



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

May 4, 2016

Mr. Marty Richey  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
P. O. Box 4  
Shippingport, PA 15077

**SUBJECT: BEAVER VALLEY POWER STATION – INTEGRATED INSPECTION  
REPORT 05000334/2016001 AND 05000412/2016001**

Dear Mr. Richey:

On March 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Beaver Valley Power Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 27, 2016, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents one violation of NRC requirements, which was of very low safety significance (Green). However, because of the very low safety significance, and because the violation is entered into your corrective action program, the NRC is treating the finding as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest the non-cited violation in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Beaver Valley Power Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding, 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 Regional Administrator, Region I, and the NRC Resident Inspector at Beaver Valley Power Station.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access Management System (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Silas R. Kennedy, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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

Enclosure:  
Inspection Report 05000334/2016001  
and 05000412/2016001  
w/Attachment: Supplementary Information

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos.: 50-334 and 50-412

License Nos.: DPR-66 and NPF-73

Report No.: 05000334/2016001 and 05000412/2016001

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA 15077

Dates: January 1, 2016 to March 31, 2016

Inspectors: J. Krafty, Senior Resident Inspector  
B. Reyes, Resident Inspector  
R. Rolph, Health Physicist

Approved By: Silas R. Kennedy, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

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## SUMMARY

IR 05000334/2016001, 05000412/2016001; 01/01/2016 – 03/31/2016; Beaver Valley Power Station, Units 1 and 2; Operability Determinations and Functionality Assessments.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified one finding of very low safety significance (Green), which was a non-cited violation (NCV). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### Cornerstone: Barrier Integrity

- Green. The inspectors identified an NCV of Title 10 of the *Code of Federal Regulations* (CFR), Part 50, Appendix B, Criterion XI, "Test Control," for FENOC's failure to properly evaluate the test results of the Control Room Envelope (CRE) unfiltered air in-leakage test performed in December 2015. Specifically, the test results exceeded the acceptance criteria specified in the test procedure and required further engineering evaluation to determine if the control room emergency ventilation system (CREVS) could meet its specified safety function. The inspectors identified that the engineering evaluation of the test results did not account for all of the in-leakage and resulted in a reasonable doubt of operability of CREVS. FENOC's immediate corrective action was to re-evaluate the December 2015 calculation and verify that CREVS remained operable with the increased in-leakage. FENOC entered the issue into their corrective action program, condition report (CR) 2016-03836.

The performance deficiency is more-than-minor because it is associated with the human performance attribute of the Barrier Integrity cornerstone, and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect from radionuclide releases caused by accidents or events. Specifically, FENOC's evaluation did not account for in-leakage from the non-tested portions of the control room radiological barrier, and therefore, did not provide reasonable assurance that the control room dose would not exceed five rem during an uncontrolled release of radioactivity. Additionally, this issue is similar to example 3j and 3k of IMC 0612 Appendix E, "Examples of Minor Issues," in that FENOC's December 2015 engineering evaluation failed to adequately account for CRE in-leakage and resulted in a reasonable doubt of the operability of CREVS. The inspectors determined that this finding was of very low safety significance (Green) because it only represented a degradation of the radiological barrier function provided for the control room. This finding has a cross-cutting aspect in the area of Human Performance, Conservative Bias, because FENOC did not take a conservative approach to decision making, particularly when the in-leakage information was incomplete [H.14]. (Section 1R15)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near 100 percent power for the entire inspection period.

Unit 2 began the inspection period at 100 percent power and operated at full power until February 3, 2016, when the unit entered a planned outage to make repair to the main generator. Operators returned the unit to 100 percent power on February 13, 2016, and operated at or near 100 percent power for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 External Flooding

a. Inspection Scope

During the week of February 22, 2016, the inspectors performed an inspection of the external flood protection measures for Beaver Valley Power Station. The inspectors reviewed technical specifications, procedures, design documents, and Chapters 2.7.3 of the Unit 1 updated final safety analysis report (UFSAR) and 3.4.1 of the Unit 2 UFSAR, which depicted the design flood levels and protection areas containing safety-related equipment to identify areas that may be affected by external flooding. The inspectors conducted a general site walkdown of the main intake structure, Unit 1 turbine building, Unit 2 service building, and Unit 1 main control room air conditioning and relay rooms to ensure that FENOC erected flood protection measures in accordance with design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to determine if FENOC planned or established adequate measures to protect against external flooding events. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed FENOC's preparations for the onset of cold weather on January 19, 2016. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the refueling water storage tanks and demineralized water storage tank to ensure availability. The inspectors verified that operator actions defined in FENOC's adverse weather procedure maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 2 'A' train of recirculation spray system (RSS) while the 'D' train of RSS was out of service for scheduled maintenance on January 22, 2016
- Unit 2 service water system when the standby service water system was connected to the 'A' train of service water on February 1, 2016
- Unit 1 low head safety injection system following surveillance testing on the 'A' train on February 29, 2016
- Unit 1 quench spray system (QSS) following surveillance testing on the 'B' QSS on March 7, 2016

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, technical specifications, CRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether FENOC's staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On February 29, 2016, the inspectors performed a complete system walkdown of accessible portions of the Unit 2 QSS to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, pipe hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the system to verify system components and support equipment were aligned correctly and operable.



The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related CRs to ensure FENOC appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 7 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that FENOC controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 1 Normal Switchgear, Fire Area NS-1, on January 22, 2016
- Unit 1 DF Switchgear, Fire Area ES-2, on January 22, 2016
- Unit 2 Cable Spreading Room, Fire Area SB-3, on February 8, 2016
- Unit 2 Auxiliary Boiler, Fire Area SOB-1, on February 16, 2016
- Unit 2 Relay Room, Fire Area CV-6, on February 16, 2016
- Unit 2 Rod Control Area, Fire Area CV-3, on February 16, 2016
- Unit 1 Auxiliary Building 722 ft., Fire Area PA-1G on February 24, 2016

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on March 8, 2016, that involved a fire in the Unit 2 condensate polishing control room. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that FENOC personnel identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. The inspectors evaluated specific attributes as follows:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques

- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with FENOC's fire-fighting strategies.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 2 samples)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site internal flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the corrective action program to determine if FENOC identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors focused on the Unit 1 auxiliary building to verify the adequacy of equipment seals located below the flood line, common drain lines and sumps, sump pumps, level alarms, and control circuits.

b. Findings

No findings were identified.

.2 Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could affect risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including manhole EMH-8A and EMH-8B containing safety-related river water and service water cables, to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 1 'C' component cooling reactor (CCR) heat exchanger to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified FENOC's commitments to NRC Generic Letter 89-13. The inspectors observed actual performance tests for the heat exchanger and reviewed the results of previous inspections of the Unit 1 CCR heat exchangers. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that FENOC initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed Unit 1 licensed operator simulator training on January 25, 2016, which included a load rejection, pressurizer level transmitter failure, instrument air compressor trip, medical emergency, and a reactor coolant pump locked rotor coincident with a steam generator tube rupture. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift manager. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed Unit 2 reactor shutdown February 3, 2016. The inspectors observed infrequently performed test or evolution briefings and reactivity control briefings to verify that the briefings met the criteria specified in NOP-OP-1002,

“Conduct of Operations” Revision 11. Additionally, the inspectors observed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, and maintenance rule basis documents to ensure that FENOC was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by FENOC staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that FENOC staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Unit 2 service water on February 8, 2016
- Unit 1 4 kilovolt (kV) station service system on February 16, 2016
- Unit 1 fire protection system on March 4, 2016

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that FENOC performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that FENOC personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When FENOC performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station’s probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 2 '2B' transformer out of service for testing and the 'B' charging pump out of service for planned maintenance on January 15, 2016
- Unit 2 No. 2 emergency diesel generator (EDG) and 'B' component cooling pump out of service on February 17, 2016
- Unit 1 'A' train of reactor plant river water out of service for '9A' auxiliary river water pump testing on March 2, 2016
- Unit 1 No. 2 EDG and 'DF' 4kV emergency bus undervoltage relays out of service for testing on March 8, 2016
- Unit 1 yellow probabilistic risk assessment (PRA) risk during racking of the 'C' river water pump breaker to the 'DF' 4 kV emergency bus on March 18, 2016
- Unit 1 yellow PRA risk during Unit 1 138 kV bus 1 power circuit breaker (PCB-92) relay trip checks

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- Unit 2 pressurizer vapor space sample outside containment isolation valve dual indication on January 7, 2016
- Unit 1 'B' steam generator main feedwater regulating valve air leakage on January 25, 2016
- Unit 1 and 2 CREVS in-leakage exceeded acceptance criteria on February 9, 2016
- Unit 2 turbine driven auxiliary feedwater (TDAFW) pump oil reservoir water intrusion on February 10, 2016
- Reanalysis of Unit 1 and Unit 2 CREVS December 2015 in-leakage that exceeded procedural limits on March 15, 2016
- Unit 2 TDAFW pump slow start time on March 22, 2016
- Unit 2 'B' service water pump head ratio in action range on March 28, 2016

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to FENOC's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by FENOC. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XI, "Test Control," for FENOC's failure to properly evaluate the test results of the CRE unfiltered air in-leakage test performed in December 2015.

Description. In December 2015, FENOC performed surveillance procedure 3BVT 1.44.05, "Control Room Envelope Air In-Leakage Test." This is a required surveillance that is used to verify that the Unit 1 and Unit 2 CREVS can perform its safety function to provide a protected environment for the control room operators following an uncontrolled release of radioactivity. The surveillance consists of four separate tests: normal mode, recirculation mode, Unit 1 pressurization mode, and Unit 2 pressurization mode. On December 22, 2015, all four tests exceeded their acceptance criteria specified in 3BVT 1.44.05, Section VIII, "Acceptance Criteria." For tests results that exceed the acceptance criteria, the surveillance procedure required further engineering evaluation. The engineering evaluation of all the test results, documented on December 31, 2015, concluded that the increased in-leakage would not cause the control room dose to exceed the limit of 5 rem stated in 10 CFR 50.67, "Accident Source Term." Based on the engineering evaluation of the test results, FENOC concluded that CREVS was operable but degraded.

To address the CREVS degraded condition, FENOC made repairs and adjustments to two CREVS inlet dampers, a fire door, and the differential pressure between the CRE and the adjoining spaces. In February 2016, FENOC re-performed in-leakage testing following the repairs. The normal mode test in-leakage increased from 907 standard cubic feet per minute (scfm) in December 2015 to 1306 scfm. FENOC performed repairs on a discharge damper, and reduced normal mode in-leakage to 1077 scfm. The engineering evaluation of the results was documented on February 9, 2016, and concluded that the in-leakage would not result in exceeding the control room dose limit stated in 10 CFR 50.67. Based on the February 2016 engineering evaluation, FENOC concluded that CREVS remained operable but degraded.

The inspectors questioned why the normal mode in-leakage in February 2016 increased when repairs were made that should have actually decreased the in-leakage. FENOC informed the inspectors that the December 2015 normal mode test was a partial test since it only tested the CREVS inlet dampers rather than the entire normal mode lineup. The inspectors determined that FENOC did not adequately evaluate the CRE test results in December 2015 since FENOC's evaluation did not make allowances for in-leakage in the untested portions of CREVS. As a result, the inspectors concluded that there was a reasonable doubt of operability of CREVS from December 31, 2015, to February 9, 2016, given that the actual December normal mode in-leakage was unknown.

FENOC provided evidence that the 1306 scfm in-leakage measured in the February 2016 normal mode test bounded the actual normal mode in-leakage in December 2015. FENOC re-evaluated the December 2015 test results using the in-leakage numbers from the recirculation mode, Unit 1 pressurization mode, and Unit 2 pressurization mode tests and calculated that the control room dose limit stated in 10 CFR 50.67 would not be exceeded as long as the normal mode in-leakage did not exceed 1697 scfm. As a result, FENOC concluded that there was a reasonable expectation of operability during

the period in question. In addition to re-evaluating the December 2015 calculation, immediate FENOC corrective action included entering this issue into their corrective action program as CR 2016-03836.

Analysis. The inspectors determined FENOC's failure properly evaluate the December 2015 CRE in-leakage test results in accordance with 10 CFR 50 Appendix B, Criterion XI, "Test Control," was a performance deficiency that was within the capability of FENOC to foresee and correct, and therefore should have been prevented. The performance deficiency was more-than-minor because it was associated with the human performance attribute of the Barrier Integrity cornerstone, and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect from radionuclide releases caused by accidents or events. Specifically FENOC's evaluation did not account for in-leakage from the non-tested portions of the control room radiological barrier, and therefore, did not provide reasonable assurance that the control room dose would not exceed five rem during an uncontrolled release of radioactivity. Additionally, this issue is similar to example 3j and 3k of IMC 0612 Appendix E, Examples of Minor Issues, in that FENOC's December 2015 engineering evaluation failed to adequately account for CRE in-leakage and resulted in a reasonable doubt of the operability of CREVS.

In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012, and Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined that this finding was of very low safety significance (Green) because it only represented a degradation of the radiological barrier function provided for the control room.

This finding has a cross-cutting aspect in the area of Human Performance, Conservative Bias, because FENOC did not take a conservative approach to decision making, particularly when the in-leakage information was incomplete [H.14].

Enforcement. 10 CFR 50 Appendix B, Criterion XI, "Test Control," requires, in part, that test results shall be documented and evaluated to assure that test requirements have been satisfied. Contrary to the above, from December 31, 2015 until February 9, 2016, FENOC failed to adequately evaluate the December 2015 CRE air in-leakage test results and could not assure that the five rem dose limit to the control room would not be exceeded. FENOC's immediate corrective action was to re-evaluate the December calculation and verify that CREVS remained operable with the increased in-leakage. Because this finding is of very low safety significance (Green) and the issue was entered into the corrective action program as CR 2016-03836, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 5000334/2016001-01 and 05000412/2016001-01, Failure to Properly Evaluate Control Room Envelope Test Results).**

1R18 Plant Modifications (71111.18 – 1 samples)

Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modification, Engineering Change Package 14-0099 – Reduction of Unit 1 Spray Line Low Temperature Setpoint, Revision 0, to

determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- Unit 2 source range detector N-31 troubleshooting unexpected neutron count at power due to a noise source and ground strap installation on February 10, 2016
- Unit 1 power range nuclear instrument, N-43, replacement of isolation amplifiers on February 17, 2016
- Unit 1 inadequate core cooling monitor data logger train A, digital contact input card replacement, on February 17, 2016
- Unit 1 'A' charging pump motor and pump preventive maintenance on February 23, 2016
- Unit 1 No. 2 EDG fuel oil transfer pump preventive maintenance on March 9, 2016
- Unit 1 control room emergency ventilation following inlet and outlet damper maintenance on March 15, 2016
- Unit 2 'B' component cooling water pump following mechanical seal replacement and breaker inspection on March 17, 2016

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 6 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and FENOC procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational



readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- 2OST-30.13B, Train B Service Water System Full Flow Test, Revision 37, on January 13, 2016 (in-service test)
- 1MSP-6.12-I, P-455, Pressurizer Pressure Channel I Test, Revision 15 on January 29, 2016
- 1OST-24.4, Steam Turbine Driven Auxiliary Feed Pump Test (1FW-P-2), Revision 54 on February 4, 2016 (in-service test)
- 2BVT 1.16.7, Supplemental Leak Collection and Release System Train “B” Filter Efficiency and Flow Test, Revision 13, on February 22, 2016
- 2MSP-2.06-I, Power Range Neutron Flux Channel N44 Refueling Calibration, Revision 35 on February 26, 2016
- 2OST-1.11C, Safeguards Protection System Train A CIB/Spray Actuation Test, Revision 27 on March 29, 2016

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation (71114.06 – 2 samples)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine FENOC emergency drill on March 10, 2016, to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also compared their observations with those identified by FENOC staff in order to evaluate FENOC’s critique and to verify whether the FENOC staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

.2 Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for Unit 1 licensed operators on January 25, 2016, which required emergency plan implementation by an operations crew. FENOC planned for this evolution to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that FENOC evaluators noted the same issues and entered them into the corrective action program.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 4 samples)

a. Inspection Scope

The inspectors reviewed FENOC's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR 20, technical specifications, applicable Regulatory Guides (RGs), and the procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators for the occupational exposure cornerstone, radiation protection program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment (1 sample)

The inspectors conducted independent radiation measurements during walk-downs of the facility and reviewed the radiological survey program; air sampling and analysis; continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy any new radiological hazards for onsite workers or members of the public.

Radiological Hazards Control and Work Coverage (1 sample)

The inspectors evaluated in-plant radiological conditions and performed independent radiation measurements during facility walk-downs and observation of radiological work activities. The inspectors assessed whether posted surveys, radiation work permits (RWPs), worker radiological briefings, the use of continuous air monitoring and dosimetry monitoring were consistent with the present conditions. The inspectors examined the control of highly activated or contaminated materials stored within the spent fuel pools and the posting and physical controls for selected high radiation areas (HRAs), locked high radiation areas and very high radiation areas (VHRA) to verify conformance with the occupational performance indicator.

Risk-Significant HRA and VHRA Controls (1 sample)

The inspectors reviewed the controls and procedures for HRAs, VHRAs, and radiological transient areas in the plant.

Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with radiation monitoring and exposure control (including operating experience) were identified at an appropriate threshold and properly addressed in the corrective action program.

Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02 – 1 sample)

a. Inspection Scope

The inspectors assessed FENOC’s performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR 20, applicable RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of Beaver Valley collective dose history and trends; ongoing and planned radiological work activities; radiological source term history and trends; and ALARA dose estimating and tracking procedures.

Radiological Work Planning (1 sample)

The inspectors selected the following radiological work activities based on exposure significance for review:

<u>RWP No.</u>	<u>Description</u>	<u>Dose Estimate (person-Rem)</u>	<u>Actual Dose (person-Rem)</u>
115-4028	Scaffolding-Construction	11.459	9.459
215-5028	Scaffolding-Construction	12.625	14.456
115-4023	Construction Support for ISI	2.950	2.364
215-5017	Primary Side Steam Generator	8.445	7.450

For each of these activities the inspectors reviewed: ALARA work activity evaluations; exposure estimates; exposure reduction requirements; results achieved (dose rate reductions, actual dose); person-hour estimates and results achieved; and post-job reviews that were conducted to identify lessons learned.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 – 2 samples)

a. Inspection Scope

The inspectors reviewed the control of in-plant airborne radioactivity and the use of respiratory protection devices in these areas. The inspectors used the requirements in 10 CFR 20, RG 8.15, RG 8.25, NUREG/CR-0041, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the UFSAR to identify ventilation and radiation monitoring systems associated with airborne radioactivity controls and respiratory protection equipment staged for emergency use. The inspectors also reviewed respiratory protection program procedures and current performance indicators for unintended internal exposure incidents.

Engineering Controls (1 sample)

The inspectors reviewed operability and use of both permanent and temporary ventilation systems, and the adequacy of airborne radioactivity radiation monitoring in the plant based on location, sensitivity, and alarm set-points.

Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were identified at an appropriate threshold and addressed by FENOC's corrective action program.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 – 2 samples)

a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR 20, RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

### Inspection Planning

The inspectors reviewed: radiation protection program audits; National Voluntary Laboratory Accreditation Program (NVLAP) dosimetry testing reports; and procedures associated with dosimetry operations.

### External Dosimetry (1 sample)

The inspectors reviewed: dosimetry NVLAP accreditation; onsite storage of dosimeters; the use of "correction factors" to align electronic personal dosimeter results with NVLAP dosimetry results; dosimetry occurrence reports; and corrective action program documents for adverse trends related to external dosimetry.

### Special Dosimetric Situations (1 sample)

The inspectors reviewed:

FENOC's worker notification of the risks of radiation exposure to the embryo/fetus; the dosimetry monitoring program for declared pregnant workers; external dose monitoring of workers in large dose rate gradient environments; and dose assessments performed since the last inspection that used multi-badging, skin dose or neutron dose assessments.

#### b. Findings

No findings were identified.

## **4. OTHER ACTIVITIES**

### 4OA1 Performance Indicator Verification (71151)

#### .1 Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications (6 samples)

##### a. Inspection Scope

The inspectors reviewed FENOC's submittals for the following Initiating Events cornerstone performance indicators for the period of January 1, 2015, through December 31, 2015.

- Unit 1 Unplanned Scrams
- Unit 2 Unplanned Scrams
- Unit 1 Unplanned Power Changes
- Unit 2 Unplanned Power Changes
- Unit 1 Unplanned Scrams with Complications
- Unit 2 Unplanned Scrams with Complications

To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors reviewed FENOC's operator narrative logs, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 1 sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that FENOC entered issues into the corrective action program at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the corrective action program and periodically attended CR screening meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. The inspectors reviewed the FENOC's Beaver Valley Fleet Oversight report for February 1 through July 31 of 2015, conducted under NOBP-LP-2023, "Performance Assessment," and selected elevation/escalation letters and associated CRs to verify that FENOC personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures. The inspectors also reviewed FENOC's corrective action program database for the third and fourth quarters of 2015 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily CR review (Section 4OA2.1).

b. Findings and Observations

No findings were identified.

No adverse trends were identified by the inspectors that had not already been identified by FENOC. The inspectors verified that identified trends were addressed within the scope of the corrective action program, or were considered as emerging or adverse trends through review and documentation in the fleet oversight report.

The inspectors noted that an adverse trend in configuration control has been identified annually by Fleet Oversight since 2012, and was discussed in the 2015 3<sup>rd</sup> quarter NRC inspection report (2015003). The inspectors evaluated a sampling of CRs associated with plant configuration control. The inspectors determined that FENOC appropriately identified a trend in the station's failure to maintain plant configuration control in CR 2015-14433, dated October 24, 2015, and implemented corrective actions.

CR 2015-14433 identifies a trend of 18 plant configuration control events that occurred during maintenance activities from May 4 through October 31, 2015. Three of the events involved the operations department and the other events involved predominantly electrical maintenance and the instrumentation and control departments. Each of the 18 events involved inadequate procedures, procedure use and adherence, or a failure to implement human performance error prevention techniques. Corrective actions included management reinforcement of human performance error prevention techniques to the maintenance department and further discussion of the techniques during focused shop briefs. The inspectors identified seven additional CRs for plant status control events not included in CR 2015-14433, all of which were operations-related.

The inspectors determined that on average, 22.5 plant configuration control events have occurred annually since 2012, with 14.25 of those events being attributed to the operations department. The inspectors identified that from May 4 through October 31, 2015, the number of operations department plant configuration control events was below the annual average with 10 events; however, the number of station events was above the annual average with 25 events. The inspectors concluded that while operations department plant configuration control improved in 2015, FENOC's corrective actions from a previous Fleet Oversight elevation and an escalation have not mitigated the trend in the station's failure to maintain plant configuration control.

#### 40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 2 samples)

##### Plant Events

##### a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that FENOC made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73, if required. The inspectors reviewed FENOC's follow-up actions related to the events to assure that FENOC implemented appropriate corrective actions commensurate with their safety significance.

- Unit 1 Notice of Unusual Event on January 1, 2016, due to FENOC's inability to verify that there was no fire within 15 minutes of receiving a smoke detector alarm in containment.
- Unit 2 planned outage on February 3, 2016, to address high vibrations on main generator end turns.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On April 27, 2016, the inspectors presented the inspection results to M. Richey, Site Vice President, and other members of the Beaver Valley Power Station staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

**ATTACHMENT: SUPPLEMENTARY INFORMATION**



**SUPPLEMENTARY INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

M. Richey	Site Vice President
C. McFeaters	Plant General Manager
D. Barth	Radiation Protection Technician
A. Brunner	Supplemental Leak Collection and Release System Engineer
G. Caccani	10 CFR 50.59 Program Manager
E. Crosby	Radiation protection Manager
R. Egolf	System Engineer
W. Etzel	Senior Consulting Engineer
J. Fontaine	Radiation Protection Supervisor ALARA
P. Hartig	Shift Manager
J. Huling	Mechanical Maintenance
D. Jones	IST Engineer
M. Kienzle	Unit 2 Auxiliary Feedwater System Engineer
T. King	System Engineer
A. Lang	Chemical Analyst
S. Mercer	System Engineer
J. Miller	Fire Marshall
T. O'Leary	Shift Manager
M. Ressler	Nuclear Configuration Control Engineering Supervisor
C. Sacha	Radiation Protection Services Supervisor
W. Scott	Control Room Supervisor
T. Steed	Director, Performance Improvement
M. Stoner	Instrumentation and Controls Supervisor
E. Thomas	Regulatory Compliance Supervisor
K. Tiefenthal	Shift Manager
S. Vicinie	Fleet Oversight Supervisor
D. Wacker	Compliance Engineer
Z. Warchol	System Engineering Supervisor
D. Wilson	Air Operated Valve Engineer

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**Opened/Closed

05000334/2016001-01	NCV	Failure to Properly Evaluate Control Room
05000412/2016001-01		Envelope Test Results (Section 1R15)

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

#### Procedures

1/2OM-53C.4A.75.2, Acts of Nature – Flood, Revision 31  
 1/2OST-45.1, Extreme Cold Weather Protection Verification, Revision 2

### **Section 1R04: Equipment Alignment**

#### Procedures

1OM-11.3.B.1, Valve List – 1SI, Revision 20  
 1OM-11.3.C, Power Supply and Control Switch List, Revision 8  
 1OM-13.3.B.1, Valve List – 1QS, Revision 15  
 1OM-13.3.C, Power Supply and Control Switch List, Revision 7  
 2OM-13.1.A, Function, Revision 1  
 2OM-13.1.B, Summary Description, Revision 3  
 2OM-13.1.C, Major Components, Revision 4  
 2OM-13.1.D, Instrumentation and Control, Revision 4  
 2OM-13.3.A, System and Component Arrangement, Revision 6  
 2OM-13.3.B.1, Valve List – 2QSS, Revision 11  
 2OM-13.3.B.2, Valve List – 2RSS, Revision 8  
 2OM-13.3.C, Power Supply and Control Switch List, Revision 9  
 2OM-30.3.B.1, Valve List – 2SWS, Revision 48  
 2OM-30.3.C, Power Supply and Control Switch List, Revision 16

#### Condition Reports

2002-02865                      2015-00946                      2016-02953

#### Drawings

10080-RM-0413-002, Valve Oper No Diagram Quench Spray System, Revision 21

### **Section 1R05: Fire Protection**

#### Condition Reports

2016-02269

#### Miscellaneous

1PFP-ALXB-722, Auxiliary Building General Area, Fire Area PA-1G, Revision 4  
 1PFP-SRVB-713, DF Switchgear Room, Fire Area ES-2, Revision 2  
 1PFP-SRVB-713, Normal Switchgear Room, Fire Area NS-1, Revision 2  
 2CPB-01, U2/Condensate Polishing Building Fire Drill Scenario  
 2PFP-ABBX-730, Auxiliary Boiler, Fire Area SOB-1, Revision 2  
 2PFP-ABBX-755, Auxiliary Boiler, Fire Area SOB-1, Revision 0  
 2PFP-CPBX-735, Condensate Polishing Building, Fire Area CP-1, Revision 0  
 2PFP-MSCV-755-RELAY, Relay Room, Fire Area CV-6, Revision 2  
 2PFP-MSCV-755-ROD, Rod Control Area, Fire Area CV-3, Revision 4  
 BVPS-1 Updated Fire Protection Appendix R Review, Revision 31  
 BVPS-2 Fire Protection Safe Shutdown Report Addendum 38

**Section 1R06: Flood Protection Measures**Procedures

1/2-ADM-2021, Control of Penetrations (Including HELB Doors), Revision 8  
 1BVT 1.33.07, Flood Seals Visual Inspection, Revision 5  
 1OM-53C.4.1.30.2, River Water/Main Intake Structure Loss, Revision 9  
 1OM-9.4.AAJ, Aux Bldg North Sump Level High, Revision 2

Work Orders

200374565	200415449	200415450	200425896
200562438			

Miscellaneous

PRA-BV1-AL-R05a, (IF) Internal Flooding Analysis, Revision 5a  
 Unit 1 Reactor Plant Vents and Drains System Health Report, 2015-1

**Section 1R07: Heat Sink Performance**Procedures

1/2-ADM-2106, River/Service Water System Control and Monitoring Program, Revision 6

Work Orders

200601526

Miscellaneous

'C' CCR Heat Exchanger (1CC-E-1C) As-Found Pictures, Dated March 21, 2016  
 Heat Exchanger Inspection Report for 'C' CCR Heat Exchanger (1CC-E-1C), Dated  
 March 21, 2016

**Section 1R11: Licensed Operator Regualification Program**Procedures

1/2-ADM-1111, NRC EPP Performance Indicator Instructions, Revision 11  
 1OM-53C.4.1.6.4, Steam Generator Tube Leakage, Revision 29  
 2OM-52.4.B, Load Following, Revision 63  
 NOBP-OP-0002, Operations Briefings and Challenge Calls, Revision 3  
 NOBP-OP-0007, Conduct of Infrequently Performed Tests or Evolutions, Revision 5  
 NOBP-TR-1112, FENOC Conduct of Simulator Training and Evaluation, Revision 2  
 NOP-LP-5011, Emergency Response Drill and Exercise Program, Revision 7  
 NOP-OP-1002, Conduct of Operations, Revision 11

Condition Reports

2016-01099	2016-01647	2016-01684
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Miscellaneous

Beaver Valley Unit 2 Narrative Logs for February 3, 2016

**Section 1R12: Maintenance Effectiveness**Procedures

1/2-ADM-1900, Fire Protection Program, Revision 38

1/2-ADM-2021, Control of Penetrations (Including HELB Doors), Revision 9

1/2PMP-33FP-Fire Doors-1M, Periodic Inspection of Fire Doors, Revision 9

Condition Reports

2013-00222	2013-03255	2013-10140	2014-00180
2014-00216	2014-00468	2014-01341	2014-01556
2014-01560	2014-02080	2014-02298	2014-03245
2014-04165	2014-04455	2014-04805	2014-04828
2014-05098	2014-05594	2014-05762	2014-06477
2014-08273	2014-09234	2014-09704	2014-10776
2014-11353	2014-12247	2014-12478	2014-12593
2014-13286	2014-13660	2014-13727	2014-14603
2014-14675	2014-14741	2014-15685	2014-16755
2014-17212	2014-18274	2014-18292	2014-18309
2014-18517	2014-18778	2015-00010	2015-00395
2015-01082	2015-01183	2015-01581	2015-02804
2015-03848	2015-05057	2015-06322	2015-06791
2015-07014	2015-07170	2015-07474	2015-08888
2015-09241	2015-09644	2015-09799	2015-10164
2015-11473	2015-11477	2015-11972	2015-13537
2015-13612	2015-13655	2015-14472	2015-14700
2015-15379	2015-16866	2015-16987	2015-17199
2015-17231	2015-17276	2015-17352	2016-00007
2016-03447			

Miscellaneous

Maintenance Rule (a)(1) Evaluation Form, CR 2013-17903, 2013-19140

Maintenance Rule (a)(1) Evaluation Form, CR 2014-0445

Maintenance Rule (a)(2) Evaluation form, CR 2013-17903, 2013-19140

Maintenance Rule System Basis Document, Unit 1 System 33, Revision 10

Maintenance Rule System Basis Document, Unit 1 System 36B, Revision 8

Maintenance Rule System Basis Document, Unit 2 System 30, Revision 6

Unit 1 – System 33 Monthly Maintenance Rule Monitoring Report, Dated February 11, 2016

Unit 1 4KV Station Service System Health Report, 2015-01

Unit 1 Fire Protection System Health Report, 2015-01

Unit 2 Service Water System Health Report, 2015-01

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**Procedures

1/2-ADM-0804, On-Line Risk Assessment and Management, Revision 13

1/2OM-36.4A.A, Racking 4KV Breakers, Revision 18

1OM-30.4M, Standby Reactor Plant River Water Pump Startup, Revision 27

BVBP-OPS-0012, Guidance for Protected Equipment during Normal Operations, Revision 10

NOP-OP-1007, Risk Management, Revision 21

NOP-OP-1007, Risk Management, Revision 22

Miscellaneous

- Beaver Valley Daily Status Report for February 17, 2016
- Beaver Valley Daily Status Report for March 18, 2016
- Beaver Valley Daily Status Report for March 2, 2016
- Beaver Valley Daily Status Report for March 29, 2016
- Beaver Valley Unit 1 Narrative Logs for March 2, 2016
- Beaver Valley Unit 1 Narrative Logs for March 29, 2016
- Beaver Valley Unit 1 Protected Equipment Tracking Log for March 8, 2016
- Beaver Valley Unit 1 Weekly Maintenance Risk Summary, for the week of February 29, 2016, Revision 0
- Beaver Valley Unit 1 Weekly Maintenance Risk Summary, for the week of March 7, 2016, Revision 0
- Beaver Valley Unit 1 Weekly Maintenance Risk Summary, for the week of March 14, 2016, Revision 0
- Beaver Valley Unit 1 Weekly Maintenance Risk Summary, for the week of March 28, 2016, Revision 0
- Beaver Valley Unit 2 Narrative Logs for February 17, 2016
- Beaver Valley Unit 2 Weekly Maintenance Risk Summary, for the week of January 11, 2016, Revision 2
- Beaver Valley Unit 2 Weekly Maintenance Risk Summary, for the week of February 15, 2016, Revision 2
- Beaver Valley Unit 2 Weekly Maintenance Risk Summary, for the week of March 28, 2016, Revision 0

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

- 1OST-1.10K, Cold Shutdown Valve Exercise Test (Part K) Main Feedwater Valves, Revision 3
- 2OST-24.4, Steam Driven Auxiliary Feed Pump (2FWE\*P22) Quarterly Test, Revision 81
- 2OST-30.3, Service Water Pump (2SWS\*P21B) Test, Revision 48
- NOBP-OP-1009, Prompt Operability Determination and Functionality Assessment Preparation Guide, Revision 6
- NOP-OP-1009, Operability Determinations and Functionality Assessments, Revision 5
- NORM-OP-1009, SRO Review of Condition Reports, Revision 4

Condition Reports

2008-49260	2015-16299	2015-16372	2015-17132
2015-17305	2015-17334	2015-17335	2015-17350
2016-00426	2016-00489	2016-00977	2016-00980
2016-01054	2016-01117	2016-01655	2016-01656
2016-01721	2016-01736	2016-01797	2016-01857
2016-01858	2016-01859	2016-01860	2016-01884
2016-02036	2016-02256	2016-03633	2016-03727

Drawings

- 10070-RM-424-5, Valve Oper No Diagram Aux Feed Pumps Lube Oil System, Revision 2
- 10080-RM-0414A-001, Valve Oper No Diagram Rx Plant Sample – Hood 1, Revision 18
- 10080-RM-0424-003, Valve Oper No Diagram Auxiliary Feedwater, Revision 18

Work Orders

- 200667597

Miscellaneous

10080-RM-0444A-002, Valve Oper No Diagram Computer and Control Room Air-Cond,  
Revision 16

2DBD-14A, Design Basis Document for Reactor Plant Sampling System, Revision 3

8700-RM-0444A-004, Valve Oper No Diagram Control Room Area-Air-Conditioning,  
Revision 14

Beaver Valley Unit 2 Narrative Logs for December 29, 2015

Control Room Envelope Inleakage Test at BVPS Data Report, December 30, 2015

Control Room Envelope Inleakage Test at BVPS Data Report, February 21, 2016

EER 601024042

NOP-ER-3202, Control Room Envelope Habitability (CREHAB) Program, Revision 0

**Section 1R18: Plant Modifications**Procedures

1LCP-6-T452, T-1RC-452, Pressurizer Spray Line 1C Temperature Loop Calibration, Revision 7

Condition Reports

2015-00631

2016-01108

2016-01114

2016-02950

Work Orders

200593358

Miscellaneous

8700-SP-1RC-14, Instrument Uncertainties for the Pressurizer Spray Line Temperature Loops  
T-1RC-451 and T-1RC-452, Revision 0

ECP-14-0099-000, Reduction of Unit 1 Loop 3 Spray Line Low Temperature Setpoint,  
Revision 0

EER 600874703, Revise Unit 1 Loop 3 Spray Line Low Temperature Setpoint, Revision 0

**Section 1R19: Post-Maintenance Testing**Procedures

1MSP-02.05-I, Power Range Neutron Flux channel N43 Refueling Calibration, Revision 34

1MSP-6.77-I, DL-1RC-100A Inadequate Core Cooling Monitor (ICCM) Data Logger Train A  
Calibration, Revision 14

1OM-7.4W, Placing the Spare/Standby Charging Pump into Operation, Revision 26

1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 71

1OST-7.4, Centrifugal Charging Pump Test (1CH-P-1A), Revision 43

2MSP-2.09-I, Nuclear Instrumentation Source Range N31 Calibration, Revision 23

2MSP-2.17-I, Nuclear Instrumentation Range N35 Neutron Detector Channel Calibration,  
Revision 11

2OM-15.4.G, Starting an Additional Primary Component Cooling Pump, Revision 16

2OST-15.2, Primary Component Cooling Water Pump (2CCP\*P21B) Test, Revision 58

3BVT-01.44.05, Control Room Envelope Air In-Leakage Test, Revision 4

Condition Reports

2016-01720

2016-02634

2016-03235

Maintenance Orders/Work Orders

200509682	200519396	200520574	200571508
200571509	200575384	200586660	200589829
200589839	200590295	200595172	200599542
200652216	200666648	200670845	200672546

Miscellaneous

BV160102R0-F, Testing of Nuclear Instrumentation Source Range N31 Circuit at Beaver Valley Unit 2

Control Room Envelope Inleakage Test at BVPS Data Report, December 30, 2015

Control Room Envelope Inleakage Test at BVPS Data Report, February 21, 2016

**Section 1R22: Surveillance Testing**Procedures

2OST-30.13B, Train B Service Water System Full Flow Test, Revision 37

2BVT 1.16.7, SLCRS Train "B" Filter Efficiency and Flow Test, Revision 13

Condition Reports

2016-00530	2016-00540	2016-02445	2016-02430
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Miscellaneous

Beaver Valley Unit 2 Narrative Logs for February 17, 18, and 25, 2016

**Section 1EP6: Drill Evaluation**Condition Reports

2015-01113	2015-02009	2015-09787	2015-09792
2015-11107	2015-16739	2015-17303	2016-01100
2015-11716			

Miscellaneous

1/2-EPP-IP-1.1.F01, FENOC Nuclear Power Plant Initial Notification Form Beaver Valley Power Station (BVPS), Revision 8

BVPS 2016 White Team Integrated Drill

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7

**Section 2RS1: Radiological Hazard Assessment and Exposure Controls (71124.01)**Procedures:

BVBP-RP-0016, Survey Requirements During Plant Transients, Revision 1

NOP-OP-4001, Radiation Protection Program, Revision 03

NOPB-OP-4008, Response to Radiological Events, Revision 04

NOBP-OP-4009, Radworker Expectations, Revision 06

NOP-OP-4101, Access Controls for Radiologically Controlled Areas, Revision 11

NOP-OP-4102, Radiological Postings, Labeling, and Markings, Revision 10

NOP-OP-4107, Radiation Work Permit (RWP), Revision 14

NOBP-OP-4114, Radiological Controls for Highly Radioactive and Irradiated Components or Materials, Revision 1

NOP-OP-4502, Control of Radioactive Material, Revision 03

NOP-OP-4701, Radiological Survey Documentation, Revision 01

Condition Reports:

2015-15759                      2015-16341                      2015-17003                      2016-03278

Surveys:

<u>Survey #</u>	<u>Date/Time</u>	<u>Unit/Bldg.</u>	<u>Elev.</u>	<u>Area/Room</u>	<u>Description</u>
100000	05/0315 - 0345	1/Containment	738	"A" RCP	Seal Removal
203330	10/02/15 -1330	2/Containment	738	"A" RCP	Post Seal Removal
203330	10/02/15-1600	2/Containment	738	"A" RCP	Seal Removal
203310	10/03/15-1240	2/Containment	738	"C" RCP	Seal Removal
102340	05/03/15-0530	1/PAB	752	VCT	Down Post
102340	05/03/15-0530	1/PAB	752	VCT	Down Post LHRA/HRA
102340	05/04/15-0930	1/PAB	752	VCT	Down Post HRA/RA
BV-M- 20150113-1	10/13/15-0200	2/PAB	755	VCT	Down Post LHRA/HRA

Other:

Radiation Protection Assessment Report 2015, December 23, 2015

**Section 2RS2: Occupational ALARA Planning and Controls (71124.02)**Procedures:

NOP-OP-4005, ALARA Program, Revision 4

**Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation (71124.03)**Procedures:

1/2-HPP-3.09.009, Portable High Efficiency Particulate Air (HEPA) Filter Units, Revision 11

1/2-HPP-4.06.012, Eberline, AMS-4 Continuous Air Monitor, Revision 9

1/2-HPP-7.03.001, HEPA Vacuum Cleaner and Portable HEPA Filtration Unit Monitor Test,  
Revision 3

NOP-OP-4702, Air Sampling, Revision 05

NOP-OP-4703, Determination of Alpha Monitoring Levels, Revision 03

Condition Reports:

2015-15416                      2015-17003                      2015-17162

**Section 2RS4: Occupational Dose Assessment (71124.04)**Procedures:

NOP-OP-4202, "Declared Pregnant Workers", Revision 0



Other:

FENOC Radiation Worker Training, Revision 3, August 7, 2015

NVLAP Certification, December 17, 2015

ERS-JTL-07-001, "Neutron Measurements at Beaver Valley Power Station" April 15, 2015

**Section 40A1: Performance Indicator Verification**

Procedures

NOBP-LP-4012, NRC Performance Indicators, Revision 5

NOBP-LP-4012-20, Unplanned Scrams Per 7,000 Critical Hours - Beaver Valley, Revision 0

NOBP-LP-4012-21, Unplanned Scrams with Complications - Beaver Valley, Revision 1

NOBP-LP-4012-22, Unplanned Power Changes Per 7,000 Critical Hours - Beaver Valley,  
Revision 0

Miscellaneous

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7

Unit 1 Power Range Neutron Flux PI data, January 1, 2015, through December 31, 2015

Unit 2 Power Range Neutron Flux PI data, January 1, 2015, through December 31, 2015

**Section 40A2: Problem Identification and Resolution**

Procedures

NOBP-LP-2023, Performance Assessment, Revision 15

NOP-OP-1007, Risk Management, Revision 21

NOP-OP-1007, Risk Management, Revision 22

NOP-WM-2001, Management Scheduling, Assessment and Seasonal Readiness Process,  
Revision 18

Condition Reports

2013-00810

2014-16653

2015-12501

2015-14433

2015-17145

Miscellaneous

Beaver Valley Unit 2 Narrative Logs for September 23, 2015

BVOV-13-0002, Elevation – Long Term Trend in Plant Status Control Events, Revision 0

BV-PA-15-01, Beaver Valley Nuclear Power Plant Fleet Oversight Performance Assessment  
Report, Revision 0

FLOV-EL-BV-15-11, Elevation – Failure to Maintain Plant Configuration Control, Revision 0

FLOV-ES-BV-14-09, Escalation – Long Term Trend in Plant Status Control Events, Revision 0

Unit 2 Weekly Maintenance Risk Summary for the Week of September 21, 2015, Revision 0

Unit 2 Weekly Maintenance Risk Summary for the Week of September 21, 2015, Revision 1

Unit 2 Weekly Maintenance Risk Summary for the Week of September 21, 2015, Revision 2

Unit 2 Weekly Maintenance Risk Summary for the Week of September 21, 2015, Revision 3

Unit 2 Weekly Maintenance Risk Summary for the Week of September 21, 2015, Revision 4

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
ALARA	as low as is reasonably achievable
CCR	component cooling reactor
CFR	Code of Federal Regulations
CR	condition report
CRE	control room envelope
CREVS	control room emergency ventilation system
EDG	emergency diesel generator
FENOC	FirstEnergy Nuclear Operating Company
HRA	high radiation area
IMC	Inspection Manual Chapter
kV	kilovolt
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PARS	Publicly Available Records
PRA	probabilistic risk assessment
QSS	quench spray system
RGs	Regulatory Guides
RSS	recirculation spray system
RWP	radiation work permits
scfm	standard cubic feet per minute
SSC	structure, system, or component
TDAFW	turbine driven auxiliary feedwater
UFSAR	Updated Final Safety Analysis Report
VHRA	very high radiation area