U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-440
License No:	NPF-58
Report No:	50-440/99003(DRP)
Licensee:	FirstEnergy Nuclear Operating Company P.O. Box 97 A200 Perry, OH 44081
Facility:	Perry Nuclear Power Plant
Location:	Perry, OH
Dates:	April 7 through May 17, 1999
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EXECUTIVE SUMMARY

Perry Nuclear Power Plant
NRC Inspection Report 50-440/99003(DRP))

This inspection report included resident inspectors' evaluations of aspects of licensee operations, engineering, maintenance, and plant support activities.

Operations

- The inspectors concluded that the overall conduct of operations continued to be professional with an appropriate focus on safety. Lessons learned were applied from the previous refueling outage in the areas of procedure adherence, safety tagging, and work control. In general, the licensee effectively managed a complex refueling outage with only minor problems noted (Section O1.1).

- A Non-Cited Violation was identified through two examples of operations department personnel failing to follow procedures as written. The inspectors were specifically concerned that, in these cases, operations personnel exercised some latitude with the procedures that was not applicable (Section O1.2).

- The inspectors concluded that the licensee was effective in inspecting, identifying, and correcting fuel failures which occurred during the operating cycle. Although the licensee could not guarantee the removal of all foreign material from the reactor vessel, steps were taken to minimize the potential for future fuel damage (Section O1.3).

- The plant Technical Specifications limit individual work hours to 72 hours in any 7-day period unless very unusual circumstances arise requiring deviation from the limit. Most plant employees worked approximately 72 hours each week during the refueling outage. Numerous deviations were processed during the outage to approve work in excess of 72 hours a week. Some of the deviations did not document specific reasons for the deviations nor did they provide any limit to the number of hours worked in a week. Plant management indicated that these deviations were for work on critical path activities which were considered to be very unusual circumstances (Section O3.1).

Maintenance

- The inspectors concluded that outage-related maintenance and surveillance activities were well coordinated and performed properly, with few exceptions. Management oversight of activities was good (Section M1.1).

- A series of two surveillance failures concurrent with a scheduled maintenance activity led to a condition where the emergency diesel generators (EDGs) for Divisions 1, 2, and 3 were inoperable at the same time during the refueling outage. The inspectors determined that the licensee met all Technical Specification requirements associated with the scheduling of these activities and that, due to the Division 1 EDG being available, there was no increase in plant risk as a result of these activities (Section M1.2).

- A maintenance technician left test equipment in a relay following a calibration activity as a result of inattention to detail. This was identified when the Division 2 EDG Loss of Offsite Power Test failed and resulted in an Non-Cited Violation (Section M1.3).

Engineering

- The inspectors concluded that engineering department personnel provided timely and effective technical support to other departments for a variety of activities during the refueling outage (Section E1.1).

- The licensee utilized effective methods to maintain fuel accountability and verify the proper placement of fuel bundles in the core prior to reactor vessel reassembly (Section E7.1).

Report Details

Summary of Plant Status

Refueling outage seven (RFO7), which began on March 27, 1999, was ongoing at the beginning of this inspection period. On May 2, licensed operators commenced a reactor startup and the reactor was critical at 10:48 p.m. On May 3, operators synchronized the plant main generator to the electrical grid at 9:49 p.m., ending RFO7. Full power was attained on May 8, 1999, and the plant was maintained at or about 100 percent power through the end of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Review of Routine Plant Operations

a. Inspection Scope (71707)

Using the guidance of Inspection Procedure (IP) 71707, the inspectors conducted frequent reviews of ongoing plant operations during RFO7 and subsequent return to full power operations.

b. Observations and Findings

In general, the licensee effectively conducted a complex refueling outage with only minor problems noted. The outage was conducted from March 27 through the synchronization of the main generator to the grid on May 3, 1999. The inspectors observed that all outage activities were conducted safely, with workers exercising conservative decision making. Major activities completed during the outage included: refueling of the reactor, jet pump cleaning, 10-year maintenance on the Division 2 emergency diesel generator, fuel assembly inspections, reactor pressure vessel nozzle inspections, elimination of the main steam isolation valve leakage control system, and plant material condition improvements.

During the Fall 1997 refueling outage (RFO6), several examples of personnel errors and personnel failing to follow written procedures were identified. Since RFO6, the licensee implemented a new procedure adherence guideline and conducted numerous training sessions for plant personnel on procedure adherence importance. The licensee also developed a performance indicator tracking system that includes periodic discussion of procedure adherence at management meetings. While the inspectors noted that procedure adherence improved from the last outage, some instances where workers failed to follow procedures occurred during RFO7 (see Section O1.2). The licensee also conducted training on safety tagging for plant and contractor personnel, to ensure adequate attention to detail through self-checking and peer reviews occurred during tagging activities. The inspectors reviewed several safety clearances, and the hanging and removal of various tags, with no problems noted. Near the end of RFO6, the licensee also adopted a new methodology for work control during outages. This method assigns specific control functions to a work control center, control room personnel, and

refueling personnel. Training was also conducted by the licensee on how these groups are to interact with each other, including conduct of briefings, communications, and SRO oversight. The inspectors observed good coordination between these groups throughout the outage.

The inspectors observed several training sessions which were developed to help prepare operators for startup activities. This was a good use of the control room simulator and provided opportunities to practice many of the startup tasks. During the actual reactor startup, the inspectors observed good three-way communications, which was an improvement over communications observed during the shutdown.

c. Conclusions

The inspectors concluded that the overall conduct of operations continued to be professional with an appropriate focus on safety. Lessons learned were applied from the last refueling outage in the areas of procedure adherence, safety tagging, and work control. In general, the licensee effectively managed a complex refueling outage with only minor problems noted.

O1.2 Adherence to Written Procedures

a. Inspection Scope (60710, 71707, and 71711)

The inspectors followed the guidance of IPs 60710, 71707 and 71711 while monitoring or reviewing the performance of numerous outage related activities.

b. Observations and Findings

During the observation or review of the performance of numerous operations department procedures, the inspectors noted some procedure adherence problems. In two cases, operators incorrectly interpreted procedural requirements which resulted in two examples of a violation. In another instance, procedures were not revised to update precautions and limitations. The concerns are described below:

(1) Fuel Movement Checklist Error

On April 5, 1999, a step of the fuel movement checklist was being performed to remove a fuel bundle from core location 13-52. However, refueling operators grappled and partially removed a fuel bundle from core location 15-50. One of the refueling bridge workers noted the error after the bundle had been lifted approximately 70 inches. The refueling supervisor notified the operations shift supervisor (SS) of the error, and requested direction on how to proceed. Fuel Transfer Instruction FTI-D0009, Revision 5, defined lifting an incorrect bundle as a mispositioning error and prohibited reinsertion of the bundle in the original location. The FTI specified that a mispositioned fuel assembly be placed in the containment fuel storage rack. However, the SS did not consider this a mispositioning error, and directed the refueling supervisor to reseat fuel bundle 15-50. Further review of this event revealed that this was a mispositioning error. Technical Specification 5.4.1.a requires written procedures to be implemented covering the applicable procedures in Regulatory Guide (RG) 1.33. A procedure for fuel movements is specified in RG 1.33, Appendix A.

The operators' failures to follow FTI-D0009, as written, is considered an example of a violation of TS 5.4.1.a. This Severity Level IV violation is being treated as a Non-Cited Violation (NCV), consistent with Appendix C of the NRC Enforcement Policy (NCV 50-440/99003-01(DRP)). This Violation is addressed in licensee's corrective action program (CAP) as CR 99-0897.

The licensee initiated a category 1 condition report (CR 99-0897) after operations management became aware of the error. The SS was temporarily relieved of duties and counseled about the issue. The CR investigation was completed by the licensee, and several corrective actions were initiated and implemented before the end of the inspection period. These included additional operator training on fuel movements, better lighting and camera performance for the refueling mast, and a procedural change to FTI-D0009 to clarify the expected actions of refueling personnel.

(2) CRD Drive Water Pressure

The inspectors reviewed the narrative logs on April 17, 1999, and noted an entry during the previous 24-hour period where the step for returning the control rod drive (CRD) pressure to normal, per Section 7.9.1 of SOI-C11, "Rod Control and Information System," Revision 7, was marked as N/A by the SS. Section 7.9.1 of SOI-C11 required, in part, that CRD pressure be restored to the normal band after it had been elevated for an individual rod. The inspectors asked the SS how this step could be considered N/A. The SS stated that it was not practical to reduce CRD pressure to the normal band after each individual rod and that N/A of this step was permitted under PAP-528, "Procedure Use and Adherence," Rev. 0.2.

PAP-528 permits the use of N/A for System Operating Instruction (SOI) steps under two circumstances: 1) for a step in the prerequisites of an SOI when plant conditions do not require or allow the performance of those steps; and 2) per Section 8 of PAP-528, the SS can use N/A when a procedure step does not apply. However, Section 8 of PAP-528 states, in part, "N/A may be utilized when station conditions prohibit or negate the need to perform a step and the intent of the procedure is not altered. The use of N/A simply due to a preference not to perform the actions as specified in the procedure is not permitted."

The inspectors questioned the SS on whether SOI-C11, Step 7.9.1.e could have been performed under the present plant conditions and the applicability of either method described in PAP-528 to use N/A for this step. The SS replied to the inspectors that the step could have been performed and that, after review of PAP-528, he did not concur with the decision to N/A the step. The SS stated that he would submit a procedure change request to SOI-C11 to allow CRD drive pressure to remain elevated while conducting multiple rod movements. After further discussions with operations department management, a condition report (CR-1470) was initiated for this issue. Technical Specification 5.4.1.a requires written procedures to be implemented covering the applicable procedures in RG 1.33. Procedures for operation of the control rod drive system and procedure adherence are specified in RG 1.33, Appendix A. The operators' failures to follow SOI-C11 procedural steps, as written, is considered an additional example of a Violation of TS 5.4.1.a. This Severity Level IV violation is

being treated as an NCV, consistent with Appendix C of the NRC Enforcement Policy. This Violation is addressed in licensee's CAP as CR 99-1470.

(3) Infrequently Performed Test or Evolution (IPTE) Controls in Surveillances

The inspectors reviewed surveillance tests prior to scheduled completion and noted that several procedures had a Precaution and Limitation (P&L), which indicted that the test was to be controlled as an IPTE. Prior to the outage, Perry management personnel reviewed the planned outage work activities and determined which activities would be treated as an IPTE. PAP-1121, "Conduct of IPTE," allowed management personnel to decide not to treat activities that met the criterion for an IPTE as an IPTE. However, the surveillance instructions for the activities, such as the LOOP/LOCA tests, specified in the P&L that the test met the criteria of an IPTE put forth in PAP-1121 and stated that Management Designee and Oversight Team involvement was required including but not limited to: 1) completion of a pre-evolution checklist; 2) termination of the test if the level of safety is reduced to an unacceptable level; and 3) review of the performed test following completion for improvements or necessary procedure changes. For these tests, the inspectors asked the test performer why it was acceptable to disregard the P&L in the surveillance instruction. The test performer explained the management decision regarding IPTEs and indicated that the P&L could be treated as an obvious error as allowed by PAP-528.

The Plant Manager provided the inspectors with a list of those tests which were designated as IPTEs for RFO7. PAP-1121 did not require the LOOP/LOCA tests to be IPTEs; it only required consideration of the need to control the tests as IPTEs. The inspectors had no concerns with the LOOP/LOCA test performances or with the decision to not treat the tests as IPTEs. The inspectors remained concerned that the P&L in the surveillance instructions was not adhered to or changed. The licensee indicated that while the P&L implied that the tests were to be treated as an IPTE, PAP-1121 governed the activity. The licensee initiated CR 99-1470 to document and review the inspectors' concerns that the test performers did not request a change to the P&L to clarify that the tests were not being treated as IPTEs. This was not considered to be a violation of NRC requirements because PAP-1121 allowed a management decision on the need to control the tests as IPTEs.

Summary

The inspectors discussed the three concerns listed above with licensee management at the exit meeting. There was considerable discussion of the intent of the allowances provided within PAP-528. The inspectors noted that in several cases, operators applied interpretations to procedural guidance, which did not appear to be allowed by PAP-528.

c. Conclusions

A Non-Cited Violation (NCV) was identified through two examples of operations department personnel failing to follow procedures as written. The inspectors were specifically concerned that, in these cases, operations personnel exercised some latitude with the procedures that was not applicable.

O1.3 Refueling and Core Alterations

a. Inspection Scope (60710)

The inspectors followed the guidance of IP 60710 in monitoring the performance of refueling and core alterations activities. The inspectors observed activities associated with fuel movement on the refueling floor, in the fuel handling building, and from the control room.

b. Observations and Findings

The inspectors observed numerous activities associated with the offloading and refueling of the reactor core, and with handling fuel bundles for sipping, inspection, and reconstitution tasks. With the exception of a single mispositioning (see Section 01.2), all fuel movements were conducted without error. All refueling activities were appropriately manned and supervised with qualified personnel. Communications between the locations for refueling activities was typically clear, and personnel utilized three-legged communications as expected. Workers were observed using attention-to-detail while conducting sipping tests on the suspected leaking fuel bundles, and on all other fuel bundles that would remain in the core for the next fuel cycle.

The licensee quickly located the specific failures for all three previously indicated fuel leaks. The licensee determined from the inspections that the three leaking fuel bundles were damaged by foreign material debris in the reactor vessel. One fuel assembly was observed to have a small metal shaving still wedged in the spacer piece at the site of the defect. The licensee conducted detailed visual inspections of another 40 random bundles to look for any apparent damage or debris. The licensee did not find any addition failures during these inspections, but did find additional debris. The licensee also identified a potential fourth leaking fuel bundle through the sipping operations. Although this bundle was carefully visually inspected, no indications of the leak could be determined. The licensee decided to segregate this fuel bundle, and refuel the reactor core without reinstalling it. One of the leaking bundles was reconstituted by replacing the flawed pin, with an individual fuel pin from the segregated bundle, and was reinserted in the core.

The licensee discussed the fuel defects with its vendor. The fuel vendor concurred with the cause of the flaws being damage from foreign material. The licensee and the fuel vendor also concluded that there is a possibility that some foreign material could still be present in the reactor vessel. The licensee informed the inspectors that a complete core offload and vessel cleaning was considered. However, they concluded that removal of all small debris could not be guaranteed, and that the overall benefit of vessel cleaning would therefore be marginal. As a preventive measure, the licensee coordinated with the fuel vendor and installed 280 new fuel assemblies that have debris filters in the nose piece. These 280 bundles represent approximately 37 percent of the total fuel bundles. The licensee plans to install additional nose piece filters during subsequent refueling outages.

c. Conclusions

The inspectors concluded that the licensee was effective in inspecting, identifying, and correcting fuel failures which occurred during the operating cycle. Although the licensee could not guarantee the removal of all foreign material from the reactor vessel, steps were taken to minimize the potential for future fuel damage.

O2 Operational Status of Facilities and Equipment

O2.1 General Plant Tours and System Walkdowns (71707, 71711)

The inspectors followed the guidance of IP 71707 and 71711 in walking down accessible portions of several systems and areas, including:

- Drywell and containment
- Emergency diesel generators
- Reactor core isolation cooling system
- Refuel floor
- Residual heat removal (RHR)/ shutdown cooling system
- Fuel handling building

Equipment operability and material condition were acceptable in all cases. Housekeeping was considered to be reasonable for a refueling outage and cleanup activities were planned. Minor discrepancies were brought to the licensee's attention and were corrected. The inspectors walked down the drywell prior to plant startup, after clean-up was complete and noted that its condition and cleanliness were good.

O3 Operations Procedures and Documentation

O3.1 Review of Overtime Usage During Refueling Outage

a. Inspection Scope (71707)

The inspectors followed the guidance of IP 71707 and reviewed the use of overtime during the refueling outage. This included a review of the licensee's administrative procedure, applicable TS, overtime hours and deviation requests for individuals in the Maintenance, Operations, and Radiation Protection departments.

b. Observations and Findings

The inspectors observed that most Perry Plant employees and contractors were on the refueling outage schedule of 12-hour shifts, 6-days a week as allowed by the licensee's fitness-for-duty program, PAP-0224, and TS 5.2.2.e. This effectively put most plant workers right at the guideline limits established by TS 5.2.2.e. The TS states that the amount of overtime worked by unit staff members performing safety-related functions shall be limited and controlled in accordance with NRC Policy Statement on working

hours (Generic Letter 82-12). The GL states, in part, "Enough plant operating personnel shall be employed to maintain adequate shift coverage without routine heavy use of overtime. However, during extended periods of shutdown for refueling, the following guidelines shall be followed." One of the guidelines is that an individual should not be permitted to work more than 72 hours in any seven day period (excluding shift turnover time). The GL goes on to specify that very unusual circumstances may arise requiring deviation from the guidelines.

The inspectors reviewed the implementation of this NRC Policy Statement. The inspectors identified that over 250 separate deviations were issued during RFO7. In many of these deviations, the list of affected individuals contained 10 or more names. Most of the deviations authorized were for specific activities; however, there were some that indicated blanket approval to work hours beyond the GL guidance without any other limits or specific reason given. The departments involved were mostly contract maintenance, instrumentation and controls, and operations personnel. During discussions with plant management, they indicated that the deviations were justified because certain critical path activities were considered to be very unusual circumstances. The licensee initiated CR 99-1067 to review overtime use during RFO7 and to review the effectiveness of corrective actions following similar issues that were identified by Quality Assurance in RFO6. Following the initiation of CR 99-1067, licensee management promptly implemented interim corrective actions to improve documentation of the basis for individual overtime deviations.

c. Conclusions

The plant Technical Specifications limit individual work hours to 72 hours in any 7-day period unless very unusual circumstances arise requiring deviation from the limit. Most plant employees worked approximately 72 hours each week during the refueling outage. Numerous deviations were processed during the outage to approve work in excess of 72 hours a week. Some of the deviations did not document specific reasons for the deviations nor did they provide any limit to the number of hours worked in a week. Plant management indicated that these deviations were for work on critical path activities which were considered to be very unusual circumstances.

O8 Miscellaneous Operations Issues

O8.1 The Severity Level IV Violations listed below were issued in Notices of Violation prior to the March 11, 1999, implementation of the NRC's new policy for treatment of Severity Level IV Violations (Appendix C of the Enforcement Policy). Because these Violations would have been treated as NCVs in accordance with Appendix C, they are being closed out in this report.

(Closed) Violation (VIO) 50-440/97012-03: Use of Improper Data on SVI. This violation is in the licensee's CAP as Potential Issue Form (PIF) 97-1441.

(Closed) Violation (VIO) 50-440/97016-03: Improper Safety Tagging. This violation is in the licensee's CAP as PIF 97-1962.

(Closed) Violation (VIO) 50-440/97021-02: Incomplete Class 1E Raceway Markings. This violation is in the licensee's CAP as CR 98-1132, PIF 98-118, and PIF 98-143.

(Closed) Violation (VIO) 50-440/97021-06: Combustibles in Combustible Free Zone. This violation is in the licensee's CAP as PIFs 97-1997 and 98-15

(Closed) Violation (VIO) 50-440/97022-01: Failure to Adhere to Safety Tagging Procedure. This violation is in the licensee's CAP as PIF 97-2085

(Closed) Violation (VIO) 50-440/98007-01: Incorrect Removal of Safety Tag and Installation of Fuse. This violation is in the licensee's CAP as PIF 98-377.

(Closed) Violation (VIO) 50-440/98010-01: Incorrect Fuse Removed. This violation is in the licensee's CAP as CR 98-1057.

(Closed) Violation (VIO) 50-440/98010-03: Missed Step in Surveillance Restoration Checklist. This violation is in the licensee's CAP as CR 98-1040.

(Closed) Violation (VIO) 50-440/98010-04: Expired Transient Combustible Permit. This violation is in the licensee's CAP as CR 98-1075.

(Closed) Violation (VIO) 50-440/98018-01: Failure to Implement Requirements of Burn Permit. This violation is in the licensee's CAP as CR 98-1907.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Review of Refueling Outage Maintenance and Surveillance Activities

a. Inspection Scope (62707, 60710, 71711, 61726)

The inspectors observed and reviewed portions of the following outage-related work activities:

- Work Order (WO) 97-3105, Hydrolaze Jet Pump Inlet Mixer
- WO's (multiple), Division 2 EDG Overhaul
- WO 98-1147, Dynamic and Static Testing Nuclear Closed Cooling Motor Operated Valves
- WO 98-2466, Supply Temp Power to Breaker Cubicle ED1A06
- WO 99-1170, D19K100 High Voltage Failure
- WO 99-7196, Replace Division 3 Diesel Generator Governor
- SVI-C71-T5425, Mode Switch Shutdown Position Functional Test
- ISI-B21-T1300, Reactor Coolant System Leakage Pressure Test
- SVI-E22-T1319, Diesel Generator Start and Load Division 3

- SVI-E22-T1329, Division 3 High Pressure Core Spray (HPCS) Diesel Generator 18 Month Functional Test
- SVI-E22-T1339, Division 3 HPCS Diesel Generator 18 Month Loss of Offsite Power (LOOP) Test
- SVI-E22-T5397, HPCS Initiation and Loss of EH13 Response Time Test
- SVI-E51-T1272, RCIC System Low Pressure Operability Test
- SVI-R43-T1317, Diesel Generator Start and Load Division 1
- SVI-R43-T1318, Diesel Generator Start and Load Division 2
- SVI-R43-T1337, Division 1 Standby Diesel Generator 18 Month LOOP Test
- SVI-R43-T1338, Division 2 Standby Diesel Generator 18 Month LOOP Test
- SVI-B21-T2005, Safety Relief Valve Exercise Test
- SVI-B13-T0001, Shutdown Margin Calculation
- SVI-C11-T1006, Control Rod Maximum Insertion Time
- SVI-B21-T1176, Reactor Coolant System Heatup and Cooldown Surveillance

Most maintenance and surveillance activities were performed in a appropriate manner, with satisfactory results. Exceptions are discussed in Sections O1.2 and M1.3. The inspectors observed good management oversight in the plant and control room during the refueling outage. The inspectors observed control room, work support center, and outage project manager turnover meetings and noted good coordination and communication between departments. The inspectors concluded that outage-related maintenance and surveillance activities were well coordinated and performed properly, with few exceptions. Management oversight of activities was good.

M1.2 Schedule of Emergency Diesel Maintenance and Testing

a. Inspection Scope (62707, 62726)

On April 22, 1999, the licensee identified that all 3 EDGs were inoperable. The Division 1 EDG was inoperable due to a scheduled maintenance activity and Division 3 was inoperable because it had failed the LOOP/LOCA test. The Division 2 EDG, which was scheduled to be operable, became inoperable when it failed its loss of offsite power (LOOP) test. The inspectors reviewed the licensee's scheduling of maintenance and testing for the 3 Divisional EDGs during the outage. This included a review of TS requirements, administrative procedures, and the licensee's controls for minimizing shutdown risk.

b. Observations and Findings

Once the 3 EDGs were identified to be inoperable, the licensee entered TS 3.8.2, "AC Sources - Shutdown," which required one EDG to be capable of supplying power to one Division (Div. 1 or 2) of onsite Class 1E AC electrical power distribution subsystems. With no operable EDG, Condition B of the TS was entered, which required: 1) suspending core alterations, 2) suspending movement of irradiated fuel assemblies, 3) suspending any operations with the potential to drain the vessel, and 4) initiating action to restore an EDG to an operable status, immediately. The first three requirements were already met because these activities were not in progress. To meet the 4th requirement, the licensee initiated an immediate investigation to restore the Division 2 EDG to an operable status. Following successful repair, the Division 2 EDG was restored to operable status on April 23, 1999.

An overhaul of the Division 2 EDG was completed and the EDG was declared operable on April 16. The Division 3 EDG received minor maintenance and was out of service from April 6-16. The Division 3 EDG then failed a LOOP/LOCA test on April 19 due to a failed diode and governor problems. Repair and retest were completed on April 24 and the Division 3 EDG was declared operable. The Division 1 EDG was taken out of service April 17-23 for minor maintenance activities. A LOOP/LOCA test was scheduled for the Division 2 EDG to occur on April 26; however, due to a schedule realignment, the licensee decided to perform the LOOP/LOCA test on April 22 even though both the Division 1 and 3 EDGs were inoperable at that time.

The inspectors questioned why the Division 2 LOOP testing was not performed prior to removing the Division 1 EDG from service. The licensee's initial plan was to always have one EDG operable and available. The Division 2 LOOP/LOCA testing needed to be performed later in the outage because of the unavailability of other systems required to support the test. The support systems were made available earlier than expected and the decision to perform the Division 2 LOOP test while the Division 1 EDG was inoperable was reviewed by the shutdown safety group. The decision to perform the test while the other EDGs were inoperable was based on the fact that the Division 1 EDG was available and running at the time and that the LOOP/LOCA test does not itself render the EDG inoperable. Due to the Division 1 EDG being available, plant risk was not increased as a result of these activities.

c. Conclusions

A series of two surveillance failures concurrent with a scheduled maintenance activity led to a condition where the emergency diesel generators for Divisions 1, 2, and 3 were inoperable at the same time during the refueling outage. The inspectors determined that the licensee met all TS requirements associated with the scheduling of these activities and that, due to the Division 1 EDG being available, there was no increase in plant risk as a result of these activities.

M1.3 Division 2 LOOP Test Failure

a. Inspection Scope (61726)

The inspectors followed the guidance of IP 61726 to review the circumstances surrounding a surveillance test failure on the Division 2 EDG. The inspectors reviewed the applicable TS sections, the surveillance instruction, and associated work documents.

b. Observations and Findings

On April 22, 1999, during performance of surveillance SVI-R43-T1338, "Division 2 Standby Diesel Generator 18-month LOOP Test," the LOOP signal did not occur as expected. The SVI directed workers to pull a fuse to simulate an undervoltage condition; however, this did not result in the undervoltage condition as expected. The licensee terminated the test and restored the system configuration to normal. Operations and Engineering department personnel began an immediate investigation and CR 99-1234 was initiated. The cause was determined to be that test devices were inadvertently left in an EDG relay following a calibration on April 1, 1999. The devices were subsequently removed and the surveillance was reperformed satisfactorily on April 23, 1999.

The test devices were small pieces of tygon tubing used to block certain contacts of the relay during calibration. The electrical maintenance technicians had performed SVI-R22-T5073, "Division 2, 4-KV Bus Undervoltage/Degraded Voltage Channel Calibration" and GEI-0105, "Maintenance and Calibration of Type NGV-11 Relays." Step 5.4.1.1 of GEI-0105 directed workers to mechanically block closed 2 out of 3 units within the relay. Step 5.4.2.5 directed workers to release the mechanically closed units. During an interview, the technician stated that he had used the tygon pieces to mechanically block the relay units, but forgot to remove them when the calibration was complete.

The inspectors reviewed the timeline associated with the activities on the Division 2 EDG. Following maintenance and testing, the Division 2 EDG was declared operable from April 16 until the test failure on April 22. The inspectors reviewed the system diagrams with engineering personnel and determined that the tygon pieces did not render the EDG inoperable. The system would have responded properly to a true low voltage condition.

Technical Specification 5.4.1.a requires written procedures to be implemented covering the applicable procedures in Regulatory Guide (RG) 1.33, Appendix A. Procedures for surveillance testing are specified in RG 1.33, Appendix A. The technician's failure to remove the relay blocks as specified in GEI-0105 was a Violation of TS 5.4.1.a. This Severity Level IV violation is being treated as an NCV, consistent with Appendix C of the NRC Enforcement Policy. This Violation is addressed in licensee's CAP as CR 99-1234. (NCV 50-440/99003-02(DRP))

c. Conclusions

A maintenance technician left test equipment in a relay following a calibration activity as a result of inattention to detail. This was identified when the Division 2 EDG LOOP Test failed and resulted in an NCV.

M8 Miscellaneous Maintenance Issues

M8.1 (Closed) Licensee Event Report (LER) 50-440/1999-02: Limiting Condition for Operation 3.0.3 Entered Due to TS Bases Statement Interpretation. This event was discussed in Inspection Report 50-440/99002, Section O1.3. When operators attempted to start the "A" RHR pump to initiate shutdown cooling, the pump did not start. The cause was later determined to be a failed optical isolator in the pump starting logic. During initial troubleshooting of the problem, the licensee entered TS 3.0.3 because the operators were not certain that they had met the conditions of TS 3.4.9, Action A.2. This required verifying an alternate method of decay heat removal within 1 hour. Although the licensed operators knew that the main condenser was available and removing heat, they were initially confused by the wording in the TS Bases. The licensee subsequently determined that the conditions of Action A.2 were met. Appropriate repairs were made to enable the "A" RHR pump to be started and there were no further problems with shutdown cooling during the refueling outage. This item is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Engineering Support of Refueling Outage Activities

a. Inspection Scope (37551)

The inspectors used the guidance of IP 37551 and evaluated engineering involvement in resolution of emergent material condition problems and other outage related activities. The inspectors reviewed areas such as operability evaluations, and root cause analyses. The effectiveness of the licensee's controls for the identification, resolution, and prevention of problems was also examined.

b. Observations and Findings

Engineering department personnel provided outage support by acting as project managers for many of the outage projects, providing modification packages to improve plant material condition, and working with maintenance personnel to resolve several of the longstanding operator work arounds. Engineering personnel also reviewed emergent equipment issues and addressed operability questions. In these instances, engineering personnel provided timely and technically adequate support to other departments. Some of the equipment and areas covered included, improvements to the feedwater check valve penetration, feedwater penetration nozzle repair, core shroud weld inspections, tornado protection modifications, plant computer upgrades, electro hydraulic control system pressure accumulators, fuel leak cause determination, jet pump cleaning, RCIC test questions, local leak rate testing, EDG failure troubleshooting, main steam isolation valve packing leakage, motor operated valve testing and repair, and air operated valve testing.

c. Conclusions

The inspectors concluded that engineering department personnel provided timely and effective technical support to other departments for a variety of activities during the refueling outage.

E7 Quality Assurance in Engineering Activities

E7.1 Core Fuel Accountability and Verification

a. Inspection Scope (60710)

The inspectors followed the guidance in IP 60710 to monitor and review the licensee's fuel accountability practices during refueling.

b. Observations and Findings

The inspectors observed numerous fuel bundle movements from the control room. The inspectors noted that each movement was performed in accordance with a reactor engineering predetermined sequence listed on a Fuel Movement Checklist. Refueling and reactor engineering personnel used exact communications and properly documented each movement.

The inspectors viewed the camera monitor video tapes of the core verification. The licensee used high quality video equipment to carefully verify that fuel bundles were in the correct core location, correct orientation, and proper physical positioning. The licensee taped the layout of the core load from numerous angles and during numerous passes of the camera throughout the core. The inspectors noted that individual bundle information was verified through serial numbers checked against the checklist. On a horizontal camera pass through the core, reactor engineering department personnel identified one fuel bundle that was raised approximately one inch above its expected position. The bundle was hoisted and properly reseated according to procedure. All aspects of the core verification were completed satisfactorily.

c. Conclusions

The licensee utilized effective methods to maintain fuel accountability and verify the proper placement of fuel bundles in the core prior to reactor vessel reassembly.

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 May 17, 1999. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

H. Bergendahl, Director, Nuclear Services Department
N. Bonner, Director, Nuclear Maintenance Department
B. Boles, Manager, Plant Engineering
R. Collings, Manager, Quality Assurance
H. Hegrat, Manager, Regulatory Affairs
T. Henderson, Supervisor, Compliance
W. Kanda, General Manager, Nuclear Power Plant Department
F. Kearney, Superintendent, Plant Operations
B. Luthanen, Compliance Engineer
L. Myers, Vice President, Nuclear
J. Powers, Manger, Design Engineering
T. Rausch, Operations Manager
S. Sanford, Senior Compliance Engineer
R. Schrauder, Director, Nuclear Engineering Department
J. Sears, Manager, Radiation Protection
J. Sipp, Manager, Radwaste, Environmental, and Chemistry
J. Wood, Vice President, Nuclear

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 60710	Refueling Activities
IP 61726:	Surveillance Observation
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71711:	Plant Startup From Refueling
IP 71750:	Plant Support
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

50-440/99003-01	NCV	Failure to Follow Procedure - Two Examples
50-440/99003-02	NCV	Test Equipment Left in a Safety-Related Relay

Closed

50-440/97012-03	VIO	Use of Improper Data on SVI
50-440/97016-03	VIO	Improper Safety Tagging
50-440/97021-02	VIO	Incomplete Class 1E Raceway Markings
50-440/97021-06	VIO	Combustibles in Combustible Free Zone
50-440/97022-01	VIO	Failure to Adhere to Safety Tagging Procedure/ Inadequate Tag-Out
50-440/98007-01	VIO	Incorrect Removal of Safety Tag and Installation of Fuse 98-377
50-440/98010-01	VIO	Incorrect Fuse Removed
50-440/98010-03	VIO	Missed Step in Surveillance Restoration Checklist
50-440/98010-04	VIO	Expired Transient Combustible Permit
50-440/98018-01	VIO	Failure to Implement Requirements of Burn Permit
50-440/99002-00	LER	LCO 3.0.3 Entered Upon Shutdown Cooling Pump Failure
50-440/99003-01	NCV	Failure to Follow Procedure - Two Examples
50-440/99003-02	NCV	Test Equipment Left in a Safety-Related Relay

Discussed

None

LIST OF ACRONYMS USED

CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
DRP	Division of Reactor Projects
EDG	Emergency Diesel Generators
HPCS	High Pressure Core Spray
IP	Inspection Procedure
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOOP	Loss of Offsite Power
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
P&L	Precaution and Limitation
PAP	Plant Administrative Procedure
PIF	Potential Issue Form
RCIC	Reactor Core Isolation Cooling
RG	Regulatory Guide
RHR	Residual Heat Removal
SOI	System Operating Instruction
SRO	Senior Reactor Operator
SVI	Surveillance Instruction
TS	Technical Specification
US	Unit Supervisor
VIO	Violation
WO	Work Order