Unit 1, elevated risk during repair of RV-1SI-857, boron injection tank relief valve as allowed by License Amendment No. 319, March 7, 2023

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Main control room envelope habitability operability determination performed following a step increase in measured leakage from 1CH-306 seal injection filter 4B vent valve housing, January 19, 2023
- (2) 2SVS-PCV101A steam generator atmospheric dump valve operability determination following the failure of Prom Logic Card 2MSS-PX-101A during troubleshooting, January 24, 2023
- (3) Unit 1, control room emergency ventilation system operability determination following charcoal filter replacement based on lab test results for removal efficiency, February 6, 2023
- (4) Unit 1, 'B' auxiliary feedwater pump operability determination after the pump was declared inoperable based on failure of the quarterly test, February 8, 2023
- (5) Units 1 and 2, control room envelope operability determination performed following reactor coolant leakage from a cracked weld downstream of the boron injection tank relief valve, RV-1SI-857, February 12, 2023
- (6) Unit 2, service water pump 2SWS-P21A, B, C seal water and motor cooling water supply strainer, 2SWS-STRM48, operability determination and past operability review due to excessive oil leakage, March 9, 2023

#### 71111.18 - Plant Modifications

##### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Unit 1, temporary modification for installation of temporary relief valve on boron injection tank vent line to support gagging existing relief valve (RV-1SI-857) to lower reactor coolant leakage, Design Equivalent Change Package 23-1015-002, February 13, 2023

#### 71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:



Post-Maintenance Testing (IP Section 03.01) (4 Samples)

- (1) Unit 1, 1B centrifugal charging pump post-maintenance test following motor and thermocouple replacements, January 6, 2023
- (2) Unit 2, post-maintenance surveillance test of the 'B' primary component cooling water pump following preventative maintenance and repair of flow indicator FI051A, January 18, 2023
- (3) Unit 1, comprehensive pump test on 1CH-P-2A boric acid transfer pump post-maintenance test following preventative maintenance, January 19, 2023
- (4) Unit 1, failed post-maintenance test of the fuel oil transfer pump (1EE-P-1A), March 15, 2023

Surveillance Testing (IP Section 03.01) (4 Samples)

- (1) Unit 1, 1OST-36.2, "No. 2 Diesel Generator Monthly Load Test WO200842836," January 4, 2023
- (2) Unit 1, 1OST-13.2, "Quench Spray Pump [1-QS-P1B] Operating Surveillance Test," January 30, 2023
- (3) Unit 2, 2OST-24.4, "Steam Driven Auxiliary Feed Pump [2FWE-P22] Quarterly Test," February 14, 2023
- (4) Unit 1, Surveillance SR 3.3.5.2, "Perform Channel Calibration," March 1, 2023

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) Unit 2, emergency preparation technical support center training exercise for a simulated accident due to loss of all AC followed by a stuck open pressurizer power-operated relief valve, January 26, 2023

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours (IP Section 02.01) (2 Samples)

- (1) Unit 1, January 1, 2022 through December 31, 2022
- (2) Unit 2, January 1, 2022 through December 31, 2022

IE03: Unplanned Power Changes per 7000 Critical Hours (IP Section 02.02) (2 Samples)

- (1) Unit 1, January 1, 2022 through December 31, 2022
- (2) Unit 2, January 1, 2022 through December 31, 2022

IE04: Unplanned Scrams with Complications (IP Section 02.03) (2 Samples)

- (1) Unit 1, January 1, 2022 through December 31, 2022
- (2) Unit 2, January 1, 2022 through December 31, 2022

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000334/2022-001-00, for Beaver Valley Power Station Unit 1, Manual Reactor Trip and Auxiliary Feedwater Actuation due to Heater Drain System Valve Failure (ADAMS Accession No. ML22222A122). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section 71153.

Notice of Enforcement Discretion (NOED) (IP Section 03.04) (1 Sample)

- (1) The inspectors evaluated the licensee actions surrounding Emergency License Amendment Request No. 319 (ML23062A521) to Renewed Facility Operating License DPR-66 for Beaver Valley Power Station, Unit 1. The license amendment implemented a change to technical specifications to add a note allowing a one-time use of an alternate manual safety injection flow path to support the repair of a leak from boron injection tank relief valve, RV-1SI-857, which was issued on March 6, 2023.

**INSPECTION RESULTS**

Untimely Corrective Action Resulting in Plant Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000334/2023001-01 Open/Closed	[H.13] - Consistent Process	71153
A Green self-revealing finding was identified for the licensee’s failure to correct a condition adverse to quality with the heater drain tank level control valve in a timely manner as required by NOP-LP-2001, “Corrective Action Program.”			
<u>Description:</u> Per LER 05000334/2022-001-00, on June 15, 2022, at 0724, while operating at 100 percent power, operators manually tripped the Unit 1 reactor from approximately 100 percent reactor power in response to secondary system perturbations that caused the steam generator secondary side water level to lower. The licensee determined that the lowering of the steam generator water level was due to reduced condensate flow from the heater drain system to the main feed pumps when the heater drain tank level control valve [LCV-1SD-106B], experienced a valve plug to stem separation.			
The licensee had a similar event occur in May of 2021 in which the same heater drain tank level control valve experienced a valve plug to stem separation. The reactor was down powered from 100 percent to approximately 26 percent to troubleshoot and repair the valve. Due to parts availability, the valve was reassembled with the used plug and a new stem and new locking pin. A new trim (valve plug, stem, pin) was ordered and received in			

March of 2022. Unit 1 was not down powered to install this new trim.

NOP-LP-2001, "Corrective Action Program," Revision 48, the revision in effect at the time of the 2021/2022 valve stem to plug separation, states that, "CAP and Non-CAP actions are intended to minimize risk by reducing the chances or consequences of reoccurrence of the identified Condition Adverse to Quality (CAQ)." The inspectors determined that the plug to stem separation in June 2022 was an adverse condition that should have been corrected following the 2021 event. The loss of steam generator water level and subsequent manual reactor trip were a result of a precursor event where the level control valve was placed back into service in less than adequate condition with known risk.

Corrective Actions: The licensee installed a more robust valve trim in the fall outage, 1R28, to prevent reoccurrence of the plug/valve stem separation.

Corrective Action References: CR 2022-04399

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to correct a condition adverse to quality in a timely manner, in 2022, when the level control valve exhibited degrading performance from January 2022 through June 2022, was a performance deficiency because it was within the capability to foresee and correct and should have been prevented.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The heater drain tank level control valve plug to stem separation resulted in rapidly decreasing steam generator secondary water level, prompting operators to initiate a manual reactor trip.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors determined that this finding was of very low safety significance (Green) because it did not cause a reactor trip coincident with the loss of mitigation equipment relied upon to transition the plant from the onset of a reactor trip to a stable shutdown condition.

Cross-Cutting Aspect: H.13 - Consistent Process: Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate. Specifically, site procedures did not reflect a consistent, systematic approach, and failed to incorporate risk insights into the process of using a used part to repair a valve.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

## EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On April 20, 2023, the inspectors presented the integrated inspection results to Barry Blair, Site Vice President, and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	1/2OM-53C.4A.75.1	Acts of Nature - Severe Weather	24
71111.04	Drawings	RM-0415-001	Valve Oper No Diagram Primary Component Cooling Water	20
		RM-0415-005	Valve Oper No Diagram Primary Component Cooling Water	11
		RM-0430-001	Valve Oper NO Diagram Service Water Supply and Distribution	38
		RM-0436-003	Valve Operator NO. Diagram, Diesel Starting Air System	30
	Procedures	1OST-24.10		18
71111.05	Fire Plans	1-PFP-SFGB-735-AUX	Aux FW & QS Pumps Fire Compartment 1-QP-1	1
		1/2PFP-GRDH	Guardhouse Building	0
		1PFP-SRVB-713-AE		3
		1PFP-SRVB-713-DF		2
		1PFP-SRVB-713-Process	Fire Pre Plan for Fire Compartment 1-CR-4	6
		1SB-09	Fire Drill Scenario Number	02/28/2023
		2-PA-3, 2-PA-3A, 2-PA-3B, & 2-PA-A3C	Fire Compartments	2
		2PFP-AXLD-735'	Auxiliary Building General Area	
		2PFP-DGBX-732-DG-2		4
71111.11Q	Corrective Action Documents	CR 2023-01902		
	Miscellaneous		Failure Mode No. Condensate Discharge	
	Procedures	1-OST-36.2	Diesel Generator No. 2 Monthly Test	89
71111.13	Miscellaneous		Amendment No. 319 to Renewed Facility Operating License DPR-66 for Beaver Valley Power Station	
	Procedures	1-OST-36.02	Diesel Generator No. 2 Monthly Test	89
		1MSP-36.46-E	1DF 4KV Emergency Bus Loss of Voltage Relay [27-VF100]	26

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Functional Test	
		1MSP-36.48A-E	1DF Emergency Loss of Voltage Bus Separation Relay [27-VF100] Calibration	18
		1MSP-36.48B-E	1DF 4KV Emergency Bus Loss of Voltage Time Delay Relay [62-VF100] Calibration	17
		1MSP-36.54B-E	1DF 4KV Em Bus Loss of Volt Diesel Start Time Delay Relay [62-VF1100] Calibration	14
		1MSP-36.56-E	1DF 4KV Emergency Bus Diesel Start Undervoltage Relay [27-VF1100] Functional Test	25
		1MSP-36.56A-E	1DF 4KV Emergency Bus Diesel Start Loss of Voltage Relay [27-VF1100] Calibration	14
		1MSP-36.82-E	Functional Test of Em Bus Loss of Volt Rel and Relay Diesel Start Loss of Volt Rel	15
		2MPS-21.09-1	Loop C Steamline Pressure Protection Channel IV Test	18
		2OST-36.2	Emergency Diesel Generator [2EGS*EG2-2] Monthly Test	83
71111.15	Corrective Action Documents	2023-00971		
		CR 2023-00405		01/19/2023
		CR 2023-00625		01/30/2023
	Engineering Evaluations	EER 601390174	Engineering Evaluation Request to Evaluate ECCS Leak Rate from RV-1SI-857	
	Procedures	1-MSP-M-44-300	Control Room Emergency Habitability System Flow and Filter Efficiency Test	
		1CMP-44VS-FL-2-1M	Control Room Emergency Outside Air Filter Replacement	
		1OST-24.3	Motor Driven Auxiliary Feed Pump Test	
		2OST-21.8	Atmospheric Steam Dump Valve Isolation Valve Strokes	1
		2OST-47.3	Containment Penetration and ASME Valve Test	44
	Work Orders	20089873	Control RM Emerg Outside Air Charcoal Filter	
71111.18	Miscellaneous	DECP 23-1014-002	Temporary Modification to Provide Alternate Pressure Relief Path	
	Work Orders	200902181		
71111.24	Corrective Action Documents	2022-01035	2FWE-P22 Turbine Driven Aux Feed Pump Steam Drain Line - Steam Leak	
		2023-01034	2FWE-P22 Turbine Driven Aux FWP - Possible Steam Leak	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			in Discharge Piping	
	Procedures	1MSP-36.48A-E	1DF 4KV Emergency Loss of Voltage Bus Separation Relay [27-VF100] Calibration	18
		1OST-13.2	Quench Spry Pump [1-QS-P-1B]	51
		1OST-36.1	Diesel Generator No. 1 Monthly Test	77 LUC PAF-23- 00091
		1OST-36.2	Diesel Generator Monthly Test	88
		1OST-7.1	Boric Acid Transfer Pump (1CH-P-2A) Operational Test	29
		1OST-7.5	Centrifugal Charging Pump Test (1CH-P-1B)	49
		2OST-15.2	Primary Component Cooling Water Pump (2CCP*P21B) Test	65
		2OST-24.4	Steam Driven Auxiliary Feed Pump [2FWE-P22] Quarterly Test	
	Work Orders	2008842286	Work Instructions for Calibration of the 1DF Emer Loss of Voltage Relay	03/03/2023
71153	Corrective Action Documents	2021-03999		
		2022-00414		
		2022-04858		
		2022-09410		
	Miscellaneous		Amendment No. 319 to Renewed Facility Operating License DPR-66 for Beaver Valley Power Station, Unit 1	