U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Commonwealth Edison Company
Facility:	Zion Nuclear Plant, Units 1 and 2
Location:	Opus West III 1400 Opus West III Downers Grove, IL 60515
Dates:	October 12 through December 6, 1996
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EXECUTIVE SUMMARY
Zion Nuclear Plant, Units 1 and 2
NRC Inspection Reports 50-295/96-17; 50-304/96-17

This inspection included aspects of licensee operations, maintenance, and engineering. The report covers an eight-week period of inspection activities by the resident staff.

Licensee performance during this inspection period was characterized by recurrent events caused by personnel errors, lack of a questioning attitude, the failure to follow procedures, and inadequate procedures. Of particular concern was the identification by NRC inspectors of several instances where the licensee's evaluation of degraded plant conditions was untimely.

Operations

- Inappropriate operator response to a material condition problem with the valve position indication for a residual heat removal system valve resulted in a 400 gallon water spill and a violation for failing to follow equipment control procedures. (Section O1.1)

- The inspectors identified several material condition deficiencies on safety-related components that were indicative of poor attention to detail during post-maintenance restoration and system engineering walkdowns. (Section O2.1)

- Operators unknowingly caused the common unit emergency diesel generator (EDG) to be inoperable for approximately two days. Operator training deficiencies and the initial failure of operators to question if an operating procedure was correct when the procedure was in conflict with requirements in the Zion Operability Determination Manual, contributed to the error. As a result, Technical Specification action requirements for an inoperable EDG were not followed, resulting in a violation. (Section O4.1)

- The inspectors identified a violation involving the failure to implement corrective actions for insufficient monitoring of the 011 125 Volt-D.C. battery exhaust ventilation system. The licensee's practice of not tracking level 4 problem identification form actions to completion contributed to this error. (Section O7.1)

Maintenance

- The inspectors identified a violation regarding the licensee's failure to address operability of a safety-related battery when surveillance test acceptance criteria were exceeded on several occasions. The inspectors identified another violation involving the incorrect determination of average cell voltage during a battery surveillance. (Section M1.1)

- The inspectors identified two examples of inconsistencies between the condition of structures, systems, or components described in completed

work documentation and the actual plant configuration. (Section M1.2)

- The inspectors identified a violation involving a compressed gas cylinder that was improperly secured to a seismically qualified scaffold. (Section M1.3)

- Five protective trips of the 2A emergency diesel generator occurred during post-maintenance testing due to poor work practices and inadequate maintenance procedures. Two examples of a violation for inadequate procedures were identified for the associated maintenance activities. (Section M3.1)

- A violation was identified involving an inadequate maintenance procedure which resulted in damage to the 1A auxiliary feedwater pump turbine inboard bearing during post-maintenance testing. (Section M3.2)

Engineering

- The inspectors identified three examples of a violation involving the failure to address operability of degraded safety-related piping supports in a timely manner. (Section E1.1)

Report Details

Summary of Plant Status

Unit 1 operated at or near 100 percent power during the inspection period.

Unit 2 remained shut down during the inspection period in support of the 14th refueling outage.

Licensee performance continued to be characterized by recurrent events caused by personnel errors, lack of a questioning attitude, the failure to follow procedures, and inadequate procedures. Of particular concern was the identification by NRC inspectors of several instances where the licensee's evaluation of degraded plant conditions was untimely. Although the licensee identified the violation pertaining to the inoperable emergency diesel generator, some examples of the failure to follow procedures, and examples of inadequate procedures, these licensee identified issues are included in the cited violations because they stem from previously identified performance problems which the licensee has not yet effectively addressed.

I. Operations

O1 Conduct of Operations

O1.1 Operation of Out-of-Service (OOS) Component Resulted in a Spill of Approximately 400 Gallons of Water

a. Inspection Scope (71707)

On November 3, during the fill and vent of the 2B train of the residual heat removal (RHR) system, the licensee spilled approximately 400 gallons of water in the Unit 2 letdown heat exchanger room. The inspectors interviewed operations department personnel, reviewed applicable procedures, and reviewed the results of the licensee's investigation.

b. Observations and Findings

On November 3, during the performance of System Operating Instruction (SOI) 5F, "Filling and Venting RHR Train B with the Unit Defueled Using the RWST [refueling water storage tank]," Revision 4, the licensee identified water flowing from the partially disassembled Unit 2 letdown heat exchanger to the Auxiliary Building sump. Radiological consequences were minimal since contamination levels were not significantly above the levels in the room before the spill. Based on the results of the licensee's investigation of this event, the licensee concluded that the spill resulted from operation of an OOS valve.

On November 1, an operator closed RHR system heat exchanger "A" discharge to letdown heat exchanger valve 2RH-8734A and placed an OOS tag on the valve to indicate that it was part of the isolation boundary

for maintenance on the Unit 2 letdown heat exchanger. The operator identified that the valve position indicator (VPI) on the reach rod operator incorrectly indicated that valve 2RH-8734A was in mid-position. The shift engineer directed the operator to first verify the valve's position locally at the valve and then to hang the OOS tag on the valve body. However, no action was taken by the licensee to disable the reach rod operator or to identify that the valve needed to be operated locally due to the material condition deficiency with the VPI.

On November 2, during the performance of SOI-5E, "Filling and Venting RHR Train A with the Unit Defueled Using the RWST," the operator conducting the evolution did not recognize that valve 2RH-8734A was an OOS component, due to the location of the OOS tag. Consequently, when the operator opened valve 2RH-8734A with the reach rod operator, a flow path was created which resulted in the spill. In addition, when valve 2RH-873A was repositioned open, the reach rod VPI broke. The operator did not identify the broken VPI as a condition which required verification of valve position locally and no action was taken to correct the deficient condition.

c. Conclusions

Inappropriate operator response to the identification of a material condition problem resulted in a spill when another operator repositioned a valve that had been tagged OOS. When an operator tasked with performing an OOS, identified that the indicated valve position on the reach rod VPI was incorrect, no action was taken by the licensee to disable the reach rod operator or to identify that the valve needed to be operated locally due to this material condition deficiency. Similarly, after the reach rod VPI pin broke during valve operation, the operator manipulating the valve did not verify the valve position locally or initiate action to resolve the deficiency.

Zion Administrative Procedure (ZAP) 300-06, "Out-of-Service Process," Revision 9, Section E.6 requires, in part, that once an OOS is in place, physical operation of an OOS component is prohibited. The operation of valve 2RH-8734A, which was an OOS component, is considered a violation of TS 6.2.1.a, as described in the attached Notice of Violation (50-304/96017-01).

01.2 Licensed Steady State Thermal Power

a. Inspection Scope (71707)

On October 23, the inspectors identified that average nuclear power instrumentation was indicating greater than 100% power. The inspectors interviewed operations personnel and reviewed applicable documentation.

b. Observations and Findings

During a routine review of control room activities, the inspectors identified that average nuclear power instrumentation was indicating greater than 100% power, specifically 100.2%. Further review of the "Power History Log," PT-0, Revision 12, Appendix P, indicated that actual power as determined by an hourly secondary calorimetric, was less than 100% power, specifically 99.8%. However, the inspectors noted that the hourly calorimetric readings recorded in the log for 4:00 a.m. and 5:00 a.m. indicated that reactor power was at 100.1%.

The inspectors determined that reactor power did not exceed the licensee's administrative limits specified in procedure PT-0, which stated:

1. When operating at full power, reactor power should be maintained such that the 60 minute calorimetric indicates an average power level of less than or equal to 100.0% power.

   IF any 60 minute calorimetric is greater than 100.0% power, THEN appropriate action and/or monitoring should be performed to ensure the next 60 minute calorimetric is LESS THAN or EQUAL to 100.0% power.

   IF the 60 minute calorimetric is greater than 100.0% power for two consecutive readings in a row, THEN immediately reduce power to less than or equal to 100.0% power to restore the next 60 minute calorimetric to less than or equal to 100.0% power. (NRC letter from E. L. Jordan dated 8/22/80, Tech Spec Interpretation 94-03).

2. IF either a 10 minute or 60 minute calorimetric indicates greater than 100.5% power, THEN immediately take action to reduce reactor power until a 10 minute calorimetric indicates less than or equal to 100.0% power.

The licensee maintained that the reactor could be operated above 100% power, up to 100.5%, with a ± 1.5% uncertainty, and still be within the appropriate design basis (102%). A review of the uncertainty analyses confirmed that the instrument uncertainties were within ± 2 percent (actual ± 1.47%). The inspector's initial review to determine if the licensee had operated the Unit 1 reactor above 100% power using this operating practice identified several other instances, in which, reactor power had been above 100% for periods of time up to three hours before action was taken to reduce reactor power to within licensed thermal power limits.

The inspectors reviewed Appendix P of PT-0 in evaluating the licensee's position on this issue with respect to information in design basis documents, including Appendix K to 10 CFR Part 50 and the Updated Final Safety Analysis Report (UFSAR). Appendix K, "ECCS [emergency core cooling system] Evaluation Models," assumes that the reactor has been operating continuously at a power level of at least 1.02 times the

licensed power level to allow for such uncertainties as instrumentation error. Also, Section 14.1.3 of the UFSAR, "Analysis Performed at 3250 MWt," states that the initial conditions for transient analysis are based on steady-state operations at 3250 MWt with a reactor power uncertainty of ± 2 percent applied to ensure conservative analysis. The licensee's operating procedure (PT-0, Appendix P) allowed reactor power to reach 100.5%, before requiring immediate action to reduce reactor power.

This issue is considered an Unresolved Item (50-295/96017-02) pending further NRC review of the licensee's practice against other pertinent licensing documents such as the Zion Facility Operating License.

c. Conclusions

After the inspectors discussed this issue with the licensee, additional operating instructions were provided to licensed operators. These instructions required operators to maintain reactor power at or below 3250 MWt (licensed thermal limits) at all times, and to take immediate action to reduce reactor power if any 60 minute calorimetric indicated greater than 100% power.

The licensee's response to this issue was timely. The licensee had taken prompt action, upon identification by the inspectors, to prohibit further operation above licensed thermal power limits. Although the licensee's corrective action was timely, the inspectors expressed concern with non-conservative past operating practices.

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature System Walkdowns

a. Inspection Scope (71707)

The inspectors conducted walkdowns of accessible portions of the following safety systems:

- Emergency Diesel Generators (EDGs) 1A, 1B, 0, 2A, 2B
- Unit 1 Containment Spray System
- Shared Unit 1 and 2 Service Water System

b. Observations and Findings

During the system walkdowns, the inspectors identified numerous discrepancies. Specifically:

- On October 14, the inspectors identified that the 1A EDG supply fan was missing one of six support rod vibration isolators. The licensee corrected the problem on the same day and performed an operability assessment. The licensee subsequently determined that the fan was operable even though the support was missing.

- On October 15, the inspectors identified that the 2A service water pump motor was leaking water at a rate of approximately 20-30 drops per minute. After engineering personnel evaluated the condition and declared the pump inoperable, the pump was taken out-of-service. The licensee determined that the leak was from the oil cooler supply line. The line was repaired and the pump was returned to service.

- On November 20, the inspectors identified numerous valve packing leaks on the Unit 1 containment spray system. The inspectors informed engineering personnel of the discrepancies and the licensee initiated appropriate corrective actions.

c. Conclusions

In addition to the above observations, the inspectors identified numerous other discrepancies, including oil leaks and missing fasteners on the EDGs. Additional material condition discrepancies and the licensee's response to them are discussed in sections M1.2 and E1.1 of this report. The failure of the licensee's staff to identify these material condition problems was indicative of poor attention to detail during post-maintenance restoration and system engineering walkdowns.

O4 Operator Knowledge and Performance

O4.1 Missed Technical Specification (TS) Action Requirements for an Inoperable EDG

a. Inspection Scope (71707)

On October 28, the licensee identified that the 0 EDG had been inoperable for approximately two days and that required TS actions had not been performed. The inspectors interviewed operations and engineering department personnel and reviewed operations department training, applicable procedures, and the results of the licensee's root cause investigation.

b. Observations and Findings

On October 28, during shift turnover, the Unit 2 nuclear station operator noticed that the Unit 2 control switch for the 0 EDG was in the pull-to-lock (PTL) position. After further review of the diesel starting logic and control circuit design by system engineering personnel, the licensee determined that the 0 EDG is rendered inoperable whenever the Unit 1 or Unit 2 control switch for the 0 EDG is in the PTL position. With the 0 EDG inoperable, TS 3.15.2.C requires that the two remaining Unit 1 EDGs be demonstrated operable and that the availability of two sources of off-site power be demonstrated. However, since the licensee did not recognize that the 0 EDG was inoperable, the TS requirements were not met.

The licensee determined that the Unit 2 control switch for the 0 EDG was

placed in the PTL position on October 26, during performance of SOI-63G, "Deenergizing 4KV ESF [Engineered Safety Feature] Buses," Revision 1. This SOI was conducted to de-energize bus 247 to support a scheduled bus outage. The licensee determined during a follow-up investigation that the SOI requirement to place the EDG control switch in the PTL position was not necessary to support the bus outage.

The licensee determined that with the Unit 2 (Unit 1) control switch in the PTL position, the 0 EDG could not be manually started with the Unit 1 (Unit 2) control switch. However, the 0 EDG would start in response to either a safety injection (SI) actuation or undervoltage (UV) condition signal, and would run until the SI signal is manually reset or the UV condition cleared. Once the emergency start signal had cleared, the 0 EDG would initiate a 15 minute cooldown cycle and then shut down since the seal-in circuit would be bypassed with the control switch in the PTL position.

The response of the 0 EDG following the shutdown depends upon the event scenario. The most risk significant scenario involves a UV condition. The 0 EDG would start on undervoltage and power the loads sequenced onto the associated unit safeguards bus. Once the EDG was aligned to the bus, the UV signal would clear and the diesel would initiate a 15 minute cooldown cycle. At the end of the cooldown cycle, the diesel would coast down under load until the bus voltage reached the undervoltage setpoint, at which time the 0 EDG would receive another emergency start signal on undervoltage. The load sequencer would strip the bus loads and then sequence loads onto the bus. The 0 EDG would then enter another cooldown cycle. The degraded voltage condition on the safeguards bus resulting from coastdown of the EDG at the end of the cooldown cycle, could adversely affect the operation of equipment powered by the bus.

The inspectors determined through several interviews that control room operators did not understand how the position of the 0 EDG unit specific control switches affected the ability of the 0 EDG to perform its intended safety function. Most operators knew that the EDG would start on an emergency signal, but they did not understand why. In addition, all of the operators interviewed understood the general operability requirements contained in the Zion Operability Determination Manual (ZODM), including the specific requirement that equipment listed in the Technical Specifications be considered inoperable when the respective control switch was in the PTL position. However, during performance of SOI-63G on October 26, the operators placed the 0 EDG control switch in PTL without recognizing or questioning the impact of their actions on the operating unit.

The inspectors reviewed licensed operator training records pertaining to operation of the 0 EDG control circuit. Initial licensed operator training included operation of the control circuit per lesson plan LO-PSC-31. This lesson plan covered both the normal and emergency start sequences. However, operation of the unit specific control switches was not specifically addressed, with the exception of one

instructor's note which indicated that the emergency start of the 0 EDG was not affected by the control switch being in PTL. This note, however, did not discuss the ability of the EDG to perform its intended safety function with either unit control switch in PTL.

In addition, the inspectors reviewed the training conducted for modification M22-0-88-09 which installed controls for the 0 EDG on the Unit 2 control board in September 1989. The training consisted of a brief description of the scope of the modification, however, it did not include any discussion of the impact of the modification on EDG control circuit operation. This training was promulgated to the licensed operators in the form of a required reading package.

c. Conclusions

Operators unknowingly rendered the 0 EDG inoperable for approximately two days. Operator training deficiencies and the failure of operators to question if an operating procedure was correct when the procedure was in conflict with requirements in the ZODM, contributed to the error.

Technical Specification 3.15.2.C permits reactor operation with the 0 EDG inoperable for 72 hours, provided that the two remaining EDGs for the associated unit are demonstrated to be operable and that two sources of off-site power are demonstrated to be available. The failure to demonstrate both the operability of the two remaining Unit 1 EDGs and the availability of two sources of off-site power is considered a violation of TS 3.15.2.C (50-295/96017-03; 50-304/96017-03), as described in the attached Notice of Violation.

O7 Quality Assurance in Operations

O7.1 Failure to Implement Corrective Actions for Inoperable Battery Exhaust Ventilation System

a. Inspection Scope (40500)

On October 15, the inspectors reviewed the licensee's corrective actions for high ambient temperature in the 011 125 Volt-D.C. battery room. This issue was previously documented in NRC Inspection Report 50-295/96014; 50-304/96014. The inspectors interviewed operations and regulatory assurance department personnel and reviewed applicable documentation, including Problem Identification Form (PIF) 2402.

b. Observations and Findings

While conducting followup inspection activities for high ambient temperature in the 011 125 Volt-D.C. battery room (refer to Section E8.2), the inspectors identified that PIF-2402 had been closed without completion of the specified corrective actions and with no other tracking mechanism in place to ensure their completion. Problem Identification Form 2402 recommended that the Unit 2 Equipment Operator Checklist, Appendix S of PT-0, be changed to require verification of air

flow in the battery room. Past practice had been to verify that the exhaust fan was energized, however, this did not ensure that the battery exhaust ventilation system was operable. In response to the inspectors' concerns, the licensee re-opened the PIF and implemented the recommended corrective actions.

c. Conclusions

Based on interviews with regulatory assurance personnel, the inspectors concluded that corrective actions for deficiencies identified in PIFs and categorized as significance level 4 were not required to be formally tracked through completion, and as a result, the actions were not always completed. The failure to implement corrective actions for an identified condition adverse to quality, specifically, insufficient monitoring of the battery exhaust ventilation system, is considered a violation of 10 CFR Part 50, Appendix B, Criterion XVI (50-295/96017-04; 50-304/96017-04), as described in the attached Notice of Violation.

07.2 Lack of Overtime Control

a. Inspection Scope (40500)

On November 14, the Site Quality Verification (SQV) Audit Group identified a significant recurring deficiency with the control of overtime. The inspectors interviewed station management, SQV and staff personnel, reviewed applicable procedures, and evaluated available data on overtime deviations.

b. Observations and Findings

During the period of November 21 through December 16, 1994, SQV personnel performed an audit in the area of operations and radwaste packaging and transport. The audit team identified that 305 overtime deviations occurred between January 1 and November 30, 1994. As a result, the licensee initiated a Level III corrective action record (CAR) for overtime control (CAR 22-94-067).

During a followup review of CAR 22-94-067, SQV identified that overtime control continued to be a problem, as evidenced by 225 overtime deviations for 38 personnel during the period from July 17 to October 25, 1996, of which only five deviations had been approved. In response to this finding, SQV initiated a Level II CAR for overtime control (CAR 22-96-053) and the licensee subsequently implemented some near term corrective actions. During a followup review to evaluate the effectiveness of these actions, the licensee identified that unauthorized overtime deviations were continuing.

The inspectors noted that the issue with control of overtime has been addressed by the NRC on several occasions, both on a generic basis and specifically with the licensee. Generic Letter (GL) 82-12, "Nuclear Power Plant Staff Working Hours," and GL 83-14, "Definition of Key Maintenance Personnel (Clarification of Generic Letter 82-12)," provided

licensees with guidance on the control of overtime. In addition, NRC Inspection Report 50-295/88017; 50-305/88017 identified that sufficient measures were not in place to ensure that safety-related work was not jeopardized by personnel working too many hours. In the licensee's response to this inspection report, dated October 4, 1989, the licensee committed to establish a corporate policy governing safety-related work at Commonwealth Edison nuclear stations by April 30, 1990, in accordance with the guidelines contained in GLs 82-12 and 83-14.

Additionally, the Diagnostic Evaluation Team (DET) inspection conducted during June 1990 identified that overtime was not being managed or controlled. In the licensee's response to the DET report, dated November 2, 1990, the licensee committed to control overtime through additional staffing, improved work planning, and strict adherence to overtime guidelines.

c. Conclusions

At the conclusion of this inspection period the licensee was in the process of conducting a root cause evaluation for the identified overtime deviations. This issue is considered an Unresolved Item (50-295/96017-05; 50-304/96017-05) pending further NRC review of licensee actions implemented in response to NRC concerns with the control of overtime to determine if licensee commitments in this area were met.

O8 Miscellaneous Operations Issues

O8.1 (Closed) LER 50-295/96026: Exhaust air flow from the fuel handling building bypassed the auxiliary building charcoal exhaust filters. This issue is discussed in Section E2.1 of this report.

O8.2 (Closed) LER 50-295/96024: Missed TS surveillances for inoperable common diesel generator caused by management deficiency. This issue is discussed in Section O4.1 of this report.

O8.3 (Open) LER 50-304/96010: Inadvertent engineered safety features (ESF) actuation. On November 20, a Unit 2 ESF actuation and containment isolation inadvertently occurred during testing. The inspectors interviewed operations and engineering personnel and reviewed applicable test procedures.

While performing Technical Staff Surveillance Procedure 079-96, "Response Time Test of Reactor Protection and Engineered Safeguards Features Logic," Revision 7G, a system engineer inadvertently shorted test leads. The leads were connected across a relay's contact which resulted in a containment isolation actuation. Reactor coolant drain tank isolation valve 2AOV-DT1003 and containment radiation monitor isolation valve 2FCV-PR24A closed. In addition, five valves associated with the isolation valve seal water system opened. The licensee immediately suspended testing activities and verified that all of the required components had properly operated during the ESF actuation.

The inspectors concluded that the licensee's immediate corrective actions to stop testing and investigate the causes for the event were appropriate. However, the inspectors noted that the licensee was slow to verify that all components operated properly as a result of the ESF actuation. The licensee did not have a full understanding that all components operated as required until November 22. At the end of the inspection period, the licensee was in the process of developing corrective actions to prevent recurrence. This item will remain open pending NRC review of the licensee's long-term corrective actions.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Failure to Address Operability for Surveillance Tests with Parameters Outside Acceptance Criteria

a. Inspection Scope (61726)

The inspectors reviewed the results of the November 1996 monthly surveillance test and all four 1996 quarterly surveillance tests for the 011 125 Volt-D.C. station battery. The inspectors also interviewed several licensed operators, system engineers, and electrical maintenance personnel.

b. Observations and Findings

The inspectors identified that the licensee failed to recognize operability concerns and take appropriate actions for abnormal specific gravity readings obtained during surveillance tests for the 011 125 Volt-D.C. station battery. The tests were conducted in accordance with Electrical Maintenance Surveillance Procedure (EMSP) 01, "Station Battery Monthly and Quarterly Surveillance," Revision 1, which implements the requirements of TS 4.15.1.E.2. This surveillance procedure specifies an acceptance criteria for corrected specific gravity of between 1.205 and 1.225. The Zion Operability Determination Manual (ZODM) requires that equipment which does not meet acceptance criteria specified in procedures be considered inoperable. The inspectors identified the following instances where the licensee did not evaluate the operability of either the battery or individual battery cells when specific gravity was not within test acceptance criteria.

- On April 1, 1996, the quarterly surveillance test results indicated that the corrected specific gravity of one cell was less than 1.205. As a result, the licensee initiated an equalizing charge on April 2.

- On October 7, the quarterly surveillance test results indicated that the corrected specific gravity for four cells was less than 1.205. As a result, the licensee initiated an equalizing charge on October 10. On October 26, the licensee completed a partial surveillance test on the four cells. The specific gravity for three of these cells was still outside of the acceptance range.

- On November 4, the monthly surveillance test results indicated that the corrected specific gravity for the pilot cell was low with a value of 1.199. The licensee did not initiate an equalizing charge.

Licensee evaluation of the surveillance test results and battery conditions consisted of an informal review by a system engineer who recommended the actions described above. Based on interviews with the involved system engineer and the electrical group lead, the inspectors determined that the system engineer did not consider acceptance criteria specified in the surveillance test to be criteria for operability.

On November 11, after several discussions with various personnel in the operations and engineering departments about whether an operability assessment was required for low specific gravity, the inspectors raised the issue to the attention of the plant manager. Subsequently, on November 15, the licensee completed an operability assessment (No. ER9606326) and determined that the 011 125 Volt-D.C. station battery was operable. The inspectors reviewed the operability assessment and had no concerns.

The inspectors noted that licensed operators were not required to review the monthly and quarterly station battery surveillance test results unless electrical maintenance personnel specified that an equalizing charge was needed. The licensee has imposed less stringent requirements for the review of battery surveillance test results relative to other TS-required surveillance tests which must be reviewed by licensed operators.

In addition, the inspectors identified an error in the performance of the quarterly station battery surveillance test conducted per EMSP-01 on July 1. Due to an error in the calculation of average individual cell voltage, the licensee did not identify that an equalizing charge needed to be performed. The inspectors determined through interviews with system engineering and electrical maintenance department personnel that each group thought that the other was going to verify the accuracy of the calculations and consequently, no independent verification of the calculations was performed.

c. Conclusions

The inspectors concluded that: (1) operability of the 011 125 Volt-D.C. station battery was not evaluated on several occasions when surveillance test results indicated that specific gravity was outside of prescribed acceptance limits, (2) battery surveillance test results were subject to

less stringent operational reviews than other TS-required surveillance tests, and (3) due to the failure to independently verify the accuracy of calculations performed for the quarterly surveillance test, the licensee did not identify that calculational errors existed which prevented the licensee from determining that an equalizing battery charge needed to be conducted.

Section 5.1.B of ZODM-0, "Operability Determination Program," Revision 8, requires that a system, subsystem, train, component, or device that fails to meet acceptance criteria specified in governing and approved procedures, be considered inoperable. The failure to address the operability of the 011 125 Volt-D.C. station battery in accordance with ZODM-0 when specific gravity was outside the acceptance criteria specified in surveillance procedure EMSP-01 on April 1, October 7 and 26, and November 4, is considered an example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96017-06a; 50-304/96017-06a), as described in the attached Notice of Violation.

Step 3.14 of EMSP-01 requires that average cell voltage be calculated and recorded. The failure to correctly calculate and record average cell voltage in accordance with EMSP-01 on July 1 is considered an example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96017-06b; 50-304/96017-06b), as described in the attached Notice of Violation.

M1.2 Inconsistencies Between Completed Work Documentation and Actual Plant Configuration

a. Inspection Scope (62707)

The inspectors identified two examples where station personnel inappropriately signed off that work package criteria had been met. The inspectors reviewed applicable documentation and interviewed operations and engineering department personnel.

b. Observations and Findings

On November 4, the inspectors identified that fasteners on several conduit supports did not meet minimum thread engagement criteria. These supports had been installed in January 1996 for 1D steam generator feedwater isolation valve 1MOV-FW0019 in accordance with Work Package No. 950020050-01. Instructions in the work package specified minimum thread engagement criteria and required quality control (QC) verification of selected work steps per Nuclear Station Work Procedure E-03. The inspectors noted that the electrician and the QC inspector involved in the work activity had each signed off that the minimum thread engagement criteria had been met.

On November 27, the inspectors identified a loose environmental qualification (EQ) union for containment air H_2 monitor loop D isolation valve 2AOV-PR25D. The EQ union was loose at the connection to the valve body. The loose union was required to be torqued to between 45 and

55 ft-lbs as specified in Work Package No. 930028776-01. In February 1995, the involved electrician and QC inspector both signed off that the union had been torqued to 50 ft-lbs.

c. Conclusions

The inspectors concluded that the safety consequences of the installation deficiencies were minimal. However, as described in NRC Inspection Report 50-295/96006-04; 50-304/96006-04, dated May 17, 1996, a violation was issued for the difference between the condition of a structure, system, or component (SSC) as described in completed work documentation and the actual plant configuration. In the case of the two examples identified during this inspection period, the work activities during which the problem originated were conducted before the violation was issued. As a result, a violation is not being cited for these examples. However, the inspectors were concerned with the identification of additional examples of inconsistencies between the condition of SSCs described in completed work documentation and the actual plant configuration. These inconsistencies indicate a lack of thoroughness on the part of maintenance workers and QC personnel in verifying that work package criteria for safety-related equipment has been met before signing off the work package.

M1.3 Gas Cylinder Improperly Secured to Scaffold

a. Inspection Scope (62707)

On November 6, the inspectors identified that a compressed gas cylinder was secured to a seismic scaffold. The inspectors interviewed the night shift scaffold supervisor, a regulatory assurance engineer, and a member of the corporate safety oversight office.

b. Observations and Findings

During an inspection of the Fuel Handling Building, the inspectors identified that a compressed gas cylinder was secured to a seismic scaffold. The questionable scaffold configuration was associated with Scaffold Log Nos. A-617-096 and A-617-176. The inspectors were concerned that the seismic scaffold evaluation was invalidated by increased loading from the gas cylinder.

The licensee initially informed the inspectors that it was acceptable to secure a gas cylinder to a scaffold. The inspectors asked the licensee if the seismic evaluation had accounted for the additional weight of the gas cylinder. The licensee subsequently determined that the evaluation did not account for any external loads, such as gas cylinders, and concluded that the gas cylinder should not have been attached to the scaffold. The inspectors were also concerned that maintenance personnel did not understand the requirements of Zion Administrative Procedure (ZAP) 900-06, "Compressed Gas Cylinder Control," Revision 1, which did not allow gas cylinders to be secured to scaffolding. In followup to the inspectors concerns, corporate safety personnel identified

additional examples where gas cylinders had been improperly secured to scaffolds.

c. Conclusions

Maintenance personnel did not understand site gas cylinder control requirements. In addition, the licensee's staff was slow to recognize the impact of gas cylinders secured to a scaffold on the seismic qualification of that scaffold. The failure to control gas cylinders, as required by ZAP 900-06, which resulted in gas cylinders being secured to a seismic scaffold, is considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96017-06c; 50-304/96017-06c), as described in the attached Notice of Violation.

M3 Maintenance Procedures and Documentation

M3.1 Poor Work Practices and Inadequate Maintenance Procedures Resulted in Five Protective Trips of the 2A EDG

a. Inspection Scope (62707)

On October 14, the 2A EDG was removed from service for replacement of the generator and modification of the diesel governor. During post-maintenance testing, the 2A EDG experienced five protective trips. The inspectors observed selected portions of the maintenance, interviewed engineering and maintenance department personnel, and reviewed applicable maintenance procedures.

b. Observations and Findings

During a followup inspection of the EDG trips, the inspectors noted the following maintenance and manufacturing errors:

Generator Leads Wired Backwards

On October 31, during startup of the 2A EDG in accordance with SOI-11A, "Local Operator Setup of Diesel Generator," Revision 5, and SOI-11C, "Local Starting of Diesel Generator," Revision 6, in preparation for Technical Staff Surveillance Procedure (TSSP) 82-94, the EDG tripped on generator phase differential approximately two seconds after the EDG had been started. The licensee subsequently identified that the generator leads from the current transformers (CT) and potential transformers (PT) had been wired incorrectly. The improperly landed leads resulted in the output of the PT being connected to one of the inputs for the differential current protection circuit, which normally received input from the CT. Consequently, when the field flashed on startup, the differential current protection circuit sensed a differential input which caused a trip signal to be generated.

The generator leads from the CT and PT were disconnected and reconnected per Work Request No. 950117181-01 which governed the generator replacement work. However, the wire numbering for the new generator was

different from the wire numbering for the original generator. Upon identifying this discrepancy, maintenance workers involved in the generator replacement activity informed their supervisor. The supervisor, however, directed the workers to connect the leads using the wire numbering scheme for the new generator without properly resolving the issue. As a result, the leads were installed incorrectly. This issue is considered an Unresolved Item (50-304/96017-07) pending NRC review of the results of the licensee's investigation of the quality assurance requirements associated with the purchase order and the vendor's quality assurance program, to determine the root causes for the improperly configured wiring harness.

Improperly Disconnected Generator Neutral Ground Lead

During troubleshooting activities following the generator phase differential trip, the licensee identified that the generator neutral ground lead was improperly disconnected. With this lead lifted, single phase ground faults could not be identified and cleared before the ground caused damage due to excessive heating.

Although the neutral ground lead had to be disconnected for removal of the generator, work instructions in Work Request No. 950117181-01 did not specify that the subject lead be disconnected. Consequently, disconnection of the lead was not documented on a lifted lead data sheet. During subsequent reassembly of the generator, the involved electrical maintenance (EM) technician identified that the generator neutral ground lead was disconnected. The EM technician reconnected the lead, completed his work tasks, and then informed the maintenance supervisor that he had reconnected the lead upon discovery that it was disconnected. The supervisor informed the EM technician that the neutral ground lead needed to be disconnected to support post-maintenance generator inspections, and as a result, the EM technician disconnected the lead. The inspectors noted that the work activities involving lifting and re-landing the generator neutral ground lead were conducted without any work controls.

During the subsequent generator inspections, conducted in accordance with P/E009-2N, "Diesel Generator Inspection and Maintenance," Revision 17, the licensee did not identify that the generator neutral ground lead was disconnected. In reviewing procedure P/E009-2N in preparation for the generator inspections, the work analyst deleted the steps which specified that the lead be disconnected since the lead had already been lifted. The maintenance supervisor who also reviewed P/E009-2N, deleted the procedure steps for reconnecting the lead since the work analyst had previously deleted the steps for disconnecting it.

Machining Imperfection in Governor Actuator

On November 2, during the initial loading of the 2A EDG to support TSSP 82-94, the EDG immediately tripped on reverse power. Based on indications, the licensee suspected that the newly installed governor actuator was causing excessive hunting resulting in a reverse power

trip. After consulting with a vendor representative, the licensee adjusted the governor response and then attempted to load the EDG. The EDG tripped again on reverse power. The licensee readjusted the governor response, started the EDG, and attempted to load it. The EDG tripped for a third time on reverse power. The licensee then directed that testing be stopped until a troubleshooting plan had been developed and approved.

The licensee determined that due to a machining imperfection, the governor actuator was not sitting flush with its baseplate. When the maintenance technician had originally installed the governor actuator, he did not question the existence of this condition. As a result, when the maintenance technician secured the governor actuator to the base plate, the misalignment caused mechanical binding of the governor actuator, resulting in the observed reverse power trips. The licensee decided to replace the governor actuator since the licensee could not determine if the actuator had been damaged by the binding.

Misaligned Governor Actuator

On November 4, the licensee installed a new governor actuator per a field change to Work Request No. 940029891-01. The work instructions in this field change consisted of the statement "Install new governor." The instructions did not address correctly positioning the terminal lever on the terminal shaft, and as a result, the governor actuator was misaligned. When the licensee attempted to start the EDG, it tripped on overspeed because excessive fuel was supplied to the engine due to the misaligned actuator.

c. Conclusions

The inspectors concluded that: (1) lack of a questioning attitude and failure to address identified discrepancies resulted in missed opportunities to prevent each of the EDG trips; (2) inadequate work instructions for the generator replacement, and the practice of not documenting the disconnection of all leads, contributed to the failure to reconnect the generator neutral ground lead; and (3) inadequate work instructions for the governor actuator replacement contributed to the overspeed trip of the 2A EDG. The inspectors also concluded that safety-related equipment was unnecessarily challenged due to poor maintenance practices and inadequate maintenance procedures.

The failure of Work Request No. 950117181-01 to provide appropriate guidance to control the configuration of the generator neutral ground lead, and the failure of the field change to Work Request No. 940029891-01 to provide appropriate guidance to control the alignment of the governor actuator, are considered two examples of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-304/96017-08a and 50-304/96017-08b, respectively), as described in the attached Notice of Violation.

M3.2 Inadequate Maintenance Procedure Resulted in Damage to the 1A Auxiliary

Feedwater (AFW) Pump Turbine Inboard Bearing

a. Inspection Scope (62707)

The inspectors observed selected portions of maintenance activities related to the 1A AFW pump. The inspectors interviewed mechanical maintenance, operations, and engineering department personnel; reviewed selected maintenance procedures; and inspected the 1A AFW pump, including the turbine inboard bearing assembly.

b. Observations and Findings

The inspectors evaluated the following issues with respect to the AFW pump work:

AFW Pump Turbine Bearing Water Intrusion

On November 25, the 1A AFW pump was removed from service for scheduled maintenance. While replacing the oil in the turbine inboard bearing, the licensee identified approximately one-half gallon of water in the turbine inboard bearing oil reservoir, which has a capacity of five and one-half quarts. Based on an investigation by system engineering personnel, the licensee identified three possible sources of water: the installed oil cooler, turbine steam migrating to the bearing along the shaft, and leakage from the oil cooler that was in service before December 1995. Based on the results of a hydrostatic test of the installed cooler and inspection of the pump turbine, the licensee concluded that the source of the water was most likely from the cooler in service before December 1995.

System engineering personnel concluded that the water had been present in the oil reservoir before the cooler was installed in December 1995 and had not been detected due to improper performance of the oil change preventive maintenance (PM) task. System engineering personnel maintained that the fuel handlers who performed this PM activity had drained oil from the reservoir via the sightglass instead of the drain plug, resulting in the removal of approximately one quart of oil from the upper portion of the reservoir. This practice resulted in the majority of the oil and whatever water was present, remaining in the reservoir.

However, the inspe tors noted that the explanation by system engineering personnel of why the presence of water in the oil reservoir had not been detected, conflicted with statements by the fuel handlers responsible for performing the PM activity. When the inspectors discussed this issue with operations management and a fuel handling supervisor responsible for completing the oil change PM, these individuals informed the inspectors that the oil change had always been conducted using the drain plug. This information did not support the conclusion by system engineering personnel that the source of the water was from the oil cooler in service before cooler replacement in December 1995. This issue is considered an Unresolved Item (50-295/96017-09) pending NRC

review of the licensee's evaluation of the source of the water and the adequacy of the oil change PM task.

AFW Pump Turbine Bearing Damage

As a result of water being identified in the bearing reservoir, the licensee expanded the scope of the scheduled maintenance to include an inspection of the turbine inboard bearing assembly. During this inspection, the licensee discovered that the bearing was wiped. Because bearing damage was limited to a discrete portion of the bearing surface, the licensee concluded that the damage was not the result of water intrusion. The licensee's investigation to determine the root cause for the bearing damage was still in progress at the end of the inspection period.

Incorrect Installation of AFW Pump Turbine Bearing Slinger Rings

On November 28, the licensee replaced the turbine inboard bearing in accordance Work Request No. 960110430-01, Revision 1. No guidance on installation of the oil slinger rings was provided in the work instructions associated with this work request. During installation of the new bearing, the maintenance staff incorrectly installed the slinger rings. Consequently, on November 29, during post-maintenance testing of the 1A AFW pump, elevated turbine inboard bearing temperature necessitated tripping the pump. The licensee identified significant bearing damage during an inspection of the bearing and attributed this damage to inadequate lubrication caused by the improperly installed oil slinger rings. The licensee replaced the damaged bearing and satisfactorily retested the AFW pump. The inspectors noted that the work activity involving installation of the oil slinger rings was observed by a mechanical maintenance supervisor.

c. Conclusions

The inspectors concluded that the work instructions used to install the 1A AFW pump turbine inboard bearing were not appropriate for the skill level of the mechanics performing the maintenance activity. The failure to provide sufficient work instructions for installation of the turbine bearing is considered an example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96017-08c), as described in the attached Notice of Violation.

III. Engineering

E1 Conduct of Engineering

E1.1 Failure to Address Operability for Deficiencies in Safety-Related Piping Supports in a Timely Manner

a. Inspection Scope (37551)

The licensee did not evaluate three NRC identified safety-related piping support deficiencies in a timely manner. The inspectors interviewed operations and engineering personnel and evaluated the licensee's resolution of the degraded pipe support conditions.

b. Observations and Findings

On October 25, the inspectors identified that a "U" bolt style piping support was missing on both the 1A and the 0 EDGs. The licensee documented this condition on Problem Identification Form (PIF) 96-3713 and initiated an operability assessment per Appendix A, "Initial Operability Assessment," of the Zion Operability Determination Manual (ZODM) 0. Based on this initial operability determination, which was completed on October 26, the licensee concluded that the EDGs were operable. The licensee is also required to perform an operability evaluation per Appendix B, "Operability Issue Form," of ZODM-0, whenever an operability issue has been identified. The licensee completed the Appendix B evaluation on November 8, which specified that a detailed calculation be completed by November 15 to determine if the jacket water cooling system remained seismically qualified. On November 8, the engineering supervisor responsible for approving the Appendix B evaluation identified that the timeliness requirements specified in the ZODM-0 had not been met.

On November 7, the inspectors notified engineering personnel that a "trapeze" style piping support for eight service water lines in the Unit 1 containment spray room was partially disassembled, in that, one of two support rods was not attached. An engineer did not inspect the support until November 14. After inspecting the support, the engineer initiated a PIF (96-4217), and an operability assessment per Appendix A of the ZODM-0 was completed. Based on this initial operability determination, the licensee concluded that the affected equipment was operable. The required Appendix B operability evaluation was completed on November 15.

On October 16, the inspectors informed a system engineer that a pipe support was missing on high pressure N_2 backup pressure control valve 1PCV-NT10. The system engineer informed the inspectors that the missing support had been identified three years ago and that there was not an operability concern based on an evaluation performed at that time. The engineer, however, could not produce the documented evaluation. In response to the inspectors concerns, the licensee performed an operability assessment for the missing pipe support on November 27 and

concluded that the valve 1PCV-NT10 was inoperable.

c. Conclusions

The inspectors concluded that engineering personnel did not evaluate safety-related material condition deficiencies for operability in a timely manner. The failures to: (1) complete Appendix B of ZODM-0 within the required time limit specified in ZODM-0 for missing jacket water cooling system pipe supports on the 1A and 0 EDGs; (2) complete operability assessments for a partially disassembled service water piping support per Appendix A and B of ZODM-0 within the time limits specified in ZODM-0; and (3) complete Appendix A within the required time limits of ZODM-0 for a missing pipe support on valve 1PCV-NT10; are considered three examples of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96017-06d; 50-304/96017-06d, 50-295/96017-06e, and 50-295/96017-06f, respectively), as described in the attached Notice of Violation.

E2 Engineering Support of Facilities and Equipment

E2.1 Exhaust Air Flow From the Fuel Handling Building (FHB) Bypassed the Auxiliary Building (AB) Charcoal Exhaust Filters

a. Inspection Scope (71707 and 37551)

On November 7, the licensee identified that the plant may have operated in a condition outside of the plant's design basis as described in the Updated Final Safety Analysis Report (UFSAR). The condition pertained to a design basis fuel handling accident. The inspectors interviewed system engineer personnel and reviewed applicable documentation, including the Technical Specifications, the UFSAR, and a fuel building ventilation system safety evaluation (50.59/0213/96).

b. Observations and Findings

Section 9.4.3.1 of the UFSAR assumes that for a fuel handling accident, all of the exhaust air from the FHB is routed through the AB charcoal exhaust filters. To facilitate the movement of large equipment into and out of containment during the Unit 2 refueling outage, the licensee removed a shield block wall between the containment and FHB. This created a ventilation exhaust path through a vertical pipe chase and pipe tunnel which bypassed charcoal filters in the AB ventilation system.

In response to a high radiation condition during a fuel handling accident, radiation monitors in the pipe tunnel (2RT-PR07A and B) should actuate, realigning the ventilation exhaust path through charcoal filters. However, per the Technical Specifications, the radiation monitors are not required to be operable in Mode 6 (refueling). Consequently, there was no assurance that the monitors would have been available to realign the pipe tunnel exhaust through charcoal filters. The licensee concluded that this condition could have resulted in

significant increases in offsite dose.

To address this issue, the licensee initiated the following corrective actions:

- Periodic Test 19, "Auxiliary Building/Fuel Building Ventilation Test," Revision 5, was revised to configure the pipe tunnel exhaust through charcoal filters during fuel handling and crane movements over the spent fuel pool.

- Engineering requests were issued to perform a modification to install duct work between the pipe tunnel opening and the AB to prevent FHB exhaust air from bypassing charcoal filters.

c. Conclusions

Upon identification, the licensee initiated prompt corrective action. As of the end of this inspection period, the licensee was still in the process of evaluating this issue. This issue is considered an Unresolved Item (50-295/96017-10; 50-304/96017-10) pending further NRC review to determine if this condition existed during actual fuel movements in the FHB and what previous opportunities existed for the licensee to identify the ventilation system concern.

E2.2 Fuel Assembly Clearances During Fuel Moves

a. Inspection Scope (71707)

On November 24, the licensee identified a discrepancy between the actual plant configuration and the UFSAR description of the clearance between the bottom of a fuel assembly and the weir gate and the distance between the surface of the spent fuel pool (SFP) and the top of a fuel assembly during fuel moves. The inspectors interviewed engineering and licensing department personnel and reviewed applicable documentation.

b. Observations and Findings

Section 12.3.2.2.3.1, "Spent Fuel Pool," of the UFSAR states that, "Using a clearance of six inches between the bottom of a spent fuel assembly and the base seal of the gate, a 10-foot 3 inch water shield is provided above the active length of the assembly during transfer." The licensee identified that the six inch clearance and water shield requirements were not met during fuel moves. The maximum clearance of a fuel assembly from the weir gate base was 2," and the SFP level would have to have been above the overflow value of 615' 5" in order to have maintained 10' 3" of water above the fuel assembly during fuel transfers. The licensee's corrective actions in response to this issue included suspension of all fuel moves and the initiation of a change to the UFSAR.

c. Conclusions

The licensee appropriately suspended fuel movement upon identification of this issue. The licensee was still in the process of evaluating the reason for and the significance of this UFSAR discrepancy at the end of the inspection period. This issue is considered an Unresolved Item (50-295/96017-11; 50-304/96017-11) pending NRC review of the results of the licensee's evaluation.

E3 Engineering Procedures and Documentation

E3.1 Review of UFSAR Commitments

The discovery of a licensee operating its facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the UFSAR descriptions. The inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The following inconsistencies were noted between the wording of the UFSAR and the plant practices, procedures, and/or parameters.

a. Fuel Handling Accident Defined in UFSAR Incorrect

On November 7, the licensee identified that the fuel handling accident, as described in UFSAR Section 9.4.3.1, was incorrect. This issue is discussed in Section E2.1 of this report.

b. Fuel Assembly Clearances During Fuel Transfer Not Consistent With UFSAR

On November 24, the licensee identified a discrepancy between the actual plant configuration and the UFSAR description of the clearance between the bottom of a fuel assembly and the weir gate and the distance between the surface of the SFP and the top of a fuel assembly during fuel moves. This issue is discussed in Section E2.2.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) IFI 50-295;304/96014-07: Safety-related piping support anchor plates exceeded the specified gap criteria between the plate and the building structure

The inspectors reviewed the licensee's operability assessment (No. ER9604805) and supporting engineering calculations and determined that the licensee's conclusions regarding operability of the analyzed pipe supports were adequately justified. However, since the licensee's operability assessment was based on an inspection of a limited number of supports, of which approximately 50 percent exceeded the gap criteria, the inspectors determined that the licensee's conclusion that all large bore piping supports with excessive gaps were capable of performing their intended safety function, lacked a technical basis. In response to the inspectors concern, the licensee informed the inspectors that in the future when deviations from the specified gap criteria were

identified, the licensee would either demonstrate that the condition is bounded by operability assessment No. ER9604805, or perform an additional evaluation of the condition. The inspectors had no further concerns with this issue and this item is closed.

E8.2 (Closed) IFI 50-295;304/96014-08: High ambient temperature in the 011 125 Volt-D.C. battery room.

Per guidance in the Zion Operability Determination Manual, the licensee considers the 011 125 Volt-D.C. battery to be operable for up to five days without the battery room exhaust ventilation system in operation, based on the calculated time for hydrogen concentration to exceed two percent without ventilation flow. The projected time for hydrogen concentration to reach two percent was based on calculation No. NED-MSD-H-7. The inspectors reviewed this calculation and did not identify any concerns.

The inspectors also reviewed the licensee's basis for allowing operation of the 125 Volt-D.C. batteries in an elevated ambient temperature environment. As documented in licensee internal correspondence (Chron No. 115671) dated May 5, 1992, the licensee concluded that continued operation of the batteries in an elevated temperature environment would result in reducing the battery service life by approximately 25 percent. However, the reduced service life of the batteries would not increase the number of expected battery replacements before the expiration of the plant license. The licensee therefore, concluded that a modification to the battery ventilation system to lower ambient temperatures was not justified based on economic considerations. The inspectors had no further safety concerns with this issue and this item is closed.

E8.3 (Closed) Unresolved item 50-295/304-96006-09 Unit 1 safety injection (SI) pump suction piping pressurized due to freezing of the recirculation line where it traversed the containment purge supply duct.

At the time of the event, Unit 1 was in Mode 5 (cold shutdown). The SI system is not required to be operable in this plant condition. The inspectors reviewed operating records for the past five years to determine if the SI system recirculation piping was susceptible to freezing due to plant conditions at a time when the SI system was required to be operable. The susceptibility of the recirculation piping to freezing was dependent upon the outside ambient temperature, whether the containment purge system was in service, and the accumulation of water in the recirculation line due to running of the SI pump during a previous surveillance test. The inspectors did not identify the existence of the required plant conditions during the past five years. The inspectors noted that the licensee completed a similar review on November 27, 1996, with the same results.

The licensee addressed this equipment vulnerability concern during the current refueling outage by rerouting the Unit 2 SI system recirculation piping away from the containment purge supply ducting. The exposed

piping in the vicinity of the Unit 1 containment purge supply ducting was heat-traced and the licensee implemented a standing order to check temperatures in the purge room each shift. The inspectors concluded that the licensee's corrective actions were adequate. This item is closed.

IV. Plant Support

F2 Status of Fire Protection Facilities and Equipment

F2.1 Unqualified Fire Barriers

On November 8, the licensee identified that "Cerifiber" fire seals installed in the plant did not conform to approved fire test reports. The licensee initiated an investigation to determine the fire seals' qualification, which was still in progress at the end of this inspection period. In the interim, the licensee established compensatory measures including hourly fire watch tours of the affected areas. This is considered an Unresolved Item (50-295/96017-12; 50-304/96017-12) pending NRC review of the licensee's investigation results.

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 6, 1996. 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.

X3 Management Meeting Summary

NRC and Commonwealth Edison management met at the NRC Region III offices on November 19, 1996, to discuss the licensee's initiative to have an independent safety assessment (ISA) of LaSalle County Station and Zion Station conducted by a contractor. At this meeting, the licensee described the purpose of each ISA, organization and staffing of the ISA team, the scope of each assessment, and the proposed schedule. The licensee stated that the ISA would consist of a comprehensive review of historical performance at each facility to determine why previous improvement initiatives had not been successful and to ensure the licensee was focusing resources on appropriate issues.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Mueller, Site Vice President
G. Schwartz, Station Manager
G. VanderHayden, Operations Manager
W. Stone, Regulatory Assurance Supervisor
B. Fitzpatrick, Operations Manager
B. Giffin, Engineering Manager
K. Hansing, Site Quality Verification Director
W. Strodl, Radiation Protection Supervisor
M. Weis, Services Director

NRC

M. Dapas, Chief, Reactor Projects Branch 2
M. Parker, Senior Resident Inspector, Palisades
A. Vegel, Senior Resident Inspector, Fermi
R. Westberg, Senior Resident Inspector

List of Inspection Procedures Used

IP 37551	Onsite Engineering
IP 40500	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726	Surveillance Observations
IP 62707	Maintenance Observation
IP 71707	Plant Operations

List of Items Opened, Closed, and Discussed

Opened

50-304-96017-01	VIO	Operation of an OOS component which resulted in a spill of approximately 400 gallons of water
50-295-96017-02	URI	Practice of allowing reactor power to knowingly exceed licensed thermal power limit
50-295/304-96017-03	VIO	Failure to demonstrate the operability of the two remaining EDGs and the availability of two sources of off-site power within one hour and at least once per every eight hours thereafter while the 0 EDG was inoperable
50-295/304-96017-04	VIO	Failure to implement corrective actions for an identified significant condition adverse to quality
50-295/304-96017-05	URI	Control of overtime
50-295/304-96017-06a	VIO	Failure to address operability of equipment when a TS required surveillance test discovered equipment parameters outside the acceptance criteria specified in the test
50-295/304-96017-06b	VIO	Failure to correctly calculate average cell voltage during a battery surveillance
50-295/304-96017-06c	VIO	Improperly attached gas cylinders to seismic scaffold which invalidated the seismic evaluation
50-295/304-96017-06d	VIO	Failure to complete appropriate operability assessment within five days of discovery of missing piping supports on the 1A and 0 EDGs
50-295/304-96017-06e	VIO	Failure to complete the appropriate operability assessments within 24 hours and five days for a partially disassembled service water piping support
50-295/304-96017-06f	VIO	Failure to complete appropriate operability assessment within 24 hours for a N_2 backup pressure control valve
50-304-96017-07	URI	Review of purchase order and vendor quality assurance program to determine cause of the improperly configured wiring harness on new generator
50-304/96017-08a	VIO	Inadequate maintenance procedure resulted in the loss of configuration control for the generator neutral ground lead

50-304-96017-08b	VIO	Inadequate maintenance procedure resulted in the misalignment of the 2A EDG governor actuator
50-295-96017-08c	VIO	Inadequate maintenance instructions resulted in the improper assembly of the 1A AFW turbine inboard bearing
50-295-96017-09	URI	Review evaluation of source [illegible] adequacy of oil change PM or [illegible] turbine inboard bearing
50-295/304-96017-10	URI	Review evaluation [illegible] bypass flow
50-295/304-96017-11	URI	Review evaluation o[illegible]mbly clearances during fuel [illegible]
50-295/304-96017-12	URI	Review fire barrier qualifi[illegible]tion documentation

Closed

50-295/304-96006-09	URI	SI pump recirculation line freezing
50-295/304-96014-07	IFI	Operability assessment and supporting engineering calculations for baseplate gaps
50-295/304-96014-08	IFI	Basis for 125 Volt battery operability without battery room exhaust ventilation
50-295-96024	LER	Missed TS surveillances for inoperable common EDG caused by management deficiency
50-304-96026	LER	FHB ventilation exhaust air flow bypassed the AB charcoal exhaust filters

List of Acronyms

AB	Auxiliary Building
AFW	Auxiliary Feedwater
CAR	Corrective Action Record
CT	Current Transformer
DET	Diagnostic Evaluation Team
EDG	Emergency Diesel Generator
ECCS	Emergency Core Cooling System
EM	Electrical Maintenance
EMSP	Electrical Maintenance Surveillance Procedure
EQ	Environmental Qualification
ESF	Engineered Safety Features
FHB	Fuel Handling Building
GL	Generic Letter
IFI	Inspection Follow-up Item
IP	Inspection Procedure
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
OOS	Out-of-Service
PDR	Public Document Room
PIF	Problem Identification Form
PM	Preventive Maintenance
PT	Potential Transformer
PTL	Pull-to-Lock
QC	Quality Control
RHR	Residual Heat Removal
RWST	Refueling Water Storage Tank
SI	Safety Injection
SFP	Spent Fuel Pool
SOI	System Operating Instruction
SQV	Site Quality Verification
TS	Technical Specification
TSSP	Technical Staff Surveillance Procedure
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UV	Undervoltage
VIO	Violation
VPI	Valves Position Indicator
ZAP	Zion Administrative Procedure
ZODM	Zion Operability Determination Manual