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

November 7, 2012

Mr. Paul Harden
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 05000334/2012004 AND 05000412/2012004

Dear Mr. Harden:

On September 30, 2012, 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 October 8, 2012 with you and other members of your staff.

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

This report documents two self-revealing findings of very low safety significance (Green). One of the findings was determined to involve 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 the 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

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Sincerely,

/RA by G. Scott Barber Acting for/

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 05000334/2012004 and 05000412/2012004
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.:	05000334/2012004 and 05000412/2012004
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Beaver Valley Power Station, Units 1 and 2
Location:	Shippingport, PA 15077
Dates:	July 1, 2012 through September 30, 2012
Inspectors:	D. Spindler, Senior Resident Inspector E. Bonney, Resident Inspector F. Arner, Senior Reactor Inspector J. Furia, Health Physicist P. Kaufman, Senior Reactor Inspector D. Kern, Senior Reactor Inspector J. Laughlin, Emergency Preparedness Specialist T. Moslak, Health Physicist S. Pindale, Senior Reactor Inspector P. Presby, Senior Operations Engineer D. Silk, Senior Operations Engineer
Approved By:	Gordon K. Hunegs, Chief Reactor Projects Branch 6 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000334/2012004, 05000412/2012004; 07/1/12 – 9/30/2012; Beaver Valley Power Station Units 1 & 2; Heat Sink Performance and Licensed Operator Requalification Program.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Two findings of very low safety significance (Green) were identified, of which one was a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, "Components Within Cross-Cutting Areas." Findings for which the SDP does not apply may be Green, or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- Green. A self-revealing Green NCV of Title 10 of the *Code of Federal Regulations* (10CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified in that FENOC failed to prevent further degradation of the 'A' component cooling water heat exchanger, which was a significant condition adverse to quality. Inspectors determined that the unhindered rate of heat exchanger tube corrosion was a performance deficiency that was within FENOC's ability to foresee and correct. FENOC entered this issue into their corrective action program for further resolution as condition report (CR) 2012-13945.

  This finding is more than minor because it affects the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined this finding was not a design qualification deficiency resulting in a loss of functionality or operability, did not represent an actual loss of safety function of a system or train of equipment, was not potentially risk-significant due to a seismic, fire, flooding, or severe weather initiating event, did not affect reactivity control systems, and did not involve the fire brigade. Therefore, inspectors determined the finding to be of very low safety significance.

  This finding has a cross-cutting aspect in the area of Human Performance, Resources, in that FENOC failed to ensure adequate design margin of the 'A' component cooling water heat exchanger was maintained, and to correct the long-standing issue of leakage past the 'A' component cooling water heat exchanger isolation valves [H.2.(a)]. (Section 1R07)

- Green: A self-revealing Green finding was identified when greater than 10 percent of reactor operators who failed the biennial written requalification examination subsequently failed the remediation examination. A performance deficiency existed since the re-examination failure rate exceeded guidance in NRC Inspection Procedure (IP) 71111.11B, Appendix F, which is an industry standard. The licensee has entered this issue into the corrective action program as CR 2012-11110.

  This finding was more than minor because it was associated with human performance attribute of the mitigating systems cornerstone and affected the cornerstone objective to

ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and, if this finding were left uncorrected would have the potential to lead to a more significant safety concern. The finding was determined to be of low safety significance (Green) based upon guidance from Inspection Manual Chapter 0609, “Significance Determination Process,” Appendix I, “Licensed Operator Requalification Significance Determination Process” because more than 10 percent of the licensed operators who were remediated failed their remediation examination.

The inspector determined that this finding had a cross-cutting aspect in the area of Human Performance, Resources, in that FENOC did not apply sufficient resources to properly remediate licensed operators who had failed their biennial written requalification examination [H.2.(b)]. (Section 1R11)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. The unit remained at or near 100 percent power throughout the inspection period.

Unit 2 began the inspection period at 100 percent power and operated at full power until August 31, when the unit entered end-of-cycle coastdown operations. On September 24, 2012 operators commenced a shutdown, from an initial power of 88 percent, for a planned refueling and maintenance outage (2R16). The unit reached Mode 6 (refueling) on September 28, 2012 and remained in a refueling outage for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of FENOC's readiness for seasonal storms with high winds/precipitation. 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

Partial System Walkdowns (71111.04Q – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1 and Unit 2, Intake structure fire protection equipment and piping on August 28, 2012
- Unit 2, 'B' Standby service water system during maintenance activities on the 'A' standby service water system on August 22, 2012
- Unit 2, 'B' and 'C' charging pump system when credited as reactor vessel inventory pathways on September 26, 2012

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, work orders, 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 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.

1R05 Fire Protection

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 1, Normal switchgear room (Fire Area NS-1) on July 18, 2012
- Unit 1, DF switchgear room (Fire Area ES-2) on July 18, 2012
- Unit 1, 722' Auxiliary building elevation general area (Fire Area PA-1G) on August 7, 2012
- Unit 2, Condensate polishing (Fire Area CP-1) on July 31, 2012
- Unit 2 Personnel air lock and purge duct rooms (Fire Area CV-5) on August 7, 2012

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could disable risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, DG-2 instrument pit, which contains 4160V cables for the 'B' emergency service water pump, to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the Unit 2 'A' component cooling water (CCP) heat exchanger to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified FENOC's commitments to NRC Generic Letter 89-13. The inspectors reviewed the results of previous inspections of the 'A' CCP heat exchanger and similar heat exchangers. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that FENOC initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

Introduction. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified in that FENOC failed to prevent recurrence of a significant condition adverse to quality. Specifically, FENOC failed to implement adequate corrective actions following the 2011 degradation of the 'A' CCP heat exchanger.

Description. In August 2011, FENOC inspected the 'A' CCP heat exchanger tubes using eddy current testing. The 'A' CCP heat exchanger contains 956 tubes. Prior to 2011, 59 tubes were plugged due to degradation. In August 2011, eddy current testing was performed on all unplugged tubes. The results of the testing revealed 797 of 897 tubes contained indications that exceeded the design calculation 10800-N-829 limitation of 60% through-wall degradation. Exceeding 60% through-wall degradation requires plugging of the tube to comply with heat exchanger portions of American Society of Mechanical Engineers (ASME) code standards. An engineering evaluation, documented in CR 2012-01376, provided compliance with the piping portions of ASME code, and allowed FENOC to keep 687 tubes in service that would normally require plugging. The revised criteria for plugging tubes in a CCP heat exchanger tube changed from 60% wall degradation to a 100% through-wall indication with leakage based on the ASME piping code standards. Engineering calculation 10800-N-829 also limited the number of tubes plugged to 70. After the August 2011 eddy current testing of the 'A' CCP heat exchanger, an additional 110 tubes were mechanically plugged, resulting in 169 of 956

tubes in the ‘A’ CCP heat exchanger being removed from service. Because the number of plugged tubes exceeded the engineering calculation limit of 70, FENOC performed an operability determination to provide guidance on limiting the maximum river temperature for the ‘A’ CCP heat exchanger to be in service.

FENOC conducted a root cause analysis (CR 2011-01747) on the degradation mechanism of the ‘A’ CCP heat exchanger tubes, and concluded that the most likely tube degradation mechanism was a combination of under deposit corrosion and microbiologically influenced corrosion. The root cause analysis documented that stagnant or low flow conditions contributed to both the under deposit and microbiologically influenced corrosion mechanisms. Corrective action 2011-01747-19 was issued to develop methods to proactively prevent corrosion to minimize the degradation occurring in the tubes. The corrective action stated heat exchangers should be placed in chemical wet layup or rotated regularly into service with sufficient flow to ensure routine chemical treatment was effective. The ‘A’ CCP heat exchanger could not be placed in chemical wet layup due to isolation valve leakage, but was rotated into service at least every 90 days. When the ‘A’ CCP heat exchanger was not in service, stagnant or low flow conditions were present from September 2011 to September 2012.

In September 2012, ‘A’ CCP heat exchanger eddy current testing was conducted, and an additional 205 tubes met the plugging criteria of 100% through-wall indication with leakage. Currently 374 of 956 tubes in the ‘A’ CCP heat exchanger are mechanically plugged and the heat exchanger is inoperable. FENOC is able to credit the ‘B’ and ‘C’ CCP heat exchangers to fulfill technical specification requirements for 2 trains of component cooling water. The ‘A’ CCP heat exchanger was credited from May 6, 2012 through June 21, 2012 as an operable train of component cooling water. Based on river water temperatures during that time, the engineering analysis on structural integrity of the heat exchanger tubes, and the CCP surge tank maintaining level, the ‘A’ CCP heat exchanger was considered capable of performing its safety function. FENOC has a replacement ‘A’ CCP heat exchanger on site and has scheduled the installation.

Analysis. Inspectors determined that the unhindered rate of heat exchanger tube corrosion was a performance deficiency that was within FENOC’s ability to foresee and correct. This finding is not similar to any minor examples in IMC 0612, Appendix E. This finding is more than minor because it affects the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding using Exhibit 2, "Mitigating Systems Screening Questions" worksheet in Appendix A of IMC 0609, "Significance Determination Process." The inspectors determined this finding was not a design qualification deficiency resulting in a loss of functionality or operability, did not represent an actual loss of safety function of a system or train of equipment, was not potentially risk-significant due to a seismic, fire, flooding, or severe weather initiating event, did not affect reactivity control systems, and did not involve the fire brigade. Therefore, inspectors determined the finding to be of very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Human Performance, Resources, in that FENOC failed to ensure adequate design margin of the A CCP heat exchanger was maintained, and that the long-standing issue of leakage past A CCP heat exchanger isolation valves was corrected [H.2.(a)].

Enforcement. 10 CFR Part 50, Appendix B, Criterion XIV, "Corrective Action " requires, in part, that for significant conditions adverse to quality, corrective actions shall be taken to preclude repetition. Contrary to the above, in 2011, FENOC failed to take adequate corrective actions to prevent further degradation of the 'A' CCP heat exchanger tubes. The corrective actions did not establish an environment that limited microbiological influenced corrosion and under deposit corrosion of the heat exchanger tubes. As a result, in August 2012, FENOC discovered an additional 205 tubes that required plugging due to 100 percent through-wall indications with leakage, with a final result of 374 tubes of 956 tubes plugged. Because this issue is of very low safety significance (Green) and FENOC entered this issue into their corrective action program as 2012-13945, this finding is being treated as an NCV consistent with the NRC Enforcement Policy. **(NCV 05000412/2012004·01, Ineffective Corrective Action Results in Inoperable Component Cooling Water Heat Exchanger)**

1R11 Licensed Operator Requalification Program (71111.11 – 3 samples)

.1 Quarterly Review of Licensed Operator Requalification and Training

a. Inspection Scope

The inspectors observed Unit 1 licensed operator simulator training on August 2, 2012, which included a Loss of All Alternating Current 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 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 Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed Unit 2 'B' train safety injection system go-test on September 6, 2012 and the heater drain system startup on August 28, 2012. 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 observed test 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 Licensed Operator Requalification

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Inspection Procedure Attachment 71111.11, “Licensed Operator Requalification Program.”

Examination Results

On September 5, 2012, the results of the biennial written exam and the annual operating tests for year 2012 for Beaver Valley Units 1 and 2 were reviewed to determine if pass/ fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, and NRC Manual Chapter 0609, Appendix I, “Operator Requalification Human Performance Significance Determination Process (SDP).” The inspector review verified the following:

For Unit 1:
- Individual pass rate on the dynamic simulator test was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the job performance measures (JPMs) of the operating exam was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the written examination was greater than 80 percent. (The pass rate was 82.9 percent.)
- More than 80 percent of the individuals passed all portions of the exam. (The overall pass rate was 82.9 percent)
- Crew pass rate was greater than 80 percent. (Pass rate was 100 percent.)

For Unit 2:
- Individual pass rate on the dynamic simulator test was greater than 80 percent. (Pass rate was 93.2 percent.)
- Individual pass rate on the job performance measures of the operating exam was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the written examination was greater than 80 percent. (There was no biennial written examination for Unit 2 this year.)
- More than 80 percent of the individuals passed all portions of the exam. (The overall pass rate was 93.2 percent)
- Crew pass rate was greater than 80 percent. (Pass rate was 100 percent.)

Due to an administrative oversight, the 2010 pass/fail results of the Beaver Valley Units 1 and 2 requalification examinations were not included in Inspection Report 2010005. The 2010 pass/fail results are provided below for both units.

The inspector verified for Unit 1 that:
- Individual pass rate on the dynamic simulator test was greater than 80 percent. (The individual pass rate was 100 percent.)
- Individual pass rate on the walk-through test was greater than 80 percent. (The individual pass rate was 100 percent.)
- Individual pass rate on the comprehensive written exam was greater than 80 percent. (The individual pass rate was 91.6 percent.)

- Overall pass rate among individuals for all portions of the exam was greater than or equal to 80 percent. (The overall pass rate was 91.6 percent.)
- Crew pass rate was greater than 80 percent. (The crew pass rate was 100 percent.)

The inspector verified for Unit 2 that:

- Individual pass rate on the dynamic simulator test was greater than 80 percent. (The individual pass rate was 97.5 percent.)
- Individual pass rate on the walk-through test was greater than 80 percent. (The individual pass rate was 100 percent.)
- Individual pass rate on the comprehensive written exam was greater than 80 percent. (There was no written exam for Unit 2 in 2010. The individual pass rate in 2009 was 95.0 percent.)
- Overall pass rate among individuals for all portions of the exam in 2010 was greater than or equal to 80 percent. (The overall pass rate was 97.5 percent.)
- Crew pass rate was greater than 80 percent. (The crew pass rate was 100 percent.)

Written Examination Quality

The inspector reviewed three written examinations administered during this examination cycle for qualitative and quantitative attributes as specified on Appendix B of Attachment 71111.11, Licensed Operator Requalification.

Operating Test Quality

Ten JPMs and five scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of Attachment 71111.11, Licensed Operator Requalification.

Licensee Administration of Operating Tests

Observations were made of the dynamic simulator exams and JPMs administered during the week of July 30, 2012. These observations included facility evaluations of crew and individual performance during the dynamic simulator exams and individual performance of five JPMs.

Examination Security

The inspector assessed whether facility staff properly safeguarded exam material. JPMs, scenarios, and written examinations were checked for excessive overlap of test items.

Remedial Training and Re-examination

The remediation plans for 12 individuals for written quiz or examination failures during this requalification cycle were reviewed to assess the effectiveness of the remedial training. For those who had failed the biennial written examination, the inspector confirmed that the remediation examinations did not duplicate questions from the failed examinations and that areas of weakness were appropriately retested.

Conformance with License Conditions

Medical records for eight individuals were reviewed for compliance with NRC regulations. Proficiency watch records for the Unit 1 operators were also reviewed for the second quarter of 2012.

Simulator Performance

Simulator performance and fidelity was reviewed for conformance to the reference plant control room. A sample of simulator deficiency reports was also reviewed to ensure facility staff addressed identified modeling problems.

Problem Identification and Resolution

Recent operating history found in inspection reports and the licensee's corrective action program was reviewed by the inspector. The inspector also reviewed specific events from the licensee's corrective action program which indicated possible training deficiencies to verify that they had been appropriately addressed. The resident inspectors were also consulted for insights regarding licensed operators' performance. The Plant Issues Matrix and the latest problem identification and resolution report were also reviewed to identify operator performance issues and potential training deficiencies.

b. Findings

Introduction: A self-revealing Green finding was identified when the failure rate for remediated licensed operators exceeded 10 percent as specified in NRC Inspection Procedure 71111.11B, "Licensed Operator Requalification Program and Licensed Operator Performance," Appendix F, "Remedial Training and Re-Examination Checklist."

Description: Six Beaver Valley Unit 1 reactor operators failed their 2012 biennial written examination. These operators were remediated and re-examined. Two of the six operators (33 percent) failed the remediation exam. This exceeded the 10 percent limit specified in the inspection procedure.

These two operators were subsequently remediated with the assistance of a mentor (their shift manager) and then successfully passed their second remediation examination. The high failure rate on the remediation examinations prompted the licensee to conduct an apparent cause evaluation (ACE). Interviews with licensee training personnel indicated that a more thorough investigation into an operator's weaknesses needed to be performed in order to conduct an effective remediation.

Analysis: The inspector determined that the high remediation failure rate was a performance deficiency that was within FENOC's ability to foresee and correct. A performance deficiency existed since the re-examination failure rate exceeded guidance in NRC IP71111.11B, Appendix F, which is an industry standard. This finding was more than minor because it was associated with human performance attribute of the mitigating systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and, if this finding were left uncorrected would have the

potential to lead to a more significant safety concern. Specifically, weaknesses that are not properly remediated could result in operator actions challenging reactor safety.

Inspection Manual Chapter 0609, "Significance Determination Process," Appendix I, "Licensed Operator Requalification Significance Determination Process" was used to assess this issue. This finding was related to the licensee remedial training and re-examinations. Because more than 10 percent of the licensed operators who were remediated failed their remediation examination, a finding of very low safety significance (Green) was applicable.

The inspector determined that this finding had a cross-cutting aspect in the area of human performance in that the licensee did not ensure sufficient resources (H.2.b) were available to properly remediate licensed operators who had demonstrated weaknesses during their written requalification examination.

Enforcement:

Enforcement action does not apply because the performance deficiency did not involve a violation of a regulatory requirement and has very low safety significance. There were no actual safety consequences because no licensed operator activities were performed by any operator that had not passed the requalification examination. FENOC took immediate corrective action to remediate and retest operators prior to assuming on-shift responsibilities. This issue is documented in CR 2012-1110.
(FIN 5000334/2012004-001, Remedial examination failure rate exceeds 10 Percent)

1R12 Maintenance Effectiveness (71111.12 – 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 2 'A' station air compressor failure to unload on August 29, 2012 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. 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.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 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 1, Online probabilistic risk assessment (PRA) risk evaluations for auxiliary feedwater (AFW) modifications dated July 16, 2012 and July 22, 2012
- Unit 2, Restoration of 'B' condensate pump on July 9, 2012
- Unit 2, Emergent work activities on 'A' station air compressor on July 30, 2012
- Unit 2, Yellow online PRA risk while 'A' quench spray pump and 'B' charging pump were unavailable on August 23, 2012

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

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

- Unit 1, Steam driven AFW pump turbine governor oil level high on August 23, 2012
- Unit 1, 1-2 Emergency diesel generator (EDG) "Start Failure" alarm during monthly surveillance test (1OST-36.2) on August 29, 2012
- Unit 1 and Unit 2, Two (2) 55-gallon drums of lubrication oil used in plant maintenance were not appropriately tested for safety related systems on July 13, 2012
- Unit 1 and Unit 2, Offsite to onsite power breaker alignment restoration after the No. 1 138kV bus re-energization on September 6, 2012
- Unit 2, Water intrusion in emergency service water pump cable instrument pit on July 31, 2012

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 samples)

Permanent Modifications

a. Inspection Scope

The inspectors evaluated engineering change proposal (ECP) 12-0178, which removed the auto-open feature of Unit 1 AFW throttle valves by disconnecting auxiliary output relay 3A-AFPB. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. Inspectors confirmed that the AFW throttle valves are normally locked open by procedure. Inspectors also physically verified that the valves are locked open. ECP 12-0178 was implemented on July 24, 2012.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 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, 'B' Spent fuel pool cooling pump failure repair on July 7, 2012
- Unit 1, Emergency response facility (ERF) EDG battery cell replacement on August 21, 2012
- Unit 2, 'B' Charging pump mechanical seal replacement on August 21, 2012
- Unit 2, 'A' Standby service water pump discharge isolation valve planned maintenance on August 23, 2012
- Unit 2, 'A' Quench spray pump following planned maintenance activities on August 27, 2012

- Unit 2, Reset of the rod control system power supply (PS-1) after replacing a blown fuse on August 27, 2012

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 7 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:

- Unit 1, P-1MS486, Loop 2 Steamline Pressure Protection Channel IV Test on August 8, 2012
- Unit 1, P-1MS476, Loop 1 Steamline Pressure Protection Channel IV Test on August 8, 2012
- Unit 1, 1OST-47.3K, Containment Isolation and ASME Test – work week 7 on August 9, 2012 (containment isolation valve)
- Unit 2, 2OST-36.1, Emergency Diesel Generator [2EGS*EG2-1] Monthly Test on July 25, 2012
- Unit 2, 2OST-6.2A, Computer Generated Reactor Coolant System Water Inventory Balance on August 8, 2012 (leak rate)
- Unit 2, 2MSP-1.05-I, Reactor Protection System Train B Test on August 9, 2012
- Unit 2, 2OST-13.1, Quench Spray Pump [2QSS*P21A] Test on August 27, 2012 (in-service test)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

The Office of Nuclear Security and Incident Response (NSIR) headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIP) and the Emergency Plan located under ADAMS accession number ML12205A075 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)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine FENOC emergency drill on August 2, 2012 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator, technical support center, and operation support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by FENOC staff in order to evaluate FENOC's critique and to verify whether the FENOC staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational/Public Radiation Safety (PS)

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

a. Inspection Scope

During the period September 24 - 27, 2012, the inspector conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas, and other radiological controlled areas during the Unit 2 (2R16) refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, relevant Technical Specifications, and the licensee's procedures.

Plant Walkdown and Radiation Work Permits (RWP) Reviews

The inspector toured accessible radiological controlled areas in the Unit 2 reactor building containment (RBC) and primary auxiliary building. Independent radiation

surveys were performed of selected areas to confirm the accuracy of survey data, and the adequacy of postings.

The inspector identified radiological significant jobs scheduled to be performed in the Unit 2 RBC. The inspector reviewed the applicable RWPs, as low as is reasonably achievable (ALARA) Plans (AP), and the electronic dosimeter dose/dose rate alarm set points, for the associated tasks, to determine if the radiological controls were acceptable and if the set points were consistent with plant policy. Jobs reviewed included under reactor head inspections (RWP 212-5050/51), removal of piping insulation (RWP 212-5015), steam generator (S/G) eddy current testing (RWP 212-5016/17), inspection of fuel transfer system (RWP 212-5019), and S/G primary side tube sleeving (RWP 212-5057).

For the jobs reviewed, the inspector determined that dosimetry was appropriately specified and located on the portion of the body receiving the highest dose rate, for those jobs having a significant dose rate gradient; i.e., under reactor head inspections and S/G channel head work.

The inspector evaluated the effectiveness of contamination controls by reviewing personnel contamination event reports (and related condition reports), and observing practices at various work locations in the RBC and at the RBC control point.

High Radiation Area and Very High Radiation Area Controls

The inspector reviewed procedures related to the control of high dose rate, high radiation areas and very high radiation areas. The inspector discussed these procedures with Radiation Protection Supervision to determine that any changes made to these procedures did not reduce safety measures.

Locked high radiation areas (LHRA), located in the Unit 2 RBC, were verified to be properly secured and posted during plant tours.

The inspector reviewed the preparations made for various potentially high dose rate jobs including fuel transfers, reactor head inspections, and S/G channel head work. This review included evaluating the effectiveness of contamination control measures, source term controls, including the use of temporary shielding and maintaining high water levels in the S/Gs.

Radiation Worker and Radiation Protection Technician Performance

During tours of radiological controlled areas in the Unit 2 RBC, the inspector questioned radiation workers and radiation protection technicians regarding the radiological conditions at the work site and the radiological controls that applied to their task. Additionally, radiological-related condition reports, including dose/dose rate alarm reports, were reviewed to evaluate if the incidents were caused by repetitive radiation worker or technician errors and to determine if an observable pattern traceable to a similar cause was evident.

The inspector attended the pre-job RWP briefing for inspection of fuel transfer cabling and components to determine if workers were properly informed, including discussions of past operating experiences, identification of the radiological conditions associated with

their tasks, heat stress considerations, electronic dosimetry dose/dose rate set points, and dose mitigation measures.

Problem Identification and Resolution

The inspectors evaluated the licensee's program for assuring that access controls to radiological significant areas were effective and properly implemented by reviewing various Nuclear Oversight audits and field observation reports, and relevant condition reports. The inspector determined that problems were identified in a timely manner, that an extent of condition, and cause evaluation were performed when appropriate, and corrective actions were effective to preclude repetitive problems.

b. Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

During the period September 24 - 27, 2012, the inspector conducted the following activities to verify that the licensee was properly implementing operational, engineering, and administrative controls to maintain personnel exposure ALARA for activities performed during the 2R16 refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR Part 20, and the licensee's procedures.

Radiological Work Planning

The inspector reviewed pertinent information regarding site cumulative exposure history, current exposure trends, and the ongoing exposure challenges for the Unit 2 outage. The inspector reviewed the 2R16 Outage ALARA Plan (AP).

The inspector reviewed the APs for all outage projects whose estimated exposure exceeded 5 person-rem. Included in this review were scaffolding installation/removal (AP 12-2-30), reactor disassembly/reassembly (AP 12-2-22), and S/G primary side tube inspections (AP 12-2-21).

In reviewing these APs, 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 (AMC) meeting minutes.

Verification of Dose Estimates

The inspector reviewed the assumptions and basis for the 2R16 outage ALARA plan. The inspector also reviewed the revisions made to various outage project dose estimates that resulted from exposure challenges presented by the AMC.

The inspector reviewed the licensee's procedures associated with monitoring and re-evaluating dose estimates when the forecasted cumulative exposure for tasks was

approached and the implementation of these procedures during the outage. The inspector reviewed the exposures for the ten (10) workers who received the highest doses for 2012 to confirm that no individual exceeded the regulatory annual limit or the performance indicator criteria.

Job Site Inspections

The inspector reviewed the exposure controls specified in ALARA Plans and RWPs for refueling activities, scaffolding installation, and attended pre-job ALARA briefings for fuel transfer system inspection, reactor head examinations, S/G eddy current testing, and insulation removal.

During the inspection period, the inspector observed workers perform RBC mobilization, scaffolding installation, and preparations for reactor disassembly. Workers were questioned regarding their knowledge of job site radiological conditions and ALARA measures applied to their tasks.

Source Term Reduction and Control

The inspector reviewed the status and historical trends for the Unit 2 source term. Through review of survey maps and interviews with the Senior Nuclear Specialist-ALARA, the inspector evaluated recent source term measurements and control strategies. Specific strategies being employed included use of maintaining an acid-reducing condition in the RCS following shutdown, use of macro-porous clean up resin, enhanced chemistry controls, system flushes, maximizing S/G water levels, and temporary shielding.

The inspector assessed the effectiveness of temporary shielding by reviewing pre and post installation radiation survey data for shielding the pressurizer spray line (Nos. 12-66, 12-67, 12-102), letdown line (No. 12-122), reactor coolant system piping (No. 12-98), and S/G hand-holes (No. 12-73).

Problem Identification and Resolution

The inspector reviewed elements of the licensee's corrective action program, including field observations by the Nuclear Oversight Department and Radiological Assessor, related to implementing the ALARA program to determine if problems were being entered into the program for timely resolution. Condition reports related to programmatic dose challenges, personnel contaminations, dose/dose rate alarms, and the effectiveness in predicting and controlling worker exposure were reviewed.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation

a. Inspection Scope

During the period September 24 – 27, 2012, the inspector conducted the following activities to verify that in-plant radioactivity airborne concentrations were being controlled and monitored and that the use of respiratory protection devices was appropriately

specified and used. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, and the licensee's procedures.

Engineering Controls

There were no current radiation work permits for airborne radioactivity areas with the potential for individual worker internal exposures to exceed 10 mrem during the 2R16 outage. The inspector reviewed air sampling records for on-going jobs to confirm that airborne contamination was not significant; e.g., reactor fuel transfer canal inspections, and fuel up-ender inspections. Additionally, the inspector confirmed that engineering controls, such as portable high efficiency particulate air (HEPA) filtration/ventilation systems, were tested, operable and to be used for tasks involving contaminated systems, such as reactor head inspections and primary side S/G tube testing.

Use of Respiratory Protection Devices

The inspector confirmed that powered air purifying respirators were used as a contingency for specific tasks involving potential airborne contamination including fuel transfer system inspections, and for opening S/Gs in preparation for tube inspections.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (72124.04)

a. Inspection Scope

During the period September 24 – 27, 2012, 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 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 Part 20, and the licensee's procedures.

External Dosimetry

The inspector verified that the on-site facility used to process thermo-luminescent dosimeters was accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). The inspector confirmed that detailed procedures were implemented associated with dosimeter practices, including routine thermoluminescence dosimeter (TLD) issuance, multi-badging, and extremity dosimeters. The inspector verified that procedural controls were in place for external effective dose equivalent determinations that would be used for high dose gradient tasks; e.g., reactor head inspections and S/G channel head work.

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 determined.

Internal Dosimetry

The inspector determined that no internal uptakes of radioactive material had occurred since the last inspection of this area in April 2012.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 - 1 sample)

a. Inspection Scope

This area was inspected to verify the effectiveness of the licensee's programs for processing, handling, storage, and transportation of radioactive material. The inspector used the requirements of 10 CFR Parts 20, 61, and 71, and 10 CFR Part 50, Appendix A, Criterion 63 - Monitoring Fuel and Waste Storage, and licensee procedures required by the Technical Specifications/Process Control Program as criteria for determining compliance.

The inspector reviewed the solid radioactive waste system description in the final safety analysis report (FSAR), the Process Control Program (PCP), and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspector reviewed the scope of any quality assurance (QA) audits in this area since the last inspection.

The inspector selected areas where containers of radioactive waste were stored, and verified that the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspector verified that the radioactive materials storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection Against Radiation." For materials stored or used in the controlled or unrestricted areas, the inspector verified that they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material not in Storage," as appropriate. Areas inspected included the Unit 1 steam generator storage building.

The inspector verified that the licensee had established a process for monitoring the impact of long-term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) sufficient to identify potential unmonitored, unplanned releases, or nonconformance with waste disposal requirements. The inspector verified that there were no signs of swelling, leakage, or deformation.

The inspector walked down accessible portions of liquid and solid radioactive waste processing systems to verify and assess that the current system configuration and

operation agree with the descriptions in the FSAR, offsite dose calculation manual, and PCP.

The inspector identified radioactive waste processing equipment that was not operational and/or was abandoned in place, and verified that the licensee had established administrative and/or physical controls to ensure that the equipment would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspector verified that the licensee had reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments."

The inspector reviewed the adequacy of any changes made to the radioactive waste processing systems since the last inspection. The inspector verified that changes from what was described in the FSAR were reviewed and documented in accordance with 10 CFR 50.59, as appropriate.

The inspector identified processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers. The inspector verified that the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the PCP, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

For those systems that provide tank recirculation, the inspector verified that the tank recirculation procedure provided sufficient mixing.

The inspector verified that the licensee's PCP correctly described the current methods and procedures for dewatering waste.

The inspector identified radioactive waste streams, and verified that the licensee's radiochemical sample analysis results were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspector verified that the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current 10 CFR Part 61 analyses.

For the waste streams identified above, the inspector verified that changes to plant operational parameters were taken into account to (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update, and (2) verified that waste shipments continued to meet the requirements of 10 CFR Part 61.

The inspector verified that the licensee had established and maintained an adequate QA program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55, "Waste Classification" and 10 CFR 61.56, "Waste Characteristics."

The inspector observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspector verified that the requirements of any applicable transport cask certificate of compliance had been met. The inspector verified that the receiving licensee was authorized to receive the shipment packages.

The inspector determined that the shippers were knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to the licensee's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979, and 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training." The inspector verified that the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

The inspector identified non-excepted package shipment records and verified that the shipping documents indicate the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and shipping identification number. The inspector verified that the shipment placarding was consistent with the information in the shipping documentation.

The inspector verified that problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution in the licensee corrective action program. The inspector verified the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radioactive waste processing, handling, storage, and transportation.

The inspector reviewed the results of selected audits performed since the last inspection of this program and evaluated the adequacy of the licensee's corrective actions for issues identified during those audits.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Mitigating System Performance Index (6 samples)

a. Inspection Scope

The inspectors reviewed FENOC's submittal of the Mitigating Systems Performance Index for the following systems for the period of September 1, 2011 through August 31, 2012:

- Unit 1 Auxiliary Feedwater System
- Unit 1 Residual Heat Removal System
- Unit 1 Support Cooling Water System
- Unit 2 Auxiliary Feedwater System
- Unit 2 Residual Heat Removal System
- Unit 2 Support Cooling Water System

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed FENOC's operator narrative logs, condition reports, mitigating systems performance index derivation 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 – 4 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 first and second 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 the FENOC quarterly trend report for the first quarter of 2012, conducted under NOP-LP-2001, Rev. 30, "Condition Report Process," and NOBP-LP-2018, Rev. 9, "Integrated Performance Assessment /Trending" 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 also observed an apparent increase in the pump seal leakage associated in various pumps in both Unit 1 river water system and Unit 2 service water system. Both of these systems draw from the Ohio River and supply cooling water to safety related components. This observation was communicated to the licensee and has been entered in their corrective action program (CR 2012-14792) for further review.

.3 Annual Sample: Review of the Operator Workaround Program

a. Inspection Scope

The inspectors reviewed the cumulative effects of the existing operator workarounds, operator burdens, existing operator aids and disabled alarms, and open main control room deficiencies to identify any effect on emergency operating procedure operator actions, and any impact on possible initiating events and mitigating systems. The inspectors evaluated whether station personnel had identified, assessed, and reviewed operator workarounds as specified in FENOC procedure NOBP-OP-0012, "Operator Work-Arounds, Burdens, and Control Room Deficiencies," Rev. 1.

The inspectors reviewed Beaver Valley Power Station's process to identify, prioritize and resolve main control room distractions to minimize operator burdens. The inspectors reviewed the system used to track these operator workarounds and recent self assessments of the program. The inspectors also toured the control room and discussed the current operator workarounds with the operators to ensure the items were being addressed on a schedule consistent with their relative safety significance.

b. Findings and Observations

No findings were identified.

The inspectors determined that the issues reviewed did not adversely affect the capability of the operators to implement abnormal or emergency operating procedures. The inspectors also verified that FENOC entered operator workarounds and burdens into the corrective action program at an appropriate threshold and planned or implemented corrective actions commensurate with their safety significance.

.4 Annual Sample: Through-wall leakage events in service water/river water/fire protection systems

a. Inspection Scope

A Problem Identification and Resolution (PI&R) sample inspection was conducted to evaluate an increasing trend in through-wall leakage events in the river water, service water, and fire protection system piping. The inspector assessed the problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to verify that FENOC was appropriately identifying, characterizing, and correcting problems associated with this issue. The inspector also assessed the appropriateness of planned and completed corrective actions. The inspector compared the actions taken to the requirements of

FENOC's corrective action program and 10 CFR Part 50, Appendix B. In addition, the inspector performed documentation reviews and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

The inspector reviewed various condition reports noted in the Attachment to this report that identified a number of small (pinhole) leaks in these piping systems, system health reports, non-destructive examination (NDE) data sheets, prompt operability determination evaluations, work and orders. The inspector also reviewed recommended action plans developed to address river and service water piping replacement, and a proposed chemical treatment improvement modification for river water, service water, and fire protection system piping.

The inspector selected a sample of NDE activities to perform a documentation review of those activities for compliance with the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. The inspector reviewed a sample of ultrasonic tests (UT) erosion/corrosion reports as noted in the Attachment to this report. The inspector noted the samples selected for "extent of condition" evaluations were of the same materials of construction and were within the same system (exhibited same or similar temperature, pressure, media and flow) as those portions of pipe which exhibited leakage. The inspector verified by these documentation reviews that the tests specified were appropriate for the volumetric examination of the piping at the through-wall penetration flawed locations. In addition, the inspector performed this review to determine that nonconforming indications were appropriately identified, characterized, documented and entered into the licensee's corrective action process.

b. Findings and Observations

No findings were identified.

The engineering evaluation of the increasing trend in through-wall leakage of these piping systems performed by FENOC determined the failure mechanism was inside diameter (ID) pitting under deposit corrosion causing pin-hole leaks in the piping which was accelerated by microbiological influenced corrosion (MIC) activity.

Sample NDE UT examinations were appropriately performed in accordance with ASME Boiler and Pressure Vessel Code Case N-513-2, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1," and with the guidance contained in Regulatory Information Summary (RIS) 2005-20, Revision 1. The NDE examination process required an expansion of sample as each lot was examined until no significant flaws were detected or, until 100 percent of susceptible and accessible locations had been examined. The sample lots were inspected and calculations performed which showed the flaw locations to be acceptable. Based on the leakage quantity from the pinhole leaks caused by MIC, which tend to be small and have little effect on pressure or structural integrity of piping, the licensee prompt operability determination (POD) evaluation determined that structural integrity was maintained and the 3-inch diameter piping is structurally acceptable per Branch Reinforcement Area methodology of ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition and all applicable Addenda up to including Winter 1972 Addenda, Section NC-3643.3.

The inspector determined that the issue is receiving appropriate management attention as indicated by the river water and service water pipe replacement project and chemical

injection modification which are currently being tracked in the Beaver Valley Plant Health Committee (PHC) Issues "Top Ten List". The PHC approved issue 11-050 for implementation of chemical treatment upgrade as indicated by corrective action CA 2011-02900-7. However, the licensee had previously developed design change package DCP-2179, Engineering Change Package ECP 02-0045 and Engineering Change Request 02-0372 to improve the effectiveness of the chemical treatment system but these improvements were never implemented and were all cancelled in 2004.

The inspector determined the licensee's response to the issue was adequate, compensatory actions, such as increased NDE inspections and monitoring of these systems piping, were appropriate. The inspector determined that the actions taken to date are reasonable to resolve the short term fix of the MIC problems. The inspector noted that to permanently resolve this issue, the planned corrective actions to replace portions of the river water and service water system piping and the chemical treatment system upgrade modifications are necessary.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 2 samples)

.1 Plant Events

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 1, Loss of No. 1 138kV switchyard bus that resulted in two inoperable offsite power sources
- Unit 1 and Unit 2, Sounding of 94 sirens due to maintenance error

Findings

No findings were identified.

4OA5 Other Activities

.1 Temporary Instruction 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 – Flooding Walkdowns

On August 28, 2012, inspectors commenced activities to independently verify that FENOC conducted external flood protection walkdown activities using an NRC-endorsed walkdown methodology. These flooding walkdowns are being performed at all sites in response to Enclosure 4 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding

Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). The results of this temporary instruction will be documented in a future inspection report.

.2 Temporary Instruction 2515/188 – Inspection of Near-Term Task Force Recommendation 2.3 – Seismic Walkdowns

On September 10, 2012 inspectors commenced activities to independently verify that FENOC conducted seismic walkdown activities using an NRC-endorsed seismic walkdown methodology. These seismic walkdowns are being performed at all sites in response to Enclosure 3 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). When complete, the results of this temporary instruction will be documented in a future inspection report.

.3 NRC Temporary Instruction 2515/177 - Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems

a. Inspection Scope

The inspectors performed the inspection in accordance with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems." The NRC staff developed TI 2515/177 to support the NRC's confirmatory review of licensee responses to NRC Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems." Based on the review of FENOC's GL 2008-01 response letters, the NRR staff provided guidance on TI inspection scope to the regional inspectors. The inspectors used this inspection guidance along with the TI to verify that FENOC implemented or was in the process of acceptably implementing the commitments, modifications, and programmatically controlled actions described in their GL 2008-01 response. The inspectors verified that the plant-specific information (including licensing basis documents and design information) was consistent with the information that FENOC submitted to the NRC in response to GL 2008-01.

The inspectors reviewed a sample of isometric drawings and piping and instrument diagrams, and conducted selected system piping walkdowns to verify that FENOC's drawings reflected the subject system configurations and Updated Final Safety Analysis Report (UFSAR) descriptions. Specifically, the inspectors verified the following related to a sample of isometric drawings for the high head safety injection (HHSI), low head safety injection (LHSI), and quench spray (QS) systems:

- High point vents were identified;
- High points that did not have vents were recognized and evaluated with respect to their potential for gas buildup;
- Other areas where gas could accumulate and potentially impact subject system operability, such as orifices in horizontal pipes, isolated branch lines, improperly sloped piping, and under closed valves, were acceptably evaluated in engineering reviews or had ultrasonic testing (UT) points which would reasonably detect void formation; and,
- For piping segments reviewed, branch lines and fittings were clearly shown.

The inspectors conducted walkdowns of portions of the above systems to reasonably assure the acceptability of FENOC's drawings utilized during their review of GL 2008-01. The inspectors verified that FENOC conducted walkdowns of the applicable systems to confirm that the combination of system orientation, vents, instructions and procedures, tests, and training, would ensure that each system was sufficiently full of water to assure operability. The inspectors reviewed FENOC's methodology used to determine system piping high points, identification of negative sloped piping, and calculations of void sizes based on UT equipment readings, to ensure the methods were reasonable.

The inspectors verified that FENOC included the appropriate emergency core cooling systems, along with supporting systems within scope of the GL. In addition, the inspectors reviewed engineering analyses associated with the development of acceptance criteria for as-found voids, which included engineering assumptions for void transport and acceptability of void fractions at the suction and discharge piping of the applicable system pumps.

The inspectors reviewed a sample of FENOC's procedures used for filling and venting the associated GL 2008-01 systems to verify that the procedures were effective in venting or reducing voiding to acceptable levels. The inspectors verified the installation of hardware vents, located in the Unit 1 LHSI suction piping from the containment sump, as committed to in FENOC's GL response.

The inspectors reviewed a sample of system UT and venting results to ensure proper implementation of the associated procedures and that the existence of unacceptable gas accumulation was evaluated within the corrective action program (CAP), as necessary. The inspectors reviewed CAP documents to verify that selected actions described in FENOC's nine-month and supplemental submittals were acceptably documented. The inspectors also verified that NRC commitments in FENOC's submittals were included in the CAP. Additionally, the inspectors reviewed selected evaluations and corrective actions for various issues FENOC identified during their GL 2008-01 review. The inspectors performed this review to ensure FENOC appropriately evaluated and adequately addressed any gas voiding concerns including the evaluation of operability for gas voids discovered in the field. Finally, the inspectors reviewed FENOC's training associated with gas accumulation to assess if appropriate training had been provided to the operations and engineering support staff to ensure appropriate awareness of the effects of gas voiding. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified. As part of their review, FENOC had examined system realignments during design basis postulated scenarios to ensure that affected piping segments would remain acceptably full of water. FENOC determined that when transferring to the recirculation mode of emergency core cooling at Unit 2, some amount of gas may be present in the recirculation spray (RS) system to HHSI/charging cross-connect piping in both RS system trains. FENOC concluded that any voids present would be swept out of the piping segments through the RS spray rings prior to realigning the flowpath from RS to the HHSI cross-connect piping. The inspectors determined that FENOC's assertion that this horizontal piping segment would become full of water by the time of the realignment had not been verified through a supporting calculation, analysis or test data.

In response to the issue, FENOC entered this issue in their correction action system (CR 2012-14071); and subsequently verified the adequacy of their design assumption that the voids would be swept through the RS system during the performance of RS system flow tests on October 3 and October 4, 2012.

This inspection completes the requirements for TI 2515/177 at Units 1 and 2.

4OA6 Meetings, Including Exit

On October 8, 2012, the inspectors presented the inspection results to Paul Harden, Site Vice President, and other members of the BVPS 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

R. Ferrie	Supervisor, Electrical Maintenance
J. Meyers	System Engineer, River Water and Service Water
D. Gmys	System Engineer, Fire Protection
B. Goff	Supervisor, Work Planning
P. Harden	Site Vice President
L. Hollencamp	Work Planning Engineer
C. Hrelec	Radwaste Shipper
R. Lieb	Director, Site Operations
R. Lubert	Supervisor, Electrical Engineering
C. McFeaters	Manager, Operations
J. Miller	Site Fire Marshall
B. Paul	Electrical Engineer
J. Saunders	Radwaste Supervisor
D. Schwer	Superintendent, Operations Support
B. Sepelak	Supervisor, Regulatory Compliance
R. Boyle	Supervisor, Nuclear Plant System Engineering
D. Schwer	Superintendent, Nuclear Operations Services
K. Deberry	System Engineer
K. Frederick	Design Engineer
K. Mitchell	System Engineer
M. Ressler	Design Engineering Supervisor

Other Personnel

L. Ryan	Inspector, Pennsylvania Department of Radiation Protection

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000334/2012004-01	FIN	Remedial examination failure rate exceeds 10 Percent (Section 1R11)
05000412/2012004·01	NCV	Ineffective Corrective Action Results in Inoperable Component Cooling Water Heat Exchanger (Section 1R07)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
1/2 OM-53C.4A.75.1, Acts of Nature- Tornado or High Wind Condition, Revision 14
1/2 OM-53C.4A.75.2, Acts of Nature- Flood, Revision 28
1/2 OM-53C.4A.75.4, Acts of Nature- Dam Failure, Revision 7

Condition Reports
2011-94360 2011-91671 2011-92388 2011-92531

Section 1R04: Equipment Alignment

Procedures
1OM-33.1.C, Major Components, Revision 5
1OM-33.3.B.1, Valve List-1FP, Revision 24
2OM-7.33B.1, Valve List-2CHS, Revision 25

Miscellaneous
Dwg 10080-RM-0430-001A
Beaver Valley Key Defense In-Depth Turnover Checklist, dated September 26, 2012 0600

Section 1R05: Fire Protection

Procedures
1PFP-SRVB-713, Normal Switchgear Fire Area NS-1, Revision 2
1PFP-SRVB-713, DF Switchgear Room Fire Area ES-2, Revision 2
2PFP-CPBX-722, Condensate Polishing Building, Fire Area CP-1, Revision 2
2PFP-MSCV-733, Personnel Air Lock & Purge Duct Rooms (CV-5), Revision 0
1PFP-AXLB-722, Auxiliary Building General Are (PA-1G), Revision 4
1OST-33.15A, Fire Extinguisher Monthly Inspection, Revision 18

Condition Reports
2012-10357 2012-12196

Section 1R06: Flood Protection Measures

Condition Reports
2012-11855 2012-11826 2012-11792 2009-60496

Drawings
10080-RC-291-I
10080-RC-729D
10080-RC-29A
10080-RE-32G

Section 1R07: Heat Sink Performance

Procedures
½-ADM-2146, BOP Eddy Current Program, Revision 2
NOP-LP-2001, Corrective Action Process, Revision 30

Condition Reports
2012-10784 2012-04966 2012-13607 2012-13235 2012-13618 2012-13945
2011-01747 2011-93970 2011-94662

Miscellaneous
10800-N-829
WO 200512876

Section 1R11: Licensed Operator Requalification Program

Procedures
1OM-53A.1.ECA-0.1 (1SS1C), Revision 9
1OM-53A.1.E-0 (1SS1C), Revision 11
2OST-1.12B, Safeguards Train B SIS Go Test, Revision 45
2OM-23B.4.A, Heater Drain System Startup, Revision 25
1OM-53C.4.1.38.1D, Loss of Vital Bus IV
1/2ADM-1347, Licensed Operator Initial Training Program, Revision 7
1/2ADM-1351, Licensed Operator Continuing Training Program, Revision 11
1/2ADM-1360, Licensed Operator Tracking, Revision 8
1/2ADM-1362, Security Provisions for Licensed Operator Examinations
BVBP-TR-0008, Licensed Operator Requalification Exam Development & Administration, Revision 7
NOP-LP-1020, Health Assessment, Revision 3
NOP-TR-2001, Licensed Operator Initial Training Program, Revision 3

Simulator Work Requests
SWR 2003, Loss of Load C7A Signal Inhibits Banks 3 & 4 Cond Stm Dumps
SWR 2009, PT-CN-103A & B Power Supply Incorrect
SWR 2027, Model Containment Pressure Transmitters PT-1LM-100A, B, C, D
SWR 2032, Steam Generator Pressure Drops During Tube Rupture
SWR 2063, ECP 11-0125 Retire Sodium Hydroxide Chem Add System Software
SWR 2064, ECP 11-0125, Retire Sodium Hydroxide Chem Add System Hardware
SWR 2065, Add Gain to Allow Increased 455A Spray Valve Open
SWR 2092, SRNI Audio Count Rate Remains Energized on Loss Vital Bus 4
SWR 2071, AMSAC Actuates on Loss of Vital Bus IV and It Should Not
SWR 2103, River Water Flow DSGs With No Pumps Running Due to Backflow
SWR 2114, Simulator CS Model Halt Due to Chem Add Pump During LORT

Simulator Tests
Simulator Evaluation for Down Power Transient for N43 Repair 13 April 2011
SQT-3.2, 2011 Unit 1 Simulator Instrument Accuracy Test
SQT-3.3, 2011 Unit 1 Simulator Physical Fidelity Review
SQT-4.78, Loss of 120 VAC Vital Bus
SQT-4.19, CCW Pump Suction Header Leak
SQT-4.16, CCW Pump Trip
SQT-5.6, 2010 Unit 1 Turbine Trip Without Reactor Trip
SQT-5.6, 2011 Unit 1 Turbine Trip Without Reactor Trip

Condition Reports
2011-93736 2011-95957 2011-97062 2011-97132 2011-00947 2011-03964
2011-04353 2012-09609 2012-11110 2012-12066

Miscellaneous
Red Team Mini-Drill Scenario Time Line, Revision 0
Beaver Valley Power Station – NRC Problem Identification and Resolution Inspection Report 05000334/2011009 and 05000412/2011009
Performance GAP Analysis for CR-G203-2001-93736, CR-2011-03964, CR-2011-00947
Training Effectiveness Evaluation Worksheet TEEW 2012-01
Learning Objective Design EPP-9381, Revision 8
Learning Objective Design OTGC-201201OER_BV3, Revision 0
Learning Objective Design OTGC-201104HIT_BV3, Revision 0
Learning Objective Design OTGC-201105HIT_BV3, Revision 1
Simulator Guide 2012 U1C3D1 – Cycle 3 Intro, As Found CPE
Unit 1 2012 Sample Plan, Revision 2

Section 1R12: Maintenance Effectiveness

Procedures
NOP-ER-3004, FENOC Maintenance Rule Program, Revision 1

Condition Reports
2012-11795 2012-12074 2012-12669 2012-13103

Miscellaneous
2DB2-34, Design basis Document for Compressed Air System, Revision 5

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
2OM-22A.3.B.2, Valve List-2CNM, Revision 11
2OM-22A.4.M, Supplying Demin Water to [2CNM-P21B] Piping During Motor Replacement, Revision 1
Duquesne Light, Cut in the No. 1/2-138kV Bus Tie No. 1 Section 138kV Breaker OCB 90, Revision 0

Condition Reports
2012-10817 2012-11490 2012-12037 2012-12074

Maintenance Orders/Work Orders
200514759

Miscellaneous
Unit 1 Weekly Maintenance Risk Summary for the week of July 16, 2012, Revision 1
Unit 1 Weekly Maintenance Risk Summary for the week of July 23, 2012, Revision 0
Unit 1 Weekly Maintenance Risk Summary for the week of July 23, 2012, Revision 1
Unit 2 Weekly Maintenance Risk Summary for the week of July 30, 2012, Revision 0
Unit 2 Weekly Maintenance Risk Summary for the week of July 30, 2012, Revision 1
Unit 2 Weekly Maintenance Risk Summary for the week of July 30, 2012, Revision 2
Unit 2 Shift Operating Logs dated July 30, 2012
Unit 2 Weekly Maintenance Risk Summary for the week of August 30, 2012, Revision 0
Unit 2 Weekly Maintenance Risk Summary for the week of August 30, 2012, Revision 1
Unit 2 Weekly Maintenance Risk Summary for the week of August 30, 2012, Revision 2
Unit 2 Weekly Maintenance Risk Summary for the week of August 30, 2012, Revision 3

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
1OST-36.2, Diesel Generator No.2 Monthly Test, Revision 62
1OM-36.4.AH, Diesel Generator No. 2 Start-up and Shutdown, Revision 13
2OST-36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification, Revision 13
1OST-36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification, Revision 18

Condition Reports
2012-13280 2009-63987 2009-58612 2012-11826 2012-11792 2009-60496
2012-11855 2012-12967 2012-11021

Miscellaneous
Unit 1 Operator Logs dated August 29 and 30, 2012
Engineering Evaluation Review (EER) 600773890
NOTF 600765012
Beta Labs Component and Material Testing Report BV-5362 dated July 17, 2012

Section 1R18: Plant Modifications

Procedures
NOP-CC-2003, Engineering Changes, Revision 17

Maintenance Orders/Work Orders
200497483

Miscellaneous
1DBD-24B, Design Basis Document for Auxiliary Feedwater System, Revision 11
NOTF 600665948

Section 1R19: Post-Maintenance Testing

Procedures
1/2 CMP-75-480V Motor-Term 1E, 480V Motor/Miscellaneous Equipment Termination, Revision 11
BVBP-Site-0053, Post-Maintenance Test Requirements, Revision 6
2OST-13.1, Quench Spray Pump [2QSS*P21A], Revision 31
2OST-30.1A, Standby Service Water Pump [2SWE-P21A], Revision 26
1/2-CMP-M-7-001, High Head Safety Injection Charging Pump Overhaul, Revision 14
1/2-CMP-M-75-034, Inspection and Cleaning Components With Boric Acid Leakage, Revision 6
2OST-7.5, Centrifugal Charging Pump [2CHS*P21B], Revision 37
1/2Cmp-75-BAT-1E, Station Battery Replacement Procedure, Revision 9
1-PMP-E-58-001, Maintenance of the ERF and ERFS Batteries, Revision 13

Condition Reports
2012-10747 2012-11142 2012-11366 2012-12245 2012-11977 2012-12584
2012-12076 2012-13066 2012-13124 2012-11206 2012-14127 2012-12745

Maintenance Orders/Work Orders
200512012 200473464 200392445 200385801 200509444

Miscellaneous
Regulatory Applicability Determination No. 12-03318, Initiating Activity No. 1/2-CMP-M-7-001, Revision 0
BVBP-SITE-53, Post-Maintenance Test Requirements, Revision 7

Section 1R22: Surveillance Testing

Procedures
2OST-13.1, Quench Spray Pump [2QSS*P21A] Test, Revision 31
1MSP-21.07-I, P-1MS476, Loop1 Steamline Pressure Protection Channel IV Test, Revision 15
1MSP-21.08-I, PS-1MS486, Loop 2 Steamline Pressure Protection Channel IV Test, Revision 15
1OST-47.3K, Containment Isolation and ASME Test-Work Week 7, week of May 7, 2012, Revision 20
1OST-47.3K, Containment Isolation and ASME Test-Work Week 7, week of June 18, 2012, Revision 20

Condition Reports
2012-11277 2012-10866 2012-11482

Maintenance Orders/Work Orders
20047400 200473464 200493215 200472379 200472380 200473353

Miscellaneous
Unit 1 Operating Logs dated June 18, 2012

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures
EPP-1-1a, “Recognition and Classification of Emergency Conditions,” Revision 14
EPP-1-1b, “Recognition and Classification of Emergency Conditions,” Revision 15

Miscellaneous
Emergency Plan, Section 4, “Emergency Conditions,” Revision 27

Section 1EP6: Drill Evaluation

Procedures
1/2-EPP-I-3, Alert, Revision 36
1/2-EPP-I-4, Site Area Emergency, Revision 36
1/2-EPP-I-5, General Emergency, Revision 37
1/2-EPP-IP-1.1, Notification, Revision 47
1/2-EPP-IP-1.4, Technical Support Center Actuation, Operation and Deactivation, Revision 33
Unit 1, EPP-I-1a, Recognition and Classification of Emergency Conditions, Revision 14
Unit 2, EPP-I-1b, Recognition and Classification of Emergency Conditions, Revision 15

Condition Reports
2012-11990 2012-11998 2012-11999 2012-12006 2012-12023 2012-12025
2012-12065

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Procedures
1/2-PCP-1.01, Process Control Program, Revision 3
NOP-OP-5201, Shipment of Radioactive Material, Revision 2
1OM-18.4.A, Flushing Resin From Any Group I Ion Exchanger to 1SW-TK-2, Revision 5
1OM-18.4.AF, Dewatering High Integrity Containers, Revision 3
1OM-18.4.AH, Resin Transfer From Any Group I Ion Exchanger to a Liner/Shipping Container, Revision 6
1OM-18.4.AJ, Resin Transfer From Any Group III Ion Exchanger to a Liner/Shipping Container, Revision 4
2OM-18.4.A, Flushing Any Group I Ion Exchange Resin to the Spent Resin Holding Tank, Revision 5
2OM-18.4.AAB, Local Spent Resin Hold Tank High Level, Revision 2
2OM-18.4.AC, Transfer of Resins From “55 gallon Drums” to the HIC at Unit 2 WHB Truck Bay, Revision 1
2OM-18.4.D, Flushing Any Group I Ion Exchange Resin to a High Integrity Container, Revision 5
2OM-18.4.Y, Dewatering Shipping Containers [HIC], Revision 7
2OM-18.4.Z, Transferring Spent Resin Hold Tank to a HIC Using a Portable Pump, Revision 1
BVPP-RP-0022, Temporary On-Site Storage of Radioactive Waste, Waste Handling Building (South of the Switchyard), Revision 2

Lesson Plans
RP-RADSHIPPING_FEN, Rev 1, Radioactive Material Packaging, Transport and Disposal Training
GEN-USDOT_FEN-01, Rev 1, USDOT Regulations General Awareness

Condition Reports
2012-08862 2011-04473 2011-02281 2011-01484 2011-01695 2011-02527
2011-95858 2012-00237

Radioactive Material Shipments
B-3979 B-4056 B-4087 B-4098 B-4106

Miscellaneous
Beaver Valley NPP Fleet Oversight Trimester Report, BV-PA-12-01
Beaver Valley NPP Fleet Oversight Trimester Report, BV-PA-11-03
Fleet Oversight Audit Report MS-C-11-08-03, Radiation Protection/Radwaste
GEL Laboratories 10 CFR 50/61 Certification of Analysis for: U-1 Primary Resin; U-1 Primary Filter; U-1 Dry Active Waste; U-1 LW Resin; U-2 Primary Resin; U-2 Primary Filter; U-2 Dry Active Waste; and, U-2 LW Resin

Section 4OA2: Problem Identification and Resolution

Condition Reports
2012-14000 2012-13174 2012-12980 2012-02382 2012-01893
2012-01887 2012-01702 2012-00532 2012-00020 2011-98173
2011-97552

Miscellaneous
SN-SA-2012-0140, Self-Assessment – Snapshot, BVPS Operator Work-Arounds, Burdens, and Control Room Deficiencies 1st Quarter 2012
SN-SA-2012-0190, Self-Assessment – Snapshot, BVPS Operator Work-Arounds, Burdens, and Control Room Deficiencies 2nd Quarter 2012
SN-SA-2012-0219, Self-Assessment – Snapshot, BVPS Operator Work-Arounds, Burdens, and Control Room Deficiencies 3rd Quarter 2012
UT Erosion/Corrosion Examination Report, BOP-UT-10-364, 2SWS-142 Line, November 6, 2010
UT Erosion/Corrosion Examination Report, BOP-UT-11-313, 2SWS-008-128-3, 8-inch service water pipe, September 29, 2011
ASME Boiler and Pressure Vessel Code Case N-513-2, Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1
NOP-CC-5703, FirstEnergy Nuclear Operating Company (FENOC) ASME Section XI Repair/Replacement (R/R) Program, Revision 00
Beaver Valley Plant Health Committee (PHC) Issues Top 10 List, July 24, 2012
Work Order 200357554, Repair thru wall leak on river water piping return from recirc spray heat exchangers, May 13, 2009
Prompt Operability Determination for CR 10-85474 Service Water Piping Leak Upstream 2SWS-142, November 9, 2010

Section 4OA3: Follow-Up of Events and Notices of Enforcement Discretion

Condition Reports
2012-13706 2012-12809

Miscellaneous
Event Notification Report 48283, Both Offsite Power Sources Inoperable, dated, September 6, 2012
Beaver Valley Units 1&2, Operations Log, dated September 6, 2012
Event Notification Report 48210, Offsite Notification Due to Inadvertent Siren Activation dated August 20, 2012

Section 4OA5: Other Activities

Calculations and Evaluations
8700-DMC-1590, Chemical Addition System Void Limits, Revision 0
8700-DMC-3412, Unit 1 Void Fraction at Charging Pump Inlet, Revision 1
8700-DMC-3661, Unit 1 Acceptance Criteria for Voids in the Unit 1 LHSI System, Revision 0
10080-N-757, Unit 2 Void Fraction at Charging Pump Inlet, Revision 0
10080-N-757, Addendum 2, Unit 1/2 Beaver Valley Piping Void Limit Determination, Revision 0

Condition Reports

2008-46084	2009-54022	2009-67586	2010-74067	2010-85216	2010-86428
2010-86618	2010-87341	2011-94430	2012-03460	2012-08876	2012-13701
2012-13925	2012-13926	2012-14038	2012-14043	2012-14065	2012-14071
2012-14086	2012-14235				

Work Orders

200284755	200338195	200357500	200417422	200424395	200428994

Design and Licensing Bases

Letter L-08-313, FENOC to NRC, Beaver Valley Power Station, Units 1 and 2, Nine-Month Response to NRC GL 2008-01, dated 10/14/08
Letter L-09-188, FENOC to NRC, Beaver Valley Power Station, Units 1 and 2, Supplemental (Post-Outage) Response to NRC GL 2008-01, dated 8/18/09
Letter L-10-002, FENOC to NRC, Beaver Valley Power Station, Units 1 and 2, Response to NRC Request for Additional Information Regarding GL 2008-01, dated 1/29/10

Drawings

10080-ISI-107936-4, Unit 2 QS System, Safeguards Area, Revision 4
10080-ISI-107937-4, Unit 2 QS System, Safeguards Area, Revision 4
10080-ISI-107940-3, Unit 2 QS System, Safeguards Area, Revision 3
10080-ISI-108105-5, Unit 2 SI System, Safeguards Area, Revision 5
10080-ISI-108107-5, Unit 2 SI System, Safeguards Area, Revision 5
10080-ISI-108310-4, Unit 2 SI System, Auxiliary Building, Revision 4
10080-RM-0407-001A, Unit 2 Chemical and Volume Control System, Revision 20
11-0125-001-003, Unit 1 QS Piping West Yard to Pipe Tunnel, Train A, Sh. 1, Revision 0
11-0125-001-006, Unit 1 QS Piping West Yard to Pipe Tunnel, Train A, Sh. 1 and 2, Revision 0
11-0125-002-003, Unit 1 QS Piping West Yard to Pipe Tunnel, Train B, Sh. 1, Revision 0
11-0125-002-006, Unit 1 QS Piping West Yard to Pipe Tunnel, Train B, Sh. 1 and 2, Revision 0
2806-263-920-126, Unit 2 SI Isometric Drawing, Safeguards Building, Sh. 4, Revision 3
2806-263-920-347, Unit 2 SI Isometric Drawing, Safeguards Building, Sh. 1, Revision 3
8700-06.024-0597, Unit 1 SI System Safeguards Area, 1SI-P-1A, Sh. 1, Revision 4
8700-06.024-0599, Unit 1 SI System Safeguards Area, 1SI-P-1B, Sh. 1, Revision 6
8700-6.24-111, Unit 1 QS Isometric Drawing, Sh. 1-5, Revision 4
8700-6.24-113, Unit 1 QS Isometric Drawing, Sh. 1-6, Revision 4
8700-6.24-83, Unit 1 LHSI Piping, Sh. 1, Revision 3
8700-ISI-0109A-6, Unit 1 LHSI System, Safeguards Area - Valve Pit, Revision 5
8700-ISI-0114A-6, Unit 1 SI System, Safeguards Area - Valve Pit, Revision 6
8700-ISI-0276A-3, Unit 1 LHSI System, Auxiliary Building, Revision 3
8700-ISI-0276B-3, Unit 1 LHSI System, Auxiliary Building, Revision 3
8700-ISI-0277B, Unit 1 Chemical and Volume Control System, Auxiliary Building, Revision 7
8700-ISI-0277C-4, Unit 1 Chemical and Volume Control System Auxiliary Building, Revision 4
8700-ISI-0279A-4, Unit 1 LHSI System, Safeguards and Auxiliary Building, Revision 4
8700-ISI-0279B-4, Unit 1 LHSI System, Safeguards and Auxiliary Building, Revision 4
8700-ISI-0279C-4, Unit 1 LHSI System, Safeguards and Auxiliary Building, Revision 3
8700-ISI-0279D-4, Unit 1 LHSI System, Safeguards and Auxiliary Building, Revision 4
8700-ISI-115A-6, Unit 1 LHSI System, Safeguards Area - Valve Pit, Revision 6
OM Figure 11-1, Unit 1 Safety Injection System, Revision 25
OM Figure 11-1, Unit 2 Low / High Head Safety Injection, Revision 17
OM Figure 13-1, Unit 1 Containment Depressurization System, Revision 24
OM Figure 13-1, Unit 2 Recirculation Spray System, Revision 12

OM Figure 13-2, Unit 1 Containment Depressurization System, Revision 12
OM Figure 13-2, Unit 2 Quench Spray System, Revision 20
OM Figure 7-1, Unit 1 Chemical and Volume Control System, Revision 32
OM Figure 7-1A, Unit 2 Chemical and Volume Control, Sh. 1, Revision 20
OM Figure 7-1B, Unit 2 Chemical and Volume Control System, Sh. 2, Revision 11
OM Figure 7-2, Unit 2 Charging System Volume Control Tank, Revision 19
OM Figure 7-3, Unit 1 Chemical and Volume Control System, Revision 21

Composite Elevation Drawings (9/11/12)
- 1CH-P-1A/B/C to Penetrations 7 and 96 (Unit 1)
- 1QS-TK-1 to 1SI-P-1A and 1B
- 1SI-P-1A to Penetrations #60 and #61 with Branch to Charging Pump
- 1SI-P-1B to Penetrations #61 and #62
- 1SI-TK-2 to Penetration #113
- 2SIS-P21A to HHSI Pumps
- 2SIS-P21A to X-61
- 2SIS-P21A to X-62
- 2SIS-P21B to HHSI Pumps
- 2SIS-P21B to X-60
- High Head to Cold Leg (Loop A) from X-113 (Unit 2)

LIST OF ACRONYMS

ACE	apparent cause evaluation
ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
AFW	auxiliary feedwater
AMC	ALARA Managers Committee
AP	ALARA plan
ASME	American Society of Mechanical Engineers
BVPS	Beaver Valley Power Station
CAP	corrective action plan
CCP	component cooling water
CFR	Code of Federal Regulations
CR	condition report
ECP	engineering change proposal
EDG	emergency diesel generator
EER	engineering evaluation review
EPIP	Emergency Plan Implementing Procedures
ERF	emergency response facility
FSAR	final safety analysis report
FENOC	FirstEnergy Nuclear Operating Company
GL	generic letter
HEPA	high efficiency particulate air
HHSI	high head safety injection
ID	inside diameter
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations

IP	inspection procedure
JPM	job performance measures
KV	kilovolt
LHRA	locked high radiation area
LHSI	low head safety injection
MIC	microbiological influenced corrosion
NCV	non-cited violation
NDE	non-destructive examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NSIR	Office of Nuclear Security and Incident Response
NVLAP	National Voluntary Laboratory Accreditation Program
PARS	Publicly Available Records
PCP	process control program
PHC	Plant Health Committee
PI&R	Problem Identification and Resolution
POD	Prompt Operability Determination
PRA	probabilistic risk assessment
QA	quality assurance
QS	quench spray
RBC	reactor building containment
RCS	reactor coolant system
RS	recirculation spray
RWP	radiation work permits
SDP	Significance Determination Process
S/G	steam generator
SSC	structure, system, or component
TI	temporary instruction
TLD	thermoluminescence dosimeter
UFSAR	Updated Final Safety Analysis Report
URI	unresolved item
UT	ultrasonic test/testing