July 29, 2003

Mr. William Pearce
Vice President
FirstEnergy Nuclear Operating Company
Post Office Box 4
Shippingport, Pennsylvania 15077

SUBJECT: BEAVER VALLEY POWER STATION - NRC INTEGRATED INSPECTION REPORT 05000334/2003003 AND 05000412/2003003

Dear Mr. Pearce:

On June 28, 2003, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Beaver Valley Power Station Units 1 and 2. The enclosed integrated inspection report documents the inspection findings, which were discussed on July 7, 2003 with you and other members of your staff.

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

The report documents one NRC-identified finding of very low safety significance (Green). This issue was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because the issue was entered into your corrective action program, the NRC is treating the issue as a non-cited violation (NCV), consistent with Section VI.A of the NRC's Enforcement Policy. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Beaver Valley.

Since the terrorist attacks on September 11, 2001, the NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction (TI) 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial power nuclear power plants during calendar year 2002, and the remaining inspection activities for Beaver Valley Power Station are scheduled for completion in calendar year 2003. The NRC will continue to monitor overall safeguards and security controls at Beaver Valley Power Station.

In accordance with 10 Code of Federal Regulations (CFR) 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public

inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610 337-5225 if you have any questions regarding this letter.

Sincerely,

***/RA/***

Neil S. Perry, Chief
Reactor Projects Branch 7
Division of Reactor Projects

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

Enclosure: Inspection Report 05000334/2003003; 05000412/2003003
w/Attachment: Supplemental Information

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REGION I

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| Docket Nos. | 50-334, 50-412 |
| License Nos. | DPR-66, NPF-73 |
| Report Nos. | 05000334/2003003 and 05000412/2003003 |
| Licensee: | FirstEnergy Nuclear Operating Company (FENOC) |
| Facility: | Beaver Valley Power Station, Units 1 and 2 |
| Location: | Post Office Box 4<br>Shippingport, PA 15077 |
| Dates: | March 30, 2003 - June 28, 2003 |
| Inspectors: | D. Kern, Senior Resident Inspector<br>G. Smith, Resident Inspector<br>J. Jang, Senior Health Physicist<br>G. Smith, Senior Physical Security Inspector<br>D. Silk, Senior Emergency Preparedness Inspector<br>C. Cahill, Senior Reactor Inspector<br>R. Barkley, Senior Project Engineer<br>S. McCarver, Reactor Inspector, Systems Branch<br>R. Cooney, Contractor |
| Approved by: | Neil S. Perry, Chief<br>Reactor Projects Branch 7<br>Division of Reactor Projects |

Enclosure

TABLE OF CONTENTS

## SUMMARY OF FINDINGS

IR 05000334/2003003, IR 05000412/2003003; 03/30/2003 - 06/28/2003; Beaver Valley Power Station, Units 1 & 2; Maintenance Risk Assessments and Emergent Work Control.

The report covered a 13-week period of inspection by resident inspectors and announced inspections by a regional senior health physicist, a senior physical security inspector, a senior reactor inspector, a senior emergency preparedness inspector, a senior project engineer, two reactor inspectors, and a contractor. One Green non-cited violation (NCV) and one unresolved item were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of Technical Specification 6.8.1 because a procedure associated with safety-related equipment was not adequately implemented. This resulted in an increased unavailability of the Unit 1, No. 1 emergency diesel generator (EDG). Procedure 1/2OM-48.1.I, "Technical Specification Compliance," Rev. 13 required written restoration instructions be provided to a remotely-stationed operator in order to maintain continued EDG availability. Although verbally covered in the pre-job brief, the written instructions were not given to the designated operator.

  This finding is greater than minor because it affects the mitigating systems cornerstone objective of ensuring availability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Without written instructions in the field, operator actions could not be considered a virtual certainty (i.e., probability nearly equal to one) as described in Nuclear Energy Institute 99-02, Rev 2. The finding was of very low safety significance because the EDG was unavailable for less than the technical specification allowed outage time of 72 hours (Section 1R13).

B. Licensee Identified Violations

None.

## REPORT DETAILS

Summary of Plant Status

Unit 1 began this inspection period in a planned refueling outage. Following completion of the outage, the unit was synchronized to the grid on April 29, 2003. The unit achieved 100 percent power on May 7. On May 11, power was reduced to 94 percent due to inadequate condenser vacuum caused by a combination of warm weather ambient conditions and condenser tube fouling. The unit returned to 100 percent power following an improvement in ambient conditions. On May 14, 2003, power was reduced to 90 percent for planned condenser waterbox cleaning. The unit returned to 100 percent power on May 22. On June 5, the unit was taken off-line, but remained critical for the purpose of performing a balance shot to the main turbine to reduce vibration. The unit returned to 100 percent power on June 6 and continued to operate at 100 percent power for the remainder of the period.

Unit 2 began this inspection period at 100 percent power. On May 22, the unit was downpowered to 75 percent power for planned condenser waterbox cleaning. Following maintenance, the unit was returned to 100 percent power on May 25. The unit continued to operate at 100 percent power for the remainder of the period.

### 1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, Barrier Integrity

1R02 Evaluation of Changes, Tests, or Experiments

a. Inspection Scope

The inspectors reviewed eight selected safety evaluations associated with initiating event, mitigating system, and barrier integrity cornerstones to verify that changes to the facility or procedures as described in the Updated Final Safety Analysis Report (UFSAR) were reviewed and documented in accordance with 10 Code of Federal Regulations (CFR) 50.59, and that the safety issues pertinent to the changes were properly resolved or adequately addressed. These safety evaluations were selected based on the safety significance of the changes and the risk to structures, systems, and components (SSC).

The inspectors also reviewed 17 screen-out evaluations for changes, tests and experiments for which the licensee determined that safety evaluations were not required. This review was performed to verify that the licensee's threshold for performing safety evaluations was consistent with 10 CFR 50.59.

In addition, the inspectors reviewed the administrative procedure that was used to control the screening, preparation, and issuance of the safety evaluations to ensure that the procedure adequately covered the requirements of 10 CFR 50.59.

The listing of the safety evaluations, screen-out evaluations, and procedures reviewed is provided in the attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments

a. Inspection Scope

Partial System Walkdowns. The inspectors performed four partial system walkdowns during this inspection period. On May 27, 2003, the inspectors walked down the Unit 1 'A' river water (RW) train while both auxiliary RW pumps were unavailable for preventive maintenance and cleaning of the auxiliary intake bay. On May 30, the inspectors walked down the Unit 1 'A' train low head safety injection (LHSI) system while the 'B' LHSI pump was unavailable for planned maintenance. On June 13, the inspectors walked down the Unit 2 'A' train high head safety injection (HHSI) system while the 'B' HHSI pump was unavailable and for planned maintenance. On June 27, the inspectors walked down the Unit 1 'B' RW train while the 'A' RW pump was unavailable for planned maintenance. In order to evaluate the operability of the selected train or system when the redundant train or system was inoperable or unavailable, the inspectors checked for correct valve and power alignments by comparing positions of valves, switches, and electrical power breakers to the procedures listed below as well as applicable chapters of the Updated Final Safety Analysis Report (UFSAR).

- Unit 1 Operating Manual (OM) Figure Number 30-1, "RW System," Rev. 20; OM Figure Number 30-4, "RW System," Rev. 13; and OM Figure Number 30-5, "RW System," Rev. 14
- Unit 1 OM Figure Number 11-1, "Safety Injection System," Rev. 16
- Unit 2 OM Figure Number 7-1A, "Chemical and Volume Control, Sh. 1," Rev. 11
- 1OM-30.3.B.1, "Valve List - 1RW," Rev. 33
- 1OM-30.3.C, "Power Supply and Control Switch List," Rev. 17
  1OM-11.3.B.1, "Valve List - 1SI," Rev. 12
- 1OM-11.3.C, "Power Supply and Control Switch List," Rev. 7
- 2OM-7.3.B.1, "Valve List - 2CHS," Rev. 15
- 2OM-7.3.C, "Power Supply and Control Switch List," Rev. 13

Complete System Walkdown. The inspectors conducted a detailed review of the alignment and condition of the Unit 2 auxiliary feedwater (AFW) system. The inspectors reviewed OM Figure Number 24-3, "Auxiliary Feedwater, " Rev. 8, to determine proper equipment alignments. In addition, the inspectors reviewed and evaluated the impact on the AFW system operation of open work requests (WRs), work orders (WOs), deficiency tags, corrective action program condition reports (CRs), and the system health report. Open issues, such as the ongoing monitoring of the Borg-Warner flow control valves on the system by the Instrumentation and Control department, were discussed with the responsible system engineer.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

Fire Area Walkdowns. The inspectors reviewed the Unit 1 Updated Fire Protection Appendix 'R' Review, Rev. 16, and the Unit 2 Fire Protection Safe Shutdown Report, Addendum 18, and identified the following risk significant areas:

- Unit 1 Process Instrument and Rod Position Room (fire area zone CR-4)
- Unit 1 Communication Equipment and Relay Panel Room (fire area zone CR-3)
- Unit 1 Pipe Tunnel Area (fire area zone PT-1, subarea QP-1)
- Unit 2 Cable Vault and Rod Control Area Cable Tunnel (fire area zone CV-3)
- Unit 2 Purple Emergency Switchgear Room (fire area zone SB-2)
- Unit 2 Control Building Instrumentation and Relay Area (fire area zone CB-1)
- Unit 2 Control Building Main Control Room (fire area zone CB-3)
- Unit 2 Control Building Fan Room (fire area zone CB-5)

The inspectors reviewed the fire protection conditions of the above listed areas in accordance with the criteria delineated in Administrative Procedure ½-(ADM)-1900, "Fire Protection," Rev. 3. Control of transient combustibles, material condition of fire protection equipment, and the adequacy of any fire protection impairments and compensatory measures were included in these plant specific reviews.

Fire Brigade Drill. On May 21, 2003, the inspectors observed a fire drill in the Unit 2 cable spreading room. The drill scenario was a deep-seated fire in a cable tray. The drill was conducted in accordance with the drill guide, "Fire Drill Scenario/CB-02," dated February 18, 2003. The fire brigade carried out the actions required by procedure 1/2OM-56B.4A.B, "Fire Brigade and Fire Fighting Procedures," Rev. 0. The inspectors reviewed: 1) effectiveness of communications during the drill; 2) assessment of the fire and the use of proper fire fighting strategy in accordance with 2OM-56B.3.B.1, "Tab 1 Control Building and Cable Tunnel," Rev. 9; 3) adequacy and condition of fire fighting equipment; 4) treatment of fire victims; and 5) knowledge and skill of the fire brigade. The inspectors evaluated the drill critique as well as the Nuclear Quality Assurance (NQA) assessment of the drill.

Post Fire Safe Shutdown Manual Actions. The inspectors reviewed evaluation 50.59-01-003, for Beaver Valley Power Station (BVPS) Unit 2. The evaluation reviewed an update to the Fire Protection Safe Shutdown Report to document spurious signal analysis for ventilation system components. The inspectors used the guidance provided in Inspection Procedure (IP) 71111.05, Enclosure 2, to evaluate the acceptability of the new manual actions. Factors, such as timing, access to equipment, diagnostic instrumentation, and availability of procedures, were considered in the inspectors'

review. The inspectors also reviewed CR 02-00921 that identified problems with the application of manual actions.

b. Findings

The inspectors identified an unresolved item (URI) concerning the acceptability of the licensee's use of manual actions to remotely operate equipment or defeat spurious actuations necessary for achieving and maintaining hot shutdown. This is unresolved pending completion of the licensee's validation of fire protection time critical manual actions.

Updated Final Safety Analysis Report, Section 9.5A.1.2.1.2.8, states "If manual actions are required these actions must be performed by onsite personnel within the necessary time interval without adversely affecting safe shutdown."

The inspectors used IP 71111.05, Enclosure 2, "Inspection Criteria for Fire Protection Manual Actions," to evaluate the application of manual actions as described in UFSAR Section 9.5A.1.2.1.2.8. The IP provides guidance for the assessment of manual actions including diagnostic instrumentation, environmental considerations, staffing, communications, special tools, training, accessibility, procedures, verification, and validation. In particular, the verification and validation guidance states, "Determine whether the manual actions have been verified and validated by plant walkdowns using current procedures. Ensure that the licensee has adequately evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in an unrecoverable condition."

The inspectors reviewed CR 02-00921, which identified that the BVPS Unit 2, Fire Protection Safe Shutdown Report and associated safe shutdown procedures did not clearly identify critical actions which must be accomplished within prescribed time frames. The inspectors concluded that an assessment of the manual actions could not be completed until the licensee had analyzed and validated the critical fire protection safe shutdown manual actions which must be accomplished within prescribed time frames. This issue has been entered into the licensee's corrective action program as Corrective Action 13, to CR 02-00921. This issue will remain unresolved pending the licensee's validation of time critical fire protection manual actions **(URI 50-412/03-003-01**, Validation and Verification of Post Fire Safe Shutdown Manual Actions Not Complete).

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed the UFSAR and the Individual Plant Examination of External Events to evaluate the design basis and risk significance for external floods. The inspectors also reviewed the Technical Specifications (TSs), Abnormal Operating Procedure ½ OM-53C.4A.75.2, "Acts of Nature - Flood," Rev. 15, and operating logs to verify procedures and operator actions for coping with floods were appropriate. Based

on associated risk significance, the inspectors performed walkdowns of the plant areas listed below. During these walkdowns the inspectors examined external flood seals, inspected the material condition of the seals, and verified various floor drains, sump pumps, and level alarm circuits were operable. The inspectors reviewed the results of the intake structure door seal checks as described in ½ Operating Surveillance Test (OST)-30.21A, "Group 1 Flood Door Seal System Operability Check," Rev. 1, and ½ OST-30.21B, "Group 2 Flood Door Seal System Operability Check," Rev. 1. Based on reviewing recently issued CRs, the inspectors determined that station personnel maintained a low threshold for identifying and resolving flood protection issues through the CR program.

- Unit 1 and Unit 2 intake structure pump cubical 'A' (flood area IS-1).
- Unit 1 and Unit 2 intake structure pump cubical 'B' (flood area IS-2).
- Unit 1 and Unit 2 intake structure pump cubical 'C' (flood area IS-3).
- Unit 1 and Unit 2 intake structure pump cubical 'D' (flood area IS-4).

b. Findings

No findings of significance were identified.

1R11 Operator Requalification

a. Inspection Scope

The inspectors observed Unit 1 licensed operator training at the control room simulator, focusing on human performance of time critical tasks. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario, identify and perform response procedures, and implement the emergency plan. The inspectors observed the operators simulator drill performance and compared it to the criteria listed in simulator scenario drill number 1DRLS-Emergency Contingency Action-0.0, Rev. 1. The inspectors observed supervisory oversight, command and control, communication practices, and crew assignments to ensure they were consistent with normal control room activities. The inspectors observed the response of the operators during the simulator drill transient and verified the fidelity of the simulator to the actual plant. The inspectors observed the effect training evaluators had in recognizing and correcting individual and operating crew mistakes including post-training remediation actions. The inspectors attended the post-drill critique in order to evaluate the effectiveness of problem identification. Scenario response procedures included the following:

- Abnormal Operating Procedure 1.1.7, "Rod Position Indication Malfunction," Rev. 8
- Emergency Operating Procedure (EOP) E-0, "Reactor Trip or Safety Injection," Rev. 5
- Emergency Contingency Actions 0.0, " Loss of All Emergency 4kV AC Power," Rev. 3

b. Findings

No findings of significance were identified

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors evaluated Maintenance Rule (MR) implementation for the issues listed below. Specific attributes reviewed included MR scoping, characterization of failed SSCs, MR risk categorization of SSCs, SSC performance criteria or goals, and appropriateness of corrective actions. The inspectors verified that the issues were addressed as required by 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance of Nuclear Power Plants," and System and Performance Engineering Administrative Manual 3.2, " Maintenance Rule Program Administration," Rev. 3. For selected systems, the inspectors observed maintenance rule steering committee meetings to determine whether system performance was properly dispositioned for MR category (a)(1) or (a)(2) performance monitoring.

- Unit 1 reactor plant component cooling water heat exchanger cleaning
- Unit 2 component cooling water system

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the scheduling and control of maintenance activities in order to evaluate the effect on plant risk. This review was against criteria contained in Nuclear Operating Procedure (NOP)-OP-1005, "Shutdown Safety," Rev. 3; 1/2ADM-2033, "Risk Management Program," Rev. 1; NOP-WM-2001, "Work Management Process," Rev. 9, and ½-ADM-804, "On-Line Work Management and Risk Assessment," Rev. 1; Nuclear Power Division Administrative Procedure 8.30, "Maintenance Rule Program," Rev. 6; and Conduct of Operations Procedure 1/2OM-48.1.I, "Technical Specification Compliance," Rev. 9. The inspectors reviewed the routine planned maintenance, restoration actions, and/or emergent work for the following equipment removed from service.

- On May 23, 2003, the inspectors observed the replacement of a 26 VDC power supply, RK-2PRI-PROC-2-IPS-1, in accordance with WO 02-010439-000. The applicable channel II instrument loads were supplied by the installed 24 VDC backup power supply during the replacement.

- Elevated river levels increased the amount of debris that entered the RW system in early June. Various RW system strainers began to clog, necessitating cleaning several times per day. On June 5, Unit 1 HHSI pump cooler RW strainers 1RW-YS-16A(B) and 1RW-YS-18A(B) were cleaned and one of the stainers was noted to be damaged.

- During June 5 - 13, Unit 2 station air compressor 2SAS-C21A was unavailable for various preventive maintenance. This maintenance was performed as part of the system betterment program to improve the compressed air system from MR category (a)(1) to (a)(2).

- On June 3, technicians repaired and tested the Unit 2 main feedwater pump (MFP) recirculation valve 2FWR-FCV-150A. Operators briefed contingency actions to immediately manually trip the MFP if a reactor trip occurred, due to unavailability of the recirculation valve to open and mitigate the subsequent system pressure transient.

- During June 6 - 7, mechanics cleaned the Unit 2 main condenser waterboxes to improve heat transfer characteristics and summer weather readiness. The plant was operated in accordance with 2OM-31.4.E, "Isolating One Half of a Condenser Section and Monitoring of Circulating Water System ," Rev. 13, to reduce the likelihood of a plant transient while cleaning was performed.

- On May 28, maintenance personnel replaced the motor for discharge ventilation damper, 1VS-D-22-1A, associated with the Unit 1, No. 1 emergency diesel generator (EDG) building. The motor had previously failed and the discharge damper had been maintained open using a temporary modification.

- On June 27, maintenance personnel performed a bay cleaning and silt check of the 'B' intake bay. During this maintenance the Unit 1 'A' RW pump was out of service for elevated vibrations. The only operable RW pump was the 'C' pump and the unit was in a 72-hour limiting conditions for operation (LCO). The silt check and bay cleaning were effectively managed and the unavailability of the river water system was minimized.

b. Findings

Introduction. The inspectors identified an NCV for failure to properly ensure availability of the Unit 1, No. 1 EDG as required by 1/2OM-48.1.I, "Technical Specification Compliance," Rev. 13.

Description. On May 28, 2003, maintenance replaced a failed exhaust damper motor on the Unit 1 No. 1 EDG in accordance with WO 03-007686. This damper had previously been wire-tied open under a temporary modification (Section 1R23). The exhaust damper operates in conjunction with the room exhaust fan. The exhaust fan receives a start signal via the start/stop switch or automatically based on increasing room temperature as sensed on the room thermostat. The discharge damper receives an

open signal via an auxiliary contact on the fan start relay. The maintenance activity required the deenergization of the affected exhaust damper motor. The associated clearance opened a 120V circuit breaker. This breaker also removed power to the inlet dampers, VS-D-22-2A and VS-D-22-2B. The licensee decided to perform the exhaust damper maintenance and maintain the No. 1 EDG available by stationing an operator at the circuit breaker with instructions to close the breaker when required by the control room. Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 2, guidance which is implemented in 1/2OM-48.1.I, "Technical Specification Compliance," Rev. 13 allows availability credit for operator actions provided that 1) restoration steps must be contained in a written procedure; 2) the steps must be uncomplicated (i.e. a single step or a few simple actions); and 3) must not require diagnosis or repair.

Although a detailed brief was given for this activity, the inspectors noted that no written procedure was provided to the operator in order to take credit for his actions to maintain continued availability of the No. 1 EDG. Nuclear Energy Institute-99-02 and 1/2OM-48.1.I, require a written procedure to help ensure virtual certainty of the successful performance of restoration actions during accident conditions. Interviews with the involved maintenance personnel revealed no initial concerns with regard to the lack of a written procedure. The presumption was that several minutes would be allowed to close the breaker before the room temperature would reach design limit if an EDG start did occur. According to the system engineer, the EDG is rendered inoperable and unavailable if the inlet dampers are deenergized and cannot open. This is due to the fact that the EDG draws combustion air directly from the room vice via a dedicated inlet line. In fact, the inlet dampers receive an open signal on either an exhaust fan or EDG start. The critical component in this situation was actually the inlet dampers. The EDG availability associated with these dampers, however, required a prompt restoration response that was not addressed with a written procedure.

Analysis. The inspectors determined the safety significance of this finding was very low (Green) using IMC 0612, Appendix 'B' and the phase one screening process of IMC 0609, Appendix 'A'. The issue affected equipment performance under the mitigating systems cornerstone. The issue was more than minor because it caused approximately 2.75 hours of unplanned EDG unavailability. The finding was of very low safety significance since the No. 1 EDG was returned to an operable condition within the 72-hour TS allowed outage time.

Enforcement. Technical Specification 6.8.1 requires that written procedures be properly implemented covering the activities referenced in Appendix "A" of Regulatory Guide 1.33, Rev. 2, February 1978. Appendix "A" of Regulatory Guide 1.33, specifies that maintenance that can affect the performance of safety-related equipment be preplanned and performed in accordance with written procedures or instructions. Contrary to these requirements, on May 28, 2003, maintenance personnel failed to maintain the No. 1 EDG available during the ventilation damper motor replacement. This violation of TS 6.8.1 is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: **NCV 50-334/03-03-02**, Failure to Follow Procedure for Manual

Operator Action Causes EDG to be Unavailable. This violation was entered into the licensee's corrective action program as CR 03-6962.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed operability evaluations in order to determine that proper operability justifications were performed for the following items, consistent with NRC Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Rev. 1. In addition, where a component was determined to be inoperable, the inspectors verified the TS LCO implications were properly addressed.

- Unit 1 reactor vessel core plate inspections identified that four fuel assembly bottom nozzle thimble screws were missing. Refueling engineers located three of the missing screws, but were unable to locate the fourth. The root-cause analysis concluded that the loose/missing thimble screws were due to a manufacturing error and only affected one fuel assembly (T-20). Engineers performed a loose parts analysis for the missing thimble screw and concluded that the reactor coolant system and reactor protective system remained operable (CR 03-4397). The inspectors reviewed the causal assessment, the 10 CFR 50.59 safety evaluation, and observed the subsequent Plant Operating Review Committee evaluation.

- Station personnel identified two unsealed conduit penetrations in the Unit 1 Cable Vault 3 area (CR 03-6069). The penetrations were at the 725.5 foot elevation, which is below the probable maximum flood level of 730 feet. This degraded condition posed a potential flooding threat to the normal and emergency switchgear rooms. Basis for Continued Operation (BCO) 1-03-003, "Unsealed Flood Penetrations in the Unit 1 Normal Switchgear Area, Rev. 0, concluded that the safety function of the emergency switchgear room remained operable based on plant requirements to establish cold shutdown conditions if river level reached 695 feet.

- On several occasions during 2002 and 2003, Unit 1 control rods unexpectedly stepped inward while in automatic control. Engineers developed "Problem Solving Plan for Inappropriate Auto Control Rod Movement, CR 03-6136, Unit 1," Rev. 0, to evaluate and resolve the issue. The causal assessment, documented in "Investigation of Rod Stepping Problem at Beaver Valley Unit 1," Rev. 0, identified two separate problems. Two degraded summing amplifiers (QM-1RC-408F and QM-1RC-408P) were replaced to correct the more significant of the two rod control problems. Engineers determined that rod control and the reactor protection system remained operable. A plant modification was initiated to address the second problem, associated with a mismatch between the turbine power and neutron flux (Nuclear Instrument 44).

- Elevated river levels caused an increased amount of debris to enter various heat exchangers and foul certain safety-related system strainers in early June. Unit 1 HHSI pump cooler RW strainers 1RW-YS-16A(B) and 1RW-YS-18A(B) required frequent isolation and cleaning, and one of the strainer baskets was noted to be damaged. The shift manager concluded the HHSI pumps remained operable. The inspectors independently evaluated the fouling effect on the HHSI pump operabilty and the effect of the broken strainer basket material on the RW system.

- On March 17, 2003, CR 03-03337 documented three specific weld anomalies associated with the blowdown lines in the Unit 1 'A' steam generator. These anomalies were noted during a post-sludge lancing cleanliness check. The inspectors reviewed BCO 1-03-002 which addressed the noted conditions. This BCO concluded that the blowdown piping anomalies will not increase the frequency of a steam generator tube rupture event. Planned corrective actions included blowdown piping inspection during the next refueling outage.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed the cumulative effects of the 12 Unit 1 operator workarounds listed on the Managers' Communications and Teamwork Meeting report dated April 3, 2003. The workarounds were reviewed to identify any effect on EOP operator actions, and impact on possible initiating events and mitigating systems. Included in this review were the effect on: (1) the reliability, availability, and potential for misoperation of a system; (2) the potential increase in initiating event frequency that could affect multiple mitigating systems; and, (3) the ability of operators to respond in a correct and timely manner to plant transients and accidents. The inspectors also discussed with the responsible owners of each of the six operator workarounds scheduled to be corrected during the ongoing Unit 1 outage the status of completion of those workarounds. Subsequent follow-up with the operator workaround coordinator confirmed that each of these six workarounds were completed as planned.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

Annual. The inspectors reviewed one permanent plant modification, Engineering Change Package (ECP) 02-0079, "Containment Instrument Air Upgrade." This modification provided the ability to supply containment instrument air via the existing service air system. The inspectors verified that the existing design bases, licensing bases, and performance capability of the service air system was not degraded by this modification.

Biennial. The inspectors reviewed nine selected risk-significant plant modification packages to verify that: (1) the design bases, licensing bases, and performance capability of risk significant SSC had not been degraded through modifications; and, (2) modifications performed during increased risk configurations did not place the plant in an unsafe condition. The modification packages were selected from among the design changes that were completed within the past two years.

The selected plant modifications were distributed among initiating event, mitigating, and barrier integrity cornerstones. For these selected modifications, the inspectors reviewed the design inputs, assumptions, and design calculations, such as instrument set-point, instrument uncertainty, and electrical loading calculations, to determine design adequacy. The inspectors also reviewed field change notices that were issued during the installation to confirm that the problems associated with the installation were adequately resolved. In addition, the inspectors also reviewed the post-modification testing, functional testing, and instrument calibration records to determine readiness for operations. Finally, the inspectors reviewed the affected procedures, drawings, design basis documents, and UFSAR sections to verify that the affected documents were appropriately updated.

The listing of the reviewed modifications is provided in the attachment.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed and/or observed five post-maintenance tests (PMTs) to ensure: 1) the PMT was appropriate for the scope of the maintenance work completed; 2) the acceptance criteria were clear and demonstrated operability of the component; and 3) the PMT was performed in accordance with procedures. The following PMTs were observed:

- Two degraded summator amplifiers (QM-1RC-408F and QM-1RC-408P) within the Unit 1 automatic rod control system were replaced (using WO 03-007949-000) to address an inadvertent inward control rod motion problem (Section 1R15). Post-maintenance testing included a 2 week post-installation validation test performed in accordance with WO 03-007949-000.

- The inspectors reviewed the results of Unit 1 OST-36.4, “Diesel Generator No. 2 Automatic Test,” Rev. 19, which was performed following replacement of the Unit 1 No. 2 EDG voltage regulator. This test revealed a potential circuit anomaly which prevented the EDG from operating in the droop mode following a specified time delay. This issue was addressed by CR 03-05404.

- The inspectors evaluated the PMT associated with the Unit 2 ‘B’ charging pump in accordance with 2OST-7.5, “Centrifugal Charging Pump [2CHS*P21B],” Rev. 24 and 2OM-7.4A, “Placing a Charging/HHSI Pump in Standby or in Service,” Rev. 19. The pump had previously been removed from service for planned maintenance on the gear casing, oil pump, as well as other preventative maintenance items.

- The inspectors evaluated the PMT associated with the Unit 1 steam driven AFW pump in accordance with 1OST-24.4, “Steam Turbine Driven Auxiliary Feed Pump Test [1FW-P-2],” Rev. 25. The pump had previously been removed from service for planned maintenance on the steam supply trip valve, TV-1MS-105B and the steam supply valve, MOV-MS-105.

- The inspectors reviewed the PMT associated with the Unit 1 ‘B’ river water pump in accordance with 1OM-30.4.M, “Reactor Plant River Water Pump Startup,” Rev. 18. The pump had previously been removed from service for cleaning and silt check of the ‘B’ intake bay.

b. Findings

No findings of significance were identified.

## 1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors observed selected Unit 1 reactor shutdown, refueling, outage maintenance, and reactor startup activities to determine whether shutdown safety functions (e.g., reactor decay heat removal, reactivity control, electrical power availability, reactor coolant inventory, spent fuel cooling, and containment integrity) were properly maintained as required by TSs and license conditions and ½-ADM-1800, “Shutdown Safety,” Rev. 0. Specific performance attributes evaluated, included configuration management, communications, instrumentation accuracy, and identification and resolution of problems. The inspectors closely evaluated configuration and inventory control during periods of reduced reactor coolant system inventory due to the associated increase in shutdown risk. Specific activities evaluated included:

- 1OM-6.4.N, “Draining the Reactor Coolant System for Refueling,” Rev. 16

- 1OST-47.3D, “Verification of Administrative Closure Controls for Containment/Fuel Building During Refueling,” Rev. 3
- Containment sump inspection to validate configuration/assembly and verify absence of foreign material.
  Beaver Valley Drawing 8700-RS-16Y, “Recirculating Pump Sump & Screens,” Rev. 1
  Beaver Valley Drawing 8700-RS-16Z, “Recirculating Pump Sump & Screens,” Rev. 1
  Beaver Valley Drawing 8700-RS-16AA, “Recirculating Pump Sump & Screens,” Rev. 1
  Beaver Valley Drawing 8700-SS-16AH, “Recirculating Pump Grating & Cruciform Assembly-Reactor Containment,” Rev. 0
- Containment closeout inspection, verifying various system configurations and the absence of foreign material or loose parts which could potentially adversely effect long term decay heat removal.
- 1OM-50.4.D, “Reactor Startup from Mode 3 to Mode 2,” Rev. 41
- 1OM-50.4.L, “Plant Heatup from Mode 5 to Mode 3,” Rev. 7
- 1OM-52.4.A, “Raising Power from 5 percent to Full Load Operation,” Rev. 43

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed and reviewed the following OSTs, concentrating on verification of the adequacy of the test to demonstrate the operability of the required system or component safety function.

- 1OST-1.1, “Control Rod Assembly Partial Movement Test,” Rev. 10
- 1OST-11.2, “Safety Injection Pump Test - [1SI-P-1B],” Rev. 16
- 2OST-1.1, “Control Rod Assembly Partial Movement Test,” Rev. 4
- 2OST-30.1A, “Standby Service Water Pump [2SWE-P21A] Test,” Rev. 20
- 2OST-36.2, “Emergency Diesel Generator (EDG) [2EGS*EG2-2] Monthly Test,” Rev. 38
- 2OST-13.1, “Quench Spray Pump [2QSS*P21A] Test,” Rev. 19

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed temporary modifications (TMs) and associated implementing documents to verify the plant design basis and the system or component operability were

maintained. Nuclear Power Division Administrative Procedure 7.4, "Temporary Modifications," Rev. 8, specified requirements for development and installation of TMs. The inspectors reviewed TMs associated with the following items:

- The inspectors reviewed the Unit 1 TM 1-03-14, "Block Open 1VS-D-22-1A." This TM wired open the No. 1 EDG building exhaust damper due to a failed motor actuator. The safety function of the damper is to allow the air in the EDG building to be exhausted to prevent overheating of an operating EDG. This damper is normally closed and fails closed. The damper opens in conjunction with the exhaust fan via an auxiliary contact located on the start relay of the fan. The fan start and damper opening is caused by either a manual start of the fan or an automatic start based on high temperature. This high temperature setpoint is controlled by a room thermostat. The UFSAR requires a minimum room temperature of 65 degrees which is typically maintained by electric space heaters. Excess heat, such as from an operating EDG, is removed via the exhaust fan through the exhaust damper. Thus, the damper was placed in its fail-safe position for EDG operability. However, this action rendered the 1A EDG building CO2 system inoperable since a CO2 actuation signal causes an automatic closure of the exhaust damper. Compensatory measures as described by procedure, ½-ADM-1900, "Fire Protection," Rev. 2, were put in place. The TM was ultimately removed and original design configuration restored following replacement of the motor operator.

- The inspectors reviewed the Unit 1 TM 1-03-12, "Control Element Rod Position Indication (CERPI) Data Collection." This TM connected four retired part-length detectors to installed spare rod position indication cabling using compatible cables and connectors. The purpose of the TM was to obtain temperature compensation data over the entire fuel cycle. Condition Report 02-09369 described a previous event in which five unit 1 CERPI channels drifted out of the TS limit of +/- 12 steps following shutdown of a containment air recirculation (CAR) fan. This caused an unplanned entry into a 15 minute action statement for each inaccurate channel. Although the CERPI is temperature compensated via a median selected resistance temperature detector (RTD) scheme, the RTDs do not fully account for the directional effects of the CAR fan flowstream. The data gathered from the part length detectors will be compared with the existing temperature data recorded by the existing CERPI system in order to assess the potential to improve the overall temperature compensation scheme utilizing the part length detectors.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspectors conducted an in-office review of licensee submitted changes for the emergency plan-related documents to determine if the changes decreased the effectiveness of the plan. A thorough review was conducted of documents related to the risk significant planning standards, such as classifications, notifications and protective action recommendations. A cursory review was conducted for non-risk significant planning standard documents. These changes were reviewed against 10 CFR 50.54(q) to ensure that the changes do not decrease the effectiveness of the plan, and that the changes as made continue to meet the standards of 10 CFR 50.47(b) and the requirements of 10 CFR 50, Appendix E. These changes are subject to future inspections to ensure that the impact of the changes continues to meet NRC regulations. The submitted and reviewed documents are listed in Attachment 1.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

1. Emergency Preparedness Simulator Evaluation

a. Inspection Scope

The inspectors observed an emergency event training evolution conducted at the Unit 1 control room simulator to evaluate emergency procedure implementation, event classification, and event notification. The event scenario involved multiple safety-related component failures and plant conditions warranting simulated Site Area Emergency event declaration. The licensee counted this training evolution for evaluation of Emergency Preparedness Drill/Exercise Performance (DEP) Indicators. The inspectors observed the drill critique to determine whether the licensee critically evaluated drill performance to identify deficiencies and weaknesses. Additionally, the inspectors verified the DEP indicators were properly evaluated consistent with Nuclear Energy Institute (NEI) 99-02, “Regulatory Assessment Performance Indicator Guideline,” Rev. 2. Additional documents used for this inspection activity included:

1OM-53A.1.E-0, “Reactor Trip or Safety Injection,” Rev. 5
1OM-53A.1.1.ECA-0.0, “Loss of all Emergency 4kV AC Power,” Rev. 3
Emergency Plan Implementing Procedure (EPIP) IP 1.1, “Notifications,” Rev. 31
EPIP I-1a, “Unit 1 Recognition and Classification of Emergency Conditions,” Rev. 6

b. Findings

No findings of significance were identified.

2. Unit 2 Emergency Preparedness Drill Evolution

a. Inspection Scope

The inspectors observed a Unit 2 emergency event training evolution to evaluate emergency procedure implementation, event classification, event notification, and protective action recommendation development. The Operations Support Center, Radiological Operations Center, Technical Support Center, and Emergency Operations Facility were activated and participated in this drill. The event scenario involved multiple safety-related component failures and plant conditions warranting simulated Alert and Site Area Emergency event declarations. The licensee counted this training evolution for evaluation of Emergency Preparedness DEP Indicators. The inspectors attended the drill critique to determine whether the licensee critically evaluated drill performance to identify deficiencies and weaknesses. Additionally, the inspectors verified the DEP indicators were properly evaluated consistent with NEI 99-02. Additional documents used for this inspection activity included:

- Beaver Valley Power Station 2003 Mini Drill Scenario
- 2OM-53A.1. E-0, “Reactor Trip or Safety Injection,” Rev. 4
- 2OM53A.1.1. ECA-0.0, “Loss of All AC Power,” Rev. 3
- 2OM-53A.1. E-3, “Steam Generator Tube Rupture,” Rev. 4
- EP I-3, “Alert,” Rev. 18
- EPIP I-1b, “Unit 2 Recognition and Classification of Emergency Conditions,” Rev. 6
- EPP IP-1.1, “Notifications,” Rev. 31
- EPP IP-4.1, “Offsite Protective Actions,” Rev. 16
- 1/2ADM-1111, “NRC Emergency Preparedness Program PI Instructions,” Rev. 0
- 1/2OM-53C.4A.75.1, “Acts of Nature - Tornado,” Rev. 9

The inspectors noted deficiencies associated with communication and prioritization of technical support activities assigned within the Technical Support Center. The inspectors discussed these observations with the emergency preparedness (EP) supervisor and verified the issues were properly identified in either the licensee critique or a separate CR (CR 03-7822).

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2PS1 Gaseous and Liquid Effluents

a. Inspection Scope

The inspectors reviewed the following documents to evaluate the effectiveness of the licensee’s radioactive gaseous and liquid effluent control programs. The requirements of the radioactive effluent controls are specified in the TS/Offsite Dose Calculation Manual (ODCM).

- the 2001 and 2002 Radiological Annual Effluent Release Reports, including projected public radiation dose assessments
- most recent ODCM (Rev. 19, November 2002)
- technical justifications for ODCM and changes made
- analytical results for charcoal cartridge, particulate filter, and noble gas samples
- implementation of the compensatory sampling and analysis program when the effluent radiation monitoring system (RMS) is out of service
- calibration records for laboratory measurements equipment (gamma and liquid scintillation counters)
- implementation of measurement laboratory quality control program, including interlaboratory and intralaboratory comparisons
- selected 2002 and 2003 radioactive liquid and gaseous release permits
- associated effluent control procedures
- self-assessment (BV-SA-02-20, Comparison of BVPS Effluent Data to other US-PWR's, June 1, 2002-July 22, 2002)
- NQA Audit for the Effluent Monitoring, Sample Handling, Training, Equipment Maintenance and Calibration, and Procedure Implementation and Maintenance (BV-C-01-12, October 16-29, 2001)
- Nuclear Quality Assurance Field Observations for the ODCM implementations (BV32002535, 11/22/02: BV32002602, 12/2/02-12/17/02: and BV32003693, 1/10/03-2/7/03)
- most recent surveillance testing results (visual inspection, delta P, in-place testings for high efficiency particulate air (HEPA) and charcoal filters, air capacity test, and laboratory test for iodine collection efficiency) for the following air treatment systems:

    - Control Room Emergency Habitability System (common system)
    - Units 1 and 2 Supplemental Leak Collection and Release Systems (SLCRS)

- most recent channel calibration results for the following radioactive liquid and gaseous effluent RMS and its flow measurement devices which are listed in Tables 4.3-3, 4.3-12, and 4.3-13 of the ODCM for both units:

    <u>Unit 1 RMS</u>

    - RM-LW-104 Liquid Waste Effluent Monitor
    - RM-LW-116 Liquid Waste Contaminated Drain Monitor
    - RM-DA-100 Auxiliary Feed Pump Bay Drain Monitor
    - RM-RW-100 Component Cooling-Recirculation Spray Heat Exchangers RW Monitor
    - RM-GW-108 B Gaseous Waste Vent System Noble Gas Monitor
    - RM-VS-101 B Auxiliary Building Ventilation System Noble Gas Monitor
    - RM-VS-107 B Reactor Building/SLCRS Noble Gas Monitor
    - RM-GW-109, CH 5 Low-Range Noble Gas monitor, (Gaseous Waste/Process Vent)
    - RM-GW-109, CH 7 Mid-Range Noble Gas Monitor, (Gaseous Waste/Process Vent)

- RM-GW-109, CH 9 High-Range Noble Gas Monitor, (Gaseous Waste/Process Vent)
- RM-VS-109, CH 5 Low-Range Noble Gas monitor (Aux Building Vent)
- RM-VS-109, CH 7 Mid-Range Noble Gas Monitor (Aux Building Vent)
- RM-VS-109, CH 9 High-Range Noble Gas Monitor (Aux Building Vent)
- RM-GW-110, CH 5 Low-Range Noble Gas monitor, (Reactor Building/SLCRS Noble Gas Monitor)
- RM-GW-110, CH 7 Mid-Range Noble Gas Monitor, (Reactor Building/SLCRS Noble Gas Monitor)
- RM-GW-110, CH 9 High-Range Noble Gas Monitor, (Reactor Building/SLCRS Noble Gas Monitor)

Unit 1 Flow Rate Measurement Devices:

- FR-LW-103 Liquid Radwaste Effluent Lines
- FR-LW-104 Liquid Radwaste Effluent Lines
- FT-CW-101 Cooling Tower Blowdown Line
- FT-CW-101-1 Cooling Tower Blowdown Line
- FR-GW-108 Gaseous Waste/Process Vent System
- FR-VS-101 Auxiliary Building Ventilation System
- FR-VS-112 Reactor Building/SLCRS

Unit 2 RMS:

- 2SGC-RQ100 Liquid Waste Process Effluent Monitor
- 2SWS-RQ101 Service Water Monitor
- 2SWS-RQ102 Service Water Monitor
- 2HVS-RQ101B Ventilation System Noble Gas Monitor
- 2HVS-RQ109B Elevated Release Low-Range Noble Gas Monitor
- 2HVS-RQ109C Elevated Release Mid-Range Noble Gas Monitor
- 2HVS-RQ109D Elevated Release High-Range Noble Gas Monitor
- 2RMQ-RQ301 B Decontamination Building Vent Noble Gas Monitor
- 2RMQ-RQ303 B Waste Gas Storage Vault Noble Gas Monitor
- 2RMR-RQ303 B Gaseous Activity Reactor Coolant System Leakage Detection Noble Gas Monitor
- 2HVL-RQ-112B Condensate Polishing Building Vent Noble Gas Monitor

Unit 2 Flow Rate Measurement Devices:

- 2SGC-FS100 Liquid Radwaste Effluent
- 2CWS-FT101 Cooling Tower Blowdown Line
- 2HVS-F22A Plant Elevated Release Vent

The inspectors also toured plant areas and observed the following activities to evaluate the effectiveness of the licensee's radioactive gaseous and liquid effluent control programs:

- walkdown for determining the availability of radioactive liquid/gaseous effluent RMS and for determining the equipment material condition;
- walkdown for determining operability of air cleaning systems and for determining the equipment material condition;
- observed charcoal/particulate filter sampling technique; and
- observed radioactive gaseous effluent sampling technique and sample preparation for gamma spectrometry measurements.

b. Findings

No findings of significance were identified.

## 3. SAFEGUARDS

Cornerstone: Physical Protection

3PP4 Security Plan Changes

a. Inspection Scope

An in-office review was conducted of changes to the licensee's Security Plan identified as Revisions 41, 42, 43, and 44. These documents were submitted to the NRC on June 14, 2001, February 20, 2002, September 12, 2002, and February 24, 2003, respectively in accordance with the provisions of 10 CFR 50.54(p). The review was conducted to confirm that the changes were made in accordance with 10 CFR 50.54(p), and did not decrease the effectiveness of the above listed plans. The NRC recognizes that some requirements contained in the Security Plan may have been superceded by the February 2002 Interim Compensatory Measures Order.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators (PIs) listed below for the period from January 2002 through April 2003, for both units. To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 2, were used to verify the basis reporting for each data element.

Reactor Safety Cornerstone

- Safety System Unavailability (AFW)
- Safety System Unavailability (HHSI)
- Safety System Unavailability (EDGs)
- Unplanned Transients per 7000 Critical Hours

The inspector reviewed a selection of licensee event reports (LERs), portions of Unit 1 and Unit 2 operator log entries, daily morning reports (including the daily CR descriptions), the monthly operating reports, and PI data sheets to determine whether the licensee adequately addressed the number of unplanned power changes greater than 20 percent that occurred in the previous four quarters. The data was compared to the data reported for the above PIs during the current quarter. The inspectors also reviewed the accuracy of the unavailability hours associated with the AFW, HHSI, and EDG safety

systems. In addition, the inspectors also interviewed licensee personnel associated with the PI data collection, evaluation, and distribution.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

1. Annual Sample Review - Evaluation and Resolution of Degraded Unit 2 Main Steam Isolation Valve Closure Time

a. Inspection Scope

The 'C' main steam isolation valve (MSIV) closed slower than the 5-second TS limit during testing in 2001 and again in 2002. Following both occurrences, the inspectors subsequently determined that problem resolution was incomplete and untimely. Station personnel wrote additional CRs to address the inspectors' findings (two Green finding NCVs) and to address permanent resolution for MSIV closure performance. The inspectors reviewed CRs 01-1493, 01-1523, 01-2074, 01-4134, 02-0216, 02-1848, 02-1869, 02-4244, 02-5214, and performances of all related surveillance testing from 2000 until present as documented in 2OST-21.7, "Main Steam Trip Valves (2MSS*AOV101A, B, and C) Full Closure Test," Rev. 7, to determine whether appropriate actions were now in place to address the performance issue.

b. Findings and Observations

There were no findings identified. Engineers ultimately concluded that the most likely causes of the slow MSIV closure time were guide pin rubbing on the actuator stanchions and failure to perform vendor recommended preventive maintenance on the valve actuators. Engineers determined that valve performance would not continue to degrade during the current operating cycle (April 2002 to September 2003). The inspectors agreed that the guide pin rubbing would not further degrade stroke time. However, the inspectors questioned whether continued degradation of elastomers and other internal actuator components, which were not periodically replaced as recommended by the vendor, could cause further valve performance degradation during this period. Engineers had not documented the basis for their assessment of this issue. Additionally, CR 02-1869 specified that a separate CR would investigate the reason why the actuator modification performed using ECP 141 did not achieve the expected results. The inspectors determined that this issue was not addressed via the corrective action process.

The inspectors determined that ongoing and planned corrective actions were appropriate to address MSIV performance, with the exception of the lack of documented evaluation of the effect of not doing vendor recommended preventive maintenance. Engineers subsequently provided MSIV partial stroke test data to demonstrate valve performance was not degrading and reviewed related vendor documentation with the inspectors.

2. Cross-References to Problem Identification and Resolution Findings Documented Elsewhere

(Section 2PS1) Radioactive Liquid and Gaseous Effluent Control Programs

The inspectors reviewed the selected following 2002-2003 CRs to evaluate the effectiveness of the licensee's problem identification and resolution processes in the areas of radioactive liquid and gaseous effluent control programs:

- CRs for Routine Effluent Control Program; (03-01017, 03-02110, 03-02318, 03-02359, 03-03814, 03-04202, 03-04830, 03-04834, 03-05280, 02-05579 02-05643, 02-05711, 03-09554, and 02-09646)
- CRs for Air Cleaning Systems; (02–2768, 03-01821, 03-01932, 03-06107, 03-06109, and 03-06118)
- CRs for RMSs; (03-00843, 03-01193, 04-01576, and 03-05202)

(Section 1EP6.2) Deficient Critique of EP Drill

The EP drill critique depth and detail was insufficient to highlight specific performance problems at the Technical Support Center (TSC). Emergency Preparedness supervisors did not establish a timely method for 1) providing deficiency feedback to drill participants; 2) remediation; and 3) corrective action effectiveness assessment. Specific TSC performance problems not addressed by the critique included:

- TSC priorities were incorrect. Updates of priorities were untimely. (#1 priority was 10 gpm RWST leak instead of restoration of electrical power sources. The quickest backup source of electrical power [EDG cross-tie] wasn't even listed on the TSC action item board.)
- Direction from the emergency director was not clearly communicated (e.g. establish reactor coolant pump (RCP) seal bleedoff to mitigate a potential RCP seal failure) and was not questioned by the TSC staff.
- Engineering support response was untimely (not provided in 30 minutes prior to ending the drill) regarding RCP seal threat information.

Although these deficiencies increased the likelihood of failing two fission product barriers, the inspectors concluded that they did not preclude implementation of the emergency plan. The issues described above were documented in CR 03-7822.

(Section 4OA3.1) Assessment of Main Intake Structure Silt Level Limits and Past Reportability

Engineers properly determined design basis intake bay silt levels for a more challenging design basis plant condition as documented in CRs 02-6899, 02-6954, 02-8291. Notwithstanding, the Corrective Action Review Board (CARB) determined that licensing and engineering personnel overlooked past reportability consideration in CRs 02-6899 or 02-6954. The CARB ensured the reportability assessment was properly performed and documented in CR 02-8291, resulting in LER 50-334/02-001.

(Section 4OA3.2) Missed Opportunities to Identify Reactor Trip Precursor

Engineers failed to identify a differential pressure instrument misapplication for the Unit 1 turbine motoring alarm following instrument failures 1993 and 1999. Additionally, while taking log readings, operators failed to recognize that the instrument provided an abnormal reading. These missed opportunities to identify and correct a degraded condition contributed to an unplanned November 11, 2002, reactor trip as documented in NRC Inspection Report Nos. 50-334(412)/02-07.

3. (Section 1R02 and 1R17) Review of Condition Reports Associated with 10 CFR 50.59 and Plant Modification Issues

The inspectors reviewed CRs associated with 10 CFR 50.59 issues and plant modification issues to ensure that the licensee was identifying, evaluating, and correcting problems associated with these areas and that the corrective actions for the issues were appropriate. The inspectors also reviewed two self-assessments related to 10 CFR 50.59 and plant modification activities at Beaver Valley. The listing of the CRs and self assessments reviewed is provided in the attachment.

4OA3 Event Follow-up

1. (Closed) LER 05000334/02-001: Silt Levels in Main Intake Structure Exceed Allowable Values

On September 25, 2002, engineers determined that previously measured silt levels in three of the four bays of the main intake structure had exceeded acceptable limits to assure adequate inflow from the Ohio River, the ultimate heat sink, under the worst case design basis scenario. The event was reported as a potential unanalyzed condition that could significantly degrade plant safety. The cause of the event was incomplete original design basis assumptions, which did not address the potential for downstream river dam failure without recovery at a time of extreme low river level. The inspectors previously documented an operability assessment of this issue in NRC Inspection Report Nos. 50-334(412)/02-07. The inspectors determined that the probability and subsequent safety significance of this event was insignificant, as documented in the LER. The inspectors performed an onsite review of the LER, verified corrective actions were appropriately implemented or scheduled, and determined there were no findings of significance. The event was documented in CRs 02-6899, 02-6954, 02-8291. This event did not constitute a violation of NRC requirements.

2. (Closed) LER 05000334(412)/02-02: Manual Reactor Trip During Planned Shutdown Due to Turbine Motoring Alarm

This event was previously documented in NRC Inspection Report Nos. 50-334(412)02-07. No new issues were revealed by the LER. The inspectors performed an onsite review of the causal assessment contained in CR 02-10167 and verified appropriate corrective actions were identified and implemented. No additional findings of significance were identified. This event did not constitute a violation of NRC requirements.

3. (Closed) Apparent Violation 05000412/03-06-01: Adequate and Timely Emergency Response Staffing in Four Key Functional Areas Not Maintained at all Times

A White violation was issued with NRC letter dated July 10, 2003, and will be reviewed under escalated action (EA) 03-054. The apparent violation is closed.

4OA6 Management Meetings

1. Exit Meeting Summary

The inspectors presented the inspection results to Mr. William Pearce and other members of licensee management following the conclusion of the inspection on July 7, 2003. The licensee acknowledged the findings presented.

The licensee did not indicate that any of the information presented at the exit meeting was proprietary.

2. FirstEnergy Nuclear Operating Company Senior Management Changes

On May 5, 2003, FENOC announced several management changes. Mr. Mark Bezilla, previously site vice president at BVPS, will become site vice president and plant manager at Davis-Besse Power Station. Mr. William Pearce, vice president of FENOC Oversight, was promoted to site vice president at BVPS. Mr. Thomas Cosgrove, Director of Work Management at BVPS, became the Director of Nuclear Engineering at BVPS. Mr. Rick Mende, manager of Plant Engineering Davis-Besse Power Station, was promoted to Director of Work Management at BVPS. Mr. Vic Kaminskas, manager of Nuclear Support at Davis-Besse Power Station, was promoted to Director of Maintenance at BVPS.

3. Site Management Visit

On May 13, 2003, Mr. Hubert Miller, Regional Administrator, Region I and Mr. John Rogge, Deputy Director, DRP (acting), toured Beaver Valley Power Station and met with station personnel to review plant performance.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

Licensee personnel

| | |
|---|---|
| W. Pearce | Vice President |
| T. Cosgrove | Director, Plant Engineering |
| L. Freeland | Manager, Nuclear Regulatory Affairs & Corrective Actions |
| R. Freund | Rad Ops Supervisor, Unit 2 |
| V. Kaminskas | Director, Maintenance |
| J. Lash | Plant General Manager |
| J. Lebda | Supervisor, Radiological Engineering and Health |
| M. Manoleras | Design Engineering, Manager |
| R. Mende | Director, Work Management |
| P. Sena | Manager, Nuclear Operations |
| J. Sipp | Manager, Nuclear Radiation Protection, Rad Ops, Units 1 and 2 |

### LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 50-412/03-03-01 | URI | Validation and Verification of Post Fire Safe Shutdown Manual Actions Not Complete (Section 1R05) |
| 50-334(412)/03-054 | EA | Adequate and Timely Emergency Response Staffing in Four Key Functional Areas Not Maintained at all Times (Section 4OA3) |

Opened/Closed

| | | |
|---|---|---|
| 50-412/03-03-02 | NCV | Failure to Follow Procedure for Manual Operator Action Causes EDG to be Unavailable (Section 1R13) |

Closed

| | | |
|---|---|---|
| 50-334/02-01 | LER | Silt Levels in Main Intake Structure Exceed Allowable Values (Section 4OA3) |
| 50-334;412/02-02 | LER | Manual Reactor Trip During Planned Shutdown Due to Turbine Monitoring Alarm (Section 4OA3) |
| 50-412/03-06-01 | AV | Adequate and Timely Emergency Response Staffing in Four Key Functional Areas Not Maintained at all Times (Section 4OA3) |

## LIST OF DOCUMENTS REVIEWED

### Section 1R4: Equipment Alignment

CRs 02-05273, 02-0450402-00823, 01-2082, 02-04577, 02-10926
CRs 02-09627, 02-06333, 03-02037, 03-00492, 02-07670, 02-09627
Deficiency Tags 37984, 37985, 37983, 32886, 43572
WO 02-004004-000
January 2003 System Health Reports for Unit 2 CCW and AFW
OST 2-OST-15.1, Rev. 30, "Primary Component Cooling Water Pump [2CCP*P21A] Test"
OST 2-OST-15.2, Rev. 31, "Primary Component Cooling Water Pump [2CCP*P21B] Test"

### Section 1R5: Fire Protection

BVPS-2 Fire Safe Shutdown Report
Unit 2 Drill Report 2OM-56C, Post-Fire Alternate Shutdown from Outside of the Control Room
NUREG-1057, Supplement No. 5, Safety Evaluation Report Related to the Operation of BVPS Unit 2
2OM-56B.3.B.3, Fire Prevention and Control, Pre-Fire Strategies, Rev. 14
½-AM-1902, Fire Brigade, Rev. 0

### Section 1R17: Permanent Plant Modification

Modifications

ECP 02-0040 Determine Minimum Number of Tensioned Reactor Head Studs to Commence Reactor Fill and Vent
ECP 02-0077 Removing Blocking Diodes from Rod Control Circuits
ECP 02-0183 Install Feedwater Isolation Valve to Support Power Up-rate
ECP 02-0063 Replacement of the No. 4 Vital Bus Inverter
ECP 02-0253 Replace 6-inch Service Water Piping with 4-inch Piping
ECP 02-0514 Modify Fire Damper
ECP 02-0731 Change the Fuses in the Control System Power Cabinet
TER 1355 Update Unit 2 Fire Protection Safe Shutdown Report to Document Spurious Signal Analysis for Ventilation System

10 CFR 50.59 Safety Evaluations

00-019 Installation of Mechanical Clamp on BVPS-2 Atmospheric Steam Dump
00-081 Revise UFSAR Section 8.4
00-113 Engineering Safety Feature Response Times
01-003 Update Unit 2 Fire Protection Safe Shutdown Report to Document Spurious Signal Analysis for Ventilation System
01-2854 Install Automatic Recirculation Control Valves at Discharge of HHSI/Charging Pump 2CHS*P21C
02-2417 Replace Service Water System (SWS) 6-inch Supply and Return Headers to Control Room Chillers.

03-0294Unit 1 Feedwater Isolation Valve Installation
03-0655Turbine Missile Analysis

10 CFR 50.59 Screening Evaluations

02-2590Replacement of River Water System 6-inch Supply and Return Headers to Control Room Chillers
02-3127Inverter No. 4 Replacement
02-3318Replace Voltage Regulator
02-3521Connection of Newly Installed Service Water Lines from the Control Room
02-3679Install 3/4-inch Branch Line on 2-SWS-006-164-3 for ECP 02-0253
02-3946Install 3/4-inch Branch Line on 2-SWS-006-163-3 for ECP 02-0253
03-1327Transformer Tap Changes
03-1335Vital Bus Inverter Voltmeter
03-1427Battery Equalizing Charge
03-1436EDG Monthly Test
03-1581Main Generator Loss of Field Relay Setting Change
03-1605Possible Circuit Anomaly EDG 1-2 During Sequence Test
03-1793Return to Service 4kV Emergency Bus 1DF
03-18707300 Power Supply Change
03-2145Safeguards Train ‘ A’ Miscellaneous
03-2145Oil Filter Pressure Switch GO Test
03-0294Unit 1 Feedwater Isolation Valve Installation

Self-Assessments

Nuclear Quality Assessment: 10 CFR 50.59 Evaluations, dated February 28,2003
Engineering Assessment Board, Product No. ECP 02-0214

Corrective Action Reports

01-3399, 01-4509, 01-0758, 02-7268, 02-09517, 02-2996, 02-7927, 02-7928, 02-6733, 03-5404

Procedures

DE-DG-005, Engineering Assessment Board, Rev. 0
½-AM-2007, Operational Acceptance of ECPs, Rev. 4
N.O.P.-CC-2001, Design Verification, Rev. 1
N.O.P.-CC-2002, Design Input, Rev. 1
N.O.P.-LP-4003, Evaluation of Changes, Tests and Experiments, Rev. 0

**Section 1EP4: Emergency Action Level and Emergency Plan Changes**

Emergency Preparedness Plan:
EPP-4, Emergency Conditions, Rev. 15
EPP-5, Emergency Organization, Rev. 17

Emergency Preparedness Plan Implementing Procedures:
EPP/I-1a, Recognition and Classification Emergency Conditions, Rev. 4
EPP/I-1b, Recognition and Classification Emergency Conditions, Rev. 4
EPP/I-2, Unusual Event, Rev. 18
EPP/I-3, Alert, Rev. 18
EPP/I-4, Site Area Emergency, Rev. 17
EPP/I-5, General Emergency, Rev. 18
EPP/IP 1.1, Notifications, Rev. 30, 31
EPP/IP 1.2, Communications and Dissemination of Information, Rev. 18
EPP/IP 1.4, Technical Support Center Activation, Operation and Deactivation, Rev. 17, 18
EPP/IP 1.6, Emergency Operations Facility Activation, Operation and Deactivation, Rev. 15, 16
EPP/IP 1.7, Emergency Response Organization Teams, Rev. 10
EPP/IP 2.2, Onsite Monitoring for Airborne Release, Rev. 12
EPP/IP 3.2, Site Assembly and Personnel Accountability, Rev. 13
EPP/IP 4.1, Offsite Protective Actions, Rev. 16

## LIST OF ACRONYMS

| | |
|---|---|
| AFW | Auxiliary Feedwater |
| BCO | Basis for Continued Operation |
| BVPS | Beaver Valley Power Station |
| CAR | Containment Air Recirculation |
| CARB | Corrective Action Review Board |
| CERPI | Control Element Rod Position Indication |
| CFR | Code of Federal Regulations |
| CR | Condition Report |
| DEP | Drill/Exercise Performance |
| ECP | Engineering Change Package |
| EDG | Emergency Diesel Generator |
| EOP | Emergency Operating Procedure |
| EP | Emergency Preparedness |
| EPIP | Emergency Plan Implementing Procedure |
| FENOC | FirstEnergy Nuclear Operating Company |
| HEPA | High Efficiency Particulate Air (filter) |
| HHSI | High Head Safety Injection |
| IP | Inspection Procedure |
| LCO | Limiting Conditions for Operation |
| LER | Licensee Event Report |
| LHSI | Low Head Safety Injection |
| MFP | Main Feedwater Pump |

| | |
|---|---|
| MR | Maintenance Rule |
| MSIV | Main Steam Isolation Valve |
| NCV | Non-cited Violations |
| NEI | Nuclear Energy Institute |
| NOP | Nuclear Operating Procedure |
| NQA | Nuclear Quality Assurance |
| NRC | Nuclear Regulatory Commission |
| ODCM | Offsite Dose Calculation Manual |
| OM | Operating Manual |
| OST | Operating Surveillance Test |
| PI | Performance Indicator |
| PMT | Post-Maintenance Test |
| RCP | Reactor Coolant Pump |
| RMS | Radiation Monitoring System |
| RTD | Resistance Temperature Detector |
| RW | River Water |
| SDP | Significance Determination Process |
| SLCRS | Supplementary Leak Collection and Release System |
| SSC | Structures, Systems and Components |
| SWS | Service Water System |
| TM | Temporary Modification |
| TS | Technical Specifications |
| TSC | Technical Support Center |
| UFSAR | Updated Final Safety Analysis Report |
| URI | Unresolved Item |
| WO | Work Order |
| WR | Work Request |