



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

August 3, 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 05000334/2012003 AND 05000412/2012003

Dear Mr. Harden:

On June 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 July 25, 2012 with Paul Harden, Site Vice President, and other members of your staff.

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

This report documents two self-revealing findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance, and because they have been entered into your corrective action program, the NRC is treating these findings as NCVs, consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest the 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/

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 05000334/2012003 and 05000412/2012003
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.: 05000334/2012003 and 05000412/2012003

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA 15077

Dates: April 1, 2012 through June 30, 2012

Inspectors: D. Spindler, Senior Resident Inspector
E. Bonney, Resident Inspector
S. Barber, Senior Project Engineer
S. Barr, Senior Emergency Preparedness Inspector
P. Kaufman, Senior Reactor Inspector
T. Moslak, Health Physicist
T. Ziev, Project Engineer
A. Dugandzic, Project Engineer
J. Laughlin, Emergency Preparedness Inspector
C. Crisden, Emergency Preparedness Inspector

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

Enclosure

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SUMMARY OF FINDINGS

IR 05000334/2012003, IR 05000412/2012003; 04/01/2012 – 06/30/2012; Beaver Valley Power Station, Units 1 & 2; Refueling and Other Outage Activities.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Two self-revealing findings of very low safety significance (Green) were identified, which were NCVs. 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: Initiating Events

- Green. A self-revealing Green NCV of TS 5.4.1, Procedures, for FENOC's failure to establish adequate procedural guidance for plant conditions for containment isolation valve leakage testing. Specifically, inadequate procedural guidance in BVT-1.47.11, Safety Injection and Charging System Containment Penetration Valve Integrity Test, established plant conditions that resulted in a water hammer event in reactor coolant system (RCS) safety injection piping. FENOC entered this issue into the corrective action program for resolution as condition report 2012-06841.

The inspectors determined the failure to establish adequate procedural guidance for plant conditions for containment isolation valve leakage testing is a performance deficiency that was within FENOC's ability to foresee and correct which contributed to a water hammer event in RCS safety injection piping. The finding is more than minor because it affects the procedure quality attribute of the Initiating Events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The inspectors evaluated the finding using "PWR Refueling Operation: RCS level > 23' or PWR Shutdown Operation with Time to Boil > 2 hours and Inventory in the Pressurizer" Checklist 4 of Attachment 1 to Appendix G of IMC 0609. Because no loss of control occurred and all mitigating capabilities were available, a Phase 2 quantitative assessment was not required. Therefore, the inspectors determined the finding to be of very low safety significance.

This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because FENOC failed to coordinate work activities impacted by changes to the work scope in the plant. [H.3(b)]. (Section 1R20)

Cornerstone: Mitigating Systems

- Green. A self-revealing Green NCV of License Condition 2.C.6.(2), Outside Containment Leakage Rate, was identified in FENOC's failure to perform adequate maintenance and restoration of the Unit 1 low head safety injection (LHSI) system. The inspectors determined the failure to adequately perform maintenance and restore the LHSI system to service is a performance deficiency that was within FENOC's ability to foresee and correct which contributed to the inoperability of the LHSI system in November 2010 and exceeding the outside containment leakage rate. FENOC entered this issue into their corrective action program as condition reports (CRs) 2010-85863, 2012-05832, and 2012-06658.

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 and the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. The inspectors and a Region I Senior Reactor Analyst (SRA) evaluated the finding using Phase 1, "Initial Screening and Characterization" worksheet in Attachment 4 to IMC 0609, "Significance Determination Process." Per Table 4a, under the Mitigating Systems Cornerstone, the inspectors determined this finding was not a design or 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, and was not potentially risk-significant due to a seismic, fire, flooding, or severe weather initiating event. Accordingly, under the Mitigating Systems Cornerstone this finding screens as Green. However, under the Barrier Integrity Cornerstone, the inspectors determined this finding represented an actual open pathway in the physical integrity of reactor containment via a heat removal system and warranted a review per Appendix H, "Containment Integrity Significance Determination Process." The inspectors and SRA determined that this finding is appropriately categorized as a Type A finding, per Appendix H, because the degraded relief valve adversely affects the operability of the LHSI system, a closed system which extends beyond the containment boundary. Based upon the above Mitigation System Cornerstone determination that this finding screens to Green (no significant increase in core damage frequency) and Table 4.1, that categorizes the faulted relief valve, that is connected to a small line (less than 1 to 2 inches in diameter) and connected to a closed system, as a condition that generally does not contribute to LERF, this finding screens per Appendix H, Figure 4.1, as very low safety significance.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Operating Experience, because FENOC failed to implement operating experience through changes to station procedures and equipment. [P.2(b)]. (Section 1R20)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 96 percent power for end-of-cycle coastdown operations. On April 7, operators commenced a shutdown from an initial power of 94 percent, for a planned refueling and maintenance outage (1R21). The unit reached Mode 6 (refueling) on April 12. Following the completion of refueling and maintenance activities, operators commenced a reactor startup on May 10. The unit remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power and operated at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 3 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

On May 24, 2012, the inspectors performed a review of FENOC's readiness for the onset of seasonal high temperatures. The review focused on the Unit 2 control room air conditioning units and component cooling water heat exchanger cleanings. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications, control room logs, and the corrective action program to determine what temperatures or other seasonal weather could challenge these systems, and to ensure FENOC personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including FENOC's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during hot weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

On April 16, 2012, the inspectors evaluated FENOC's preparation, protection, and actions from the effects of sustained high winds to Unit 1 and Unit 2 during a tornado watch and high wind advisory. The inspectors' efforts focused on review of specific unit actions based on actual environmental conditions and adherence to mitigating procedures. The inspectors performed walkdowns of each unit's external structures and emergency response facilities to verify the adequacy of protection from high winds, readiness for use, and continuity of power.

areas which could potentially impact safety-related equipment were also walked down. The inspectors reviewed expected licensee actions based on abnormal operating procedure (AOP) 1/2OM-53C.4A.75.1, "Acts of Nature - Tornado or High Winds."

b. Findings

No findings were identified.

.3 Summer Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

a. Inspection Scope

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

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1, 1-1 emergency diesel generator (EDG) during a 1-2 EDG refueling outage maintenance window on April 20, 2012
- Unit 1, Component cooling water system during river water reverse flow lineup on May 4, 2012
- Unit 1, Control room air conditioning fan 'B' with 'A' fan unavailable due to shaft degradation on May 9, 2012
- Unit 2, Component cooling water pump 'A' & 'C' during 'B' pump maintenance on June 13, 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.

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

a. Inspection Scope

On April 18, 2012, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 Low Head Safety Injection (LHSI) system walkdown to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hangar and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related condition reports and work orders to ensure FENOC appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

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

- Unit 1 Reactor containment building (Fire Area RC-1) on April 15, 2012
- Unit 2 East cable vault (Fire Area CV-2) on May 16, 2012

- Unit 2 Control rod area (Fire Area CV-3) on May 16, 2012
- Unit 2 Relay room (Fire Area CV-6) on May 16, 2012
- Unit 2 Cable spreading room (Fire Area SB-3) on June 13, 2012

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 samples)

.1 Internal Flooding Review

a. Inspection Scope

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

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the 'C' recirculation spray heat exchanger (1RS-E-1C) 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 1RS-E-1C 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

No findings were identified.

1R08 Inservice Inspection Activities (71111.08 – 1 sample)

a. Inspection Scope

From April 16-25, 2012, the inspector conducted a review of FENOC's implementation of in-service inspection (ISI) program activities for monitoring degradation of the reactor coolant system boundary and risk significant piping system boundaries for Beaver Valley Power

Station (BVPS), Unit 1. The sample selection was based on the inspection procedure objectives and risk priority of those components and systems where degradation would result in a significant increase in risk of core damage. The inspector reviewed documentation, observed in-process non-destructive examinations (NDE) and interviewed inspection personnel to verify that the non-destructive examination activities performed during 1R21 outage, as documented in BVPS Unit 1 Inservice Inspection, Interval 4, Period 2 schedule, were conducted in accordance with the requirements of ASME Boiler and Pressure Vessel Code Section XI, 2001 Edition, 2003 Addenda.

Non-Destructive Examination and Welding Activities

The inspector performed observations of NDE activities in process and reviewed documentation of nondestructive examinations listed below:

- Direct observation of manual Ultrasonic Test (UT), volumetric examination, 6" safety injection system butt weld SI-73-5-F-06. Record review of UT Pipe Weld Examination Report No. UT-12-1024, dated April 18, 2012.
- Direct observation of manual UT vessel examination, steam generator feedwater nozzle-to-vessel weld RC-E-1A-N-9. inner-corner region examination. Record review of UT Vessel Examination Report No. UT-12-1105, dated April 27, 2012.
- Direct observation of manual UT thickness of Unit 1 containment liner cylinder, component ID location 1RN-024, UT Erosion/Corrosion Examination Report No. UT-12-1065, dated April 24, 2012. Record review of Unit 1 containment liner UT thickness examinations, UT Erosion/Corrosion Examination Report No. UT-12-1070, component ID location 1RN-012, dated April 25, 2012, and UT Erosion/Corrosion Examination Report No. UT-12-1082, component ID location 1RN-066, dated April 24, 2012.
- Independent general visual inspection of Unit 1 reactor containment cylindrical steel liner during 1R21.
- Direct observation of Liquid Penetrant Test (PT) examination of 2-inch socket welds CH-98-1G-F-1C-A and CH-98-1B-F-02-A for repair/replacement of chemical volume control 1CH-187 valve, Report No. BOP-PT-12-019. Record review of PT, surface examination, chemical volume control field socket welds for 1CH-187 valve to pipe weld and elbow to pipe weld, Liquid Penetrant Examination Report No. BOP-PT-12-019, dated April 19, 2012.
- Record review of PT examination data records, Report Nos. PT-12-1001 & PT12-1002, both dated April 19, 2012 of socket welds on residual heat removal system, components IDs: RH-18-1-LPD-FW1A and RH-18-1-LPD-FW2A.
- Record review of Magnetic Particle Testing (MT), steam generator feedwater system nozzle-to-vessel weld RC-E-1A-N-9, MT examination Report No. MT-12-1001, dated April 24, 2012.
- Record review of visual examination of steam generator 1A hot leg and cold leg nozzle inner radius welds, component ID RC-E-1A-RADIUS(1H) (1C), Visual Exam of Equipment

and Component (VT-1) Report No. VT-12-1155, dated April 24, 2012, and Report No. VT-12-1156, dated April 24, 2012.

The inspector reviewed certifications of the technicians performing the non-destructive examinations and verified that the examinations were performed in accordance with approved procedures and that the results were reviewed and evaluated by certified Level III NDE personnel.

There were no samples available for review during this inspection that involved examinations with recordable indications that have been accepted for continued service from the previous Beaver Valley Unit 1 outage 1R20 through 1R21 outage.

Other Augmented or Industry Initiative Examinations

The inspector reviewed industry initiative of buried piping inspections at BVPS Unit 1 to verify conformance with NEI 09-14, Guideline for the Management of Underground Piping and Tank Integrity. Specifically, the inspector reviewed UT erosion/corrosion thickness examination data records of Beaver Valley Unit 1 underground (buried piping) auxiliary feedwater (AFW) system 8-inch (8" C/S WD-22-151-Q3), 6-inch diameter (6" S/S WD-2-153A; 6" C/S WD-23-151-Q3; and 6" C/S WD-24-151-Q3), and 1-inch diameter (1" C/S WAPD-20-151-Q3) piping segments, Report No. BOP-UT-12-071, dated April 23, 2012 to verify that the activities were performed in accordance with applicable examination procedures, industry guidance, and NRC commitments. By review of photographic pictures of the uncovered Unit 1 buried AFW piping in the Beaver Valley Unit 1 West Yard near the Tank 10 building, general visual examination of equipment and components record BOP-VT-12-058, dated April 17, 2012, UT data examination records, and discussions with the buried piping program owner the inspector verified that none of the UT measurements taken were below thickness minimum, no indications or defects required disposition, and the bitumastic exterior pipe coating remained in-tack.

Repair/Replacement Consisting of Welding Activities

To verify that the welding and applicable NDE activities were performed in accordance with ASME Code requirements the inspector reviewed replacement activity of 2-inch chemical volume control globe valve 1CH-187, ASME Class 1, per work order 200204229. The inspector reviewed the weld data sheets and PT examination reports for socket welds CH-98-1G-F-1C-A pipe to valve and CH-98-1B-F-02-A pipe to elbow for replacement valve 1CH-187.

Reactor Pressure Vessel Upper Closure Head (RPVUCH) Penetration Inspection Activities

Unit 1 RPVUCH was replaced in spring of 2006 so no bare metal visual examination or non-visual NDE were performed during 1R21. The inspector verified that no examinations were required during Beaver Valley Power Station 1R21 outage, based on the baseline UT exams that were performed in 1R17 (2006) on the RPVUCH and bare metal visual examinations were performed on the RPVUCH during 1R20 (2010) outage. The inspector verified that these reactor pressure vessel upper closure head inspection frequencies were in accordance with ASME Boiler and Pressure Vessel Code Case N-729-1, Alternative Examination Requirements for PWR Reactor Vessel Upper Heads, i.e., bare metal visuals examinations are required every three refueling outages and UT examinations on the RPVUCH dissimilar metal penetration welds are required once every 10 years.

Boric Acid Corrosion Control Inspection Activities

The inspector reviewed the boric acid corrosion control (BACC) program, which is performed in accordance with Beaver Valley Power Station procedures, discussed the program with the boric acid program owner, and sampled photographic inspection records of boric acid found on safety significant piping and components inside the Beaver Valley Unit 1 containment structure during walkdowns conducted by licensee personnel which was directly observed by the resident inspectors on their initial containment entry walkdowns during 1R21 outage conducted on April 9, 2012. The inspectors observed the identification and documentation of non-conforming conditions of boric acid leaks in the corrective action program with emphasis on areas that could cause degradation of safety significant components.

The inspector verified that potential deficiencies identified during the walkdowns were entered into the licensee's corrective action program and reviewed evaluations of the more significant deficiencies documented in condition reports CR 12-05271, 1RC-82 lower connection drain line for Level Transmitter LT-1RC-470 threaded connection, and CR 12-05284, 1CH-128 instrument tubing for 'B' reactor coolant pump seal water pressure transmitter, to verify that the corrective actions were consistent with the requirements of the ASME Code and 10 CFR 50, Appendix B, Criterion XVI. The inspector also reviewed the associated engineering evaluations for the above condition reports to verify that equipment or components that were wetted or impinged upon by boric acid solutions were properly analyzed for degradation that might impact their associated design basis functions.

Steam Generator Tube Inspection Activities

The inspector directly observed a sample of the Beaver Valley Unit 1 steam generator (SG) eddy current tube examinations, which consisted of full length bobbin inspection of 50% of the in-service tubes in each of the three SGs (except Row 1 and 2 U-bends), +Pt inspection of 50% of Row 1 and 2 U-bends, +Pt inspection of 100% of the bobbin special interest I-codes, and +Pt inspection of peripheral and tube lane regions using an alternate tube pattern for detection of loose parts and possible tube wear. The inspector reviewed a sample of the indications identified in the SGs during the 1R21 eddy current inspections to verify that they were consistent with the potential degradation mechanisms that may be observed during the 1R21 inspection as documented in BVPS Unit 1 Steam Generator Degradation 1R21 Refueling Outage Report SG-SGMMP-12-1, dated February 24, 2012.

The inspector verified that the SG eddy current tube examinations were performed in accordance with Unit 1 Technical Specification 5.5.5.1, Unit 1 Steam Generator Program by reviewing the SG tube eddy current test results to verify that no in-situ pressure testing was required, no tubes required stabilization, no tubes required plugging during 1R21 inspection, and no leakage occurred over the operating cycle. The inspector also verified that the SG tube examination screening criteria was in accordance with the Electric Power Research Institute Steam Generator Guidelines and flaw sizing was in accordance with EPRI examination technique specification sheet.

In addition, the inspector reviewed the foreign object search and retrieval (FOSAR) results on the secondary side of the SGs, reviewed corrective actions to remove the foreign objects if possible, and reviewed evaluation of material that remained in the SGs. The inspector verified the following FOSAR results: S/G 'A', 15 of 16 items retrieved (small metal piece remained); S/G 'B', 31 of 37 items retrieved (gasket material and small metal piece remained); and, S/G

'C', 15 of 17 items retrieved (gasket material remained). All material that remained in the SGs was reviewed and approved by Westinghouse Engineering.

b. Findings

No findings were identified.

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

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on May 22, 2012, which included the Unit 1 simulator White Team mini-drill scenario. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. The inspectors observed control room activities on April 10, 2012 which included the following:

- Observed the Unit 1 crew perform 1OST-36.4, Diesel Generator No. 2 Automatic Test. This test involved de-energizing 4 kV bus DF, auto start of EDG 'B', and sequencing of 'B' Charging Pump, 'B' low head SI pump, and 'B' MDAFW pump. The test also involved simultaneously shedding all three sequenced loads (Charging, SI, and MDAFW pumps) following a successful start of the EDG to demonstrate proper EDG governor performance/operation.
- Observed multiple Unit 1 crew briefs prior to each portion of the test evolution. Observed CR operator's communications, board operations, and procedural compliance in accordance with the Unit 1 conduct of operations procedure.
- Prior to starting the test, Unit 1 crew appropriately secured the 'B' loop of RHR pump and monitored RCS temperature trend.

On April 29, 2012, inspectors observed the refueling cavity and reactor vessel draindown per 1OM-20.4.E, Draining the Refueling Cavity. As part of the evolution, the inspectors observed the pre-job briefing, communications, command and control, and procedure use.

Findings

- b. No findings were identified

1R12 Maintenance Effectiveness (71111.12 – 3 samples)

a. Inspection Scope

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

- Unit 1, 'B' reactor coolant pump leak and reactor coolant system (RCS) review on June 7, 2012
- Unit 2, Supplemental leak collection and release system performance on May 14, 2012
- Units 1 and 2, Source range nuclear instrument performance on May 17, 2012

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 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, Yellow shutdown defense-in-depth risk for decay heat removal for the RCS depressurization on April 11-13, 2012

- Unit 1, Yellow shutdown defense-in-depth risk during reload of the core with one train of residual heat removal operable on April 27, 2012
- Unit 1, Yellow shutdown defense-in-depth risk assessment with single train of spent fuel pit cooling with degraded rubber expansion joint on May 3, 2012
- Unit 1, Risk evaluation for Mode 4 entry with control room return fan 1VS-F-40A inoperable on May 9, 2012
- Unit 1, Yellow probabilistic risk assessment (PRA) risk during replacement of TCV-1RW-101A control room air condition CNDS (1VS-E-4A) Recirculation Valve" on June 19 and June 21, 2012
- Unit 2, Failure to include scheduled testing of A & B boric acid pumps in PRA unavailability on April 18, 2012
- Unit 2, Emergent work on 2MSS-FI495 STM Gen 21C steam flow indicator failing low on June 1, 2012

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- Unit 1, 'A' and 'B' LHSI pumps in ASME alert range for low differential pressure on April 15, 2012
- Unit 1, 1-2 EDG turbocharger compressor blade damage on April 18, 2012
- Unit 1, PCV-1RC-455C, 'C' pressurizer pilot operated relief valve (PORV) and PCV-1RC-455D, 'D' pressurizer PORV failed diaphragm integrity test on May 7, 2012
- Unit 1, Mode 4 entry with 1A inside recirculation spray pump inoperable on May 9, 2012
- Unit 1, River water valve 1RW-150 structural integrity on May 9, 2012
- Unit 2, 'B' supplemental leak collection and release fan inoperable due to high vibrations on April 30, 2012
- Unit 2, Potential fire affect on main steam isolation valve bypass valves on May 24, 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 – 2 samples).1 Permanent Modificationsa. Inspection Scope

The inspectors evaluated Engineering Change Package 11-0082, Sodium Tetraborate Basket Installation on April 24, 2012. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change.

b. Findings

No findings were identified.

.2 Permanent Modificationsa. Inspection Scope

The inspectors evaluated a modification to the 'A' and 'B' reactor coolant pump (RCP) seal differential pressure instrumentation. Engineering change package (ECP) 12-0254-000 removes instrument tubing for PDI-1CH-125 and PDI-1CH-128 and caps the piping to them from the RCP seals. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 8 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, LHSI relief valve 1RV-SI-845B testing on April 15, 2012
- Unit 1, N32 source range neutron detector channel calibration on April 17, 2012
- Unit 1, 1-2 Vital bus inverter installation testing on April 18, 2012

- Unit 1, 'A' residual heat removal (RHR) pump and motor replacement on April 28, 2012
- Unit 1, 1-2 EDG maintenance activities during refueling outage 1R21 on May 1, 2012
- Unit 2, Replacement of 2MSS-FX495 STM Gen steam flow computer on May 31, 2012
- Unit 1, Replacement of 1RW-158 charging pump cooler 'B' supply header check valve on June 8, 2012
- Unit 2, Pressurizer level protection level switch card replacement on June 6, 2012

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 maintenance and refueling outage (1R21), which was conducted April 9 through May 10, 2012. The inspectors reviewed FENOC's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Monitoring of decay heat removal operations
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity, including core map verification
- Maintenance of secondary containment as required by technical specifications
- Refueling activities, including fuel handling and fuel receipt inspections
- Fatigue management
- Identification and resolution of problems related to refueling outage activities

b. Findings

(1) Inadequate Maintenance results in Low Head Safety Injection System Exceeding Outside Containment Leakage Rates

Introduction. A self-revealing Green NCV of Unit 1 License Condition 2.C.6.(2), Outside Containment Leakage Rate, was identified in FENOC's failure to perform adequate maintenance and restoration of the Unit 1 LHSI system. Specifically, failure to adequately vent the LHSI system, adjust relief valve guide rings, and adequately align the relief valve (RV-1SI-845B) tailpipe resulted in exceeding the outside containment leakage rate and the inoperability of both LHSI trains.

Description. On November 15, 2010, Beaver Valley Unit 1 lifted relief valve RV-1SI-845B during the quarterly surveillance 1OST-11.1, Safety Injection Pump Test. The relief valve lifting was reported in Licensee Event Report (LER) 2010-003-000 due to exceeding leakage outside containment. Based on the leakage rate of 20 gpm, during accident conditions, dose limits for the Unit 1 and Unit 2 shared control room and the Exclusion Area Boundary would be exceeded. An Unresolved Issue 05000334/2010005-01 was opened for this issue. The relief valve was subsequently temporarily gagged after assessing adequate overpressure protection was provided by 2 other relief valves in the same system. ASME Code Section XI allows for the removal of a class 3 piping valve for one operating cycle, but it must be restored prior to entering the next operating cycle.

FENOC's root cause evaluation determined that nozzle loading, defined as additional piping stress applied to the relief valve tailpipe that can affect the lift pressure setting, was the likely cause of the unexpected lifting of the relief valve on November 15, 2010. Inspectors observed the tailpipe on the affected relief valve, and confirmed the installed piping was angled upwards to align the flanged fitting to the relief valve. The inspectors observed the removal of the flanged fitting to the relief valve on April 13, 2012 during refueling outage 1R21. The relief valve tailpipe moved away from the piping when the flanges were disconnected, which confirmed a piping misalignment had been created during installation in 1R20. RV-1SI-845B was replaced and the tailpipe misalignment was corrected via WO 200440046 on April 13, 2012. Bench testing confirmed that the set pressure of RV-1SI-845B was 9.1 psig below the required set pressure of 235 psig.

On April 15, 2012, the replaced relief valve RV-1SI-845B lifted during 1OST-11.14A, Low Head Safety Injection Full Flow Test. The control room received the safeguards building sump alarm and observed lowering RWST level during the LHSI full flow test, which confirmed a lifting relief valve in the LHSI system. Inspectors observed the repetition of the test on April 16, 2012, and the relief valve did not lift. No system maintenance was performed between the April 15 and April 16 tests.

RV-1SI-845B is a local high point in the system at 1.5 feet above the discharge of the 'A' LHSI pump. No vent exists in the RV-1SI-845B line to remove voids in the standpipe during a system fill and vent. Air voids can cause a pressure spike during the initial pump start and force the relief valve to open. Using the system conditions present during the relief valve lifting, system modeling confirmed that voids present in the standpipe could cause a pressure spike sufficient to lift the relief valve. After the April 16, 2012 testing, RV-1SI-845B was replaced and the relief valve standpipe was filled prior to system testing. The LHSI system was tested on May 5, 2012, and no relief lifted. The relief valve standpipe has been included in the monthly ECCS void check surveillance.

During FENOC's investigation of the relief valve lifting on April 15, 2012, a second issue was identified regarding the unexpected change in volume of the refueling water storage tank (RWST). On April 15, 2012, the relief valve continued to lift until the 'A' LHSI pump was secured, and reseated at approximately 100 psig, which is significantly below the expected blowdown or reseal set point of 211 psig. RV-1SI-845A, B and C are Crosby relief valves with adjustable guide ring settings that control the blowdown setting. Each valve has unique settings associated with its serial number. The valves are interchangeably installed in the system; however, the blowdown set point adjustment requires information associated with the serial number of the valve. Work orders were generated with respect to the valve location, not the serial number. The impact of the incorrect blowdown setting was the 20 gpm leak rate of the system exceeded the Mode 1 Safety Injection Recirculation Mode Leak Test limit of 5700 cc/hr on November 15, 2010. The NRC issued Information Notice 92-64 on August 28, 1992 regarding several industry issues with Crosby relief valve adjustable guide ring settings. Potential problems noted in IN 92-64 are the high likelihood that uncontrolled maintenance results in misadjusted guide rings and that the misadjusted guide rings are not self revealing until a plant transient occurs, as seen in 2010 at Unit 1.

An extent of condition found 22 Crosby relief valves with adjustable set points installed in safety related systems (19 in Unit 1, 2 in Unit 2). Crosby relief valve blowdown set points are initially adjusted at the manufacturer, and are received with a data sheet on the blowdown set points. The review of all work orders for currently installed valves identified 1 safety injection accumulator at Unit 2 with potentially incorrect guide ring settings. FENOC declared the accumulator operable based on numerous control room indications that provide immediate feedback on SI accumulator pressure. FENOC entered these issues into their corrective action program as CR 2010-85863, 2012-05832, and 2012-06658.

Analysis. The inspectors determined the failure to adequately perform maintenance and restore the LHSI system to service is a performance deficiency that was within FENOC's ability to foresee and correct which contributed to the inoperability of the LHSI system on November 15, 2010 and exceeding the outside containment leakage rate. This finding is more than minor because it affects the equipment performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding also affected the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. The inspectors and a Region I Senior Reactor Analyst (SRA) evaluated the finding using Phase 1, "Initial Screening and Characterization" worksheet in Attachment 4 to IMC 0609, "Significance Determination Process." Per Table 4a, under the Mitigating Systems Cornerstone, the inspectors determined this finding was not a design or 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, and was not potentially risk-significant due to a seismic, fire, flooding, or severe weather initiating event. Accordingly, under the Mitigating Systems Cornerstone this finding screens as Green. However, under the Barrier Integrity Cornerstone, the inspectors determined this finding represented an actual open pathway in the physical integrity of reactor containment via a heat removal system and warranted a review per Appendix H, "Containment Integrity Significance Determination Process." The inspectors and SRA determined that this finding is appropriately categorized as a Type A finding, per Appendix H, because the degraded relief valve adversely affects the operability of the LHSI system, a closed system which extends beyond the containment boundary. Based upon the above

Mitigation System Cornerstone determination that this finding screens to Green (no significant increase in core damage frequency) and Table 4.1, that categorizes the faulted relief valve, that is connected to a small line (less than 1 to 2 inches in diameter) and connected to a closed system, as a condition that generally does not contribute to LERF, this finding screens per Appendix H, Figure 4.1, as very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Operating Experience, because FENOC failed to implement operating experience through changes to station procedures and equipment [P.2(b)].

Enforcement. Unit 1 License Condition 2.C.6.(2) requires implementation of a program to reduce leakage from systems outside containment that could contain highly radioactive fluids during a serious transient or accident to as low as practical levels and shall include, in part, integrated leak test requirements. Contrary to the above, FENOC exceeded the integrated leak test limit of 5700 cc/hr during the 20 gpm lift of relief valve RV-1SI-845B. The inspectors determined the leak could have been prevented by adequate maintenance practices for restoration of the LHSI system. Specifically, the LHSI system was not adequately filled and piping was incorrectly aligned, which caused the relief valve set point to lift during normal system pressure. The incorrectly set guide ring in the relief valve caused the relief valve to remain open longer than designed. Because this issue is of very low safety significance (Green) and FENOC entered this issue into their corrective action program as CR 2010-85863, 2012-05832, and 2012-06658, this finding is being treated as an NCV consistent with the NRC Enforcement Policy and closes URI 05000334/201005-01: Premature Lifting of ECCS Relief Valve RV-1SI-845B. **(NCV 05000334/2012003-01, Inadequate Maintenance results in Low Head Safety Injection System Exceeding Outside Containment Leakage Rates)**

- (2) Inadequate Containment Isolation Valve Leakage Testing Procedure Resulted in RCS Piping Water Hammer

Introduction. A self-revealing Green NCV of TS 5.4.1, "Procedures", for FENOC's failure to establish adequate procedural guidance for plant conditions for containment isolation valve leakage testing. Specifically, inadequate procedural guidance in BVT-1.47.11, Safety Injection and Charging System Containment Penetration Valve Integrity Test, established plant conditions that resulted in a water hammer event in RCS safety injection piping.

Description. On April 30, 2012, Beaver Valley Unit 1 experienced a water hammer event in Class 1 safety injection piping. The affected piping connects to each RCS hot leg through safety injection penetrations 1X-7, 1X-33, 1X-96 and 1X-113. Containment isolation valve leakage testing, BVT-1.47.11, Safety Injection and Charging System Containment Penetration Valve Integrity Test, step B.7, requires the opening of MOV-1SI-869B. At the time MOV-1SI-869B was stroked open, the 'A' charging pump was in service, with a boundary clearance in place. 1CH-25 was used as a clearance boundary against the 'A' charging pump pressure of approximately 2500 psig. However, valve seat leakage past 1CH-25 occurred and pressurized the outboard side of MOV-1SI-869B. A second test boundary for BVT-1.47.11 testing was established downstream of MOV-1SI-869B for penetration 1X-33 testing using a freeze seal with a differential pressure limitation of 75 psid. In previous outages, freeze seals were successfully used as test boundaries; however, there were no charging pumps in service during testing. The 1R21 outage scope and outage work sequencing was significantly altered by a six day delay in core offload. This changed the anticipated plant conditions to conduct the leak rate testing. Specifically, the charging pump was not scheduled to be in service when

this test was to be originally performed and the procedure had no precaution to ensure that charging was not in service.

When MOV-1SI-869B was stroked on April 30, testing personnel immediately noticed the indications of a loss of the freeze seal. Temperature indications at the freeze seal changed from -90F to -5F, indicating the freeze seal had moved. Personnel on the 692' level of containment heard a loud noise and observed a small piping deflection, which indicated a water hammer event. Similar indications of water hammer were observed outside containment on the 722' level in the 'C' penetrations area. The 1X-33 freeze seal shifted two feet because pressurized water flowing through MOV-1SI-869B exceeded 75 psid across the freeze seal. The pressure wave caused by the freeze seal shift forced two check valves (1SI-83 and 1SI-84) closed, accounting for the noise heard in containment.

Engineering personnel performed a walkdown of penetration 1X-7 and 1X-33 piping inside containment. Piping, piping supports, check valves, cantilevered vent and drain valves, and drain connections were inspected for damage. No damage was found during the walkdown. FENOC entered the issue into the corrective action program under CR 2012-06841.

Analysis. The inspectors determined the failure to establish adequate procedural guidance for plant conditions for containment isolation valve leakage testing is a performance deficiency that was within FENOC's ability to foresee and correct which contributed to a water hammer event in RCS safety injection piping. The finding is more than minor because it affects the procedure quality attribute of the Initiating Events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge safety functions during shutdown as well as power operations. The inspectors evaluated the finding using "PWR Refueling Operation: RCS level > 23' or PWR Shutdown Operation with Time to Boil > 2 hours and Inventory in the Pressurizer" Checklist 4 of Attachment 1 to Appendix G of IMC 0609. Because no loss of control occurred and all mitigating capabilities were available, a Phase 2 quantitative assessment was not required. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

The finding has a cross-cutting aspect in the area of Human Performance, Work Control, because FENOC failed to coordinate work activities impacted by changes to the work scope in the plant [H.3(b)].

Enforcement. TS 5.4.1, "Procedures", requires that procedures be established, implemented and maintained as recommended in Appendix A of Regulatory Guide 1.33. Regulatory Guide 1.33, 8.b.(1)(a), requires that specific procedures for surveillance tests and inspections should be written for pressurized water reactor containment leak rate tests. Contrary to the above, FENOC's procedure, BVT-1.47.11, "Safety Injection and Charging System Containment Penetration Valve Integrity Test" failed to establish adequate conditions for containment isolation valve leakage testing, which resulted in a water hammer event in safety injection piping. Because this issue is of very low safety significance (Green) and FENOC entered this issue into their corrective action program as CR 2012-06841, this finding is being treated as an NCV consistent with the NRC Enforcement Policy. **(NCV 05000334/2012003-02, Inadequate Containment Isolation Valve Leakage Testing Procedure Resulted in RCS Piping Water Hammer)**

1R22 Surveillance Testing (71111.22 – 6 samples)a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and FENOC procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- Unit 1, 1OST-11.14A, LHSI Full Flow Test on April 15, 2012
- Unit 1, 1OST-1.10N, Cold Shutdown Valve Exercise Test (Part N) on April 17, 2012 (containment isolation valve)
- Unit 1, 1OST-36.2, Diesel Generator No. 2 Monthly Test on April 25, 2012
- Unit 2, 2OST-36.1, Emergency Diesel Generator [2EGS*EG2-1] Monthly Test on May 2, 2012
- Unit 1, 1OST-30.12A, Train A Reactor Plant River Water System Full Flow Test on May 30, 2012
- Unit 2, 2OST-11.2 Low Head Safety Injection Pump [2SIS*P21B] Test on June 6, 2012 (inservice test)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness1EP4 Emergency Action Level and Emergency Plan Changes (IP 71114.04)a. Inspection Scope

The Nuclear Security and Incident Response (NSIR) headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIPs) and the Emergency Plan located under the Agencywide Documents Access and Management System (ADAMS) accession number ML12123A722, 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 U.S. Nuclear Regulatory Commission (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.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

RS01 Radiological Hazard Assessment and Exposure Controls (71124.01)

a. Inspection Scope

During the period April 23 - 26, 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 1 1R21 refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR Part 20, relevant Technical Specifications, and the licensee's procedures.

Plant Walkdown and Radiation Work Permit Reviews

The inspector toured accessible radiological controlled areas in the Unit 1 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 being performed in the Unit 1 RBC. The inspector reviewed the applicable radiation work permits (RWP), 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 replacement of a residual heat removal (RHR) system pump, RH-P-1A, (RWP 112-4042), decontaminating RHR components (RWP 112-4042), and installing a freeze seal near CH-220 (RWP 112-4003).

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.

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 egress from contamination areas.

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 1 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, spent resin transfer, cavity decontamination, and RHR pump replacement. This review included evaluating the effectiveness of contamination control measures, source term controls, including the use of temporary shielding.

Radiation Worker and Radiation Protection Technician Performance

During tours of radiological controlled areas in the Unit 1 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 RHR pump replacement, installation of a freeze seal near CH-220, and for decontaminating RHR system components to determine if workers were properly informed including discussions of past operating experiences, identification of the radiological conditions associated with their tasks, electronic dosimetry dose/dose rate alarm 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 appropriate to preclude repetitive problems.

b. Findings

No findings were identified.

RS02 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

During the period April 23 - 26, 2012, the inspector conducted the following activities to verify that the licensee was properly implementing operational, engineering, and administrative controls to maintain personnel exposure as low as is reasonably achievable (ALARA) for activities performed during the 1R21 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 1 outage. The inspector reviewed the 1R21 Outage ALARA Plan.

The inspector reviewed the exposure status for tasks performed during the Unit 1 outage and compared actual exposure with forecasted estimates contained in various project ALARA

Plans (AP). The inspector reviewed the Work-In-Progress ALARA reviews for selected jobs whose actual dose approached the forecasted estimate. Outage jobs reviewed included scaffolding installation, AP 12-1-30, RHR pump overhaul, AP 12-1-33, and reactor disassembly/reassembly, AP 12-1-22.

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, reviewing outage Work-in-Progress reviews, attending a Station ALARA Managers Committee (AMC) meeting, and reviewing recent AMC meeting minutes. The AMC meeting agenda, which the inspector attended, included revising dose estimates for a residual heat removal pump, 1RH-P-1A, replacement and revising the dose estimate for maintenance on the recirculation spray heat exchanger.

Verification of Dose Estimates

The inspector reviewed the assumptions and basis for the 1R21 outage ALARA plan. The inspector also reviewed the revisions made to various outage project dose estimates due to emergent work; e.g., scaffolding activities, recirculation spray heat exchanger maintenance, and RHR pump replacement, authorized by the Station ALARA manager's Committee.

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 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 ALARA controls specified in ALARA Plans and RWPs, RHR pump replacement, refueling activities, scaffolding installation, and attended pre-job ALARA briefings for RHR pump replacement, decontaminating RHR components, and installing a freeze seal to support maintenance on CH-220.

During the inspection period, the inspector observed workers perform RBC demobilization, scaffolding installation, and preparations for RHR pump replacement. 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 1 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, and temporary shielding.

The inspector assessed the effectiveness of temporary shielding by reviewing pre and post installation radiation survey data for shielding the pressurizer cubicle, No. 12-19, pressurizer

spray line, No. 12-33, DG-TK-1 drain line, No. 12-38, fuel transfer keyway, No. 12-59, and the reactor head stand, No. 12-35.

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.

RS03 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

a. Inspection Scope

During the period April 23 – 26, 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 Part 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 1R21 outage. The inspector reviewed air sampling records for ongoing jobs to confirm that airborne contamination was not significant; e.g., steam generator bowl surveys, reactor transfer canal inspections, and fuel handling building transfer canal up-ender inspections. Additionally, the inspector confirmed that engineering controls, such as portable high efficiency particulate air (HEPA) filtration/ventilation systems, were specified and used for tasks involving the opening of contaminated systems, such as for RHR pump replacement.

Use of Respiratory Protection Devices

The inspector confirmed that respirators were used as a contingency for specific tasks involving potential airborne contamination including steam generator bowl surveys, and for containment fuel transfer canal inspections.

b. Findings

No findings were identified.

RS04 Occupational Dose Assessment (71124.04)

a. Inspection Scope

During the period April 23 – 26, 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 thermoluminescent dosimeters (TLD) was accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). The inspector confirmed that detailed procedures were implemented associated with dosimeter practices, including routine TLD issuance, multi-badging, and extremity dosimeters.

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

Internal Dosimetry

The inspector reviewed the bioassay procedure to determine if uptakes of internally deposited radioactive material had been appropriately evaluated by whole body counting and bioassay techniques. The inspector reviewed ten urine (tritium) analyses for workers re-racking the Unit 2 spent fuel pool. The inspector reviewed the associated dose assessments and determined that the evaluations were appropriately carried out and that no committed effective dose equivalent (CEDE) exceeded the recordable criteria of 10 mrem.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled FENOC's submittals for the Safety System Functional Failures performance indicator for both Beaver Valley Unit 1 and Unit 2 for the period of April 1, 2011, through March 31, 2012. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed Beaver Valley Unit 1 and Unit 2 operator narrative logs, operability assessments, maintenance rule records, maintenance work orders,

condition reports, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed FENOC's submittal for the RCS specific activity and RCS leak rate performance indicators for both Unit 1 and Unit 2 for the period of April 1, 2011 through March 31, 2012. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements for RCS leakage, and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the RCS identified leakage rate.

b. Inspection Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 3 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 Annual Sample: Post Maintenance Testing

a. Inspection Scope

The inspectors performed an in-depth review of FENOC's post maintenance testing program as an adequacy review of the corrective actions associated with NRC Finding/NCV 2009001-01, "Inadequate Post Maintenance Testing on 1RW-57" (Condition Reports 2009-59866 and

2009-62705). This activity involved a missed post maintenance test for a check valve replacement.

The inspectors assessed FENOC's problem identification threshold, cause analysis, extent of condition, and the prioritization of timeliness of FENOC's corrective actions to determine whether FENOC was appropriately identifying, characterizing, and correcting problems associated with port maintenance testing and whether the completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of FENOC's corrective action program and 10CFR50, Appendix B. Inspectors reviewed condition reports, procedures, and interviewed plant personnel associated with the planning and execution of post maintenance testing activities.

b. Findings and Observations

No findings were identified.

FENOC's apparent cause for this Finding/NCV 2009001-01, "Inadequate Post Maintenance Testing on 1RW-57" was work planning failed to self check the post maintenance testing plan against the Inservice Testing (IST) coordinator's recommendations and contributing causes from the work package processing and the Operations department review of the work package. In reviewing the corrective actions for these causes, the required actions only focused on the ASME IST testing of check valves. The extent of cause review did not identify that other safety related component post maintenance testing could also be affected by the same cause. This observation has been entered into FENOC's corrective action program (CR-2012-11206).

.3 Annual Sample: Non-destructive Testing Program Review

a. Inspection Scope

The inspector reviewed a sample of Beaver Valley Unit 1 condition reports, which identified non-destructive examination (NDE) indications, deficiencies and other nonconforming conditions since the previous 1R20 outage and during the 1R21 outage. The inspector verified that nonconforming conditions were properly identified, characterized, evaluated, corrective actions identified and dispositioned, and appropriately entered into the Beaver Valley corrective action program.

b. Findings

No findings were identified.

4OA5 Other Activities

1. Review of License Renewal Commitment Inspection of Unit 1 Containment Liner

a. Inspection Scope

Inspection of the Beaver Valley Unit 1 containment liner was visually and ultrasonic test (UT) examined during 1R21. Visual examination of 100% of accessible containment liner surfaces and supplemental volumetric UT inspection of 37 random sample locations were completed during 1R21. The inspector verified that the Unit 1 containment liner inspections were

performed by qualified personnel using approved procedures and the examinations were satisfactorily completed in accordance with ASME Code, Section XI, Subsection IWE and the containment liner met the design nominal thickness by observing several manual UT thickness examinations, review of various UT thickness examination data records, and conducting a general visual inspection of the containment liner coating.

The inspector verified that FENOC satisfactorily completed Unit 1 license renewal commitment number 32 to perform supplemental volumetric UT thickness examinations on a minimum of 75 randomly selected containment liner locations by January 29, 2016, in accordance with BV1 Operating License, Section 2.1 and Appendix A of NUREG-1929, Safety Evaluation Report and Supplement 1 of NUREG-1929, dated October 2009 with no evidence of loss of material.

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000334/2010-003-00: Premature Lifting of ECCS Relief Valve Results in Post-Accident Outside-Containment Leakage Limits To Be Exceeded

On November 15, 2012, FENOC discovered that the 'A' LHSI Pump discharge relief valve RV-1SI-845B lifted with 20 gpm leakage rate going to the safeguards building area sump. As a result, the condition was recognized as an unanalyzed condition that significantly degraded plant safety and could have prevented the safety function to control the release of radioactive material. One self-revealing finding was identified. The enforcement aspects of this issue are discussed in Section 1R20. This LER is closed.

4OA6 Meetings, Including Exit

The inspector presented the inservice inspection results to Mr. Mark Manoleras, Director, Engineering, and other members of the FirstEnergy staff at an exit meeting conducted on April 25, 2012. FirstEnergy acknowledged the inspection results and observations presented. No proprietary information was presented in this report.

On July 25, 2011, the inspectors presented the inspection results to Paul Harden, Site Vice President, and other members of the Beaver Valley Power Station staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

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

G. Alberti	Steam Generator Project
S. Baker	Site, Radiation Protection Manager
M. Banko	Quality Assurance Assessor
C. Battistone	Supervisor, Engineering Programs
G. Buck	ISI, Level III
D. Canan	Senior Nuclear Specialist – Respiratory Protection
F. Cousart	Electrical Engineer
C. Flaim	Work Management Supervisor
J. Fontaine	Supervisor, ALARA
P. Harden	Site Vice President
L. Hollencamp	Work Management Engineer
S. Hovanec	Supervisor, Nuclear Electrical System Engineering
J. Gallagher	Maintenance Rule Coordinator
D. Grabski	ISI Coordinator
D. Hecht	ISI Engineer
D. Jones	IST Coordinator
H. Kahl	Fire Protection Engineer
S. Keener	System Engineer
T. King	System Engineer
J. Lebda	Senior Nuclear Specialist – Dosimetry
R. Lieb	Director, Site Operations
R. Lubert	Supervisor, Electrical Engineering
J. Lutz	Shutdown Defense-in-Depth Coordinator
M. Manoleras	Director, Engineering
D. McBride	Staff Nuclear Engineer
C. Miller	Senior Radiation Protection Technician
K. Mitchell	System Engineer
B. Paul	Electrical Engineer
R. Pucci	Radiological Assessor/Supervisor Technical Training
J. Redant	Senior Radiation Protection Technician
D. Reeves	Manager, Technical Services Programs
B. Sepelak	Supervisor, Regulatory Compliance
P. Slifkin	Technical Services Engineer
R. Wolfe	Staff Nuclear Engineer

Other Personnel

L. Ryan	Inspector, Pennsylvania Department of Radiation Protection
M. Rubidue	Inspector, State of Ohio

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATEDOpened/Closed

05000334/2012003-01	NCV	Inadequate Maintenance results in Low Head Safety Injection System Exceeding Outside Containment Leakage Rate (Section 1R20)
05000334/2012003-02	NCV	Inadequate Containment Isolation Valve Leakage Testing Procedure results in RCS piping Water Hammer (Section 1R20)

Closed

05000334/2010-003-00	LER	Premature Lifting of ECCS Relief Valve Results in Post-Accident Outside–Containment Leakage limits to be Exceeded (Section 4OA5)
05000334/2010005-01	URI	Premature Lifting of ECCS Relief Valve RV-1SI-845B (Section 1R20)

LIST OF DOCUMENTS REVIEWED**Section 1R01: Adverse Weather Protection**Procedures

1/2OM-53C.4A.75.1, Acts of Nature—Tornado or High Wind Condition, Revision 14
 1/2OM-53C.4A.35.1, Degraded Grid, Revision 7
 NOP-OP-1003, Grid Reliability Protocol, Revision 4

Condition Reports

2011-03166 2012-01901 2012-03915

Section 1R04: Equipment AlignmentProcedures

1OM-11.3.B.1, Valve List-1SI, Revision 18
 1OM-15.3.B.1, Valve List-1CCR, Revision 20
 2OM-15.3.B.1, Valve List-2CCP, Revision 17

Condition Reports

2011-00320 2012-08428 2012-08020 2012-08401

Maintenance Orders/Work Orders

200414676

Drawings

8700-RM-411-1, Piping and Instrumentation Diagram Safety Injection, Revision 24
 8700-RM-411-2, Piping and Instrumentation Diagram Safety Injection, Revision 14
 8700-RM-0415-001, Component Cooling Water, Revision 22

8700-RM-0436-001, Emergency Diesel Generator Air Start System, Revision 11
8700-RM-0436-002, Emergency Diesel Generator Fuel Oil, Revision 9
8700-RM-436-003, Lube Oil System, Revision 6
8700-RM-0436-004, EE-EG-1(2) Water Cooling System, Revision 5
8700-RM-444A-4, Control Room Area-Air Conditioning, Revision 10
8700-RM-0415-0001, Valve Oper No Diagram – Component Cooling Water, Revision 22

Miscellaneous

NOP-WM-2001, Work Management Scheduling/Assessment/Seasonal Readiness Process,
Revision 13
Clearance 2W06-15-CCP-007
Clearance 2W06-15-CCP-008

Section 1R05: Fire Protection

Procedures

1PFP-RCBX-692, Reactor Containment Building Fire Area RC1, Revision 1
1PFP-RCBX-718, Reactor Containment Building Fire Area RC1, Revision 1
1PFP-RCBX-738, Reactor Containment Building Fire Area RC1, Revision 1
1PFP-RCBX-767, Reactor Containment Building Fire Area RC1, Revision 1
2PFP-MSCV-755-ROD, Rod Control Fire Area CV-3, Revision 4
2PFP-MSCV-755-RELAY, Relay Room Fire Area CV-6, Revision 2
2PFP-MSCV-735, East Cable Vault Fire Area CV-2, Revision 3
2PFP-SRVB-745, Cable Spreading Room Fire Area SB-3, Revision 3

Miscellaneous

Analysis No. 10080-B-085

Section 1R06: Flood Protection Measures

Condition Reports

2012-07220 2012-06845

Work Orders

200433549

Miscellaneous

REJ-1RW-1EC, Assessment, Revision 2, dated 5/2/12
RW Flood Height Calibrations with Max 10hr Flood Time, dated 5/2012
Beaver Valley Unit 1 Operating Logs, dated 4/30/12
VT-500, Visual Examination of Equipment and Components, REJ-RW-19C, dated 4/30/12
Beaver Valley Unit 1 Weekly Maintenance Risk Summary, dated 5/8/12

Section 1R07: Heat Sink Performance

Condition Reports

2012-04791 2010-84423

Work Orders

200441089

Miscellaneous

04-021-0011, Recirculation Spray Water Coolers Technical Manual, Revision H
8700-RT-113C, Tubesheet Map for Heat Exchanger RS-E-1C, Revision 6

Section 1R08: In-service Inspection

Procedures

NDE-UT-308, Component Weld Profiling and Thickness Measurements Using Straight Beam
Ultrasonic Techniques, Revision 14
1/2-ADM-2039, BVPS ISI Ten-Year Plans, Revision 12
1/2-ADM-2099, Primary Containment ISI Program, Revision 0
NOP-CC-5703, FirstEnergy Nuclear Operating Company ASME Section XI Repair/Replacement
(R/R) Program, Revision 1

NDE Records

UT Pipe Weld Examination Report No. UT-12-1024, dated April 18, 2012
UT Vessel Examination Report No. UT-12-1105, dated April 27, 2012
Visual Exam of Equipment and Component (VT-1) Report No. VT-12-1155, dated April 24, 2012
Visual Exam of Equipment and Component (VT-1) Report No. VT-12-1156, dated April 24, 2012
UT Erosion/Corrosion Examination Report No. UT-12-1065, Random Liner Location 1RN-024,
dated April 24, 2012
UT Erosion/Corrosion Examination Report No. UT-12-1070, Random Liner Location 1RN-012,
dated April 25, 2012
UT Erosion/Corrosion Examination Report No. UT-12-1082, Random Liner Location 1RN-066,
dated April 24, 2012
Liquid Penetrant Examination Report No. BOP-PT-12-019, dated April 19, 2012
Liquid Penetrant Examination Report No. PT-12-1001, dated April 19, 2012, component ID:
RH-18-1-LPD-FW1A
Liquid Penetrant Examination Report No. PT-12-1002, dated April 19, 2012, component ID:
RH-18-1-LPD-FW2A
Visual Exam of Equipment and Component (VT-1) Report No. VT-12-1155, component ID:
RC-E-1A-RADIUS(1H), dated April 24, 2012
Visual Exam of Equipment and Component (VT-1) Report No. VT-12-1156, component ID:
RC-E-1A-RADIUS(1C), dated April 24, 2012

Work Orders

200204229

Miscellaneous

ASME Boiler and Pressure Vessel Code Case N-729-1, Alternative Examination Requirements
for PWR Reactor Vessel Upper Heads
BVBP-ENG-0109, BVPS Containment Liner UT Thickness Guidance Document, Revision 0
MS-C-12-01-13, Fleet Oversight Audit Report, January 16, 2012 through March 6, 2012, Design
Control/Engineering Programs/ ASME, dated March 8, 2012
BVPS Unit 1 Steam Generator Degradation 1R21 Refueling Outage Report SG-SGMMP-12-1,
dated February 24, 2012
BVPS 1R18 Degradation Assessment and Cycle 19 Operational Assessment with Regard to
Eddy Current Skip Cycle Mode for Cycle 21, Westinghouse LTR-SGMP-10-96, dated
August 27, 2010

Condition Reports

2011-06044 2011-96451 2012-00829 2012-00932 2012-00955 2012-01205
 2012-01976 2012-05858 2012-05900 2012-06019

Section 1R11: Licensed Operator Requalification ProgramProcedures

1OM-20.4.E, Draining the Refueling Cavity, Revision 8
 1OST-35.4, Diesel Generator No. 2 Automatic Test, Revision 35

Miscellaneous

2012 Dry Run #1 Scenario Timeline, Revision 0

Section 1R12: Maintenance EffectivenessProcedures

1/2ADM-2114, Maintenance Rule Program Administrative Procedure, Revision 1

Condition Reports

2012-07200 2012-06796 2012-05762 2012-05235 07-24845 02-40027
 09-65891 09-66419 09-69346 09-68023 07-30316 09-54203
 07-18138 2012-05255 07-26986 09-64474 07-15864 2012-05250

Miscellaneous

Unit 2 SSCs within Scope of Maintenance Valve List, dated 6/22/05
 Unit 2 System Health Report 2011-04 dated 2/20/12

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

2OST-7.2, Boric Acid Transfer Pump [2CHS*P22B] Operational Test, Revision 19
 NOP-OP-1010-01, Operational Decision Making Issue, Revision 4
 1OM-44A.4.Q, Loss of All Unit 1 Control Room Cooling, Revision 0

Condition Reports

2012-06050 2011-00483 2012-08908 2012-07112 2012-07254

Work Orders

200396225

Miscellaneous

BV-1 Control Room Return Fan 1VS-F-40A OOS PRA Risk Assessment, dated 5/8/12
 1R21 Defense-in-Depth Report, Revision 1
 Weekly Maintenance Risk Summary, week of 4/16/12, Revision 0
 Weekly Maintenance Risk Summary, week of 4/16/12, Revision 1
 REJ-1RW-1EC, Assessment, Revision 2, dated 5/2/12
 RW Flood Height Calibrations with Max 10hr Flood Time, dated 5//12
 Weekly Maintenance Risk Summary, week of 5/28/12, Revisions 1 and 2
 Unit 1 Weekly Maintenance Risk Summary for the week of June 18, 2012, Revisions 0 and 1

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

1OST-11.14A, LHSI Full Flow Test, Revision 28
 1/2ADM-2033, Risk Management Program, Revision 4
 NOP-OP-1009-02, Prompt Functionality Assessment Form, Revision 3

Condition Reports

2012-05830	2012-05754	2012-05764	2012-05832	2012-06098	2012-06364
2012-06102	2012-06267	2012-06371	2012-06519	2012-06796	2012-06447
2012-06446	2012-06988	2012-07488	2012-07294	2012-05870	2012-07112
2012-07254					

Drawings

RM-0411-001, Safety Injection System, Revision 24
 8700-DMC-343A, Impact of New 3/4" Tubing on PORV OPPS Operation, Revision 0
 8700-DMC-342A, PORV Nitrogen Pressure in Modes 1-3, Revision 0

Work Orders/Notifications

600748537

Miscellaneous

Analysis of Alert range Delta-p for [1SI-P-1A and 1B] per CR 2012-05830, dated 4/16/12
 Evaluation of 3"-WR-110-157W-Q3 with Through-Wall Leak Near 1RW-150, dated 5/8/12

Section 1R18: Plant ModificationsProcedures

1CHM-SAM-3.19A, Containment pH Reagent Buffer Baskets [1RS-BSK1,(2), (3), (4), (5), (6)],
 Revision 0

Condition Reports

2012-05250	2012-06470	2012-05808	2012-05804
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Work Orders/Notifications

200480284 60068241115 60068241116

Drawings

8700-RM-0413-001, Containment Depressurization System, Revision 23
 8700-RM-0413-002, Containment Depressurization System, Revision 12

Miscellaneous

ECP 11-0082-00
 ECP 11-0095
 ECP 11-00125
 Calc 8700-DMC-3809, Determination of Fill Levels for Unit 1 Sodium Tetraborate Baskets,
 Revision 0

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

1MSP-02.16-I, Nuclear Instrumentation Source Range N32 Neutron Detector Channel Calibration, Revision 13
 1/2CMP-75-4kV Motor Term-1E, 4kV Motor Termination, Revision 16
 1/2CMP-75-Vertical Motor-1E, 4kV and 480v Vertical Motor Removal and Reinstallation, Revision 9
 1OST-10.1, Residual Heat Removal Pump Performance Test, Revision 25 (LUC PAF 12-00945)
 1MSP-36.28-E, No. 2 Emergency Diesel Generator Electrical Inspection, Revision 7
 1MSP-36.30-E, No. 2 Emergency Diesel Generator Motor Operation Grounding Switch and Ground Resistor Inspection, Revision 7
 1PMP-36EE-EG-1-2, Emergency Diesel Generator Relay Cleaning and Inspection, Revision 14
 1MSP-38.35-M, No. 2 Emergency Diesel Generator Internal Inspection, Revision 13
 1OST-36.04, Diesel Generator No. 2 Automatic Test, Revision 8
 2MSP-21.33, 2MSS-F495, Loop 3 Main Steam Flow Channel IV Calibration, Issue 4, Revision 17
 1OST-30.14B, Stroke Test of Train B RPRW Valves, Revision 4
 1OST-11.1, Safety Injection Pump Test – [1SI-P-1A], Revision 23
 3 BVT01.11.04, Void Monitoring, Revision 8

Condition Reports

2012-05762	2012-06035	2012-06233	2012-05974	2012-05817	2012-08908
2012-09669	2012-05832	2012-06658	2012-06891	2012-06893	2012-06851
2010-85863					

Work Orders/Notifications

200439741	200297891	200499527	200439907	200021398	200439859
200440494	200439853	200440178	200439803	200440184	200377874
200439793	200308125	200374989	200439807	200369086	200439805
200439806	200439804	200377872	200440175	200504189	200420668
200440046	200503509				

Miscellaneous

ES-T-001, Component Qualification/Post Modification Testing Guidelines, Revision 5
 BVBP-SITE-0053, Post-Maintenance Test Requirements, Revision 5

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

1OM-51.4.E, Station Shutdown – Preparing for and Entering Refueling (Mode 6), Revision 3
 1OST-49.2A, Shutdown Margin Calculation for Plant Cooldown to Mode 5, Revision 14
 1OM-6.4.N, Draining the RCS for Refueling, Revision 23
 1OM-7.4.I, Collapsing the Pressurizer Bubble, Revision 17
 1OST-49.3, Refueling Operations Prerequisite, Revision 20
 1OM-50.4.D, Reactor Startup From Mode 3 to Mode 2, Revision 54
 1MSP-12-RS SUMP-1M, Containment Sump Inspection, Revision 20
 1RST-2.1, Initial Approach to Criticality after Refueling, Revision 14
 1BVT-1.47.11, Safety Injection and Charging System Containment Penetration Valve Integrity Test, Revision 21

Condition Reports

2012-06336	2012-06337	2012-06313	2012-06299	2012-06231	2012-06208
2012-06254	2012-06266	2012-06235	2012-06173	2021-06168	2012-05765
2012-05899	2012-05792	2012-06016	2012-06585	2012-06851	2012-06841
2012-10989					

Miscellaneous

8700-RM-411-1, Piping and Instrumentation Diagram Safety Injection, Revision 24
 8700-6.24-200 Sheet 1, Reactor Containment Annulus High Head Safety Injection, Revision 3
 8700-6.24-200 Sheet 2, Support Table, Revision 1
 8700-6.24-200 Sheet 3, Support MK:PS-1, Revision 5
 8700-6.24-377 Sheet 1, Safety Injection Reactor Containment Annulus Piping, Revision 2
 8700-6.24-377 Sheet 2, Support Table, Revision 1

Section 1R22: Surveillance TestingProcedures

NOP-WM-3620, Air Operated Valve Diagnostic Testing, Revision 1
 1OST-30.12A, Train A reactor Plant River Water System Full Flow Test, Revision 31
 1OST-30.12A, Train A reactor Plant River Water System Full Flow Test, Revision 26

Condition Reports

2012-07031 2012-05977 2012-05830

Work Order/Notification

200402737 600746181

Section 1EP4: Emergency Action Level and Emergency Plan ChangesProcedures

Emergency Plan, "Emergency Measures," Revision 28
 Emergency Plan, "Emergency Facilities and Equipment," Revision 27
 1/2 –EPP-IP-1.2, "Communications and Dissemination of Information," Revision 28
 1/2 –EPP-IP-1.4, "Technical Support Center Activation, Operation and Deactivation,"
 Revision 33
 1/2 –EPP-IP-1.6, "Emergency Operations Facility Activation, Operation and Deactivation,"
 Revision 25
 1/2 –EPP-IP-2.3, "Offsite Monitoring for Airborne Release," Revision 19

Section RS01: Radiological Hazard Assessment and Exposure ControlsProcedures

1/2-ADM-1601, Radiation Protection Standards, Revision 20
 1/2-ADM-1611, Radiation Protection Administrative Guide, Revision 13
 1/2-HPP-3.05.001, Exposure Authorization, Revision 8
 1/2-HPP-3.07.002, Radiation Survey Methods, Revision 7
 1/2-HPP-3.08.003, Radiation Barrier Key Control, Revision 13
 1/2-HPP-3.08.006, Shielding, Revision 4

BVBP-RP-0003, Dosimetry Practices, Revision 9
 BVBP-RP-0013, Radiation Protection Risk Assessment Process, Revision 3
 BVBP-RP-0020, RP Job Coverage General Guidance, Revision 17
 NOP-OP-4206, Bioassay Administration, Revision 0
 NOP-OP4005, ALARA Program, Revision 3
 NOP-OP-4107, Radiation Work Permit, Revision 10
 NOP-OP-4601, Contamination Control Program, Revision2
 NOP-OP-4102, Radiological Postings, Labeling, and Markings, Revision 6
 NOP-OP-4702, Air Sampling, Revision 2
 NOP-OP-4703, Determination of Alpha Monitoring Levels, Revision 1

Nuclear Oversight Performance Assessment (PA) Reports

2012 Oversight Assessment of Radiation Protection, April 24, 2012
 Radiological Quality Assessments Nos. PO4-16-12, PO4-17-12

Condition Reports

2012-06601	2012-06468	2012-06475	2012-06095	2012-06013	2012-05981
2012-05993	2012-06030	2012-06014	2012-05925	2012-05720	2012-05801
2012-06320	2012-06404	2012-06372	2012-06407	2012-06518	2012-04937
2012-05106	2012-05552	2012-05581			

RWP/ALARA Plans & related Work-in-Progress Reviews

RWP 112-4019/AP12-1-19, Secondary Side Steam Generator Sludge Lancing/Inspection
 RWP 112-4017/AP12-1-20, Primary Side Steam Generator Eddy Current Setup/Demob
 RWP 112-4017/AP12-1-21, Steam Generator Platform/Channel Head Work
 RWP 112-4018/AP12-1-22, Reactor Disassembly/Reassembly
 RWP 112-4020/AP12-1-24, Transfer Canal Work/Blank Flange
 RWP 112-4028/AP12-1-30, 1R21 Scaffolding – Unit 1 RBC
 RWP 112-4042/AP12-1-33, RH-P-1A Coupling Upgrade/Pump Overhaul

ALARA Manager Committee Meeting Minutes

Attended Meeting No. 12-07
 Reviewed meeting minutes for 12-03, 12-06,

Miscellaneous Reports

1R21 Outage ALARA Plan
 1R21 Temporary Shielding Plan
 EPRI Standard Radiation Monitoring Program - Unit 1 Source Term Measurements
 High Dose Individuals for 2010
 Dose and Dose Rate Alarm Reports for 2012
 Beaver Valley 5 Year Dose Reduction Plan

Section 40A1: Performance Indicator Verification

Procedures

NOBP-LP-4012, NRC Performance Indicators, Revision 3

Section 4OA2: Problem Identification and Resolution

Procedures

NOP-WM-1001, Order Planning Process, Revision 18

NOP-WM-1005, Work Management Order Testing, Revision 3

BVBP-SITE-0053, Post-Maintenance Testing Requirements, Revision 6

Condition Reports

2009-59866 2009-62705 2011-92386 2012-00602 2011-94879

LIST OF ACRONYMS

AC	alternating current
ADAMS	Agencywide Documents Access and Management System
AFW	auxiliary feedwater
ALARA	as low as is reasonably achievable
AP	ALARA Plan
ASME	American Society of Mechanical Engineers
BACC	boric acid corrosion control
CEDE	committed effective dose equivalent
CFR	Code of Federal Regulation
CR	condition report
DRS	Division of Reactor Safety
ECP	engineering change package
EDG	emergency diesel generator
EPIP	Emergency Plan Implementing Procedures
FOSAR	foreign object search and retrieval
HEPA	high efficiency particulate air
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
ISI	inservice inspection
KV	kilovolt
LER	licensee event report
LHRA	locked high radiation area
LHSI	low head safety injection
MT	magnetic particle testing
NCV	non-cited violation
NDE	non-destructive examination
NRC	Nuclear Regulatory Commission
NSIR	Office of Nuclear Security and Incident Response
NVLAP	National Voluntary Laboratory Accreditation Program
pCi/g	picocuries per gram
PARS	Publicly Available Records
PRA	probabilistic risk assessment
PSB1	Plant Support Branch 1
PT	liquid penetrant test
RBC	reactor building containment
RCP	reactor coolant pump
RCS	reactor coolant system
RHR	residual heat removal
RWP	radiation work permit
SDP	significance determination process
SG	steam generator
SSC	structure, system, or component
TLD	thermoluminescent dosimeter
UFSAR	Updated Final Safety Analysis Report
URI	unresolved item
UT	ultrasonic test
VT	visual examination