UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

May 2, 2018

Mr. Richard Bologna
Site Vice President
First Energy Nuclear Operating Company
Beaver Valley Power Station
P. O. Box 4, Route 168
Shippingport, PA 15077-0004

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 – INTEGRATED INSPECTION REPORT 05000334/2018001 AND 05000412/2018001

Dear Mr. Bologna:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Beaver Valley Power Station, Units 1 and 2. On April 3, 2018, the NRC inspectors 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.

NRC inspectors documented one finding of very low safety significance (Green) in this report. Additionally, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Beaver Valley Power Station. In addition, if you disagree with 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, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Beaver Valley Power Station.

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 the NRC Public Document Room in accordance with Title 10 of the Code of Federal Regulations (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Matthew R. Young, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Numbers: 50-334 and 50-412
License Numbers: DPR-66 and NPF-73

Enclosure:
Inspection Report 05000334/2018001
and 05000412/2018001

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SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 – INTEGRATED INSPECTION REPORT 05000334/2018001 AND 05000412/2018001 DATED MAY 2, 2018

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☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP	RI/DRP		
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DATE	04/24/2018	04/25/2018	05/01/2018		

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number(s):	50-334 and 50-412
License Number(s):	DPR-66 and NPF-73
Report Number(s):	05000334/2018001 and 05000412/2018001
Enterprise Identifier:	I-2018-001-0076
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Beaver Valley Power Station, Units 1 and 2
Location:	Shippingport, PA 15077
Inspection Dates:	January 1, 2018 to March 31, 2018
Inspectors:	S. Haney, Senior Resident Inspector (Acting) S. Horvitz, Senior Resident Inspector (Acting) A. Turilin, Resident Inspector (Acting) R. Rolph, Health Physicist J. Kulp, Senior Reactor Inspector T. Fish, Senior Operations Engineer
Approved By:	Matthew R. Young, Chief Reactor Projects Branch 6 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring FirstEnergy Nuclear Operating Company's (FENOC's) performance at Beaver Valley Power Station Units 1 and 2 by conducting the baseline inspections described in this report 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. NRC identified and self-revealed findings, violations, and additional items are summarized in the table below. Licensee-identified non-cited violations are documented in the Inspection Results section of the report.

List of Findings and Violations

Inadequate Procedure Adherence			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green FIN 05000334/2018001-01 Closed	Not Applicable	71153
A self-revealed Green finding was identified when the licensee failed to adequately implement procedure NOP-WM-1001, "Order Planning Process." Specifically, FENOC personnel that made a change to work order testing requirements did not receive concurrence from a Unit 1 Senior Reactor Operator nor did they ensure that the original scope and/or intent of the test was met.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000334/2017-003-00	Beaver Valley Power Station Unit 1 Reactor Trip due to Turbine Trip and Automatic Initiation of Auxiliary Feedwater System	71153	Closed

SUMMARY OF PLANT STATUS

Unit 1 and 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 plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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 (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for high river level conditions on February 26, 2018.

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

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

(1) Unit 1, 1-2 emergency diesel generator (EDG) air start system on January 3, 2018
(2) Unit 2, turbine driven auxiliary feedwater pump steamline during maintenance on 'B' train steamline isolation valves on January 23, 2018
(3) Unit 1, 'A' river water system during 'B' river water pump surveillance testing on February 9, 2018
(4) Unit 2, 2-1 EDG following air damper repairs on February 28, 2018

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (6 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Unit 1, fuel building and decontamination building (fire area FB-1) on February 9, 2018
(2) Unit 2, fuel building and decontamination building (fire area FB-1) on February 9, 2018
(3) Unit 2, 'AE' switchgear room (fire area SB-1) on March 1, 2018
(4) Unit 1 and Unit 2, intake structure screen area (fire area IS) on March 8, 2018
(5) Unit 1 and Unit 2, intake structure pump cubicles (fire areas IS-1,2,3,4) on March 8, 2018
(6) Unit 2, primary auxiliary building 755' elevation (fire areas PA-4,5,6) on March 13, 2018

Annual Inspection (1 Sample)

The inspectors evaluated fire brigade performance on March 6, 2018.

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the intake structure on March 29, 2018.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a crew of licensed operators in the Unit 1 simulator during licensed operator requalification training on January 30, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated the Unit 1 downpower to 82 percent to search for a condenser tube leak on January 9, 2018, and the return to full power on January 11, 2018.

Operator Requalification Exam Results, Unit 1 (Annual) (1 Sample)

The inspectors reviewed and evaluated Unit 1 requalification examination results (operating test, only) on March 26, 2018.

Operator Requalification Program and Operator Performance, Unit 1 (Biennial) (1 Sample)

The inspectors reviewed and evaluated operator performance, evaluator performance, and simulator performance during Unit 1 requalification examinations completed on January 26, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Unit 1, radiation monitoring system on February 8, 2018
(2) Unit 2, electrical heat tracing system on January 23, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (5 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Unit 1, emergent maintenance to repair condenser tube leak on January 11, 2018
(2) Unit 2, planned maintenance on the 2-1 EDG on February 27, 2018
(3) Unit 2, elevated risk due to planned maintenance on seal water injection filter on March 8, 2018
(4) Unit 2, planned elevated risk for solid state protection system train 'A' testing on March 19, 2018
(5) Unit 1, planned maintenance on the 1A system station service transformer on March 20, 2018

71111.15 - Operability Determinations and Functionality Assessments (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Unit 2, turbine driven auxiliary feedwater pump steamline isolation valve stroke time outside acceptable range on May 17, 2017
(2) Unit 2, no flow indication for 21A low head safety injection pump during surveillance on January 4, 2018
(3) Unit 2, 2-2 EDG jacket water heater power supply malfunction on January 10, 2018
(4) Unit 1, water intrusion into outboard turbine oiler of turbine driven auxiliary feedwater pump on February 28, 2018
(5) Unit 1, control room emergency air cooling system credit of manual actions on March 12, 2018
(6) Unit 1, river water pipe fitting leak on 1-1 EDG heat exchanger vent line on March 22, 2018

71111.19 - Post Maintenance Testing (7 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

(1) Unit 2, 2-2 EDG jacket water heater power supply repair on January 10, 2018
(2) Unit 2, turbine driven auxiliary feedwater steam supply isolation valve planned preventive maintenance on January 26, 2018
(3) Unit 1, 'E' incore detector and spool replacement on February 22, 2018
(4) Unit 2, 2-1 EDG air damper repairs on February 27, 2018
(5) Unit 2, control rod process rack card repairs on March 14, 2018
(6) Unit 2, 'A' motor driven auxiliary feedwater pump suction relief valve maintenance on March 20, 2018
(7) Unit 1, 1-1 EDG 1A heat exchanger inlet river water isolation valve repairs on March 29, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

(1) 1MSP-6.40-I, T-RC432 Delta T TAVG protection instrument channel III calibration on February 26, 2018
(2) 2OST-1.11E, 'A' safeguards protection system miscellaneous go test on March19, 2018

Inservice (3 Samples)

(1) 2OST-11.1, 21A low head safety injection pump test on January 6, 2018
(2) 1OST-24.3, 3B motor driven auxiliary feed pump test on January 17, 2018
(3) 1OST-13.7A, 2A recirculation spray pump flow test on January 22, 2018

Reactor Coolant System Leak Detection (1 Sample)

2OST-6.2A, computer generated reactor coolant system water inventory balance on March 7, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated the conduct of a routine FENOC emergency planning drill on February 8, 2018.

Drill/Training Evolution (1 Sample)

The inspectors evaluated a simulator training evolution for Unit 1 licensed operators on January 30, 2018.

RADIATION SAFETY

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Walk Downs and Observations (1 Sample)

The inspectors walked down the gaseous and liquid radioactive effluent monitoring and filtered ventilation systems to assess the material condition and verify proper alignment according to plant design.

Calibration and Testing Program (Process and Effluent Monitors) (1 Sample)

The inspectors evaluated the FENOC's gaseous and liquid effluent monitor instrument calibration and testing.

Sampling and Analyses (1 Sample)

The inspectors evaluated radioactive effluent sampling and analysis activities.

Instrumentation and Equipment (1 Sample)

The inspectors reviewed radioactive effluent discharge system surveillance test results and reviewed the methodology used to determine the radioactive effluent stack and vent flow rates based on Technical Specifications/Off Site Dose Calculation Manual acceptance criteria.

Dose Calculations (1 Sample)

The inspectors reviewed several liquid and gaseous discharge permits to evaluate public dose calculations (monthly, quarterly, and annual) and the annual radiological effluent release reports for 2015 and 2016.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified FENOC's performance indicators submittals listed below for the period of January 1, 2017, to December 31, 2017. (6 Samples)

(1) Unit 1 and 2 Unplanned Scrams per 7000 Critical Hours
(2) Unit 1 and 2 Unplanned Power Changes per 7000 Critical Hours
(3) Unit 1 and 2 Unplanned Scrams with Complications

The inspectors verified FENOC's performance indicators submittals listed below for the period of April 1, 2016, to December 31, 2017. (1 Sample)

Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue.

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (1 Sample)

The inspectors evaluated the following licensee event reports which can be accessed at https://lersearch.inl.gov/LERSearchCriteria.aspx:

Licensee Event Report (LER) 05000334/2017-003-00, Beaver Valley Power Station Unit 1 Reactor Trip due to Turbine Trip and Automatic Initiation of Auxiliary Feedwater System, on January 4, 2018. The review for this event is documented in Inspection Report 2017004.

INSPECTION RESULTS

Licensee Identified Non-Cited Violation	71124.06
This violation of very low safety significance was identified by the licensee and has been entered into the licensee's corrective action program and is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: Technical Specification 5.5.2 (c), "Radioactive Effluent Controls Program," requires monitoring, sampling, and analysis of gaseous effluents. Contrary to the above, from 1989 to the present, the sample pump flow rates through several isokinetic nozzles was too high to allow for accurate monitoring and representative sampling. In 1989, automatic flow control features of some effluent monitoring instruments were disabled and in 2016, several new monitors were installed on the same isokinetic nozzle sample lines. Both of these actions prevents accurate monitoring and representative sampling.	
Significance/Severity: The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process." The inspectors determined that finding was of very low safety significance (Green). Corrective Action Reference(s): CR-2017-04211 and CR-2018-00283.	

Inadequate Procedure Adherence			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000334/2018001-01 Closed	Not Applicable	71153
A self-revealed Green finding was identified when the licensee failed to adequately implement procedure NOP-WM-1001, "Order Planning Process." Specifically, FENOC personnel that made a change to work order testing requirements did not receive concurrence from a Unit 1 Senior Reactor Operator nor did they ensure that the original scope and/or intent of the test was met.			
Description: On November 7, 2017, with the plant operating at full power, Unit 1 experienced an automatic turbine trip and coincident reactor trip initiated by a main unit generator fault protection trip. The auxiliary feedwater system automatically actuated on low steam generator water level as expected, and performed as designed. The plant was then stabilized in Mode 3 using the normal main feedwater system. In response to the Unit 1 reactor trip, FENOC performed a root cause evaluation and identified that the direct technical cause was foreign material within the isolated phase bus ducts, which caused an electrical fault that led to the generator protection trip and subsequent turbine trip and reactor trip. The licensee determined that the pieces of belt found in the B phase bus duct, which were tested and verified to electrically conduct, were large enough to cause sufficient bridging and electrical faults. The licensee also concluded that the foreign material had been in the duct for many years and eventually shifted position due to air flow until it was positioned in a manner that caused the fault. The licensee restored the iso-phase bus on November 12, 2017, by cleaning the duct, removing all foreign material, and performing a satisfactory Hi-Pot test on all three phases. Lastly, the corrective action to preclude repetition was to revise the procedure, 1/2PMP-35-GML/TRF-03E, "Iso-Phase Bus Inspection and Test," to clarify the intent and scope to ensure that a full bus inspection is completed as required.			

An extent of condition review was also performed and verified that a full bus duct inspection was performed at Unit 2 in 2012 as required by the work scope for a belt guard modification.

The licensee determined that the root cause was decisions individuals made in 2013 that allowed personnel to change work scope without following the process to get approval for the scope change.

In February 2006, a full inspection of the Unit 1 iso-phase bus was performed. All access ports were opened to inspect and clean all bus duct insulators, including internal inspection for foreign material using a borescope. In September 2010, the licensee replaced a drive belt on the duct cooling fan following a fan failure on the B phase fan. No foreign material inspection was performed following the replacement of the belt prior to placing the fan back in service. The licensee identified this as a missed opportunity to investigate potential foreign material intrusion into the duct that could have potentially identified and removed belt foreign material preventing the 2017 Unit 1 trip. In October 2013, the licensee completed a modification to the ducts of the main unit generator that included replacing large portions of the ducts and adding belt guards to the fan belts to prevent further belt failures from introducing foreign material into the ducts. A post work task for this modification was to include complete visual inspections, testing, and cleaning of the iso-phase bus ducts in accordance with 1/2PMP-35-GML/TRF-03E. Based on information the inspectors reviewed in the completed modification work orders from 2013, the crew did not perform the intended borescope inspection and marked the steps for insulator inspection as not applicable. The documented reasoning for the scope change was “per satisfactory hi-pot test results and discussion with system engineer.” The individual that made a change to work order testing requirements did not receive concurrence from a Unit 1 Senior Reactor Operator nor did they ensure that the original scope and/or intent of the test was met in accordance with the requirements of NOP-WM-1001, Order Planning Process, Revision 20. Therefore, the inspection of the Unit 1 iso-phase bus ducts was not performed as required.

Corrective Action(s): FENOC restored the iso-phase bus on November 12, 2017, by completing the full bus duct inspection, cleaning the duct, removing all foreign material, and performing a satisfactory Hi-Pot test on all three phases. Also, the corrective action to preclude repetition was to revise the procedure, 1/2PMP-35-GML/TRF-03E, to clarify the intent and scope to ensure that full bus inspections are completed as required.

Corrective Action Reference(s): CR-2017-11134

Performance Assessment:

Performance Deficiency: FENOC procedure NOP-WM-1001, “Order Planning Process” requires that individuals making changes to testing requirements shall receive concurrence from a Senior Reactor Operator and ensure that the original scope and/or intent of the test is met. On October 31, 2013, individuals changed the scope of work order testing requirements to inspect the iso-phase bus ducts, but did not receive concurrence from the Unit 1 Senior Reactor Operator nor did they ensure that the original scope and/or intent of the test was met.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the human performance attribute of the Initiating Events cornerstone and affected the cornerstones objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations.

Significance: The inspectors assessed the significance of the finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions." The inspectors determined that this performance deficiency did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-Cutting Aspect: No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

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 3, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. Richard Bologna, Site Vice President, and other members of the Beaver Valley Power Station's staff.

DOCUMENTS REVIEWED

71111.04

Work Orders
200732414

71111.12

Miscellaneous
601107823

71111.13

Work Orders
200666517
200669633
200717095
200732414
200734925
200739461

Miscellaneous
Beaver Valley Unit 1 Week 01/08/2018, T-0 ICDP Profile, Revision 2
Beaver Valley Unit 2 Week 02/26/2018, T-0 ICDP Profile, Revision 0
Beaver Valley Unit 2 Week 03/05/2018, T-0 ICDP Profile, Revision 1
Beaver Valley Unit 1 Week 03/19/2018, T-0 ICDP Profile, Revision 0
Beaver Valley Unit 2 Week 03/19/2018, T-0 ICDP Profile, Revision 0

71111.15

Condition Reports
CR-2006-03318
CR-2017-05624
CR-2018-00240
CR-2018-00080
CR-2018-00134
CR-2018-00142
CR-2018-00147
CR-2018-00570
CR-2018-01779
CR-2018-02225
CR-2018-02232
CR-2018-02726

Work Orders
200652768
200641353
200642013
200642558
200647317
200739525
200744746

Miscellaneous
601144445
601144942
601147388
601147415
601152547
601158024

71111.19

Work Orders
200521771
200542420
200622362
200652768
200672109
200745894
200690571
200732414
200739525
200743114

71111.22

Miscellaneous
200670137

71124.06

Discharge Packages
Liquid, Unit 1, 6470, 6430, 6415, 6488, 6515, 6529
Unit 2, 6478, 6494, 6516, 6532
Gaseous, 01901, 01902, 01905, 01906, 01907
FENOC Beaver Valley Power Station - 2016 Radioactive Effluent Release Report, April 5, 2017
FENOC Beaver Valley Power Station - 2015 Radioactive Effluent Release Report, April 28, 2016
Results of Radiochemistry Cross Check Program, First Energy Beaver Valley 1st Quarter 2016 through 4th Quarter 2017

71151

Miscellaneous
Unit 1 Power Range Neutron Flux PI data, January 2017 through December 2017
Unit 2 Power Range Neutron Flux PI data, January 2017 through December 2017

71152

Miscellaneous
PA-BV-2018-0004-006, Assessment of Chemistry Field Activities performed on 2/15/18

71153

Work Orders
200121564
200209770
200429521
200469979
200518153
200734302