



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

May 9, 2013

Mr. Eric A. Larson  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
P. O. Box 4, Route 168  
Shippingport, PA 15077

**SUBJECT: BEAVER VALLEY POWER STATION – NRC INTEGRATED INSPECTION  
REPORT 05000334/2013002 AND 05000412/2013002**

Dear Mr. Larson:

On March 31, 2013, 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 5, 2013 with Eric Larson, Site Vice President, 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 NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance, and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs 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 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 10 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/**

Gordon K. Hunegs, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000334/2013002 and 05000412/2013002  
w/Attachment: Supplementary Information

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**U.S. NUCLEAR REGULATORY COMMISSION**

## REGION I

Docket Nos.: 50-334, 50-412

License Nos.: DPR-66, NPF-73

Report No.: 05000334/2013002 and 05000412/2013002

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA 15077

Dates: January 1, 2013 to March 31, 2013

Inspectors: D. Spindler, Senior Resident Inspector  
T. Ziev, Resident Inspector (Acting)  
D. Silk, Senior Operations Engineer  
T. Moslak, Health Physicist  
E. Burket, Emergency Preparedness Inspector

Approved By: Gordon Hunegs, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

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## SUMMARY

IR 05000334/2013002, 05000412/2013002; 01/01/2013 – 03/31/2013; Beaver Valley Power Station, Units 1 and 2; Maintenance Risk Assessment and Emergent Work Controls.

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" (SDP), dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4.

### Cornerstone: Mitigating Systems

Green. The inspectors identified a Green, NCV of 10 CFR 50.65(a)(4) "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," because FENOC did not implement risk management actions to manage the risk associated with the performance of preventive maintenance on the Unit 2 23A motor-driven auxiliary feedwater pump. Specifically, FENOC did not post the 23B motor-driven and turbine-driven auxiliary feedwater pumps as protected equipment in the field as required by NOP-OP-1007, "Risk Management" and BVBP-OPS-0012, "Guidance for Protected Equipment during Normal Operations." The station's immediate corrective actions including posting the turbine-driven auxiliary feedwater pump as protected equipment, and entering this issue into their corrective action program as condition report CR-2013-03412.

The inspectors determined that the finding is more-than-minor because it is associated with the human performance attribute of the Mitigating Systems cornerstone, and adversely impacted the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events. Specifically, removing the 23A motor-driven auxiliary feedwater pump without protecting the 23B motor-driven and turbine-driven auxiliary feedwater pumps reduced the reliability and capability of the auxiliary feedwater system. The inspectors, in conjunction with the regional senior reactor analysts, evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and Flowchart 2, "Assessment of Risk Management Actions" of IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Using the Birnbaum value for the 23A motor-driven auxiliary feedwater pump from the plant risk information book, the inspectors estimated the incremental core damage probability to be approximately  $1.46E-7$  during the preventive maintenance period. Additionally, FENOC calculated the incremental core damage probability to be approximately  $1.76E-7$  using the On-Line Risk Safety Monitor. Since the finding is a 10 CFR 50.65(a)(4) performance issue associated with risk management actions only and the incremental core damage probability is not greater than  $1E-6$ , the inspectors determined the finding to be of very low safety significance (Green). This finding has a cross-cutting aspect in the Human Performance Area, Work Practices because FENOC not did follow their risk management procedures during preventive maintenance on the 23A motor-driven auxiliary feedwater pump. Specifically, FENOC did not post opposite train equipment as protected as required by NOP-OP-1007 and BVBP-OPS-0012 [H.4(b)]. (Section 1R13)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On February 8, 2013, operators reduced power to approximately 82 percent to facilitate cleaning main condenser tubing and associated waterboxes and plugging condenser tubing with identified leakage. Following cleaning and repairs, operators returned the unit to 100 percent on February 24, 2013. The unit remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. The unit remained at or near 100 percent power throughout 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 4, 2013, the inspectors performed an inspection of the external flood protection measures for Beaver Valley Power Station (BVPS). The inspectors reviewed the UFSAR, Chapter 2.4.2.4, 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 all external areas of the plant, including the turbine building, auxiliary building, and intake structure to ensure that FirstEnergy Nuclear Operating Company (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.

##### b. Findings

No findings were identified.

#### .2 Readiness for Impending Adverse Weather Conditions

##### a. Inspection Scope

The inspectors performed a review of FENOC's readiness for seasonal storms with high winds on January 20, 2013. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications, control room logs, and the corrective action program to determine if seasonal weather could challenge safety systems, and to ensure FENOC personnel had adequately prepared for potential challenges. The inspectors performed walkdowns of the external structures to ensure station personnel identified issues that could challenge the operability of the systems during periods of high

winds/precipitation. Documents reviewed for each section of this inspection report are listed in the Attachment.

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:

- 2-2 emergency diesel generator (EDG) during maintenance on the 21B air compressor system on February 13, 2013
- 23B motor-driven auxiliary feedwater (MDAFW) and turbine-driven auxiliary feedwater (AFW) systems during breaker preventive maintenances (PM) and relay calibration on the 23A MDAFW system on February 26, 2013
- 21A and 21B service water systems during 21C service water pump breaker PMs on March 8, 2013

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, the UFSAR, technical specifications, condition reports, 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 March 18, 2013, the inspectors performed a complete system walkdown of accessible portions of the Unit 2 high-head safety injection 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, hangar 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 EDG 2-2 room (Fire Area DG-2) on February 14, 2013
- Unit 1 and 2 intake structure cubicles (Fire Area IS 1, 2, 3, 4) on February 28, 2013
- Unit 2 EDG 2-1 room (Fire Area DG-1) on March 4, 2013
- Unit 1 auxiliary building (Fire Area PA-1C) on March 18, 2013
- Unit 1 auxiliary building (Fire Area PA-1E) on March 18, 2013

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 samples)

.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 Unit 2 safeguards building to verify the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers.

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 licensed operator simulator training on February 25, 2013, which included a loss of off-site electrical power and a failure to scram. 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 technical advisor. 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 1OST-24.3, Motor Driven Auxiliary Feed Pump Test [1FW-P-3A] and 2OST-36.2, Emergency Diesel Generator [2EGS\*EG2-2] Monthly Test on March 20 and 21, 2013. The inspectors observed evolution briefings and reactivity control briefings to verify that the briefings met the criteria specified in Conduct of Operations. Additionally, the inspectors monitored 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 – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structures, systems, and 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.

- Multiple repairs regarding 1B charging pump in February and March 2013
- Unit 2 containment isolation valves exceed maintenance rule (a)(1) goal in January 2013

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 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.

- Elevated risk associated with planned maintenance activities on Unit 1 for emergent work on D-2 instrument air dryer for the week of January 21, 2013
- Elevated risk associated with planned maintenance activities with 2CHS-P21C out of service and 2FWE-P22 testing simultaneously on unit 2 for the week of January 21, 2013
- Elevated risk during planned testing 1B river water pump on January 28, 2013
- Elevated risk during planned 1B train solid state protection system testing on February 21, 2013
- Elevated risk during 23A MDAFW pump planned maintenance February 25 and 26, 2013

b. Findings

Introduction: The inspectors identified a Green, NCV of 10 CFR 50.65(a)(4) “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” because FENOC did not implement risk management actions to manage the risk associated with performance of preventive maintenance on the Unit 2 23A motor-driven auxiliary feedwater (MDAFW) pump. Specifically, FENOC did not post the 23B motor-driven and turbine-driven auxiliary feedwater pumps as protected equipment in the field as required by NOP-OP-1007, “Risk Management” and BVBP-OPS-0012, “Guidance for Protected Equipment during Normal Operations.”

Description: On February 25 and 26, 2013, FENOC planned to remove the Unit 2 23A MDAFW from service for breaker preventive maintenance and relay testing. FENOC calculated risk for this activity in the weekly maintenance risk summary which showed that the activity would place Unit 2 into a yellow (elevated) risk condition. Plant daily status reports for February 25 and 26 reflected the Unit 2 yellow risk status, and the yellow risk activity was discussed during the daily plant status meetings. Plant daily status reports indicated the ‘B’ equipment train was protected, but did not indicate that the turbine driven auxiliary feedwater (TDAFW) pump was also protected equipment. On February 25, at 23:29, FENOC removed the 23A MDAFW pump from service making the pump inoperable and unavailable, and elevating Unit 2 risk to yellow.

On the afternoon of February 26, the inspectors conducted a walk down of the Unit 2 auxiliary feedwater system to verify implementation of risk management actions during the yellow risk condition for the 23A MDAFW pump preventive maintenance. The inspectors identified that there were no protected equipment postings around the 23B MDAFW and TDAFW pumps. In response to inspector questioning about protected equipment posting requirements, operations posted protected equipment signs around the TDAFW pump and noted in the logs that the equipment was being protected at 15:30. At 21:35, operations reviewed the post maintenance testing, determined the results were satisfactory, and declared the pump operable.

The inspectors reviewed the requirements of NOP-OP-1007, “Risk Management” and BVBP-OPS-0012, “Guidance for Protected Equipment during Normal Operations.” NOP-OP-1007 states that protected equipment postings should be used for yellow risk level activities or plant conditions. BVBP-OPS-0012 states that for planned maintenance on a non-protected auxiliary feedwater component that renders the component inoperable, the shift manager shall ensure that the opposite train’s (i.e. protected train) pump is conspicuously posted to identify it as a protected pump. The inspectors determined that FENOC failed to meet the requirement of these procedures when they failed to post the 23B MDAFW and TDAFW pumps as protected equipment while 23A MDAFW pump was inoperable for preventive maintenance.

Analysis: The inspectors determined that failure to implement risk management actions to manage increased risk associated with the performance of preventive maintenance on the Unit 2 23A motor-driven auxiliary feedwater pump, is a performance deficiency that was within FENOC’s ability to foresee and correct. The inspectors determined that the performance deficiency is more-than-minor because it is associated with the human performance attribute of the Mitigating Systems cornerstone, and adversely impacted the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events. Specifically, removing the 23A MDAFW pump without

protecting the 23B MDAFW and TDAFW pumps reduced the reliability and capability of the auxiliary feedwater system.

The inspectors, in conjunction with the regional senior reactor analysts, evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and Flowchart 2, "Assessment of Risk Management Actions" of IMC 0609 Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Using the Birnbaum value for the 23A MDAFW pump from the plant risk information book, the inspectors estimated the incremental core damage probability to be approximately  $1.46E-7$  during the preventive maintenance period. Additionally, FENOC calculated the incremental core damage probability to be approximately  $1.76E-7$  using the On-Line Risk Safety Monitor. Since the finding is a 10 CFR 50.65(a)(4) performance issue associated with risk management actions only and the incremental core damage probability is not greater than  $1E-6$ , the inspectors determined the finding to be of very low safety significance (Green).

This finding has a cross-cutting aspect in the Human Performance Area, Work Practices because FENOC did not follow their risk management procedures during preventive maintenance on the 23A motor-driven auxiliary feedwater pump. Specifically, FENOC did not post opposite train equipment as protected as required by NOP-OP-1007 and BVBP-OPS-0012 [H.4(b)].

Enforcement: 10 CFR 50.65 "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," paragraph (a)(4) requires, in part, that before performing maintenance activities, the licensee shall access and manage the increase in risk that may result from proposed maintenance activities. Contrary to the above, on February 25 and 26, 2012, FENOC failed to implement risk management actions described in NOP-OP-1007 and BVBP-OPS-0012 in order to manage the elevated risk associated with preventive maintenance on the Unit 2 23A MDAFW pump. Specifically, FENOC failed to post the TDAFW and the 23B MDAFW pumps as protected equipment. FENOC's immediate corrective actions including posting the turbine-driven auxiliary feedwater pump as protected equipment, and entering this issue into their corrective action program as condition report CR-2013-03412. Because this violation was of very low safety significance (Green), and FENOC entered this issue into their corrective action program (CR-2013-03412), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV05000412/2012002-01 Failure to Manage Elevated Risk during Preventive Maintenance)**

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

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

- 1B river water pump support wall anchor material not per design on January 29, 2013
- Unplanned limiting condition for operation entry when the 1AE electrical bus voltage was found out of tolerance low on February 18, 2013
- Pinhole leak on service water piping to 2-2 EDG on February 28, 2013

- Pressurizer power operated relief valve [2RCS-PCV456] loop seal temperature limits not met on March 8, 2013
- 21C charging pump wear found on the high speed coupling on the pump side coupling teeth on March 9, 2013
- Failure of PT-1MS-485 channel III "B" steam generator pressure instrument on March 10, 2013

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.

1R19 Post-Maintenance Testing (71111.19 – 4 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.

- Post maintenance testing following relay maintenance on the 2AE 4160 volt bus and the 2N 480 volt bus relays on January 9, 2013
- 2-1 EDG jacket coolant pressure switch calibration for PS210-1 following maintenance on January 10, 2013
- 2-1 EDG low lube oil pressure switch testing following maintenance on January 14, 2013
- Post maintenance testing following relay maintenance on unit 1 reactor coolant pump 4160 volt bus under frequency relay on January 17, 2013

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 9 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-30.6B, Reactor Plant River Water Pump 1C Test on Train B Header on January 2, 2013
- 2OST-36.1, Emergency Diesel Generator [2EGS\*EG2-1] monthly test on January 10, 2013
- 2OST-7.5, Centrifugal Charging Pump [2CHS\*P21B] on January 17, 2013
- 1OST-13.5, Quench Spray Pump [1QS-P-1A] test on January 31, 2013
- 2BVT1.39.14, Battery Charger [BAT\*CHG2-1] Load Test on February 4, 2013
- 2OST-13.1, Quench Spray Pump [2QSS\*P21A] test on February 5, 2013
- 1OST-24.4, Steam Turbine Driven Auxiliary Feed Pump Test [1FW-P-2] on February 11, 2013
- 2OST-11.2, Low Head Safety Injection Pump [2SIS\*P21B] test on February 12, 2013
- 2MSP-21.01-1, 2MSS-P474 Loop A steam pressure protection channel II test on February 12, 2013

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)a. Inspection Scope

NRC staff from the Office of Nuclear Security and Incident Response (NSIR) performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIPs) and the Emergency Plan located under ADAMS accession numbers ML13023A371 and ML130070160 as listed in the Attachment.

The licensee determined that in accordance with 10 CFR 50.54(q), the changes made in the revisions resulted in no reduction in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The NRC review was not documented in a safety evaluation report and

did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

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 February 25, 2013 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 Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

During the period January 28 - 31, 2013, the inspector evaluated FENOC's performance in assessing the radiological hazards and the effectiveness of radiological controls implemented in the workplace.

The inspector used the requirements in 10 CFR Part 20 and guidance in Regulatory Guide 8.38 Control of Access to High and Very High Radiation Areas for Nuclear Plants, Technical Specifications, and the FENOC procedures as criteria for determining compliance.

a. Inspection Scope

Inspection Planning

The inspector reviewed the 2012 Beaver Valley performance indicators for the occupational exposure cornerstone, the results of Radiation Protection (RP) program performance assessments, and relevant condition reports (CR) related to occupational

radiation safety initiated since the last inspection, to identify performance trends and repetitive problem areas.

### Radiological Hazard Assessment

The inspector reviewed whether there had been changes to plant operations since the last inspection that resulted in a new radiological hazard for onsite workers. Changes reviewed included preparations for demolishing portions of the Unit 1 radwaste system in preparation for performing independent spent fuel storage installation (ISFSI) operations, and removing spent fuel storage racks from the Unit 2 spent fuel pool (SFP) in preparation for installing new maximum density storage racks. The inspector evaluated FENOC's assessment of the potential impact of these changes, and actions for mitigating the radiological hazards.

The inspector selected the following risk-significant work activity that involved exposure to radiation to evaluate procedure implementation and coordination of activities.

- Removing spent fuel storage rack # 13 (RWP 213-2027) from the Unit 2 SFP

For this work activity, the inspector evaluated whether the pre-work surveys performed were appropriate to identify and quantify radiological hazards and establish adequate protective measures. The inspector evaluated the comprehensiveness of the radiological survey program for characterizing the SFP racks to determine if the appropriate radioisotopes were properly identified.

In preparation for removing SFP rack No. 13, on January 30, 2013, the inspector attended the pre-job briefing for workers assigned to remove the rack. The inspector reviewed the work instructions to determine if the radiological coverage for removing the rack, from the SFP, was appropriate; that monitoring instrumentation was operable; and that hold points had been established to stop work if unanticipated dose rates occurred.

The inspector observed the rack being removed from the SFP and transferred to the Decontamination Building to evaluate whether workers adhered to established work instructions. The inspector assessed the radiological controls implemented for the transportation trailer where the rack was placed in preparation for shipping offsite. The inspector performed independent surveys to verify that radiological conditions were accurately measured and that the postings and barriers were appropriate. .

The inspector conducted walk-downs in the Unit 1 and Unit 2 radiological controlled areas (RCA) and performed independent radiation measurements in the Auxiliary and Fuel Handling Buildings, including radioactive waste storage and handling areas, to evaluate material and radiological conditions.

The inspector evaluated FENOC's program for monitoring and controlling levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne. The inspector evaluated the locations of continuous air monitors to determine if they were in areas with low background radiation, to minimize false alarms, and was representative of work area airborne concentrations.

During plant tours, the inspector selected four containers holding non-exempt licensed radioactive material, which may cause unplanned or inadvertent exposure of workers. The inspector assessed whether the containers were labeled and controlled in

accordance with 10 CFR Part 20 requirements, that the storage location was appropriately monitored, and that the contents and dose rates of the containers were clearly identified.

#### Instructions to Workers

The inspector reviewed the following radiation work permits (RWP) used to access high radiation areas (HRA) and locked HRAs (LHRA), attended the pre-job briefings, and evaluated whether specified work control instructions and control barriers were consistent with TS and procedural requirements for entry into LHRAs.

- Removing spent fuel storage rack # 13 from the Unit 2 SFP (RWP 213-2027)
- Management tours of the Unit 1 and Unit 2 RCA (RWP 313-3002)

For these RWPs, the inspector evaluated whether allowable stay times and permissible dose for radiologically significant work under each RWP were clearly identified. The inspector evaluated whether electronic personnel dosimeter (EPD) alarm set-points were in conformance with survey indications and plant procedural requirements.

The inspector reviewed three recent occurrences where a worker's EPD noticeably malfunctioned or alarmed. The inspector evaluated whether workers responded appropriately to the off-normal condition and that the occurrence was included in the corrective action program.

For work activities that could suddenly and severely increase radiological conditions, the inspector assessed the procedures to inform workers of these changes that could significantly impact their occupational dose.

#### Contamination and Radioactive Material Control

The inspector observed workers at the main control point, where FENOC monitors potentially contaminated material leaving the radiological control area, and inspected the methods used for controlling, surveying, and releasing materials from these areas. The inspector observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures. The inspector assessed whether the radiation monitoring instrumentation used for equipment release and personnel contamination surveys had appropriate sensitivity for the types of radiation present.

The inspector reviewed FENOC's criteria for the survey and release of potentially contaminated material. The inspector evaluated whether there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material.

The inspector reviewed FENOC's procedures and records to verify that the radiation detection instrumentation was operable and used at its typical sensitivity level based on appropriate counting parameters. The inspector evaluated whether sealed sources, used to verify instrument operability, were accounted for and were tested for loose surface contamination.

### Radiological Hazards Control and Work Coverage

The inspector evaluated ambient radiological conditions and performed independent radiation measurements during walk-downs of the facility. The inspector evaluated whether the conditions were consistent with applicable posted surveys, RWPs, and associated worker briefings.

The inspector evaluated the adequacy of radiological controls, such as required surveys, key control, radiation protection job coverage, and contamination controls. The inspector evaluated FENOC's use of EPDs in high noise areas that were also HRAs or LHRA.

The inspector evaluated whether radiation monitoring devices were placed on the individual's body consistent with FENOC procedures. The inspector evaluated whether the dosimeter was placed in the location of highest expected dose.

The inspector reviewed the following RWP for work within potential airborne radioactivity areas where individual worker internal exposures were possible.

- Removing spent fuel storage rack # 13 (RWP 213-2027) from the Unit 2 SFP

For this RWP, the inspector evaluated airborne radioactive controls and monitoring, including the potential for airborne tritium uptakes. The inspector assessed the SFP airborne tritium monitoring program, including bioassay results, to confirm that workers were appropriately monitored, dose was assessed, and that procedures were appropriately implemented.

The inspector examined FENOC's physical and programmatic controls for highly activated or contaminated materials stored within the spent fuel pool. The inspector reviewed the spent fuel pool material inventory, observed material that was stored in the pool, and evaluated whether appropriate controls were in place to preclude inadvertent removal of these materials from the pool.

The inspector examined the posting, physical barriers, and key controls for selected HRAs and LHRAs to verify conformance with the regulatory requirements.

### Risk-Significant HRA and VHRA Controls

The inspector discussed with the radiation protection manager the controls and procedures for high-risk HRAs and VHRAs. The inspector assessed whether any changes to relevant FENOC procedures substantially reduced the effectiveness and level of worker protection.

The inspector discussed with first-line health physics supervisors the controls in place for special areas that have the potential to become LHRAs or VHRAs, during certain plant operations. The inspector evaluated whether these plant operations require communication beforehand with the radiation protection department, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards, including supervisory authorization for permitting access.

### Radiation Worker Performance

The inspector observed the performance of radiation workers removing a storage rack from the Unit 2 SFP and evaluated their implementation of RWP requirements. The inspector evaluated whether workers were aware of the radiological conditions in their workplace and the RWP controls/limits in place, and whether their behavior reflected the level of radiological hazards present.

### Radiation Protection (RP) Technician Proficiency

The inspector observed the performance of the RP technicians with respect to controlling radiation work. The inspector evaluated whether technicians were aware of the radiological conditions in their workplace and the RWP controls/limits, and that their behavior was consistent with their training and qualifications with respect to the radiological hazards and work activities.

The inspector reviewed radiological condition reports generated since the last inspection. The inspector evaluated whether there was an observable pattern traceable to a similar cause. The inspector assessed whether this perspective matched the corrective action approach taken by FENOC to resolve the reported problems.

### Problem Identification and Resolution

The inspector evaluated whether problems associated with radiation monitoring and exposure control were being identified by FENOC at an appropriate threshold and were properly addressed for resolution in the licensee's corrective action program. The inspector assessed the appropriateness of the corrective actions for a selected sample of problems documented by FENOC that involve radiation monitoring and exposure controls. The inspector assessed FENOC's practices for applying radiation protection operating experience to their plant.

#### b. Findings

No findings were identified.

### 2RS2 Occupational ALARA Planning and Controls (71124.02)

During the period January 28 - 31, 2013, the inspector assessed performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspector used the requirements in 10 CFR Part 20, Regulatory Guide 8.8 - Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Plants will be As Low As Is Reasonably Achievable, RG 8.10 - Operating Philosophy for Maintaining Occupational Radiation Exposure As Low as Is Reasonably Achievable, Technical Specifications, and FENOC procedures as criteria for determining compliance.

#### a. Inspection Scope

##### Inspection Planning

The inspector reviewed pertinent information regarding station collective dose history, current exposure trends, and ongoing or planned activities in order to assess current

performance and exposure challenges. Included in this review were the ALARA planning for demolishing the Unit 1 radwaste processing area in preparation for conducting ISFSI operations, and for re-racking the Unit 2 SFP. The inspector reviewed the plant's three year rolling average collective exposure to determine if the ALARA regulatory threshold was exceeded.

The inspector reviewed site-specific procedures associated with maintaining occupational exposures ALARA, which included a review of processes used to estimate and track exposures from specific work activities.

The inspector reviewed the long term measures contained in the site's 5 year exposure reduction plan (2013 - 2017) to evaluate the initiatives that will be taken to reduce on-line and outage cumulative exposure.

### Radiological Work Planning

The inspector reviewed the ALARA work activity evaluations, exposure estimates, and exposure reduction requirements for current jobs in progress. Included in this review were the ALARA plans and RWPs for demolishing the Unit 1 solid waste processing area in preparation for conducting ISFSI, operations, and for re-racking the Unit 2 SFP. The inspector assessed the integration of ALARA requirements into work procedures and RWPs, and the involvement of the ALARA Managers Committee in evaluating the ALARA challenges.

The inspector reviewed the assumptions and basis for the current annual collective dose estimate for accuracy. The inspector reviewed applicable procedures to assess the methodology for estimating exposures for specific work activities and for department and station collective exposure goals.

The inspector evaluated FENOC's procedures to track, trend, and if necessary, to reduce occupational doses for ongoing work activities. The inspector reviewed the established dose threshold criteria that would stop work, prompt additional reviews, and necessitate implementing additional ALARA planning and controls.

### Verification of Dose Estimates and Exposure Tracking Systems

The inspector selected for review the work activities that had the highest exposure since the last inspections. These maintenance and repair activities were performed during the refueling outage (2R16) in the fall of 2012. In particular, the inspector reviewed the RWPs, ALARA plans, and post-job ALARA reviews for all 2R16 projects whose exposure exceeded 5 person-rem. Included in this review were scaffolding installation/removal (RWP 212-5028/AP 12-2-30), reactor disassembly/reassembly (RWP 212-5018/AP 12-2-22), steam generator primary side tube inspections/sleeving (RWP 212-5017 & 5057/AP 12-2-21), and reactor head inspection/repairs (RWP 212-5050 & 5055/AP12-2-45).

The inspector compared the results achieved (dose rate reductions, actual dose) with the forecasted dose established in FENOC's ALARA planning for these work activities. The inspector compared the person-hour estimates provided by maintenance planning and other groups to the RP group actual person-hours for the work activity, and evaluated the accuracy of these time estimates. The inspector evaluated the reasons for any inconsistencies between estimated and actual work activity doses.

In reviewing the ALARA plans, the inspector evaluated the departmental interfaces between radiation protection, operations, maintenance crafts, and engineering to identify missing ALARA program elements and interface problems. The evaluation was accomplished by interviewing site staff, and reviewing outage station ALARA managers committee meeting minutes.

The inspector evaluated the licensee's method of adjusting exposure estimates resulting from re-work, for unexpected changes in scope, or when emergent work was encountered. The inspector assessed whether adjustments to exposure estimates were based on sound radiation protection and ALARA principles or if they were adjusted to account for failures to properly plan/control the work.

The inspector reviewed exposure records, for the ten highest exposed workers occurring in 2012, and EPD alarm reports to verify that no regulatory criteria was exceeded and no performance indicator threshold was met.

The inspector reviewed the ALARA planning for current jobs-in-progress. In particular, the inspector assessed the planning and dose reduction measures in place for re-racking the Unit 2 SFP (RWP 213-2027/AP13-2-08).

#### Radiation Worker Performance

The inspector observed radiation worker and RP technician performance during work activities being performed in radiation areas, airborne radioactivity areas, and HRAs. Included in these observations were workers removing a storage rack from the Unit 2 SFP and preparing it for shipment. The inspector assessed radiation worker performance with respect to ALARA principles and RWP requirements.

#### Problem Identification and Resolution

The inspector reviewed problems associated with ALARA planning and controls with respect to the identification of exposure challenges at appropriate dose thresholds, and that the challenges were properly addressed for resolution in the licensee's corrective action program. The inspector also assessed FENOC's process for applying ALARA operating experience issues to their plant practices and procedures.

#### b. Findings

No findings were identified.

### 2RS4 Occupational Dose Assessment (71124.04)

#### a. Scope

During the period January 28 – 31, 2013, the inspector conducted the following activities to verify that the occupational dose was appropriately monitored and that the processes were effectively carried out in determining external and internal dose to assure that the total effective dose equivalent was accurately measured. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, and the licensee's procedures.

### External Dosimetry

The inspector confirmed that detailed procedures were implemented during the 2R16 outage, associated with dosimetry practices, including routine thermoluminescent dosimeter issuance, multi-badging, and extremity dosimeters.

The inspector reviewed condition reports related to electronic dose and dose rate alarms received on electronic dosimetry, to determine if the cause of the alarm was properly identified.

In particular, the inspector reviewed the ALARA planning and dosimetry results for a diver performing work in the fuel transfer canal in the Fuel Handling Building during 2R16. The inspector reviewed the pre-job preparations, work zone survey measurements, multi-dosimetry results, tritium bioassay results, and NRC Form 5 data for the diver.

### Internal Dosimetry

The inspector reviewed the bioassay procedure to determine if uptakes of internally deposited radioactive material had been appropriately evaluated by whole body counting and bioassay techniques. The inspector reviewed urine (tritium) analyses for workers re-racking the Unit 2 spent fuel pool, for a diver conducting maintenance in the fuel transfer canal during 2R16, and for a worker that was splashed by contaminated water, when removing a steam generator man-way during the 2R16 outage. The inspector reviewed the associated dose assessments and determined that the evaluations were appropriately carried out and that no committed effective dose equivalent exceeded the recordable criteria of 10 mrem.

#### b. Findings

No findings were identified.

## 4. **OTHER ACTIVITIES**

### 4OA1 Performance Indicator Verification (71151 – 6 samples)

#### .1 Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications

##### a. Inspection Scope

The inspectors reviewed FENOC's submittals for the following Initiating Events Cornerstone performance indicators for the period of January 1, 2012 through December 31, 2012.

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

- 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 6. The inspectors reviewed FENOC's operator narrative logs, condition reports, 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 – 2 samples)

.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 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. In this review, the inspectors included repetitive or closely-related issues that may have been documented by FENOC outside of the corrective action program, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or corrective action program backlogs. The inspectors also reviewed FENOC's corrective action program database for the third and fourth quarters of 2012 to assess condition reports written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily condition report review (Section 4OA2.1). The inspectors reviewed FENOC's Beaver Valley Fleet Oversight report for the third trimester of 2012, to verify that FENOC personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

The inspectors evaluated a sampling of condition reports associated with the on-line risk management program. These condition reports showed minor lapses in the implementation of this program and in the use of the risk management software. The purpose of this program is to ensure that on-line maintenance can be effectively performed while performing actions to mitigate additional risk to nuclear safety. Examples identified in this review were the inadequate use of the risk management software, crediting equipment as available before the post maintenance testing was completed, evaluating emergent activities adequately, and ensuring applicable mitigating actions were in place. This review included a sample of issues and events that occurred over the course of the last two quarters of 2012 to objectively determine whether issues were appropriately considered or ruled as emerging or adverse trends, and in some cases, verified the appropriate disposition of resolved trends. Additionally, the scope of this review was expanded to include the first quarter of 2013 condition reports associated with the on-line risk management program to ensure that previous corrective actions from a previous trend condition report (CR 2012-11710) were in place and effective. This trend review was provided to FENOC and had been included in the corrective action program (CR 2013-04931). The inspectors will continue to monitor this issue to ensure that this adverse trend improves and corrective actions associated with this identified trend are effective.

### .3 Annual Sample: Review of Plant Configuration Control Issues

#### a. Inspection Scope

The inspectors performed an in-depth review of FENOC's corrective actions associated with selected samples of operations and maintenance department configuration control issues in 2011 and 2012. The inspectors assessed FENOC's problem identification threshold, cause analyses, and the prioritization, timeliness, and effectiveness of FENOC's corrective actions to determine whether FENOC was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of FENOC's corrective action program and 10 CFR 50, Appendix B. In addition, the inspectors reviewed documents governing plant status control and clearances, and interviewed personnel responsible for trending and assessment of configuration control issues.

#### b. Findings and Observations

No findings were identified.

The inspectors determined that FENOC applied a low threshold for identifying plant configuration control issues and entering them into the corrective action program. The inspectors reviewed FENOC's evaluations of configuration control issues and verified that the depth of evaluation was commensurate with the safety significance of the issues. FENOC determined that the causes of most configuration control issues were human performance issues such as lack of attention to detail and failure to self check.

FENOCs developed corrective actions including coaching, training, and site-wide communications to re-enforce human performance standards. FENOC increased field observations to provide immediate feedback to workers on the use of human performance error prevention tools. Additionally, FENOC established a Standards Adherence sub-committee on the Human Performance committee to assess issues where standards were not applied correctly. The inspectors determined that the corrective actions were appropriate, prioritized commensurate with safety significance, and implemented in a timely manner. The inspectors observed that while the corrective actions were generally effective, with no significant configuration control issues occurring during 1Q2013, minor configuration control issues continued.

In one instance, a technician installed testing equipment on the wrong logic card during calibration of steamline pressure protection loop 1 channel IV. As a result, the control room received an unexpected alarm and made an unplanned entry in to TS 3.3.2 "Engineered Safety Features Actuation System Instrumentation" for one steamline pressure protection channel failed. FENOC determined that the cause of this issue was lack of self and peer-checking during the calibration. This issue was determined to be a minor because it did not result in a plant transient. In accordance with IMC 0612, "Power Reactor Inspection Reports," the above issue constituted a violation of minor significance that is not subject to enforcement action in accordance with the NRC Enforcement Policy. FENOC entered this issue into their corrective action program as CR-2013-01024.

In the other instance, an operator aligned a venting hose from the Unit 1 'B' charging pump to the steam generator blowdown sample sink instead of the primary sample sink. As a result, an unplanned radioactive release was made to the river water system during venting of the charging pump. FENOC determined that the causes of this issue were inadequate component verification, informal communications, inadequate operator knowledge, and lack of component identification. This issue was determined to be a minor because it resulted in an insignificant offsite dose consequence. In accordance with IMC 0612, "Power Reactor Inspection Reports," the above issue constituted a violation of minor significance that is not subject to enforcement action in accordance with the NRC Enforcement Policy. FENOC entered this issue into their corrective action program as CR-2013-01129.

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

- .1 (Closed) Licensee Event Report (LER) Supplement 05000334/2012-001-01: Premature Lifting of ECCS Relief Valve Results in Post-Accident Outside-Containment Leakage Limits to be Exceeded.

On November 15, 2010, FENOC discovered that the Unit 1 1A LHSI Pump discharge relief valve RV-1SI-845B lifted with 20 gpm leakage rate going to the safeguards building area sump. As a result, the condition was recognized as an unanalyzed condition that significantly degraded plant safety and could have prevented the safety function to control the release of radioactive material. The enforcement aspects of this issue were discussed in NRC Integrated Inspection Report 05000334/2012003. The inspectors did not identify any new issues during the review of this supplement. This LER is closed.

#### 4OA6 Meetings, Including Exit

On April 5, 2013 the inspectors presented the inspection results to Eric 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
M. Banko	Quality Assurance Assessor
D. Barth	Senior Radiation Protection Technician
D. Benyak	Manager, Regulatory Compliance
W. Blazer	Reactor Operator, Unit 1
E. Crosby	Radiation Protection Supervisor
K. DeBerry	Staff Nuclear Engineer
K. Farzan	Compliance Engineer
R. Ferrie	Supervisor, Electrical Maintenance
J. Freund	Supervisor, Radiation Protection, Support Services
J. Fontaine	Supervisor, ALARA
J. Habuda	Unit Supervisor, Unit 2
P. Harden	Site Vice President
S. Hart	Reactor Operator, Unit 1
S. Kubis	System Engineer
R. Kuckiewicz	Manager, Nuclear Oversight
R. Lieb	Director, Site Operations
J. Lutz	Shift Manager, Unit 2
D. McBride	Senior Consultant
J. Miller	Fire Marshall
K. Mitchell	System Engineer
D. Murray	Director Performance Improvement
J. Patterson	Staff Nuclear Engineer
T. Pittas	Reactor Operator, Unit 2
L. Proudfoot	Unit Supervisor, Unit 1
J. Rudant	Senior Radiation Protection Technician
M. Schiavoni	Supervisor, Instrumentation and Control
B. Sepelak	Supervisor, Regulatory Compliance
M. Smith	Unit Supervisor, Unit 2
T. Steed	Site Radiation Protection Manager
M. Stoner	Supervisor, Instrumentation and Control
T. Winfield	Supervisor, Electrical Maintenance

Other Personnel

L. Ryan	Inspector, Pennsylvania Department of Radiation Protection
M. Rubadue	Senior Health Physicist, Ohio Bureau of Radiation Protection

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

05000412/2013002-01	NCV	Failure to Manage Elevated Risk during Preventive Maintenance
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Closed

05000334/2012-001-01

LER

Premature Lifting of ECCS Relief Valve Results in Post-Accident Outside-Containment Leakage Limits to be Exceeded

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather Protection**

Procedures

1/2OM-53C.4A.75.2, Acts of Nature – Flood, Revision 28

2OST-45.11, Cold Weather Protection Verification, Revision 20

1OST-45.11, Cold Weather Protection Verification, Revision 22

NOP-WM-2001, Work Management Scheduling/Assessment/Seasonal Readiness Processes, Revision 14

1/2 OM-53C.4A.75.1, Acts of Nature- Tornado or High Wind Condition, Revision 15

Condition Reports

2013-01811 2013-01925 2013-00817

Miscellaneous

Performance Assessment Report BV-PA-12-03

Assessment PA-BV-2012-0069-007

**Section 1R04: Equipment Alignment**

Procedures

2OM-24.3.B.2, Valve List-2FWE, Revision 9

2OM-36.3.B.2, Valve List-2EGA, Revision 15

2OM-30.3.B.1, Valve List-2SWS, Revision 43

2OM-7.3.B.1, Valve List-2CHS, Revision 25

Condition Reports

2013-02747 2013-01920

Drawings

10080-RM-424-3, Revision 9

10080-RM-430-1, Revision 29

10080-RM-407-1A, Revision 14

10080-RM-407-1B, Revision 9

10080-RM-407-2, Revision 14

10080-RM-407-3, Revision 12

10080-RM-407-4, Revision 6

10080-RM-411-1, Revision 11

**Section 1R05: Fire Protection**

Procedures

1/2 ADM-1900, Fire Protection Program, Revision 21

2 PFP-DGBX-732, Diesel Generator 2-2 Room Fire Area DG-2, Revision 3

1PFP-1NTS-705-Pump Cubicles, Fire Area IS-1,2,3,4, Revision 1  
2 PFP-DGBX-732, Diesel Generator 2-1 Room Fire Area DG-1, Revision 3  
1PFP-AXLB-752 Auxiliary Building General Area Fire Area PA-1C, Revision 3  
1PFP-AXLB-735 Auxiliary Building General Area Fire Area PA-1E, Revision 2

Miscellaneous

CR 2010-81040      CR 2011-05246

**Section 1R06: Flood Protection Measures**

Condition Reports

2013-03635

Calculations

211-N-265  
211-N-265, Revision 6, Add. 0  
211-N-265, Revision 6, Add. 1  
211-N-265, Revision 6, Add. 2  
211-N-265, Revision 6, Add. 6  
211-N-265, Revision 6, Add. 7

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

Procedures

1OST-24.3, Motor Driven Auxiliary Feed Pump Test [1FW-P-3A], Revision 7  
2OST-36.2, Emergency Diesel Generator [2EGS\*EG2-2] Monthly Test, Revision 66  
NOBP-TR-1112, FENOC Conduct of Simulator Training and Evaluation, Revision 2  
NOP-OP-1002, Conduct of Operations, Revision 7

Miscellaneous

OTLC-S20130201EBV1 – Beaver Valley Power Station Unit 1 simulator exercise guide

**Section 1R12: Maintenance Effectiveness**

Condition Reports

2013-02613	2013-01108	2013-00098	2011-04919	2011-02107	2011-92831
2011-92513	2011-92259	2010-75256	2010-70974	2009-64040	2013-01198
2013-01202	2013-01681	2013-02423	2013-02549	2013-02582	2013-02617
2013-02621	213-02943	2013-03398			

Miscellaneous

Systems, Structures, and Components (SSC) with increased monitoring per Maintenance Rule report dated March 12, 2013  
Maintenance Rule (a)(2) evaluation form 2009-64040 dated June 28,2012  
Maintenance Rule (a)(2) evaluation form 2009-64040 dated December 10, 2009  
System Health Report, System 47, Unit 2 Containment System  
Unit 1, Chemical Volume and Control System, System Health Report 2012-4

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

1/2 ADM-2033, Risk Management Program, Revision 4

NOP-OP-1007, Risk Management, Revision 16

Miscellaneous

Unit 1, Weekly Maintenance Risk Summary for the week of January 21, 2013, Revisions 0 to 4

Unit 2, Weekly Maintenance Risk Summary for the week of January 21, 2013, Revisions 0 to 5

Unit 1, Weekly Maintenance Risk Summary for the week of January 28, 2013, Revision 0

Unit 1, Weekly Maintenance Risk Summary for the week of February 18, 2013

**Section 1R15: Operability Determinations and Functionality Assessments**Procedures1OST-36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification,  
Revision 20

2OM-6.4.Q, "Isolation of a Power Operated Relief Valve," Revision 20

Condition Reports

2012-19651 2013-00594 2013-02470 2013-03108 2013-02671 2013-03063

2013-03393 2013-03484 2013-03496 2013-03052 2013-03484

Work Orders/Notifications

20054563 600819930 600819675

Drawings

8700-RC-32E, Intake Structure Sheet 2 Plan at EL 680'-0" and Misc Details, Revision 0

8700-RC-32R, River Water Pumps 1WR-1A/1B/1C Seismic Restraint Modification at EL 653'-5",  
Revision 1OtherASME Code Case N-513-2, "Evaluation Criteria for Temporary Acceptance of Flaws in  
Moderate Energy Class 2 or 3 Piping Section XI, Division 1"RIS 2005-20, 'Revision to NRC Inspection Manual Part 9900 Technical Guidance, Operability  
Determinations & Functionality Assessments for Resolution of Degraded or  
Nonconforming Conditions Adverse to Quality or Safety", Revision 1GL 90-05, Guidance for Performing Temporary Non-Code Repair of ASME Code Class  
1, 2, and 3 Piping

Engineering Evaluation Request 6008/9930

**Section 1R19: Post-Maintenance Testing**Procedures1MSP-36.06A-E, 1A Reactor Coolant Pump 4KV Bus Underfrequency Relay 81-VA100  
Functional Test, Revision 151MSP-36.06B-E, 1B Reactor Coolant Pump 4KV Bus Underfrequency Relay 81-VB100  
Functional Test, Revision 161MSP-36.06C-E, 1C Reactor Coolant Pump 4KV Bus Underfrequency Relay 81-VA100  
Functional Test, Revision 16

2MSP-37.03-E, 2N 480 Volt Emergency Bus Degraded Voltage Relays 27-RN200AB and 27-RN200BC Test, Revision 18  
2MSP-36.33-E, 2AE 4Kv Emergency Bus Degraded Voltage Relay 27-VE3200AB and 27-VE3200BC Test, Revision 18  
2ICP-36-PS210-1-2, EDG-PS210-1 Diesel Generator 2-1 Jacket Conduit Pressure Switch Calibration 4  
2ICP-36-PS201-1-2, EDO-PS201-1, -2, -3, -4 Diesel Generator 2-1 Lube Oil Low Pressure Switch Calibration

Work Orders

200491913 20049194 20049195 200490660 200490656

**Section 1R22: Surveillance Testing**

Procedures

2MSP-21.01-1, 2MSS-P474, Loop A Steamline Pressure Protection Channel II Test, Revision 13  
1OST-30.6B, Reactor Plant River Water Pump 1C Test on Train B Header, Revision 34  
1OST-13.1, Quench Spray Pump [1QS-P-1A] Test, Revision 37  
1OST-24.4, Steam Turbine Driven Auxiliary Feed Pump Test [1FW-P-2], Revision 50  
2OST-36.1, Emergency Diesel Generator [2EGS\*EG2-1] Monthly Test, Revision 67  
2OST-7.5, Centrifugal Charging Pump [2CHS\*P21B], Revision 37  
2BVT1-39.14, Battery Charger [BAT\*CHG2-1] Load Test, Revision 5  
2OM-39.4C, Shutdown of Batteries 2-1, 2-2, 2-3, 2-4, 2-5, 2-6 and Their Respective Chargers, Revision 11  
2OM-39.4.o, Spare Battery Charger Operations for Bat 2-1, Revision 1  
2OM-39.4D, Startup and Shutdown of Spare Battery Charger (Train A), Revision 12  
2OST-13.1, Quench Spray Pump [2QSS\*P21A] Test, Revision 31  
2OST-13.1 Results From August 21, 2012  
2OST-13.1 Results From November 13, 2012  
2OST-11.2, Low Head Safety Injection Pump [2SIS\*P21B] Test, Revision 27

Work Orders

WO 20491157  
WO 20467692

Condition Reports

2011-88050 2013-01806

**Section 1EP4: Emergency Action Level and Emergency Plan Changes**

Procedures

Emergency Preparedness Plan, Section 5, "Emergency Organization," Revision 27

Other

Evacuation Time Estimate Study Update

**Section 1EP6: Drill Evaluation**

Condition Reports

2013-02787

Miscellaneous

OTLC-S20130201EBV1 – Beaver Valley Power Station Unit 1 simulator exercise guide

**Section Occupational Radiation Safety**Procedures:

1/2-ADM-1601. Radiation Protection Standards, Revision 20  
 1/2-ADM-1611. Radiation Protection Administrative Guide, Revision 13  
 1/2-HPP-3.01.001, Radioactive Source Accountability, Revision 8  
 1/2-HPP-3.05.001, Exposure Authorization, Revision 8  
 1/2-HPP-3.07.002, Radiation Survey Methods, Revision 7  
 1/2-HPP-3.08.003, Radiation Barrier Key Control, Revision 13  
 BVBP-RP-0003, Dosimetry Practices, Revision 10  
 BVBP-RP-0013, Radiation Protection Risk Assessment Process, Revision 3  
 BVBP-RP-0020, RP Job Coverage General Guidance, Revision 18  
 NOP-OP-4101, Access Controls for Radiologically Controlled Areas, Revision 8  
 NOP-OP-4105, Diving In Contaminated Systems, Revision 2  
 NOP-OP-4206, Bioassay Administration, Revision 0  
 NOP-OP4005, ALARA Program, Revision 3  
 NOP-OP-4107, Radiation Work Permit, Revision 11  
 NOP-OP-4601, Contamination Control Program, Revision 3  
 NOP-OP-4102, Radiological Postings, Labeling, and Markings, Revision 9  
 NOP-OP-4702, Air Sampling, Revision 3  
 NOP-OP-4703, Determination of Alpha Monitoring Levels, Revision 2  
 NOBP-OP-4114, Radiological Controls for Highly Radioactive Materials and Irradiated Components, Revision 1

**Condition Reports :**

2013-01129    2012-15835    2012-18352    2012-16792    2012-16438  
 2012-16856    2012-16867    2012-14958    2012-16144    2012-15229  
 2012-15105

**Other**

PA-BV-12-03: 2R16 Radiation Protection Performance Assessment  
 PA-BV-12-03T12: Radiation Protection 3<sup>rd</sup> Trimester Performance Assessment  
 ALARA Manager Committee Meeting Minutes: Meeting Nos. 12-23, 12-24  
 RWP 212-5017 & 5057/AP 12-2-21, S/G Primary Side Platform/Channel Head Work  
 RWP 212-5018/AP12-2-22, Reactor Disassembly/Reassembly  
 RWP 212-5028/AP 12-2-30, Scaffolding 2R16  
 RWP 212-5050 & 5055/12-2-45 Rx Under Head Welding Preps and Repair Activities  
 RWP 212-5073/AP12-2-52, FHB Diver/Support for SFP Upender Cable Replacement  
 RWP 213-2027/AP13-2-08, Re-Rack the Unit -2 Spent Fuel Pool  
 ALARA Overview and Dose Reduction Plan for Independent Spent Fuel Storage Installation (ISFSI) Project Unit-1 Solid Waste Demolition  
 ALARA Overview and Dose Reduction Plan for Re-Racking the Unit 2 Spent Fuel Pool  
 NOBP-OP-4111, 5 Year Exposure Reduction Plan (2013-2017)  
 2R16 Post - Outage ALARA Report  
 EPRI Standard Radiation Monitoring Program - Unit 2 Source Term Measurements  
 Highest Dose Individuals for 2012

Dose and Dose Rate Alarm Reports for 2012 through January 2013  
 Investigational Bioassay Data Records for potential tritium exposure  
 Unit 2 Spent Fuel Pool Re-rack – Project Plan  
 Chemistry Data for Fuel Handling Building Air borne Contamination & SFP water samples  
 Radioactive Source Inventory and Sealed Source Leak Test Record

### **Section 40A1: Performance Indicator Verification**

#### Procedures

NOBP-LP-4012, NRC Performance Indicators, Revision 4

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

#### Procedures

NOP-LP-2001, Corrective Action Program, Revision 31  
 NOBP-OP-0004, Plant Status Control and Clearance Events, Revision 7  
 NOBP-LP-2607, Observation and Coaching Program, Revision 5  
 NORM-OP-0002, Operations Section Performance Indicators, Revision 6  
 NOP-OP-1007, Risk Management, Revision 15 and 16  
 NOBP-LP-2023, Performance Assessment, Revision 12  
 NOP-LP-2023, Conduct of Fleet Oversight, Revision 11

#### Condition Reports:

2010-87025	2011-04088	2011-05339	2011-88088	2011-91368
2011-96244	2011-97132	2012-00330	2012-04406	2012-05237
2012-05356	2012-06744	2012-08381	2012-10448	2012-10619
2012-10870	2012-13394	2012-13459	2012-14281	2012-15263
2012-15334	2012-15538	2012-15623	2012-16442	2012-16735
2012-17016	2012-17487	2012-18018	2013-00810	2013-01579
2013-01129	2012-12951	2012-15023	2012-10554	2012-11490
2012-11794	2012-12244	2012-12882	2012-12975	2012-10992
2012-12114	2012-15167	2012-11710	2013-01746	2013-03014
2012-02549	2012-03819			

#### Other

Performance Gap Analysis, CA 11-88088-1  
 Lesson Plan 3SQS-48.1, Conduct of Operations, Revision 23  
 Lesson Plan OTGC-201104OER\_BV3, 2011 Cycle 4 Operating Experience, Revision 0  
 Lesson Plan OTGC-201201BKROE\_BV3, 4KV/480V Breaker Racking, Revision 0  
 Full Assessment: BV-PA-11-03 BVPS Clearance and Tagging  
 Site Human Performance Team Meeting Minutes July 12, 2012  
 Site Human Performance Team Meeting Minutes August 17, 2012  
 Site Human Performance Team Meeting Minutes November 30, 2012  
 Site Human Performance Team Meeting Minutes December 13, 2012

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
AFW	auxiliary feedwater
ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
CR	condition reports
EDG	emergency diesel generator
EPD	electronic personnel dosimeter
EPIP	Emergency Plan Implementing Procedures
FENOC	FirstEnergy Nuclear Operating Company
HRA	high radiation area
ISFSI	independent spent fuel storage installation
IMC	Inspection Manual Chapter
LER	Licensee Event Report
LHRA	locked high radiation area
MDAFW	motor-driven auxiliary feedwater
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
NSIR	Office of Nuclear Security and Incident Response
PARS	Publicly Available Records
PM	preventive maintenance
RCA	radiological controlled area
RP	radiation protection
RWP	radiation work permit
SDP	Significance Determination Process
SFP	spent fuel pool
SSC	structure, system, or component
TDAFW	turbine-driven auxiliary feedwater
UFSAR	Updated Final Safety Analysis Report
VHRA	very high radiation area