



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

January 31, 2017

Mr. Marty Richey
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
05000334/2016004 AND 05000412/2016004

Dear Mr. Richey:

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Beaver Valley Power Station, Units 1 and 2. On January 27, 2017, NRC inspectors discussed the results of this inspection with Mr. R. Bologna, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, 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; and the NRC Resident Inspector at Beaver Valley Power Station. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Beaver Valley Power Station.

M. Richey

- 2 -

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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

Enclosure:
Inspection Report 05000334/2016004
and 05000412/2016004 w/Attachment:
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05000334/2016004 AND 05000412/2016004 DATED JANUARY 31, 2017

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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.: 05000334/2016004 and 05000412/2016004

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, PA 15077

Dates: October 1, 2016 - December 31, 2016

Inspectors: J. Krafty, Senior Resident Inspector
S. Horvitz, Resident Inspector
K. Carrington, Acting Resident Inspector
J. Schussler, Acting Resident Inspector
E. Burkett, Reactor Inspector
J. DeBoer, Emergency Preparedness Inspector
J. Furia, Senior Health Physicist
R. Rolph, Health Physicist
C. Safouri, Reactor Engineer

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

Enclosure

TABLE OF CONTENTS

SUMMARY	3
1. REACTOR SAFETY	4
1R01 Adverse Weather Protection	4
1R04 Equipment Alignment	4
1R05 Fire Protection	6
1R11 Licensed Operator Requalification Program and Licensed Operator Performance ...	8
1R12 Maintenance Effectiveness	9
1R13 Maintenance Risk Assessments and Emergent Work Control	10
1R15 Operability Determinations and Functionality Assessments	10
1R18 Plant Modifications	12
1R19 Post-Maintenance Testing	13
1R20 Refueling and Other Outage Activities	14
1R22 Surveillance Testing	14
1EP4 Emergency Action Level and Emergency Plan Changes	15
2. RADIATION SAFETY	16
2RS1 Radiological Hazard Assessment and Exposure Controls	16
2RS3 In-Plant Airborne Radioactivity Control and Mitigation	17
2RS4 Occupational Dose Assessment	17
4. OTHER ACTIVITIES	19
4OA1 Performance Indicator Verification	19
4OA2 Problem Identification and Resolution	20
4OA6 Meetings, Including Exit	20
4OA7 Licensee-Identified Violations	21
SUPPLEMENTARY INFORMATION	A-1
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED	A-1
LIST OF ACRONYMS	A-13

SUMMARY

IR 05000334/2016004 and 05000412/2016004; 10/1/2016 – 12/31/2016; Beaver Valley Power Station Units 1 and 2; Operability Determinations and Functionality Assessments.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified one non-cited violation (NCV), which was of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process", dated December 4, 2014. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated August 1, 2016. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. A self-revealing NCV of Title 10 of the *Code of Federal Regulations* (CFR) 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for FENOC's failure to assure that activities affecting quality were accomplished in accordance with procedures. Specifically, FENOC failed to follow NOP-OP-1001, "Clearance/Tagging Program," and clearance 1W11-30-MNM-002 when removing the clearance for the 'A' bay of the main intake structure. This resulted in disabling the automatic start capability of the standby 'C' river water pump and made the 'A' river water train inoperable and unavailable. FENOC's immediate corrective action was to rack the breaker for the 'A' river water pump to the disconnect position, which cleared the annunciator and restored operability to the 'A' train of river water. FENOC entered this issue into their corrective action program (CAP) as condition report (CR) 2016-14253.

The performance deficiency is more-than-minor because it is associated with the Human Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, FENOC incorrectly racked the 'A' river water pump breaker onto the 1AE 4160 volts alternating current (VAC) safety bus while the 'C' river water pump was already racked onto the bus. This caused the 'A' train of river water to be inoperable and unavailable because the automatic start capability of the 'C' pump was disabled. The inspectors determined that this finding was of very low safety significance (Green) because it did not represent a loss of system and/or function, an actual loss of function of a single train for greater than its technical specification allowed outage time, or an actual loss of function of one non-technical specification train designated as high safety significance. This finding has a cross-cutting aspect in Human Performance, Avoid Complacency, because the operators did not plan for the possibility of mistakes and did not implement appropriate error-reduction tools [H.12]. (Section 1R15)

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 CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period shutdown for refueling outage 1R24. On October 21, 2016, following completion of the planned refueling and maintenance outage, operators commenced a reactor startup. On October 22, operators shut down the unit from 15 percent power to repair an issue with the turbine lube oil system. On October 25, the operators recommenced reactor startup. Operators returned the unit to 100 percent power on October 27, 2016, and remained at or near 100 percent for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power and remained at or near 100 percent power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors reviewed FENOC's readiness for the onset of seasonal low temperatures. The review focused on the electrical heat trace systems, including refueling water storage tank, quench spray, and safety injection. Additionally, inspectors reviewed seasonal readiness of the building ventilation systems and the emergency diesel generators (EDG). The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure FENOC personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including FENOC's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1 low head safety injection system following restoration from maintenance on October 4, 2016

- Unit 1 'B' quench spray containment depressurization system following a comprehensive pump and valve stroke timing surveillance test on November 17, 2016
- Unit 1 EDG 1-2 during EDG 1-1 surveillance testing on December 28, 2016

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, CRs, 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

On September 27 through October 7, 2016, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 reactor coolant system (RCS) to verify the existing equipment lineup was correct. The inspectors reviewed drawings and equipment line-up check-off lists to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, and hanger and support functionality. 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 and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed the system health report and a sample of work orders to ensure FENOC appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire ProtectionResident Inspector Quarterly Walkdowns (71111.05Q – 3 samples)a. Inspection Scope

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

- Unit 1 Reactor Containment Building, Fire Area RC-1, on October 11, 2016
- Unit 2 Diesel Generator 2-1 Room, Fire Area DG-1, on November 2, 2016
- Unit 2 North and South Safeguards, Fire Area SG-1S & SG-1N, on November 21, 2016

b. Findings

No findings were identified.

1R08 In-Service Inspection (71111.08P - 1 sample)a. Inspection Scope

From October 3-11, 2016, the inspectors conducted an inspection and review of in-service examination activities in order to assess the effectiveness of FENOC's program for monitoring degradation of the RCS boundary, risk-significant piping and components, and containment systems during the Beaver Valley Power Station, Unit 1, refueling outage, 1R24. 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.

Non-destructive Examination (NDE) and Welding Activities

The inspectors observed or reviewed the following NDE activities and completed data records:

- Manual ultrasonic testing, volumetric inspection record, American Society of Mechanical Engineers (ASME) Class 1, 'C' steam generator nozzle to safe end weld, RC-E-1C-N-11
- Liquid penetrant testing, surface examination record, ASME Class 2, quench spray system welded attachment support R-230, QS-2-3B-A-01
- Visual examination, visual inspection record, ASME Class 1, reactor vessel head bottom-mounted instrument nozzles, 1RV-BMI-PENE-OD
- Radiographic testing, volumetric inspection records, ASME Class 2, new welds for replaced auxiliary feed water turbine steam supply trip valves (TV-1MS-105A/B) F1, F2, FW3, and FW5

For each evaluation, the inspectors verified NDE activities were performed in accordance with the 2001 Edition, 2003 Addenda, of the ASME Boiler and Pressure Vessel (BPV) Code requirements. The inspectors also verified the NDE activities met the requirements contained in ASME Section XI, Mandatory Appendix VIII, Article VIII-2000 and the examination personnel were qualified in accordance with ASME Section XI, Mandatory Appendix VII. The inspectors verified that indications and defects, if present, were dispositioned in accordance with the ASME Code. The inspectors performed a record review of the Containment General Visual Examination implemented in conformance with the 2001 Edition, 2003 Addenda of Article IWE of Section XI. The inspectors ensured that difficult to access areas or areas made visible by maintenance activities, were included within the scope of the visual examination. Additionally, the inspectors verified the basis for declaring some containment areas as inaccessible for visual examination by comparing the basis against previous containment visual examination records. The inspectors also performed a walk down of the accessible areas of containment to independently assess the condition of the moisture barrier and containment liner.

Re-examination of an Indication Previously Accepted for Service After Analysis

There was no sample available for review during this inspection that involved examination with recordable indications that had been accepted for continued service following the previous Unit 1 outage, 1R23.

Modification/Repair/Replacement Consisting of Welding on Pressure Boundary Risk Significant Systems

The inspectors reviewed the pressure boundary risk significant welding activity, including associated NDE, for the installation of ASME Class 1 valve CH-368, reactor coolant pump 1A seal injection line low point drain, and ASME Class 2 valve 1MS-523, residual heat removal isolation valve. The inspectors verified that the welding, NDE, and acceptance were performed in accordance with the 2001 Edition, 2003 Addenda of the ASME BPV Code requirements and FENOC's repair and replacement program procedure. Specifically, the inspectors verified the welding procedure specification contained the essential, and where applicable, the supplemental essential variables, in conformance with ASME Section IX, QW-200, and that the weld variables were within the range qualified by the supporting Procedure Qualification Record as required by ASME Code Section IX, QW-250.

Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors verified that no inspections were required to be performed of the reactor vessel upper head penetrations during 1R24.

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the following engineering evaluations performed for boric acid found on RCS piping and components: CR-2015-14228 (pipe plug downstream of 2SSR-313 safety injection sample containment leakage monitoring line), CR-2015-14210 (gasketed connection downstream of 2CHS-763), and CR-2016-11855 (body to bonnet bolting on valve MOV-1RC-591). The inspectors evaluated whether FENOC applied appropriate corrosion rates to the affected components and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity.

The inspectors reviewed the following corrective actions performed for evidence of boric acid leaks identified: CR-2016-11541 (1SI-21, loop 2 hot leg safety injection check valve), CR-2016-11822 (1CH-54, ball valve demineralizer outlet isolation), and CR-2016-11884 (underside of suction flange of 1RH-P-1A residual heat removal pump). The inspectors confirmed that these corrective actions were consistent with requirements of the ASME Code and 10 CFR 50, Appendix B, Criterion XVI.

Steam Generator Tube Inspection Activities

The inspectors reviewed the degradation assessment and operational assessment, LTR-SGMP-15-17, prepared for the 1R24 outage. This document was based on the steam generator tube inspection results from the 1R21 outage when tube inspections were previously performed. The inspectors observed eddy current testing (ET) of the primary side of the steam generator tubes and reviewed the examination results to evaluate FENOC's ability to predict future tube performance by comparing the current results with the values predicted in the 1R21 outage operational assessment. The inspectors then evaluated the scope of the ET to determine if areas of potential degradation were inspected, noting if areas known to represent ET challenges were included. Lastly, the inspectors compared the steam generator tube ET examination scope and expansion criteria with technical specification requirements to determine if the FENOC was in compliance with these requirements. The inspectors reviewed a sample of the Electric Power Research Institute Appendices H and I (Pressurized Water Reactor Steam Generator Examination Guidelines) Examination Technique Specification Sheets to determine if the ET probes and equipment were qualified for detection or sizing of the expected types of tube degradation.

The inspectors observed the inspection of the secondary side of the steam generator and the process to remove foreign objects to evaluate conformance with FENOC's Steam Generator Examination Program.

Identification and Resolution of Problems.

The inspectors reviewed a sample of CRs 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 Regualification Program and Licensed Operator Performance (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed Unit 2 licensed operator simulator training on November 7, 2016, which included a service water header rupture and a steam line break inside containment with the failure of select components to automatically start or reposition 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 operators on Unit 1 perform reactor startups on October 21 and 25, 2016, following completion of planned maintenance and refueling outage 1R24. The inspectors observed infrequently performed test or evolution briefings, pre-shift briefings, and reactivity control briefings to verify that the briefings met the criteria specified in FENOC's Operations Section Expectations Handbook and FENOC Administrative Procedure OP-AA-329, "Conduct of Infrequently Performed Tests and Evolutions," Revision 1. Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

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

For each sample selected, the inspectors verified that the 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 2 supplemental leak collection and release system on October 21, 2016
- Unit 1 and Unit 2 work package and receipt inspection document review of quality control verifications on December 1, 2016 (quality control)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 2 samples)a. Inspection Scope

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

- Unit 1 yellow shutdown risk for decay heat removal during reactor cavity drain down to the reactor vessel flange on October 11, 2016
- Unit 1 emergent work for loop channel II over power delta temperature inoperability due to erratic readings on November 15, 2016

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 8 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 letdown flow control valve, MOV-1CH-142, exceeds total thrust criteria on October 10, 2016
- Unit 1 EDG 1-1 auto load test frequency below acceptance criteria on October 13, 2016
- Unit 1 EDG 1-2 auto load test frequency below acceptance criteria on October 13, 2016
- Unit 1 relief valve, RV-1RH-721, not tested for expanded scope from RV-1CH-203 test result on October 17, 2016
- Unit 1 seismic qualification for conduit containing safety related electrical cables on November 18, 2016
- Unit 2 source range detector N-32 spiking with high voltage to detector deenergized on November 23, 2016

- Unit 2 turbine driven auxiliary feedwater pump quarterly surveillance test, cold start timing, on December 1, 2016
- Unit 1 improper clearance restoration of the 'A' river water pump on December 13, 2016

The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to FENOC's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

Introduction. A Green self-revealing NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for FENOC's failure to assure that activities affecting quality were accomplished in accordance with procedures. Specifically, FENOC failed to follow NOP-OP-1001, "Clearance/Tagging Program," and clearance 1W11-30-MNM-002 when removing the clearance for the 'A' bay of the main intake structure. This resulted in disabling the automatic start capability of the standby 'C' river water pump and made the 'A' river water train inoperable and unavailable.

Description. On December 13, 2016, Unit 1 operators were removing the clearance for the 'A' bay of the main intake structure following maintenance. The 'A' river water pump had been racked out during the maintenance. Both trains of the safety-related river water system were operable. The 'B' pump was in operation on the 'B' train and the 'C' pump was in standby on the 'A' train. The restoration configuration for the 'A' river water pump breaker was racked out. The operators incorrectly racked in the breaker.

Since the 'C' river water pump was already racked in on the 1AE 4160 VAC safety bus, the control room received annunciator A1-75, "River Water Pump 1A & 1C Racked Into Emergency Bus 1AE." This activated an interlock which disabled starting the river water pumps on the 1AE safety bus. The purpose of the interlock was to prevent overloading the EDGs during an emergency start condition. This caused the 'A' train of river water to be inoperable and unavailable.

The unit supervisor was dispatched to investigate. After determining what had happened, operators racked the breaker for the 'A' river water pump to the disconnect position which cleared the annunciator and restored operability to the 'A' train of river water, 11 minutes after the control room annunciator was received. FENOC's review of the incident determined that appropriate human performance tools, such as the two minute drill and peer check, were not used while removing the clearance on the 'A' river water pump.

Analysis. The inspectors determined that the failure to assure that activities affecting quality were accomplished in accordance with procedures was a performance deficiency that was within the capability of FENOC to foresee and correct, and should have been prevented. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the performance deficiency is more than minor because it is associated with the Human Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of

systems that respond to initiating events to prevent undesirable consequences. Specifically, FENOC incorrectly racked the 'A' river water pump breaker onto the 1AE 4160 VAC safety bus while the 'C' river water pump was already racked onto the bus. This caused the 'A' train of river water to be inoperable and unavailable because the automatic start capability of the 'C' pump was disabled.

In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued October 7, 2016, and Exhibit 2 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined that this finding was of very low safety significance (Green) because it did not represent a loss of system and/or function, an actual loss of function of a single train for greater than its technical specification allowed outage time, or an actual loss of function of one non-technical specification train designated as high safety significance.

This finding has a cross-cutting aspect in Human Performance, Avoid Complacency, because the operators did not plan for the possibility of mistakes and did not implement appropriate error-reduction tools [H.12].

Enforcement. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality were accomplished in accordance with procedures. Contrary to the above, FENOC failed to follow procedures while removing the 'A' bay of the main intake structure clearance. Specifically, for 11 minutes on December 13, 2016, FENOC operators caused the 'A' train of river water to be inoperable and unavailable when a second river water pump was racked onto the AE safety bus. FENOC's immediate corrective actions were to rack out the 'A' river water pump breaker which restored the operability of the 'A' train of river water. Because this finding is of very low safety significance (Green) and the issue was entered into FENOC's CAP, CR 2016-14253, this violation is being treated as a NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 5000334/2016004-01, Failure to Follow Procedure Results in an Inoperable 'A' River Water Train.)**

1R18 Plant Modifications (71111.18 – 2 samples)

.1 Permanent Modifications – Open Phase Detection System

a. Inspection Scope

The inspectors evaluated a modification to the Unit 1 'B' system station service transformer (SSST) implemented by engineering change package 15-0059-004, "Unit 1 Open Phase Detection System." 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, including installation of open phase alarm detection cabinet and control room annunciators, and replacement of the Unit 1 'B' SSST high side neutral cable. The inspectors also reviewed revisions to the control room alarm response procedure and interviewed engineering and operations personnel to ensure the procedure could be reasonably performed.

b. Findings

No findings were identified.

.2 Permanent Modifications – Computer Enhanced Rod Position Indication (CERPI)

a. Inspection Scope

The inspectors evaluated a modification to the Unit 1 rod position indication (RPI) system implemented by engineering change package 14-0068, "CERPI Replacement to Ovation Distributed Control System." 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, including replacement of programmable logic controller RPI with Ovation-based distributed control system RPI and replacement of the analog RPI meters with dual flat panel touch screen monitors. The inspectors also reviewed the results of the site acceptance testing and surveillance testing and interviewed engineering personnel to ensure that the required testing was completed before plant start up.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities 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, observed the pre-job brief and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Replacement and repair of portions of Unit 1 river water piping on October 11, 2016
- Replacement of the Unit 1 EDG 1-2 power pack on October 14, 2016
- Installation of backdraft dampers on the discharge of the Unit 1 control room area return fans on October 21, 2016
- Replacement of 33 core exit thermocouples on October 21, 2016
- Replacement of Unit 1 turbine driven auxiliary feedwater main steam trip valves, 105A and 105B, on October 6, 2016
- Replacement of Unit 1 feedwater containment isolation valve 100A hydraulic pump and motor on November 8, 2016

b. Findings

No findings were identified.

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

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 maintenance and refueling outage (1R24), conducted September 24 through October 25, 2016. The inspectors reviewed FENOC's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

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

The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied.

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

- 1OST-47.115, Unit 1 Type C Leak Test for Penetration #16 (Component Cooling Supply to the Containment Shroud Cooling) Containment Isolation Valve Test, Revision 0, on October 5, 2016
- 1OST-11.14b, Unit 1 High Head Full Flow Test, Revision 35, on October 10, 2016
- 1-MSP-E-39-402, Unit 1 Battery [BAT-1-2] Service Discharge Test, Revision 1, on October 26, 2016
- 1BVT 1.21.2, Trevitest Method for Main Steam Safety Valve Setpoint Check, Revision 16, on December 2, 2016

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by FENOC as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 - 5 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, technical specifications, applicable Regulatory Guides (RGs), and the procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators 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.

Contamination and Radioactive Material Control (1 sample)

The inspectors observed the monitoring of potentially contaminated material leaving the radiological controlled area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material. The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with requirements.

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 (LHRAs) and very high radiation areas (VHRAs) to verify conformance with the occupational performance indicator.

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.

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, technical specifications, and procedures required by technical specifications 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 performance indicators for unintended internal exposure incidents.

Use of Respiratory Protection Devices (1 sample)

The inspectors reviewed the adequacy of FENOC's use of respiratory protection devices in the plant to include applicable "as low as is reasonably achievable" (ALARA) evaluations, respiratory protection device certification, respiratory equipment storage, air quality testing records, and individual qualification records.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 - 1 sample)

a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR 20, Regulatory Guides, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed: radiation protection program audits, National Voluntary Laboratory Accreditation Program dosimetry testing reports, and procedures associated with dosimetry operations.

Source Term Characterization (1 sample)

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored. The inspector verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 6 samples)

a. Inspection Scope

The inspectors verified the effectiveness of FENOC's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170-177, 10 CFR 20, 61, and 71; applicable industry standards; regulatory guides; and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage (1 sample)

The inspectors observed radioactive waste container storage areas and verified the postings and controls and that FENOC had established a process for monitoring the impact of long-term storage of the waste.

Radioactive Waste System Walkdown (1 sample)

The inspectors walked down the following:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for mixing and transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification (1 sample)

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

Shipment Preparation (1 sample)

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and FENOC verification of shipment readiness.

Shipping Records (1 sample)

The inspectors reviewed selected non-excepted package shipment records.

Problem Identification and Resolution (1 sample)

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were identified at an appropriate threshold and properly addressed in FENOC's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 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 October 1, 2015, through September 30, 2016:

- Unit 1 emergency alternating current (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 performance indicator data reported during those periods, the inspectors used definitions and guidance contained in in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed FENOC's CRs, mitigating systems performance index derivation reports, event reports, and Applicable system health reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

The inspectors reviewed licensee submittals for the occupational radiological occurrences performance indicator (PI) for the first quarter 2015 through the fourth quarter 2015. The inspectors used PI definitions and guidance contained NEI 99-02, to determine the accuracy of the PI data reported. The inspectors reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized PI occurrences. The inspectors conducted walkdowns of various LHRA and VHRA entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

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. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, FENOC performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On January 27, 2017, the inspectors presented the inspection results to Mr R. Bologna, Plant Manager, and other members of the Beaver Valley Power Station staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance and meets the NRC Enforcement Policy criteria for being dispositioned as a NCV.

Radioactive material shipment B-4655, was made from Beaver Valley on May 5, 2016, to ResinSolutions in Erwin, TN. During a self-assessment performed by the FENOC staff on November 3, 2016, it was identified that the scaling factors used to determine the hard-to-detect nuclides listed on the manifest (NRC Form 540) for shipment B-4655 were incorrect. The scaling factors used to manifest the shipment were not for the waste stream shipped. Recalculation of the isotopic values using the correct waste stream scaling factors resulted in different numeric values for multiple radionuclides in the shipment, but did not cause a change in the proper shipping name, packaging, or labeling.

10 CFR 71.5 requires, in part, that radioactive materials be transported with an accurate shipment manifest. Contrary to the above, on May 5, 2016, FENOC transported radioactive materials with a shipment manifest that incorrectly stated that the radiological activity of the package was higher than the actual activity. FENOC documented this issue in CR 2016-13071, and provided a corrected shipment manifest to the recipient of the material. In accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," the finding was determined to be of very low safety significance (Green) because FENOC had an issue involving transportation of radioactive material, but it did not involve a radiation limit that was exceeded, a breach of package during transport, a certificate of compliance issue, a low level burial ground nonconformance, or a failure to make notifications or provide emergency information.

ATTACHMENT: SUPPLEMENTARY INFORMATION

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

M. Richey, Site Vice President
 R. Bologna, General Plant Manager
 M. Berg, Design Engineer
 A. Bohr, System Engineer
 J. Crawford, Mechanical Design Engineer
 E. Crosby, Radiation Protection Manager
 A. Crotty, Electrical and I&C System Engineering Supervisor
 J. Fontaine, Radiation Protection Supervisor ALARA
 K. Frederick, Design Engineer
 D. Grabski, Programs Engineer
 J. Hartig, Project Engineer
 M. Jansto, System Engineer
 D. Jones, IST Program Engineer
 M. Kienzle, Senior Nuclear Engineer
 T. King, System Engineer
 R. Kristophel, Superintendent, Unit 1 Operations
 E. Loehlein, Operations Manager
 J. Miller, Fire Marshall
 M. Manoleras, Engineering Director
 M. Ressler, Supervisor, Design Engineering
 J. Saunders, Radwaste Supervisor
 S. Sawtschenko, Emergency Preparedness Manager
 L. Seaman, Programs Engineer
 E. Thomas, Regulatory Compliance Supervisor

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

05000334/2016004-01	NCV	Failure to Follow Procedure Results in an Inoperable 'A' River Water Train (Section 1R15)
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LIST OF DOCUMENTS REVIEWED**Section 1R01: Adverse Weather Protection**Procedures

1OM-45.1.C, Major Components, Revision 8
 1OST-45.11A, Cold Weather Protection Verification Performed in September and October, Revision 2
 1OST-45.11B, Cold Weather Protection Verification Performed in November, Revision 3
 1/2OST-45.1, Extreme Cold Weather Protection Verification, Revision 2
 2OM-45D.1.B, Summary Description, Issue 4 Revision 0
 2OM-45D.1.C, Major Components, Issue 4 Revision 0

2OST-45.11A, Cold Weather Protection Verification Performed in September and October,
Revision 5
2OST-45.11B, Cold Weather Protection Verification Performed in November, Revision 1

Condition Reports

2016-10051	2016-10372	2016-12338
2016-10319	2016-12076	2016-12425

Section 1R04: Equipment Alignment

Procedures

1OM-11.3.B.1, Valve List -1SI, Revision 21
1OM-11.3.C, Power Supply and Control Switch List, Revision 8
1OM-13.1.B, Summary Description, Revision 3
1OM-13.3.B.1, Valve List 1QS, Revision 16
1OM-6.3.B.1, Valve List – 1RC, Revision 18
1OM-6.3.C, Power Supply and Control Switch List, Revision 11
1OST-13.2, Quench Spray Pump [1QA-P-1B] Test, Revision 47

Condition Reports

2014-04441	2015-08819	2016-11693
2014-11558	2015-10841	2016-11775
2015-02294	2015-15301	2016-11903
2015-04719	2016-00267	
2015-06499	2016-03430	

Drawings

8700-RM-0406-001, Valve Oper No Diagram Reactor Coolant System, Revision 21
8700-RM-0406-002, Valve Oper No Diagram Reactor Coolant System, Revision 24
8700-RM-0406-003, Valve Oper No Diagram Reactor Coolant System, Revision 10
8700-RM-0406-004, Valve Oper No Diagram Reactor Coolant System, Revision 4
8700-RM-0413-001, Valve Oper No Diagram Containment Depressurization System,
Revision 25
8700-RM-0436-001, Valve Oper No Diagram Emergency Diesel Generator Air Start System,
Revision 11
8700-RM-0436-002, Valve Oper No Diagram Emerg Diesel Gen Fuel Oil Sys, Revision 12
8700-RM-0436-003, Valve Oper No Diagram Lube Oil System, Revision 6
8700-RM-0436-004, Valve Oper No Diagram EE-EG-1,(2) Water Cooling System, Revision 5
10080-RM-0085B, Flow Diagram Containment Depressurization Piping Sheet 2, Revision 31

Miscellaneous

Unit 1 Reactor Coolant System Health Report, 2016-01
Unit 1 System 6 Maintenance Rule System Basis Document, Revision 11

Section 1R05: Fire Protection

Procedures

1OST-33.30, Containment Hose Station Air Test and Hose Replacement, Revision 4
1/2-ADM-1900, Fire Protection Program, Attachment B, Revision 39
2DBD-33B, Design Basis Document for Fire Protection System, Revision 15

Condition Reports
2016-12986

Drawings
10080-RB-0090B, Flow Diagram-CO2 Fire Protection & Smoke Detection System Sheet 2,
Revision 24

Miscellaneous
1PFP-RCBX-767, Reactor Containment Building, Fire Area RC-1, Revision 2
Updated Fire Protection Appendix R Review, BVPS Unit 1, Revision 31
2PFP-DGBX-732, Diesel Generator 2-1 Room, Fire Area DG-1 Revision 3
2PFP-SFGS-737, Safeguards Fire Area SG-1S, SG-1N Revision 3
2PFP-SFGS-718, Safeguards Fire Area SG-1S, SG-1N Revision 2

Section 1R08: In-Service Inspection

Procedures
1/2-ADM-0810, Scaffold Erection and Tagging, Revision 17
1/2-ADM-2039, BVPS ISI Ten-Year Plans, Revision 15
1/2-ADM-2099, Primary Containment ISI Program, Revision 4
1BVT 1.47.1, Containment Structural Integrity Test, Revision 14
1-GT-01, ASME Section IX Welding Procedure Specification (WPS) for GTAW, Revision 2
1-SM-01, ASME Section IX Welding Procedure Specification (WPS) for SMAW, Revision 2
CR.ASME.1, Computed Radiography, Examination of Welds and Components, Revision 0
DLW-01-16, Eddy Current Inspection Examination Technique Specification Sheets (ETSS),
Revision 0
IQC 560, Written Practice for Qualification and Certification of NDE Personnel per
ASME Section XI and ANSI/ANST CP-189 Requirements, Revision 0
ISIE-ECP-2, Steam Generator Examination Program, Revision 28
NDE-LP-101, Solvent Removable Visible Dye, Revision 24
NDE-VT-502, Leakage Examination Requirements, Revision 10
NOP-CC-5703, FirstEnergy Nuclear Operating Company (FENOC) ASME Section XI
Repair/Replacement (R/R) Program, Revision 4
NOP-CC-5709, Review and Approval of Contracted Nondestructive Examination Activities,
Revision 3
NOP-ER-2001, Boric Acid Corrosion Control Program, Revision 12
PDI-UT-10, Generic Procedure for the Ultrasonic Examination of Dissimilar Metal Welds,
Revision F

NDE Summary Reports
PT-16-1000, QS-2-3B-A-01 Welded Attachment Support R-230 Examination, dated 10/6/2016
BOP-VE-16-005, Radiographic Examination of Weld FW3 on MS Line S -31, dated 10/2/2016
BOP-VE-16-006, Radiographic Examination of Weld FW5 on MS Line SHP-31, dated 10/2/2016
BOP-VE-16-007, Radiographic Examination of Weld F1 on MS Line SHP-31, dated 10/2/2016
BOP-VE-16-008, Radiographic Examination of Weld F2 on MS Line SHP-31, dated 10/2/2016
BOP-VE-16-009, Radiographic Examination of Weld FW5 R1 on MS Line SHP-31,
dated 10/6/2016
BOP-VE-16-010, Radiographic Examination of Weld F1 R1 on MS Line SHP-31,
dated 10/6/2016
BOP-VE-16-011, Radiographic Examination of Weld F2 R1 on MS Line SHP-31,
dated 10/6/2016

UT-16-1007, RC-E-1C-N-11 Nozzle to Safe End (Hot Leg) Examination, dated 10/6/2016
 VT-16-1055, 1RV-BMI-PENE-OD, RV Lower Head BMI Nozzles Visual Examination, dated 10/3/16

Condition Reports

2015-06164	2016-11335	2016-11795
2015-14454	2016-11676	2016-11855
2015-15669	2016-11743	2016-11881
2016-02200	2016-11767	2016-11884
2016-09992	2016-11769	2016-11926
2016-10607	2016-11779	

Work Orders

200532645
 200557766

Miscellaneous

ECP 16-0444-001, Drawing Update for Weld Additions During Leak Repair of Line BV-WR-20, Revision 0
 FENOC Memo Re Designation of FENOC Site Principal NDE Level III & NDE Site Certification Officer, dated 01/04/2016
 IR-2005-85, Technical Justification for the Acceptance of Ultrasonic Examination Demonstration Results on Beaver Valley's Steam Generator Nozzle-to-Safe End Dissimilar Metal Weld Mockup, dated December 2005
 LTR-SGMP-15-17, Review of BVPS 1R21 Degradation Assessment and Cycle 22, 23, and 24 Operational Assessment with Regard to Eddy Current Skip Cycle Mode for End-of-Cycle 23, dated 4/10/2015
 MS-C-16-01-13, Design Control/Engineering Programs/ASME Audit, dated 3/7/2016
 OE-2015-0470-6, Misapplication of the Reactor Vessel Head Inspection Code Requirements, dated 3/11/2016

Section 1R11: Licensed Operator Regualification Program

Procedures

1OM-50.4.D, Reactor Startup From Mode 3 to Mode 2, Revision 59
 1OM-50.4.D1, Reactor Startup From Mode 3 to Mode 2 – Initial Criticality, Revision 1
 1OM-50.4.D2, Reactor Startup From Mode 3 to Mode 2, Revision 0
 1RST-2.1, Initial Approach to Criticality After Refueling, Category I, Issue 1, Revision 17

Miscellaneous

OTLC-S201605CPEPRAC_BV2, Licensed Operator Training/Licensed Regualification Training, Revision 0
 Reactivity Plan – Beaver Valley Power Station Unit 1 Cycle 25 Initial Startup Following 1R24, Revision 0

Section 1R12: Maintenance Effectiveness

Procedures

BVPM-ER-3004, Maintenance Rule Program Supplemental Guidance, Revision 2
 NOP-ER-3004, FENOC Maintenance Rule Program, Revision 2
 NOP-LP-2018, Quality Control Inspection of Maintenance and Modification Activities, Revision 14

NOP-LP-2018, Quality Control Inspection of Maintenance and Modification Activities,
Revision 13
BVBP-QC-001, QC Order/Notification Review, Revision 3
NOP-LP-2020, Quality Control Receipt Inspection, Revision 18
NOP-WM-1001, Order Planning Process, Revision 23
NOBP-OP-0007, Conduct of Infrequently Performed Tests or Evolutions, Revision 05

Condition Reports

2016-12648
2016-12989

Drawings

10080-RM-416-1, Valve Oper No Diagram Supplementary Leak Collect & Release, Revision 12
10080-RM-0416-002, Valve Oper No Diagram Supplementary Leak Collection, Revision 10
10080-RM-444D-1, Valve Oper No Diagram Aux Bldg Ventilation System, Revision 8
10080-RM-0444D-002, Valve Oper No Diagram Aux Bldg Ventilation System, Revision, 12

Work Orders

200590731	200643833	200642863
200590727	200620392	200669822

Miscellaneous

2DBD-16, Design Basis Document for Supplementary Leak Collection and Release System
(SLCRS), Revision
Maintenance Rule Basis Document, Unit 2 System 16, Revision 4
Maintenance Rule Failure Form for Condition Report 2014-04723
Maintenance Rule Failure Form for Condition Report 2014-10528
Maintenance Rule Failure Form for Condition Report 2015-01676
Maintenance Rule Failure Form for Condition Report 2015-03500
Maintenance Rule Failure Form for Condition Report 2015-03511
Maintenance Rule Failure Form for Condition Report 2016-02430
Maintenance Rule Failure Form for Condition Report 2016-03557
Maintenance Rule Failure Form for Condition Report 2016-08062
Maintenance Rule Failure Form for Condition Report 2016-09724
Maintenance Rule Failure Form for Condition Report 2016-10213
Multiple Employee QA/QC Examiner Certification Review, QC Certifications
Quality Control Receipt Inspection Report Purchase Order 45495216
Quality Control Receipt Inspection Report Purchase Order 47610005
Quality Control Receipt Inspection Report Purchase Order 47645023
System 16 Health Report 2015-2

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

1/2CMP-4-Contingency Hatch Closure-1M, Revision 1
1MSP-6.39-I, T-RC422 Delta T TAVG Protection Instrument Channel II Calibration, Revision 37
1OM-1.4.AAG, Loop Overpower Delta T, Revision 1
1OM-1.4.AAH, Loop Overpower Delta T Auto Turbine Runback Block Rod Withdrawal,
Revision 4
NOP-OP-1007, Risk Management, Revision 23
1/2-ADM-0804, Online Risk Assessment and Management, Revision 13
NOP-WM-0001, Work Management Process, Revision 9

Work Orders

200699153

Condition Reports

2016-12237

2016-13452

Miscellaneous

Beaver Valley Key Shutdown Defense-in-Depth Turnover Checklist October 11, 2106

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 74

1OST-36.3, Diesel Generator No. 1 Automatic Test, Revision 36

NOBP-OM-4010, Restart Readiness for Plant Outages, Revision 4

NOP-OP-1009, Operability Determinations and Functionally Assessments, Revision 6

1/2 –PIP-E04, Seismic Conduits and Supports, Revision 8

2OST-24.4, Steam Driven Auxiliary Feed Pump [2FWE*P22] Quarterly Test, Revision 85

Condition Reports

2016-11396

2016-11941

2016-13309

2016-11469

2016-12171

2016-13610

2016-11508

2016-12173

2016-13786

2016-11548

2016-12335

2016-13827

2016-11574

2016-12958

2016-11730

2016-13263

Miscellaneous

EER 601065433 – Over Thrust Condition Evaluation (MOV-1CH-142), Revision 0

EER 601066466, Evaluate the Emergency Diesel Generator Frequency of 59.99 Hz to the
Associated Pump Margins, Revision 0EER 601070425, Source Range Instruments Have Exhibited the Effects of Induced Noise from
External Sources, Revision 1VTI 8700-06.048-0164, Weak Link Analysis of a Masoneilan Model 90-20721 Control Valve,
Revision E**Section 1R18: Plant Modifications**Procedures

1BVT 1.1.1, Rod Position Indication Calibration and Control Rod Drop Test, Revision 6

1OST-1.1, Control Rod Assembly Partial Movement Test, Revision 21

1OST-1.13, Channel check of Group Demand Counters Within a Bank and Overlap Verification,
Revision 221OST-1.14, Inter-Comparison Between Control Bank Benchboard Indicators and Logic Cabinet
Indicator, Revision 13

PIPS E05.3, Non-Seismic Conduits and Supports, Revision 1

Condition Reports

2016-12684

2016-12332

2016-12186

2016-11694

Work Orders

200602190	200602193	200602197
200602191	200602196	

Drawings

8700-RE-0002S, Wiring Diagram Sys Sta Serv Trans 1B, Revision 1
 8700-RE-1C, Equipment One Line Diagram, Revision 30
 8700-RE-21QH, Annunciator A8 Window Arrangement, Revision 15

Miscellaneous

ECP 15-0059-000, Unit 1 Open Phase Protection System, Revision 0
 ECP 15-0059-004, Install Open Phase (OPD) System Cabinet at Unit 1 System Station Service Transformer TR-1B, Revision 1
 ECP 15-0059-005, Complete Wiring of Open Phase Detection (OPD) System Cabinet at Unit 1 System Station Service Transformer TR-1B, Revision 3
 ECP 16-0032, CERPI Site Acceptance Testing, Revision 0
 TR-102348/NEI 01-01, Guideline on Licensing Digital Upgrades, Revision 1
 WNA-AR-00420-DLW, Beaver Valley Unit 1 Ovation-based CERPI System Upgrade Failure Modes and Effects Analysis, Revision 0
 WNA-PV-00065-DLW, Beaver Valley Units 1 and 2 Control System Upgrades Software Implementation Plan, Revision 0

Section 1R19: Post-Maintenance TestingProcedures

1BVT1.44.8, Diesel Generator Building Ventilation Test, Revision 4
 1OST-24.9, Turbine-Driven AFW Pump [1FW-P-2] Operability Test, Revision 55
 1OST-30.12A, Train A River Water Full Flow Test, Revision
 1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 74
 1OST-6.7, Accident Monitoring Instrumentation Channel Checks, Revision 28
 3BVT 1.44.06, Control Room Heat Load Removal Capability and Purge Flow Test, Revision 1
 1OST01.10K, Cold Shutdown Valve Exercise Test (Part K) Main Feedwater Valves, Revision 3
 1-CMP-I-24-003, Feedwater Isolation Valve Actuator Maintenance, Issue 4 Revision 1

Condition Reports

2016-10607	2016-12299	2016-12464
2016-11665	2016-12333	2016-12369
2016-12210	2016-12462	

Work Orders

200579805	200642204	200692196
200579830	200646237	200692287
200582430	200653953	200695689
200641840	200679614	
200641841	200679615	

Drawings

02-21725-01, Actuator Control Schematic Sheet 5, Revision F
 8700-RM-0430-003, Piping & Instrumentation Diagram River Water System, Revision 30

Miscellaneous

ECP 15-0349-002, NFPA 805 Item BV1-2088: Emergency Diesel Generator Building Ventilation Modification – Offline Work, Revision 2

ECP 16-0244-001, Install a New Back Draft Damper on Discharge of BV-1VS-F-40A, Revision 2

ECP 16-0244-001, Install a New Back Draft Damper on Discharge of BV-1VS-F-40B, Revision 2

ECP 16-0487-001, Change 1FW-P-100A, B, C Safety Classification from Q to A, Revision 1

Report No. RAL-5442, Flowserve

Section 1R20: Refueling and Other Outage ActivitiesProcedures

1/2-ADM-0810, Scaffold Erection and Tagging, Revision 17

1/2RP-2.7, Reactor Vessel Head Removal/Reactor Vessel Head Lift Rig Checkout, Revision 17

1OM-11.4.D, Filling the Reactor Refueling Cavity, Revision 16

1OM-20.4.E, Draining the Refueling Cavity, Revision 41

1OM-50.4.M, Station Startup- Undefined Mode to Mode 6, Revision 1

1OM-52.4.R.1.F, Station Shutdown from 100% Power to Mode 5, Revision 32

1OM-6.4.N, Draining the RCS for Refueling, Revision 26

1OST-47.3D, Verification of Administrative Closure Controls for Containment/Fuel Building During Refueling, Revision 16

1OST-49.2A, Shutdown Margin Calculation for Plant Cooldown to Mode 5, Revision 16

1OST-49.3, Refueling Operations Prerequisites, Revision 26

1RST-2.2, Core Design Check Test, Revision 18

BVPS-OPS-0027, Outage Defense in Depth, Revision 16

NOP-LP-1009, Fatigue Assessments, Revision 8

NOP-LP-4011, FENOC Work Hour Control, Revision 11

NOP-OP-1005, Shutdown Defense in Depth, Revision 15

Condition Reports

2016-11646	2016-12092	2016-12134
2016-11664	2016-12098	2016-12353
2016-12008	2016-12114	2016-12382
2016-12082	2016-12120	2016-12825

Work Order

200645233

Miscellaneous

1R24 Infrequently Performed Tests or Evolutions (IPTEs), September 14, 2016

1R24 Pre-Outage Defense-in-Depth Report, Revision 1

Beaver Valley Key Shutdown Defense-In-Depth Turnover Checklist,
September 24 -October 26, 2016

Beaver Valley Unit 1- FAR PPE-16-151, October 10, 2016

Evolution Specific Reactivity Plan, Unit 1 Cycle 24 EOC Shutdown
September 23-September 24, 2016

Fatigue Assessment Troy Nesmith, October 6, 2016

Fatigue Management Deviations from 9/24/2016 to 10/24/2016

Mode Hold Restraints List

Outage Control Center Shift Turnover Report, September 24-October 26, 2016

Section 1R22: Surveillance Testing

Procedures

1OST-47.115, Type C Leak Test- Penetration #16 (CCR Supply to the Cnmt Shroud Clg Coils),
Revision 0
1OST-36.2, Diesel Generator No. 2 Monthly Test, Revision 74
1OM-39.1.B, Summary Description, Revision 1
1OM-39.3.A, System Component Arrangement, Revision 2
1/2OM-47.4, Guidelines for Local Leak Rate Testing, Revision 0
1-MSP-E-39-402, Battery [BAT-1-2] Service Discharge Test, Issue 4 Revision 1
1OST-11.14B, HHSI Full Flow Test, Revision 35

Condition Reports

2016-11396
2016-12137

Work Orders

200646682

Drawings

8700-RM-415-001, Valve Oper No Diag Component Cooling Water, Revision 23
8700-RM-415-3, Valve Oper No Diag Component Cooling Water, Revision 12
8700-RM-415-4, Valve Oper No Diag Component Cooling Water, Revision 10
8700-RM-415-5, Valve Oper No Diag Component Cooling Water, Revision 14

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Emergency Plan

Beaver Valley Emergency Preparedness Plan, Section 5, "Emergency Organization",
Revision 30
Beaver Valley Emergency Preparedness Plan, Section 6, "Emergency Measures", Revision 32
Beaver Valley Emergency Preparedness Plan, Appendix F, "Warning Sirens", Revision 17

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures:

NOBP-OP-4109, ALARA Post Outage Report, Revision 01
NOBP-OP-4113, ALARA Design Reviews, Revision 01
NOP-OP-4005, ALARA Program, Revision 05
NOP-OP-4101, Access Controls for Radiologically Controlled Areas, Revision 11
NOP-OP-4102, Radiological Postings, Labeling, and markings, Revision 11
NOP-OP-4107, Radiation Work Permit (RWP), Revision 15
NOP-OP-4502, Control of Radioactive Material, Revision 04

Condition Reports:

2016-02713	2016-08329	2016-10337
2016-06414	2016-08820	

Surveys:

<u>Survey/Map #</u>	<u>Date/Time</u>	<u>Unit/Bldg</u>	<u>Elev</u>	<u>Area/Room</u>
102401, Aux Building,	9/5/16 - 2200	1/Containment	768	PAB Floor
BV-M-2016004-72	10/4/16 - 0200	1/Containment		Cavity
103208	10/2/16 - 2300	1/Containment		"A" S/G Platform
103205A	10/2/16 - 0415	1/Containment		"A" S/G Bull Pen
103208	10/2/16 - 0415	1/Containment		"A" S/G Platform
BV-M-2016004-20	10/1/16 - 1855	1/Containment		"B" S/G Platform

Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation

Procedures:

½-HPP-3.10.001, Respirator Selection and Use, Revision 14
 ½-HPP-7.03.002, Airborne Exposure (DAC-hr) Tracking, Revision 0
 NOP-OP-4301, Respiratory Protection Program, Revision 07
 NOP-OP-4302, Issuing Respiratory Protection, Revision 04
 NOP-OP-4331, Use of Powered Air-Purifying Respirators, Revision 01
 NOP-OP-4702, Air Sampling, Revision 05
 NOP-OP-4703, Determination of Alpha Monitoring Levels, Revision 05

Condition Reports:

2016-10624 2016-11267

Section 2RS4: Occupational Dose Assessment

Procedures:

NOP-OP-4205, Dose Assessment, Revision 07
NOP-OP-4206, Bioassay Program, Revision 03

Condition Reports:

2016-11867

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

Procedures:

1/2-HPP-3.07.014, Sampling of Volumetric Materials and Miscellaneous Media for Radioactivity Evaluation, Revision 3

1/2OM-18.4A.C, Use and Handling of High Integrity Containers, Revision 7

1/2-PCP-1.01, Process Control Program, Revision 6

1OM-18.4.A, Flushing Resin From Any Group I Ion Exchanger to 1SW-TK-2, Revision 7

1OM-18.4.AF, Dewatering High Integrity Containers, Revision 3

1OM-18.4.AG, Transferring Spent Resin From Resin Waste Hold Tank to a High Integrity Container Using Resin Metering Pump, Revision 6

1OM-18.4.AH, Resin Transfer From Any Group I Ion Exchanger to a Liner/Shipping Container, Revision 10

1OM-18.4.AJ, Resin Transfer From Any Group III Ion Exchanger to a Liner/Shipping Container, Revision 7

1OM-18.4.AO, Transferring Resin Waste Hold Tank to a HIC – Vendor Procedure Support, Revision 4

2OM-18.4.AC, Transfer of Resins From 55-Gallon Drums to the HIC at Unit 2 WHB Truck Bay, Revision 1
 2OM-18.4.D, Flushing Any Group I Ion Exchanger Resin to a High Integrity Container, Revision 7
 2OM-18.4.F, Flushing Any Group III Ion Exchanger Resin to a High Integrity Container, Revision 2
 2OM-18.4.Y, Dewatering Shipping Containers (HIC), Revision 7
 2OM-18.4.Z, Transferring Spent Resin Hold Tank to a HIC Using a Portable Pump, Revision 1
 2OM-18.4A, Flushing Any Group I Ion Exchanger Resin to the Spent Resin Holding Tank, Revision 6
 NOP-OP-5201, Shipment of Radioactive Material – Waste, Revision 7

Condition Reports:

2015-11227	2016-13071
2015-16724	2016-14026

Shipments:

B-4642	B-4646	B-4657
B-4643	B-4656	

Miscellaneous:

EnergySolutions Air Transport of Radioactive Materials Training
 EnergySolutions NRC/DOT Radioactive Packaging, Transportation and Disposal Course
 Filters; U-2 Primary Filters; U-1 Primary Resins; U-2 Primary Resins
 GEL Laboratories 10 CFR 50/61 Certificates of Analysis for: U-1 DAW; U-2 DAW; U-1 Primary
 RP-RADSHIPPING_FEN, Radioactive Material Packaging, Transport and Disposal
 SN-SA-2016-0287, Self-Assessment Beaver Valley Radwaste Shipping

Section 40A1: Performance Indicator Verification

Condition Reports

2015-11972	2015-16099	2016-08243
2015-13612	2016-00530	2016-09110
2015-13661	2016-00540	2016-11075
2015-13769	2016-02286	2016-12083
2015-13853	2016-03633	
2015-15402	2016-05966	

Miscellaneous

BVRM-RAS-0001, Mitigating System Performance Index Basis Document Beaver Valley
 Power Station Unit 1, Revision 7
 BVRM-RAS-0002, Mitigating System Performance Index Basis Document Beaver Valley
 Power Station Unit 2, Revision 10
 Unit 1 Chemical and Volume Control System Health Report, 2015-2 and 2016-1
 Unit 1 Emergency Diesel Generators System Health Report, 2015-2 and 2016-1
 Unit 1 River Water System Health Report, 2015-2 and 2016-1
 Unit 2 Chemical and Volume Control System Health Report, 2015-2 and 2016-1
 Unit 2 Emergency Diesel Generators System Health Report, 2015-2 and 2016-1
 Unit 2 Service Water System Health Report, 2015-2 and 2016-1

Section 40A2: Problem Identification and Resolution

Condition Reports

2016-12171

2016-13721

2016-12437

2016-14253

Drawings

8700-RE-21CB, Elementary Diagram- Diesel Generator No. 2 ACB 1F9, Sheet 1, Revision 16

8700-RE-21QN, Elementary Diagram Annunciator A9, Sheet 1

LIST OF ACRONYMS

AC	alternating current
ADAMS	Agencywide Documents Access and Management System
ASME	American Society of Mechanical Engineers
BPV	Boiler and Pressure Vessel
CAP	corrective action program
CERPI	Computer enhanced rod position indication
CFR	Code of Federal Regulations
CR	condition report
EAL	emergency action level
EDG	emergency diesel generator
ET	eddy current testing
FENOC	First Energy Nuclear Operating Company
HRA	high radiation area
IMC	Inspection Manual Chapter
NCV	non-cited violation
LHRA	locked high radiation area
NDE	non-destructive examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PI	performance indicator
RCS	reactor coolant system
RGs	regulatory guides
RPI	rod position indication
SSST	system station service transformer
UFSAR	Updated Final Safety Analysis Report
VAC	volts alternating current
VHRA	very high radiation area