March 17, 2000

EA 00-45
EA 00-53

Mr. L. W. Myers
Senior Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Post Office Box 4
Shippingport, Pennsylvania 15077

SUBJECT: NRC INTEGRATED INSPECTION REPORT NOS. 05000334/2000001 and 05000412/2000001

Dear Mr. Myers:

This refers to the inspection conducted from January 9 through February 19, 2000, at the Beaver Valley Power Station facility for which the findings were discussed in an exit on February 24, 2000. The enclosed report represents the results of this inspection.

During the 6-week inspection period, your conduct of activities at the Beaver Valley Power Station facility was characterized by safe operation of the plant. Unit 1 operators responded with a strong focus on safety to failures of river water pumps and to a packing leak from a charging flow control valve. In addition, management's initial response to the failure of two of the three safety related river water pumps was appropriate. The event response team effectively evaluated and determined the cause of the failures. Notwithstanding the strong immediate response to the event, two river water pumps were inoperable for approximately six days as a result of inadequate evaluation and application of a temporary procedure.

Based on the results of this inspection, an apparent violation was identified. This issue involved an inappropriate procedure for the circumstances, as required by 10 CFR 50, Appendix B, Criterion V. An inadequate evaluation and application of a temporary operating procedure caused the failure of two river water pumps to start because of pump shaft thermal expansion due to higher seal water supply temperature. Your investigation identified that one train of river water was inoperable for approximately 6 days. This is the third event in the past year that has adversely affected the risk significant river water (Unit 1) or service water (Unit 2) systems. In July 1999 inadequate corrective actions and preventive maintenance resulted in biofouling problems for the Unit 2 service water system. We issued a severity level three violation for the problems associated with this event. In November 1999 inadequate corrective actions resulted in a water hammer event that challenged the operability of the service water system. This event

was described in NRC Integrated Inspection Report 05000334(412)/1999010 as an apparent violation. No Notice of Violation is presently being issued for the February 2000 river water pump failures or the November 1999 service water findings. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report and the NRC Integrated Inspection Report 05000334(412)/1999010 may change as a result of further NRC review.

An open predecisional enforcement conference to discuss the two apparent violations for the February 2000 river water pump failures and the November 1999 water hammer event has been scheduled for April 13, 2000. The decision to hold a predecisional enforcement conference does not mean that the NRC has determined that violations have occurred or that enforcement action will be taken. This conference is being held to obtain information to enable the NRC to make an enforcement decision, such as a common understanding of the facts, root causes, missed opportunities to identify the apparent violations sooner, corrective actions, significance of the issues and the need for lasting and effective corrective action. In addition, this is an opportunity for you to point out any errors in our inspection reports and for you to provide any information concerning your perspectives on 1) the severity of the violations, 2) the application of the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and 3) any other application of the Enforcement Policy to this case, including the exercise of discretion in accordance with Section VII.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these apparent violations is required at this time.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,

/RA/

Richard V. Crlenjak, Deputy Director
Division of Reactor Projects

Docket Nos.: 05000334; 5000412
License Nos: DPR-66, NPF-73

Enclosure: Inspection Report Nos. 05000334/2000001, 05000412/2000001

cc w/encl:
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R. Fast, Director, Plant Maintenance
F. von Ahn, Director, Plant Engineering
R. Donnellon, Director, Projects and Scheduling
M. Pearson, Director, Plant Services
W. Pearce, Manager, Operations
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REGION I

Docket Nos.	05000334, 05000412
License Nos.	DPR-66, NPF-73
Report Nos.	05000334/2000001, 05000412/2000001
Licensee:	FirstEnergy Nuclear Operating Company
Facility:	Beaver Valley Power Station, Units 1 and 2
Location:	Post Office Box 4 Shippingport, Pennsylvania 15077
Dates:	January 9 through February 19, 2000
Inspectors:	David M. Kern, Senior Resident Inspector Glenn T. Dentel, Resident Inspector Geoffrey A. Wertz, Resident Inspector Gregory C. Smith, Senior Physical Security Inspector, DRS Kathleen D. Modes, Radiation/Security Specialist, DRS
Approved by:	John F. Rogge, Chief Projects Branch 7 Division of Reactor Projects

EXECUTIVE SUMMARY

Beaver Valley Power Station, Units 1 and 2
NRC Inspection Report 05000334/2000001 and 05000412/2000001

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a six-week period of resident inspection; in addition, it includes the results of an announced inspection by regional security inspectors.

Operations

- An observant reactor operator identified a low level indication for the volume control tank due to a packing leak on the charging flow control valve. The plant staff re-activated a temporary operating procedure and the operating crew safely removed the valve from service. (Section O1.2)

- Due to a common mode failure, two of three safety related Unit 1 river water (RW) pumps failed to start causing a RW train to be inoperable from February 5 to 11. Failure to recognize the effect of a temperature differential between the RW and the RW pump seal water resulted in an inadequate evaluation and application of a temporary procedure, and the subsequent failures to start of the RW pumps. This was an apparent violation. (Section O2.1)

- Operators responded to the degraded river water (RW) system with the appropriate safety focus. Measures were implemented to protect the opposite RW train including restricting access to vital components. The auxiliary RW system was verified to be available. Operators reviewed abnormal operating procedures associated with the loss of RW, as a precautionary measure. (Section O2.1)

- The Event Response Team did a thorough initial evaluation and identified several potential causes for the river water (RW) pump binding. The team systematically investigated the potential causes and quickly focused on the thermal binding of the pumps due to a temperature differential. Testing validated the suspected cause for the RW pump binding. Appropriate corrective actions and preventive maintenance testing returned the pumps to operable status. (Section O2.1)

- Good controls and extensive reviews were conducted with Units 1 and 2 technical specification interpretations. Deficiencies were identified with the quality and controls of the technical specification clarifications. Corrective actions addressed the deficiencies. (Section O3.1)

- Unit 2 operators demonstrated a questioning attitude during routine tours of the plant. (Section O4.1)

- Event descriptions and corrective actions contained in five licensee event reports were appropriate. (Sections O8.1, O8.3, O8.4, E8.1, and S8)

Maintenance

- Three surveillance tests were completed safely with appropriate supervisory oversite. (Section M1.1)

- Corrective action to improve preventive maintenance scheduling and limit equipment out- of-service time was not effectively implemented. For example, SLCRS (primary auxiliary building ventilation) was taken out-of-service twice in January when the work could have been scheduled during a single train outage. (Section M1.2)

- Preventive maintenance on service water and river water vacuum break check valves was completed satisfactorily. Deficiencies with the preventive maintenance procedure were identified. Verification that the check valve was adequately cleaned and not binding was added to the preventive maintenance procedure. A longstanding material condition problem with the vacuum break isolation valve hampered the work. (Section M2.1)

- The maintenance procedure change request backlog was generally classified correctly and proper administrative controls were instituted for the high priority change requests. (Section M3.1)

Engineering

- System engineers did not aggressively pursue two 1999 failures of an atmospheric steam dump valve. Initial troubleshooting of the January 2000 valve failure was not comprehensive and extended the out-of-service time. Subsequent maintenance activities, engineering support activities, and post maintenance testing were adequate to return the valve to operability. (Section E2.1)

Plant Support

- Security and safeguards activities, in the areas of access authorization, alarm stations, communications, and protected area access control of personnel, packages, and vehicles, were implemented in accordance with the licensee's commitments and NRC requirements. In addition, security facilities and equipment were well maintained and reliable. (Section S1 and S2)

- Security and safeguards procedures and documentation were properly implemented. Event logs were properly maintained and effectively used to analyze, track, and resolve safeguards events. (Section S3)

- The security force members adequately demonstrated the requisite knowledge necessary to effectively implement their duties and responsibilities with their position. Security force personnel were trained in accordance with the requirements of the Training and Qualification Plan, training documentation was properly maintained and accurate, and the training staff provided effective training. (Sections S4 and S5)

- Security Department’s audits were comprehensive in scope and depth, the audit findings were reported to the appropriate level of management, and the program was being properly administered. In addition, a review of the documentation applicable to the self-

assessment program indicated that the program was effectively implemented to identify and resolve potential weaknesses. (Section S7)

TABLE OF CONTENTS

Table of Contents

Report Details

Summary of Plant Status

Unit 1 began this inspection period at 100 percent power. On February 1 the unit began a power coastdown prior to the 13th refueling outage (13R). On February 13 operators reduced power to 50 percent to perform planned surveillance testing. As planned to commence the refueling outage, on February 15, operators took the turbine generator off line, and on the following day placed the reactor into cold shutdown.

Unit 2 began this inspection period at 100 percent power and remained at or near full power throughout the period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious; specific events and noteworthy observations are detailed in the sections below.

O1.2 Unit 1 Operator Response to Charging Flow Control Valve Packing Failure

a. Inspection Scope (71707)

On February 4, 2000, at approximately 9:00 a.m., the Unit 1 reactor operator noticed a decrease in volume control tank (VCT) level along with a level increase in the primary drain transfer tank. Subsequent investigation indicated a six gallon per minute (gpm) packing leak had developed from the charging flow control valve [FCV-1CH-122]. The inspectors observed the operating crew's response to the leak.

b. Observations and Findings

The reactor operator was observant and noticed the chart recorder indicating VCT tank level decreasing. The operator also noticed that the primary drain transfer tank level and charging flow had increased six gpm. The normal sources to the primary drain transfer tank were reviewed and the suspected source of the increased leakage was quickly identified as the charging flow control valve packing drain. Visual observation of the valve identified minor external leakage.

The operating crew appropriately reviewed the technical specification requirements for identified leakage (10 gpm), quantified the leakage estimate, and notified senior station management. The general manager of nuclear operations decided to re-activate temporary operating procedure (TOP), 1TOP-96-15, "Bypassing [FCV-1CH-122] For Maintenance," Rev. 3, and repair the valve. The procedure was reviewed by the inspectors and determined to be well written. The preevolution briefing accurately described the tasks to be performed, emphasized the communications between the reactor operator and the plant operator in the field, and reviewed industry lessons

learned. The crew performed the procedure safely. The valve was isolated and charging flow was correctly established through the use of the TOP. Communications were effective throughout the event.

The valve packing was replaced the following day and the charging flow control valve was returned to operation.

c. Conclusions

An observant reactor operator identified a low level indication for the volume control tank due to a packing leak on the charging flow control valve. The plant staff re-activated a temporary operating procedure and the operating crew safely removed the valve from service.

O2 Operational Status of Facilities and Equipment

O2.1 Unit 1 River Water Pumps Failure to Start

a. Inspection Scope (93702, 71707, 62707, 37551)

On February 8 at 12:09 p.m., while performing Operational Surveillance Test (OST) 30.12B, "River Water (RW) Full Flow Test," Rev 13, the "B" RW pump failed to start. Preliminary investigation identified that the pump motor breaker tripped on over-current. This rendered the "B" train of safety related river water inoperable. The "C" river water pump was then aligned to the "B" river water header and, at 5:16 p.m., it tripped in a similar manner as the "B" RW pump.

A Multi-Disciplinary Event Response Team (ERT) was convened to determine the root cause and corrective actions. The inspectors observed the troubleshooting efforts used by the ERT to identify and correct the pump problems.

b. Observations and Findings

Operator Response

Upon identifying that the "B" pump would not start, operators promptly declared the "B" RW train inoperable. TS 3.7.4.1 requires both trains of RW supplying safety related loads to be operable. If less than two systems are operable, the inoperable train must be restored within 72 hours or the plant must be placed in Hot Standby within the following 6 hours. Condition reports 000528 and 000531 were initiated.

Operators, with the "B" RW train unavailable, implemented measures to protect the "A" RW train. Access to the "A" intake cubicle and other supporting equipment was restricted. The operators verified that the auxiliary river water (ARW) system was not similarly affected. The ARW pumps were rotated by hand and electrically started. The ARW pumps rotated easily. Operators also reviewed abnormal operating procedures associated with the loss of river water, as a precautionary measure. The inspectors concluded that the operators implemented good compensatory measures to ensure

adequate RW supplies were available during this period. The event was properly reported to the NRC in accordance with 10 CFR 50.72.

Past Problems with Seal Water Purity

Unit 1 has three safety related RW pumps to supply the primary side heat loads and two non-safety related Raw Water/Turbine Plant (TP) RW pumps that supply non-safety related secondary loads.

The original system design had seal water being supplied from the discharge of the RW pumps to both the RW and TP RW pumps after passing through a motorized strainer. [Note: Each RW pump has a safety related supply which is from its own pump discharge through a Y-strainer.] Numerous problems were experienced before original plant startup with pump seal and bearing failures as a result of silt in the river water. In June 1975, a sand filter (non-safety related) was added. The sand filter processed river water from the discharge of the TP RW pumps and provided seal water to the RW and TP RW pump seals. Minimal improvement was noted as silt contaminated the sand filters within 2 months of operation. The station's filtered water system was chemically tested in late 1975 and determined to be suitable as RW and TP RW seal water supply. The filtered water system was supplied from the TP RW pumps, and after mechanical and chemical treatment, provided filtered water to the seals of the RW and TP RW pumps. The system was connected in late 1976 and had been providing an acceptably clean source of seal water.

Event Assessment

The plant manager convened an ERT to investigate the cause and recommend corrective actions. The ERT determined that the pumps failed to start due to mechanical interference between the impeller and the pump casing. The cause of the interference was due to thermal expansion of the pump shaft as a result of elevated seal water temperature versus lower river water temperature. The seal water temperature was approximately 30°F higher than the river water temperature due to implementation of a TOP. TOP 90-17, "River Water Supply to the Six Way Flow Splitting Box," Rev. 3, was used to route filtered water around a portion of the filtered water system which was out of service for maintenance. The filtered water system was being used as the source of the seal water supply. The TOP had been used twice before but during warm weather months (July 1990 and May/June 1997) when the warm river water would not provide the necessary temperature difference that could affect the pumps.

Once the higher temperature filtered water was suspected as the source of the problem, additional measures were taken by operators to protect the "A" RW train. An operator was stationed at the pump to secure filtered water should the pump trip. This compensatory action was a good decision as further testing on the "C" RW pump indicated that the pump shaft would grow approximately .006 inches per minute with the elevated seal water temperature. With a nominal .008 to .012 inches running clearance between the pump and casing, this would allow only a few minutes of seal water injection before the thermal growth of the shaft would force the impeller to contact the casing. The inspectors reviewed the plant's emergency safeguard features (ESF) during a loss of power and identified that the automatic operation of the RW pump would occur within 30 seconds after the pump was shutdown. The inspectors

determined that, should the pump shut down and restart during an ESF actuation, the pump clearances would have been sufficient.

The ERT directed various tests to understand the cause and effect on the RW pumps. Then, the "B" RW pump impeller to casing clearance was adjusted, the filtered water supply was isolated such that the pump discharge was the seal supply, and Operating Surveillance Test 30.3, "Reactor Plant River Water Pump 1B Test," Rev. 21, was performed satisfactorily on February 9 at 9:15 p.m. The pump was declared available if needed but not operable pending completion of the ERT root cause assessment and engineering evaluation of potential damage from the failed start. The decision by the general manager of nuclear operations to restore the "B" RW pump to an available condition was good and improved safety.

The TOP which caused the RW pumps to become inoperable was implemented at 10:10 p.m. on February 5. The "B" RW pump was returned to available status on February 9 at 9:15 p.m. Based on this information, the station's probablistic risk assessment engineer evaluated the increase in core damage frequency due to the "B" RW train and spare "C" RW pump being unavailable. The engineer determined the increase in risk was low to moderate.

The ERT preliminarily determined that the root cause was due to a knowledge deficiency. The lack of knowledge concerning the effect of differential temperature on the pump shaft to impeller casing clearance was the specific deficiency. The licensee, failing to recognize the effect that seal water temperature could have on the pump operability, allowed the modification to supply filtered water to the pump seals (see section on Past Problems with Seal Water Purity) and implementation of the TOP.

Actions Taken

The ERT identified and systematically investigated several potential causes for the pump binding. Testing was performed by isolating the "C" RW pump from the filtered water seal supply and allowing its shaft temperature to stabilize. Then filtered water was restored and the shaft growth was measured every 5 minutes. The data indicated that shaft grew approximately .078 inches with seal water approximately 31° F higher than the river water. The rate of growth was approximately .006 inches per minute for the first 10 minutes. The rate slowed and the shaft growth stopped after 20 minutes.

Engineers, in contact with the pump vendor, evaluated the RW pumps for damage after the failed start attempts. The evaluation indicated that the couplings were the weakest component. Engineers concluded that the stalled motor torque applied to the pump shaft was within acceptable limits. Also, successful OSTs were subsequently performed and demonstrated the adequacy of the coupling integrity. Vibration readings were taken and found to be normal. The "C" intake bay was inspected by a diver and found to be free of large debris.

The recommended clearance between the pump and motor couplings is .035 inches to .047 inches. This establishes the desired pump "lift" or gap between the rotating impeller and the stationary pump casing. (The pump shaft stretches due to its weight and its dynamic force of the pumped fluid during pump operation. According to the vendor, this stretch is approximately .028 inches.) Both "B" and "C" RW pumps were set

at .045 inches pump clearance. The OST's were performed satisfactorily and the "B" RW pump was restored to operable status at 8:58 a.m. on February 11.

Inspectors Assessment

1. The ERT systematically identified and evaluated potential causes and determined an apparent cause. The ERT quickly focused on the elevated seal water temperature and the potential for thermal expansion. The system engineer recognized that the filtered seal water temperature, which was normally the same temperature as the river water, was much higher during the event due to the TOP. Subsequent pump testing confirmed the cause and effect of elevated seal water temperature.

2. The ERT preliminary conclusion that the root cause of the pump binding was due to a knowledge-based deficiency concerning the effect of elevated seal water temperature was appropriate. As a result:

   - The review, approval, and installation of TOP 90-17 did not account for the elevated filtered water temperature on the RW pump operation.

   - During the installation of filtered water as the primary source of seal water in 1976, engineers did not evaluate the potential to introduce elevated temperature seal water into the safety related pumps.

3. Design change package (DCP) 2189 was implemented in the fall of 1999 to install a cyclone separator in place of a previously installed sand filter, which had not been effective at providing a clean source of seal water. The inspectors noted that the DCP was completed and operational. However, material condition problems prevented it from remaining in service. Had the cyclone separator remained in service, the RW pump seals would have been supplied directly from the river and not from the filtered water system. The installation of the TOP would not have had any effect. The deficiencies in the post modification acceptance testing were documented in CR 000720.

On February 20 with the "B" RW pump seals supplied from the pump discharge, the inline Y-strainer had to be continuously flushed to prevent plugging due to a buildup of sediment. The river level had increased in the past several days due to recent rain and snow melt runoff. Condition report 000751 was initiated to investigate the adequacy of the safety related self-supplied strainers. An MDAT was initiated to review and assess the condition.

10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," requires that "activities affecting quality shall be prescribed by documented ... procedures of a type appropriate for the circumstances...." Lack of knowledge of the effect of elevated seal water temperature on the operability of the RW pumps resulted in an inadequate evaluation and application of TOP 90-17 which caused the "B" RW train to be inoperable for a period of approximately six days. Failure to understand the potential impact to the RW pumps due to the application of TOP 90-17 resulted in an inappropriate procedure for the circumstances and appeared to be a violation of 10 CFR 50, Appendix B, Criterion V.

Additional NRC inspection, as well as assessment of licensee investigations and corrective actions are necessary to determine the safety significance of this event. **(EEI 05000334/00-01-01)**

c. Conclusions

Due to a common mode failure, two of three safety related Unit 1 river water (RW) pumps failed to start causing a RW train to be inoperable from February 5 to 11. Failure to recognize the effect of a temperature differential between the RW and the RW pump seal water resulted in an inadequate evaluation and application of a temporary procedure, and the subsequent failures to start of the RW pumps. This was an apparent violation.

Operators responded to the degraded RW system with the appropriate safety focus. Measures were implemented to protect the opposite RW train including restricting access to vital components. The auxiliary RW system was verified to be available. Operators reviewed abnormal operating procedures associated with the loss of RW, as a precautionary measure.

The Event Response Team did a thorough initial evaluation and identified several potential causes for the river water pump binding. The team systematically investigated the potential causes and quickly focused on the thermal binding of the pumps due to a temperature differential. Testing validated the suspected cause for the RW pump binding. Appropriate corrective actions and preventive maintenance testing returned the pumps to operable status.

O3 Operations Procedures and Documentation

O3.1 Technical Specifications Interpretations and Clarifications

a. Inspection Scope (71707)

The inspectors reviewed the Operations Department technical specification (TS) interpretations and clarifications. The inspectors examined the controls, the quality, and the evaluations performed on the interpretations and clarifications. This item was

selected for investigation due to past problems associated with TS implementation documented in NRC Inspection Reports (IRs) 05000334(412)/1999008 and 05000334(412)/1998005.

b. Observations and Findings

On January 15, 2000, nine TS interpretations and 17 TS clarifications existed. The TS interpretations were well controlled with extensive initial evaluations and subsequent annual reviews. In addition, the TS interpretations were scheduled to be eliminated through TS amendments. Six of the nine TS amendments were already submitted with the remaining three to be included in the improved standard TS amendment submittal.

The TS clarifications had minimal controls and were only evaluated by the General Manager of Nuclear Operation or one of his unit managers. The inspectors determined that minimal differences existed between the content of the interpretations and the clarifications. The inspectors identified several deficiencies in the TS clarifications. In a clarification regarding emergency diesel generator surveillance requirements, the clarification was confusing and misleading. After the inspectors' questions, the Unit 2 Operations Manager agreed and eliminated the clarification. In a second instance, the clarification stated that past practices (regarding sampling of the reactor coolant system) may not have satisfied TS surveillance requirements. The inspectors questioned whether a reportability review was conducted. A reportability review was conducted but the evaluation was in direct contrast to the TS clarification. A condition report (CR 000432) was generated to reevaluate the past reportability. In other instances, the inspectors identified that clarifications were not updated with the most current information. The inspectors did not identify any instances where the clarifications were improperly used and TSs were violated. The General Manager of Nuclear Operation determined that due to the concerns about quality of the clarifications all would be eliminated.

c. Conclusions

Good controls and extensive reviews were conducted with Units 1 and 2 TS interpretations. Deficiencies were identified with the quality and controls of the TS clarifications. Corrective actions addressed the deficiencies.

O4 Operator Knowledge and Performance

O4.1 Unit 2 Operator Tours

a. Inspection Scope (71707)

The inspectors accompanied the non-licensed operators on normal tours of the primary auxiliary and safeguards buildings, the outside buildings, and the turbine building. The inspectors assessed operators' questioning attitude and investigated any long standing equipment problems encountered during the tours.

b. Observations and Findings

The operators were knowledgeable and demonstrated questioning attitudes by examining equipment beyond the required instrument readings. Minor equipment deficiencies were identified and corrected and/or entered into the condition reports. Several long standing problems were noted for non-safety related equipment, but the inspectors did not identify any problems that affected plant safety.

c. Conclusions

Unit 2 operators demonstrated a questioning attitude during routine tours of the plant.

O8 Miscellaneous Operations Issues

O8.1 (CLOSED) Licensee Event Report (LER) 05000412/1999006: Loss of Beaver Valley Power Station Unit No. 2 4KV Train 'B' Emergency Bus

a. Inspection Scope (92700)

The inspectors performed an on-site review of this LER.

b. Observations and Findings

The event and immediate NRC assessment was fully documented in NRC IR 05000334(412)/1999005 and 1999007. The reportability assessment and the risk significance evaluation contained in the LER were comprehensive. Corrective actions were comprehensive and were adequately implemented.

The inspectors noted, however, that engineering evaluations described in the LER did not contain an adequate basis on which to revise station alarm response procedures (ARPs) as described in corrective action number 10. Those ARP revisions permitted continued reactor coolant pump (RCP) operation without seal cooling for 5 minutes. As discussed in NRC Integrated IR 05000334(412)/1999009, subsequent to the LER, additional information to protect the RCP seals by establishing RCP trip criteria for maximum RCP radial bearing and RCP seal leak-off temperatures was incorporated into the ARPs. The inspectors determined that the resulting loss of RCP seal cooling ARPs were adequate to protect the RCP seals. The changes to corrective action number 10 did not significantly change the meaning of the LER and did not require LER revision.

c. Conclusions

The reportability assessment and the event description for a licensee event report on the July 1999 loss of a Unit 2 emergency bus were comprehensive.

O8.2 (CLOSED) Violation (VIO) 05000334(412)/1998011-01: Corrective Action Breakdown Regarding Meteorological Monitoring Instrument Channel Calibration Deficiencies

a. Inspection Scope (92901)

The inspectors reviewed the corrective actions to a violation on the meteorological monitoring instruments.

b. Observations and Findings

This violation resulted from a station-wide corrective action program breakdown associated with inoperable meteorological monitoring instrumentation. The corrective actions for this violation, listed in Duquesne Light Company letter to the NRC dated March 29, 1999, were comprehensive. The inspectors verified that the corrective actions were properly implemented. In general, use of the condition report program, including follow-up investigations and extent of condition reviews has improved. Formal procedural requirements are now in place to assure technical specification interpretation requests are managed and acted upon in a timely manner. Training on lessons learned from this violation, was thorough and was presented to a broad population of station personnel. The causes of this violation, and associated corrective actions, were different than those for a recent corrective action violation discussed in NRC Integrated IR 05000334(412)/1999010. Therefore the occurrence of the recent corrective action violation does not indicate that corrective actions for violation 05000334(412)/1998011-01 were ineffective.

c. Conclusions

The corrective actions for the violation for inoperable meteorological monitoring instrumentation were comprehensive.

O8.3 (CLOSED) LER 05000412/1997001-02: Reactor Trip due to Main Transformer Ground Protection Relay

a. Inspection Scope (92700)

The inspectors performed an onsite review of the LER and the revisions to the root cause and corrective actions.

b. Observations and Findings

The original LER and the first revision were previously reviewed and documented in NRC Integrated IRs 05000334(412)/1997006 and 1998002, respectively. The LER was revised after the seventh refueling outage due to additional information obtained.

Specifically, the licensee identified a detached air diffuser screen located near the main unit generator. The licensee concluded that the detached screen contributed to the trip by causing a ground which actuated a protection relay. The inspectors verified that appropriate corrective actions were added to conduct inspections and to reinforce the fasteners/welds for the air diffuser screens.

c. Conclusions

The revision to a Unit 2 LER was appropriate to capture recently identified additional information pertaining to the root cause and corrective actions for a January 1997 reactor trip.

O8.4 (CLOSED) LER 05000334/1999011: Inadequate Axial Flux Difference Monitor Alarm Surveillance

a. Inspection Scope (92700)

The inspectors performed an onsite review of this LER.

b. Observations and Findings

The inspectors review of this LER did not indicate any violation of NRC requirements. The LER was accurately written and thoroughly descriptive of the condition. The immediate corrective actions were comprehensive and completed.

c. Conclusions

An LER regarding axial flux difference was accurately written and the corrective actions were completed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Routine Surveillance Observations

a. Inspection Scope (61726)

The inspectors observed selected surveillance tests. Operational surveillance tests (OSTs) and a maintenance surveillance procedure (MSP) reviewed and observed by the inspectors are listed below.

- 2OST-1.11B, “Safeguards Protection System Train A SIS Go Test,” Rev. 17
- 1OST-30-12B, “Train B Reactor Plant River Water System Full Flow Test,” Rev. 13
- 1MSP-36.05A-E, “1A Reactor Coolant Pump 4KV Bus Undervoltage Relay 27-VA100 28 Day Functional Test,” Rev. 17

b. Observations and Findings

The testing was performed safely with good supervisory oversite. The inspectors observed detailed reviews of changes to the "Go" testing procedure and good interaction among operators prior to performance of the test.

c. Conclusions

Three surveillance tests were completed safely with appropriate supervisory oversite.

M1.2 Additional Out-of-Service Time for Safety Related Equipment

a. Inspection Scope (62707)

The inspectors reviewed activities associated with surveillance and preventive maintenance tasks on the supplementary leak collection and release system (SLCRS). In addition, the inspectors examined activities to reduce unavailability and improve reliability of systems.

b. Observations and Findings

On January 25 the "A" train of SLCRS was removed from service to obtain main filter bank charcoal samples. The train was returned to service approximately 38 hours later in accordance with the schedule. The inspectors questioned why this activity was not combined with other maintenance activities completed earlier in January (see NRC Integrated IR 05000334(412)/1999010) when the "A" train of SLCRS was removed from service for 109 hours. The maintenance schedulers failed to identify the two separate work activities for the "A" train, and later determined that the two train outages should have been combined. This lack of effective scheduling resulted in 38 additional hours of out-of-service time for a safety related system. A condition report (CR 000679) was generated to investigate the problem.

Previous problems, such as ineffective communications, untimely work package planning, poor work package walkdowns, and inefficient scheduling, were noted causes of extended out-of-service for safety related equipment (see NRC Integrated IR 05000334(412)/1999004). One corrective action was to group preventive maintenance tasks into functional equipment groups (FEGs) to improve scheduling and to provide an additional barrier beyond the manual tasks of the scheduler. System engineers created FEGs during their preventive maintenance optimization project; however, due to poor communication and coordination between the system engineers and the schedulers, the FEGs were unusable and never implemented into the schedule. The inspectors concluded that corrective action to improve preventive maintenance was not effectively implemented.

c. Conclusions

Corrective action to improve preventive maintenance scheduling and limit equipment out- of-service time was not effectively implemented. For example, SLCRS (primary auxiliary building ventilation) was taken out-of-service twice in January when the work could have been scheduled during a single train outage. (Section M1.2)

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Unit 1 River Water Pump Vacuum Break Check Valve Preventive Maintenance

a. Inspection Scope (62707, 37551)

Previous material condition deficiencies on the Unit 2 service water vacuum break check valves contributed to a reduction in availability of that safety system (see NRC Integrated IR 05000334(412)/1999010). As a result, the inspectors observed the preventive maintenance (PM) for the Unit 2 standby service water (SWE) pump and Unit 1 river water (RW) pump vacuum break check valves (2-SWE-277 and 1-RW-486). The inspectors focused on the adequacy of the PM.

b. Observations and Findings

The inspectors observed PM work orders 99-224348-000 and 00-001047-000 for the Unit 2 SWE pump vacuum break check valve 2-SWE-277 and Unit 1 RW pump vacuum break valve 1-RW-486. The Unit 2 vacuum break check valve was disassembled, inspected, and re-assembled in accordance with the work order. The valve was in good material condition and no deficiencies were noted by the inspectors.

However, the Unit 1 vacuum break check valve bonnet cap was not in good material condition. Specifically, the valve bonnet cap internals were heavily corroded. A system engineering supervisor inspected the component and recommended replacement; however, a replacement part was not available. The supervisor then advised maintenance to clean the component, ensure the check valve plug moves freely, and re-assemble the valve. After cleaning was performed, the inspectors examined the valve and noted that the plug was sticking in the bonnet cap in the full open position. The inspectors questioned the maintenance technician concerning the sticking problem. The maintenance technician indicated that they were following their procedure and that they would contact their supervisor. The supervisor directed the maintenance technician to take the bonnet to the shop to perform additional cleaning on the bonnet cap and plug. He verified that the plug did not stick prior to re-assembly. The PM was completed and the post maintenance test was satisfactory. The supervisor initiated CR 000306 due to the significant amount of corrosion on the valve.

The inspectors noted two deficiencies during the performance of the preventive maintenance work. Although the system engineering supervisor had informed the maintenance technician to clean the bonnet cap and verify that the plug moves freely, the sticking problem was not resolved when the inspectors examined the valve. The maintenance supervisor indicated that the maintenance technician may not have understood the information from the engineering supervisor since the plug did move

freely in the bonnet cap for most of its travel. The preventive maintenance procedure, 1CMP-75-PACIFIC CHECK-1M, Rev. 1 did not have any verification that the plug would not stick in the bonnet cap. The inspectors noted that the top of the bonnet cap had score marks indicating past plug sticking problems. The inspectors determined that the PM procedure, and communications and workmanship were deficient. Corrective actions were taken and the valve was returned to service appropriately.

The inspectors were concerned that if the valve was to stick during a pump start, a water hammer event similar to one documented in NRC Integrated IR 05000334(412)/1999010, could result.

The upstream isolation valve (1-RW-471) for the vacuum break check valve was used as a clearance boundary for the PM work. This valve had a known leakage problem since December 1998. The valve repair had been re-scheduled three times and was currently scheduled for May 2000. The valve leaked sufficiently to prevent the performance of a disc to seat contact test as specified in the vacuum break check valve PM. Although this test was not performed, the valve was observed to stop the leakage flow when placed on its seat. In addition, the leakage was not being contained during the maintenance work as water was puddling on the floor where the workers were working on the valve. The inspectors questioned the shift supervisor about the leakage and housekeeping concern. The shift supervisor had a leak collection device installed and removed the water off the floor. The inspectors observed the plant operator using a pipe wrench to open the valve after the maintenance was performed. The inspectors were concerned that this could overstress the valve internals, potentially cause it to fail, and result in a water hammer. The plant operator discussed the method of opening the valve with the nuclear shift supervisor who indicated that valve wrenches specifically designed to open these valves were available and should be used in the future. The mechanical maintenance superintendent indicated that a new valve was being procured but was unaware if a repair attempt had been performed. The inspectors determined that the leaking isolation valve was not repaired in a timely manner, which hampered the ability of the maintenance technician to perform the PM task.

A post maintenance critique was held to examine the deficiencies raised. The noted deficiencies, along with other issues, were accurately documented in CR 000399.

c. Conclusions

Preventive maintenance on service water and river water vacuum break check valves was completed satisfactorily. Deficiencies with the preventive maintenance procedure were identified. Verification that the check valve was adequately cleaned and not binding was added to the preventive maintenance procedure. A longstanding material condition problem with the vacuum break isolation valve hampered the work.

M3 Maintenance Procedures and Documentation

M3.1 Maintenance Procedure Change Request Backlog

a. Inspection Scope (62707)

The inspectors reviewed the maintenance procedure change request backlog to evaluate the significance of the items in the backlog and the impact on the quality of the maintenance procedures. The inspectors examined a sample of the procedure change requests.

b. Observations and Findings

On January 17, 2000, the maintenance procedure change request backlog was 1019 items with 168 items classified as priority 1. The priority 1 change requests were those that require revision before the procedure can be used. The remaining change requests were considered enhancements which did not prevent usage of the procedures. The inspectors reviewed electrical maintenance procedure change requests for eight risk significant systems. The inspectors concluded that the procedure change requests were generally classified correctly and proper administrative controls were instituted for the priority 1 procedure change requests. In two instances, the inspectors identified deficiencies in the classification of the procedure change requests. Corrective actions were initiated in response to the inspectors' concerns. No adverse consequences were noted due to the problems identified in these two procedure change requests.

The maintenance procedure change request backlog has remained steady for the last six months. Additional staff augmentation was planned to reduce the backlog. Although the substantial backlog of enhancements did not directly affect the performance of the procedures, it did reduce the overall clarity of the maintenance procedures.

c. Conclusions

The maintenance procedure change request backlog was generally classified correctly and proper administrative controls were instituted for the high priority change requests.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Unit 2 "C" Atmospheric Steam Dump Valve Failure

a. Inspection Scope (37551, 62707, 71707)

The inspectors reviewed the maintenance and troubleshooting activities conducted after the failure to stroke open of the "C" atmospheric steam dump valve. The work orders, engineering supporting documentation, and operation's post maintenance testing were examined during the inspection. The atmospheric steam dump valves main safety function is to mitigate the consequences of a steam generator tube rupture accident.

Atmospheric steam dump valves on the “A” and “B” steam generators and a residual heat release valve connected to all three steam generators provide a similar function.

b. Observations and Findings

On January 28 the “C” atmospheric steam dump valve was removed from service to add hydraulic fluid and nitrogen to the valve actuator. On January 29 the valve failed to stroke. Maintenance activities were performed over the next few days to replace various components, but the valve remained unable to stroke in all circumstances. Specifically, the valve failed to stroke open after power to the actuator was deenergized and reenergized. On February 2 after failure to electronically stroke the valve, operators attempted a manual stroke of the valve and were unsuccessful. The cause for the failure to manually stroke the valve could not be determined. By February 3 the inspectors questioned whether a systematic evaluation such as a troubleshooting or recovery plan was being conducted. None were currently being implemented. After six days from initial failure, on February 4, a manager was assigned to ensure a systematic troubleshooting was performed of the valve. In addition, a temporary clamp was installed on the valve to allow flow through the valve, which allowed the seven day out-of-service time to be extended 14 additional days, since the actual function of the valve was now available. On February 14, after extensive troubleshooting and repairs, the valve was tested successfully and declared operable.

Beaver Valley has had previous problems with the hydraulic actuator used in the atmospheric dump valves. The feedwater isolation valves having similar actuators were being tracked under the category 10 CFR 50.65(a)(1) of the maintenance rule. The “C” atmospheric dump valve previously failed to stroke on July 27, 1999, and other problems were noted on October 22, 1999, for failure to stroke with an 18 percent demand. The previous “C” atmospheric dump valves were documented in the condition report system under CR 991837 and CR 992860. Currently, the 1999 failure investigations are continuing.

The inspectors determined that the system engineers’ investigation of the previous failures were not aggressive, as evidenced by five extensions to the 1999 failure investigations. Based on the initial investigation and the immediate corrective actions taken, the inspectors could not determine if the investigation into the July failure contributed to the failure to stroke in February 2000. The post maintenance testing conducted in July and October 1999 would not have identified the failure to stroke open after deenergization and reenergization of the valve. Overall, the risk significance was low due to the redundancy of the other atmospheric dump valves and the residual heat release valve. The system engineers and maintenance personnel did not aggressively pursue the root cause and corrective actions for the January 2000 failure. The lack of a systematic approach resulted in delays in determining the root cause and extended the out-of-service time.

The inspectors concluded that current maintenance activities, engineering support activities, and post maintenance testing were adequate to return the valve to operability. Subsequent corrective actions to test the valve on a more frequent basis and with stricter testing requirements were appropriate. Long term corrective actions were still being evaluated and were scheduled to be completed by May 3, 2000.

c. Conclusions

System engineers did not aggressively pursue two 1999 failures of an atmospheric steam dump valve. Initial troubleshooting of the January 2000 valve failure was not comprehensive and extended the out-of-service time. Subsequent maintenance activities, engineering support activities, and post maintenance testing were adequate to return the valve to operability.

E8 Miscellaneous Engineering Issues

E8.1 (CLOSED) LER 05000412/1999007: Forced Shutdown Due to Inoperable Emergency Diesel Generator

a. Inspection Scope (92700)

The inspectors performed an on-site review of this LER.

b. Observations and Findings

In July 1999 marine biological fouling caused the Unit 2 emergency diesel generator (EDG) heat exchangers to become degraded and subsequently the EDGs were declared inoperable. The event and immediate NRC assessment were fully documented in NRC IRs 05000334(412)/1999005 and 1999007. The event description and reportability assessment contained in the LER were comprehensive. Corrective actions discussed in the LER were reasonable to preclude recurrence. The inspectors have observed several intake bay cleanings and some biocide treatment activities since this event and noted that corrective actions for those activities were properly implemented. A collective assessment of corrective actions for this event remains open pending NRC inspection to close out violations 05000412/99-212(01013) and 05000412/99-212(01023).

c. Conclusions

The reportability assessment and the event description for a licensee event report on the forced Unit 2 shutdown in July 1999 were comprehensive.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

a. Inspection Scope (81700)

The inspectors determined whether the conduct of security and safeguards activities met the licensee's commitments in the NRC-approved physical security plan (the Plan) and NRC regulatory requirements. The security program was inspected during the period of February 8-11. Areas inspected included: Access Authorization (AA) program; alarm stations; communications; and protected area (PA) access control of personnel and packages.

b. Observations and Findings

Access Authorization Program. The AA program was reviewed to verify implementation was in accordance with applicable regulatory requirements and the Plan commitments. The review included an evaluation of the effectiveness of the AA procedures, as implemented, and an examination of AA records for 12 individuals. Records reviewed included both persons who had been granted and denied access. The AA program, as implemented, provided assurance that persons granted unescorted access did not constitute an unreasonable risk to the health and safety of the public. Additionally, access denial records and applicable procedures were reviewed to verify that appropriate actions were taken when individuals were denied access or had their access terminated.

Alarm Stations. Operations of the Central Alarm Station (CAS) and the Secondary Alarm Station (SAS) were reviewed. Both alarm stations were determined to be equipped with appropriate alarms, surveillance and communications capabilities. Interviews with the alarm station operators found them knowledgeable of their duties and responsibilities. Observations and interviews also verified that the alarm stations were continuously manned and independent and diverse so that no single act could remove the plant’s capability for detecting a threat and calling for assistance. The alarm stations did not contain any operational activities that could interfere with the execution of the detection, assessment, and response functions.

Communications. Document reviews and discussions with alarm station operators determined that the alarm stations were capable of maintaining continuous intercommunications and continuous communications with each security force member (SFM) on duty. Alarm station operators were testing communication capabilities with the local law enforcement agencies as committed to in the Plan.

PA Access Control of Personnel and Hand-Carried Packages. On February 9 and 10, during peak activity periods, personnel and package search activities were observed at the personnel access portal. Positive controls were determined to be in place to ensure only authorized individuals were granted access to the PA and that all personnel and hand-carried items entering the PA were properly searched.

PA Access Control of Vehicles. On February 9 and 10 vehicle access control activities were observed at the main vehicle access control entry point. The activities observed included SFM's verification of vehicle authorization and escort requirements, and the performance of three vehicle searches prior to granting PA access. Vehicles were controlled and searched in accordance with the Plan and applicable procedures.

c. Conclusions

Security and safeguards activities, in the areas of access authorization, alarm stations, communications, and protected area access control of personnel, packages, and vehicles, were implemented in accordance with the licensee's commitments and NRC requirements.

S2 Status of Security Facilities and Equipment

a. Inspection Scope (81700)

The areas inspected were PA assessment aids, PA detection aids, and personnel search equipment.

b. Observations and Findings

Assessment Aids. On February 9 and 10 the effectiveness of the assessment aids was evaluated by observing the PA perimeter on closed circuit television (CCTV), in the CAS and the SAS, respectively. The evaluation of the assessment aids was accomplished by observing, on CCTV, an SFM performing a perimeter patrol. The assessment aids generally had good picture quality, view, and zone overlap. Additionally, to ensure the Plan commitments were satisfied, the licensee had procedures in place requiring the implementation of compensatory measures in the event the alarm station operator was unable to properly assess the cause of an alarm.

PA Detection Aids. On February 10, while observing the assessment aids, testing was also observed of selected intrusion detection zones in the plant protected area. The appropriate alarm was generated in each zone for each test. Through observations and review of the testing documentation associated with the equipment repairs, it was verified that repairs were made in a timely manner and that the equipment was functional and effective, and met the commitments in the Plan.

Personnel and Package Search Equipment. On February 9 both the routine use and the daily operational testing of the personnel and package search equipment were observed. Personnel search equipment was being tested and maintained in accordance with procedures and the Plan. Personnel and packages were being properly searched prior to PA access.

Observations and procedural reviews determined that the search equipment performed in accordance with procedures and Plan commitments.

c. Conclusions

The security facilities and equipment were well maintained and reliable and met the licensee's commitments and NRC requirements.

S3 Security and Safeguards Procedures and Documentation

a. Inspection Scope (81700)

The areas inspected were implementing procedures and security event logs.

b. Observations and Findings

Security and Program Procedures. Review of selected security program implementing procedures, associated with personnel search, vehicle search, and equipment testing, verified that the procedures were consistent with the Plan commitments.

Security Event Logs. The Security Event Logs for the previous twelve months were reviewed. Based on this review, and discussion with security management, it was determined that the licensee appropriately analyzed, tracked, resolved and documented safeguards events.

c. Conclusions

Security and safeguards procedures and documentation were properly implemented. Event Logs were properly maintained and effectively used to analyze, track, and resolve safeguards events.

S4 Security and Safeguards Staff Knowledge and Performance

a. Inspection Scope (81700)

The area inspected was security staff requisite knowledge.

b. Observations and Findings

Security Force Requisite Knowledge. A number of SFMs in the performance of their routine duties were observed. These observations included alarm station operations, personnel and package searches, and exterior patrol alarm response. Additionally, SFMs were interviewed and based on the responses to questioning, it was determined that the SFMs were knowledgeable of their responsibilities and duties, and could effectively carry out their assignments.

Response Capabilities. Review of documentation of contingency response drills and critiques disclosed that the licensee was exercising this portion of the program. The review also disclosed that the licensee was using lessons learned from the drills to modify and refine the response plan to improve its effectiveness.

c. Conclusions

The SFMs adequately demonstrated the requisite knowledge necessary to effectively implement their duties and responsibilities associated with their position.

S5 Security and Safeguards Staff Training and Qualifications (T&Q)

a. Inspection Scope (81700)

The areas inspected were security training and qualifications and training records.

b. Observations and Findings

Security Training and Qualifications. On February 9 T&Q records of 10 SFMs were reviewed. The results of the review indicated that these personnel were trained in accordance with the approved T&Q plan.

Training Records. Through review of training records, it was determined that the records were properly maintained, accurate and reflected the current qualifications of the SFMs.

c. Conclusions

Security force personnel were trained in accordance with the requirements of the T&Q Plan. Training documentation was properly maintained and accurate. The training staff provided effective training.

S6 Security Organization and Administration

a. Inspection Scope (81700)

The areas inspected were management support and staffing levels.

b. Observations and Findings

Management Support. Review of program implementation since the last program inspection disclosed that adequate support and resources continued to be available to ensure effective program implementation.

Staffing Levels. The total number of trained SFMs immediately available on shift met the requirements specified in the Plan and implementing procedures.

c. Conclusions.

The level of management support was adequate to ensure effective implementation of the security program, as evidenced by the allocation of resources to support programmatic needs.

S7 Quality Assurance (QA) in Security and Safeguards Activities

a. Inspection Scope (81700)

The areas inspected were audits, problem analyses, corrective actions, and effectiveness of management controls.

b. Observations and Findings

Audits. Surveillances conducted as part of the 1999 QA Security Program Audit were reviewed, along with the audit checklists for the audit and the surveillances that had been conducted as part of that audit. The review disclosed that they were comprehensive in scope and depth.

Problem Analyses. A review of data derived from the security department's self-assessment program indicated that potential weaknesses were being properly identified, tracked, and trended.

Corrective Actions. Review of corrective actions implemented by the licensee, in response to the QA audits and self-assessment program, disclosed that all corrective actions had been implemented and were effective.

Effectiveness of Management Controls. The licensee had programs in place for identifying, analyzing, and resolving problems. They include the performance of annual QA audits, a departmental self-assessment program and the use of industry data, such as violations of regulatory requirements identified by the NRC at other facilities, as a criterion for self-assessment.

c. Conclusions

Security Department’s audits were comprehensive in scope and depth, the audit findings were reported to the appropriate level of management, and the program was being properly administered. In addition, a review of the documentation applicable to the self-assessment program indicated that the program was effectively implemented to identify and resolve potential weaknesses.

S8 Miscellaneous Security and Safeguards Issues

S8.1 (CLOSED) LER 99-S01-00: Uncompensated Loss of Ability to Detect Within a Single Intrusion Security Detection Zone

The inspectors reviewed the event, the cause, the mitigating factors, and the corrective actions, as implemented for the event. No further action was deemed necessary.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on February 24, 2000. The licensee acknowledged the findings presented. The security specialist inspection preliminary findings were presented to licensee management on February 11, 2000.

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

X3 Management Meeting Summary

Mr. Robert Saunders was named president and chief nuclear officer of FirstEnergy Nuclear Operating Company effective January 19, 2000. Mr. Saunders replaces Mr. John Stetz.

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering
IP 61726	Surveillance Observation
IP 62707	Maintenance Observation
IP 71707	Plant Operations
IP 81700	Physical Security Program for Power Reactors
IP 92700	Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901	Follow-up - Operations
IP 93702	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000334/00-01-01	EEI	Inadequate Procedure Results in Failure of One Train of Unit 1 River Water System (Section O2.1)

Closed

05000412/1999006	LER	Loss of Beaver Valley Power Station Unit No. 2 4KV Train 'B' Emergency Bus (Section O8.1)
05000334(412)/1998011-01	VIO	Corrective Action Breakdown Regarding Meteorological Monitoring Instrument Channel Calibration Deficiencies (Section O8.2)
05000412/1997001-02	LER	Reactor Trip due to Main Transformer Ground Protection Relay (Section O8.3)
05000334/1999011	LER	Inadequate Axial Flux Difference Monitor Alarm Surveillance (Section O8.4)
05000412/1099007	LER	Forced Shutdown Due to Inoperable Emergency Diesel Generator (Section E8.1)
05000334/99-S01	LER	Uncompensated Loss of Ability to Detect Within a Single Intrusion Security Detection Zone (Section S8.1)

LIST OF ACRONYMS USED

13R	13th Refueling Outage
AA	Access Authorization
ARPs	Alarm Response Procedures
ARW	Auxiliary River Water
CAS	Central Alarm Station
CCTV	Closed Circuit Television
DCP	Design Change Package
EA	Enforcement Action
EDG	Emergency Diesel Generator
EEI	Escalated Enforcement Item
ERT	Event Response Team
ESF	Emergency Safeguard Features
FEGs	Functional Equipment Groups
gpm	Gallon Per Minute
IR	Inspection Report
LER	Licensee Event Report
MDAT	Multi-Disciplinary Analysis Team
MSP	Maintenance Surveillance Procedure
NRC	Nuclear Regulatory Commission
OST	Operational Surveillance Test
PA	Protected Area
PM	Preventive Maintenance
QA	Quality Assurance
RCP	Reactor Coolant Pump
RP	Reactor Plant
RW	River Water
SAS	Secondary Alarm Station
SFM	Security Force Member
SLCRS	Supplementary Leak Collection and Release System
SPED	System and Performance Engineering Department
SWE	Standby Service Water
T&Q	Training and Qualification
the Plan	NRC-approved Physical Security Plan
TOP	Temporary Operating Procedure
TP	Turbine Plant
TS	Technical Specification
VCT	Volume Control Tank
VIO	Violation