

February 14, 2011

EA-11-004

Mr. Paul A. 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 05000334/2010005 AND 05000412/2010005, AND EXERCISE OF  
ENFORCEMENT DISCRETION

Dear Mr. Harden:

On December 31, 2010, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Beaver Valley Power Station Units 1 and 2. The enclosed integrated inspection report documents the inspection results, which were discussed on January 21, 2011, with you and other members of your staff.

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

Based on the results of this inspection, this report documents two self-revealing findings of very low safety significance (Green). Both of these findings were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations which were determined to be of very low safety significance are listed in this report. However, because of the very low safety significance and because they are both entered into your corrective action program (CAP), the NRC is treating the findings as non-cited violations (NCVs), consistent with Section 2.3.2 of the NRC's Enforcement Policy. If you contest any of the findings 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. In addition, if you disagree with the characterization of the

cross-cutting aspect of 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 1 and the NRC Senior Resident Inspector at the Beaver Valley Power Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

Additionally, the inspectors reviewed Licensee Event Report 50-334/2010-002, which described the details associated with a 270 degree circumferential flaw on a drain valve located on the common suction piping for the Residual Heat Removal (RHR) system, discovered on October 2, 2010. This issue constituted a violation of NRC requirements, in that you entered Mode 5 operations without immediately taking actions to restore the RHR system to operable status in accordance with Technical Specifications (TS). However, the NRC concluded that your initial operability assessment of RHR upon observation of the leak was reasonable based on the information available at the time and was not within your ability to foresee and correct, and therefore, did not identify any performance deficiency associated with the violation. The NRC noted that you took immediate action to perform a more detailed non-destructive evaluation of the RHR weld and piping integrity, declared RHR inoperable in a timely manner, and effectively implemented the TS required action statement to immediately initiate action to restore operability. Additionally, the NRC performed a risk evaluation and determined the issue to be of very low safety significance. Based on these facts, I have been authorized, after consultation with the Director, Office of Enforcement, and the Regional Administrator, to exercise enforcement discretion in accordance with Section 3.5 of the Enforcement Policy and refrain from issuing enforcement for the violation.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, and its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). We appreciate your cooperation. Please contact me at 610-337-5200 if you have any questions regarding this letter.

Sincerely,

**/RA/**

Darrell J. Roberts, Director  
Division of Reactor Projects

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

Enclosures: Inspection Report 05000334/2010005; 05000412/2010005  
w/ Attachment: Supplemental Information

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 Darrell J. Roberts, Director  
 Division of Reactor Projects

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos. 50-334, 50-412

License Nos. DPR-66, NPF-73

Report Nos. 05000334/2010005 and 05000412/2010005

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Post Office Box 4  
Shippingport, PA 15077

Dates: October 1, 2010 through December 31, 2010

Inspectors: D. Werkheiser, Senior Resident Inspector  
E. Bonney, Resident Inspector  
P. Kaufman, Senior Reactor Inspector  
T. Moslak, Health Physicist

Approved by: R. Bellamy, Ph.D., Chief  
Projects Branch 6  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000334/2010005, IR 05000412/2010005; 10/01/2010 – 12/31/2010; Beaver Valley Power Station, Units 1 & 2; Outage Activities

The report covered a 3-month period of inspection by resident inspectors, regional reactor inspectors, and a regional health physics inspector. Two (Green) findings were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. Cross-cutting aspects associated with findings are determined using IMC 0310, "Components Within The Cross-Cutting Areas," dated February 2010. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### Cornerstone: Mitigating Systems

- Green. A self-revealing non-cited violation (NCV) was identified in that a chemical addition pump [1WT-P-15B] was misaligned to an isolated main feed water header, and upon starting caused an unexpected pressure transient, which affected the 'B' Fast Acting Main Feedwater Isolation Valve (HYV-1FW-100B) (MFIV). Specifically, the main feed water piping was inadvertently isolated and pressurized beyond its normal operating pressure, causing significant packing leakage of the 'B' MFIV. This issue was entered into the licensee's corrective action program under CR 10-84891.

Traditional enforcement does not apply because the issue did not have an actual safety consequence or the potential for impacting NRC's regulatory function, and was not the result of any willful violation of NRC requirements. The inspectors determined that the finding was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors performed a Phase 1 SDP evaluation in accordance with IMC 0609, Appendix G, Attachment 1, Checklist 3 "PWR Cold Shutdown and Refueling Operation RCS Open and Refueling Cavity Level <23' OR RCS Closed and No Inventory in Pressurizer with Time to Boiling <2 hours." There was no loss of control, and all mitigating capabilities were available, therefore a Phase 2 quantitative assessment was not required and the issue screened to Green (very low safety significance).

The cause of this finding relates to the cross-cutting aspect of Human Performance, Work Practices, in that FENOC did not utilize human error prevention techniques, pre-job brief and peer checking, to prevent the misalignment of the chemical addition pump. [H.4.(a)] (Section 1R20)

### Cornerstone: Barrier Integrity

- Green. A self-revealing non-cited violation (NCV) of TS 5.4.1, "Procedures", was identified in that the shift technical advisor's (STA) failure to follow procedure resulted in the maximum differential temperature being exceeded on the spray nozzle during pressurizer heat up. Specifically, the STA failed to notify the shift manager promptly when it became apparent that the maximum differential temperature of the spray nozzle trend was degrading and its limit subsequently exceeded. This issue was entered into the licensee's corrective action program under CR 10-85021.

Enclosure

Traditional enforcement does not apply because the issue did not have an actual safety consequence or the potential for impacting NRC's regulatory function, and was not the result of any willful violation of NRC requirements. The inspectors determined that the finding was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor because if left uncorrected, had the potential to lead to a more significant safety concern. The inspectors performed a Phase 1 SDP evaluation in accordance with IMC 0609, Appendix G, Attachment 1, Checklist 4 "PWR Refueling Operation: RCS level > 23' or PWR Shutdown Operation with Time to Boil > 2 hours And Inventory in the Pressurizer." There was no loss of control, all mitigating capabilities were available, therefore a Phase 2 quantitative assessment was not required and the issue screened to Green (very low safety significance).

The cause of this NCV relates to the cross-cutting aspect of Human Performance, Resources, in that FENOC personnel were not adequately trained to recognize the indications being monitored, resulting in the pressurizer spray nozzle maximum differential temperature being exceeded.  
[H.2.(b)] (1R20)

### **Other Findings**

Two violations of very low safety significance, which were identified by FENOC, have been reviewed by the inspectors. Corrective actions taken or planned by FENOC have been entered into the licensee's corrective action program. These violations and their corrective actions are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status:

Unit 1 began the inspection period at approximately 80 percent power in preparation for steam generator safety valve testing and then began a planned refueling outage on October 2. The unit commenced startup on November 3 and returned to full power on November 6. On December 10, the unit was down-powered to 82 percent for a planned condenser tube leak search and returned to full power December 13. The unit remained at 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On November 6, the unit was down-powered to 97 percent for planned turbine throttle and governor valve testing and returned to full power later the same day. The unit remained at 100 percent power for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### **Cornerstone: Initiating Events, Mitigating Systems, Barrier Integrity [R]**

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Seasonal Susceptibility

##### a. Inspection Scope (1 sample)

The inspectors reviewed the Beaver Valley Power Station (BVPS) design features and FENOC's implementation of procedures to protect risk significant mitigating systems from cold weather conditions and high winds. The inspectors walked down risk significant plant areas for several days in November and December and assessed FENOC's protection activities for cold weather conditions. The inspectors were sensitive to outside instrument line conditions and the potential for unheated ventilation. The walkdown included the emergency diesel generator rooms, low head safety injection, and service/river water systems. The inspectors also reviewed 1OST-45.11, "Cold Weather Protection Verification," Rev. 19 and 2OST-45.11, "Cold Weather Protection Verification," Rev. 19. Other documents that were reviewed are listed in the attachment.

##### b. Findings

No findings were identified.

##### .2 Adverse Weather

##### a. Inspection Scope (1 sample)

#### October 26 – Tornado Watch/High Winds

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." Average wind speeds exceeded 20 miles per hour, with gusts up to 30 miles per hour.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial System Walkdowns (71111.04Q)

a. Inspection Scope (3 samples)

The inspectors performed three partial equipment alignment inspections during conditions of increased safety significance, including when redundant equipment was unavailable during maintenance or adverse conditions. The partial alignment inspections were also completed after equipment was recently returned to service after significant maintenance. The inspectors performed partial walkdowns of the following systems, including associated electrical distribution components and control room panels, to verify the equipment was aligned to perform its intended safety functions:

- On October 18, Unit 1, 'B' train river water with emergency diesel generator (EDG) heat exchanger temporary modification, ECP 10-0224-000, installed;
- On November 30, Unit 2, 2-1 EDG during ventilation damper maintenance on the 2-2 EDG; and
- On November 30, Unit 1, 3A auxiliary feedwater (AFW) pump during preventative maintenance on 3B AFW pump.

b. Findings

No findings were identified.

.2 Complete System Walkdown (71111.04S)

a. Inspection Scope (1 sample)

The inspectors completed a detailed review of the alignment and condition of the Unit 2 'B' train AFW system. The inspectors conducted a walkdown of the system to verify that the critical portions, such as valve positions, switches, and breakers, were correctly aligned in accordance with procedures, and to identify any discrepancies that may have had an effect on operability.

The inspectors also reviewed outstanding maintenance work orders to verify that the deficiencies did not significantly affect the 'B' train AFW system function. In addition, the inspectors discussed system health with the system engineer and reviewed the condition report database to verify that equipment alignment problems were being identified and

appropriately resolved. Documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Sample Review (71111.05Q)

a. Inspection Scope (5 samples)

The inspectors reviewed the conditions of the fire areas listed below, to verify compliance with criteria delineated in Administrative Procedure 1/2-ADM-1900, "Fire Protection," Rev. 19. This review included FENOC's control of transient combustibles and ignition sources, material condition of fire protection equipment including fire detection systems, water-based fire suppression systems, gaseous fire suppression systems, manual firefighting equipment and capability, passive fire protection features, and the adequacy of compensatory measures for any fire protection impairments. Documents reviewed are listed in the Attachment:

- Unit 1, Reactor Containment Building (Fire Area RC-1);
- Unit 2, Primary Auxiliary Building (Fire Area PA-3);
- Unit 2, Primary Auxiliary Building (Fire Area PA-4);
- Unit 2, Primary Auxiliary Building (Fire Area PA-5); and
- Unit 2, Safeguard Building North (Fire Area SG-N1).

b. Findings

No findings were identified.

.2 Fire Brigade Response to Smoke and Fire Alarm at Primary Access Facility (71111.05A)

a. Inspection Scope (1 sample)

The inspectors observed personnel actions and fire brigade performance in response to reports of smoke and fire alarm in the Primary Access Facility (PAF) on December 14. The cause of the smoke was quickly determined to be a failed heater panel and was de-energized. No fire was evident. The inspectors observed the fire brigade members using protective clothing, turnout gear, and self-contained breathing apparatus and entering the fire area in a controlled manner. The inspectors also observed the fire-fighting equipment brought to the fire scene to evaluate whether sufficient equipment was available to effectively control and extinguish a potential fire in accordance with the pre-fire plan. The inspectors observed the fire fighting directions and communications between fire brigade members and team leader, including the safe evacuation of non-essential personnel and the safety of other essential personnel, who remained in the building. The inspectors verified that fire brigade members took adequate actions to allow safe re-entry to the building.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)a. Inspection Scope (1 sample)

The inspectors reviewed a sample of internal flood protection measures regarding cables located in underground manholes. The inspectors selected a FENOC inspection of manholes 11A and 20A that contain Unit 1 and Unit 2 important to safety power and control cables that are located underground. The inspectors entered the confined areas with FENOC personnel, inspected the manholes, and monitored licensee maintenance activities.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07).1 Annual Sample Review (71111.07A)a. Inspection Scope (1 sample)

The inspectors reviewed the inspection eddy current test documentation associated with the Unit 1 'C' recirculation spray heat exchanger (1RS-E-1C) conducted on October 15. The review included an assessment of the testing methodology and verified consistency with Electric Power Research Institute document NP-7552, "Heat Exchanger Performance Monitoring Guidelines," December 1991, and Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The inspectors reviewed inspection results and related condition reports.

b. Findings

No findings were identified.

1R08 Inservice Inspection (71111.08P)a. Inspection Scope (1 sample)

From October 12 - 20, during the 1R20 refueling outage, the inspectors conducted a review of FENOC's implementation of in-service inspection (ISI) program activities for monitoring degradation of the reactor coolant system boundary and risk significant piping system boundaries for Beaver Valley Power Station 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 inspectors reviewed documentation, observed in-process non-destructive examinations (NDE) and interviewed inspection personnel to verify that the activities were performed in accordance with the requirements of ASME Boiler and Pressure Vessel Code Section XI, 2001 Edition, 2003 Addenda.

The inspectors reviewed a sample of Unit 1 condition reports, which identified flaws and other nonconforming conditions since the previous 1R19 outage and during the 1R20 outage. The inspectors verified that nonconforming conditions were properly identified, characterized,

evaluated, corrective actions identified and dispositioned, and appropriately entered into the Beaver Valley corrective action program.

#### Non-Destructive Examination (NDE) Activities

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

- Direct observation of manual Ultrasonic Test (UT), volumetric examination, 14" diameter pressurizer surge line, pipe to pipe butt weld, component DLW-501-PRESS-2-F-38, UT Pipe Weld Examination Report No. UT-10-1050, dated October 18;
- Direct remote observation of visual examination of Beaver Valley Unit 1 Reactor Pressure Vessel (RPV) lower head bare metal inspection (BMI) of the 50 nozzles; Report No. VT-10-1035, dated 10/14/2010, and reactor vessel upper head BMI and 60 control rod drive mechanism (CRDM) penetrations, one head vent penetration, and one reactor vessel level instrument penetration; 1R20 Report No. WDI-PJF-1304791-NDE-001, Rev. 0, dated October 19;
- Direct inspection and review of visual examination test results report for 1BVT 1.47.1, Containment Structural Integrity Test, dated October 26, during 1R20 examination of Beaver Valley Unit 1 Containment Cylindrical Steel Liner;
- Record review of Liquid Penetrant Test (PT), surface examination, residual heat removal, field socket weld valve to pipe weld, component ID number BV-1RH-200, PT Examination Report No. BOP-PT-10-165, dated October 15; and
- Record review of five manual UT, volumetric examinations of three pressurizer safety, one relief and one spray nozzle dissimilar metal butt weld structural weld overlays, UT examination Report Nos. VEN-10-1001 through VEN-10-1010, all dated October 15.

The inspectors reviewed certifications of technicians performing the NDEs. The inspectors 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 1R19 through 1R20 outage.

#### Unit 1 Reactor Pressure Vessel Upper Closure Head Penetration Inspection Activities

The inspectors reviewed visual examination report and video recording of the Beaver Valley Unit 1 reactor pressure vessel upper closure penetration nozzles to head penetrations with Alloy 600/82/182 material. The Unit 1 reactor pressure vessel upper closure head was replaced in 2006. The inspector directly observed portions of the remote visual inspection to confirm appropriate coverage was achieved and verified that no boric acid leakage or wastage had been observed on the reactor pressure vessel upper closure head surface to verify that the remote visual inspection was conducted using procedure MRS-SSP-1398 and in accordance with 10 CFR 50.55a(g)(6)(ii)(D).

### Repair/Replacement Consisting of Welding Activities

The inspectors reviewed a Beaver Valley Unit 1 replacement activity to verify that welding and applicable NDE activities were performed in accordance with ASME Section XI Code requirements. Specifically, replacement of 3/4-inch residual heat removal suction low point drain valve 1RH-200, ASME Class 2, per work order 200199095 due to a 270 degree circumferential crack in the pipe to valve socket weld when boric acid leakage was observed during the licensee's 1R20 initial containment entry boric acid visual inspection walkdown on October 2. The inspectors verified that the socket weld deficiency was appropriately entered into the licensee's corrective action program. Condition report CR 10-83533 was issued to identify the weld flaw and resulting corrective actions, which includes a root cause report, metallurgical evaluation, and extent of condition review. The valve with the socket weld flaw was sent to a laboratory for metallurgical evaluation on October 18. The inspector also reviewed several of the PT examination reports associated with extent of condition inspections conducted as a result of the weld flaw in the socket weld to valve 1RH-200.

### Unit 1 Reactor Pressure Vessel Lower Head Penetration Nozzle Inspection Activities

The inspectors verified that the Alloy 600 BMI exams of the Beaver Valley Unit 1 reactor pressure vessel lower head instrument nozzle penetration welds per procedure NDE-VT-513 during 1R20 was acceptable by reviewing visual examination photographs and VT-2 leakage record VT-10-035. The inspectors verified no leakage was identified at any of the 50 penetrations.

### Boric Acid Corrosion Control (BACC) Inspection Activities

The inspectors reviewed Beaver Valley's boric acid corrosion control program, discussed the program with the program owner, and sampled photographic inspection records of boric acid found on safety significant piping and components inside the Beaver Valley Unit 1 containment during walkdowns conducted by licensee personnel which was directly observed by the resident inspectors on their initial containment entry walkdowns during 1R20 refueling outage conducted on October 2. The inspectors observed the identification and documentation of various boric acid leaks with emphasis on areas that could cause degradation of safety significant components.

The inspectors verified that potential deficiencies identified during the walkdowns were entered into the licensee's corrective action program and reviewed two of the more significant condition reports CR 10-83632, 1RH-200 drain line socket weld flaw and CR 10-83530, 1SI-22 safety injection swing check valve degraded studs, to verify that the corrective actions were consistent with the requirements of the ASME Code and 10 CFR 50, Appendix B, Criterion XVI. The inspectors also reviewed two engineering evaluations CR 10-83540, 1RH-P-1A pump and CR 10-83541, 1RH-P-1B pump 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 (SG) Tube Inspection Activities

No eddy current examinations were performed of Beaver Valley Unit 1 steam generator (SG) tubes during the 1R20 outage. The steam generators were replaced in 2006.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope (1 sample)

On December 8<sup>th</sup>, the inspectors observed a sample of Unit 1 and Unit 2 licensed operator regualification simulator training which also included Unit 1 just-in-time training for a down power for a condenser waterbox leak search. The inspectors evaluated licensed operator performance regarding command and control, implementation of normal, annunciator response, abnormal, and emergency operating procedures, communications, technical specification review and compliance, and emergency plan implementation. The inspectors evaluated the licensee staff training personnel to verify that deficiencies in operator performance were identified, and that conditions adverse to quality were entered into the licensee's corrective action program for resolution. The inspectors reviewed simulator physical fidelity to assure the simulator appropriately modeled the plant control room. The inspectors verified that the training evaluators adequately addressed that the applicable training objectives had been achieved.

b. Findings

No findings were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope (1 sample)

The inspectors evaluated Maintenance Rule (MR) implementation for the issues listed below. The inspectors evaluated specific attributes, such as MR scoping, characterization of failed structures, systems, and components (SSCs), MR risk characterization of SSCs, SSC performance criteria and goals, and appropriateness of corrective actions. The inspectors verified that the issues were addressed as required by 10 CFR 50.65 and the licensee's program for MR implementation. For the selected SSCs, the inspectors evaluated whether performance was properly dispositioned for MR category (a)(1) and (a)(2) performance monitoring. MR System Basis Documents were also reviewed, as appropriate. Documents reviewed are listed in the Attachment.

- MR (a)(1) evaluation for Emergency Response Facility Diesel Generator documented in CR 10-83369, "Maintenance Rule Criteria for Unit 1/2 System 58E was exceeded."

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessment and Emergent Work Control (71111.13)

a. Inspection Scope (5 samples)

The inspectors reviewed the scheduling and control of five activities, and evaluated their effect on overall plant risk. This review was conducted to ensure compliance with applicable criteria contained in 10 CFR 50.65(a)(4). Other documents reviewed during the inspection are listed in the Attachment.

- On September 29, Unit 1 on-line yellow risk assessment as documented in CR 10-83724;
- On October 4, Unit 1 shutdown risk assessment during 1-2 EDG auto-load test while RHR drain valve (1RH-200) was degraded;
- On October 4, Unit 2 on-line risk assessment while jumpering out cell #23 for safety-related battery #2-2;
- On October 19, Unit 1 shutdown risk assessment and affect on safety-related 'AE' bus during 1-1 EDG testing; and
- On November 2, Unit 1 shutdown orange risk evaluation to perform corrective repair and retest of charging and letdown valve 1CH-220.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope (6 samples)

The inspectors evaluated the technical adequacy of selected immediate operability determinations (IOD), prompt operability determinations (POD), and functionality assessments (FA), to verify that determinations of operability were justified. In addition, the inspectors verified that TS limiting conditions for operation (LCO) requirements and UFSAR design basis requirements were properly addressed. In addition, the inspectors reviewed compensatory measures implemented to ensure the measures worked and were adequately controlled. Documents reviewed are listed in the Attachment.

- On October 6, Unit 1, residual heat removal common suction drain valve, 1RH-200, socket weld crack and ASME code repair as documented in CR 10-83533 (also see section 4OA3);
- On October 9, Unit 1, safety injection check valve, 1SI-22, bolt wastage as documented in CR 10-83984;
- On October 17, Unit 1, 480V bus 8N1 transformer disconnect switch malfunction as documented in CR 10-84471;
- On October 13 - November 8, Unit 1, 1-1 EDG river water heat exchanger temporary modification installed as documented in CR 10-84574;
- On November 3, Unit 2, vendor 10CFR21 issue potentially affecting the main feedwater regulation valve disk as documented in CR 10-85267; and
- On November 16, Unit 1, emergency core cooling system and control room envelope operability during low head safety injection relief valve, RV-1SI-845B, failure as documented in CR 10-85863 (see also 4OA3.1).

b. Findings

Introduction. An unresolved item (URI) was identified because additional information regarding the existence of adverse nozzle loads affecting, and the as-found testing and inspection results of, the set point of Unit 1 relief valve RV-1-SI-845B is required to determine whether a performance deficiency existed which contributed to its premature lifting. The inspectors will review the additional information after the relief valve is removed and the valve and associated pipe alignment is inspected.

Description. As reported by FENOC on November 16, 2010 (Event Notification 46421), and LER 05-334/2010-003-00, Unit 1 Low Head Safety Injection (LHSI) system relief valve RV-1SI-845B unexpectedly lifted during planned testing of the 'A' LHSI pump. The relief valve properly reseated and cycled open only during pump operation. The condition revealed itself during surveillance testing by an unexpected sump alarm and lowering of the refueling water storage tank level. FENOC evaluated the impact to the LHSI safety function and the control room envelope. FENOC also determined that the relief valve could be gagged closed and still maintain LHSI system protection and testing capability with the remaining two relief valves and additional compensatory measures. This relief valve had been installed during the most recent refueling outage and post-maintenance tested satisfactorily. FENOC entered the issue into their CAP as CR 10-85863 and conducted a root cause analysis and concluded the most probable cause was nozzle loading effects from possible LHSI piping misalignment. FENOC plans to remove the valve and inspect it and the piping alignment at the earliest acceptable plant condition to continue its investigation. The inspectors will review the additional information of the as-found condition of the relief valve and the associated LHSI piping alignment to determine if a performance deficiency exists. **(URI 05000334/2010005-01: Premature Lifting of ECCS Relief Valve RV-1SI-845B)**

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope (2 samples)

The inspectors reviewed the following temporary modifications (TMOD) based on risk significance. The TMOD and associated 10 CFR 50.59 screening were reviewed against the system design basis documentation, including the UFSAR and the TS. The inspectors verified the TMODs were implemented in accordance with Administrative (ADM) Procedure, 1/2-ADM-2028, "Temporary Modifications," Rev. 6. Documents reviewed are listed in the Attachment.

- On October 6 -15, TMOD ECP-10-0619-001, residual heat removal common suction line drain valve, 1RH-200, clamp installation and removal. Inspectors walked down the systems to verify the changes described in the package were consistent with field implementation, and that the safety function of the RHR system would be maintained; and
- On October 13 - November 8, TMOD ECP 10-02224-000, associated with temporary piping to the river water heat exchanger servicing the 1-1 EDG. For this activity, the inspectors walked down the systems to verify that changes described in the package were actually implemented, and verified the post-modification testing was satisfactorily accomplished.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope (6 samples)

The inspectors reviewed the following activities to determine whether the post-maintenance tests (PMT) adequately demonstrated that the safety-related function of the equipment was satisfied given the scope of the work, and that operability of the system was restored. In addition, the inspectors evaluated the applicable acceptance criteria to verify consistency with the design and licensing bases, as well as TS requirements. The inspectors witnessed the test or reviewed test data to verify results adequately demonstrated restoration of affected safety functions. The inspectors also verified that conditions adverse to quality were entered into the corrective action program for resolution. Documents reviewed during the inspection are listed in the Attachment:

- On October 13, Unit 1, WO 200298746 retest of low head safety injection supply check valve, 1SI-24, following seat repairs to correct back leakage;
- On October 15, Unit 1, WO 2001990951 inspection and testing for residual heat removal common suction drain valve, 1RH-200, replacement;
- On October 20, Unit 1, WO 200434057 for 1-1 EDG governor post-replacement testing;
- On October 26, Unit 1, WO20029874 retest of low head safety injection supply check valve, 1SI-22, following bolt replacement and seat repairs to correct back leakage;
- On October 26, Unit 1, verification of low head safety injection supply check valves' cap torques for 1SI-22 and 1SI-24 and no leakage; and
- On October 31, Unit 1, 'C' steam generator 10C/12C common snubber replacement.

b. Findings

No findings were identified.

1R20 Refueling and Outage Activities (71111.20)

.1 Unit 1 Refueling Outage (1R20)

a. Inspection Scope (1 sample)

The inspectors observed selected outage activities to determine whether shutdown safety functions (e.g. reactor decay heat removal, spent fuel pool cooling, and containment integrity) were properly maintained as required by TS and plant procedures. The inspectors evaluated specific performance attributes including operator performance, communications, and instrumentation accuracy. The inspectors reviewed procedures and/or observed selected activities associated with the Unit 1 refueling outage. The inspectors verified activities were performed in accordance with procedures and verified required acceptance criteria were met. The inspectors also verified that conditions adverse to quality identified during performance of selected outage activities were identified as required by the licensee's corrective action program. Documents reviewed are listed in the Attachment. The inspectors also evaluated the following activities:

- Pre-Outage Shutdown Safety Review;
- Reactor plant shutdown and cooldown, including evaluation of cooldown rates;
- Initial containment and containment sump walkdown, including liner inspection;
- Coordination of electrical bus work, emergency diesel generator tests;
- Monitoring of decay heat removal processes;
- Refueling activities; fuel handling and inspection;
- Reactor coolant system draindown;
- 1C21 core map/fuel assembly verification;
- Final containment walkdown and closeout inspection;
- Reactor start-up and low power physics testing;
- Control rod drop measurement and testing;
- Reactor plant start-up and heat-up; and
- Balance-of-plant walkdown during power ascension.

The inspectors also observed selected management review activities associated with restart readiness of Unit 1, following completion of the 1R20 refueling activities. The restart readiness review meeting was accomplished as required by NOBP-OM-4010, "Restart Readiness for Plant Outages," Rev. 4, on October 22. The purpose of the review, in part, was to assure that the plant's material condition, programs/processes, and personnel were ready for startup and safe, reliable operation after completion of outage activities.

b. Findings

1. Failure to Follow Procedure Results in Main Feedwater Piping Pressurization

Introduction: A Green, self-revealing non-cited violation (NCV) was identified in that a chemical addition pump [1WT-P-15B] was misaligned to an isolated main feed water header and started, causing an unexpected pressure transient, which affected the 'B' Fast Acting Main Feedwater Isolation Valve (HYV-1FW-100B) (MFIV). Specifically, the main feed water piping was inadvertently isolated and pressurized beyond its normal operating pressure, causing significant packing leakage of the 'B' MFIV.

Description: On October 25, Unit 1 intended to add chemicals to the 'B' steam generator when an operator misaligned the chemical addition pump to an isolated feedwater pipe section due to implementing an incorrect section of procedure 1OM-32.4.AL, "Chemical Addition to the Steam Generators," for the existing plant condition. The incorrect procedure section aligned the system such that the valve upstream of 'B' MFIV was open with the downstream valve (1WT-510) remaining shut. This resulted in the chemical addition pump (positive displacement type) injecting into an isolated pipe section affecting the 'B' main feedwater regulating valve (FCV-1FW-488), the 'B' bypass main feed regulating valve (FCV-1FW-489), and the 'B' MFIV.

Approximately two hours into the five hour process, after the start of the chemical addition, the operator noted the discharge pressure of the pump was higher than expected, but did not take further action. Normal pressure for the shutdown plant condition is less than 1000 psig. Another hour later, the control room received a report from the field of excessive packing leakage from the 'B' MFIV. The chemical addition pump was shutdown and it was determined that system pressure was greater than 1515 psig for two hours and fifty-four minutes. FENOC performed an engineering evaluation of the pressure transient and determined the piping allowable stresses were not exceeded. Corrective actions included inspection of affected

pipng, valves, instrument lines, and successful adjustment of the 'B' MFIV packing and diagnostic testing of the 'B' main feed regulating valve prior to entering Mode 3.

Analysis: The failure to properly align the chemical addition pump [1WT-P-15B], as required by procedure is considered a performance deficiency. Traditional enforcement does not apply because the issue did not have an actual safety consequence or the potential for impacting NRC's regulatory function, and was not the result of any willful violation of NRC requirements. The inspectors determined that the finding was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors performed a Phase 1 SDP evaluation in accordance with IMC 0609, Appendix G, Attachment 1, Checklist 3 "PWR Cold Shutdown and Refueling Operation RCS Open and Refueling Cavity Level <23' OR RCS Closed and No Inventory in Pressurizer Time to Boiling <2 hours." There was no loss of control, all mitigating capabilities were available, therefore a Phase 2 quantitative assessment was not required and the issue screened to Green (very low safety significance).

The cause of this finding relates to the cross-cutting aspect of Human Performance, Work Practices, in that FENOC did not utilize human error prevention techniques, pre-job brief and peer checking, to prevent the misalignment of the chemical addition pump. [H.4.(a)]

Enforcement: TS 5.4.1, "Procedures", requires that procedures be established, implemented and maintained as recommended in Appendix A of Regulatory Guide 1.33, including instructions for Filling, Venting, and Draining the Feedwater System. Contrary to the above, FENOC failed to adequately implement the procedure for adding chemicals to the steam generators. Because this deficiency is considered to be of very low safety significance (Green) and was entered into the corrective action program (CR 10-84891), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000334/2010005-02, Failure to Follow Procedure Results in Main Feedwater Piping Pressurization)**; and

## 2. Maximum Delta-Temperature Exceeded for Spray Nozzle during Pressurizer Heatup

Introduction: A Green, self-revealing NCV of TS 5.4.1, "Procedures", was identified in that the STA failure to follow procedures resulted in the maximum differential temperature being exceeded on the spray nozzle during pressurizer heatup. Specifically, the shift technical advisor (STA) failed to notify the shift manager promptly when it became apparent that the maximum differential temperature of the spray nozzle trend was degrading and limit subsequently exceeded.

Description: On October 28, 2010 a Unit 1 plant heat up was in progress while in Mode 5 in accordance with procedure 1OM-50.4.L, "Plant Heatup from Mode 6 to Mode 3". A steam bubble was present in the pressurizer and plant pressure was being raised in preparation for starting a reactor coolant pump. Auxiliary spray was initiated for pressurizer level control per 1OM-50.4.L, section E. Several sections of 1OM-50.4.L were in progress simultaneously throughout the shift.

1OM-50.4.L, Attachment 3, Data Sheet 5 is used to trend differential temperature between the auxiliary spray line and the pressurizer. The data sheet requires a log entry every half hour for differential temperature and an annotation if the temperature limit of 320F was exceeded. The differential temperature calculation requires the use of containment temperature when auxiliary spray is off-scale low, which was correctly utilized by the STA. However, the indication and resulting calculation were incorrectly believed not to be a true representation as evidenced by an annotation by the STA at the bottom of the data sheet stating that the differential temperature calculated was not a true indication of auxiliary spray temperature.

The STA notified the senior operators 1 hour and 30 minutes after the limit was exceeded and after discussions with the reactor operator concerning temperature indications. The shift manager was notified after three data sheet log entries exceeding the differential temperature limit. The crew took actions to establish normal letdown flow and reduced the differential temperature to less than 320F limit. The limit had been exceeded for a total of approximately 1 hour and 45 minutes.

FENOC's engineering evaluation determined the transient on the spray nozzle was accounted for in the spray nozzle fatigue analysis and had no degrading effect on the pressurizer. FENOC has included this transient in the Unit 1 fatigue cycle counting program.

Analysis: The failure to maintain pressurizer spray nozzle differential temperature below the limit during pressurizer heat up as required by procedure is considered a performance deficiency. Traditional enforcement does not apply because the issue did not have an actual safety consequence or the potential for impacting NRC's regulatory function, and was not the result of any willful violation of NRC requirements. The inspectors determined that the finding was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor because if left uncorrected, had the potential to lead to a more significant safety concern.

The inspectors performed a Phase 1 SDP evaluation in accordance with IMC 0609, Appendix G, Attachment 1, Checklist 4 "PWR Refueling Operation: RCS level > 23' or PWR Shutdown Operation with Time to Boil > 2 hours And Inventory in the Pressurizer." There was no loss of control, all mitigating capabilities were available, therefore a Phase 2 quantitative assessment was not required and the issue screened to Green (very low safety significance).

The cause of this NCV relates to the cross-cutting aspect of Human Performance, Resources, in that FENOC personnel were not adequately trained to recognize the indications being monitored, resulting in the pressurizer spray nozzle maximum differential temperature being exceeded. [H.2.(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, Section 2.a, requires general plant operating procedures, including instructions for transitioning from cold shutdown to hot standby. Contrary to the above, FENOC failed to adequately implement the procedure for plant heatup. Because this deficiency is considered to be of very low safety significance (Green), and was entered into the corrective action program (CR-10-85021), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 0500334/2010005-3, Maximum Differential Temperature Exceeded for Spray Nozzle during Pressurizer Heatup).**

1R22 Surveillance Testing (71111.22)

- a. Inspection Scope (7 samples: 1 isolation valve, 1 leak rate, 1 in-service testing, and 4 routine)

The inspectors witnessed the performance of or reviewed test data for the seven following Operation Surveillance Test (OST) and Maintenance Surveillance (MSP) performances. The reviews verified that the equipment or systems were being tested as required by TS, the UFSAR, and procedural requirements. The inspectors also verified that the licensee established proper test conditions, that no equipment pre-conditioning activities occurred, and that acceptance criteria were met.

- On October 1, 1OST-36.5&5A, Rev. 6, "Emergency Switchgear Operational Test (Manual and Auto Transfer from Unit to System Station Service Transformer);"
- On October 6, 1OST-36.3, Rev 26 , "Diesel Generator No. 1 Automatic Test;"
- On October 14, 1BVT-1.39.3, Rev.5, "Station Battery [BAT1-3] Test;"
- On October 22, 1OST-24.13, Rev. 12, "Overspeed Trip test of TDAFW;"
- On October 22, 1OST-11.14B, Rev. 28, "HHSI Full Flow Test;"
- On October 30, 1BVT-1.47.4, Rev. 14, "Containment Electrical Penetrations Type B Leak Test;" and
- On December 29, 1OST-6.2A, Rev. 18, "Computer Generated Reactor Coolant System Water Inventory Balance."

- b. Findings

No findings were identified.

## 2. **RADIATION SAFETY**

### **Cornerstone: Occupational Radiation Safety [RS]**

#### 2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

- a. Inspection Scope

During the period October 18 - 21, the inspector conducted 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 (1R20) refueling outage. Implementation of these controls was reviewed against the criteria contained in 10CFR20, relevant TSs, and the licensee's procedures.

#### Plant W alldown and Radiation Work Permits (RWP) Reviews

The inspector toured accessible radiological controlled areas in the Unit 1 reactor building containment (RBC), primary auxiliary building, and radwaste building. With the assistance of a radiation protection technician, independent radiation surveys were performed of selected areas to confirm the accuracy of survey data, and the adequacy of postings.

The inspector identified radiologically significant jobs being performed in the Unit 1 RBC. The inspector reviewed the applicable RWPs, ALARA Plans (AP), and the electronic dosimeter dose/dose rate 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 GSI-191 insulation removal/replacement (RWP 110-4048), reactor cavity decontamination (RWP 110-4009), relief valve replacement on the regenerative heat exchanger (RWPs 110-4028/110-4003), and a spent resin transfer (RWP 110-0507). For the jobs reviewed, the inspector determined that dosimetry was appropriately specified and located on the portion of the body receiving the highest dose rate, for significant dose gradients. The inspector determined that tele-dosimetry was extensively used to monitor and control worker exposure for dose intensive jobs.

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 step off pad.

#### 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 the Radiation Protection Supervisor to determine that any changes made to these procedures did not reduce safety measures.

Keys to locked high radiation areas (LHRA), located in Unit 1 were inventoried, and accessible LHRAs were verified to be properly secured and posted during plant tours in Unit 1.

The inspector reviewed the preparations made for various potentially high dose rate jobs including fuel transfers, spent resin transfer, cavity decontamination, and reactor nozzle insulation modifications. This review included evaluating the effectiveness of contamination control measures, source term controls, and 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 refueling activities 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 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 if problems were identified in a timely manner, that an extent of condition

and cause evaluation were performed when appropriate, previous radiation surveys remained valid, and corrective actions were appropriate to preclude repetitive problems.

b. Findings

No findings were identified.

2RS02 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

During the period October 18 - 21, the inspector conducted 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 1R20 refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR 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 1R20 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 10-1-13), insulation modifications (AP 10-1-27), and reactor disassembly/reassembly (AP 10-1-16).

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 Station ALARA Managers Committee (AMC) meetings, and reviewing recent AMC meeting minutes. The AMC meeting agendas, which the inspector attended, included revising dose estimates for a residual heat removal pump (1RH-P-1B) seal repair and revising dose estimate for radiation protection department outage support.

Verification of Dose Estimates

The inspector reviewed the assumptions and basis for the 1R20 outage ALARA plan. The inspector also reviewed the revisions made to various outage project dose estimates due to emergent work; e.g., insulation modifications, scaffolding activities, and RHR seal repairs, 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 2010 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, for GSI-191 insulation replacement, refueling activities scaffolding installation, and attended pre-job ALARA briefings for cavity decontamination, relief valve replacement on the regenerative heat exchanger, and a spent resin transfer.

The inspector observed workers perform RBC demobilization, scaffolding installation, and RHR seal repairs. 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, increased filtration flow, enhanced chemistry controls, system flushes, and temporary shielding.

### 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.

### 2RS03 In-Plant Airborne Radioactivity Control and Mitigation (71124.04)

#### a. Inspection Scope

During the period October 18 – 21, the inspector conducted activities to verify that in-plant radioactivity airborne concentrations were being controlled and monitored and that the use of respiratory protection devices was appropriately specified and used. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, and the licensee's procedures.

### Engineering Controls

There were no current radiation work permits for airborne radioactivity areas with the potential for individual worker internal exposures to exceed 50 mrem during the 1R20 outage. The inspector reviewed air sampling records for on-going jobs to confirm that airborne contamination was not significant. Additionally, the inspector confirmed that engineering controls, such as portable HEPA filtration/ventilation systems were specified and used for tasks involving the opening of a contaminated system; e.g., replacement of a relief valve on

the regenerative heat exchanger, or for work on externally contaminated components, such as reactor nozzle insulation replacement.

#### Use of Respiratory Protection Devices

The inspector confirmed that respirators were used as a contingency for specific tasks involving potential airborne contamination including GSI-191 reactor nozzle insulation replacement (RWP 110-4048), and for containment fuel transfer cart cable inspection (RWP 110-4020).

b. Findings

No findings were identified.

#### 2RS04 Occupational Dose Assessment (71124.04)

a. Inspection Scope

During the period October 18 – 21, the inspector conducted 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 10CFR20, and the licensee's procedures.

#### External Dosimetry

The inspector verified that the on-site facility used to process thermo-luminescent dosimeters was accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). The inspector confirmed that detailed procedures were implemented associated with dosimeter practices, including routine issuance, multi-badging, extremity, and neutron 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. Additionally, the inspector reviewed alarm trends and a follow-up investigation that the licensee had conducted regarding anticipatory dose rate alarms that workers had received.

#### 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. The inspector reviewed three whole body counts and 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 [OA]

##### 4OA1 Performance Indicator Verification (71151)

###### a. Inspection Scope (6 samples total)

The inspectors sampled licensee submittals for Performance Indicators (PI) listed below for both Unit 1 and Unit 2 to verify accuracy of the data recorded from October 2009 through September 2010. The inspectors reviewed Licensee Event Reports, condition reports, portions of various plant operating logs and reports, and PI data developed from monthly operating reports. Methods for compiling and reporting the PIs were discussed with cognizant engineering and licensing personnel. To verify the accuracy of the PI data reported during this period, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 6, were used for each data element.

###### Cornerstone: Mitigating Systems (4 samples)

- Unit 1 and Unit 2 Emergency AC power systems [MS06] - Emergency Diesel Generators; and
- Unit 1 and Unit 2 High pressure safety injection systems [MS07] -High Head Safety Injection.

###### Cornerstone: Occupational Radiation Safety (1 sample)

- Station implementation of the Occupational Exposure Control Effectiveness Performance Indicator [OR01] Program. Specifically, the inspector also reviewed condition reports, and associated documents, for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures. This inspection activity completes the annual inspection requirement.

###### Cornerstone: Public Radiation Safety (1 sample)

- Station implementation of the RETS/ODCM Radiological Effluent Occurrence [PR01] Program. The inspector also reviewed relevant effluent release reports for the period January 1, 2010 through October 1, 2010, for issues related to the indicator, which measures radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; 5mrads/qtr gamma air dose, 10 mrad/qtr beta air dose, and 7.5 mrads/qtr for organ dose for gaseous effluents. This inspection activity completes the annual inspection requirement.

###### b. Findings

No findings were identified.

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

###### .1 Daily Review of Problem Identification and Resolution

###### a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into FENOC's corrective action program. This review was accomplished by reviewing summary lists of each CR, attending screening meetings, and accessing FENOC's computerized CR database.

b. Findings

No findings were identified.

.2 Annual Sample: Review of Abandoned/Retired-in-Place Program

a. Inspection Scope (1 sample)

The inspectors evaluated whether station personnel were tracking and implementing the program as required by BVPS-SITE-0010, "Abandoned in Place Equipment," Rev. 1. The inspectors also reviewed the cumulative effect of the abandoned-in-place program, the clearances associated with abandoned equipment, and documentation of the affected equipment. The review was performed to identify the effect on operational safety equipment by the abandoned-in-place equipment, and any impact on possible initiating events and mitigating systems.

The inspectors interviewed personnel involved in the different phases of the process. Inspectors reviewed the system used to track information on abandoned-in-place equipment. The inspector toured the plant to compare the database information to equipment labeled as abandoned-in-place in the plant.

b. Findings and Observations

No findings were identified.

The abandoned-in-place program is essentially implemented by the permanent modification program, with detailed engineering reviews and updates to procedures and drawings. Candidate equipment for abandoned-in-place are selected by system engineers and approved by the plant health committee. However, the inspector was unable to identify a current/collective master list of approved equipment awaiting entry into the program. The inspectors identified examples where equipment was selected but have not entered the program for several years. It was also identified that items categorized as "abandoned equipment" in the operations clearance log was not consistent with the reviewed system engineering database of selected/approved abandoned-in-place equipment. The inspector did not identify any impact to safety-related equipment.

40A3 Followup of Events and Notices of Enforcement Discretion (71153 - 4 samples total)

The inspectors performed four event followup inspection activities. Documents reviewed for this inspection activity are listed in the Supplemental Information attached to this report.

.1 Plant Event Review

a. Inspection Scope (2 samples)

For the plant events below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to regional personnel and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of additional reactive inspection activities. The inspectors reviewed FENOC's follow-up actions related to the events to assure that appropriate corrective actions were implemented commensurate with their safety significance. Documents reviewed during the inspection are listed in the Attachment.

- Unit 1: On October 2, during a boric acid walkdown of containment shortly after a planned refueling shutdown, the licensee identified a leak and subsequent apparent crack of a socket weld to an RHR suction common drain valve (see LER 50-334/2010-002-00 review in section 4OA3.2 of this report). FENOC took appropriate actions to mitigate the degraded condition and replaced the valve / piping assembly, returning the equipment to full structural compliance, prior to core loading. FENOC reported this issue as Event Notification 46304 on October 2<sup>nd</sup> and documented this issue in CR 10-83533; and
- Unit 1: On November 15, during a planned surveillance test of the 'A' low head safety injection pump, discharge relief valve, RV-1SI-845B, lifted unexpectedly at its design flow of 20 gpm into the safeguards building area sump. FENOC evaluated the impact to emergency core cooling flow and the control room envelope. The licensee gagged the relief valve to prevent further lifting during pump operation (see section 1R18). The residents reviewed FENOC's evaluation and administrative controls to maintain overpressure protection of the affected piping. FENOC reported this issue as Event Notification 46421 on November 16<sup>th</sup> and documented this issue in CR 10-85863 (also see section 1R15)

b. Findings

No findings were identified.

.2 Review of Licensee Event Reports (LERs) (2 samples)

(Closed) LER 05000334/2010-001-00: "Void in Emergency Core Cooling System Pump Suction Header Results in Entry into Technical Specification LCO 3.0.3."

The LER discusses the licensee's identification, on August 26, 2010, of an air void within the common suction header of the Unit 1 charging pumps following initial fill of the 'A' High-Head Safety Injection (HHSI) pump suction piping following planned maintenance. After filling the suction piping for alignment, Ultrasonic Tests (UT) were performed on the piping which identified an air void within the 8 inch suction header. Subsequent engineering evaluation initially concluded that the void size exceeded the allowable charging suction piping void size acceptance criteria as defined in the licensee's void-measuring procedure. The control room was informed by engineering and both trains of HHSI were declared inoperable. The licensee entered TS 3.0.3 pursuant to TS 3.5.2 Action C for less than 100% of the Emergency Core Cooling System (ECCS) flow equivalent to a single operable ECCS train available. The HHSI system became inoperable when the HHSI fill and vent procedure introduced an apparent unacceptable air void into the common HHSI suction pipe header. Therefore, the licensee determined that Unit 1 was in a condition prohibited by plant TSs. TS 3.0.3 requires action to be initiated within one hour to place the plant in a Mode or other condition in which the condition of operation is no longer applicable, which was accomplished by immediate venting of the air void.

The inspectors reviewed the LER, verified the appropriateness of corrective actions and extent of condition reviews, and interviewed engineers and licensed operators. Corrective actions included a review of operations procedures that fill and vent the ECCS system, the development of a method to fill/vent charging pump piping while at power in a manner that does not challenge the operability of the system, the revision of the site procedure on cross-discipline review to ensure ECCS fill and vent procedures include a review of applicable isometric drawings, and the issuance of a plant operating experience report on the event. The licensee conducted an engineering technical assessment, which concluded that the HHSI pump capability would not have been significantly challenged by the measured void using best-estimate considerations. The void monitoring acceptance criteria for this section of piping was recalculated and determined to not have been exceeded during this event. Therefore, the conditional risk probability of the HHSI pumps failing due to the void is negligible and the safety significance of the HHSI pump suction header void event was very low. As a result, this failure to have an adequate procedure to fill and vent an HHSI pump during maintenance recovery activities at power, without impacting the function of the in-service HHSI pumps constitutes a violation of minor significance that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. This LER is closed.

(Closed) LER 50-334/2010-002-00, "270 Degree Circumferential Flaw Found on Residual Heat Removal System Drain Valve Socket Weld"

On October 2, 2010, while Beaver Valley, Unit 1 was shut down in Mode 5 (cold shutdown) for a refueling outage, an active boric acid leak was identified on a drain valve (1RH-200) located on the common suction piping for the Residual Heat Removal (RHR) system. Approximately five hours after the initial identification of the active leak and entry into Mode 5, a non-destructive examination (NDE) was performed on the valve and its associated piping. A circumferential crack of 270 degrees in length with water seeping from the toe of the weld was discovered and both trains of RHR were declared inoperable. Since the adverse condition was identified prior to the completion of the NDE and no action was immediately taken as required by TS 3.4.7 for no required RHR trains operable while in Mode 5 operation, the licensee inadvertently entered a condition prohibited by TS 3.4.7. When the licensee determined that both trains of RHR were inoperable, they evaluated the issue for reportability and appropriately issued LER 50-334/2010-002, "270 Degree Circumferential Flaw Found on Residual Heat Removal System Drain Valve Socket Weld," dated November 29, 2010. This LER reported that Beaver Valley, Unit 1 had been in a condition which was prohibited by TS 3.4.7.C, which requires immediate action if both trains of RHR are inoperable while in Mode 5 operations.

The issue is considered within the traditional enforcement process because there was no performance deficiency identified and Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening" directs disposition of this issue in accordance with the Enforcement Policy. The inspectors used the Enforcement Policy, Section 6.1 – Reactor Operations, to evaluate the significance of this violation. The inspectors concluded that the violation is more than minor and best characterized as Severity Level IV (very low safety significance) because it is similar to Enforcement Policy Section 6.1, example d.1. Additionally, the inspectors assessed the risk associated with the issue by using IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process." The inspectors screened the issue, and evaluated it using Checklist 2 of IMC 0609, Appendix G, Attachment 1. Throughout the duration of the event, the secondary side water level of at least two steam generators sufficient for decay heat removal (including necessary support systems) were available. As a result, this issue would screen as very low safety significance (Green).

Because it has been determined that it was not reasonable for the licensee to be able to foresee and prevent the weld crack, or to have made the RHR inoperability decision at an earlier time, and as such no performance deficiency exists, the NRC has decided to exercise enforcement discretion in accordance with Section 3.5 of the NRC Enforcement Policy and refrain from issuing enforcement action for the violation of TS (EA-11-004). Further, because licensee actions did not contribute to this violation, it will not be considered in the assessment process or the NRC's Action Matrix. This LER is closed.

#### 4OA5 Other

##### .1 TI 2515/172, RCS Dissimilar Metal Butt Welds (DMBW)

###### a. Inspection Scope

The Temporary Instruction, TI 2515/172, provides for confirmation that owners of pressurized-water reactors (PWRs) have implemented the industry guidelines of Materials Reliability Program-139 regarding nondestructive examination and evaluation of certain dissimilar metal butt welds in reactor coolant systems containing nickel based alloys 600/82/182. The TI requires documentation of specific questions in an inspection report. The questions and responses were previously documented in Beaver Valley Inspection Report 05000334/2008003.

Manual Ultrasonic Test (UT) volumetric examinations of the five structural weld overlays installed during 1R18 on the three pressurizer safety, one relief and one spray nozzle-to-safe end dissimilar metal butt welds were performed during 1R20 outage and the records were reviewed by the inspector.

###### b. Findings

No findings were identified.

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

###### a. Inspection Scope

Inspection of the Beaver Valley Unit 1 containment liner was successfully completed during 1R20 outage. In addition to the visual examination of 100% of accessible containment liner surfaces, 38 random and 6 non-random sample-location volumetric examinations were performed during 1R20. Two non-random UT examinations were previously completed on-line on May 7, 2010 and documented in NRC inspection report 0500334/2010003. The remaining 37 random examinations of the initial 75 random sample locations will be completed during the next two Beaver Valley Unit 1 outages (1R21 and 1R22). The sections of the containment liner volumetrically examined during 1R20 met the design nominal liner thickness of 0.375 inches and were assessed by the licensee to be satisfactory.

The inspector conducted a direct inspection of the Unit 1 containment liner and reviewed various random and non-random UT examination records, UT examination record of the liner plate replaced to remove a defect where a through-wall hole was discovered in April 2009, and record review of test results from the 100% general visual inspection of accessible liner area performed during 1R20 to verify the inspections were performed in accordance with ASME Code, Section XI, Subsection IWE and met Beaver Valley Unit 1 operating license.

b. Findings

No findings were identified.

4OA6 Management Meetings

- .1 Inservice Inspection. The inspector presented the inspection results to Mr. Paul Harden, Site Vice President, and other members of his staff at a debrief conducted on October 20. FENOC acknowledged the inspection results and observations presented. No proprietary information is presented in this report.
- .2 Occupational Radiation Safety Inspection. The inspector presented the inspection results to Mr. Paul Harden, Site Vice President, and other members of his staff at a debrief conducted on October 21. FENOC acknowledged the inspection results and observations presented. No proprietary information is presented in this report.
- .3 Regional Administrator Site Visit. On November 3, a site visit was conducted by Mr. W. Dean, Regional Administrator, for the NRC Region 1 office. During Mr. Dean's visit, he toured the plant and met with FENOC personnel.
- .4 Quarterly Inspection Report Exit. On January 21, the inspectors presented the normal baseline inspection results to Mr. Paul Harden, Site Vice President, and other members of the licensee staff. FENOC acknowledged the inspection results and observations presented. The inspectors confirmed that proprietary information was not retained at the conclusion of the inspection period.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by FENOC and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, for being dispositioned as a Non-Cited Violations:

- Violation of TS 5.4.1, 'Procedures' for not properly calibrating the Unit 1 power range nuclear instrument channel N41 and returning it to an operable status following I&C subsequent to the post-outage maintenance on November 4. The instrument was not calibrated properly due to mis-direction on which portion of the procedure to perform. The reactivity senior operator stationed at-the-controls quickly recognized the degraded instrument and alerted the crew. The licensee documented this issue in CR 10-85405. The violation is not greater than green because only one channel was affected for a short period of time; and
- Violation of TS 5.4.1, 'Procedures' for not properly conducting and documenting maintenance on the Backup Indicating Panel, a remote panel required for safe shutdown of Unit 1. Two thermocouple input wires were discovered disconnected internal to the panel on October 31 during a refueling surveillance test from a previous maintenance activity. The licensee documented this issue in CR 10-85168. The violation is not greater than green because alternate indications were available and simple repairs could be made in a timely manner.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Licensee personnel

S. Baker	Site, Radiation Protection Manager,
M. Banko	Chemistry Manager
D. Canan	Senior Nuclear Specialist – Respiratory Protection
J. Fontaine	Supervisor, ALARA
J. Freund	Supervisor, Rad Support Services
D. Girdwood	Radiological Assessor/Supervisor Technical Training
D. Grabski	ISI Coordinator
P. Harden	Site Vice President
T. Heimel	NDE Level III
M. Helms	Nuclear Oversight Assessor
J. Lebda	Senior Nuclear Specialist – Dosimetry
R. Lieb	Director, Site Operations
C. Miller	Senior Radiation Protection Technician
J. Miller	Site Fire Marshall
D. Patten	Fleet Engineering Programs
J. Redant	Senior Radiation Protection Technician
L. Renz	Radiological Effluent Chemist
J. Saunders	Supervisor, Radwaste/Shipping
B. Sepelak	Supervisor, Regulatory Compliance
J. Severyn	Technical Service Engineering
W. Williams	Alloy 600 Program Owner
T. Winfield	Electrical Maintenance Supervisor

Other Personnel

L. Ryan	Inspector, Pennsylvania Department of Radiation Protection
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**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened

05000334/2010005-01	URI	Premature Lifting of ECCS Relief Valve RV-1SI-845B. (Section 1R15)
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Open/Closed

05000334/2010005-02	NCV	Failure to Follow Procedure Results in Main Feedwater Piping Pressurization. (Section 1R20)
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05000334/2010005-03	NCV	Maximum Differential Temperature Exceeded for Spray Nozzle during Pressurizer Heatup. (Section 1R20)
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Closed

05000334/2010-001-0	LER	Void in Emergency Core Cooling System Pump Suction Header Results in Entry into Technical Specification LCO 3.0.3. (Section 4OA3.2)
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05000334/2010-002-0	LER	270 Degree Circumferential Flaw Found on Residual Heat Removal System Drain Valve Socket Weld. (Section 4OA3.2)
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## LIST OF DOCUMENTS REVIEWED

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

#### Procedures

1OST-45.11 "Cold Weather Protection"  
2OST-45.11 "Cold Weather Protection"

#### Conditions Reports

10-83317      10-86327      10-87075      10-87145

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

#### Procedures

1OM-24.4.5, Rev. 2, Auxiliary Feedwater Pump Startup  
2OM-36.3.A, Rev. 7, System & Component Arrangement  
2OM-24.3.B.2, Rev. 9, Steam Generator Feedwater Valve List  
2OM-24.3.C, Rev. 14, Power Supply and Control Switch List

#### Drawings

8700-RM-424-002, Rev. 13  
10080-RM-0402-003, Rev. 12  
10080-RM-0402-5, Rev. 2

#### Condition Reports

09-52603      09-59227      09-66042      09-59622

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

#### Condition Reports

10-84150      10-84152      10-48325      10-84515

#### Other

1PFP-RCBX-692, Rev. 0 Reactor Containment  
1PFP-RCBX-718, Rev. 0 Reactor Containment  
1PFP-RCBX-738, Rev. 0 Reactor Containment  
1PFP-RCBX-767, Rev. 0 Reactor Containment  
10080-B-085, Rev. 12

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

#### Procedures

½-MI-MANHOLE-75-1E

#### Condition Reports

10-80688      10-85715      10-86107      10-86249      10-86647      10-87161

#### Work Orders

200413194 (MH 11A)  
200328616 (MH 20A)  
200409343 (1DA-P-8A pump repair #1)  
2002370684 (1DA-P-8A pump repair #2)  
200441436 (1DA-P-8A pump repair #3)

Engineering Change

ECP 09-0631 (Manhole leveling and dewatering capabilities)

ECP 09-0460-01 (1DA-P-8A pump install)

**Section 1R07: Heat Sink Performance**

Condition Reports

10-85005

**Section 1R08: Inservice Inspection**

Procedures

MRS-SSP-1398, Reactor Vessel Head Penetration Remote Visual Inspection for Beaver Valley Unit 1, Rev. 4

WDI-PJF-1304731-EPP-001, Examination Program Plan for In-service Inspection of the Pressurizer Nozzle Structural Weld Overlays at Beaver Valley Unit 1, Rev. 0

NDE-VT-513, Visual Examination of the Reactor Vessel Bottom Mounted Instrumentation (BMI) Nozzles, Rev. 3

NDE-UT-308, Component Weld Profiling and Thickness Measurements Using Straight Beam Ultrasonic Techniques, Rev. 14

1BVT 1.47.1, Containment Structural Integrity Test, Rev. 11, dated 10/26/2010

NDE Records

UT Examination Reports, VEN-10-1001 through VEN-10-1010, three pressurizer safety, one relief and one spray nozzle dissimilar metal butt weld structural weld overlays, all dated 10/13/2010

Visual Examination Report, VT-10-035, Reactor Vessel Lower Head BMI Nozzles, dated 10/14/2010

Visual Exam of Equipment and Component (VT-3) Report, BOP-10-101, RC Liner KTA #76, JP #20, paint anomaly (G11), dated 10/19/2010

UT Erosion/Corrosion Examination Report, UT-10-1003, 1CNMT, Liner Replacement, Liner Area R, dated 10/08/2010

UT Erosion/Corrosion Examination Report, UT-10-1018, 1RN-073, Random Liner 73, dated 10/11/2010

UT Erosion/Corrosion Examination Report, UT-10-1019, 1RN-074, Random Liner 74, dated 10/11/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-321, 1RN-074 Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-322, 1RN-074 Left-Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-322, 1RN-074 Right-Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-322, 1RN-073 Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-322, 1RN-073 Left-Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, BOP-UT-10-322, 1RN-074 Right-Autoscan, dated 10/20/2010

UT Erosion/Corrosion Examination Report, UT-10-335, Liner Deficiency KTA-76, RC Liner, dated 10/20/2010

Liquid Penetrant Examination Report, BOP-PT-10-145, RH-18-1-2-10, dated 10/11/2010

Liquid Penetrant Examination Reports, BOP-PT-10-151 through 155, dated 10/14/2010

1BVT 1.47.1, Containment Structural Integrity Test Report, dated 10/26/2010

Condition Reports

09-57823	09-67158	10-74770	10-78855	10-80179	10-83530	10-83533
10-83540	10-83541	10-83594	10-83632	10-83801	10-83994	10-84108

Other

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, Rev. 0  
 MS-C-10-06-13, Fleet Oversight Audit Report, June 30, 2010 through August 12, 2010, Engineering ASME (EEN-007), 8/13/2010  
 WDI-PJF-1304791-NDE-001, Rev. 0, Beaver Valley Unit 1 RPV Head Penetration Visual Examination 1R20, dated October 19, 2010  
 SN-SA-10-258, FENOC ASME Section XI Inservice Examination Program Self Assessment, 9/28/2010  
 Work Order 200199095, Replace Drain Valve 1RH-200, dated 10/15/2010  
 Certificate of Qualification for ID# 0002661

**Section 1R12: Maintenance Rule Implementation**Procedures

NOP-ER-3004, Rev. 1, FENOC Maintenance Rule Program

Condition Reports

10-83647	10-70733	09-69495	09-67601
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Other

Unit 2 System Health Report 2010-2, System 58 - Unit 1 ERF Substation System

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

½-ADM-0712, Rev. 3, Shutdown Defense in Depth Assessment

Condition Reports

10-85277

**Section 1R15: Operability Evaluations**Drawings

8700-06.039-067, LHSI piping relief valve, Crosby diagram  
 8700-411, LHSI Piping Diagram

Calculations

NOTF 600641951

Procedures

1OST11.1, Safety Injection Pump Test [1SI-P-1A]  
 1PMP-75-SWI-1E, Inspection of GE 4kV Switches SE-100S, Rev. 3

Condition Reports

10-84477	10-84502	10-85267
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Vendor Manual

Unit 2 CCI Drag Valve Design Summary

Work Orders / Notifications

600641951 (1SI-22 degraded bolt strength calculation and evaluation)  
600643638

Other

10CFR50.59 Screen #10-05306 for ECP 10-0760-000  
1DBD-37, Design Basis Doc for 480V Distribution System, Rev. 7  
ASME Code NC/ND-7000  
BVPS Unit 1 Logs dated 10/18/10; 11/15 – 11/6/2010  
Cold Shutdown, Forced Outage Maintenance List: WO 200436824  
Control Components Inc. 10CFR21 Letter dated 10/29/2010 (ADAMS ML1030601021)  
EER 600643613  
ECP 10-0224-000, Rev.0  
ECP 10-0760-000, Temporary Modification to Gag Shut RV-1SI-845B  
Failure Modes Analysis – Unit 1 LHSI System Leakage (CR 10-10-85863)

**Section 1R18: Plant Modifications**

Condition Reports

10-83305      10-83235

Work Orders / Notifications

200377068  
600640262

Other

ECP 09-0174-000, Rev.1  
ECP 10-0224-000, Rev.0

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

Procedures

1OM-36.4.AV, Rev. 0, Diesel Generator No. 1 Post Maintenance Governor Testing  
1OST-36.1, Diesel Generator No. 1 Monthly Test, Rev. 52  
1OST-11.16, Rev. 24, Leakage Testing RCS Pressure Isolation Valves  
½ CMP-75-Velan Check-1M, Rev. 6, Repair of Velan Swing Check Valves  
½ CMP-75-SNUBBER-2M

Work Orders / Notifications

200298746      200432381      60064366

Condition Reports

10-84477      10-84455      10-84426

Drawings

Assembly Diagram for snubber BV-RC-HC-10C

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

½-ADM-0712, Rev. 3, Shutdown Defense in Depth Assessment  
 NOP-OP-1005, Rev. 13, Shutdown Defense in Depth  
 1RST-2.1, Rev. 14, Initial Approach to Criticality after Refueling  
 1OM-50.4.L, Rev. 23, Plant Heatup from Mode 6 to Mode 3  
 1OM-32.4.AL, Rev. 5, Chemical Addition to the Steam Generators  
 ½-PIP-M14, Rev. 10, Pipe Classes for use on BV-1 and BV-2

Condition Reports

10-86281      10-853121      10-85021      06-02872      10-84891

Work Orders / Notifications

200434663      200434662      200434514      600645131      60045159      600644968

Other

BV1 Shift and Outage Logs, dated October 1 – November 6, 2010  
 BV1 Corrective Action 10-84891-01, Technical Evaluation of Systems and Components

Drawings

8700-RM-0424-001

**Section 1R22: Surveillance Testing**Procedures

1BVT-1.47.4, Rev. 14, Containment Electrical Penetrations Type B Leak Test  
 1/2CMP-24-GOVERNOR-1M

Work Orders

200209407      200309372      200309152

Condition Reports

10-84610      10-71053

Other

BV1 Shift Operations Log, dated October 1, October 22, 2010

**Section RS01: Radiological Hazard Assessment and Exposure Controls**Occupational Radiation Safety

½-ADM-1601, Rev. 20, Radiation Protection Standards  
 ½-ADM-1611, Rev. 10, Radiation Protection Administrative Guide  
 ½-HPP-3.02.004, Rev. 4, Area Posting  
 ½-HPP-3.05.001, Rev. 8, Exposure Authorization  
 ½-HPP-3.07.002, Rev. 7, Radiation Survey Methods  
 ½-HPP-3.07.013, Rev. 7, Barrier Checks  
 ½-HPP-3.08.003, Rev. 4, Radiation Barrier Key Control  
 ½-HPP-3.08.006, Rev. 2, Shielding  
 BVBP-RP-0003, Rev. 8, Dosimetry Practices  
 BVBP-RP-0013, Rev. 3, Radiation Protection Risk Assessment Process  
 BVBP-RP-0020, Rev. 15, RP Job Coverage General Guidance  
 NOP-OP-4206, Rev. 1, Bioassay Administration

NOP-OP4005, Rev. 1, ALARA Program  
 NOP-OP-4005, Rev. 1, Operational ALARA Program  
 NOP-OP-4107, Rev. 4, Radiation Work Permit  
 NOP-WM-7017, Rev. 1, Contamination Control Program  
 NOP-OP-4102, Rev. 4, Radiological Postings, Labeling, and Markings  
 NOP-OP-4702, Rev. 1, Air Sampling

Nuclear Oversight Performance Assessment (PA) Reports

PA Nos. 1057, 1067, 1074, 1124, 1128, 1139, 1146, 1193, 1202, 1222, 1147  
 1<sup>st</sup> and 2<sup>nd</sup> Quarterly Nuclear Oversight Assessment Report Summaries

Condition Reports

10-84412	10-84407	10-84429	10-84168	10-84233	10-84227	10-84383
10-84393	10-83907	10-83898	10-83788	10-80397	10-80593	10-83230
10-83653	10-83474	10-83569	10-84560	10-84508	10-84518	10-84584
10-82309	10-84552	09-52208	10-83224			

ALARA Plans & related Work-in-Progress Review

10-1-16, Reactor Disassembly/Reassembly  
 10-1-13, 1R20 Scaffolding – Unit 1 RBC  
 10-1-27, Unit-1 RBC Rx Nozzle Insulation – ECP 09-0612

ALARA Manager Committee Meeting Minutes

Attended Meeting Nos. 1R20-06m, 1R20-07m  
 Reviewed meeting minutes for 10-18m, 10-19m, 10-20m, 10-21m, 10-22m, 10-23m

Miscellaneous Reports

1R20 Outage ALARA Plan  
 EPRI Standard Radiation Monitoring Program - Unit 1 Source Term Measurements  
 High Dose Individuals for 2010  
 Dose and Dose Rate Alarm Reports for 2010  
 Beaver Valley 5 Year Dose Reduction Plan  
 RETS/ODCM Radiological Effluent Occurrence Performance Indicator Reports, Jan-Sep 2010  
 Occupational Exposure Control Effectiveness Performance Indicator Reports, Jan-Sep 2010

**Section 40A2: Identification and Resolution of Problems**

Procedures

BVBP-SITE-0010, Rev. 1, Abandoned in Place Equipment

Condition Reports

10-71915	10-87338	09-53481	09-55424	10-85309	08-42055
08-40928	07-17122	07-17064	07-12230		

Notifications

600496004 600635256

Other

BVPS Unit 1 Tagouts in effect more than 1 Day, 12/22/10  
 BVPS Unit 2 Tagouts in effect more than 1 Day, 12/22/10  
 Unit 1 and 2 Approved Abandoned in Place 10CFR50.59 Screens list

**Section 4OA3: Event Response**

Technical Specifications

- 3.4.7 RCS Loops – Mode 5, Loops Filled (Amendments 278/161)
- 3.5.2 Emergency Core Cooling System (Amendments 278/161)
- 3.7.10 Control Room Envelope (Amendments 278/161)

Condition Reports

10-81835      10-83533      10-85287      10-85863

Procedures

- 1OM-7.4.AN, Rev. 15, Returning a Charging Pump to Service Following Mechanical Maintenance
- 1OM-7.4.AN, Rev. 15 (Limited Use Change PAF 10-01989), Returning a Charging Pump to Service Following Mechanical Maintenance
- 1OST-11.1, Safety Injection Pump Test [1SI-P-1A]
- 3BVT01.11.04, Rev. 4, Void Monitoring

Drawings

- 8700-RM-410-1, Rev. 11, "Piping and Instrumentation Diagram of Residual Heat Removal System"
- Team Industry Services Inc. Construction drawings for 1RH-200 code-compliant repair clamp, dated 10/4/2010

Calculations

- 10080-N-757, Rev. 0, Beaver Valley Piping Void Limit Determination

Other

- BV1 Operations Shift Logs, dated October 2 – 10, 2010
- LER 05-334/2010-002-00, "270 Degree Circumferential Flaw Found on Residual Heat Removal System Drain Valve Socket Weld," dated November 29, 2010
- Operational Decision Making Interface for 1RH-200, CR 10-83619/10-83533, dated 10/4/2010
  
- NOTF 600640751, Design temporary strongback to support 1RH-200, dated 10/2/2010
- Root Cause Analysis Report 10-83533, 1RH200, dated 11/10/2010
- Root Cause Analysis Report 10-85863, RV-1SI-845B, dated 12/15/2010
- WO 200199095, Liquid Penetrant Results for 1RH-200 Socket Weld, dated 10/2/2010
- VT-1 Visual Exam of 1RH-200, dated 10/4/2010

**LIST OF ACRONYMS**

ADM	Administrative Procedure
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
AMC	ALARA Managers Committee
AP	ALARA Plan
ASME	American Society of Mechanical Engineers
BACC	Boric Acid Corrosion Control
BCO	Basis for Continued Operations
BMI	Bare Metal Inspection
BVPS	Beaver Valley Power Station
CAP	Corrective Action Program
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CR	Condition Report(s)
CRDM	Control Rod Drive Mechanism
DMBW	Dissimilar Metal Butt Weld
EDG	Emergency Diesel Generator
FA	Functionality Assessments
FENOC	First Energy Nuclear Operating Company
HEPA	High-Efficiency Particulate Air
IMC	Inspection Manual Chapter
IOD	Immediate Operability Determination
IP	Inspection Procedure
ISI	Inservice Inspection
LCO	Limiting Conditions for Operations
LER	Licensee Event Report
LHRA	Locked High Radiation Areas
MR	Maintenance Rule
MSP	Maintenance Surveillance Package
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
OD	Operability Determinations
OST	Operations Surveillance Test
PAF	Primary Access Facility
PI	Performance Indicator
PI&R	Problem Identification and Resolution
POD	Prompt Operability Determination
PMT	Post Maintenance Testing
PT	Liquid Penetrant Test
RBC	Reactor Building Containment
RPV	Reactor Pressure Vessel
RWP	Radiation Work Permit
SG	Steam Generator
SSC	Structures, Systems, and Components
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Test