November 10, 2003

Mr. William Pearce
Site Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Post Office Box 4
Shippingport, Pennsylvania 15077

SUBJECT: BEAVER VALLEY POWER STATION - NRC INTEGRATED INSPECTION REPORT 05000334/2003004 AND 05000412/2003004

Dear Mr. Pearce:

On September 27, 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 October 17, 2003 with you and members of your staff.

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

This report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of an NRC requirement. However, because of its very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. If you contest any 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, D.C. 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, Washington, D.C. 20555-0001; and the NRC Resident Inspector at Beaver Valley.

The NRC has increased security requirements at the Beaver Valley Power Station in response to terrorist acts on September 11, 2001. Although the NRC is not aware of any specific threat against nuclear facilities, the NRC issued an Order and several threat advisories to commercial power reactors to strengthen licensees' capabilities and readiness to respond to a potential attack. The NRC continues to monitor overall security controls and will issue temporary instructions in the near future to verify by inspection the licensee's compliance with the Order and current security regulations.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, and its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA by Richard S. Barkley Acting For/

Peter W. Eselgroth, Chief
Projects Branch 7
Division of Reactor Projects

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

Enclosures: Inspection Report 05000334/2003004 and 05000412/2003004
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.	50-334, 50-412
License Nos.	DPR-66, NPF-73
Report Nos.	05000334/2003004 and 05000412/2003004
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Beaver Valley Power Station, Units 1 and 2
Location:	Post Office Box 4 Shippingport, PA 15077
Dates:	June 29, 2003 - September 27, 2003
Inspectors:	P. Cataldo, Senior Resident Inspector G. Smith, Resident Inspector G. Dentel, Senior Resident Inspector J. McFadden, Health Physicist R. Fuhrmeister, Senior Reactor Inspector R. Barkley, Senior Project Engineer M. Modes, Senior Reactor Inspector
Approved by:	Peter W. Eselgroth, Chief Projects Branch 7 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000334/2003-004, IR 05000412/2003-004; 06/29/2003 - 09/27/2003; Beaver Valley Power Station, Units 1 and 2.

This report covers a 13-week period of inspection by the resident inspectors and announced inspections by regional inspectors. Two Green non-cited violations (NCVs) 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 (TS) 3.7.4.1 on Unit 1, because one train of River Water (RW) was inoperable for a time period that exceeded the Limiting Condition for Operation (LCO) action time of 72 hours and the additional six hours required to place the unit in Mode 3 (78 total hours). Vibration measurements taken on the 'A' RW pump exceeded the American Society of Mechanical Engineers (ASME) limit for operability; however, the pump remained in operation for 78.5 hours.

  This finding is greater than minor because it affected the Mitigating System cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The finding is of very low safety significance because the pump was operating at required flow and pressure during the entire time period and thus remained in an available status.

B. Licensee Identified Violations

A violation of very low safety significance, which was identified by the licensee, was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. The violation and corrective action tracking number is listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at essentially 100 percent power for the duration of the inspection period, with the exception of a slight load reduction of 65 megawatts during the onset of the northeast blackout on August 14, 2003. Unit 2 operated at essentially 100 percent power for the duration of the inspection period, with the exception of a slight load reduction of 15 megawatts during the onset of the northeast blackout on August 14, 2003. In addition, on September 12, a downpower to 48 percent power was performed to support main steam safety valve testing (Section 1R14), followed by the unit being taken off line for a refueling outage on September 13. Unit 2 remained in the refueling outage for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

1. Hot Weather Preparations

a. Inspection Scope

The inspectors reviewed the station's seasonal preparations for hot weather to determine whether appropriate procedures, maintenance, and evaluations were performed to support continued mitigating system operability and minimize plant risk associated with hot weather related initiating events. Hot weather and corresponding warm river water (RW) temperatures pose challenges to various mitigating systems and increase the likelihood of initiating events. Material condition and heat exchanger performance of the Unit 1 RW system, Unit 2 service water (SW) system, and Units 1&2 circulating water systems were evaluated. The inspectors interviewed station personnel, performed partial system walkdowns, reviewed completed test and maintenance documents, and observed portions of surveillance activities, to determine whether equipment performance was effectively maintained as specified by the applicable acceptance criteria. Documents associated with this review are listed in the Attachment.

b. Findings

No findings of significance were identified.

2. Hurricane Isabel Preparations

a. Inspection Scope

From September 15 - 18, the inspectors reviewed the station's preparation and response to Hurricane Isabel. This review was performed to determine whether appropriate procedures, maintenance, and evaluations were performed to support both continued mitigating system operability and to minimize plant risk associated with

flooding and high wind-related initiating events. The inspectors reviewed licensee preparations which included:

- Limited emergency response facility staffing and continuous weather monitoring;
- Securing of exterior structures and various storage trailers, as well as water-tight doors;
- Installation of temporary measures in the Unit 1 circulating water pump house to handle possible flooding; and
- Review of two abnormal operating procedures in preparation for the storm, 1/2OM-53C.4A.75.1, "Acts of Nature - Tornado," Rev. 9 and 1/2OM-53C.4A.75.2, "Acts of Nature - Flood," Rev. 18

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments (71111.04)

a. Inspection Scope

Partial System Walkdowns. The inspectors performed two partial system walkdowns during this inspection period.

- Unit 2 'A' train quench spray (QS) system on September 2, following the performance of surveillance test procedure 2OST-13.1, "Quench Spray Pump {2QSS*P21A} Test," Rev. 19.
- 2-2 emergency diesel generator (EDG) on September 4, while the 2-1 EDG was out of service for maintenance.

The inspectors evaluated the operability of the selected train or systems, verified valve and breaker alignments against applicable procedures (see attachment for listing), and reviewed the design bases in the Updated Final Safety Analysis Report (UFSAR).

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors performed 10 walkdowns of risk significant fire protection areas during the inspection period. The fire areas reviewed included the following:

- Unit 1 Cable Spreading Room (Fire Area CS-1)
- Unit 1 Component Cooling Water Pumps Area (Fire Area PA-1E)
- Unit 1 Intake Structure Cubicles (Fire Area IS-1 through 4)
- Unit 1 Emergency Switchgear Room (Fire Area ES-1)
- Unit 1 Main Steam Valve Area (Fire Area MS-1)
- Unit 2 Control Building Cable Spreading Room (Fire Area CB-2)
- Unit 2 Control Building Main Control Room (Fire Area CB-3)
- Unit 2 Cable Vault and Rod Control Area (Fire Area CV-1)
- Unit 2 Cable Vault and Rod Control Area (Fire Area CV-2)
- Unit 2 Cable Vault and Rod Control Area (Fire Area CV-4)

The inspectors reviewed the Unit 1 Updated Fire Protection Appendix 'R' Review and the Unit 2 Fire Protection Safe Shutdown Report to verify the fire protection features of the selected areas were in compliance with the criteria delineated in Nuclear Power Division Administrative Procedures (NPDAP), ½-ADM-1900, "Fire Protection," Rev. 5. This review also included an assessment of the licensee's control of transient combustibles, material condition of fire protection equipment, and the adequacy of any fire protection impairments and compensatory measures.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors performed walkdowns of two risk significant flood areas and reviewed various licensee documents to determine the adequacy of protection of areas from internal flooding. This review included the UFSAR, Individual Plant Examination, TSs, abnormal operating procedure 1/2OM-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. During these walkdowns the inspectors examined a sample of internal flood seals, inspected the material condition of potential sources of internal flooding, and verified various floor drains, sump pumps, and level alarm circuits were operable. The inspectors reviewed the most recently completed inspection, 1BVT-1.33.07, "Flood Seals Visual Inspection," Rev. 1, as well as the Unit 1 flood seal database and discussed observations with the Flood Protection Engineer. The following flood areas were reviewed:

- Unit 1 Normal Switchgear Room (flood zone NS-1).
- Unit 1 Communication Equipment and Relay Panel Room (flood zone CR-3).

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the design bases and performance testing to verify that heat exchangers in the River Water/Service Water (RW/SW) systems and the closed loop component cooling water (CCCW) systems in the plant were capable of and available to perform their design functions when called upon to do so. Heat exchangers 1EE-E-1A, 1B, and 7C in the RW/SW system; 1CC-E-1A, 1B, and 2CCP-E21A, 21B, and 21C in the CCCW system were also reviewed.

The inspectors reviewed the licensee's implementation of commitments made in response to NRC Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The review included licensee procedures for heat exchanger inspections, cleaning and performance methods and frequencies, and the adequacy of their documentation. Also, the biocide injection system implemented to control biologic fouling was reviewed for effectiveness.

The inspector witnessed the scheduled inspection of heat exchanger 2CCP-E21C to evaluate the adequacy of the inspection procedure and findings. The performance of the supporting systems, such as pumps for net positive suction head and valve stroke times, was also reviewed to verify the integrated system performance.

The inspector also reviewed a sample of CRs related to heat exchangers and associated systems to ensure the licensee was appropriately identifying, characterizing, and correcting problems related to these components.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

The scope of this inspection consisted of the review of three non-destructive examination (NDE) activities associated with the Unit 2 2003 refueling outage. Specifically, the NDE activities were: 1) the review of one examination from the previous outage containing a recordable indication, 2) three American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, repairs or

replacements, and 3) the verification that acceptance of welds on the Class 1 and 2 pressure boundary are in conformance with the ASME Code. All the available steam generator inspection activities identified in IP 7111108 were conducted.

The inspector evaluated the general implementation of the steam generator program by reviewing the steam generator aging management and assessment program including data management, degradation assessment, and plugging criteria. The inspector reviewed the licensee's threshold for implementation of the alternate repair criteria and discussed with the licensee steam generator aging management issues, such as sludge lancing, secondary side water chemistry and the manner by which the eddy current program was managed. The inspector verified the licensee was examining the steam generator tubes for 100 percent of their length (air-to-air).

To evaluate the specific implementation of the steam generator program, the inspector interviewed the vendor's primary, secondary, and resolution analysts. The inspector interviewed the licensee's independent qualified data analysts, and reviewed selected samples of the eddy current data acquisition and analysis of the 'A,' 'B,' and 'C' steam generators. For example, the inspector reviewed the resolution results of the eddy current inspection of row 30, column 81, of the 'C' steam generator.

The inspector reviewed the results of the remote video inspection for foreign material in the blow-down lane of the 'C' steam generator and discussed the actions planned for the removal of the material and the surrounding sludge. Specifically, the appearance of a small sludge pile outside the blow-down lane was discussed, its possible causes, and the impact it was having on tube integrity in that area of the generator.

The inspector also reviewed other portions of the inservice inspection and nondestructive evaluation programs. During the previous outage, inspectors had identified what could have been interpreted as less than minimum wall thickness from review of radiographs of welds SI-60-1A-F5A and SI-75-2-FAA during the replacement of motor-operated valve 867B in the safety injection line. During this current inspection, the inspector reviewed licensee actions taken following the last outage supporting the conclusion that the minimum wall requirement was met.

The inspector witnessed the calibration of an ultrasonic instrument for the purpose of performing an ASME Section XI ultrasonic examination of weld 2QSS-243-F510 in the safeguards system. The ultrasonic inspection personnel experienced technical difficulties that precluded completion of the ultrasonic examination in the presence of the NRC inspector. The ISI personnel responded to the problem by initiating a condition report (CR). The inspector observed that the ultrasonic test technicians were qualified and knowledgeable.

The inspector reviewed three ASME repair/replacement packages. One package detailed the replacement of a damaged flange on a conoseal, and included the reweld of the canopy seal. All the repair/replacements were implemented in conformance with the requirements of ASME.

The inspector discussed the corrective action program with the licensee's steam generator eddy current manager. No corrective actions had been generated in the period since the last NRC inspection of the Inservice Inspection program, including the current outage. The manager attributed this, in part, to the refinement in the vendor's software and data management processes. For example, the eddy current software currently used had been strengthened to disallow the incorrect application of eddy current probes or data review. This reflected a pro-active approach towards problem resolution.

b. Findings

No findings of significance were identified.

1. RPV Head and Vessel Head Penetration Nozzles (TI 2525/150 Rev 2)

a. Inspection Scope

In accordance with Temporary Instruction TI 2515/150, Rev. 2, the inspectors reviewed the Beaver Valley Power Station (BVPS) program to implement RPV head and vessel head penetration inspection activities in response to NRC Order EA-03-009 issued on February 11, 2003. For the samples taken, in accordance with TI 2525/150, Rev. 2, the licensee verified that the plant procedures, equipment, and personnel were demonstrated to be effective in the detection and sizing of primary water stress corrosion cracking (PWSCC) in vessel head penetration nozzles and detection of RPV head wastage.

The inspectors reviewed the licensee's calculation of the effective degradation years accounting for the RPV Unit 2 that provides for the susceptibility ranking to ensure the licensee properly characterized any potential RPV head degradation.

The inspectors observed the remote video inspection of selected samples of the RPV head in the area of each penetration by VT-2 qualified examination personnel and compared the observed results with the characteristics of boric acid residue resulting from primary leakage as described in procedure MRS-SSP-1510, Rev. 0., Westinghouse Electric Company, attached to the First Energy Regulatory Applicability Determination 03-03025 Rev. 0.

The inspectors reviewed the documented results of ultrasonic and eddy current volumetric inspection of selected RPV head nozzles at penetrations 4, 9, 12, 14, and 19. The inspectors also reviewed the First Energy request for relaxation of Order requirements regarding inspection of the bottom of the RPV penetration nozzles due to the physical configuration of the nozzle and limitations of test equipment as described in FENOC L-03-088. The inspectors discussed with the licensee the ultrasonic inspection results for the RPV head penetration nozzle in the region of the closure weld, including techniques used, and the technical justification of these techniques using mock-up demonstrations. For additional information regarding this inspection, see Attachment 1 of this report.

b. Findings

No findings of significance were identified.

2. Reactor Pressure Vessel (RPV) Lower Head Inspection Activities (TI 2525/152)

a. Inspection Scope

In accordance with Temporary Instruction TI 2515/152, the inspectors reviewed the Beaver Valley Power Station (BVPS) program to implement RPV lower head inspection activities in response to NRC Bulletin 2003-02, issued on August 21, 2003. This inspection was performed to verify implementation of licensee commitments to the bulletin related to effectively detecting signs of leakage from the RPV lower head penetration (LHP) nozzles and detecting RPV lower head degradation.

The inspectors examined samples of the results of bare metal visual (BMV) examination of the 50 bottom mounted instrumentation (BMI) perforations through the RPV lower head surface, and the annular space around each entry boss perforation of the 50 BMI tubes through the lower head to determine any signs of leakage of primary coolant through the head-to-tube annuluses, along the surface of the tubing, or on the surface of the lower reactor head. From samples of remote 20x photographs taken of 4 quadrants of each tube at each intersection between the lower shell perforations and BMI tubes, the inspector examined the condition of the lower head surfaces that had a thin white residual powdery substance. The inspectors reviewed the licensee finding that on 171 of 200 perforation quadrants, there was no evidence of debris or material in the annulus between the tubing and boss, whereas 29 of the 200 quadrants having slight discoloration marks were identified as requiring additional evaluation. The inspectors examined photographs of the lower head and penetration surface areas and compared the condition of these surfaces with the boron leakage found at the South Texas reactors to verify that the appearance of the boron leakage surface at South Texas was not similar to that at Beaver Valley.

The inspectors reviewed results of the licensee's chemical evaluation of the substance at the perforation-tube juncture and over the lower shell surface at the region at penetration numbers 29 and 43, which identified no evidence of boron leakage. The inspectors discussed his concern with the licensee using a relatively small number of samples (2) as a means to guarantee the absence of boron in the residue over the (50) perforations. In response to the inspector's concern, the licensee subsequently increased the number examined to (3). For additional information regarding this inspection, see Attachment 2 of this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed Unit 1 licensed operator requalification training at the control room simulator. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario and implement the emergency plan. The inspectors observed the operators' simulator drill performance and compared it to the criteria listed in simulator scenario "Licensed Operator Training, Unit 1 Simulator, Drill 30," Rev. 2A. 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 training evaluators to ensure they were recognizing and correcting individual and operating crew deficiencies including post training remediation actions.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors evaluated Maintenance Rule (MR) implementation for the two issues listed below. Specific attributes reviewed included MR scoping, characterization of failed structures, systems, and components (SSC), 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 Code of Federal Regulations (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 the selected systems, the inspectors observed maintenance rule steering committee (MRSC) meetings to determine whether system performance was properly dispositioned for MR category (a)(1) or (a)(2) performance monitoring. In addition, the inspector reviewed the applicable system health reports, MR system basis documents, and various CRs over the last six months.

- The inspectors reviewed MR implementation with respect to the Unit 1 heater drain system, including CR 02-00823, "Transient Caused by Heater Drain Tank Level Control Valve Failures," and associated maintenance preventable functional failure evaluations. The inspectors also reviewed the additional corrective actions identified in CR 03-07748 for a revised maintenance preventable functional evaluation.

- The inspectors reviewed MR implementation with respect to the Unit 1 and 2 emergency diesel generator systems.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's scheduling and control of five maintenance activities in order to verify management of plant risk and the adequacy of risk assessments. This review was against criteria contained in Nuclear Operating Procedure-OP-1005, "Shutdown Safety," Rev. 5; ½-ADM-2033, "Risk Management Program," Rev. 2; Nuclear Operating Procedure-WM-2001, "Work Management Process," Rev. 2; ½-ADM-804, "On-Line Work Management and Risk Assessment, Rev. 3; 1/2ADM-2114, "Maintenance Rule (MR) Program Administrative Procedure," Rev. 0; and Conduct of Operations Procedure 1/2OM-48.1.I, "Technical Specification Compliance," Rev. 13. The inspectors reviewed the routine planned maintenance, restoration actions, and/or emergent work for the following:

- On July 24, operators identified a degraded 125 volt station battery was due to low cell voltage. Operators entered the appropriate 7-day TS LCO and initiated appropriate corrective maintenance. In addition, on July 25, the operators identified a valve actuator failure for pressurizer power operated relief (PORV) block valve MOV-1RC-535 during a quarterly valve stroke surveillance test.

- On July 31, planned maintenance involving the refurbishment of the spare Unit 2 'C' High Head Safety Injection pump.

- On September 3, the 2-1 EDG was removed from service to reroute the jacket cooling water vent line and supports to facilitate the scheduled engine overhaul during the upcoming refueling outage. The machine was subsequently declared available following completion of the maintenance on September 4.

- On September 5, the Unit 1 'B' RW pump was removed from service due to elevated vibration readings. The maintenance activities included pump shaft and bearing replacement as well as a rebalancing of the shaft couplings.

- On September 26, repairs were completed to the 'A' Supplementary Leak Collection and Release System (SLCRS) exhaust fan, 1VS-F-4A. The repair involved installing a patch on the discharge exhaust boot that utilized an epoxy in the repair process, and required an extended curing time.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14)

1. Unit 1 Power Transient Above Rated Thermal Power

a. Inspection Scope

The inspectors reviewed licensee performance during a power transient while recovering from a low condenser vacuum condition on May 12, 2003. During the planned evolution, operators observed reactor power briefly increase to 2717 megawatts thermal (MWT), which was above the rated power limit of 2689 MWT. Operators promptly reduced turbine load and borated to reduce reactor power to below the rated limit in accordance with 1OM-52.2.A, "Precautions and Limitations," Rev. 14. Engineers determined the unanticipated power increase was in response to an unexpected electrical distribution grid frequency disturbance, while the turbine load limiter was not engaged. Corrective actions included procedure reviews to reevaluate when the load limiter should be in service, and design reviews to consider installation of an enhanced grid frequency control device. The inspectors reviewed plant records, procedures, and human performance in response to this evolution, to determine whether personnel performance caused unnecessary plant risk or challenges to reactor safety.

b. Findings

No findings of significance were identified.

2. Unit 2 Power Reduction and Main Steam Safety Valve (MSSV) testing

The inspectors reviewed licensee performance during a power reduction from full power on September 12, 2003, in preparation for a refueling outage. The evolution was performed in accordance with 2OM-52.4.R.1.F, "Refueling Station Shutdown From 100 percent power to Mode 5," Rev. 0. The reduction was secured at 48 percent to perform MSSV lift testing as required by TS surveillance 4.7.1.1. Five of the fifteen safety valves were tested as in accordance with 2BVT-1.21.2, "Trevitest Method for Main Steam Safety Valve Setpoint Check," Rev. 7. The inspectors verified that all five valves tested were within the TS required setpoint values.

3. (Closed) Licensee Event Report (LER) 50-334/03-01: Safety Injection and Reactor Trip Due to Inadvertent Main Steam Isolation Valve Closure

On February 24, 2003, Unit 1 tripped from full power and experienced an automatic safety injection due to an unplanned closure of the 'C' main steam isolation valve (MSIV). The licensee determined the cause of the event was inadequate control of scaffold erection activities in the main steam valve room and poor configuration control of the MSIV actuators. The event was previously documented as a Green finding in NRC Inspection Report Nos. 50-334(412)/03-02 and included identified human performance deficiencies and process weaknesses. No new issues were revealed by the LER. This LER was closed during an onsite review.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed seven operability evaluations to determine whether proper operability justifications were performed. In addition, where a component was determined to be inoperable, the inspectors verified the TS LCO implications were properly addressed.

- On June 23, divers measured high silt levels at the main intake bay traveling screens (CR 03-0623). System engineers evaluated the results and modified the bay cleaning schedules to maintain the system operable. The inspectors reviewed Calculation 10080-N-779, which detailed the minimum requirements of the intake structure and the ultimate heat sink (the Ohio River). The inspectors also interviewed the system engineer and reviewed historical silt data to determine adequacy of the operability determination.

- On June 6, the 'A' river water pump was declared inoperable but available due to vibrations exceeding inservice testing limits. The inspectors reviewed the determination that the pump remained available with the increased vibration levels and the operability assessments prior to the declaration of inoperability. The inspectors also reviewed CR 03-06173 which addressed the predictive maintenance group's use of vibration data in determining operability

- On July 18, 2003, ventilation fire dampers 2HVE-DMPF29A and B were found to be inoperable, stuck in the open position. The cause was excessive dirt and lack of lubrication. The inspectors reviewed Operating Manual Figure 44G-3, "Condensate Polishing Building Ventilation, Health Physics/Chemistry Area Air Conditioning," Rev. 3, and discussed the issue including extent of condition for other station fire dampers with the system engineer. Engineers determined this issue had no effect on plant risk and the problem did not affect other station fire dampers.

- On July 11, 2003, engineers identified that design calculations for certain wedge type gate valves used non-conservative valve factors for determining motor-operated valve (MOV) actuator torque and thrust requirements. Fifty-two valves installed on both units were affected and were subsequently determined to be operable. The inspectors reviewed MOV torque and thrust calculation data and verified that the current valve factor was less than the limiting valve factor used in the calculations.

- During the months of July and August 2003, the Ohio River level fluctuated due to significant rainfall, resulting in increased silt buildup rate in the basin of the intake structure. Significant silt buildup could make the Unit 1 safety-related RW and Unit 2 SW pumps inoperable. Surveillance test results indicated that intake bay silt levels were from 20 to 26 inches, which in several cases exceeded the acceptance criteria of less than or equal to 22 inches. Engineers performed a detailed assessment and concluded the intake bays remained operable (CR 03-

8035 and 03-8966). Further corrective actions were initiated to verify the surveillance test interval was sufficient to maintain pump operability.

- The inspectors reviewed CR 03-07102, which described a condition on Unit 2 where the 'B' Primary Component Cooling Water (CCP) pump could cause a dead head condition of either the 'A' or the 'C' CCP pump. This potential condition is a result of the 'B' CCP pump being a hydraulically stronger pump than the 'A' or 'C' pump. Specifically, during a loss of offsite power concurrent with the 'B' CCP serving as a credited CCP pump, following bus reenergization by the EDGs, the 'B' CCP could overpower and deadhead the remaining CCP pump and ultimately cause overheating and failure of the other running CCP pump. A subsequent single failure of the 'B' CCP pump would result on a total loss of the CCP function and thus a failure of the plant to reach mode 5 (cold shutdown) as required in the design basis. (No CCP credit is given for a design basis accident where a containment isolation phase 'B' is required.) The 'B' CCP pump has subsequently been removed from service to eliminate the dead heading concern and the 'A' and 'C' remain the credited TS CCP pumps. LER 2003-002 has been generated to address this issue.

- The inspectors reviewed regulatory affairs evaluation, "Tech Spec 3.4.11, Action 'D' Whitepaper," dated July 26, 2003. The inspectors interviewed regulatory affairs concerning aspects of this white paper. The evaluation discussed the implementation of TS 3.4.11 action 'D' which deals with an inoperable PORV block valve. The evaluation was generated to verify proper TS compliance as Unit 1 and Unit 2 each had an inoperable PORV block valve.

b. Findings

Introduction. The inspectors identified that Beaver Valley failed to recognize that vibrations on a Unit 1 safety-related RW pump exceeded ASME XI required action limits. The failure to declare the pump inoperable and take the appropriate action per TS 3.7.4.1 was a non-cited violation (NCV) and a finding of very low safety significance (Green).

Description. On May 9, 2003, during the 'A' river water pump surveillance, vibration readings exceeded the ASME Section XI alert range. Operators appropriately placed the pump on double testing frequency per ASME Section XI. On May 13, a vibration analyst recorded a vibration reading of 0.400 in/sec during a routine plant tour. Although not conducted during a surveillance test, the reading was taken at similar flows and pressures as the normal testing conditions. The ASME Section XI required action limit of 0.264 in/sec for this pump was exceeded and the pump should have been declared inoperable. Between May 13 and 15, six additional readings were taken with vibration readings between 0.400 and 0.500 in/sec. The 'A' pump was removed from service on May 16 due to the higher vibration readings and the 'C' pump was placed in service, thereby restoring the subsystem to operable status. The licensee subsequently declared the pump inoperable based on vibration data taken previously on June 6. The total time that the pump was inoperable was approximately 78.5 hours.

During a subsequent NRC inspection in July, the inspectors questioned the operability of the ‘A’ river water pump. The licensee confirmed that the pump should have been declared inoperable and issued LER 50-334/2003-004. The inspectors also determined that engineers had appropriately concluded that the ‘A’ RW pump, although inoperable, remained available to provide cooling to safety-related components.

Analysis. The operators' failure to declare the ‘A’ RW pump inoperable when the ASME required action limit was exceeded was a performance deficiency. The finding was more than minor because the ASME code vibration levels exceeded the TS limits (See Manual Chapter 0612, Appendix E, example 2a). Using Appendix "A," Phase 1 of Manual Chapter 0609, the finding was determined to be of very low safety significance (Green) since there was no loss of safety function based on the determination that the ‘A’ river water pump remained available to mitigate accidents, no design or qualification deficiency existed and the condition was not determined to be potentially risk significant due to external events such as fires or floods.

This finding contains aspects of the cross-cutting area of problem identification and resolution. Specifically, the failure to recognize that the Unit 1 ‘A’ RW pump had degraded to the point where the pump was inoperable from a TS LCO perspective is a contributing cause to this finding.

Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirement or Beaver Valley procedure.

Enforcement. The inspectors identified an NCV of Technical Specification 3.7.4.1. Specifically, on May 16, the licensee failed to restore two subsystems to operable status within 72 hours and failed to reach hot shutdown within the next six hours as required by the TS. The total time one subsystem was inoperable was approximately 78.5 hours. Because this violation was of very low safety significance (Green) and FENOC entered this finding into its corrective action program (CR 03-07766), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. (NCV 05000334/2003-004-01, Failure to Declare River Water Pump with High Vibration Readings Inoperable).

1R16 Operator Work-Arounds (71111.16)

a. Inspection Scope

The inspectors reviewed the cumulative effects of the Unit 2 operator workarounds. The workarounds were reviewed to identify the impact on operator actions during plant transients or implementation of emergency operating procedures, as well as the cumulative impact on mitigating systems. The inspectors evaluated whether station personnel were identifying, assessing, and reviewing operator workarounds as specified in Beaver Valley Business Practice (BVBP)-OPS-0002, “Operations Work Arounds Control Room Deficiencies,” Rev. 8.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

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

- On July 29, 2003, 1MSP-E-39-302, “Vital Bus Weekly Battery Inspection,” Rev. 7, and 1OST-39.1D, “Weekly Station Battery Check, Battery No. 4,” Rev. 11, were successfully performed following identification on July 24, 2003, that the 1-4 station battery had a degraded cell.

- The inspectors reviewed the results of 1OST-30.02, “Reactor Plant River Water Pump 1A Test,” Rev 30 and 1BVT-2.30.1, “River Water Pump [1WR-P-1A] Head Capacity Curve,” Rev. 12, which were performed on July 18 following a complete rebuild of the pump.

- On September 26, the inspectors reviewed the results of a PMT performed on the ‘A’ SLCRS exhaust fan in accordance with 1OST-16.1, “Supplementary Leak Collection and Release Test for Exhaust Through the Main Filter Bank - Train A,” Rev. 7. This test was performed following fan discharge boot repairs.

- The inspectors reviewed the results of Unit 1 1MSP-21.24-I, "P-486 Loop 2 Steamline Pressure Protection Channel IV Calibration," Issue 2 Rev. 8, which was performed following the replacement of the Unit 1 RK-PRI-PROC-31 card. The card was replaced in response to a spike in B Channel IV on July 31, 2003. This issue was addressed by CR 03-08304.

- The inspectors reviewed the results of 2OST-30.03, “Reactor Plant River Water Pump 1B Test,” Rev 33 and 1BVT-2.30.2, “River Water Pump [1WR-P-1B] Head Capacity Curve,” Rev. 12, which were performed on September 16, following a complete rebuild of the pump.

- From September 24 - 26, post maintenance testing was conducted on the 2-1 Emergency Diesel Generator in accordance with 2OM-36.4.AM, “[2EGS*EG2-1] Run-In Procedure Following Cylinder Replacement,” Rev. 1 and 2OM-36.4.AO, “Emergency Diesel Generator [2EGS*EG2-1] Start-up Timing Test,” Rev. 1. The maintenance included cylinder liner replacement as well as replacement of a failed fuel injector.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20)

a. Inspection Scope

The inspectors observed selected 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 NOP-OP-1005, "Shutdown Safety," Rev. 0. Specific performance attributes evaluated, included configuration management, communications, instrumentation accuracy, and identification and resolution of problems. The inspectors evaluated the following activities:

- Pre-Outage Shutdown Safety Review
- Plant shutdown and cooldown
- Installation of temporary power to spent fuel pool cooling pump
- Clearance execution
- Configuration and inventory control during periods of reduced reactor coolant system (RCS) inventory due to the associated increase in shutdown risk.
- Performed walkdown of residual heat removal system
- Coordination of electrical bus work and minimization shutdown risk
- Performed walkdown of reactor coolant system level instrumentation
- Verified maintenance of boration flowpaths

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed and reviewed the following five surveillance activities, concentrating on verification of the adequacy of the test to demonstrate the operability of the required system or component safety function:

- 1OST-36.1, “Diesel Generator No.1 Monthly Test,” Rev. 38
- 1OST-24.2, “Motor Driven Auxiliary Feed Pump Test [1FW-P-3A],” Rev. 23
- 2OST-11.2, “Low Head Safety Injection Pump [2SIS*P21B] Test,” Rev. 18
- 2OST-13.1, “Quench Spray Pump [2QSS*P21A] Test,” Rev. 19
- 2BVT-1.13.5, “Recirculation Spray Pump Test,” Rev. 10

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed a temporary modification (TM) associated with the block valve for a PORV. The inspectors reviewed the associated implementing documents to verify the plant design basis and the system or component operability was maintained, which included ½-ADM-2028, “Temporary Modifications,” Rev. 3. TM 1-03-019 was installed on MOV-1RC-535, the block valve for power operated relief valve (PORV), PCV-1RC-455C. The motor operator for the block valve exceeds the maximum torque value of 500 ft-lbs. due to a failure in the limit switch assembly while stroking closed. This TM installed a stem clamp to maintain the valve in the closed position. Additionally the valve motor was de-energized and the nitrogen was isolated to the associated PORV. Following failure of the block valve, TS LCO 3.4.11, requires closing of the block valve. This TM serves as a positive measure of maintaining the block valve in a closed position.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Occupational Radiation Safety (OS)

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope

The inspector reviewed radiological work activities and practices and procedural implementation during observations and tours of the facilities and inspected procedures, records, and other program documents to evaluate the effectiveness of the access controls to radiologically significant areas.

On September 23, 24, and 25, 2003, the inspector, on three separate occasions, toured the radiologically-controlled area (RCA). The observed areas included the auxiliary and fuel handling buildings of Unit 1 and the reactor containment, auxiliary, fuel handling, and turbine buildings of Unit 2, and the common health physics access control point on the third floor of the South Office and Shop Building. At the common control point, the inspector observed radiation workers logging into the RCA on radiation work permits (RWPs) using electronic dosimeters and observed radiation workers exiting the RCA and then logging out of their RWPs. The inspector examined the use of personnel dosimetry and the radiological briefings for in-going radiation workers. Also, during these walkdowns, the inspector observed and verified the appropriateness of the posting, labeling, and barricading of radioactive material, radiation, contamination, high radiation, and locked high radiation areas. The inspector used a portable radiation survey meter to verify radiological conditions. The inspector observed work activities by both radiation workers and radiation protection technicians for compliance with the RWP requirements and radiological protection procedures. The inspector reviewed work activities and/or work documentation related to outage RWPS (RWPs 203-5010, -5028, -5039, -5040, and -5045) (See also the List of Documents Reviewed section).

The inspector reviewed the use of a Radiological Access Request form required for access to the Unit 2 reactor containment during this refueling outage (2R10). The inspector witnessed the morning radiation protection (RP) shift turnover meetings and selected RWP briefings for work in reactor containment on September 23, 24, and 25, 2003.

The inspector discussed with RP management the licensee's controls for highly activated or contaminated materials (non-fuel) stored within the spent fuel pool. The inspector reviewed the licensee's self-assessments and audits related to the access control program since the last inspection and the licensee documentation package for the performance indicator (PI) event which occurred since the last inspection (Section 4OA7).

The inspection included a selective review of documents and procedures (as listed in the List of Documents Reviewed section) to evaluate the adequacy of radiological controls. The review was against criteria contained in 10 CFR 19.12, 10 CFR 20 (Subparts B, C, D, F through J, L, and M), plant TSs, and site procedures.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspector reviewed the effectiveness of the licensee's program to maintain occupational radiation exposure as low as is reasonably achievable (ALARA).

The inspector reviewed the site's actual versus projected cumulative collective exposures for year-to-date and for refueling outages for Unit 1 and Unit 2. Unit 1 had a refueling outage (1R15) in March/April of this year. During this inspection, Unit 2 was in a refueling outage (2R10). The inspector reviewed the 2R10 Daily Radiation Work Permit (RWP) Exposure Summaries for September 22 through 26, 2003, which listed the exposure incurred on the last shift, the total exposure to the present date, the person-rem estimate, and percent of the estimate for each outage RWP. The inspector selectively examined ALARA reviews associated with the RWPs cited in Section 2OS1. The inspector reviewed automatic reevaluations of dose estimates by ALARA group personnel. The inspector noted that individual exposure tracking reports by work group were available to all on the Beaver Valley web site.

On September 22, 2003, the inspector witnessed a prejob ALARA briefing of workers for work on RWP 203-5059 (reactor conoseal replacement). Also, on September 24, the inspector witnessed a site ALARA committee meeting at which foreign object removal work on steam generator secondary sides (RWP 5037) and reactor head inspection work (RWPs 203-5035 and -5036) were discussed. The inspector also reviewed the ALARA committee meeting minutes from early May to early September 2003. The

inspector reviewed CRs related to ALARA and related corrective actions which had been generated since the last inspection.

The inspector discussed the Unit 1 and Unit 2 plant source terms with RP and ALARA personnel. The licensee stated that there were plans to replace the Unit 1 steam generators and to replace the Unit 1 reactor head with an integrated head within several years and that a steam generator replacement project group had been formed.

The inspector performed a selective examination of documents and procedures (as listed in the List of Documents Reviewed section) for regulatory compliance and for adequacy of control of radiation exposure.

The review was against criteria contained in 10 CFR 20.1101 (Radiation protection programs), 10 CFR 20.1701(Use of process or other engineering controls), and site procedures.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

a. Inspection Scope

The inspector reviewed the program for health physics instrumentation and for installed radiation monitoring instrumentation to determine the accuracy and operability of the instrumentation.

During the plant tours described in Section 2OS1, the inspector reviewed field instrumentation utilized by health physics technicians and plant workers to measure radioactivity and radiation levels, including portable field survey instruments, hand-held contamination frisking instruments, teledose meters, personnel contamination monitors, and portal monitors. The inspector verified current calibration, source checking, and proper instrument function. The inspector also identified and noted the condition, operability, and calibration status of selected installed area and process radiation monitors and any accessible local indication information for those monitors. The inspector also reviewed a student study guide for radiation survey meter requalification.

Additionally, the inspector discussed with the Health Physics Respiratory Protection Specialist the requirement for standby rescue personnel in 10 CFR 20.1703(f). The inspector reviewed procedure ½-HPP-3.10.005, Air-supplied Hood, which implemented this requirement.

The inspector performed a selective examination of documents and procedures (as listed in the List of Documents Reviewed section) for regulatory compliance and adequacy. The review was against criteria contained in 10 CFR 20.1501, 10 CFR 20 Subpart H, plant TSs, and site procedures.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

1. Occupation Exposure Control Effectiveness

a. Inspection Scope

The inspector selectively examined records used by the licensee to identify occurrences involving high radiation areas, very high radiation areas, and unplanned personnel exposures for the time period from August 2002 through August of 2003. The reviewed records included selected corrective action program records and Beaver Valley's Monthly Performance Indicator (PI) Data Elements records for this PI. This review was conducted against the applicable criteria specified in NEI's Regulatory Assessment Performance Indicator Guideline No. 99-02 (Rev. 2, with an effective date of November 19, 2001). The inspector also examined the licensee's documentation package for a PI event identified in CR 03-04951. This review and examination did not identify any significant problems with the PI accuracy or completeness and thus verified this performance indicator.

b. Findings

No findings of significance were identified.

2. Safety System Functional Failures

a. Inspection Scope

The inspectors reviewed the Unit 1 and Unit 2 performance indicators for safety system functional failures to determine whether the NRC approved guidance, provided in Nuclear Energy Institute 99-02, was properly implemented. Verification included review of the data collected, PI definitions, data reporting elements, calculational methods, definition of terms, and use of clarifying notes. The inspectors verified accuracy of the reported data, through reviews of LERs submitted during the period December 2002 through August 2003.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

1. Annual Sample Review

a. Inspection Scope

The inspectors selected one deficiency report for detailed review (CR 03-06816). The deficiency report was associated with activities in response to identified problems with respect to instrument loop power supplies to evaluate the timeliness and effectiveness of corrective actions. The inspectors evaluated condition reports, which documented power supply problems, reviewed the schedule for power supply replacements, and discussed the issues and schedule with engineering personnel.

b. Observations

Beaver Valley Power Station (BVPS) Unit 1 has experienced a number of problems with Westinghouse 7100 series instrument loop power supplies since November 2001. These problems have included failures in service, and failure to meet specifications during testing. In each instance, immediate corrective actions restored the instrument loop to service with a properly functioning power supply. First Energy Nuclear Operating Company evaluated the trend and determined that actions need to be taken to ensure the long-term reliability of the power supplies. Based on industry operating experience, vendor information, and BVPS plant specific failure data, preventive maintenance actions were developed to replace/refurbish the power supplies prior to expected end-of-life for the component. The licensee has also implemented preventive maintenance activities to ensure the long-term reliability of the 7300 series modules at Unit 2.

Due to age and availability issues with the Westinghouse 7100 series modules, FENOC is planning to replace critical instrument power supplies with new modules from NUS Instruments. Replacements have been scheduled so that all engineered safety features actuation system and solid state protection system loops should be completed by April 2004. In addition, FENOC assembled a team to perform a detailed review of power supply performance issues at BVPs. This effort included FENOC and Westinghouse personnel, and evaluated failure history, maintenance history, surveillance testing, vendor documentation, industry operating experience and design documentation. The team evaluated all the power supplies used in protection functions, or which may affect the safe and reliable operation of the facility. The recommendations of the review group were incorporated into the preventive maintenance activities which were developed.

b. Findings

No findings of significance were identified.

2. Occupational Radiation Safety

a. Inspection Scope

The inspector selected five issues identified in the Corrective Action Program (CAP) for detailed review (CR Nos. 02-07508, 03-05338, 03-07660, 03-07932, and 03-09659).

The issues were associated with a contamination event due to a discrete particle, improvements needed in contamination control, a site visit to benchmark contamination control processes, ineffective corrective actions for contamination control, and a collective significance review of CRs in radiation protection, respectively. The documented reports for the issues were reviewed to ensure that the full extent of the issues were identified, appropriate evaluations were performed, and appropriate corrective actions were specified and prioritized.

b. Findings

No findings of significance were identified.

3. Inspection Module Problem Identification and Resolution (PI&R) Review

The inspectors reviewed various CRs associated with the inspection activities captured in each inspection module detailed in this report. During this review, the inspectors assessed the fundamental ability of the licensee to identify adverse conditions for the areas inspected, and verified the licensee had entered these issues into its corrective action program for resolution. Where applicable, CRs reviewed during the inspection are documented under each module; however, for reviews that entailed large number of CRs, these are more appropriately documented in the Attachment.

4. Cross-References to PI&R Findings Documented Elsewhere

Section 1R15 describes a finding for failure to comply with TS LCO 3.7.1.4 where only one train of RW was operable for a period in excess of the LCO action time limit. The licensee had a previous opportunity to identify the finding.

4OA3 Event Follow-up

1. (Closed) LER 05000412/03-001: Lag Time Constant for Steam Line Pressure Channel Used in the Reactor Protection System Found Out of Tolerance

On December 31, 2002, during a routine 18-month calibration of the Loop B Steamline Pressure Protection Channel used in the Reactor Protection System for Unit 2, the channel was found to have a lag time constant of 8.95 seconds. BVPS Unit 2 Technical Specification 3.3.2.1, Table 3.3-3, requires that the lag time constant be less than or equal to five seconds. The coarse time constant switch was found to be on setting 6; procedurally the switch's normal position is setting 5. The coarse time constant switch was returned to setting 5, which returned the lag time constant value to within TS requirements. The inspectors determined that the 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 03-00044 and 03-00390.

2. (Closed) Licensee Event Report 05000334/2003-002-00 and 2003-002-01: Potential Overpressurization of Unit 1 Cable Vaults if a CO2 Discharge Were to Occur Results in an Unanalyzed Condition

The inspectors reviewed the licensee event report (LER) and related documentation, and observed the field conditions to verify the event was accurately reported as required by 10 CFR 50.73, causal assessment and corrective action assignments were appropriate to preclude recurrence and to determine whether the event was caused by a performance deficiency. The event was reported as an unanalyzed condition which significantly degraded plant safety.

4OA5 Other

1. Review of Industry Experience Evaluation

Institute of Nuclear Power Operations (INPO) personnel conducted a Beaver Valley Units 1 and 2 plant evaluation during the period September 30 - October 11, 2002. The final evaluation report was issued in June 2003. The inspectors reviewed the INPO plant evaluation report, determined that the observations and findings were consistent with documented NRC findings, and determined that no additional follow-up inspection associated with the plant evaluation was warranted.

2. (Closed) Unresolved Item (URI) 50-334/03-002-04: NRC to Review Circumstances Associated with Shipment of a Radioactive Part to a Vendor Laundry.

During a previous inspection conducted on March 17 - 21, 2003, the inspector reviewed CR No. 03-00244. This CR documented that a neutron-activated metal clip was inadvertently mixed in with soiled anti-contamination clothing during replacement of an excore detector on November 15, 2002, inside the key-way area of the containment. The anti-contamination clothing and clip were shipped in November 2002 as a controlled radioactive materials shipment to a nuclear laundry. At the time of this inspection, the inspector identified the need for additional information to complete a review of this matter relative to the licensee's conformance with applicable regulatory requirements. During the current inspection, the inspector reviewed the subject condition report, its cause analysis, and the corrective actions taken. Additionally, the inspector examined radiation surveys of the key way and of the clip, the activity and radionuclide information for the clip, RWP 102-6008 for the excore detector replacement work and its ALARA review, the laundry shipping record and procedure, and the personnel dose records for the subject RWP. The inspector reviewed the account of the excore detector incident documented by the radiation protection technician providing job coverage. The inspector also discussed the specifics of the event with radiation protection management. Based on this information, the inspector did not identify any regulatory requirement which had been violated, and, therefore, the unresolved item is being closed.

4OA6 Meetings, Including Exit

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 October 17, 2003. The licensee acknowledged the findings presented.

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

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- TS 6.12.2 requires that each high radiation area, in which the intensity of radiation is greater than 1000 millirem/hour, be provided with locked doors to prevent unauthorized entry into such areas. Contrary to this, on April 10, 2003, the door to such an area was left unlocked and unattended for a period of time. This was identified in the licensee's corrective action program as Condition Report 03-04951. This violation is of very low safety significance because it did not constitute an ALARA finding, did not result in an overexposure, did not create a substantial potential for overexposure, and did not compromise the licensee's ability to assess dose to workers.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

W. Pearce, Vice President
R. Mende, Director, Work Management
V. Kaminskas, Director, Maintenance
L. Freeland, Manager, Nuclear Regulatory Affairs & Corrective Actions
R. Freund, Rad Ops Supervisor, Unit 2
P. Hartig, System Engineer
J. Lash, Plant General Manager
J. Lebda, Supervisor, Radiological Engineering and Health
E. Loehlein, Reactor Vessel Haed Inspection, Project Manager
D. Mickinac, Engineer, Regulatory Compliance
L. Miller, System Engineer
P. Sena, Manager, Nuclear Operations
B. Sepalak, Licensing Engineer
J. Sipp, Manager, Nuclear Radiation Protection, Rad Ops, Units 1 and 2
M. Testa, Project Manager
T. Cosgrove, Director, Plant Engineering

Westinghouse Electric Company

D. Adamonis, Engineer

NRC Personnel

P. Cataldo, Senior Resident Inspector
G. Smith, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

05000334, 412/2003-004-01	NCV	Failure to comply with TS 3.7.4.1 (Section 1R15)

Closed

05000334/2003-001	LER	Safety Injection and Reactor Trip Due to Inadvertent Main Steam Isolation Valve Closure (Section 1R14.2)
05000334/2003-002-00/ 05000334/2003-002-01	LER	Potential Overpressurization of Unit 1 Cable Vaults if a CO_2 Discharge Were to Occur, Results in an Unanalyzed Condition (Section 4OA3)

05000334/2003-002-04	URI	NRC to Review Circumstances Associated with Shipment of a Radioactive Part to a Vendor Laundry (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

½ Operational Surveillance Test (OST) 30.19A, "Main Intake Structure 'A' Bay Silt Check and Bay Cleaning," Rev. 4
½ OST-30.19B, "Main Intake Structure 'B' Bay Silt Check and Bay Cleaning," Rev. 4
½ OST-30.19C, "Main Intake Structure 'C' Bay Silt Check and Bay Cleaning," Rev. 4
½ OST-30.19D, "Main Intake Structure 'D' Bay Silt Check and Bay Cleaning," Rev. 4
Plant Engineering Summer Readiness Report - 2003

Section 1RO4: Equipment Alignments

Procedures

2OM-13.3.B.1, "QSS Valve List," Rev. 7
2OM-13.3.B.2, "Valve List - 2RSS," Rev. 7
2OM-13.3.C, "Power Supply and Control Switch List," Rev. 7
2OM-36.3.B.1, "Valve List - 2EDG," Rev. 7
2OM-36.3.B.2, "Valve List - 2EDA," Rev. 12
2OM-36.3.B.3, "Valve List - 2EDF," Rev. 9
2OM-36.3.B.4, "Valve List - 2EDO," Rev. 9
2OM-36.3.B.5, "Valve List - 2EDS," Rev. 10
2OM-36.3.C, "Power Supply and Control Switch List - Diesel Generator 2-2," Rev. 10

Section 1RO7: Heat Sink Performance

Calculations

EPRI TR-107397 "Service Water Heat Exchanger Testing Guidelines," Final Report
Calculation PGT-2002-1404, "Evaluation of the BVPS U1 CCW Heat Exchanger CCW Surface Sensor Methodology Bias," Rev. 1
Calculation PGT-2002-1405, "Evaluation of the BVPS U1 CCW Heat Exchanger RW Surface Sensor Methodology Bias," Rev. 2
Calculation PGT-2002-1406, "Evaluation of the BVPS U1 CCW Heat Exchanger CCW Flow Instrument Bias Uncertainty," Rev. 2
Calculation PGT-2002-1525, "Evaluation of the BVPS U1 CC Heat Exchanger CC-E-1A,B,C, Thermal Performance Test Data Evaluation and Uncertainty Analysis," Rev. 0
Calculation 8700-DMC-2571: FE Design Analysis, Rev. 3

Section 1R08: Inservice Inspection

NRC Inspection Manual

TI 2515/152	Reactor Pressure Vessel Lower Head Penetration Nozzles Bulletin 2003-02
TI 2515/150	Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles
IP 57050	Visual Testing Examination

NRC Bulletins

2003-02	Leakage From Reactor Pressure Vessel Lower Head Penetrations 08/21/03

Beaver Valley Power Plant Orders Unit2

200016190	Perform Under Head Inspection of Unit 2 RPV
200016190	Perform Visual Inspection of 50 Bottom Mounted Instrumentation Nozzles
200016180	Perform Top Head Inspection Unit 2

Chemistry Report

D.J. Salera	Chemical Analysis of Residue from Bottom of Reactor Vessel

FENOC

L-03-138	BV Units 1&2, Response to NRC Bulletin 2003, 09/19/2003
L-03-103	BV1 Reactor Head Inspection 60-Day Report
L-03-088	BY2 Order EA-03-009 Relaxation Request 7/29/03
L-03-035	BV Units 1&2 Order Establishing Interim Inspection Requirements 3/3/03

BMI Summary

Weakland, Dennis	Evaluation of BMI Inspections 2R10, 09/17/2003
MRS-SSP-1520	WGHS RVBH Cleaning Condition Assessment Appendix D, 9/15/03

Examination Reports

WGHS BV2 04 01	Ultrasonic Report Sheets Penetration 04 09/21/03
WGHS BV2 04 01	Eddy Current Report Sheets Penetration 04 09/21/03
WGHS BV2 09 01	Ultrasonic Report Sheets Penetration 09/21/03
WGHS BV2 09 01	Eddy Current Report Sheets Penetration 09/21/03
WGHS BV2 10 01	Ultrasonic Report Sheets Penetration 10 09/22/03
WGHS BV2 10 01	Eddy Current Report Sheets Penetration 10 09/22/03
WGHS BV2 12 01	Ultrasonic Report Sheets Penetration 12 09/20/03
WGHS BV2 12 01	Eddy Current Report Sheets Penetration 12 09/20/03
WGHS BV2 14 01	Ultrasonic Report Sheets Penetration 14 09/22/03
WGHS BV2 14 01	Eddy Current Report Sheets Penetration 14 09/22/03
WGHS BV2 15 01	Ultrasonic Report Sheets Penetration 15 09/21/03
WGHS BV2 15 01	Eddy Current Report Sheets Penetration 15 9/21/03
WGHS BV2 19 01	Ultrasonic Report Sheets Penetration 19 09/22/03

WGHS BV2 19 01 Eddy Current Report Sheets Penetration 19 09/22/03

Corrective Action

CR 03-01486 CA 01 Unit 2 Response to NRC 2003-02, 02/26/03
CR 03-01486 CA 02 Unit 2 Response to Order, 03/03/03
CR 03-01486 CA 03 Unit 2 Order Effectiveness, 07/15/03
CR 03-01486 CA 04 Unit 2 Calculation Development, 02/26/03
CR 03-01486 CA 05 Unit 2 Inspection List, 03/07/03
CR 03-01486 CA 06 Unit 2 Visual Inspections, 02/21/03
CR 03-01486 CA 07 Unit 2 Response to Order, 03/03/03
CR 03-01486 CA 08 Unit 2 Boric Acid Program, 03/07/03
CR 03-01486 CA 09 Unit 2 EDY Calculation, 07/31/03
CR 03-01486 CA 10 Unit 2 Relaxation Requirements 03/29/03
CR 03-01486 CA 11 Unit 2 Flaw Repair Technique, 03/29/03
CR 03-01486 CA 12 Unit 2 Relaxation Approval,04/18/03
CR 03-01486 CA 13 Unit 2 Procedure Approval, 5/13/03
CR 03-01486 CA 14 Unit 2 Regulatory Affairs Approval, 06/17/03l
CR 03-01486 CA 16 Unit 2 NRC Approval for Relaxation, 07/15/03
CR 03-01486 CA 17 Unit 2 Report Submitted, 06/18/03
CR 03-01486 CA 18 Unit 2 Reporting Requirement, 12,09,03
CR 03-01486 CA 19 Unit 2 Reporting Requirement, 11/18/03
CR 03-01486 CA 20 Unit 2 Reporting Requirement, 06/25/03
CR 03-01486 CA 21 Unit 2 Request for Relaxation, 07/29/ 03
CR 03-08900 CA 01 Unit 2 Lower Head Penetration Program
CR 03-08900 CA 02 Unit 2 Bulletin 2003-02 Visual Inspection, 09/20/03
CR 03-08900 CA 03 Unit 2 Bulletin 2003-02 Response, 10/10/03
CR 03-08900 CA 04 Unit 2 Bulletin 2003-02 Visual Inspection, 09/19/03
CR 03-08900 CA 05 Unit 2 Boric Acid Inspection, 09/12/03
CR 03-08900 CA 06 Unit 2 Commitment from L-03- 138, 11/30/03
CR 03-08900 CA 07 Unit 2 Commitment from L-03- 138, 09/19/03
CR 03-08900 CA 08 Unit 2 Commitment from L-03- 138, 09/19/03
CR 03-08900 CA 09 Unit 2 Commitment from L-03- 138, 11/30/03

Condition Reports

CR 03-01486 Unit 2 Reasonable Assurance, 02/12/03
CR 03-09647 Unit 2 Debris Assessment, 09/18/03
CR 03-08900 NRC Bulletin Leakage from Lower Head Penetrations 8/22/2003

Regulatory Applicability Determination

03-03024 RVH Unit 2 WGHS Head Inspection Procedure, 08/20/03
03-03025 RVH Unit 2 WGHS Remote Video Inspection, 08/20/03
03-03030 WGHS Field Service Procedure MRS-SSP-1520

Drawings

35RO5013 Beaver Valley 2 Lower Head Perforation Inspection Map

Miscellaneous Photographs

Gap-Scanner for UT/ECT Inspection of ID Tube Surfaces
Gap-Scanner Probes
BV 2 Reactor Bottom Head Penetration Nozzles (3)
Evidence of Leakage of South Texas Reactor Small Leakage
Photographs of Lower Head Penetration Nozzles with Surface Residue

Section 2OS1: Access Control to Radiologically Significant Areas (71121.01)

Documents

RWP 203-5010, Rev. 0, Containment scaffolding
RWP 203-5028, Rev. 0, Fuel transfer system upgrade (reactor containment building)
RWP 203-5039, Rev. 0, Installation and removal of steam generator equipment
RWP 203-5040, Rev. 0, Platform support for steam generators
RWP 203-5045, Rev. 0, Valve repair/all valves except residual heat removal/excess letdown platforms
Beaver Valley Power Station Radiological Access Request Form For Containment Entry
RP Organizational Challenges
Nuclear Quality Assessment report for first quarter of 2003 (BV-C-03-01)
Nuclear Quality Assessment report for second quarter of 2003 (BV-C-03-02)

Procedures

Procedure 1/2HP-3.02.003, Rev. 3, Decontamination control
Procedure 1/2HPP-3.04.044, Rev. 1, High activity airborne Xe-133 exposure control
Procedure 1/2HPP-3.07.013, Rev. 2, Barrier checks
Procedure 1/2HPP-3.08.001, Rev. 2, Radiological work permit

Section 2OS2: ALARA Planning and Controls (71121.02)

Documents

RWP 203-5010, Rev. 0, Containment scaffolding
RWP 203-5028, Rev. 0, Fuel transfer system upgrade (reactor containment building)
RWP 203-5039, Rev. 0, Installation and removal of steam generator equipment
RWP 203-5040, Rev. 0, Platform support for steam generators

RWP 203-5045, Rev. 0, Valve repair/all valves except residual heat removal/excess letdown platforms
ALARA review 03-02-11, Fuel transfer system upgrade (reactor containment building)
ALARA review 03-2-19, Installation and removal of steam generator equipment
ALARA review 03-2-20, Platform support for steam generators
ALARA review 03-02-24, Valve repair/all valves except RHR/excess letdown platforms
ALARA review 03-02-31, Containment scaffolding
2R10 Daily RWP Exposure Summaries for September 22 through 26, 2003
ALARA committee meeting minutes for May 7, May 16, May 21, June 4, July 9, July 17, July 30, August 27, and September 3, 2003
ALARA report for Unit 1's 15th refueling outage (March 8 to April 29, 2003)
Monthly collective radiation exposure for Unit 1 for 2003
Monthly collective radiation exposure for Unit 2 for 2003

Procedures

1/2ADM-1621, ALARA program, Rev. 0
1/2HPP-3.08.001, Rev. 2, Radiological work permit
1/2HPP-3.08.005, Rev. 2, ALARA review program

Section 2OS3: Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

Documents

Radiation survey meter requalification student study guide, MISC-3202, Rev. 0

Procedures

Procedure 1/2HPP-3.10.005, Rev. 2, Air-supplied hood

Section 4OA2: Other Activities

Condition Reports

01-7371	01-7383	01-7417	01-7690	02-01540	02-03772
03-05852	02-08142	01-8262	02-0040	02-00115	02-02639
03-00501	03-04581	03-06288	03-06816	03-01295	

Miscellaneous Documents

LER 50-334/2003-002-00
LER 50-334/2003-002-01
Power Supply Latent Issues Report

TI 2515/150 Rev 2 Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles

Reporting Requirements

a.1. Was the examination performed by qualified and knowledgeable personnel?

The visual examination (VT) of the outside surface of the head and areas around the CRDMs was performed by qualified and knowledgeable personnel with certification to the American Society of Mechanical Engineers (ASME), Section XI, Level II and Level III for visual examiners using effective remote video imaging and optical equipment. The eddy current (ECT) and ultrasonic examinations (UT) were performed by qualified and knowledgeable personnel using calibrated equipment and procedures demonstrated to be capable of identifying CRDM degradation. In addition, Level II and Level III examiners had received training in this type of inspection that included a review of industry experiences, lessons learned, inspection results and procedure requirements.

a.2. Was the examination performed in accordance with approved procedures?

The VT, ECT and UT were in accordance with approved and adequate procedures by the qualified examination personnel.

a.3. Was the examination able to identify, disposition, and resolve deficiencies?

The examination was adequate to identify, disposition and resolve deficiencies. A detailed systematic visual examination by quadrants was made of each penetration. The VT examination documentation included a written record and video. The ECT and UT documentation included computer based data storage for re-review during future examinations.

a.4. Was the examination capable of identifying the PWSCC phenomenon described in Order EA-03-009?

The examination performed was capable of identifying the PWSCC phenomenon described in the Order. The examination was adequate to identify, disposition and resolve deficiencies. The VT, ECT and UT examinations were complimentary to each other in providing a full outside head surface and CRDM/weld volumetric examination.

b. What was the condition of the reactor vessel head?

The general condition of the head was mostly clean bare metal with minor debris remaining. The video taped inspection showed no boron deposits that were considered to result from leakage through the CRDM to head welds or the CRDMs.

c. Could small boron deposits, as described in the Bulletin 2001-01, be identified and characterized?

Small boron deposits, as described in Bulletin 2001-01, could have been identified and characterized by the visual examination and chemical analysis of any residue. None were found during the visual inspection.

d. What material deficiencies were identified that required repair?

There were no deficiencies requiring repairs identified.

e. What, if any, significant items that could impede effective examination?

The thermal sleeves that are inside most of the CRDMs and CRDM weld distortion result in a narrow gap between the sleeve OD and the CRDM inner diameter (ID) that prevents UT examination of some CRDMs and makes ECT examination difficult.

f. The basis for the temperature used in the susceptibility ranking calculation.

The basis for determination of the temperature to be used in the susceptibility ranking is described in calculation CRDMEDY - 04058M2, using the reactor head temperature during the lifetime history of full power operation of the reactor and the reference operating temperature.

g. During non-visual examinations, was the disposition of indications consistent with the guidance provided in Appendix D of this TI? If not, was more restrictive flaw evaluation guidance used?

Disposition of non-visual indications was available in the procedures for VT, UT and PT.

h. Did procedures exist to identify potential boric acid leaks from pressure retaining components above the RPV head?

Procedures do exist to identify potential boric acid leaks through chemical analysis.

i. Did the licensee perform appropriate follow-on examinations for indications of boric acid leaks from pressure retaining components above the RPV head?

There were no boric acid leaks reported by the licensee.

TI 2515/152 Rev 0 Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02)

Reporting Requirements

a.1. Was the examination performed by qualified and knowledgeable personnel?

The visual examination (VT) of the lower head penetrations and nozzles and areas around the instrument tubes was performed by qualified and knowledgeable personnel with certification to the American Society of Mechanical Engineers (ASME), Section XI, Level II and Level III for visual examiners using effective remote video and optical equipment. In addition, Level II and Level III examiners had received training in this type of inspection, included a review of industry experiences, lessons learned, inspection results and procedure requirements.

a.2. Was the examination performed in accordance with approved procedures?

The VT examination was performed in accordance with approved and adequate procedures.

a.3. Was the examination able to identify, disposition, and resolve deficiencies?

The examination was adequate to identify, disposition and resolve deficiencies. A detailed systematic visual examination of tubing quadrants was made at each penetration. The VT examination documentation included a written record and video.

a.4. Was the examination capable of identifying the PWSCC phenomenon described in the bulletin?

The examination performed was capable of identifying the PWSCC phenomenon described in the Bulletin. The examination was adequate to identify, disposition and resolve deficiencies.

b. What was the physical condition of the RPV lower head? (e.g. debris, insulation, dirt, boric acid deposits from other sources, physical layout, viewing obstructions)

From samples of remote 20x photographs taken of 4 quadrants of each tube at each intersection between the lower shell perforations and BMI tubes, the inspector examined the condition of the lower head surfaces that had a thin white residual powdery substance. Around the boss of each penetration, the inspector reviewed the licensee finding that on 171 of 200 perforation quadrants, there was no evidence of debris or material in the annulus between the tubing and boss, whereas 29 of the 200 quadrants having slight discoloration marks were identified as requiring additional evaluation. The licensee attributed this substance to residue from protective coating (e.g., tape) that was likely applied during RPV head initial fabrication.

c. Could small boron deposits, as described in the Bulletin 2003-02, be identified and characterized?

Small boron deposits, as described in Bulletin 2003-02, could have been identified and characterized by the visual examination and chemical analysis of any residue.

d. What material deficiencies (cracks, corrosion, etc.) were identified that required repair?

There were no material deficiencies found by the inspector.

e. What, if any, impediments to effective examinations, for each of the NDE methods, were identified (e.g., insulation, instrumentation, nozzle distortion? are significant items that could impede effective examination)?

The inspector noted difficulties in access to the small bottom head examination and the difficulties in reaching all the tubes for four (4) quadrant examination. There was also some consideration of ALARA requiring the utilization of a remote crawler with an attached 20x zoom lense. There were also difficulties with access fully around the lower compartment.

f. Did the licensee perform appropriate follow-on examinations for indications of boric acid leaks from pressure retaining components above the RPV lower head?

The licensee performed additional examination of the white residue and markings of protective taping on the lower head surface.

LIST OF ACRONYMS USED

ADAMS	Component of NRC's Document System
ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
BMI	Bottom Mounted Instrumentation
BVPS	Beaver Valley Power Station
CAP	Corrective Action Program
CCCW	Closed Loop Component Cooling Water
CR	Condition Report
CRDM	Control Rod Drive Mechanism
CFR	Code of Federal Regulations
CR	Condition Report
EDG	Emergency Diesel Generator
ECT	Eddy Current Testing
EDY	Effective Degradation Years
EFPY	Effective Full Power Years
EPRI	Electric Power Research Institute
FENOC	First Energy Nuclear Operating Company
FSAR	Updated Final Safety Analysis Report
INPO	Institute of Nuclear Power Operations
ISI	Inservice Inspection
LHP	Lower Head Penetration
LCO	Limiting Condition of Operation
LER	Licensee Event Report
MOV	Motor Operated Valve
MR	Maintenance Rule
MRSC	Maintenance Rule Steering Committee
MSSV	Main Steam Safety Valve
MWT	Megawatts Thermal
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NQA	Nuclear Quality Assurance
NRR	Nuclear Reactor Regulation
NPDAP	Nuclear Power Division Administrative Procedure
NRC	Nuclear Regulatory Commission
OST	Operational Surveillance Test
PARS	Publicly Available Records
PI	Performance Indicator
PMT	Post Maintenance Test
PT	Penetrant Testing
PWSCC	Primary Water Stress Corrosion Cracking
QS	Quench Spray
RCS	Reactor Coolant System
RW	River Water
RW/SW	River Water/Service Water
RO	Refuel Outage
RPV	Reactor Pressure Vessel

RV	Reactor Vessel
RWP	Radiation Work Permit
SDP	Significance Determination Process
SLCRS	Supplementary Leak Collection and Release System
SSC	System, Structures, Components
SW	Service Water
TI	Temporary Instruction
TM	Temporary Modification
TS	Technical Specification
URI	Unresolved Item
UT	Ultrasonic Testing
VHP	Vessel Head Penetration
VT	Visual Test