



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
2100 RENAISSANCE BLVD.  
KING OF PRUSSIA, PA 19406-2713**

August 1, 2017

Mr. Richard Bologna  
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 – INTEGRATED INSPECTION REPORT  
05000334/2017002 AND 05000412/2017002**

Dear Mr. Bologna:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Beaver Valley Power Station, Units 1 and 2. On July 10, 2017, the NRC inspectors discussed the results of this inspection with Mr. Marty Richey, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

No NRC-identified or self-revealing findings were identified during this inspection. The inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC's Resident Inspector at Beaver Valley Power Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and the NRC's Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

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

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

R. Bologna

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Enclosure:

Inspection Report 05000334/2017002 and 05000412/2017002  
w/Attachment: Supplementary Information

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05000334/2017002 AND 05000412/2017002 DATED AUGUST 1, 2017

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ADAMS ACCESSION NUMBER: ML17214A025

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos.: 50-334 and 50-412

License Nos.: DPR-66 and NPF-73

Report No.: 05000334/2017002 and 05000412/2017002

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station (BVPS), Units 1 and 2

Location: Shippingport, PA 15077

Dates: April 1, 2017 to June 30, 2017

Inspectors: J. Krafty, Senior Resident Inspector  
S. Horvitz, Resident Inspector  
J. DeBoer, Emergency Preparedness Inspector  
E. Gray, Senior Reactor Inspector  
R. Rolph, Health Physicist

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

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**SUMMARY**

IR 05000334/2017002 and 05000412/2017002; 4/1/2017 – 6/30/2017; BVPS Units 1 and 2; Integrated Inspection Report.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

No findings were identified.

**Other Findings**

A violation of very low safety significance that was identified by FENOC was reviewed by the inspectors. Corrective actions taken or planned by FENOC have been entered into FENOC's corrective action program (CAP). This violation and corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near 100 percent power for the entire inspection period.

Unit 2 began the inspection period in end-of-cycle coastdown operations at 95 percent power. On April 22, 2017, operators commenced a shutdown for a planned refueling and maintenance outage (2R19). Following the completion of refueling and maintenance activities, operators commenced a reactor startup on May 20, 2017. Operators returned the unit to approximately 100 percent power on May 24, 2017, and remained near 100 percent power for the remainder of the inspection period.

## 1. REACTOR SAFETY

### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

1R01 Adverse Weather Protection (71111.01 – 2 samples)

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

##### a. Inspection Scope

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

##### b. Findings

No findings were identified.

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

##### a. Inspection Scope

The inspectors reviewed FENOC's preparations for a tornado watch condition on May 1, 2017. The inspectors reviewed the implementation of adverse weather preparation procedures during this adverse weather condition. The inspectors walked down and evaluated the need to remove or restrain potential missiles.

The inspectors verified that operator actions defined in FENOC's adverse weather procedure maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 2 'B' train of component cooling water following a surveillance test on April 10, 2017
- Unit 2 auxiliary feedwater system following system maintenance during the refueling outage on May 19, 2017
- Unit 1 low head safety injection (LHSI) system following testing of the 'B' LHSI pump on June 6, 2017
- Unit 1 'A' train of quench spray following planned maintenance on June 12, 2017

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether FENOC staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

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

a. Inspection Scope

Between May 15, 2017, and June 2, 2017, the inspectors performed a complete system walkdown of accessible portions of the Unit 2 reactor coolant system to verify the existing equipment lineup was correct. The inspectors reviewed drawings, equipment line-up check-off lists, and clearances to verify the system was aligned to perform its required safety functions.



The inspectors also reviewed electrical power availability, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified and protected from external threats. The inspectors also examined the material condition of the components for degradation.

Additionally, the inspectors discussed the system health report with the system engineer and reviewed a sample of related condition reports and work orders to ensure FENOC appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

a. Inspection Scope

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

- Unit 2 Reactor Containment Building, Fire Area RC-1, on April 24, 2017
- Unit 2 Auxiliary Building, Fire Area PA-3, on May 17, 2017
- Unit 2 Primary Auxiliary Building, Fire Areas PA-4, PA-6, & PA-7, on May 17, 2017
- Unit 2 Primary Auxiliary Building, Fire Area PA-5, on May 17, 2017
- Unit 1 Cable Tray Mezzanine, Fire Area CS-1, on May 26, 2017
- Unit 1 Relay Room, Fire Area CR-3, on May 26, 2017

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)Annual Review of Cables Located in Underground Bunkers/Manholesa. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could affect risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including manholes 1EMH8A and 1EMH8B containing Unit 1 river water pump cables and Unit 2 service water pump cables, to verify that the cables were not submerged in water, that cables appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)a. Inspection Scope

The inspectors reviewed the Unit 2 emergency diesel generator (EDG) 2-2 jacket water and intercooler heat exchangers' readiness and availability to perform their safety functions. The inspectors reviewed FENOC's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors observed the "as found" condition of the heat exchangers and reviewed the results of the inspections of the EDG 2-2 heat exchangers. The inspectors verified that FENOC initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchangers did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R08 In-service Inspection BVPS Unit 2 (71111.08 – 1 sample)a. Inspection Scope

Between May 1, 2017, and May 9, 2017, the inspectors conducted a review of FENOC's implementation of in-service inspection program activities for monitoring degradation of the reactor coolant system boundary, risk significant piping and components, and containment systems during the BVPS Unit 2 refueling outage (2R19). The sample selection was based on the inspection procedure objectives and risk priority of those pressure retaining components in these systems where degradation would result in a significant increase in risk.

The inspection included a review of non-destructive examination (NDE) procedures, NDE in progress, and completed NDE records to verify that the NDE activities performed were conducted in accordance with the requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI, 2001 Edition, 2003 Addenda.

#### Nondestructive Examination and Welding Activities (Section 02.01)

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

#### ASME Code Required Examinations

- For the Manual Ultrasonic Testing (UT), volumetric inspection of the steam generator (SG) shell circumferential welds 5 and 6, at the lower and upper cone section and a portion of the intersecting longitudinal welds, the inspector observed the UT calibration process, reviewed the work instruction package including the UT procedure, discussed the examination technique with the UT technician, observed the process oversight and reviewed the UT inspection report.
- For Manual UT, Summary No. 526700, of the SG feedwater nozzle inner radius UT examination the inspector observed the UT calibration process, reviewed the work instruction package including the UT procedure, discussed the examination technique with the UT technician, observed the process oversight, and reviewed the UT inspection report.
- Bare Metal Visual Examination video records were reviewed of the reactor pressure vessel (RPV) upper head at the control rod drive mechanism (CRDM) penetrations, as examined per Procedure WDI-SSP-1236 with reference to ASME Code Case N-729-1.
- On liquid penetrant examination (PT) of the three CRDM welds numbers 41, 44 and 57 to the underside of the RPV head, the inspector reviewed the PT procedure, WDI-SSP-1237, Revision 2, discussed the PT process parameters with the examiner to confirm the adequacy of the examination method, and reviewed the completed PT examination report for comparison to the requirements of ASME Code Section XI and ASME Code Case N-729-1.
- For visual examination (VT) of the interior of the containment boundary, the inspector observed the containment interior surface and penetration areas on a sampling basis at each elevation of containment, including the intersection of the containment liner to containment concrete floor. Condition reports of containment surface conditions needing evaluation or repair, mostly by surface preparation and recoating were reviewed for comparison to the scope of the ASME Code, Section XI, IWE.
- For Manual UT Erosion/Corrosion Examinations performed using ChecWorks FSA Version 4.1, under the Flow-Accelerated Corrosion (FAC) and Erosion Mechanisms Program (NOP-ER-2005, Revision 5), the 2R19 examination scope was reviewed with the FAC program manager, and a sample of FAC measurements were examined.

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

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

There were no samples available for review during this inspection that involved examinations with recordable indications that had been accepted for continued service following the previous Unit 2 2R18 refuel outage with the exception of the PT examination of CRDM welds 41, 44, and 57 discussed above.

#### Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities (Section 02.02)

The inspectors reviewed VT criteria, the VT procedure and sampled the photographic records and documentation of the VTs done for the full circumference of each CRDM reactor vessel upper head penetration during 2R19 as viewed on the top of the RPV head.

The inspectors reviewed ultrasonic inspection procedure for UT inspection of CRDM to RPV head welds as examined from the underside of the RPV head. The ultrasonic data presentation and documentation of a sample of the CRDM welds were reviewed.

#### Boric Acid Corrosion Control (BACC) Inspection Activities (Section 02.03)

The inspectors reviewed the BACC program, which is performed in accordance with FENOC procedures, including NOP-ER-2001, and sampled photographic inspection records of boric acid observed on safety significant piping and components inside the containment structure during walkdowns conducted by licensee personnel which was directly observed by the NRC resident inspectors.

The inspectors reviewed the identification and documentation of non-conforming conditions of boric acid leaks in the CAP with a focus on areas that could cause degradation of safety significant components. The inspectors discussed the program requirements and plant BACC activities with the boric acid program owner. Photographic inspection records of identified boric acid leakage locations were reviewed with attention to the mitigation and evaluation plans.

The inspectors reviewed a sample of condition reports including those documented in CR-2017-04485 and CR-2017-04495, for evaluation and disposition within the CAP. Samples selected were based on component function, significance of leakage and location where direct leakage or impingement on adjacent locations could cause degradation of safety system function.

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

### Steam Generator Tube Inspection Activities (Section 02.04)

The three BVPS Unit 2 Model 51M SGs each contain 3376 Alloy 600 mill annealed, 0.875" outside diameter x 0.050" wall tubes. Extensive eddy current testing (ECT) of the SG tubes was done during the 2R19 refuel outage. The base scope ECT examinations included 100 percent full length by bobbin coil in all but rows 1 and 2, 100 percent hot leg +Point in the top of tube sheet region of +3" to -6", +Point of rows 3 to 10 in the U-Bend area, sleeve area inspection, and various +Point examination of special interest areas. The inspectors reviewed the Westinghouse Report SG-SGMP-17-6 Revision 0, titled "Beaver Valley Power Station Unit 2 2R19, Steam Generator Degradation Assessment" which describes in detail the known tube condition of each U2 SG and the 2R19 SG tube inspection scope.

The inspectors directly observed a sample of the SG eddy current tube examinations and assessed the progress and controls in place to achieve the planned ECT examination scope. The inspectors reviewed the results of the examinations to determine FENOC's capability to assess future tube performance, and therefore plan for appropriate examinations, by comparing the examination results this refueling outage with the values predicted in the previous outage operational assessment. The inspectors then evaluated the scope of ECT to determine if areas of potential degradation were inspected, noting that areas known to represent eddy current challenges were included. The inspectors also compared the SG tube eddy current examination scope and expansion criteria with technical specification (TS) requirements to determine whether FENOC was in compliance with these requirements. The inspectors noted that active degradation mechanisms were identified, principally in the area near the top of tubesheet, appropriate actions were taken to plug or sleeve the affected tubes. The inspectors observed tube sleeving and plugging processes. Additionally, two tubes were selected for in-situ pressure testing by FENOC staff because they represented the highest level of degradation. The inspectors observed the in-situ pressure testing process for both tubes R31-C-63 and R8-C-26 from SG "A".

The inspectors verified that the SG tube examination screening criteria was in accordance with the Electric Power Research Institute SG Guidelines and that the examination technique specification sheets (listed in the documents reviewed section) used for the examinations were appropriate for the expected types of tube degradation. The inspectors directly observed a qualified data analyst's review of more than five SG tubes to determine that proper eddy current analysis techniques were applied.

The inspectors participated in the April 4, 2017, conference call between FENOC and NRC Office of Nuclear Reactor Regulation where the nearly complete SG ECT scope and results were presented.

### Identification and Resolution of Problems (Section 02.05)

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

#### b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance  
(71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed a Unit 2 licensed operator annual requalification simulator examination on June 12, 2017, which included a SG tube rupture and the failure of select components to automatically start as required. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed the reactor heat up from Mode 4 to Mode 3 on May 16, 2017, and the initial Unit 2 reactor startup following 2R19 on May 20, 2017. Additionally, the inspectors observed procedure use, crew communications, and coordination of activities between work groups to verify that they met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance work orders, and maintenance rule basis documents to ensure that FENOC was identifying and properly evaluating performance problems within the scope of the maintenance rule.

For each sample selected, the inspectors verified that the structure, system, or component was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by FENOC staff was reasonable. As applicable, for structures, systems, and components classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these structures, systems, and components to (a)(2). Additionally, the inspectors ensured that FENOC staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Unit 1 area ventilation system on May 24, 2017
- Unit 2 annunciator system on June 13, 2017
- Unit 1 chilled water system on June 27, 2017

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that FENOC performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that FENOC personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When FENOC performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 2 yellow shutdown risk for decay heat removal during reactor cavity drain down to the reactor vessel flange on April 26, 2017
- Unit 2 yellow shutdown risk for electrical power availability due to an offsite source threat to offsite power availability during a tornado watch on May 1, 2017
- Unit 1 yellow probabilistic risk assessment (PRA) risk while the 'A' system station service transformer (SSST) was unavailable on May 6, 2017
- Unit 2 yellow shutdown risk for decay heat removal while 'A' residual heat removal (RHR) train was unavailable on May 6, 2017
- Unit 2 unplanned yellow shutdown risk for decay heat removal when the 'A' RHR pump did not produce flow when started on May 9, 2017
- Unit 1 yellow PRA risk while the 'B' SSST was removed from service for transformer deluge testing on May 11, 2017
- Unit 2 yellow PRA risk while 'A' SSST unavailable for deluge testing on June 15, 2017

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Unit 1 pressurizer level transmitter LT-1RC-461 found out of tolerance on October 6, 2016
- Unit 1 'A' SSST loss of power to the oil pumps and fans due to grounds on April 1, 2017 and re-evaluation on June 28, 2017
- Unit 1 pressurizer level transmitter LT-1RC-459 failed required channel check on April 17, 2017
- Unit 1 non-conservative TS for residual heat release valve on April 21, 2017
- Unit 2 Source Range Detector, N32, noise affecting source range counts on June 8, 2017
- Unit 2 EDG 2-1 building ventilation damper, 2HVD-MOD22A failing to open on June 22, 2017

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and Updated Final Safety Analysis Report (UFSAR) to FENOC's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by FENOC.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples)

.1 Permanent Modification

a. Inspection Scope

The inspectors evaluated a modification to the Unit 2 2SWS-MOV104B, recirculation spray heat exchanger 21B cooling water supply valve, implemented by engineering change package 15-0299-002, "Replace Various BV-2SWS-MOV104B-OPER Actuator Internals to Mitigate Damage due to a Hot Short per National Fire Protection Association (NFPA) 805 (IN92-18)." The modification replaced gearbox internal to reduce the overall gear ratio from 52.5 to 34.1. The inspectors verified that the design bases, licensing bases and performance capability of the affected systems were not degraded by the modification.



In addition, the inspectors reviewed modification documents associated with the upgrade and design change. The inspectors interviewed engineering personnel and walked down the completed modification to ensure that it was installed as designed.

b. Findings

No findings were identified.

.2 Permanent Modification

a. Inspection Scope

The inspectors evaluated a modification to the Unit 2 2SIS\*MOV867D, high head safety injection (HHSI) pumps isolation to cold leg injection valve, implemented by engineering change package 15-0299-007, "Replace Actuator BV-2SIS-MOV867D-OPER and Modify BV-2SIS-MOV867D per NFPA 805 (IN92-18) Evaluation." The modification replaced the actuator, yoke, and valve stem with more robust components. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change. The inspectors also interviewed engineering personnel and walked down the completed modification to ensure that it was installed as designed.

b. Findings

No findings were identified

.3 Permanent Modification

a. Inspection Scope

The inspectors evaluated a modification to the Unit 2 pressurizer power operated relief valves (PORV) implemented by engineering change packages 15-0571-001, "Replace PORV Orifices in BV-2RCS-PCV455C, 455D, & 456" and 15-0571-002, "Change PORV Heat Trace Setpoints." The inspectors verified that the design bases, licensing bases and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change. The inspectors interviewed engineering personnel and walked down the completed modification to ensure that it was installed as designed.

b. Findings

No findings were identified

1R19 Post-Maintenance Testing (71111.19 – 7 samples)a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, and witnessed the test or reviewed test data to verify quality control hold points were performed and checked and that results adequately demonstrated restoration of the affected safety functions.

- Unit 2 'A' component cooling pump breaker, pump, and motor preventive maintenance on April 1, 2017
- Unit 2 EDG 2-2 following turbo charger replacement and various engine preventive maintenance tasks on May 4, 2017
- Unit 2 'A' RHR pump and motor maintenance on May 9, 2017
- Unit 2 pressurizer power operated relief valve 455D overhaul on May 13, 2017
- Unit 2 turbine driven auxiliary feedwater pump governor replacement on May 17, 2017
- Unit 2 'B' SG feedwater isolation valve, 2FWS\*HYV157B, actuator repairs on May 19, 2017
- Unit 2 fitting leak repair on the line to reactor vessel level indication system transmitter, 2RCS-LIS-1321, on May 20, 2017

b. Findings

No findings were identified.

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

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 2 maintenance and refueling outage (2R19), conducted April 22 through May 21, 2017. The inspectors reviewed FENOC's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered.

During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TSs when taking equipment out of service
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that TSs were met

- Monitoring of decay heat removal operations
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Refueling activities, including fuel handling
- Fatigue management
- Tracking of startup prerequisites, walkdown of the primary containment to verify that debris had not been left which could block the emergency core cooling system suction strainers and startup and ascension to full power operation
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 6 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant structures, systems, and components to assess whether test results satisfied TSs, the UFSAR, and FENOC procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied.

Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- 2BVT 1.21.2, Trevitest Method for Main Steam Safety Valve Setpoint Check, on April 21, 2017
- 2OST-36.3, EDG 2-1 Automatic Test, on April 22, 2017
- 2OST-47.112, Type C Leak Test – Penetration #20 (Safety Injection Accumulators Fill Line), on April 28, 2017 (containment isolation valve)
- 2OST-11.14A, LHSI Full Flow Test, on April 29, 2017
- 1OST-13.2, 'B' Quench Spray Pump Test, on May 1, 2017
- 2OST-11.14B, HHSI Full Flow Test, on May 8, 2017

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness****1EP2 Alert and Notification System (ANS) Evaluation (71114.02 - 1 sample)****a. Inspection Scope**

An onsite review was conducted to assess the maintenance and testing of the ANS. During this inspection, the inspectors conducted a review of the BVPS siren testing and maintenance programs. The inspectors reviewed the associated ANS procedures and the Federal Emergency Management Agency approved ANS Design Report to ensure compliance with design report commitments for system maintenance and testing. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 2. Reference criteria included 10 CFR 50.47(b)(5) and the related requirements of 10 CFR 50, Appendix E.

**b. Findings**

No findings were identified.

**1EP3 Emergency Response Organization (ERO) Staffing and Augmentation System (71114.03 – 1 sample)****a. Inspection Scope**

The inspectors conducted a review of the BVPS ERO augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key FENOC staff to respond to an emergency event and to verify FENOC's ability to activate their emergency response facilities (ERFs) in a timely manner. The inspectors reviewed the BVPS Emergency Plan for ERF activation and ERO staffing requirements, the ERO duty roster, applicable station procedures, augmentation test reports, the most recent drive-in drill reports, and corrective action reports related to this inspection area. The inspectors also reviewed a sample of ERO responder training records to verify training and qualifications were up to date. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 3. Reference criteria included 10 CFR 50.47(b) (2) and related requirements of 10 CFR 50, Appendix E.

**b. Findings**

No findings were identified.

**1EP5 Maintaining Emergency Preparedness Inspection Scope (71114.05 - 1 sample)**

The inspectors reviewed a number of activities to evaluate the efficacy of FENOC's efforts to maintain the BVPS emergency preparedness program. The inspectors reviewed: memorandums of agreement with offsite agencies, the 10 CFR 50.54(q) Emergency Plan (EP) change process and practice, BVPS's maintenance of equipment important to EP, records of evacuation time estimate population evaluation and provisions for, and implementation of, primary, backup and alternative ERF maintenance.

The inspectors also verified FENOC's compliance at BVPS with NRC EP regulations regarding, protective actions for on-site personnel during events, emergency declaration timeliness, ERO augmentation and alternate facility capability, evacuation time estimate updates, on-shift ERO staffing analysis and ANS back-up means.

The inspectors further evaluated FENOC's ability to maintain BVPS's EP program through their identification and correction of EP weaknesses, by reviewing a sample of drill reports, self-assessments, and 10 CFR 50.54(t) reviews. Also, the inspectors reviewed a sample of EP-related condition reports initiated at BVPS from March 2015, through June 2017. The inspection was conducted in accordance with NRC Inspection Procedure 71114.05. Reference criteria included 10 CFR 50.47(b) and the related requirements of 10 CFR 50, Appendix E.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 1 sample)

Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for Unit 2 licensed operators on June 12, 2017 which required emergency plan implementation by an operations crew. FENOC planned for this evolution to be evaluated and included in performance indicator (PI) data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that FENOC evaluators noted the same issues and entered them into the CAP.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 - 6 samples)

a. Inspection Scope

The inspectors reviewed FENOC's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR 20, TSs, Regulatory Guide (RG) 8.38, and the procedures required by TSs as criteria for determining compliance.

### Inspection Planning

The inspectors reviewed the PIs for the occupational exposure cornerstone, radiation protection program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

### Radiological Hazard Assessment (1 sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed the radiological survey program, air sampling and analysis, continuous air monitor use, recent plant radiation surveys for radiological work activities and any changes to plant operations since the last inspection to verify survey adequacy of any new radiological hazards for onsite workers or members of the public.

### Instructions to Workers (1 sample)

The inspectors reviewed high radiation area (HRA) work permit controls and use, observed containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements.

The inspectors reviewed several occurrences where a worker's electronic personal dosimeter alarmed. The inspectors reviewed FENOC's evaluation of the incidents, documentation in the CAP, and whether compensatory dose evaluations were conducted when appropriate. The inspectors verified follow-up investigations of actual radiological conditions for unexpected radiological hazards were performed.

### Radiological Hazards Control and Work Coverage (1 sample)

The inspectors evaluated in-plant radiological conditions and performed independent radiation measurements during facility walkdowns and observation of radiological work activities. The inspectors assessed whether posted surveys, radiation work permits, worker radiological briefings and radiation protection job coverage, the use of continuous air monitoring, air sampling and engineering controls and dosimetry monitoring were consistent with the present conditions. The inspectors examined the control of highly activated or contaminated materials stored within the spent fuel pools and the posting and physical controls for selected HRAs, locked high radiation areas and very high radiation areas (VHRAs) to verify conformance with the occupational PI.

### Risk-Significant HRA and VHRA Controls (1 sample)

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

### Radiation Worker Performance and Radiation Protection Technician Proficiency (1 sample)

The inspectors evaluated radiation worker performance with respect to radiation protection work requirements. The inspectors evaluated radiation protection technicians in performance of radiation surveys and in providing radiological job coverage.

Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with radiation monitoring and exposure control (including operating experience) were identified at an appropriate threshold and properly addressed in the CAP.

b. Findings

No findings were identified.

2RS2 Occupational As Low as Is Reasonably Achievable (ALARA) Planning and Controls (71124.02 - 3 samples)a. Inspection Scope

The inspectors assessed FENOC's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable. The inspectors used the requirements contained in 10 CFR 20, applicable RGs, TSs, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of FENOCs collective dose history and trends, ongoing and planned radiological work activities, previous post-outage ALARA reviews, radiological source term history and trends and ALARA dose estimating and tracking procedures.

Verification of Dose Estimates and Exposure Tracking Systems (1 sample)

The inspectors reviewed the current annual collective dose estimate, basis methodology and measures to track, trend and reduce occupational doses for ongoing work activities. The inspectors evaluated the adjustment of exposure estimates, or re-planning of work. The inspector reviewed post-job ALARA evaluations of excessive exposure.

Radiation Worker Performance (1 sample)

The inspectors observed radiation worker and radiation protection technician performance during radiological work to evaluate worker ALARA performance according to specified work controls and procedures. Workers were interviewed to assess their knowledge and awareness of planned and/or implemented radiological and ALARA work controls.

Problem Identification and Resolution (1 sample)

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

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the control of in-plant airborne radioactivity and the use of respiratory protection devices in these areas. The inspectors used the requirements in 10 CFR 20, RG 8.15, RG 8.25, NUREG/CR-0041, TS, and procedures required by TS as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the UFSAR to identify ventilation and radiation monitoring systems associated with airborne radioactivity controls and respiratory protection equipment staged for emergency use. The inspectors also reviewed respiratory protection program procedures and current PIs for unintended internal exposure incidents.

Engineering Controls (1 sample)

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

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled FENOC's submittals for the Safety System Functional Failures PI for both Unit 1 and Unit 2 for the period of April 1, 2016, through March 31, 2017. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed FENOC's operator narrative logs, operability assessments, maintenance rule records, condition reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.



.2 Mitigating Systems Performance Index (4 samples)

a. Inspection Scope

The inspectors reviewed FENOC's submittal of the Mitigating Systems Performance Index for the following systems for the period of April 1, 2016, through March 31, 2017:

- Unit 1 Emergency AC Power System
- Unit 2 Emergency AC Power System
- Unit 1 High Pressure Injection System
- Unit 2 High Pressure Injection System

To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed FENOC's operator narrative logs, maintenance rule records, condition reports, mitigating systems performance index derivation reports, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.3 Performance Indicator Verification (71151- 3 samples)

a. Inspection Scope

The inspectors reviewed FENOC's submittal for the following three EP PI for the period of April 1, 2016 through March 31, 2017.

- Drill and Exercise Performance
- ERO Drill Participation
- ANS Reliability

To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7.

b. Findings

No findings were identified.

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

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify FENOC entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends.

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

.2 Annual Sample: Negative Trend in Emergency Bus Degraded Voltage Relays

a. Inspection Scope

The inspectors performed an in-depth review of FENOC's corrective actions associated with condition reports CR 2016-12018, NRC Identified Negative Trend on Safety Related EDG undervoltage relays and CR 2016-11351, Measured Maintenance Data (MMD) Program Deficiencies. Specifically, FENOC's failure to identify the negative trend led to seven failures to trip above the TS minimum value for "as found" drop out voltage between 2011 and 2016. This resulted in an NRC identified NCV in inspection report 2016003. The inspectors assessed FENOC's problem identification threshold, extent of condition reviews and the prioritization and timeliness of FENOC's corrective actions to determine whether FENOC was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of FENOC's CAP and 10 CFR 50, Appendix B. In addition, the inspectors interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

FENOC did not perform a cause analysis related to this issue. CR 2017-02685 identified that NOP-LP-2001, Corrective Action Program, a "Fix" evaluation is not sufficient for issues that result in an NRC NCV. FENOC's corrective actions in CR 2016-12018 were to modify work order templates to (1) enter relay calibration data into their MMD database, which is the database used for trending and (2) initiate a condition report when relay drift limits are exceeded. The corrective action in CR 2016-11351 is to implement a new web-based MMD-Relay Application.

The inspectors verified that condition reports were initiated when relay drift limits were exceeded. The inspectors determined that CR 2016-11351 did validate that several relay experienced successive drift violation that correlated with the time of year (winter or summer). However, there were no corrective actions to confirm or address the cause of the excessive drift in the dropout voltage of the AB 27N model 411T6375HF relays. The dropout voltage drift exceeded 50 percent of the "as found" band in one-third of the tests since 2009. The inspectors also noted that FENOC did not perform an extent of condition review.

The inspectors performed a review of emergency bus loss of voltage, time delay and diesel start relay tests since 2014 in order to determine if excessive drift was present. The inspectors did not find excessive drift in the time delay and diesel start relays.

The inspectors found excessive drift in two of the six loss of voltage relays. VF1200, the Unit 2 DF 4160 volts alternating current (VAC) bus relay had one test where the “as found” drop out voltage drift exceeded 50 percent of the allowable band. VE100, the Unit 1 AE 4160 VAC bus relay, had multiple tests where the drift exceeded 50 percent of the “as found” drop out voltage band, so tests were reviewed back to 2011. The inspectors determined that VE100’s drift exceeded 50 percent of the “as found” band in four out of the thirteen surveillance tests (31 percent). The inspectors did not find any condition reports documenting this issue.

The inspectors determined FENOC’s overall response to the issue was inadequate because they did not perform a cause evaluation as required by their CAP, did not confirm and correct the cause of the excessive drift and did not perform an extent of condition review. These performance deficiencies are minor because no equipment operability or functionality was significantly affected.

After follow-up discussions with engineering, a plan was developed to increase the frequency of the surveillance from six months to three months and determine the cause of the relay drift. The plan was documented in notification 601115431 and the surveillance change was documented in notification 601111509. The inspectors reviewed the plan and determined that it would adequately address the issue that resulted in the finding.

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

##### .1 (Closed) Licensee Event Report (LER) 05000334/2017-001-00: Inadequate Tornado Missile Protection Identified Due to Non-Conforming Design Conditions

On February 3, 2017, Unit 1 and 2 declared the main steam safety valves and atmospheric dump valves inoperable due to inadequate tornado missile protection. Compensatory measures were implemented within the timeframe of the applicable limiting condition for operation (LCO) and the systems were declared operable but nonconforming in accordance with the guidance in Enforcement Guidance Memorandum (EGM) 15-002, Revision 1. In addition, the Unit 2 tornado missile barrier doors, auxiliary building door A-35-5a and fuel building door F-66-3, were found to be open. The doors were closed and latched. On March 31, 2017, the Unit 1 residual heat release valve was included in TS 3.7.4 under administrative controls and was declared inoperable. Compensatory measures were implemented within the applicable LCO and was declared operable but nonconforming in accordance with the guidance in EGM 15-002 Revision 1. The enforcement aspects of the issue were discussed in inspection report 05000334/2017001 and 05000412/2017001. The inspectors verified that FENOC implemented additional 60 day compensatory measures as required by EGM 15-002. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

##### .2 (Closed) Licensee Event Report 05000412/2017-001-00: Surveillance Testing Rendered Service Water System Inoperable Due to the Coupling of Seismic Category 1 Piping to Not Seismic Category 1 Piping

In March 2017, the Unit 2 service water full flow test, an 18 month surveillance test, was being revised to declare the service water train inoperable when the standby service water system was aligned to it. It was discovered that the procedure change would result in both trains of service water being inoperable.

A review of the past three year's performance of the test revealed that both trains of service water were inoperable due to one train inoperable due to test alignment and the other train inoperable due to the standby service water system being aligned to it. The enforcement aspects of this issue are discussed in Section 4OA7. This LER is closed.

#### 4OA6 Meetings, Including Exit

On July 10, 2017, the inspectors presented the inspection results to Mr. Marty Richey, Site Vice President, and other members of the BVPS staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by FENOC and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a NCV. TS 3.7.8, "Service Water System", requires two service water trains to be operable. There is no associated action provided for both trains inoperable. LCO 3.0.3 states, in part, that when an LCO is not met and an associated action is not provided, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within one hour to place the unit, as applicable, in MODE 3 within 7 hours. Contrary to the above, on August 20, 2015 and August 31, 2015, FENOC had both trains of service water inoperable for greater than 7 hours while performing the service water full flow test and did not place Unit 2 in Mode 3. FENOC entered this issue into the CAP as CR 2017-04023. The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings." Because the finding represented a loss of function of a system, a detailed risk evaluation was performed. A Region I senior reactor analyst used the BVPS Unit 2 Standardized Plant Analysis Risk Model version 8.5 to perform the evaluation. A seismic initiating event frequency was obtained from the Risk Assessment of Operational Events Handbook Volume 2, External Events. A surrogate loss-of-offsite-power event was used applying the seismic initiating event frequency for BVPS with a train of service water being failed with no recovery assumed. The finding was determined to be of very low safety significance (Green) because the limited exposure time in this configuration resulted in a change in core damage frequency in the 1E-10/yr range. The dominant core damage sequence was a seismic event with failure of the EDG.

### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

**SUPPLEMENTARY INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

M. Richey, Site Vice President  
G. Alberti, Supervisor, Steam Generator  
S. Baldwin, Supervisor, Mechanical Maintenance  
M. Berg, Design Engineer  
J. Blattner, Supervisor, Electrical/I&C Engineering  
J. Bollman, Radiation Protection Technician  
A. Burger, Supervisor, Nuclear Reactor Engineering  
G. Cacciani, Senior Consulting Engineer  
J. Crawford, Mechanical/Structural Engineer  
E. Crosby, Radiation Protection Manager  
A. Crotty, Manager, Plant Engineering  
M. Dzumba, System Engineer  
R. Etzel, Senior Consulting Engineer, Analytical Methods  
J. Flaherty, Electrical & I&C Engineer  
J. Fontaine, Radiation Protection Supervisor ALARA  
J. Gallagher, Maintenance Rule Coordinator  
S. Gattuso, Shift Manager  
D. Grabski, ISI Coordinator  
L. Greeley, System Engineer  
R. Haefner, Mechanical Maintenance Technician  
T. Heimel, ISI/NDE, Level III Contractor  
D. Hoover, Mechanical Engineering Specialist  
A. Justice, Supervisor, Nuclear I&C Maintenance  
K. Kimmerle, Supervisor, Radiation Protection  
T. King, System Engineer  
R. Kristophel, Unit 1 Superintendent of Shift Operations  
R. Kuhn, Senior Consulting Engineer, Mechanical Maintenance  
R. Lubert, Supervisor, Electrical and I&C Engineering  
S. Mercer, System Engineer  
T. Migdal, Superintendent, Nuclear Operations Services  
J. Miller, Fire Marshal  
C. O'Neill, Supervisor, Nuclear Engineering Programs  
S. Padgett, Shift Supervisor  
J. Patterson, System Engineer  
M. Ressler, Design Engineering  
B. Ronosky, System Engineer  
S. Sawtschenko, Manager, Emergency Response  
J. Snyder, System Engineer  
M. Stoner, Superintendent, Nuclear I&C Maintenance  
E. Thomas, Supervisor, Regulatory Compliance  
T. Winfield, Supervisor, Nuclear Electrical Maintenance  
S. Woolsey, Shift Manager

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**

Closed

05000334/2017-001-00	LER	Unit 1 and Unit 2 Inadequate Tornado Missile Protection Identified Due to Nonconforming Design Conditions (Section 4OA3)
05000412/2017-001-00	LER	Surveillance Testing Rendered Service Water System Inoperable Due to the Coupling of Seismic Category 1 Piping to Not Seismic Category 1 Piping (Section 4OA3)

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather Protection**

Procedures

1/2OM-35.4A.A, Voltage Schedule Guidance, Revision 13  
 1/2OM-53C.4A.35.1, Degraded Grid, Revision 9  
 1/2OM-53C.4A.75.1, Acts of Nature - Severe Weather, Revision 21  
 NOP-OP-1003, Grid Reliability Protocol, Revision 8

Miscellaneous

NORM-ER-1110, FENOC Life Cycle Management Switchyard Beaver Valley, Revision 3  
 Unit 1 Main Generator and Transformer Maintenance Rule Monthly Monitoring Spreadsheet, June 2017  
 Unit 1 4KV Station Service System Health Report 2016-2  
 Unit 1 Emergency Diesel Generators System Health Report 2016-2  
 Unit 2 4KV Station Service System Health Report 2016-2  
 Unit 2 Emergency Diesel Generators System Health Report 2016-2  
 Unit 2 Main Generator and Transformer Maintenance Rule Monthly Monitoring Spreadsheet, June 2017

**Section 1R04: Equipment Alignment**

Procedures

1OM-11.3.B.1, Valve List - 1SI, Revision 21  
 1OM-13.3.B.1, Valve List - 1QS, Revision 16  
 1OST-11.2, Safety Injection Pump Test - [1SI-P-1B], Revision 27  
 2OM-15.3.B.1, Valve List - 2CCP, Revision 20  
 2OM-24.3.B.2, Valve List - 2FWE, Revision 13  
 2OM-6.3.B.1, Valve List - 2RCS, Revision 21  
 2OM-6.3.C, Power Supply and Control Switch List, Revision 13

Condition Reports

2014-09102	2015-12733	2017-04511
2014-09119	2015-14668	2017-04872
2014-10331	2015-15083	

Work Orders

200497559	200665341	200669152
200665168	200668728	200669153

Drawings

10080-RM-21-2, Valve Oper No Diagram AFW Pump Steam & Resid Heat Rel, Revision 17  
RM-0406-001, Valve Oper No Diagram Reactor Coolant System, Revision 27  
RM-0406-002, Valve Oper No Diagram Reactor Coolant System, Revision 21  
RM-0411-011, Piping & Instrumentation Diagram Safety Injection System, Revision 28  
RM-0413-001, Valve Oper No Diagram Containment Depressurization System, Revision 26  
RM-0415-001, Valve Oper No Diagram Primary Component Cooling Water, Revision 20  
RM-0424-003, Valve Oper No Diagram Auxiliary Feedwater, Revision 19

Miscellaneous

Maintenance Rule System Basis Document Reactor Coolant System, Revision 11  
Unit 2 Reactor Coolant system Health Report, 2016-2

**Section 1R05: Fire Protection**

Procedures

Updated Fire Protection Appendix R Review, BVPS-1, Revision 31

Miscellaneous

1PFP-SRVB-713-Relay, Relay Room Pre-Fire Plan, Fire Area CR-3, Revision 1  
1PFP-SRVB-725, Cable Tray Mezzanine, Fire Area CS-1, Revision 3  
2PFP-AXLB-710, Auxiliary Building General Area, Fire Area PA-3, Revision 1  
2PFP-AXLB-718, Auxiliary Building General Area, Fire Area PA-3, Revision 1  
2PFP-AXLB-735, Auxiliary Building General Area, Fire Area PA-3, Revision 1  
2PFP-AXLB-755, Primary Auxiliary Building, Fire Area PA-4, PA-6 & PA-7, Revision 1  
2PFP-AXLB-773, Primary Auxiliary Building, Fire Area PA-5, Revision 2  
2PFP-RCBX-692, Reactor Containment Building, Fire Area RC-1, Revision 1  
2PFP-RCBX-718, Reactor Containment Building, Fire Area RC-1, Revision 1  
2PFP-RCBX-738, Reactor Containment Building, Fire Area RC-1, Revision 2  
2PFP-RCBX-767, Reactor Containment Building, Fire Area RC-1, Revision 1

**Section 1R06: Flood Protection Measures**

Drawings

10080-RE-32T, Ductline Details Intake Structure, Revision 6

**Section 1R07: Heat Sink Performance**

Procedures

½-ADM-2106, River/Service Water System Control and Monitoring Program, Revision 6

Miscellaneous

½-ADM-2106.F01, Heat Exchanger Inspection Report for 2EGS-E21B, Revision 6  
½-ADM-2106.F01, Heat Exchanger Inspection Report for 2EGS-E22B, Revision 6

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

Procedures

2BVT 1.47.1, Containment Structural Integrity Test, Unit 2, Revision 13  
NOP-ER-2001, Boric Acid Corrosion Control Program, Revision 13  
NOP-ER-2005, Flow Accelerated Corrosion Management Program, Revision 05,  
PT Procedure, WDI-SSP-1237, Liquid Penetrant Examination of CRDM Penetration Nozzle  
Weld Overlays at Beaver Valley, Revision 2

SGP-PLG-RIB-FP-GEN, Mechanical Ribbed Plugging of Steam Generator Tubes, Revision 3  
 SGP-REP-INS-FP-Gen, Standard In-Situ Pressure Test Using the Computerized Data  
 Acquisition System, Revision 4.

Unit 1/2 ADM-2099, Primary Containment ISI Program, Revision 4

VT Procedure, WDI-SSP-1236, Reactor Vessel Head Penetration Remote Visual Inspection for  
 Beaver Valley Unit 2, Revision 0

Condition Reports

2017- 04485	2017- 04713	2017- 04774
2017- 04495	2017- 04745	2017- 04775

NDE Records

2R19 Boric Acid Team Status as of 4/30/2017, (BA Program tracking data)  
 UT Calibration/Examination Summary No. 190600 for 2RCS\*PRE21-N-09,  
 Report No. UT-17-1020, Nozzle to Vessel weld  
 UT Calibration/Examination Summary No. 190700 for 2RCS\*PRE21-N-09IR,  
 Report No. UT-17-1019, Nozzle, Inside Radius  
 UT Calibration/Examination Summary No. 526700 for 2RCS\*SSG21A-N-09IR,  
 Report No. UT-17-1022, Nozzle, Inside Radius  
 UT Calibration/Examination Summary No. 527000 for 2RCS\*SG21A-N-09,  
 Report No.-UT-17-1021, Nozzle to Shell Weld #9 (FWater Inlet)  
 UT Calibration/Examination Summary No. 527200 for 2RCS\*SG21A-C-05,  
 Report No. UT-17-1017, Shell Circumferential Weld #5  
 UT Calibration/Examination Summary No. 527300 for 2RCS\*SG21A-C-06,  
 Report No. UT-17-1018, Shell Circumferential Weld #6

Miscellaneous

# 21410.1 for HL TTS expansion transition, 3-coil +Point  
 #128411 Dented and non-dented TSP intersections with 0.720 bobbin for axial ODSCC  
 #128412 Full Tube length with 0.720 Bobbin for Volumetric indications  
 2R19 Boric Acid Leak Tracking Table, components for inspection, results, applicable  
 Condition Reports  
 Eddy current examination technique specification sheets (ETSS)  
 Generic Letter 95-05. Voltage Based Repair Criteria for Westinghouse Steam Generator Tubes  
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2015-05656	2016-07752	2017-03326
2015-06039	2016-07798	2017-03714
2015-11165	2016-08323	2017-04061
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2016-00256	2016-09250	2017-05005
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200025399	200619775	200667765
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203102	Containment 692'	4/22/2017	0030
203103	Containment 692'	4/22/2017	0040
203104	Containment 692'	4/22/2017	0015
203120	Excess Letdown Heat Exchanger 692'	4/22/2017	0015
203201	Containment 718'	4/22/2017	0130
203205	"C" Steam Generator Cubicle 718'	4/22/2017	0130
203210	Pressurizer Relief Tank Cubicle 718'	4/22/2017	0130
203215	"B" Steam Generator Cubicle 718'	4/22/2017	0130
203220	"A" Steam Generator Cubicle 718'	4/22/2017	0130
203301	Containment 738'	4/22/2017	0015
203305	Incore Instrument Room 738'	4/22/2017	0030
203310	"C" Motor Cubicle 738'	4/22/2017	0055
203315	Pressurizer Cubicle 738'	4/22/2017	0105
203320	"B" Motor Cubicle 738'	4/22/2017	0115
203330	"A" Motor Cubicle 738'	4/22/2017	0045
203401	Containment 767'	4/22/2017	0030
203410	Pressurizer Cubicle 767'	4/22/2017	0100
203410	Pressurizer Cubicle 767'	4/22/2017	0245
203415	Pressurizer Cubicle 780'	4/22/2017	0115
203415	Pressurizer Cubicle 780'	4/22/2017	0245

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1MSP-36.45-E, 1AE 4KV Emergency Bus Loss of Voltage Relay 27-VE100 Functional Test, Revision 26

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1MSP-36.47A-E, 1AE 4KV Emergency Bus Loss of Voltage Relay 27-VE100 Calibration, Revision 13

1MSP-36.47B-E, 1AE 4KV Emergency Bus Loss of Voltage Time Delay Relay 62-VE100 18 Month Calibration, Revision 9

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- 1MSP-36.54A-E, 1DF 4KV Emergency Bus Diesel Start Undervoltage Relay 27-VF1100  
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- 1MSP-36.55-E, 1AE 4KV Emergency Bus Diesel Start Loss of Voltage Relay 27-VE1100  
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- 1MSP-36.56-E, 1DF 4KV Emergency Bus Diesel Start Loss of Voltage Relay 27-VF1100  
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- 2MSP-36.01-E, 2AE 4KV Emergency Bus Loss of Voltage Relay 27-VE200 Calibration,  
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- 2MSP-36.15A-E, 2AE 4KV Emergency Bus Diesel Start Undervoltage Relay 27-VE2200  
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- 2MSP-36.16A-E, 2DF 4KV Emergency Bus Diesel Start Undervoltage Relay 27-VF2200  
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- 2016-12018
- 2016-13266
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**LIST OF ACRONYMS**

AC	alternating current
ALARA	as low as is reasonably achievable
ANS	alert and notification system
ASME	American Society of Mechanical Engineers
BVPS	Beaver Valley Power Station
BACC	boric acid corrosion control
CAP	corrective action program
CFR	Code of Federal Regulation
CRDM	control rod drive mechanism
ECT	eddy current test
EDG	emergency diesel generator
EGM	enforcement guidance manual
EP	emergency plan
ERF	emergency response facility
ERO	emergency response organization
FAC	flow-accelerated corrosion
FENOC	FirstEnergy Nuclear Operating Company
HHSI	high head safety injection
HRA	high radiation area
IMC	Inspection Manual Chapter
kV	kilovolt
LCO	limiting condition for operation
LER	licensee event report
LHSI	low-head safety injection
MMD	measured maintenance data
NCV	non-cited violation
NDE	non-destructive examination
NEI	Nuclear Energy Institute
NFPA	National fire Protection Association
NRC	Nuclear Regulatory Commission
PI	performance indicator
PORV	power operated relief valve
PRA	probabilistic risk assessment
PT	liquid penetrant examination
RG	regulatory guide
RHR	residual heat removal
RPV	reactor pressure vessel
SG	steam generator
SSST	system station service transformer
TS	technical specifications
UFSAR	Updated Final Safety Analysis Report
UT	ultrasonic test
VAC	volts alternating current
VHRA	very high radiation area
VT	visual examination