



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

August 4, 2015

Mr. Eric A. Larson  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
P. O. Box 4  
Shippingport, PA 15077-0004

**SUBJECT: BEAVER VALLEY POWER STATION – INTEGRATED INSPECTION  
REPORT 05000334/2015002 AND 05000412/2015002**

Dear Mr. Larson:

On June 30, 2015, 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 July 24, 2015, with you, and other members of your staff.

NRC inspectors 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 two findings of very low safety significance (Green). One of these findings involved a violation of NRC requirements. However, because of the very low safety significance, and because it is entered into your corrective action program, the NRC is treating this 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 NRCs "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, 50-412  
License Nos. DPR-66, NPF-73

Enclosure:  
Inspection Report 05000334/2015002 and 05000412/2015002  
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.: 05000334/2015002 and 05000412/2015002

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA 15077

Dates: April 1, 2015 to June 30, 2015

Inspectors: J. Krafty, Senior Resident Inspector  
B. Reyes, Resident Inspector  
E. Gray, Senior Reactor Inspector  
N. Graneto, Operations Engineer  
R. Rolph, Health Physicist  
H. Anagnostopoulos, Health Physicist

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

Enclosure

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## SUMMARY

IR 05000334/2015002 and 05000412/2015002; 04/01/2015 – 06/30/2015; Beaver Valley Power Station, Units 1 and 2; In-Plant Airborne Radioactivity Control and Mitigation, Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified two findings of very low safety significance (Green), one of 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: Initiating Events

- Green. A self-revealing finding was identified for FENOC's failure to perform maintenance on the Unit 2 feedwater heater drain system in accordance with FENOC's maintenance process, NOP-WM-4006, "Conduct of Maintenance." Specifically, FENOC did not adjust the 'A' first point feedwater heater normal and high level control valve (LCV) controllers to their specified setpoints. As a result, the 'A' heater and separator drain pumps tripped and this led to an unplanned power reduction from 100 percent to 60 percent reactor power on April 12, 2015. FENOC's corrective action included adjusting the setpoints of the LCV controllers to their specified setpoints and entering the issue into their corrective action program as condition report 2015-05088.

The performance deficiency was more-than-minor because it was associated with the Configuration Control attribute of the Initiating Events cornerstone, and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Additionally, the performance deficiency was similar to example 4.b in IMC 0612 Appendix E, in that failing to follow procedure caused a reactor transient. This finding was determined to be of very low safety significance (Green) because it did not cause a reactor trip and the loss of mitigation equipment. This finding has a cross-cutting aspect in the area of Human Performance, Training, because FENOC failed to ensure knowledge transfer to maintain a knowledgeable, technically competent workforce and instill nuclear safety values. Specifically, FENOC did not ensure that knowledge was adequate to perform maintenance on the 'A' first point feedwater heater LCVs [H.9]. (Section 4OA3)

### Cornerstone: Occupational/Public Radiation Safety

- Green. The inspectors identified a self-revealing NCV of Technical Specification 5.4.1, "Procedures," for FENOC's failure to utilize respiratory protection, as required by the applicable radiation work permit (RWP), for entry into the 722-foot elevation of the solid radioactive waste building on March 12, 2014. This resulted in the unplanned internal

exposure of one worker. Immediate corrective actions included reestablishing RWP controls of the area and entering this issue into their corrective action program as condition report 2015-06636.

The inspectors determined that the performance deficiency is more than minor because it affected the Program and Process attribute of the Occupational Radiation Safety cornerstone objective to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. The inspectors evaluated the finding using NRC Inspection Manual Chapter 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," and determined the finding to be of very low safety significance (Green) because it was not related to as low as (is) reasonably achievable (ALARA), did not result in an overexposure or a substantial potential for overexposure, and did not compromise the licensee's ability to assess dose. The finding has a cross-cutting aspect of Human Performance, Conservative Bias, in that individuals did not use decision making-practices that emphasized prudent choices over those that are simply allowable. Specifically, a radiation protection technician did not use conservative decision making practices and make prudent choices when entering an area with unknown radiological conditions. Examples of non-conservative decision making included: failure to wear respiratory protection when entering into unknown radiological conditions, the failure to complete and evaluate an air sample prior to entry, and not taking into account the adverse radiological conditions of the adjoining area above (735 foot elevation). [H.14] (Section 2RS3)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On April 15, 2015, operators inserted a manual reactor trip after the 'A' condensate pump tripped on overcurrent. Operators returned the plant to 48 percent power with one condensate pump in operation on April 17 and remained at that power until the plant shutdown for 1R23 on April 24. Operators returned the unit to 100 percent power on May 25. Operators performed a planned shutdown of the plant on June 13 to replace a power range detector. Operators returned the plant to 100 percent power on June 16 and remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On April 12, 2015, operators performed a rapid power reduction to 60 percent when the 'A' heater drain and 'A' separator drain pumps tripped due to 'A' first point feedwater heater level control issues. Operators returned to plant to 100 percent power on April 14 and remained 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 – 3 samples)

.1 Summer Readiness of Offsite and Alternate Alternating Current Power Systems

#### a. Inspection Scope

The inspectors performed a review of plant features and procedures for the operation and continued availability of the offsite and alternate alternating current (AC) power system to evaluate readiness of the systems prior to seasonal high grid loading. The inspectors reviewed FENOC's procedures affecting these areas and the communications protocols between the transmission system operator and FENOC. This review focused on changes to the established program and material condition of the offsite and alternate AC power equipment. The inspectors assessed whether FENOC established and implemented appropriate procedures and protocols to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system. The inspectors evaluated the material condition of the associated equipment by interviewing the responsible system engineer, reviewing condition reports and open work orders, and walking down portions of the offsite and AC power systems including the 345 kilovolt (kV) and 138 kV switchyards. Documents reviewed for each section of this inspection report are listed in the Attachment.

#### b. Findings

No findings were identified.



## .2 External Flooding

### a. Inspection Scope

During the week of April 13, 2015, the inspectors performed an inspection of the external flood protection measures for Beaver Valley Power Station. The inspectors reviewed technical specifications, procedures, and the Updated Final Safety Analysis Report (UFSAR), Chapter 2.3.3, 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 plant, including the intake structure, and Unit 1 primary grade water pump room and turbine building to ensure that FENOC erected flood protection measures in accordance with design specifications. The inspectors reviewed the latest piping penetration flood seal inspections for both units to ensure deficiencies were being identified and appropriately addressed. 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.

### b. Findings

No findings were identified.

## .3 Readiness for Impending Adverse Weather Conditions

### a. Inspection Scope

The inspectors reviewed FENOC's preparations for the onset severe weather due to high winds on April 21, 2015. 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 site and the switchyard to ensure that loose items that could impact essential systems including offsite power were being addressed. 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 personnel.

### b. Findings

No findings were identified.

## 1R04 Equipment Alignment

### .1 Partial System Walkdowns (71111.04 – 3 samples)

#### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1, 'B' train low head safety injection when the 'A' train was out of service for testing on April 3, 2015

- Unit 1, No. 2 emergency diesel generator (EDG) during the overhaul of No. 1 EDG on May 5, 2015
- Unit 1, 'A' train of residual heat removal following maintenance on May 10, 2015

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, 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

From May 4 through May 6, 2015, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 recirculation spray system 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, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems 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 condition reports and work orders 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 – 5 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 2, 'B' train 480 volt motor control center room, fire area PA-7, on April 2, 2015
- Unit 1, motor generator room, fire area MG-1, on April 20, 2015
- Unit 1, carbon dioxide storage and primary grade pump room, fire area CO-1 on April 22, 2015
- Unit 1, reactor containment building, fire area RC-1, on April 28, 2015
- Unit 1, fuel building, fire area FB-1, on May 1, 2015

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site 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 also focused on the Unit 2 auxiliary building, 735 foot elevation, which contains the component cooling water pumps to verify the adequacy of the assumptions made in the flooding calculation, the impact of flooding in other areas, and the adequacy of the drains to remove water from the area. The inspectors walked down the area to ensure that the descriptions of the area in the analysis were accurate.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 1 'A' reactor plant component cooling heat exchanger to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design bases for the component and verified FENOC's commitments to NRC Generic Letter 89-13. The inspectors observed the as-found condition of the heat exchanger and reviewed the results of inspection conducted on March 23, 2015. The inspectors discussed the results of the most recent inspection with engineering staff and

reviewed pictures of the as-found 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.

1R08 In-Service Inspection Beaver Valley Unit 1 (71111.08 – 1 sample)

a. Inspection Scope

From May 7 through May 12, 2015, the inspectors conducted a review of FENOC's implementation of in-service inspection (ISI) program activities for monitoring degradation of the reactor coolant system boundary, risk significant piping and components, and containment systems during the Beaver Valley Power Station, Unit 1, refuel outage (1R23). The sample selection was based on the inspection procedure objectives and risk priority of those pressure retaining components in these systems where degradation would result in a significant increase in risk. The inspection included a review of non-destructive examination (NDE) procedures and completed NDE records to verify that the non-destructive examination activities performed were conducted in accordance with the requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI, 2001 Edition, 2003 Addenda.

Nondestructive Examination and Welding Activities

The inspectors observed the following NDE activities and reviewed related procedures and data records:

ASME Code Required Examinations

- Manual Ultrasonic Test (UT), volumetric inspection of the pressurizer upper head to shell circumferential weld and a portion of the intersecting longitudinal weld;
- Manual UT of the residual heat removal system mixing "T", Drawing 8700-ISI-0075-A-5 per procedure NDE-UT-329, Revision 0, for Thermal Fatigue, per MRP-146 and MRP-192;
- Bare Metal Visual Examination video records of the reactor vessel upper head at the control rod drive mechanism penetrations; as examined by Procedure NDE-GP-106 (WDI-SSP-1287, Revision 2), reference ASME Code Case N-729-1;
- Computed (digital) Radiographic Examination Technique review and observation of a sample of current Radiographic Examination results;
- Review of UT examinations completed during the current refuel outage 1R23 on a previous Unit 1 containment liner plate repair;

- For liquid penetrant (PT) surface examination of the safety injection (SI) system, component SI-20-8-A-03, the inspectors reviewed the prior summary report 311700, and discussed the PT process parameters with the examiner to confirm the adequacy of the examination method. The inspection procedure, NDE-LP-101, Revision 23, and the examiner qualifications were compared to the requirements of ASME Code, Section XI;
- For visual (VT) surface examination of the SI system, support SI-20-R-75A, the inspectors reviewed the prior summary report 311800, and discussed the VT process parameters with the examiner to confirm the adequacy of the examination method. The inspection procedure, reference VT-501/502/503, and the examiner qualifications were compared to the requirements of ASME Code, Section XI;
- For Manual UT Erosion/Corrosion Examinations performed under the flow-accelerated corrosion (FAC) and erosion mechanisms program, the 1R23 examination scope was reviewed, and a sample of FAC measurements was examined. As operating experience concurrent with 1R23 showed an offsite FAC related elbow failure, the inspector confirmed that Beaver Valley Power Station staff evaluated the operating experience for applicability to the Beaver Valley Power Station site;
- The inspectors reviewed certifications of the NDE technicians performing the examinations and verified that the inspections were performed in accordance with approved NDE procedures and that the results were reviewed and evaluated by certified Level III NDE personnel.

#### Re-examination of an Indication Previously Accepted for Service after Analysis

There were no samples available for review during this inspection that involved examinations with recordable indications that had been accepted for continued service following the previous Unit 1 1R22 outage.

#### Modification/Repair/Replacements Consisting of Welding on Pressure Boundary Risk Significant Systems

In the area of welding, the inspectors observed replacement welds in the plant, reviewed the work packages, weld planning, welding procedures and controls on welding for replacements of pipe to pipe, pipe to valve welds and socket welds. The radiographs and radiography reports for the butt welds were reviewed for consistency to the ASME Code Sections V and III and the radiographic procedure NDT 100-RT-002, Revision 8.

#### Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors reviewed VT criteria, the VT procedure and the photographic records of the visual inspections done for the full circumference of each control rod drive mechanism reactor vessel upper head penetration during 1R23 as viewed on the top of the reactor pressure vessel head.

### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the boric acid corrosion control (BACC) program, which is performed in accordance with Beaver Valley Power Station procedures, and sampled photographic inspection records of boric acid observed on safety significant piping and components inside the containment structure during walkdowns conducted by FENOC personnel which was directly observed by the NRC Resident Inspectors.

The inspectors reviewed the identification and documentation of non-conforming conditions of boric acid leaks in the corrective action program with a focus on areas that could cause degradation of safety significant components. The inspectors discussed the program requirements and plant BACC activities with the BACC program owner. Photographic inspection records of identified boric acid leakage locations were reviewed with attention to the mitigation and evaluation plans. The inspectors reviewed a sample of condition reports for evaluation and disposition within the corrective action program. Samples selected were based on component function, significance of leakage, and location where direct leakage or impingement on adjacent locations could cause degradation of safety system function.

The inspectors verified that potential deficiencies identified during the walkdowns were entered into the corrective action program and either corrected or scheduled for mitigation prior to plant restart. The inspectors also reviewed the associated engineering evaluations for the above condition reports to verify that equipment or components that were wetted or impinged upon by boric acid solutions were properly analyzed for degradation that might impact their function.

### Steam Generator Tube Inspection Activities

No eddy current inspections were required or performed of the Beaver Valley Power Station Unit 1 steam generator tubes during 1R23 refueling outage.

### Identification and Resolution of Problems

The inspectors reviewed a sample of condition reports which identified NDE indications, deficiencies and other nonconforming conditions since the previous refueling outage. The inspectors verified that nonconforming conditions were properly identified, characterized, evaluated, corrective actions identified and dispositioned, and appropriately entered into the corrective action program.

#### b. Findings

No findings were identified.

### 1R11 Licensed Operator Requalification Program

#### .1 Quarterly Review of Licensed Operator Requalification Testing and Training (71111.11Q – 1 sample)

##### a. Inspection Scope

The inspectors observed Unit 1 licensed operator simulator training on May 27, 2015, which included a reactor trip and turbine failure to trip, a stuck open power operated relief valve, a failure of both EDGs, and a loss of offsite power. 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 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 (71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed and reviewed a reactor startup on Unit 1 following an outage on May 23, 2015. The inspectors observed the control rod withdrawal to reactor criticality, the crew's response to control rod position indication deviations, the infrequently performed test or evolution briefing, and reactivity control briefings to verify that the briefings met the criteria specified in NOP-OP-1002, "Conduct of Operations," Revision 10. 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.

.3 Annual Review of Regualification Examination Results (71111.11A – 1 sample)

a. Inspection Scope

On June 22, 2015, a region-based inspector conducted an in-office review of results of FENOC-administered biennial written examination tests for 2015, for Beaver Valley Power Station, Unit 2 operators. The annual requalification operating examination has not yet been administered in 2015. The inspection assessed whether Pass/Fail rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Regualification Human Performance Significance Determination Process." The review verified that the failure rate (individual or crew) did not exceed 20 percent. Zero out of 42 operators failed the Biennial Written Examination. The overall individual failure rate was 0.0 percent.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, or component (SSC) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, 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, 480 volt station service system on May 6, 2015
- Unit 2, main steam system on June 12, 2015

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, emergent work on the service water system due to a leak on the turbine plant component cooling water bypass line on April 12, 2015



- Unit 2, unplanned maintenance on the No. 2 EDG following a secondary process rack card failure on April 20, 2015
- Unit 1, 1R23 outage defense-in-depth report on April 24, 2015
- Unit 1, lowered RCS inventory on April 29, 2015
- Unit 1, Yellow defense-in-depth for AE bus and both trains of the supplemental leak collection and release system being removed from service on May 6, 2015
- Unit 1, lowered RCS inventory on May 12, 2015

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 1, turbine driven auxiliary feedwater pump outboard oiler water intrusion on April 16, 2015
- Unit 1, 'B' steam generator feedwater bypass flow control valve slow stroke time on April 18, 2015
- Unit 1, Husky bus cable inspection and tan delta testing results from transformer TR-1A on May 12, 2015
- Unit 1, core exit thermocouple assembly degraded insulation on May 19, 2015
- Unit 1, SOV-1RC-105, reactor vessel head vent valve exceeded closed stroke time on May 19, 2015
- Unit 1, PCV-1RC-456, power operated relief valve closed stroke time outside of the acceptable range on May 19, 2015
- Unit 1, 'A' motor driven auxiliary feedwater pump breaker failure to close on May 21, 2015

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

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)Permanent Modificationsa. Inspection Scope

The inspectors evaluated a modification to the Unit 1 'A' reactor coolant pump (RCP) implemented by engineering change package 11-0698, "Reactor Coolant Pump Shutdown Seal." The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change, including replacement of the 'A' RCP number 1 seal with a Generation III Westinghouse Shutdown Seal and removal of the floating ring seals. The inspectors also reviewed revisions to the control room alarm response procedure and interviewed engineering and operations personnel to ensure the procedure could be reasonably performed.

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 1, No. 1 EDG turbocharger and power pack replacements on May 11, 2015
- Unit 1, battery charger 1-1 overhaul on May 12, 2015
- Unit 1, '1B' inside recirculation spray pump motor replacement on May 12, 2015
- Unit 1, weld repairs on the 24" river water line to the recirculation spray heat exchangers on May 21, 2015
- Unit 1, diverse and flexible coping strategies piping modifications to the 'A' auxiliary feedwater system, river water system to the component cooling reactor heat exchangers, and demineralized water storage tank and 480 V disconnect modification to the emergency diesel bus E-07 on May 26, 2015
- Unit 1, 'B' steam generator main feedwater regulating valve actuator overhaul on May 27, 2015
- Unit 1, system station service transformer bushing replacement on May 29, 2015

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 maintenance and refueling outage (1R23), which was conducted April 25 through May 24, 2015. The inspectors reviewed FENOC's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Monitoring of decay heat removal operations
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls including: flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of secondary containment as required by technical specifications
- Refueling activities, including fuel handling and fuel receipt inspections
- Fatigue management
- Tracking of startup prerequisites, walkdown of the primary containment to verify that debris had not been left which could block the emergency core cooling system suction strainers, and startup and ascension to full power operation
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 8 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:

- 1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 69, and 1OST-36.22, Diesel Gen. No. 2 Simulated Undervoltage Start Signal, Revision 10, on April 8, 2015
- 2OST-24.4, Steam Driven Auxiliary Feed Pump [2FWE\*P22] Quarterly Test, Revision 78, on April 21, 2015 (In-Service Testing (IST))
- 1BVT 1.21.2, Trevitest Method for Main Steam Safety Valve Setpoint Check, Revision 16, on April 23, 2015
- 1OST-36.3, Diesel Generator No. 1 Automatic Test, Revision 34, on April 26, 2015
- 1OST-11.14A, Low Head Safety Injection Full-Flow Test, Revision 30, on May 1, 2015 (IST)
- 1BVT 1.47.5, Type C Leak Test (Penetration 55-4, TV-1SS-111A1, TV-1SS-111A2), Revision 27, on May 1, 2015 (Containment Isolation Valve)
- 1BVT-01.39.3, Station Battery [BAT-3] Service Test, Revision 6, on May 7, 2015, and 1BVT 1.39.7, Station Battery [BAT-2] Performance Discharge Test, Revision 7, on May 19, 2015
- 2OST-6.2A, Computer Generated Reactor Coolant System Water Inventory Balance, Revision 33, on May 28, 2015 (RCS leak detection)

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation (71114.06 – 1 sample)

.1 Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for Unit 1 licensed operators on May 27, 2015, 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 – 1 sample)

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 (RP) program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors reviewed recent plant radiation surveys and any changes to plant operations since the last inspection to identify any new radiological hazards for onsite workers or members of the public.

Instructions to Workers

The inspectors observed several containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements. The inspectors reviewed several occurrences where a worker's electronic personal dosimeter alarmed. The inspectors reviewed FENOC's evaluation of the incidents, documentation in the corrective action program, and whether compensatory dose evaluations were conducted when appropriate.

Contamination and Radioactive Material Control

The inspectors observed the monitoring of potentially contaminated material leaving the radiological control area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material. The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with requirements.

### Radiological Hazards Control and Work Coverage

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, RWPs, worker radiological briefings, the use of continuous air monitoring and dosimetry monitoring were consistent with radiological 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 (LHRAs) and very high radiation areas (VHRA) to verify conformance with the occupational performance indicator.

### Risk-Significant HRA and VHRA Controls

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

### Problem Identification and Resolution

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

#### a. 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 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 Power Station's 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

The inspectors selected the following radiological work activities for review:

- 115-4018, Reactor Disassembly/Reassembly
- 115-4028, Scaffolding
- 115-4021, Move Head/Upper Internals
- 115-4007, Outage Construction Maintenance
- 115-4023, In-Service Inspection Insulation

For each of these activities, the inspectors reviewed: ALARA work activity evaluations, exposure estimates, exposure reduction requirements, results achieved (dose rate reductions), and person-hour estimates and results achieved.

#### Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the current annual collective dose estimate; basis methodology; and measures to track, trend, and reduce occupational doses for ongoing work activities.

#### Source Term Reduction and Control

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

#### Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls were identified at an appropriate threshold and properly addressed in the corrective action program.

#### b. Findings

No findings were identified.

### 2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 – 1 sample)

#### 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-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

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

### Use of Respiratory Protection Devices

The inspectors reviewed the adequacy of FENOC's use of respiratory protection devices in the plant to include applicable ALARA evaluations, respiratory protection device certification, respiratory equipment storage, air quality testing records, and individual qualification records.

#### b. Findings

Introduction. The inspectors identified a self-revealing, Green, NCV of Technical Specification 5.4.1, "Procedures," for FENOC's failure to utilize respiratory protection, as required by the RWP, for entry into the 722-foot elevation of the solid radioactive waste building on March 12, 2014.

#### Description.

On March 12, 2014, at approximately 1130 hours, a radiation protection technician (RPT) entered the 722-foot elevation of the solid radioactive waste building to conduct an initial radiation and contamination survey and to take some photographs of the work area. This area of the solid radioactive waste building had not been accessed since the 1980's. The RPT utilized RWP 114-1030 which was approved for use on December 10, 2013. The RWP was written in support of the installation of a new demineralizer system in the solid radioactive waste building. Task 4 of that RWP was developed for radiation protection staff support of the work and was classified as "medium" radiological risk. The RWP's scope included the 722-foot elevation of the solid radioactive waste building. The "Respiratory Requirements" section of Task 4 specifies: "AP FFACE CONDITIONAL" (i.e., air purifying full-face respirator, with some conditions). However, the level of airborne radioactivity was not assessed prior to the RPT entry and the RPT did not wear respiratory protection during the entry. The inspectors concluded that the RPT failed to follow the requirements of the RWP which resulted in the unintended internal radiation exposure to the RPT.

The inspectors noted that FENOC radiation protection personnel had several opportunities to ensure adequate radiation protection prior to entry into the 722-foot elevation of the solid radioactive waste building. For example, a recent contamination survey taken of pump motors on the 735-foot elevation above this location prior to the RPT entry, revealed removable alpha contamination levels of 173 and 200 disintegrations per minute (dpm)/100 centimeters (cm)<sup>2</sup>, which provided the RPT with indications of significant alpha contamination in the area (an internal exposure hazard). A level greater than 200 dpm/100 cm<sup>2</sup> removable alpha contamination is the threshold at which, per FENOC procedures, work in the area would be classified as "high" radiological risk. The 735-foot elevation and the 722-foot elevation are only separated by open floor grating. Also, the collection of an area air sample was started prior to the entry to the 722-foot elevation. However, the air sample was not completed and assessed prior to the RPT entry.

The initial count of the area air sample, at 1230 hours that day, warranted further analysis and RP supervision was notified. Subsequent gamma spectroscopy analysis identified Cobalt-60 and Cesium-137 in the air sample. Upon completion of the survey on the 722-foot elevation, removable surface contamination levels were found to exceed the threshold for high radiological risk, with one smear measuring 256 dpm/100cm<sup>2</sup> alpha and 160 mrad beta-gamma.



On March 14, 2014, at 1830 hours, alpha analysis of the work area air sample measured 3.79 derived air concentration (DAC) for the alpha component of the sample. On March 15, 2014, at 0530 hours, a recount of the area air sample revealed an alpha level of 4.47 DAC, which indicated significant airborne radioactivity existed during the RPT entry into the area on March 12, 2014.

On March 17, 2014, the affected RPT's potential internal exposure was assessed via whole-body-counting as < 10 mrem committed effective dose equivalent (CEDE). A subsequent internal exposure evaluation, which used the air sample result and included hard-to-detect radionuclides, assigned 2.1 mrem CEDE internal exposure to the RPT.

FENOC's immediate corrective actions included reinforcing the RWP respiratory protection requirements for entries into this work area and entering this issue into their corrective action program for further evaluation.

Analysis. The failure to use respiratory protection as required by RWP 114-1030, Revision 0, Task 4, during initial entry into an area of unknown radiological conditions is a performance deficiency that was reasonably within FENOC's ability to foresee and correct. The inspectors determined that the performance deficiency is more than minor because it affected Program and Process attribute of the Occupational Radiation Safety cornerstone objective to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Specifically, the failure to use respiratory protection resulted in the unintended internal exposure of a worker. The inspectors evaluated the finding using NRC Inspection Manual Chapter 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," and determined the finding to be of very low safety significance (Green) because it was not related to ALARA, did not result in an overexposure or a substantial potential for overexposure, and did not compromise the licensee's ability to assess dose. A single worker was affected by the event, and the estimated internal dose to the worker was a small fraction of the annual occupational exposure limit.

The finding has a cross-cutting aspect of Human Performance, Conservative Bias, in that individuals did not use decision making-practices that emphasize prudent choices over those that are simply allowable. Specifically, a radiation protection technician did not use conservative decision making practices when entering an area with unknown radiological conditions. Examples of non-conservative decision making included: the failure to wear respiratory protection for an initial entry into unknown radiological conditions, the failure to complete and evaluate an air sample prior to entry, and not taking into account the adverse radiological conditions of the adjoining area above (735 foot elevation). (H.14)

Enforcement. Technical Specification 5.4.1 requires that written procedures shall be established, implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 1. RWPs and ALARA procedures are specified in Appendix A. Procedure NOP-OP-4107, "Radiation Work Permit," Revision 14, in Section 4.1.5, specifies that Radiation Workers are responsible for reading, understanding, and adhering to the RWP requirements and the applicable ALARA Plan.

RWP 114-1030, Revision 0, Task 4 specified the use of respiratory protection for work on the 722-foot elevation of the solid radioactive waste building. Contrary to this requirement, respirators were not worn for the RPT initial entry into the 722-foot elevation on March 12, 2014, resulting in an unplanned and unintended internal radiation exposure. Immediate corrective actions included reestablishing RWP controls within one hour after the high airborne radioactivity was identified and entering this issue into the corrective action program (condition report 2015-06636). Because this issue is of very low safety significance (Green) and FENOC entered this issue into their corrective action program, this finding is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000334/2015002-01; 05000412/2015002-01, Failure to Utilize Respiratory Protection as Specified by the Radiation Work Permit)**

2RS4 Occupational Dose Assessment (71124.04 – 1 sample)

a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR 20, applicable 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

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.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled FENOC’s submittals for the Safety System Functional Failures performance indicator for both Unit 1 and Unit 2 for the period of April 1, 2014, through March 31, 2015. To determine the accuracy of the performance indicator data reported

during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed FENOC's operability assessments, condition reports, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

The inspectors reviewed licensee submittals for the occupational radiological occurrences performance indicator for April 1, 2014, through March 31, 2015. The inspectors used performance indicator definitions and guidance contained in NEI Document 99-02, Revision 7, to determine the accuracy of the performance indicator data reported. The inspectors reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized performance indicator occurrences. The inspectors conducted walk-downs of various LHRA and VHRA entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

.3 Reactor Coolant System (RCS) Specific Activity and RCS Leak Rate (4 samples)

a. Inspection Scope

The inspectors reviewed FENOC's submittal for the RCS specific activity and RCS leak rate performance indicators for both Unit 1 and Unit 2 for the period of April 1, 2014, through March 31, 2015. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements of RCS leakage, and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the RCS identified leakage rate, as well as chemistry personnel taking and analyzing an RCS sample.

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 condition report screening meetings.

###### b. Findings

No findings were identified.

##### .2 Annual Sample: Rubber Expansion Joint Program, Follow-up of Selected Issues

###### a. Inspection Scope

The inspectors performed a follow-up in-depth review of the rubber expansion joint issue discussed in integrated inspection report 2013003 that resulted in inoperability of the Unit 1 safety related river water system. The review identified six deficiencies. For the current in-depth review, the inspectors reviewed the corrective actions associated with condition reports 2013-05914, 05915, 05916, 05924, 05925, and 05926, which were generated as a result of the deficiencies identified.

The inspectors assessed FENOC's corrective actions to determine whether the corrective actions were timely and appropriately addressed the issue. The inspectors compared the actions taken in accordance with the requirements of FENOC's corrective action program and 10 CFR 50, Appendix B, "Corrective Action." In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

###### b. Findings and Observations

No findings were identified.

Inspectors had previously identified that FENOC's preventive maintenance (PM) deferral procedure did not include industry or vendor recommended compensatory measures when PMs were deferred beyond the grace period. FENOC's corrective action to address this issue was to update the rubber expansion joint program procedure to include additional inspections or testing on the expansion joints with deferred PMs.

FENOC implemented several corrective actions to address that training was not performed on the lessons learned from rubber expansion joint service life extensions. FENOC provided training on the design, construction, and inspection of rubber

expansion joints. FENOC also realized that they did not have adequate technical justification to extend the PM interval and changed the PM interval back to its original frequency. Additionally, FENOC is performing microwave inspections of non-safety related rubber expansion joints to develop a database to justify extending PM intervals.

Some replacement dates for rubber expansion joints in the PM program matrix were incorrect because they were based on “field complete” work order dates rather than actual installation dates. FENOC’s corrective actions included updating the rubber expansion joint database to reflect the actual installation dates and revising the rubber expansion joint installation procedure to add a line item for an installation date signature.

FENOC’s corrective action to assure timely review of outage-related PM deferrals is included in FENOC’s outage management procedure as pre-outage milestone 23 which requires approval of PM deferrals 24 weeks prior to the start of an outage.

FENOC’s procedures for implementing PM frequency changes did not address PMs that were already scheduled. FENOC revised their work management PM process procedure to have the initiator identify open orders associated with the PM and post a restraint on the order. Planning will incorporate the PM revision into open orders.

The rubber expansion joint for the switchgear cooling condenser pumps discharge line to the unit 1 switchgear chillers was degraded. FENOC’s corrective actions included replacing the rubber expansion joint with a modified design that included spring washers on the rubber expansion joint control rods to better absorb axial loading and installing a pipe support on the vertical piping downstream of the rubber expansion joint to limit the vertical forces on the rubber expansion joint.

In summary, the inspectors determined that FENOC’s corrective actions were appropriate. In addition, the inspectors verified that the corrective actions were completed within the timeframes specified in NOP-LP-2001, “Corrective Action Program.”

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 3 samples)

##### .1 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. 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 2, rapid power reduction to 60 percent power on April 12, 2015, when the 'A' heater drain and separator drain pumps tripped due to 'A' first point feedwater heater level control issues.
- Unit 1, manual reactor trip on April 15, 2015, due to 'A' condensate pump trip.
- Unit 1, planned outage on June 13, 2015, to replace the N43 power range detector.

b. Findings

Introduction. A Green self-revealing finding was identified for FENOC's failure to perform maintenance on the Unit 2 feedwater heater drain system in accordance with FENOC's maintenance process, NOP-WM-4006, "Conduct of Maintenance." Specifically, FENOC did not adjust the 'A' first point feedwater heater normal and high LCV controllers to their specified setpoints. As a result, the 'A' heater and separator drain pumps tripped and this led to an unplanned downpower from 100 percent to 60 percent reactor power.

Description. On April 12, 2015, Unit 2 was operating at 100 percent reactor power when control room operators received the annunciator "1ST POINT FW HTR 21A/LEVEL HIGH/LOW" and observed 'A' first point feedwater heater level indicator oscillating between 14 and 30 inches. As the heater reached the high level switch setpoint, the high LCV failed open and dumped inventory to the main condenser causing heater level to lower. As heater level lowered below the switch setpoint, the high LCV shut and the normal LCV modulated closed. The high LCV continued cycling open and closed which started a diverging heater level oscillation, and resulted in the downstream 'A' heater drain receiver tank being starved of inventory. Level in the 'A' heater drain receiver tank lowered past the Lo-Lo level setpoint initiating a trip of the 'A' heater drain pump and 'A' separator drain pump. The 'C' condensate pump automatically started to maintain adequate suction pressure for the main feedwater pumps. Operators entered abnormal operating procedure 2OM-53C.4.2.51.1, "Unplanned Power Reduction," and reduced reactor power to 60 percent.

The expected system operation is for the 'A' first point feedwater heater level to be maintained by the normal LCV. The valve will modulate and divert water to the 'A' heater drain receiver tank as necessary to maintain level at the programmed setpoint. If 'A' first point feedwater heater level rises and reaches the high LCV controller setpoint, the valve modulates open to divert water to the main condenser. If level continues to rise, a high level bistable switch will fully open the high LCV.

FENOC's investigation determined that both the normal and high level controllers were set above their specified setpoints. The normal LCV was unable to control level in the 'A' first point feedwater heater on April 12, 2015 due to a suspected positioner issue. The high LCV controller setpoint was set above the high level bistable setpoint, so instead of high LCV modulating open, the high level bistable fully opened and then shut the valve in attempt to maintain level in the 'A' first point feedwater heater. This led to the diverging level oscillations and initiated the event. FENOC technicians are formally trained to tune controllers so that level is controlled as specified in the setpoint documents. FENOC considers this task to be "skill-of-the-craft." Sometime between April 2011 and November 2012, the normal and high LCV controllers were not adjusted to their setpoints as specified in setpoint documents SPD-2FWS-LC103A2 and SPD-2FWS-LC103A1, respectively. The inspectors determined that this was not in

accordance with NOP-WM-4006, "Conduct of Maintenance," step 4.2.9, which states that "Craftsman perform the preventive and corrective maintenance in accordance with the site process."

The inspectors noted that FENOC also determined that the preventive maintenance work order instructions for the normal and high LCV controllers are inadequate in that they do not contain specific steps to verify or adjust the controllers to the specified setpoints, and if a calibration is performed, the work order subsequently returns the controller settings to the as-found values.

FENOC's corrective action included adjusting the setpoints of the LCV controllers to their specified setpoints and entering the issue into their corrective action program as condition report 2015-05088.

Analysis. The inspectors determined that failure to perform maintenance on the Unit 2 feedwater heater drain system, in accordance with NOP-WM-4006, 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 Configuration Control attribute of the Initiating Events cornerstone, and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, setting the 'A' first point heater normal and high LCV controllers outside of their specified setpoints led to an unplanned power reduction of 40 percent reactor power. Additionally, the performance deficiency was similar to the "not minor if" statement in example 4.b in IMC 0612, Appendix E, "Examples of Minor Issues," dated August 11, 2009, in that failing to follow procedure caused a reactor transient.

The inspectors evaluated this finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012, and IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012. Using IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions," this finding was determined to be of very low safety significance (Green) because it did not cause a reactor trip and the loss of mitigation equipment.

This finding has a cross-cutting aspect in the area of Human Performance, Training, because FENOC failed to ensure knowledge transfer to maintain a knowledgeable, technically competent workforce and instill nuclear safety values. Specifically, FENOC did not ensure that knowledge was adequate to perform maintenance on the 'A' first point feedwater heater LCVs [H.9].

Enforcement. This finding does not involve enforcement action because no violation of a regulatory requirement was identified. NOP-WM-4006 is not a procedure recommended by Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, and the work being performed was not on a safety-related system. FENOC entered this issue into their corrective action program as condition report 2015-05088. Because this finding did not involve a violation and was of very low safety significance (Green), it is identified as a FIN. **(FIN 05000412/2015002-02, Failure to Perform Maintenance in Accordance with Licensee Maintenance Process)**

**4OA6 Meetings, Including Exit**

On July 24, 2015, the inspectors presented the inspection results to E. Larson, 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

E. Larson	Site Vice President
C. McFeaters	Site Operations Director
R. Boyle	Superintendent, Construction Services
G. Buck	ISI/NDE, Level III Contractor
A. Delmonico	Mechanical Maintenance Supervisor
P. Deluca	Maintenance Mechanic
M. Dugovich	Plant Operator
J. Earle	Advanced Nuclear Specialist
R. Ferrie	Electrical Maintenance Supervisor
M. Gorham	System Engineer
D. Grabski	ISI Coordinator
T. Heimel	ISI/NDE, Level III Contractor
S. Hughes	Decontamination Technician
P. Johnson	Safety & Human Performance Manager
R. Klindworth	Maintenance Manager
D. Jones	IST Coordinator
L. Kalkstein	RCP Shutdown Seal Engineer
M. Kienzle	System Engineer
D. Kozina	Radiation Protection Technician
J. Kunz	Instrumentation and Control Superintendent
D. Meskel	Component Engineer
J. Miller	Fire Marshall
M. Morgan	Operations Instructor
J. Ostroski	Heat Exchanger Engineer
J. Pritt	Radiation Protection Technician
A. Reardon	System Engineer
M. Reese	Radiation Protection Technician
B. Sepelak	Regulatory Compliance Supervisor
D. Sharbaugh	Outage Manager
J. Tolbert	Licensed Operator Continuing Training Supervisor
J. Walsh	Radiation Protection Technician
T. White	Weld Engineer
D. Wilson	AOV Engineer

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

05000334/2015002-01	NCV	Failure to Utilize Respiratory Protection as Specified by the Radiation Work Permit (Section 2RS3)
05000412/2015002-01		

05000412/2015002-02

FIN

Failure to Perform Maintenance in accordance  
with Licensee Maintenance Process (Section  
4OA3)

## LIST OF DOCUMENTS REVIEWED

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

#### Procedures

1BVT 1.33.07, Flood Seal Visual Inspection, Revision 5  
2BVT 1.33.07, Flood Seal Visual Inspection, Revision 4  
1/2OM-35.4A.A, Voltage Schedule Guidance, Revision 11  
1/2OM-53C.4A.75.1, Acts of Nature – Severe Weather, Revision 17  
1/2OM-53C.4A.75.2, Acts of Nature – Flood, Revision 31

#### Work Orders

200562438    200562439

#### Condition Reports

2014-11303    2014-12981    2014-14493

#### Miscellaneous

Unit 1 4KV Station Service System Health Report, 2014-2  
Unit 1 Electrical Grid Equipment BV/MI System Health Report, 2014-2  
Unit 1 Main Generator and Transformer System Health Report, 2014-2  
Unit 2 4KV Station Service System Health Report, 2014-2  
Unit 2 Beaver Valley Substation System Health Report, 2014-2  
Unit 2 Main Generator and Transformer System Health Report, 2014-2

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

#### Procedures

1OM-10.3.B.1, Valve List – 1RH, Revision 8  
1OM-11.3.B.1, Valve List – 1SI, Revision 20  
1OM-13.1.B, Summary Description, Revision 3  
1OM-13.3.A, System and Component Arrangement, Revision 5  
1OM-13.3.B.2, Valve List – 1RS, Revision 7  
1OM-13.3.C, Power Supply and Control Switch List, Revision 7  
1OM-30.3.B.1, Valve List – 1RW, Revision 48  
1OM-36.3.B.1, Valve List – 1DA, Revision 7  
1OM-36.3.B.2, Valve List – 1DCW, Revision 4  
1OM-36.3.B.3, Valve List – 1DLO, Revision 5  
1OM-36.3.B.4, Valve List – 1EE, Revision 4  
1OM-36.3.B.5, Valve List – 1FO, Revision 9

#### Condition Reports

2013-11267    2013-12168    2013-13671    2013-16225    2013-16340    2013-16512  
2014-18627    2015-00270    2015-06280    2015-06341

Maintenance Orders/Work Orders  
200560561

Miscellaneous  
RM-0413-002, Valve Oper No Diagram – Containment Depressurization System, Revision 13

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

Miscellaneous  
1PFP-FULB-735-766, Fuel Building, Fire Area FB-1, Revision 3  
1PFP-PWSB-713, CO2 Storage and PG Pump Rooms, Fire Area CO-1, Revision 0  
1PFP-RXBX-692, Reactor Containment Building, Fire Area RC-1, Revision 2  
1PFP-RXBX-718, Reactor Containment Building, Fire Area RC-1, Revision 2  
1PFP-RXBX-738, Reactor Containment Building, Fire Area RC-1, Revision 2  
1PFP-RXBX-767, Reactor Containment Building, Fire Area RC-1, Revision 2  
1PFP-SRVB-713-MOTOR, Motor Generator Room, Fire Area MG-1, Revision 1  
2PFP-PAB-755-Purple MCC Room Fire Area PA-7, Revision 0  
Unit 1 Updated Fire Protection Appendix R Review, Revision 31

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

Procedures  
2OM-53C.4.2.15.1, Loss of Primary Component Cooling Water, Revision 4  
2OM-9.4.AAI, Auxiliary Building Sump Level High, Revision 2

Miscellaneous  
211-N-265, Flooding Analysis Outside Containment, Revision 6

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

Procedures  
1/2-ADM-2106, River/Service Water System Control and Monitoring Program, Revision 5

Miscellaneous  
Heat Exchanger Inspection Report for BV-1CC-E-1A

Condition Reports  
2015-04589 2015-04724

### **Section 1R08: In-service Inspection**

Procedures  
ADM-2205, Flow-Accelerated Corrosion (FAC) and Erosion Mechanisms (EM) Program,  
Revision 3  
NDE-GP-101, Requirements for Data Recording, Revision 14  
NDE-GP-104, Requirements for Reference Points for Data Recording Unit1, Unit 2  
NDE-UT-306, Manual Ultrasonic Examination of Vessel Welds Greater Than 2" Thickness,  
Revision 11  
NDE-UT-329, Ultrasonic Examination of Small-Diameter Piping Butt Welds and Components for  
Thermal Fatigue, Revision 0  
NDE-VT-503, Visual Examination Requirements for Component Supports, Revision 24

NDT 100-RT-002, Computed Radiographic Examination in Accordance with ASME Section V,  
Article 2, Revision 8  
NOP-ER-2001, Boric Acid Control Program, Revision 11  
WDI-SSP-1287, Reactor Vessel Head Penetration Remote Visual inspection for Beaver  
Valley, Unit 1, Revision 2

NDE Records

BOP-VE-15-001, 002, 003, 004, and 005 Radiograph Examination reports, 3-inch diameter, pipe  
to valve welds 11 and 12

Miscellaneous

Drawing 8700-ISI-C-002 Q, Revision 1; Pressurizer Shell UT Calibration Block  
Notifications 600967687 and 8, Document Change Requests to show acceptance of tack welds  
Report No. UT-15-1001, 1CNMT-Liner-1R22, 14"x 17" replaced area.  
Report No. UT-15-1033 for component RH-12-602-Q2, Mixing Tee, 12" pipe  
Report No. UT-15-1037, RC-TK-1-L-3, Longitudinal Weld, 4.4" thick, pressurizer shell  
Report No. UT-15-1038, RC-TK-1-C-7, Circ Weld, 4.4" thick, pressurizer upper head to shell  
Report Nos. UT-15-1003-8, Socket welded 2" pipe drain lines, various components, RC-1502  
Report Nos. UT-15-1009-12, Butt welds, 6" pipe drain lines, various components, RC-1502  
UT Thermal Fatigue Scope for Mixing T component RH-12-3-F-01, Per MRP-192 and MRP-146  
Weld Data sheet for 1-WR-20-R1 on line 24"-WR-151-Q3, Work Order 200623134  
Weld Data sheet for FW-12 on line 3"-SDHV-3-601-Q2, Work Order 200532584  
Weld Data sheet for FW-14A, component 1RW-164, Work Order 200504138  
Weld Data sheet for FW-2A, component 1RW-165, Work Order 200504141  
Weld Data sheet for WR-16-F-1R on line 30"-WR-17-151-Q3, Work Order 200615382

Condition Reports

2015-06216   2015-06217   2015-06562   2015-06671   2015-06762   2015-06782  
2015-06795   2015-06803

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

Procedures

1RST-2.1, Initial Approach to Criticality after Refueling, Revision 16  
NOBP-OP-0002, Operations Briefings and Challenge Calls, Revision 3  
NOBP-OP-0007, Conduct of Infrequently Performed Tests or Evolutions, Revision 5  
NOP-OP-1002, Conduct of Operations, Revision 10

Miscellaneous

1LOCT-ES-1.1.001, Licensed Operator Training Simulator Scenario, Revision 0

**Section 1R12: Maintenance Effectiveness**

Procedures

NOP-ER-3004, FENOC Maintenance Rule Program, Revision 2

Condition Reports

2007-31411	2012-08908	2012-09987	2012-15111	2012-14437	2012-14529
2012-14841	2012-15520	2012-16179	2012-16405	2012-17261	2012-17361
2013-00063	2013-00098	2013-01108	2013-10323	2013-10409	2013-11132
2013-13130	2013-14295	2013-19256	2013-19514	2014-09116	2014-09135
2014-09149	2014-12969	2014-14962	2014-16599	2014-16662	2014-17624
2014-17770	2014-18677				

Work Orders

200422383	200526285
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Miscellaneous

10080-US(P)-289, Beaver Valley Unit 2 (DMW) SGTR Margin to Overfill Reanalysis for Decay Heat Issue, Revision 0  
 DMC-10080-0068, Flow Capacity of Atmospheric Steam Dump and Decay Heat Release Valves, Revision 0  
 Maintenance Rule System Basis Document, Unit 2 System 21, Revision 8  
 Maintenance Rule System Basis Document, Unit 2 System 37, Revision 6  
 Unit 2 480 Volt Station Service System Health Report 2014-2  
 Unit 2 Main Steam System Health Report 2014-2

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

1/2-ADM-0804, On-Line Risk Assessment and Management, Revision 12  
 1OM-20.4E, Draining the Refueling Cavity, Revision 38  
 1OM-6.4N, Draining the RCS for Refueling, Revision 25  
 NOBP-OP-0007, Conduct of Infrequently Performed Tests or Evolutions, Revision 05  
 NOP-OP-1005, Shutdown Defense-In-Depth, Revision 14  
 NOP-OP-1007, Risk Management, Revision 20

Condition Reports

2015-05057	2015-05550
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Miscellaneous

1R23, Pre-Outage Defense-in-Depth Report

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

NOP-ER-4002, Medium Voltage Shielded Cable Testing and Diagnostics, Revision 0  
 NOP-OP-1009, Operability Determinations and Functionality Assessments, Revision 5

Condition Reports

2008-42790	2014-16358	2014-26901	2015-05312	2015-05467	2015-06124
2015-06178	2015-06644	2015-06657	2015-06674	2015-07049	2015-07158
2015-07271					

Maintenance Orders/Work Orders

200542923	200594361	200621506	200589315
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Miscellaneous

Notification 600969728

**Section 1R18: Plant Modifications**Procedures

1OM-53.C.4.1.6.8, Abnormal RCP Operation, Revision 16

NOP-LP-4003, Evaluation of Changes, Tests and Experiments, Revision 7

Miscellaneous

03.031-0032, Model 93ANS RCP Seal High Temp O-Rings, Revision 3

03.031-0033, Model 93ANS RCP Seal High Temp O-Rings, Revision 3

11-0698-000, Reference Documents for ECP-11-0698 – Reactor Coolant Pump Shutdown Seal, Revision 2

11-0698-001, Implementation Documents for ECP-11-0698 – Install RCP Shutdown Seal / Remove Floating Ring Seal for 1RC-P-1A, Revision 1

11-6098-001-ADL, Affected Documents List for ECP-11-0698, Revision 1

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

1BVT 1.13.5, Inside Recirculation Spray Pump Test, Revision 28

1BVT 1.39.14, Station Battery Charger [BAT-CHG1-1A and BAT-CHG1-1B] Load Test, Revision 5

1CMP-24FW-FEED REG-1I, Main Feedwater Regulating Valve Actuator Installation and Removal, Revision 1

1OM-36.4.C, System Station Service Transformer 1A Startup, Revision 9

1OST-1.10K, Cold Shutdown Valve Exercise Test (Part K) Main Feedwater Valves, Revision 2

1OST-36.1, Diesel Generator No. 1 Monthly Test, Revision 62

1OST-39.7, Weekly DC Bus Surveillance, Revision 6

NOP-WM-3620, Air Operated Valve Diagnostic Testing, Revision 3

Condition Reports

2015-06365    2015-07088    2015-07199    2015-07412

Maintenance Orders/Work Orders

200503375    200560561    200571939    200589471    200589777    200589779

200588453    200592266    200607983    200611537    200616747    200623134

200640773

Miscellaneous

Notification 600969515

**Section 1R20: Refueling and Other Outage Activities**Procedures

1OM-6.4N, Draining the RCS for Refueling, Revision 25

1OM-50.4.L, Plant Heatup From Mode 6 to Mode 3, Revision 32

1OM-52.4.B, Load Following, Revision 51

1OM-52.4.R.1.F, Station Shutdown from 100% Power to Mode 5, Revision 31

1RST-2.1, Initial Approach to Criticality after Refueling, Revision 16

## **Section 1R22: Surveillance Testing**

### Procedures

1OST-11.14A, LHSI Full Flow Test, Revision 30  
1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 69  
1OST-36.22, Diesel Gen. No. 2 Simulated Undervoltage Start Signal, Revision 10  
2OST-24.4, Steam Driven Auxiliary Feed Pump [2FWE\*P22] Quarterly Test, Revision 78

### Miscellaneous

RM-0411-001, Piping & Instrumentation Diagram, Safety Injection System, Revision 27

## **Section 2RS1: Access Control to Radiologically Significant Areas**

### Procedures

1/2-ADM-1624, Routine Survey Program, Revision 9  
1/2-ADM-1601, Radiation Protection Standards, Revision 22  
1/2-HPP-3.07.001, Contamination Survey Methods, Revision  
NOP-OP-4001, Radiation Protection Program, Revision 3  
NOP-OP-4010, Determination of Radiological Risk, Revision 8  
NOP-OP-4101, Access Controls for Radiologically Controlled Areas, Revision 11  
NOP-OP-4102, Radiological Postings, Labeling, and Markings, Revision 10  
NOP-OP-4104, Job Coverage, Revision 6  
NOP-OP-4106, Control of Radiography Operations, Revision 4  
NOP-OP-4107, Radiation Work Permit (RWP), Revision 14  
NOP-OP-4502, Control of Radioactive Material, Revision 3  
NOP-OP-4701, Radiological Survey Documentation, Revision 1  
NOP-OP-4703, Determination of Alpha Monitoring Levels, Revision 3

### Condition Reports

2014-07364 2014-07495 2014-08174 2014-09199 2014-11720

### Miscellaneous

Beaver Valley Nuclear Power Plant Final Safety Analysis Report  
NPD35SHP:3248, Radiation Protection Assessment Report, July 2, 2014  
Radiological Survey Numbers  
100000, 103101, 103105, 103201, 103205, 103210, 103215, 103220, 103225, 103305, 103310,  
103315, 103320, 103325, 103401, 103410, 103417, 103425

## **Section 2RS2: Occupational ALARA Planning and Controls**

### Procedures

NOP-OP-4005, ALARA Program, Revision 4

### Documents

ALARA Managers Committee Exposure Review for RWP 115-4023  
ALARA Plan 14-2-57, 15-1-32, 15-1-33, 15-1-34, 15-1-37  
ALARA Post-Job Review for 14-2-57, dated 5/9/14  
ALARA Work In-Progress Review for 14-2-57, dated 5/06/14  
ALARA Work In-Progress Review for 14-2-57, dated 5/08/14  
ALARA Work In-Progress Review 15-1-26, dated 5/02/15

ALARA Work In-Progress Review 15-1-33, dated 5/02/15  
ALARA Work In-Progress Review 15-1-35, dated 5/02/15  
ALARA Work In-Progress Review for RWP 115-4030, dated 4/30/15  
ALARA Work In-Progress Review for RWP 115-4060, dated 5/02/15  
Station ALARA Committee Meeting Minutes, 1/22/15, 1/29/15, 2/11/15, 2/25/15, 4/10/15

### **Section 2RS3: In-plant Airborne Radioactivity Control and Mitigation**

#### Procedures

1/2-HPP-3.09.009, Portable High Efficiency Particulate Air (HEPA) Filter Units, Revision 10  
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 5

#### Documents

½-HPP-3.09.009.F03, Beaver Valley HEPA Unit Accountability Log, Revision 3, Unit ID#80  
½-HPP-3.09.009.F03, Beaver Valley HEPA Unit Accountability Log, Revision 3, Unit ID#204  
Air/Gas Quality Report, First Energy Bauer K-14/12, S/N 34554 dated 3/31/15  
Radiation Work Permit (RWP) 114-1030  
Air Sample Records  
14-0627, 14-0629, 14-0634, 14-0635, 14-0636, 14-0637, 14-0638, 14-0639, 14-0640, 14-0641,  
14-0647, 15-0221, 15-0222, 15-0223, 15-0234, 15-0225, 15-0227, 15-0228, 15-0230, 15-0454,  
15-0466, 15-0467, 15-0462

### **Section 2RS4: Occupational Dose Assessment**

#### Condition Reports

2015-06490 2015-08174

#### Miscellaneous

BVPS Bioassay Report 2014-2015

### **Section 4OA1: Performance Indicator Verification**

#### Procedures

1/2-CHM-ANA-5.7, Iodine, Revision 7  
1CHM-SAM-3.26, RCS-Demineralizer Inlet and Outlet Header, Revision 13  
2-CHM-SAM-3.12, Reactor Coolant Letdown (Demineralizer inlet Header), Revision 17  
2OST-6.2A, Computer Generated Reactor Coolant System Water Inventory Balance,  
Revision 33

#### Miscellaneous

LER 05000334 and 05000412/2014-003-00  
LER 05000334 and 05000412/2014-004-00  
LER 05000334 and 05000412/2014-005-00  
LER 05000412/2014-001-00  
LER 05000412/2014-002-00  
LER 05000412/2014-006-00  
Work Order 200564711





## **Section 4OA2: Problem Identification and Resolution**

### Procedures

1/2-ADM-2046, Rubber Expansion Joint Inservice Inspection (ISI) Program, Revision 2  
NOBP-OM-2001, FENOC Outage Management, Revision 10  
NOP-WM-3001, Work Management PM Process, Revision 14  
NORM-ER-3413, Piping Expansion Joints, Revision 4

### Condition Reports

2012-01440    2013-04779    2013-05914    2013-05915    2013-05916    2013-05924  
2013-05925    2013-05926

### Miscellaneous

ESPC-2012043\_BV3, Visual and Physical Inspection Techniques for Rubber Expansion Joints – Garlock Sealing Technologies  
06.024-8022-SHT-001, Switchgear Air Conditioning ISO for Lines 8"-WR-483-121 & 6"-WR-485, 486, 489, 492, 493-121, Revision 4

## **Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion**

### Procedures

2OM-53C.4.2.51.1, Unplanned Power Reduction, Revision 16  
NOP-WM-0001, Work Management Process, Revision 8  
NOP-WM-4300, Order Execute Process, Revision 12  
NOP-WM-4006, Conduct of Maintenance, Revision 7

### Condition Reports

2015-05088    2015-09574    2015-10744

### Miscellaneous

SPD-2FWS-LC103A1, Setpoint Document for 2FWS-LC103A1, Revision 1  
SPD-2FWS-LC103A2, Setpoint Document for 2FWS-LC103A2, Revision 1  
SPD-2FWS-LS103A2, Setpoint Document for 2FWS-LS103A2, Revision 1

## LIST OF ACRONYMS

AC	alternating current
ADAMS	Agencywide Documents Access and Management System
ALARA	as low as (is) reasonably achievable
ASME	American Society of Mechanical Engineers
BACC	boric acid corrosion control
CEDE	committed effective dose equivalent
CFR	Code of Federal Regulations
cm	centimeters
DAC	derived air concentration
dpm	disintegrations per minute
EDG	emergency diesel generator
FAC	flow-accelerated corrosion
FENOC	FirstEnergy Nuclear Operating Company
HRA	high radiation area
IMC	Inspection Manual Chapter
ISI	in-service inspection
IST	in-service testing
kV	kilovolt
LCV	level control valve
LHRA	locked high radiation area
NCV	non-cited violation
NDE	non-destructive examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PM	preventative maintenance
PT	liquid penetrant test
RCP	reactor coolant pump
RCS	reactor coolant system
RG	Regulatory Guide
RP	radiation protection
RPT	radiation protection technician
RWP	radiation work permit
SI	safety injection
SSC	structure, system, or component
UFSAR	Updated Final Safety Analysis Report
UT	ultrasonic test
VHRA	very high radiation area
VT	visual test