U.S. NUCLEAR REGULATORY COMMISSION

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REGION III

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Report No:	50-295/97025(DRP); 50-304/97025(DRP)			
Licensee:	Commonwealth Edison Company			
Facility:	Zion Nuclear Plant, Units 1 and 2			
Location:	101 Shiloh Boulevard Zion, IL 60099			
Dates:	October 11 through December 16, 1997			
Inspectors:	E. Cobey, Acting Senior Resident Inspector D. Calhoun, Resident Inspector C. Brown, Resident Inspector N. O'Keefe, Resident Inspector J. Yesinowski, Illinois Department of Nuclear Safety (IDNS) Inspector			
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EXECUTIVE SUMMARY Zion Nuclear Flant, Units 1 and 2 NRC Inspection Report 50-295/97025(DRP); 50-304/97025(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a nine-week period of inspection activities by the resident staff.

During this inspection period, licenses performance was again inconsistent. Operations department personnel continued to experience problems with system configuration control and the adequacy of pre-evolution walkdowns. These problems contributed to inadvertent inoperability of an emergency diesel generator and testing procedure deficiencies not being identified until the evolution was being conducted. In addition, control room operators continued to be unnecessarily challenged by inadequate procedural guidance and inconsistent support of other departments. Specifically, deficient maintenance practices resulted in failure of a fuel oil injection pump on an emergency diesel generator and an inadvertent engineered safety feature actuation. However, an overall improvement was noted in the thoroughness of post-event investigations and the adequacy of immediate corrective actions.

Operations

- The inspectors concluded that operations department management demonstrated a lack of communication and command and control of plant activities prior to and during the splitting of the service water header between units which contributed to the inadvertent loss of service water flow to an emergency diesel generator. In addition, a violation was identified involving the failure to provide appropriate guidance in a procedure to ensure that adequate service water flow was maintained to the 2B emergency diesel generator (Section O1.1).
- The inspectors concluded that the licensee continued to experience problems in the areas of pre-evolution walkdowns and system configuration control. For example, operator walkdowns of a procedure governing splitting of the service water system between units were not sufficient to identify procedural deficiencies and on-shift management was not aware of pertinent aspects of plant configuration during the subsequent evolution. These problems contributed to the inadvertent loss of service water flow to an emergency diesel generator (Sections O1.1 and O1.5)
- The inspectors co. Juded that the inadvertent cross-connection of the Unit 1 and Unit 2 condensate storage tank event was due to the Unit Supervisor's failure to follow station procedures for performing an evolution when a procedure did not exist for that evolution. Also, the inspectors determined that the lack of aggressive parameter trending contributed to the operator's failure to detect the level changes in the condensate storage tanks (Section O1.4).
- A violation was identified involving the licensee's failure to make the required four-hour notification to the NRC for the plant being outside its design basis due to an inoperable containment penetration line (Section O8.1).
- A non-cited violation was identified involving the licensee's failure to provide adequate guidance in a procedure for moving fuel assemblies (Section O8.2).

 The inspectors concluded that the licensee had performed several thorough post-event investigations during this period (Sections 01.1, 01.4, 08.2, 08.3, and M1.3).

Maintenance

- The inspectors concluded that a skill based error contributed to the failure of a fuel oil injection pump on the 1A emergency diesel generator (Section M1.1).
- A violation was identified involving the licensee's failure to provide adequate guidance in a surveillance procedure to test containment isolation and component actuation circuitry (Section M1.2).
- A violation was identified pertaining to electrical maintenance personnel's failure to follow a maintenance procedure for replacing a safeguards relay. The error resulted in an inadvertent engineered safety feature system actuation (Section M1.2).
- A violation was identified involving the licensee's failure to identify and perform a
 post-maintenance test following the replacement of a safeguards relay (Section M1.2).

Engineering

- A non-cited violation was identified involving the licensee's failure to perform inservice testing on the 2A safety injection pump suction valve within the specified periodicity (Section E8.1).
- The inspectors identified a violation involving the "bensee's failure to maintain a control room heating, ventilation and air conditioning system design drawing current with the as-built system design (Section E8.2).

Plant Support

 The licensee identified a third instance of inattentiveness by the security guard force (Section S8.1).

Report Details

Summary of Plant Status

During this inspection period, the licensee maintained Unit 1 in a defueled condition and Unit 2 in a cold shutdown, depressurized condition pending completion of restart actions delineated in the Zion Recovery Plan.

i. Operations

O1 Conduct of Operations

O1.1 Unit 2 Residual Heat Removal (RHR) System Rendered Inoperable Due to a Failure to Maintain the Required Number of Service Water (SW) Pumps

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's failure to maintain the required number of operable SW pumps on October 12, 1997. The inspectors interviewed operators, reviewed applicable procedures and documentation, and evaluated the licensee's subsequent root cause investigation and corrective actions.

Observations and Findings

On October 12, 1997, Unit 1 was defueled and Unit 2 was in cold shutdown. The SW system was cross-connected between units with the 1A SW pump out-of-service (OOS) and the 1B SW pump inoperable, but available, due to the 1A emergency diesel generator (EDG) being OOS for maintenance. The 1C, 2A, 2B, and 2C SW pumps were all operable.

Sequence of Events on October 12, 1997:

- At 1335, the licensee held the complex evolution briefing for the performance of System Operating Instruction (SOI) 61F, "Splitting Service Water Header for Maintenance," Revision 0.
- At 1445, the licensee began performing SOI-61F. (This activity was conducted from Unit 1.)
- At 1515, a non-licenzed operator isolated SW cooling first to the 2B EDG in accordance with SOI-61F, Step 1.2. (This action rendered the 2B EDG and the 2C SW pump inoperable.)
- At 1525, the Unit 1 Nuclear Station Operator placed the control switch for the 1C SW pump in pull-to-lock in accordance with SOI-61F, Step 1.3. (This action rendered the 1C SW pump inoperable.)
- At 1540, the licensee held the pre-job briefing for the performance of Periodic Test (PT) 11E-0, "0 Dic sel Generator Cylinder Liner Test," Revision 1.

- At 1550, the licensee began performing PT-11E-0. (This activity was conducted from Unit 2.)
- At 1554, the 0 EDG maintenance lockout switch was placed in the "Maint Lockout" position in accordance with PT-11E-0, Step 5, which made the 0 EDG inoperable. Consequently, the 2A SW pump was made inoperable due to the pump not having an emergency power supply.
- At 1650, the 0 EDG maintenance lockout switch was placed in the "Normal" position in accordance with PT-11E-0, Step 34, which restored the 0 EDG and the 2A SW pump to an operable condition.
- At 1705, a non-licensed operator identified that the 2B EDG did not have SW cooling flow.
- At 1710, a non-licensed operator opened the normally closed Unit 2 EDG cross-tie valve, 2MOV-SW0023, which restored the 2B EDG and the 2C SW pump to an operable condition.
- At 1720, the licensee completed PT-11E-0.
- At 1901, the licensee notified the NRC of this event in accordance with 10 CFR 50.72.

Following the discovery that the 2B EDG was without SW cooling flow, the licensee restored SW flow to the 2B EDG and initiated a prompt investigation. The licensee determined that Technical Specification Interpretation (TSI) 91-05, "Service Water (SW) Pump OPERABILITY," Revision 4, specified that three SW pumps be operable for the existing plant configuration, each with an independent operable emergency power supply; however, from 1525 to 1710, the licensee did not maintain the required number of operable SW pumps. Without three operable SW pumps, the SW system was inoperable since it was not at the provide adequate cooling water flow to the common component cooling water (CC) system during a dual unit loss of offsite power event. The common unit CC system was inoperable since the CC system was a necessary support system.

The licensee determined that SOI-61F, Revision 0, was inadequate, in that, it did not address the Unit 2 EDG cross-tie valves. As a result, the procedure did not ensure that SW flow to the 2B EDG was available from the Unit 2 header prior to isolating the supply from the Unit 1 header. In addition, a technical review of the procedure, performed during the procedure revision process, and operator walkdowns of the procedure were not adequate to identify that the procedure would not work as written. The failure of SOI-61F, Revision 0, to provide appropriate guidance to ensure that adequate SW flow was maintained to the 2B EDG while splitting the SW headers is considered ar example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/97025-01a; 50-304/97025-01a), as described in the attached Notice of Violation.

In addition, the licensee determined that during the event the Unit 1 Supervisor was not aware of the existing plant configuration. Specifically, on October 11, 1997, the Unit Supervisor had been involved in the development of an OOS to support isolating SW

loads such that only two SW pumps were required to be operable in accordance with TSI 91-05. This OOS isolated two of the three CC heat exchangers. Subsequently, on the next shift, the Shift Manager modified the OOS to isolate only one of the three CC heat exchangers, since this was the configuration necessary to support splitting the SW headers. As a result, three SW pumps were required to be operable in accordance with TSI 91-05. However, during the shift turnover the following day, the Unit Supervisor was not made aware of the modification to the OOS. Consequently, the Unit Supervisor did not understand that three SW pumps were required to be operable in accordance with TSI 91-05.

The licensee also determined that the operating shift management exhibited a lack of communication and command and control of plant activities leading up to and during this event. Specifically: (1) the operating shift management did not ensure that the complex evolution briefing for the performance of SOI-61F and the pre-job briefing for the performance of PT-11E-0 addressed the configuration of plant systems or the impact of other scheduled activities; (2) the Unit 1 Supervisor and the Unit 2 Supervisor did not discuss the impact of performing concurrent activities (SOI-61F on Unit 1 and PT-11E-0 on Unit 2) which would affect the SW system; (3) the Unit 1 Supervisor did not notify the Shift Manager or the Unit 2 operating crew when a common system component (1C SW pump) was made inoperable; and (4) both the Shift Manager and the Unit 2 Supervisor failed to ensure that the minimum number of SW pumps would be operable during the performance of PT-11E-0.

In response to this event, the licensee's planned or completed corrective actions included the following:

- The licensee revised SOI-61F to reflect the need to verify the position of the Unit 2 EDG cross-tie valves.
- The Operations Manager removed the Shift Manager and both Unit Supervisors from their normal shift duties to participate in the root cause investigation and the development of the corrective actions.
- Each operating shift will perform a "vulnerability assessment" to determine the degree of vulnerability posed by the abnormal status of plant equipment to heighten the awareness of shift management in prioritizing recovery actions and anticipating casualties.
- The operations staff will clarify the Zion Operations Department Standards to require a control room announcement whenever a major piece of equipment is being manipulated.
- The Complex Evolution and Pre-Job Brief Checklists will be revised to check for any shift activities that could affect the planned evolution.
- The operation procedures group will revise Zion Operating Instruction 001, "Procedure Walkdowns," to include additional expectations including the verification of flow paths and that the procedure will work properly as written.

c. Conclusions

The inspectors concluded that: (1) the technical review and the subsequent operator walkdowns of SOI-61F, Revision 0, were not adequate to ensure that the procedure provided appropriate guidance for maintaining SW cooling flow to the 2B EDG; (2) an incomplete shift turnover resulted in the Unit 1 Supervisor not being knowledgeable of the existing plant configuration; (3) the lack of communication between the operating shift management resulted in conflicting evolutions being performed simultaneously; and (4) the operating shift management's command and control of plant activities was weak. The inspectors also determined that the licensee's post-event investigation was thorough.

As documented in NRC Inspection Reports 50-295/97022; 50-304/97022, 50-295/97013; 50-304/97013; 50-295/97012, and 50-295/97002; 50-304/97002, the failure to provide operating procedures that contain guidance appropriate to the circumstances remains problematic. (See also Section M1.2). Although the violation example was self-disclosing, it is being cited as a repetitive issue.

O1.2 Control Room Heating, Ventilation, and Air Conditioning (HVAC) System Inoperable due to Incomplete Modification

On October 22, 1997, the licensee made a 10 CFR 50.72 notification after discovering that the station's non-safety-related heating system was relied on for maintaining the control room HVAC system operable. Specifically, the licensee determined that operation of the auxiliary building supply fans was needed to ensure the control room HVAC system was able to maintain the control room at a positive pressure. The station heating system is lost during design basis accident conditions which could cause the auxiliary building supply fans to trip on low temperature during cold weather. Therefore, the control room HVAC may potentially not maintain the control room at a positive pressure during an accident.

Subsequently, on November 10, 1997, the licensee made another 10 CFR 50.72 notification stating that the station heating system was not required for control room HVAC system operability as long as dampers properly closed during accident conditions to maintain the computer room at a positive pressure, thereby providing a buffer zone between the control room and the auxiliary building. However, these dampers were inoperable because an incomplete 1985 modification prevented the dampers from closing on a safety injection actuation.

This issue is considered an Unresolved Item (50-295/97025-02; 50-304/97025-02) pending NRC review of the licensee's completed investigation and development of corrective actions to restore the control room HVAC system to an operable condition.

O1.3 Unit 2 RHR System Rendered Inoperable

On October 30, 1997, the licensee identified that when cross tying Unit 1 and Unit 2 on October 25, 1997, the licensee reduced the number of required service water pumps below the number required for the plant conditions. As a result, the service water system was rendered inoperable. The operators subsequently declared the CC and RHR systems inoperable because these systems were supplied by the SW system. The

Icensee reported the inoperability of the RHR system in accordance with 10 CFR 50.72(b)(2)(iii)(B).

This error occurred while performing SOI-61E, "Service Water Component Isolation During Various Piant Conditions," Revision 2. The operators opened a knife switch on the 0 EDG for Bus 147 so that the EDG would preferentially load onto Bus 247 in the event of a dual unit loss of offsite power. However, the operators failed to recognize that this action alone was not sufficient to cause the 0 EDG to load onto Bus 247. This issue is considered an Unresolved Item (50-304/97025-03) pending the inspectors's review of the licensee's completed investigation and corrective actions.

O1.4 Condensate Storage Tanks (CSTs) Inadvertently Cross-connected

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the inadvertent cross-connection of the CSTs. The inspectors interviewed operators, reviewed applicable procedures and documentation, and evaluated the licensee's root cause investigation and subsequent corrective actions.

b. Observations and Findings

On November 13, 1997, the Unit Supervisor directed a non-licensed operator to transfer the auxiliary boiler makeup from the Unit 1 CST to the Unit 2 CST. The non-licensed operator transferred the suction of the auxiliary boiler makeup pumps to the Unit 2 CST; however, he failed to transfer the makeup recirculation path from the Unit 1 CST to the Unit 2 CST. The auxiliary boiler makeup pumps were drawing a suction from the Unit 2 CST and recirculating approximately 48 gallons per minute to the Unit 1 CST. As a result, the level in the Unit 1 CST was increasing and the level in the Unit 2 CST was decreasing at approximately 2 feet per day. However, due to the scale of the CST level instrumentation and a lack of aggressive parameter trending, the operators failed to detect the changes in the CST levels until the "Condensate Storage Tanks Level High-Low" alarm actuated on November 15, 1997, when the Unit 2 CST level reached approximately 8 feet.

The licensee determined that the cause of the event was the Unit Supervisor's failure to follow Zion Administrative Procedure (ZAP) 300-02, "Use of Procedures in the Operating Department," Revision 14. Zion Administrative Procedure 300-02 required, in part, that when an evolution must be performed and a procedure does not exist, then complete an Attachment B, "Operating Evolution Instructions (When A Procedure Does Not Exist)," which would have ensured the evolution was reviewed and approved by two Senior Reactor Operator licensed individuals. In addition, the licensee determined that the Unit Supervisor and the non-licensed operator placed a low level of attention on the evolution since they both perceived that the task was routine. The licensee's corrective actions included:

- The licensee aligned the auxiliary boiler makeup to the Unit 1 CST.
- The involved Unit Supervisor reviewed the event with each operating crew.

Operations Policy 12, "Configuration C Irol," will be revised to include management's expectations that each in I configuration change be logged and that operators perform follow-up reviews o plant parameters as a contirmation that the configuration change was correctly performed.

Non-safety-related system operating instructions will be reviewed to determine if sufficient procedural guidance exits to perform routine evolutions.

Conclusions C.

The inspectors concluded that the event occurred due to the Unit Supervisor's failure to follow the requirements of ZAP 300-02 for the performance of an evolution when no procedural guidance existed; and, the lack of aggressive parameter trending contributed to the failure of the operators to detect the unexpected changes in CST levels until the CST low level alarm was received. These deficiencies were not violations of NRC requirements because safety related activities were not involved. The inspectors also concluded that the licensee's investigation was thorough and the proposed corrective actions appeared appropriate.

Observations of Operational Readiness Demonstration Program Activities 01.5

Inspection Scope (71707)

The inspectors observed operations department personnel perform surveillance testing on the Unit 2 engineered safety features Bus 249 as part of the operational readiness demonstration program. The inspectors observed control room activities, attended pre-evolution briefings, interviewed operations department personnel, and reviewed applicable documentation.

Observations and Findings b.

The inspectors observed operations department personnel perform three periodic tests (PTs). The inspectors noted that although three-way communications had improved, at various times, the operators did not consistently perform three-way communications and routinely substituted a verbal shorthand method of communications in place of three-way communications. In addition, problems in the area of system configuration control and thoroughness of pre-evolution walkdowns as previously documented in NRC Inspection Report 50-295/97016; 50-304/97016, continued to challenge operations department personnel.

Periodic Test 3.8.1.16-249, "Simulated Safety Injection with Degraded Voltage Start of Diesel Generator 2B," Revision 0

On November 17, 1997, the inspectors observed that the test coordinator performed a thorough briefing, conducted a good dry-run to ensure test performers were prepared, and ensured that observers of the PT understood not to disturb the test performers. At the completion of the test, the test performers properly recognized that the test acceptance criteria had not been met for the reactor containment fan cooler and appropriately declared applicable equipment inoperable.

During the dry-run and subsequently during various sections of the PT, the inspectors noted generally good use of three-way communication techniques. However, the inspectors identified that operators were directing and reporting back, "Perform Step 1 [2, 3, etc.]" instead of reading the procedural step. This verbal shorthand (perform Step (X)) method of communications was used throughout the performance of the test. After the operators completed the test, the inspectors queried the Unit Supervisor (US) and the test coordinator regarding the appropriateness and intent of using this verbal shorthand practice. The test coordinator informed the inspectors that a decision had been made and test performers informed that use of this verbal shorthand method would only be allowed for sections of the procedure which were very time dependent. The inspectors noted that this verbal shorthand method had also been used for other than time dependent portions of the PT. In either case, the licensee's operating standard did not address this practice. The use of this verbal shorthand method did not meet licensee management's expectations for three-way communications. The inspectors noted that three-way communication by the US slipped below licensee operating standards as the evolution progressed, in that, the US did not repeat information but only stated, "understand."

Periodic Test 11-DG2B-R1, "2B Diesel Generator Loading, Load Rejection, and Hot Restart Test," Revision 3

On November 20, 1997, the inspectors attended the pre-job briefing and observed the PT. The inspectors determined that the pre-job briefing was comprehensive and interactive, and appropriately emphasized procedural adherence. The inspectors also noted that briefing participants demonstrated a questioning attitude by verifying that the PT would meet the appropriate TS requirements.

The inspectors noted that the test performers again used the previously described verbal shorthand method of communication for other than time dependent portions of the PT. The inspectors also noted that the formality of three-way communications of test performers slipped below licensee operating standards after the test was completed and as the shift progressed further into the day.

During the performance of the PT, the operators were to determine what initiated the start of the EDG and the time it took for the EDG to close onto its respective bus. The inspectors observed that the US did not know how to obtain the initiating event actuation time from the strip chart recorder, which resulted in the US obtaining an incorrect actuation time. This error was corrected by a Nuclear Station Operator after the inspectors guestioned the start time of the initiating event.

Periodic Test 3.8.1.10-249, "Loss of Offsite Power Testing of Diesel Generator 2B," Revisions 2 and 3

On November 18 and 19, 1997, the inspectors observed operations department personnel's attempts to perform the PT. On both days, the test was stopped due to problems with the 2C auxiliary feed water (AFW) pump lubricating oil system.

On November 18, 1997, the Shift Manager (SM) appropriately suspended the PT after identifying that water was mixed with the oil in the 2C AFW pump oil cooler. The SM directed isolation of the cooling water to the cooler so that the oil c, uld be replaced. Due

to the apparent leakage path, the SM decided to maintain the cooling stater isolated and unisolate it only to perform the PT. The SM's decision was not based on engineering analysis, in that, the decision did not consider if the cooler could be adversely affected by being in this configuration. Also, the SM did not document the abnormal configuration of the cooler. This decision did not meet the licensee's operating standards.

While subsequently performing the PT, 16 procedural discrepancies were identified. The licensee characterized these changes as editorial and procedural enhancements. The subsectors disagreed with this characterization because several changes included onsuring that the correct components were identified. The inspectors concluded that the walkdown of the procedure previously conducted on November 3, 1997, was inadequate because 16 changes were subsequently made in order to perform the PT. The test coordinator subsequently implemented the changes in Revision 3 of the PT to facilitate performing the test the next day.

Following implementation of Revision 3 to the test procedure, a pre-evolution briefing was held on November 19, 1997, in preparation for performance of the test. However, neither the US nor the SM attended the brief, although the US was actively involved in the subsequent activity. The inspectors considered this a deficient management oversight practice. During the briefing, operators demonstrated a questioning attitude in querying if the root cause had been determined for water intrusion in the 2C AFW pump oil cooler. Although the root cause was not determined, operations department personnel decided to proceed with performing the PT with the understanding that the PT would be terminated if problems arose with the 2C AFW pump oil cooler. T' a test performers slopped the PT after 45 minutes due to water in-leakage into the oil pooler.

In addition to the 16 procedural changes in Revision 3, the PT also had been revised to address a scheduling change. After operators had walked down the T on November 14, 1997, the service water booster pump, which needed to be verified as operating during the PT, was unexpectedly taken OOS for planned work. This scheduling oversight necessitated Revision 2 to the PT. Although the test performers had been briefed on Revision 2, the test coordinator elected to proceed without having issued Revision 2. The inspectors considered this a deficient practice.

c. Conclusions

The control room operator's identification of the procedural inadequacies and the immediate corrective actions taken to stop the evolution until the procedure deficiencies were corrected was considered a positive attribute. However, the inspectors concluded that the occurrence of these testing problems indicated that weaknesses still exist in the areas of procedure adequacy, scheduling, and communications. Specifically, the inspectors were concerned with the repeated use of the verbal shorthand method of communications while performing the PTs, unexpected system configuration changes necessitating a PT revision, the poor quality of the PT walkdown, and the SM's failure to use a technical basis for and document the altered cooler configuration.

O3 Operations Procedures and Documentation

03.1 Operations and Engineering Department Personnel Exceeding Overtime Requirements

a. Inspection Scope (71707)

The inspectors reviewed operations and engineering department personnel's adherence to the station's overtime requirements during the performance of Technical Specification Surveillance 3.8.1.10-1, "Loss of Offsite Power Testing of Diesel Generators During Refueling for Unit 1," from July 23 through 29, 1997. The inspectors interviewed operations and engineering department personnel L. d reviewed operating logs, gatehouse access records, and the applicable procedures and documentation.

b. Observations and Findings

The inspectors reviewed the gatehouse access records from July 15 through August 6, 1997, for 49 operations and engineering department personnel involved in the performance of the test. The inspectors identified 25 examples of unapproved overtime in excess of the guidelines specified in ZAP 200-04, "Overtime Guidelines," Revision 2, Section F.4.b. The inspectors also identified seven examples of overtime in excess of the guidelines where the individuals involved in the instances had subsequently obtained post approval.

As described in NRC Inspection Report 50-295/97013; 50-304/97013, dated August 15, 1997, a violation was issued for the licensee's failure to control the use of overtime in excess of the overtime guidelines by operations department personnel. The inspectors noted that these additional examples occurred prior to the issuance of NRC Inspection Report 50-295/97013; 50-304/97013. As a result, a violation is not being issued since these examples were additional examples of a previously cited Violation (50-295/97013-02; 50-304/97013-02).

c. <u>Conclusion</u>

The inspectors concluded that these additional examples further demonstrate that deficiencies existed in the implementation of station's overtime policy.

O8 Miscellaneous Operations Issues

O8.1 (Closed) LER 50-304/97004-00: Small Bore Containment Penetration Line Inadequately Supported Since Plant Construction.

On October 15, 1997, engineering department personnel identified that a containment penetration line was not adequately supported as evidenced by piping deformation of the line. The 2DT040-¼ line was the discharge piping line from the reactor coolant drain tank to the auto gas analyzer. The line contained the reactor coolant drain tank to auto gas analyzer containment isolation valves, 2AOV-DT9159A and B. The next day, engineering department personnel performed a design engineering calculation which indicated that line 2DT040-¼ was inoperable due to the line being over stressed due to the lack of supports for the piping and lock of seismically mounted supports for the valves. With the

penetration line inoperable, the plant was placed in an unanalyzed condition requiring NRC notification. Design engineering department personnel documented this deficient condition in problem identification form (PIF) Z1997-02272 and notified onshift operations management of the condition at approximately 1730, on October 16, 1997. At that time, the SM did not make the required 10 CFR 50.72 notification. Subsequently, the SM screened the PIF against the station's reportability criteria and determined at 2300 that this condition was not reportable. Therefore, notification was not made to the NRC.

On October 17, 1997, engineering department personnel informed an off-duty SM of the inoperable condition of the penetration line. The SM determined that this condition met the station's reportability criteria but had not been reported. The SM subsequently made the required notification at 1504. In discussing this issue with station personnel, the inspectors determined that the licensee had not initiated a PIF for the failure to make the notification within the four-hour time requirement. The failure of the S.A on October 16, 1997, to notify the NRC of the plant being in an unanalyzed condition due to the inoperability of the penetration line within four hours is considered a violation of 10 CFR 50.72(b)(2)(I) (50-304/97025-04), as described in the attached Notice of Violation. Although the violation was licensee identified, it is being cited as a repetitive issue since previously similar problems were documented in NRC Inspection Report 50-295/97002; 50-304/97022.

The licensee's corrective actions included:

- Engineering department personnel walked down other small bore piping and documented any additional problems.
- Operations department personnel made the required notification to the NRC on October 17, 1997.
- Engineering department personnel initiated actions to seismically support the penetration line.

The inspectors concluded that engineering department personnel had performed a thorough assessment of the deficient penetration line. However, the inspectors were concerned that the licensee had not formally documented that the NRC notification was not made within the required time limits until prompted by the inspectors.

O8.2 (Closed) Unresolved Item 50-295/97013-01: Damaged grid straps on fuel assembly (FA) while transporting the FA to the spent fuel pool.

The inspectors reviewed the circumstances surrounding this event which occurred on April 23, 1997. When moving a FA to open water, after approval by the Fuel Handling Supervisor (FHS), the bundle contacted the baffle and tore off parts of two grid straps. The FHS recognized the damage when hoisting the next fuel bundle, which contained debris, and immediately stopped fuel moves with the bundle hoisted.

The licensee maintained control of t e FA, by stationing a senior reactor operator to observe the FA, while it remained housted approximately 6 inches, during which plans for visual inspections were discussed. After approximately eight hours, the bundle was lowered to its original location in accordance with a revised Nuclear Component Transfer

List. The licensee subsequently recovered the grid strap pieces. The licensee performed visual inspections of 34 fuel bundles, the baffle, and the area around the E2 core location. The licensee did not identify any additional damage or foreign material. The inspectors determined that although the bundle could have been lowered sooner, the licensee's actions were acceptable.

The Westinghouse refueling philosophy, which was followed by the licensee, was to utilize open water moves to the maximum extent possible in order to minimize potential damage from grid interactions between adjacent bundles. For core offloading, this involved hoisting each bundle up about 6 inches, overriding the hoist interlock, performing a lateral move into an unobstructed area, then hoisting the bundle up into the mast. The hoist interlock was intended to avoid damaging fuel bundles during lateral moves near other objects by requiring bundles to be hoisted fully into the mast before allowing lateral movement. The licensee incorporated this philosophy into Fuel Handling Instruction (FHI) 13, "Manipulator Crane." However, the inspectors noted that "open water" was not defined in this procedure. Vendor documents required at least 2 inches of open space on all sides to be considered open water.

The licensee's detailed root cause investigation was thorough and identified that the event was caused by an inadequate fuel handling procedure and an error in judgement. The decision to attempt to move the bundle into open water was incorrect because the FA first had to be moved closer to the baffle. The latest revision of the vendor fuel specification gave examples of safe move sequences for different configurations and clearly showed that this condition was not an open water move. However, that revision had not been incorporated into licensee procedures. Also, the vendor had provided a recommended official sequence to maximize possible open water moves, which was also not incorporated by the licensee.

The inspectors reviewed the licensee's corrective actions for this event. The licensee incorporated the vendors recommendations into the station procedures, including defining open water moves and designing the fuel move sequence to maximize the possible number of open water moves. Additionally, fuel move sheets will clearly indicate which moves can be considered open water moves. The licensee also conducted training on the event and the new procedural requirements. The inspectors concluded that the corrective actions appeared to be adequate.

The licensee's failure to provide appropriate procedural guidance for performing open water fuel movements without defining what c ...ditions had to be satisfied to safety accomplish such a move is considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/97025-05). This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

O8.3 (Closed) LER 50-304/97003-00: Unit 2 Residual Heat Removal (RHR) Declared Inoperable Because Only One Component Cooling Pump Was Operable.

On October 14, 1997, the 1B EDG failed to start during performance of PT-11-DG1B, "1B Diesel Generator Loading Test," Revision 11. The licensee subsequently declared the 0C component cooling water (CC) pump inoperable as a result of the failure of the 1B EDG, since the 1B EDG was the emergency power supply for the 0C CC pump. Prior to 1B EDG testing, control room operators had declared the 0B CC pump inoperable due to excessive oil leakage from the outboard pump bearing oil sight glass. Consequently, only one CC pump remained operable which was not sufficient to provide the required cooling to support operability of the RHR system. As a result, the licensee reported the event to the NRC in accordance with 10 CFR 50.72.

The licensee determined that the cause of the 18 EDG's failure to start was a ruptured air distribution pipe. A ½ inch threaded pipe nipple, between the left air start header and the tubing supplying air to both air start distributors, had broken. Systems Material Analysis Department personnel's analysis of the broken nipple indicated that cyclic fatigue caused the pipe nipple to fail.

The licenses's corrective actions included:

- Engineering department personnel inspected the air distribution piping for the other four EDGs with no other additional problems noted.
- Mechanical maintenance department personnel repaired the 1B EDG.

The inspectors determined that the licensee's investigation was thorough and subsequent corrective actions were appropriate.

O8.4 (Closed) Unresolved Item 50-295/96017-02: Practice of allowing reactor power to exceed the licensed thermal power limit.

The inspectors identified in the incess where the licensee operated slightly above 100 percent power for longer than 1 hour. The inspectors reviewed the licensee's procedures for maintaining operating power limits and compared the instructions to the NRC Jordan Letter dated August 22, 1980. The Jordan letter provided guidance on how the NRC enforced the operating license maximum operating core thermal power. The inspectors concluded that the licensee's procedure "Power History Log," PT-0, Revision 12, Appendix P, met the guidance set forth in the Jordan Letter. The inspectors reviewed the computer logs for the periods in question which recorded the results of the 10-minute, 60-minute, and 8-hour calorimetric calculations of reactor thermal power. These indicated that the licensee met the guidance in the Jordan Letter during the periods in question, and thus no violation existed. This item is closed.

- O8.5 (Closed) Licensee Event Report (50-304/97002): Inadvertent Isolation of Service Water Cooling to 2B Emergency Diesel Generator During System Alignment (See Section 01.1).
- O8.6 Zion Station Restart Action Plan Review
- a. Inspection Scope (71707)

The inspectors reviewed the licensee's completed restart action items as specified in the NRC Zion Station Restart Action Plan, dated September 11, 1997.

b. Observations and Findings

C.2.1.b: Effectiveness of Industry Experience Review Program

The inspectors verified the completion of Zion Station Unit 2 Recovery Plan Items 11.5 and 11.6. The licensee's review of both the open and closed operating experience issues was completed on July 30, 1997. The review evaluated the issues contained in NRC Inspection Reports, NRC Information Notices, NRC Bulletins, NRC Generic Letters, Nuclear Operations Notifications, Significant Conditions Adverse to Quality/Level II events, and Licensee Event Reports. This review was completed in accordance with the Zion Unit 2 Restart Plan Program Review document. As a result of this review, 173 items were designated as restart items. However, prior to restart, the licensee planned to add any additional commitmed categorized as a restart issue to the restart issue matrix in accordance with Action Plan 11, "Operating Experience."

C.2.2.a: Goals/Expectations Communicated To and Understood by the Staff

The inspectors verified the completion of Zion Station Unit 2 Recovery Plan Items 3.1, 6.2.4, and 9.3.

- The licensee implemented the Zion Operations Department Standards.
- The licensee implemented the Operations and System/Component Engineering Interface Agreement which was issued on June 25, 1997.
- The licensee implemented standards for offshift management command and control which were issued on October 6, 1997.

C.2.2.b: Demonstrated Expectation of Adherence to Procedures

The inspectors verified the completion of Zion Station Unit 2 Recovery Plan Item 5.1. The licensee completed this item on May 30, 1997, when ZAP 300-02, "Use of Procedures in Operating Department," Revision 12, was approved. However, this procedure was subsequently revised twice. On September 30, 1997, ZAP 300-02, Revision 14, was approved.

C.2.3.a: Management Support

The inspectors reviewed the completion of Zion Station Unit 2 Recovery Plan Item 2.5. The licensee developed position descriptions for operations department personnel including the Shift Operations Supervisor, the Shift Manager, the Unit Supervisor, the Shift Technical Advisor, the Non-Licensed Shift Supervisor, the Nuclear Station Operator, the Non-Licensed Operator, and the Qualified Nuclear Engineer. Each of these position descriptions included areas of accountability, responsibility, and position duties.

On July 22, 1997, the licensee approved the position descriptions for operations department support personnel including the Operations Work Control Center Supervisor, the Operations Staff Supervisor, and the Assistant Superintendent Operations. Each of these position descriptions included areas of accountability and responsibility and position duties. While reviewing these roles and responsibilities, the inspectors noted that the

operations department was subsequently reorganized and the Assistant Superintendent Operations position had been eliminated. In addition, the roles and responsibilities for some of the operations department support positions, such as the Operations Training Liaison, had not been developed. As a result of the inspectors questions, the licensee re-opened this action plan item.

C.2.3.d: Adequate Plant Administrative Procedures

The inspectors verified the completion of Zion Station Unit 2 Recovery Plan Items 5.1, 6.1.1, and 6.1.4.

- Zion Administrative Procedure 300-02, "Use of Procedures in Operating Department," Revision 12, was approved on May 30, 1997. However, this procedure was subsequently revised twice. On September 30, 1997, ZAP 300-02, Revision 14, was approved.
- Zion Operability Determination Manual 0, "Operability Determination Program," Revision 11, was approved on October 17, 1997.

c. Conclusions

The inspectors concluded that the licensee was making progress in completing the Zion Station Unit 2 Recovery Plan. However, the inspectors noted that once a recovery plan item was closed, the licensee was not updating the item to reflect any subsequent changes.

O8.7 10 CFR 50.54(f) Letter Commitment Review

a. Inspection Scope (71707)

The inspectors reviewed the status of commitments pertaining to Commonwealth Edison's March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). The commitment numbers correspond to those used by the licensee in their March 28, 1997, response.

b. Observations and Findings

<u>Commitment 1</u>: "To reinforce these principles and assure that performance results are achieved, the CNOO [Chief Nuclear Operating Officer] conducts Management Review Meetings (typically each month) at each site."

<u>Commitment 75</u>: "The CNOO conducts Management Review Meetings at each site focused on safety performance and the effectiveness of improvement initiatives. These meetings address trends of safety, performance, and cost indicators; results of third party (NRC and INPO) inspections; results of site self-assessments; status of material condition in the plant; outage planning and performance; and assessments of the quality of workforce product and training."

Commitment 100: "We have established the actions to be taken if the performance criteria are not met. In order to assess that effective and timely actions are taken,

assessment of performance indicators and implementation of actions based on this assessment will take place at the site, NOD [Nuclear Operating Division], and Board levels. Each of the performance indicators described in Sections 4.7.1 and 4.7.2 above will be monitored by the Site Vice Presidents, and will ha reviewed during the periodic Management Review Meeting for each station."

Complitment 271: "The CNOO (typicality monthly) conducts Management Review Meetings at each site, focusing on safety performance and the effectiveness of improvement initiatives."

Commitment 322: "Each month the Chief Nuclear Operations Officer conducts Management Review Meetings at all sites."

The inspectors observed the Zion Station Management Review Meeting conducted on October 27, 1997. The inspectors noted that the meeting accomplished all of the objectives noted in the above commitments.

c. Conclusions

The inspectors concluded that the licensee was conducting Management Review Meetings as described in Commonwealth Edison's March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f).

II. Maintenance

M1 Conduct of Maintenance

- M1.1 <u>1A Emergency Diesel Generator (EDG) Fuel Oil Leak Due to an Improperty Assembled</u> Compression Fitting
- a. Inspection Scope (62707)

The inspectors reviewed the circumstances surrounding the emergency shutdown of the 1A EDG during testing on October 17, 1997. The inspectors interviewed operations and maintenance department personnel and reviewed the applicable maintenance work instructions.

b. Observations and Findings

On October 17, 1997, during the performance of PT 11-DG1A-R, "1A Diesel Generator 24-Hour Loading Test," Revision 2, a non-licensed operator initiated an emergency shutdown of the EDG due to a severe fuel oil leak on the six left (6L) injection pump. The licensee immediately placed the control switch for the 1A EDG in pull-to-lock, quarantined the area, and initiated PIF Z1997-02284.

The licensee determined that the leak occurred due to a failed compression fitting on the low pressure fuel oil line to the 6L injection pump. This compression fitting had been replaced on October 16, 1997, in accordance with Work Request No. 970107757-01. This work request did not contain any specific instructions on how to install the fitting

since the licensee considered this activity within the "craft capability" of the maintenance mechanics. This particular type of fitting was designed to have been assembled by tightening the nut 1¼ turns from finger tight; however, the mochanic that assembled the fitting tightened the nut until no additional movement was achievable. Consequently, upon the startup of the 1A EDG, the fuel oil pressure in the line caused the fitting to separate.

In response to the inspectors' questions, the licensee indicated that mechanical maintenance personnel were trained on the assembly of compression fittings during mechanical maintenance "A" track training. In addition, the licensee indicated that the involved mechanic had received this training during the first quarter of 1996 and had since successfully performed this activity on numerous occasions.

c. <u>Conclusions</u>

The inspectors concluded at the failure of the compression fitting on the 1A EDG low pressure fuel oil line to the oL injection pump was due to a skill based error during maintenance.

M1.2 Incorrectly Wired Safeguards Relay Resulted in an Inadvertent Engineered Safety Feature (ESF) Actuation

Inspection Scope (61726 and 62707)

The inspectors observed the performance of selected portions of PT 10-3, "Containment Isolation Phase B Testing," Revision 12, interviewed operations, work control, and maintenance department personnel, and reviewed applicable procedures and documentation.

b. Observations and Findings

On December 2, 1997, during the performance of PT 10-3, "Containment Isolation Phase B Testing," Revision 12, Section 5.1, "Train A Division 7 Continuity Check of Containment High High Pressure and Containment Isolation Phase B and Component Actuation From Energizing Safety Injection Relay SIX 1A," the operators identified that relay SX1 had not de-energized as expected in Step 17. As a result, the operators stopped the testing to determine the cause of the relay's failure to de-energize. The licensee determined that the procedure would not work as written, in that, the relay remained energized through a seal in contact and a manual reset button until the reset button was actuated in Step 34. The licensee subsequently attempted to place the plant in a safe and stable configuration by completing the remaining portion of Section 5.1.

The inspectors noted that the licensee revised PT 10-3 on October 31, 1997, to incorporate relays, including relay SX1, that had not been previously tested. The licensee identified the failure to test these relays during reviews conducted in response to NRC Generic Letter 96-01, "Testing of Safety-Related Logic Circuits." However, the inspectors determined that the technical review for this revision was not adequate to identify that the revised procedure would not work as written. The failure of PT 10-3 to provide appropriate guidance to test the Train "A" Division 7 containment isolation and component actuation circuitry energized from safety injection relay SIX 1A is considered an example

of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/97025-01b; 50-304/97025-01b), as described in the attached Notice of Violation.

While the licensee was attempting to place the plant in a safe and stable configuration following the identification of the above procedural deficiency, an inadvertent ESF actuation occurred when an operator released reset push-button #11, "Division 7 Test," in Section 5.1, Step 34. The 2A SW pump and the 2B charging pump audilary lube oil pump autostarted. The licensee subsequently determined that all other ESF equipment either were already running or were out-of-service. As a result of the ESF actuation, the operating crow emergency tripped the 0 EDG, which was running in accordance with PT 10-3, and declared the equipment associated with the ESF buses 147 and 247 inoperable. The licensee subsequently determined that safety injection relay SIX1 AX failed to unlatch when push-button #11 was depressed. Consequently, the associated seal in contact for the relay remained closed. Therefore, when the push-button was released, the ESF actuation occurred. The licensee notified the NRC of this event in accordance with 10 CFR 50.72.

The licensee subsequently determined that the cause of the failure of relay SIX1 AX to unlatch was due to the relay being wired incorrectly during maintenance conducted on October 4, 1997. Specifically, while replacing relay SIX1 AX in accordance with Work Request No. 960104192 and Zion Generating Station Maintenance Procedure E005-2, "HFA Relay Inspection and Adjustment," Revision 7, electrical maintenance technicians connected the wire from the reset coil, wire 2C #12, to Terminal 10 (a spare terminal) instead of Terminal 12 as specified in the HFA Relay Data Sheet. Consequently, the reset coil for relay SIX1 AX was disconnected from the circuit.

Based on interviews with the involved electrical maintenance technicians, the inspectors identified that the error occurred because the technicians installed the relay using a wiring diagram instead of using the HFA Relay Data Sheet, which provided the physical configuration of the relay terminals. In addition, the inspectors identified that ooth of the technicians involved in the relay replacement documented the replacement by signing the HFA Relay Data Sheet. One signed the "Retermed By" block and the other signed the "Verified By" block; but, both technicians were involved in the maintenance and neither performed an independent verification. Based on discussions with the maintenance management's expectations for verifying completed maintenance activities, since an independent verification was not performed.

Zion Generating Station Maintenance Procedure E005-2, "HFA Relay Inspection and Adjustment," Revision 7, Section H, Steps 8.2 and 8.3, required that the relay be installed and reterminated per the applicable relay data sheet. The failure of the electrical maintanance technicians to follow E005-2 and install relay SIX1 AX in accordance with the HFA Relay Data Sheet is considered a violation of 10 CFR Part 50, Appendix B, Criterion V, (50-304/97025-06), as described in the attached Notice of Violation.

In addition, the licensee determined that a post-maintenance test (PMT) was not specified for the relay replacement conducted on October 4, 1997. Consequently, the maintenance error was not identified until following the resultant ESF actuation on December 2, 1997. The licensee also determined that on September 1, 1997, a work analyst identified and documented, in the note field of the work request, that the PMT requirements for the work activity were needed from the system engineer. However, the work analyst did not initiate any action to ensure that the PMT was specified prior to the maintenance being completed. Based on interviews with operations, work control, and maintenance department personnel, the inspectors identified that the licensee staff did not have a clear and consistent understanding of the PMT process. In addition, the inspectors identified that at least 43 other work requests had been approved without PMT requirements having been specified.

10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The failure to identify and perform a post-maintenance test for the replacement of relay SIX1 AX is considered a violation of 10 CFR Part 50, Appendix B, Criterion XI (50-304/97025-07), as described in the attached Notice of Violation.

c. Conclusions

The inspectors concluded that: (1) the technical review of PT 10-3, Revision 12, was not adequate to ensure that the procedural steps were sequenced in a manner which allowed the successful testing of the train "A" Division 7 containment isolation and component actuation circuitry energized from safety injection relay SIX 1A; (2) the inadvertent ESF actuation resulted from the safety injection relay SIX1 AX being miswired due to the electrical maintenance technicians not following E005-2 during replacement of the relay; and (3) the maintenance error was not identified following the replacement of the relay due to the licensee's failure to conduct a PMT.

As documented in NRC Inspection Reports 50-295/97022; 50-304/97022, 50-295/97013; 50-304/97013, 50-295/97012, and 50-295/97002; 50-304/97002, the failure to provide operating procedures that contain guidance appropriate to the circumstances remains problematic (See also Section O1.1). Although the violation example was self-disclosing, it is being cited as a repetitive issue.

In addition, as previously documented in NRC Inspection Reports 50-295/97019; 50-304/97019, 50-295/97016; 50-304/97016, 50-295/97013; 50-304/97013; 50-295/96017; 50-304/96017, and 50-295/96014; 50-304/96014, the failure of maintenance personnel to follow procedures continues to be an area of concern. Therefore, even though the violation was identified as the result of a self-disclosing event, it is being cited as a repetitive issue.

The failure to identify and perform a PMT for the replacement of relay SIX1 AX is being cited, since by the end of the inspection period the licansee had not completed their investigation and identified comprehensive corrective actions for the programmatic issues associated with the post-maintenance testing process.

M1.3 Failure of the 2B Emergency Diesel Generator Train B Starting Air Compressor

a. Inspection Scope (62707)

The inspectors reviewed the licensee's actions for determining the root cause of the catastrophic failure of the 2B EDG Train B starting air compressor during an operability run of the compressor. The inspectors interviewed root cause personnel, operations, engineering, and regulatory assurance department personnel, and reviewed appropriate station procedures and documentation.

b. Observations and Findings

On October 17, 1997, while operations department personnel were performing PT-11C-28, "2B Diesel Generator Starting Air Compressor Capacity Test," Revision 0, the 2B EDG Train B, starting air compressor failed. A maintenance mechanic supervisor was in the room when the compressor failed and informed onshift operations management of the event. The Shift Manager directed that the room be guarantined and requested a prompt event investigation.

The inspectors reviewed the licensee's investigation report of the compressor's failure. The inspectors considered the investigation thorough, agreed with the conclusions documented in the report, and determined that the proposed and completed corrective actions appeared appropriated. The licensee determined, as indicated by field inspections and laboratory examination, that the compressor failed due to severe galling between the third stage piston and its upper cylinder liner as a result of piston misalignment. The piston misalignment was due to maintenance personnel inappropriately torquing the piston capscrew. The inappropriate torquing was performed based on incorrect vendor manual information.

The licensee determined that on October 2, 1997, mechanical maintenance department personnel performed preventive maintenance on the compressor, for the first time, as governed by DG050-03, "DG [Diesel Generator] Air Start System five-Year Preventive Maintenance," Revision 0. Procedure DG050-03, specified incorrect vendor information which had been incorporated in 1992. Specifically, the procedure directed the mechanics to verify that each individual piston did not rotate. This was a correct verification action for the first and second stage pistons because the pistons were not supposed to move; however, this was an incorrect verification action for the third stage piston because it was supposed to rotate. Therefore, when the mechanics performed this step and identified that the third stage piston moved, the mechanics contacted the system engineer for assistance. The system engineer subsequently contacted the vendor representative who incorrectly confirmed that each piston should not move within its respective cylinder. The licensee eliminating the piston movement by torguing the piston capscrew in accordance with the torque table in the vendor manual. After completing the repairs, on October 17, 1997, while operators were performing PT-11C, the compressor failed after running for approximately 29 minutes.

The licensee's failure to provide appropriate procedural guidance for maintenance on the emergency diesel generator starting air compressor is considered a <u>violation</u> of 10 CFR Part 50, Appendix B, Criterion V (50-304/97025-08). This non-repetitive.

licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

c. <u>Conclusion</u>

The inspectors concluded that the cause of the 28 EDG Train 8 starting air compressor failure was inadequate vendor information concerning piston alignment, combined with a lack of a questioning attitude by engineering and maintenance personnel. However, the inspectors considered the licensee's investigation of this failure to be thorough.

III. Engineering

E8 Miscellaneous Engineering Issues

E8.1 (Closed) Licensee Event Report (50-304/97005): Missed TS Surveillance Test - Failure to Test the 2A Safety Injection Pump Suction Valve in the Prescribed Periodicity.

On October 24, 1997, while conducting an audit of the Inservice Test (IST) Program, Quality and Safety Assessment personnel identified that the 2A safety injection pump suction valve, 2MOV-SI8923A, had not been stroke tested quarterly in accordance with TS 4.0.5. Specifically, the licensee stroke tested the valve on December 14, 1995, and did not perform the test again until May 29, 1996. However, since TS 4.0.2 allowed a 25 percent extension to the surveillance interval, the testing was required to have been completed prior to April 8, 1996. Consequently, between April 8 and May 29, 1993, the 2A safety injection pump was inoperable. The licensee notified the NRC of this condition in accordance with 10 CFR 50.72.

The licensee determined that the cause for the missed surveillance testing was that the IST program was inadequate, in that, the program did not verify that all of the IST requirements, which were located in various procedures, were completed. The licensee's planned corrective actions included:

- The IST Group Lead will include in their review for acceptance criteria a second check to ensure the periodicity requirements for each component are met.
- The IST Group Lead will put into place a mechanism to ensure their review of applicable periodic tests and technical staff surveillances is conducted prior to the critical date for the component tested.
- The Shift Operations Supervisor will ensure the periodic tests which require IST review will be provided to the IST Group Lead prior to the critical date.
- The System Engineering Supervisor will ensure the technical staff surveillances which contain IST components will be provided to the IST Group Lead prior to the critical date.
- The Work Control Superintendent addressed the issue with the Operations Department Predefine Coordinator.

The IST group will pursue acquiring a scheduling/monitoring tool that will keep track of IST surveillances on a component level.

The inspectors concluded that the licensee's corrective actions appeared adequate to prevent recurrence. The failure to perform IST on the 2A safety injection pump suction valve, 2MOV-SI8923A, within the specified periodicity is considered a violation of TS 4.0.5 (50-304/97025-09). This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

E8.2 (Closed) Unresolved Item 50-295/97016-08; 50-304/97016-08; Review of the licensee's evaluation of the as-built configuration of the control room ventilation system and its ability to fulfill the required safety functions.

In response to inspectors' identification, on July 17, 1997, that three exhaust ducts were missing or improperly connected, the system engineer identified 11 additional exhaust ducts which had never been installed. Each of the ducts were intended to connect to the top of control panels to cool panel components. The licensee determined that construction drawings (circa 1971) noted these discrepancies. However, the licensee had never created an as-built drawing of the system configuration or evaluated the acceptability of the existing condition. As a result, the licensee was using M-315, "Control floom HVAC [Heating, Ventilation, and Air Conditioning] System EI. 642'-0"," to maintain control of the design of the system.

The inspectors determined that mechanical maintenance department personnel were installing additional control room display monitors under Work Request Nos. £70044984-01 and 970044985-01. The work requests required the mechanics to disconnect some of the ducts and specified foreign material control measures to prevent debris from entering the control boards; therefore, mechanics had to install tape over the vent holes in the top of some control boards after removing the ducts. The inspectors reviewed 50.59 Safety Evaluation No. 97-413 for the work and determined that it did not evaluate the impact of disrupting the cooling flow path for the control boards by disconnecting the ducts or taping the duct openings. The inspectors concluded that there were no safety consequences for this technical oversight. In addition, the inspectors noted that the impact of another condition created temporarily during the work (breaching of the control room envelope to route cables) was appropriately assessed in the 50.59 evaluation.

The licensee measured temperature profiles in the control room and performed a 50.59 safety evaluation to assess the impact of the as-built configuration. The licensee concluded that the existing natural circulation of air in the panels was adequate in all cases because panel temperatures were less than 10 degrees F above ambient room temperature. Also, the heat input into the general area of the control room was small and did not impact temperature control under normal or accident conditions.

The inspectors reviewed the control room temperature profile data and the 50.59 safety evaluation results for the as-built condition. The inspectors verified that control room design for maintaining positive pressure was not affected based on the most recent surveillance test results conducted on August 26, 1997. While reviewing the design and licensing basis of this system, the inspectors noted that Updated Final Analysis Report

(UFSAR) Section 9.4.1.2 system description included the statement: "Return air passes through the control boards into a return duct system which is connected to outlets at the top of the boards." Since the licensee evaluated the actual configuration with roughly half of these duct connections not installed, this UFSAR statement was general in nature and not specifically descriptive of the actual configuration. The design engineering supervisor stated that the 50.59 evaluation concluded that the UFSAR did not require any changes because this statement was correct since some of the ducts were installed as described.

The licensee's failure to notintain drawing M-315, "Control Room HVAC [Heating, Ventilation, and Air Conditioning] System EI. 642'-0"," consistent with the as-built design configuration is considered a violation of 10 CFR Part 50, Appendix B, Criterion III, (50-295/97025-10; 50-304/97025-10), as described in the attached Notice of Violation.

IV. Plant Support

S8 Miscellanec & Security and Safeguards Issues

S8.1 (Open) Inspection Follow-up Item (50-304/97022-09): Review the licensee's investigation and corrective action for inattentive security officers.

Cn October 21, 1997, a security supervisor discovered a security officer asleep while standing watch for a vital barrier associated with the Unit 2 unit auxiliary transformer. The security post had been established on September 23, 1997, as compensatory measures for an earlier problem. Although the vital barrier was intact, the post for the transformer had not been closed. Therefore, the security officer was still required to be alert to perform compensatory measures. The licensee's corrective actions included relieving the security officer of the post and posting a new officer. The security officer was subsequently terminated. This was the third instance of an inattentive security officer within a four week period. This inspection follow-up item will remain open pending further review of this issue by the regional security specialist.

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 December 16, 1997. 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

- J. Brons, Site Vice President
- R. Starkey, Plant General Manager
- K. Dickerson, Executive Assistant to Site Vice President
- T. Saksetski, Executive Assistant to Site Vice President
- D. Bump, Restart Manager
- R. Zyduck, Site Quality Verification Manager
- E. Katzman, Radiation Protection Manager
- T. O'Connor, Operations Manager
- L. Schmeling, Training Manager
- R. Thorson, Electrical Maintenance Superintendent
- C. Winters, Shift Operating Supervisor
- J. Brandes, Assistant Shift Operating Supervisor
- D. Beutel, Regulatory Assurance
- F. Jones, Regulatory Assurance

NRC

- A. Vegel, Acting Chief, Reactor Projects Branch 2
- E. Cobey, Acting Senior Resident Inspector
- D. Calhoun, Resident Inspector
- C. Brown, Resident Inspector

IDNS

J. Yesinowski

List of Inspection Procedures Used

Ir 3/331 Engineering	IP	3755	1 En	gineening	
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- IP 61726 Surveillance Observations
- IP 62707 Maintenance Observation
- IP 71707 Plant Operations
- IP 71750 Plant Support

List of Items Opened, Closed, and Discussed

Opened

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50-295/304-97025-01a	VIO	Failure to provide appropriate guidance in SOI-61F to ensure that adequate SW flow was maintained to the 2B EDG while splitting the SW headers
50-295/304-97025-01b	ViO	Failure of PT10-3 to provide appropriate guidance to test the Train "A" Division 7 containment isolation and component actuation circuitry energized from safety injection relay SIX 1A
50-295/304-97025-02	URI	Review of the licensee's completed investigation and corrective actions for the restoration of the control room ventilation system
50-304/97025-03	URI	Review of the licensee's completed investigation of the circumstances which resulted in the RHR system being rendered inoperable
50-304/97025-04	VIO	Failure of the Shift Manager to make the required notification, within four hours, for an inoperable containment penetration line
50-295/97025-05	NCV	Failure to have an adequate procedure for moving fuel assemblies
50-304/97025-06	VIO	Failure of the electrical maintenance technicians to install relay SIX1 AX in accordance with the maintenance procedure
50-304/97025-07	VIO	Failure to identify and perform a post-maintenance test for the replacement of relay SIX1 AX
50-304/97025-08	NCV	Failure to have adequate procedure for emergency diesel generator starting air compressor maintenance

50-304/97025-09	NCV	Failure to perform IST on the 2A safety injection pump suction valve, 2MOV-SI89234, within the specified periodicity
50-295/304-97025-10	VIO	Failure to maintain design drawing for the control room ventilation system current with the as-built configuration
Closed		
50-295/96017-(\2	URI	Practice of allowing reactor power to exceed licensed thermal power limit.
50-295/97013-01	URI	Failure to have an adequate procedure for moving fuel assemblies
50-295/304-97016-08	URI	Failure to maintain design drawing for the control room system current with the as-built configuration
50-304/97002	LER	Inadvertent Isolation of Service Water Cooling to 2B emo:gency diesel generator during system alignment
50-304/97003	LER	Unit 2 residual heat removal declared inoperable because only one component cooling pump was operable
50-304/97004	LER	Small bore containment penetration line inadequately supported since plant construction
50-304/97005	LER	Missed technical specification surveillance test - failure to test the 2A safety injection pump suction valve in the prescribed periodicity
50-295/97025-05	NCV	Failure to have an adequate procedure for moving fuel assemblies
50-304/97025-08	NCV	Failure to have adequate procedure for emergence diesel generator starting air compressor maintenance
50-304/97025-09	NC//	Failure to perform IST on the 2A safety injection pump suction valve, 2MOV-SI8923A, within the specified periodicity

Discussed

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50-295/97022-09

50-295/304-97013-02

NOV Failure to control use of overtime in excess of guidelines

IFI Review the licensee's investigation and corrective actions for the inatientive security officers

List of Acronyms

AFW	Auxiliary Feedwaler System
CC	Component Cooling Water
CST	Condensate Storage Tank
DRP	Division of Reactor Projects
EDG	Emergency Diesel Generator
ESF	Engineered Safety Feature
FA	Fuel Assembly
FHI	Fuel Handling Instruction
FHS	Fuel Handling Supervisor
HVAC	Heating, Ventilation, and Air Conditioning
IDNS	Illinois Department of Nuclear Safety
IFI	uspection Follow-up Item
IP	Inspection Procedure
IST	Inservice Test
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
008	Out-of-Service
PDA	Public Document Room
PIF	Problem Identification Form
PMT	Post-Maintonance Test
PT	Periodic Test
RHR	Residual Heat Removal
GM	Shift Manager
SOI	System Operating Instructions
SW	Service Water
TS	Technical Specifications
751	Technical Specification Interpretation
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
US	Unit Supervisor
VIO	Violation
ZAP	Zion Administrative Procedure

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