U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/91010(DRP); 50-304/91010(DRP)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place - Suite 300
Downers Grove, IL 60515

Facility Name: Zion Nuclear Power Station, Units 1 and 2

Inspection At: Zion, Illinois

Inspection Conducted: April 9 through May 30, 1991

Inspectors: J. D. Smith

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Reactor Projects Section 1A

6-18-91
Date

Inspection Summary

Inspection from April 9, 1991 through May 30, 1991 (Reports No. 50-295/91010(DRP); No. 50-304/91010(DRP)
Areas Inspected: Routine, unannounced resident inspection of licensee action on previous inspection findings; summary of operations; operational safety verification and engineered safety feature (ESF) system walkdown; surveillance observation; maintenance observation; Emergency Diesel Generator (EDG) maintenance; safety assessment and quality verification; licensee event reports (LERs); and management meetings.
Results: Of the eight areas inspected, no violations or deviations were identified. The licensee's performance in these areas are discussed below:

Plant Operation

The operator responses to adverse plant conditions were good as evidenced by the loss of suction to the RHR pump where prompt operator action prevented possible damage to the pump. The operator's response to the safety injection was prompt and correct in accordance with emergency procedures. The housekeeping of the auxiliary building has slipped due to the lack of resources during the forced outage. More management attention needs to be applied to housekeeping in contaminated areas. More management attention through increased surveillance, documentation and plant tours should be considered during infrequent evolutions such as Spent Fuel Pool (SFP) filling. The chemistry department did not have a trending program for SFP boron concentration which permitted a slow dilution to go uncorrected over a month.

Surveillance

The surveillances were monitored by plant management. Communication, coordination and test control were evident during the Unit 1 startup surveillance activities. The conflicts which occurred during the 1B EDG 24 hour endurance test 15.6.43 were discussed and resolved appropriately.

Maintenance

Management attention to ensure proper prioritization and scope of work was evidenced by the formation of the Error Free Start-up Team. The team reviewed outstanding work requests to ensure that all safety related and important to safety work would be performed prior to plant startup. Management involvement with the diesel generator work was good. Good coordination and communication between departments was observed; planning and scheduling of diesel generator work was effective during the outages. The resident inspector staff was kept well informed of the status of maintenance evolutions.

The licensee's use of PRA is limited and not being used in as many applications as it could be. Additional management attention is needed to ensure the availability of spare parts. Although improvements have been seen in work documentation, some minor concerns are still noted.

Engineering and Technical Support

Engineering support for all departments continues to be good as evidenced by startup testing, maintenance support and root cause investigations. Technical management involvement with daily activities was strong. Implementation of system engineer procedures demonstrates the licensee commitment to improve engineering support.

SAQV

The licensee's root cause analysis for the inverter failures that resulted in two plant events was thorough, but due to the intermittent nature of the problem, inconclusive. They are continuing to monitor the inverters. Senior management communication to the staff was evidenced by the State of the Station Address, which provided management expectations for future performance.

DETAILS

1. Persons Contacted

T. Joyce, Station Manager
* T. Rieck, Superintendent, Technical
*#W. Kurth, Superintendent, Production
* R. Budowle, Onsite Nuclear Safety
T. Broccolo, Director, Services
* D. Karjala, Director, Performance Improvement
W. Stone, Assistant to Technical Superintendent
P. LeBlond, Assistant Superintendent, Operations
#R. Johnson, Assistant Superintendent, Maintenance
J. LaFontaine, Assistant Superintendent, Work Planning
* D. Wozniak, Project Manager, ENC
#D. Bump, Nuclear Quality Programs Supervisor
* R. Whittier, Nuclear Quality Programs
* C. Schultz, Quality Control Supervisor
* R. Chrzanowski, Regulatory Assurance Supervisor
* W. T'Niemi, Technical Staff Supervisor
*#K. Dickerson, Regulatory Assurance
#M. Krysiak, Mechanical Maintenance
#T. Van DeVoot, Maintenance Staff
#L. Montes, Diesel Improvement Team Leader

NRC Personnel

*#A. M. Bongiovanni, Resident Inspector
#H. A. Walker, Reactor Inspector

# Indicates persons present at the maintenance overview exit interview on April 19, 1991.

* Indicates persons present at the exit interview on May 30, 1991.

The inspectors also contacted other licensee personnel including members of the operating, maintenance, security, and engineering staff.

2. Licensee Actions on Previous Inspection Findings (92701, 92702)

Violations

(Closed) Violation (295/86026-01B); A number of work packages did not contain "sign offs" for some steps indicating that the steps had been completed. The inspector reviewed licensee actions taken to correct this problem including those described in the response letter dated March 20, 1987. During the inspection, the inspector reviewed 17 nuclear work request packages and all completed steps were appropriately signed. This item is closed.

(Closed) Violation (295/86026-02B); An emergency diesel generator (EDG) was released for testing without verification that inspection was completed and acceptable. The inspector reviewed licensee actions taken to correct this problem including those described in the response letter dated March 20, 1987. Prior to the maintenance test run of EDG 1A, the inspector reviewed 17 nuclear work request packages. All work requests had the required signatures and evidence of verifications. This item is closed.

Open Items

(Open) Open Item (295/91002-01;304/91002-02); Review of the licensee's self assessment of their Type C leak rate testing program. As discussed in inspection report (295/91004;304/91004), the evaluations for testing requirements have been completed and five additional penetrations were identified. This item remains open pending the completion of the Type C testing to be performed during the next refueling outages.

(Closed) Open Items (304/90026-03 (DRP); Root cause of reactor trip breaker trip during surveillance. The root cause for the trip was attributed to poor guidance on racking in breakers. The associated corrective actions are addressed in Ler 304/90014. This item is considered closed.

No violations or deviations were identified.

3. Summary of Operations

Unit 1

The unit entered this inspection report period in cold shutdown in an extended forced outage due to the Unit 2 System Auxiliary Transformer (SAT) failure. During the outage, the licensee completed maintenance on the emergency diesel generators, verification of the local leak rate testing program and testing of the fire protection system. On April 23, the licensee inadvertently induced a blackout signal while performing an out of service on the Unit 1 SAT. The blackout signal and subsequent ESF actuation signal caused actuation of the following equipment: 1B service water pump, 0D component cooling water pump, 1A auxiliary feedwater pump and two reactor containment fan coolers. The affected service buses were re-energized and the systems were realigned. On May 12, a safety injection from hi steam flow/low low Tave occurred when the 112 instrument inverter failed. Prior to the event, the low low Tave bistables were tripped to support the calibration of the RTDs which were in progress. The licensee estimated that 2000 gallons of borated water was injected into the reactor coolant system from the charging pumps. On May 13 at approximately 1:15 p.m., the unit was made critical and on May 14 at 9:15, the unit was synchronized to the grid. The unit operated routinely at power levels up to 100% power for the remainder of the period.

Unit 2

During the entire inspection report period, the unit remained in cold shutdown in a forced outage caused by the system auxiliary transformer failure. The licensee performed maintenance on the EDGs, tested the fire protection/deluge system, and completed corrective actions associated with the SAT failure. The outage is expected to last until June 10, 1991.

No violations or deviations were identified.

4. Operational Safety Verification and Engineered Safety Features System Walkdown (71707 &71710)

a. Operationsl Safety

During the inspection period between April 9, 1991 through May 27, 1991, the inspectors verified that the facility was being operated in conformance with the licenses and regulatory requirements and that the licensee's management control system was effectively carrying out its responsibilities for safe operation. This was done on a sampling basis through routine direct observation of activities and equipment, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions for operation action requirements (LCOARs), corrective action, and review of facility records.

On a sampling basis the inspectors daily verified proper control room staffing and access, operator behavior, and coordination of plant activities with ongoing control room operations; verified operator adherence with the latest revisions of procedures for ongoing activities; verified operation as required by Technical Specifications (TS); including compliance with LCOARs, with emphasis on engineered safety features (ESF) and ESF electrical alignment and valve positions; monitored instrumentation recorder traces and duplicate channels for understanding, off-normal condition, and corrective actions being taken; examined nuclear instrumentation (NI) and other protection channels for proper operability; reviewed radiation monitors and stack monitors for abnormal conditions; verified that onsite and offsite power was available as required; observed the frequency of plant/control room visits by the station manager, superintendents, assistant operations superintendent, and other managers; and observed the Safety Parameter Display System (SPDS) for operability.

b. Engineered Safety Feature (ESF) Systems (71710)

During the inspection, the inspectors selected accessible portions of several ESF systems to verify status. Consideration was given to the plant mode, applicable Technical Specifications, Limiting Conditions for Operation Action Requirements (LCOARs), and other applicable requirements.

Various observations, where applicable, were made of hangers and supports; housekeeping; valve position and conditions; potential ignition sources; major component labeling, lubrication, cooling, etc.; whether instrumentation was properly installed and functioning and significant process parameter values were consistent with expected values; whether instrumentation was calibrated; whether necessary support systems were operational; and whether locally and remotely indicated breaker and valve positions agreed.

During the inspection, the accessible portions of AC electrical power system; DC electrical power system; reactor protection system; residual heat removal (RHR) system; containment and support system; safety injection systems; service water system; component cooling water system; diesel generator and auxiliaries system; plant fire protection system; and control room system were inspected to verify operability. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified proper return to service of affected components. Tours of the auxiliary and turbine buildings were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, and excessive vibrations and to verify the maintenance requests had been initiated for equipment in need of maintenance.

The house-keeping of the RHR rooms were found to be below average. During the RHR tours, the inspector noted various tools, ladders and other discrepant items in the room. Material Condition Cards and work requests were written by the system engineer to resolve these concerns.

c. Onsite Event Follow-up (93702)

Spent Fuel Pool Overflow

On February 22, 1991, the spend fuel pool (SFP) was approximately three inches above the low level alarm. Demineralized water makeup was started to raise the pool level. The SFP boron concentration was 2209 ppm when the fill operation was secured on February 28 and the SFP concentration was measured at 2168 ppm on March 1. Between March 1 and April 16, 1991, the SFP concentrations taken weekly by chemistry dropped from 2168 ppm to 1998 ppm, below the FSAR limit of 2000 ppm. During this time period, the demineralized water hose was left in the pool and flow from a leaking valve caused the slight dilution. On April 16, when the low concentration was reported to operations, a feed and bleed lineup from the RWST to the SFP was performed by procedure. Approximately 17 hours later, a SFP high level alarm was received. The control room operator throttled back on the flow returning to the SFP to better balance the feed and bleed operation. The flow indication from the SFP back to the RWST was not reliable for flow balancing since it measured both the return flow to the RWST and a small flow back to the SFP. At the same time, the radiation waste operator noted a rapid level increase in the Auxiliary Building Equipment Drain tank (ABEDT) which could not be controlled by the drain tank pumps and immediately contacted the control room. Makeup to the SFP was then terminated. An

operating licensed shift supervisor verified the SFP level at the south end of the pool and had no concerns. However, the pool was overflowing at the northeast corner which was the low point for the pool and was not observed. The ABEDT overflowed between 500 and 1000 gallons and as a result, bedplate drains in the Unit 1 and 2 containment spray pump rooms and the Unit 1 safety injection pump rooms backed up and contaminated the rooms. The areas outside of these rooms and the level below were also contaminated. The areas were immediately roped off and decontaminated.

The resident inspector had the following concerns: the weekly SFP samples are not trended by chemistry or operations, the hose was left in the pool, the SFP had to overflow during the period the hose was left in the pool for the SFP boron dilution to occur, the SFP feed and bleed procedure was inadequate and the low point of the SFP was not known by the operators. Also, the log entry was deficient, in that, the areas of the spill were not logged nor was there a later entry in the log stating the ABEDT overflow had stopped and confirmed to be from the SFP overflow. The licensee is performing a Human Performance Enhancement Report for this incident. This issue is considered an Open Item (295/91010-01) pending review of the corrective actions.

Inadvertent start of an Auxiliary Feedwater (AFW) Pump Lube Oil Pump

On April 17, 1991, a partial clear of the 2A AFW pump system was conducted to support a maintenance test. The test was completed and during the system realignment, the 2A AFW pump lube oil pump breaker was left in the closed position, instead of opened as required by General Operating Procedure (GOP) 4. During subsequent electrical maintenance, the 2A AFW pump lube oil pump was started inadvertently. The cause of the event was that the out of service did not describe the correct position of the breaker after the test. Also, the GOP was deficient, in that, although required for other equipment, a caution tag was not required to be placed on the breaker to designate the breaker position while in cold shutdown. The GOP will be revised to require a caution tag indicating an open position for lube oil pump breaker.

Temporary Loss of Core Cooling - Unit 1

On April 21, 1991, a momentary loss of voltage from AC instrument inverter 111 caused many bistables to trip and immediately reset. The power disruption caused the residual heat removal (RHR) loop suction valve, 1 MOV RH8702 to close. The 1A RHR pump was running at the time of the event in the cold shutdown mode of operation. The operator immediately secured the pump before the valve closed and suction was lost to the pump. This prompt action prevented potential damage to the pump. In accordance with Abnormal Operating Procedure (AOP) 6.3 loss of RHR and AOP 8.1 loss of instrument bus, the operator stroked the valve open after the valve had closed. The RHR pump was restarted and core cooling re-established four minutes later. No reactor core temperature increase was observed on the

core thermocouples since the unit had been in cold shutdown for approximately 140 days. Trouble shooting of the inverter to identify the root cause of the voltage upset was performed. No component internal to the inverter was found to be defective or degraded. The root cause investigation was inconclusive; however, it appears that a fault on the load side of the inverter caused the loss of output power.

ESF Actuation Caused by Inadvertent Blackout Signal

On April 23, 1991, the licensee inadvertently induced a blackout signal while performing an out of service on the Unit 1 system auxiliary transformer (SAT). At the time of the event, the licensee was attempting to backfeed power to Unit 1 from the Unit 2 SAT per procedure which resulted in de-energizing nonessential service busses 143 and 144. The blackout signal and subsequent ESF actuation signal caused the following equipment to actuate: 1B service water pump, 0D component cooling water pump, 1D and 1E reactor containment fan coolers, service water isolation to the turbine building, and opened the steam supply valve to the 1A auxiliary feedwater (AFW) pump. The essential service buses were being fed by the Unit 2 SAT and remained energized during the event. The non essential service busses were re-energized and the equipment was realigned. Later, while proceeding with the out of service sequence, the non essential service busses 144 and 145 were de-energized per procedure which caused a 2/4 RCP service bus undervoltage condition resulting in the 1A AFW pump steam supply valve opening. During both evolutions, the vital busses remained energized and the diesel generators were not called on to start.

The root cause appeared to be procedural deficiencies. The logic sequence error in the new backfeed procedure was not identified during the extensive technical and onsite review of the procedure. Prior to returning the electrical lineup to normal, the licensee corrected the procedure and verified the steps on the simulator. No further problems were observed.

SI from Hi Steam Flow and Low Low Tave Signal

On May 10, 1991, with Unit 1 in hot shutdown at normal operating pressure and temperature, a spurious safety injection (SI) occurred due to the failure of instrument inverter 112. At the time of the event, the instrument maintenance personnel were performing RTD cross-calibration testing which required the average reactor coolant temperature (Tave) lo-lo bistables to be tripped per instructions, IMP-RC-5. At 12:20 a.m., the instrument inverter 112 tripped which caused the Hi-Steam Flow bistables to trip. With the lo-lo Tave bistables previously tripped for cross-calibration testing, the tripping of the Hi-Steam Flow bistables established the 2 of 4 coincidence necessary to actuate safety injection and steam line isolation. The operators entered the appropriate Emergency Operating Procedure (EOP) and the SI was terminated at 12:28 a.m.

The reactor coolant system pressure peaked at approximately 2400 psig. During the event the automatic feature of the pressurizer power operated relief valves (PORVs) were lost and Hi Head SI flow was unable to be verified via individual flow indicators for each cold leg injection. The inspectors assessed the licensee's activities that pertained to the failed inverter 112, the loss of the auto feature of both PORVs and the unability to use main control board (MCB) indication for Hi-Head SI flow.

The licensee's troubleshooting could not clearly establish the failure mode of Inverter 112. The licensee hypothesized that due to a voltage transient on the 480 AC source for Inverter 112, the AC input breaker on Inverter 112 tripped, due to overvoltage. By design, the backup 125 DC source should then power Inverter 112 to supply regulated 120 AC power to Instrument Bus 112. A review of the Sequential Events Recorder (SER) determined that at 12:20.10.134 a.m., several SI bistables tripped and cleared approximately 0.3 seconds later. Then approximately 0.2 seconds later, the SI bistables tripped again with the failure of Inverter 112. When Inverter 112 intermittently failed at 12:20.10.134 a.m., the pre-charge capacitors in Inverter 112 discharged. The intermittent failure was caused by oxidation on either or both the DC disconnect breaker on Inverter 112 or the DC feeder breaker on DC Bus 111 to Inverter 112. In about 0.3 seconds the oxidation vaporized off the breaker contacts and full current flow through the breakers was available. However, due to the discharge of the pre-charge capacitors, the current draw to re-charge the capacitors was large enough to cause the DC feeder breaker to trip on overcurrent on DC Bus 111 causing permanent loss of Inverter 112.

During subsequent troubleshooting, the licensee did identify a degraded silicon control rectifier (SCR). However, the degraded SCR was determined not to be the cause of the DC feeder breaker trip, since two 100 amp fuses in the SCR circuit would have blown prior to the DC feeder breaker tripping. The licensee inspected the DC feeder breaker, AC input breaker and the DC disconnect breaker and did not identify any significant anomalies. However, if oxidation on breaker contacts was the cause of the Inverter 112 failure, the oxidation would have vaporized during the excessive current draw. The licensee replaced the DC feeder breaker and the AC Input breaker. However, since a spare breaker was not available for the DC disconnect breaker, the licensee burnished and cleaned the contacts and re-installed the breaker. Since, the failure mode of Inverter 112 could not be clearly established, the licensee connected instruments to Inverter 112 to monitor performance. A similar intermittent loss of Inverter 111 had occurred several weeks earlier but did not result in a total loss of Inverter 111. The causes for the intermittent losses of the inverter 111 and 112 are considered an Open Item (295/91010-02) pending further review by the licensee and the NRC.

The licensee reviewed the control circuits for the pressurizer PORVs a determined that the auto-feature for both PORVs was lost with the loss of Instrument Bus 112. When the Master Pressure Controller (MPC) was in the automatic mode, the control power source for the MPC was Inverter 112. The PORVs were still operable in the manual mode which the operators used to reduce RCS pressure. The inspectors reviewed abnormal procedure, AOP-8.1, "Loss of Instrument Bus" and determined that the procedure did not identify the loss of the auto feature of both PORVs if Instrument Bus 112 was lost. The procedure also did not clearly identify that other Instrument Bus losses such as; 111, 113 and 114 would also result in a loss of the auto feature of a PORV due to loss of a pressurizer pressure channel that was used as a input signal to the PORV auto control circuit. The lack of procedure AOP-8.1 to clearly identify the loss of a PORV(s) due to various losses of Instrument Busses is considered an Open Item (295/91010-03) pending further NRC review of the licensee's actions related to Bulletin 79-27, "Loss of Non-Class 1E Instrumentation and Control Power System Bus During Operation."

The inspectors determined that two of the four Hi Head SI flow indicators on the Main Control Board (MCB) were out of service for a temporary alteration (FI-926) and a ruptured bellows (FI-925). FI-925 would not have been available even without a ruptured bellows since the instrument was normally supplied by Instrument Bus 112. The licensee estimates that during the event, Hi Head SI flow was approximately 160 gpm or 40 gpm in each leg. The MCB indicators for Hi Head SI flow had a non-linear range of 0-400 gpm. Due to the low flow of 40 gpm, the operators had indication near 0 gpm since the bottom 1/4" of the indicator scale represented 0-100 gpm flow. The operators did have available total Hi Head SI flow from FI-934. The licensee determined that the EOP did not identify by equipment identification number, the indicators for the operators to use when the EOP required verification of SI flow. This is considered an Open Item (295/91010-04(DRP) pending review of corrective actions.

Assessment of Startup of Unit 1

The resident staff conducted a comprehensive overview of Unit 1 startup, which included observation and review of the following: the startup packages for completeness; all mode changes from cold shutdown to power operations; diesel generators 24-hour endurance run and bus drop tests; safety injection signal and a dead bus diesel start and bus loading; loss of offsite power and diesel start test. The residents also observed other periodic tests. Good test coordination was provided by Technical Staff Engineers. Senior operations management were present during various phases of the tests.

On May 13 and May 14, 1991, the resident inspectors observed the Control Room (CR) demeanor and operating crew's performance during the approach to criticality, the synchronization to the grid and power ascension to 30%. The unit was placed on-line in a smooth orchestrated manner. The CR was maintained quiet and orderly during

these evolutions. During this time, the operating crew showed professionalism, team work, and very good communication. This is a noticeable improvement in the CR demeanor, crew team work and communication observed during prior start-ups.

d. Current Material Condition (71707)

The inspectors performed general plant as well as selected system and component walkdowns to assess the general and specific material condition of the plant, to verify that Nuclear Work Requests (NWRs) had been initiated for identified equipment problems, and to evaluate housekeeping. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting.

e. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc., and randomly examined radiation protection instrumentation for use, operability, and calibration.

f. Security (81064)

Each week during activities or tours, the inspector monitored the licensee's security program to ensure that observed actions were implemented in accordance with the approved security plan. The inspector noted that persons within the protected area displayed proper photo-identification badges and those individuals requiring escorts were properly escorted. The inspector also verified that checked vital areas were locked and alarmed. Additionally, the inspector also verified that observed personnel and packages entering the protected area were searched by appropriate equipment or by hand.

g. Assessment of Plant Operations

The operator responses to adverse plant conditions were good as evidenced by the loss of suction to the RHR pump where prompt operator action prevented possible damage to the pump. The operator's response to the safety injection was prompt and correct in accordance with emergency procedures. The housekeeping of the auxiliary building has slipped due to the lack of resources during the forced outage. More management attention needs to be applied to housekeeping in contaminated areas. More management attention through increased surveillance, documentation and plant tours should be considered during infrequent evolutions such as Spent Fuel Pool (SFP) filling. The chemistry department did not have a trending

program for SFP boron concentration which permitted a slow dilution to go uncorrected over a month.

No violations or deviations were identified.

5. Monthly Surveillance Observation (61726)

The inspector observed Technical Specifications required surveillance testing on the various systems and verified whether testing was performed in accordance with adequate procedures, whether test instrumentation was calibrated, whether limiting conditions for operation were met, whether removal and restoration of the affected components were accomplished, whether test results conformed with technical specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and whether any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The inspector also witnessed portions of the following test activities:

TSS 15.6.35	Manual Actuation of the Safety Injection and Safe Shutdown Systems and Diesel Generator (EDG) Loading Test
TSS 15.6.43	Endurance Testing of Diesel Generators During Refueling
PT2A-ST	Safety Injection System Tests - Stroke timing
PT 5 and 5A	Reactor Protection Logic
PT 10	Safeguards Actuation
PT 11	Diesel Generator Loading Test
SOI 63	Unit 1 and Unit 2 SAT backfeed procedure

Regarding SOI-63, this procedure was newly developed by the licensee to be used during the SAT outages. An extensive procedure review was performed; however, sequencing errors were not found during the review as discussed in paragraph 4c. The licensee revised the procedure and verified the sequencing on the simulator.

Regarding TSS 15.6.43, several minor problems occurred during the test performance. The test for the 1B EDG was started while the 0 EDG was on the 24-hour endurance run. The test section 8.3 for the loss of offsite power for the 1B EDG required the service water supply valve to the 0 EDG to be closed; however, since the 0 EDG was running, the valve needed to be opened. Also, Regulatory Guide 1.108 and the test both stated that the loss of offsite power test was to be performed immediately following the 24-hour endurance run. Since the 1B EDG test could not be completed, the licensee performed the load rejection portion of the test on the 0 EDG and secured the 0 EDG. Testing on the 1B EDG commenced

approximately two hours after it had secured and approximately two and one half hours later, testing on the 0 EDG resumed. Discussions with the licensee indicated that the time between testing was not long enough to cool the engine; therefore, the intent of the testing requirements were met.

Assessment of Surveillance

The surveillances were monitored by plant management. Communication, coordination and test control were evident during the Unit 1 startup surveillance activities. The conflicts which occurred during TSS 15.6.43 were discussed and resolved appropriately.

No violations or deviations were identified.

6. Monthly Maintenance Observation (62703)

St ion maintenance activities affecting the safety-related systems and components listed below were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from and restored to service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and fire protection controls were implemented. Work requests were reviewed to determine the status of outstanding jobs and to assure that priority is assigned to safety-related equipment maintenance which may affect system performance.

a. Maintenance Related Events

Diesel Fire Pump Battery Discharge

After the completion of the diesel fire pump maintenance, both new batteries were found discharged. Investigation determined that the out-of-service (OOS) for the maintenance activity may have caused the discharge of these batteries. Recharging of these batteries caused a delay for the return to service. The licensee is performing a root cause analysis investigation into this occurrence. This is considered an Unresolved Item (295/91010-05 (DRP)) pending the review of the root cause analysis.

Probabilistic Risk Assessment for Outage Work

A Probabilistic Risk Assessment (PRA) technique is being developed to be used for work prioritizations. The licensee's corporate PRA group was involved in a computer weighted prioritizati . model based on system importance for outage work. Some changes were made to work scheduling based on the group's input. The licensee is continuing to evaluate methods for implementing PRA in work scheduling.

b. Assessment of Maintenance

Management attention to ensure proper prioritization and scope of work was evidenced by the formation of the Error Free Start-up Team. The team reviewed outstanding work requests to ensure that all safety related and important to safety work would be performed prior to plant startup. Management involvement with the diesel generator work was good. Good coordination and communication between departments was observed. The planning and scheduling of diesel generator work was effective during he outages. The resident inspector staff was kept well inf. ed of the status of maintenance evolutions.

The licensee's use of PRA is limited and not being used in as many applications as it could be. Additional management attention is needed to ensure the availability of spare parts. Although improvements have been seen in work documentation, some minor concerns are still noted.

No violations of deviations were identified.

7. Emergency Diesel Generator Program

The Zion Diesel Improvement Project (ZDIP) is a permanent task force of selected personnel focused on improving EDG reliability in both the near and long term. The group has a specific structure and is staffed by position and name. The structure is appropriate to the project's goal although some of the support staff encountered minor conflicts between ZDIP priorities and those of their assigned supervisor. The inspectors attended the 10:30 a.m. regular status meeting and noted that the priorities were clear, responsibilities for tasks were communicated and that the project staff understood the importance of the diesel problems.

The EDG maintenance outages were examined to evaluate how the deficiencies were identified, what criteria was used t decide whether jobs should be completed or deferred, and what was the level of planning and scheduling involvement. Deficiencies were identified by multi-disciplined walkdown teams while the engines were running; the inspector reviewed the original deficiency lists and noted that they were comprehensive. General criteria used for job selection included whether or not the deficiency could impact operation or reliability, consideration was given to the amount of improvement compared to the level of effort, and whether the complexity of the task could result in creating new problems. Detailed planning and scheduling was evidenced by the on-time completion of the EDG outages.

Observation of Maintenance Activities

The inspector selected EDG 1A maintenance activities for review in order to evaluate the adequacy of diesel maintenance The inspector observed the activities to determine if licensee performance was adequate and in accordance with required administrative and technical requirements. The inspector assessed work activities including observation of work in progress, a review of work packages for work control and planning, management presence and involvement, quality control presence and involvement, procedure availability, adequacy, and use; personnel training and qualification, material availability, measuring and test equipment (M&TE) application and calibration, and post maintenance testing adequacy including proper acceptance criteria.

Most of the work observed was mechanical work, but some minor electrical work was also involved. The work was associated with portions 17 nuclear work requests (NWRs). The most significant work was associated with three NWRs as follows:

- NWR Z10710 - Perform 18 month surveillance on EDG 1A.
- NWR Z11382 - Repair water leaks to 7 left and 8 left cylinder heads and replace or repair as necessary.
- NWR Z90219 - Investigate and repair speed droop problem on governor.

No significant problems were noted; however, minor concerns were identified with the documentation of work performed and the availability of spare parts. Observations made during the inspection were as follows:

- NWR Z10710 - During step E4 of the surveillance test, the fuel injectors were tested for opening pressure. The EDG 1A 7L injector nozzle was incorrectly documented on the recorded data sheet as having passed a test when it actually failed. The licensee found the error and the injector was repaired and passed the required test. In addition, there were several instances on the data sheet where the data were written over.
- NWR Z11382 - Undocumented work activities took place after work was signed as completed. Cylinder heads were removed and tested for cracks. A crack was found in the 7 L head, which was replaced; the 8 L head was cleaned and re-installed.

  One stud on cylinder 8 left was re-removed but the signatures on the work package data sheet were not updated. The documented signatures were for work that had been previously completed including bolt torque requirements. The stud was reinstalled and appropriately torqued. There were no apparent hardware related problems.

  The QC inspector signed on the original installation of head 8 left, but there was no evidence of QC involvement in the re-installation.

Head 8 left had to be removed to allow grinding of head 7 left. The re-installation work included the torque testing of all head bolts and two studs. The work activities were documented in the daily work log but the signed step was not changed.

- NWR Z90219 - Post maintenance testing of EDG 1A indicated that the governor was not properly working. The licensee determined that the governor was defective. The governor was replaced and adjusted. The diesel system engineer was actively involved in the troubleshooting and repair of the governor.

As noted above, on at least two occasions, rework was performed after procedure steps had been signed. Although the rework appeared to be adequately performed, the signed steps were not re-signed or noted as reworked. This was considered a weakness in the inspection program and the credibility of the documented work activities.

In some cases, maintenance work activities were delayed because replacement parts not available. A number of diesel parts were obtained from other of the licensee's plants. Safety significant work was not delayed because of a shortage of parts.

The inspector concluded that the maintenance and surveillance activities associated with EDG 1A, in the areas inspected, were adequate and accomplished by trained and skilled maintenance personnel. The work procedures and instructions were adequate and available at the work location. The new procedures developed for diesel maintenance were very good and contained many illustrations and drawings to assist in the work. No significant problems were noted during the inspection; however, the documentation of work performed and the availability of spare parts was of minor concern.

Summary of EDG Maintenance Performed

The Zion Diesel Improvement Project appears to be an effective approach to resolution of the station's EDG reliability problems. The group is well-organized, staffed, and supported by station management. EDG maintenance and testing were adequately performed with only minor documentation problems noted during the inspection.

The license amendment for EDG technical specification changes was submitted by the licensee on March 28, 1991. The changes are as follows: the allowable outage time for each diesel was reduced to three days regardless of the number of valid failures the EDGs experienced (the 0 EDG is allowed a seven day outage if one unit is in mode 5 or 6); the surveillance frequency would be more consistent with Generic Letter No. 84-15, and would require increased testing frequency only on diesels experiencing failures and the requirement for testing EDGs when an emergency core cooling system is inoperable was deleted.

No violations or deviations were identified.

8. Engineering and Technical Support (37828)

The inspectors evaluated the extent to which engineering principles and evaluations were integrated into daily plant activities. This was accomplished by assessing the technical staff involvement in non-routine events, outage-related activities, and assigned TS surveillances; observing on-going maintenance work and troubleshooting; and reviewing deviation investigations and root cause determinations.

a. Engineering and Technical Support Events

Zebra Mussels Found in Afterbay

During the week of April 22, 1991, the licensee conducted inspections of the forebay, afterbay, and intake structures in response to Generic Letter 89-13, "Service Water Problems Affecting Safety-Related Equipment." In general, the overall conditions of the structures and pipings were good. During the inspections of the afterbay area and inlet piping, the diver found individual and small bunches of zebra mussels ranging from [illegible] inch in size. It was estimated that the largest cluster found contained approximately ten mussels per square feet and covered an area of about three feet. Due to the size and the quantity of mussels found, the licensee concluded that no immediate microbiological fouling concerns exist at this time. The licensee plans to continue their efforts associated with the Generic Letter which includes a modification to enable the addition of a biocide to the service water and fire protection system. Additionally, the licensee has inspected two of the three component cooling water heat exchangers and have found no evidence of zebra mussels. These actions are being tracked with a previously identified Open Item (295/90030-19(MPS); 304/90030-19(MPS)).

Missing Rubber from the Traveling Screen

On April 23, 1991, an inspection of the 2B service water pump intake structure was conducted to investigate the cause of the pump's low running amps. During the inspection, the diver found approximately 50 feet of 1/4" by 4" rubber and removed it from the inlet area of the pump below the first impeller. The rubber was determined to be the rubber shield designed as a fish/debris shield for the traveling screen guide rails. The licensee inspected all six of the travelling screen guide rails to verify the condition and to locate any missing pieces. Loose and missing rubber was reattached using stainless steel lag bolts and washers. An engineering evaluation was performed and determined that the additional missing pieces would not affect the operability of the forebay. To ensure operability of the service water system, the licensee performed pump performance and check valve operability tests. No discrepancies were found.

Main Steam Isola. n Valves Solenoid Valves Lifetime (MSIV SV)

On May 15, 1991, the technical staff informed the resident staff that while reviewing the environmental qualification (EQ) binders for main steam system, a question was raised as to the lifetime of the main steam isolation valve solenoid valves (MSIV SV). The evaluation determined that the "O" rings had a service life of five years and the valves had an energized service life of 77.6 weeks. The licensee determined that these are the only solenoid valves affected at the station. The solenoid valves are made by Chicago Fluid Power, Model No. NSV1-16-C-XP. They are unique to the MSIVs and they have not been installed in other Zion's applications. The MSIV SVs are normally de-energized except during hot shutdown conditions or when called upon to close by a safeguard signal. The licensee evaluated the possible total time that these valves could have been energized since their installation in 1986 and has determined that approximately one-half of the service life has been used.

The technical staff performed an engineering evaluation and determined that based on the service life, the MSIV SVs were operable. The licensee has initiated corrective actions to ensure the operability of the solenoid valves. The procedures which required the MSIV SVs to be de-energized within 24 hours after the main steam isolation valves closure will be revised to require de-energizing MSIV SVs one hour after the closure of the MSIVs. Also, the licensee intends to replace all the MSIV SVs during the next refueling outages to re-establish a baseline of energization time. This is considered Open Item (295/91010-06 (DRP); 304/91010-01(DRP)) pending replacement of the main steam isolation valves solenoid valves.

System Engineer's System Walkdowns

To improve the engineering support to the station, the licensee implemented ZAP 10-53-3, Zion Station Technical Staff System Engineer, which describes the responsibilities and duties of a system engineer. The Zion station personnel played a key role in the development of the corporate procedure.

The procedure requires the engineer to perform a detailed walkdown of the assigned system on a quarterly basis in addition to keeping informed of the daily activities on the system. A checklist is provided in the procedure to direct the engineer on the key items such as documentation review, such as open work requests, operating logs recent surveillances and temporary alterations on the system: general material conditions such as abnormal temperature, leakage, damaged or missing tags, loose or missing components, and obstructions hampering equipment access; and component characteristics such as abnormal parameters, evidence of inadequate lubrication, and condition of valves, motors, electrical and other equipment. Prior to the walkdown, the engineer is required to solicit and discuss any concerns that the operating department may have regarding daily operation of the equipment.

During this inspection period, the inspector accompanied the system engineer and supervisors on the residual heat removal (RHR) system walkdown. In general, the checklist was an effective tool for the engineer. The engineer identified conditions which needed attention such as leaks, missing tags, and equipment discrepancies and wrote laundry tags for these items. Pre-hung laundry tags were tracked to ensure that a work request existed to correct the previously identified discrepancies. The following items were identified: the appearance of carbon-steel degradation, insulation missing on service water lines, boric acid deposits on equipment, tools and ladders left in the rooms, and missing handwheels on small valves. Discussions with the engineer indicated that work requests and material condition cards were written to correct the discrepancies found. The system walkdown appears to be an effective mechanism to increase the engineers knowledge, expertise and involvement with the performance of the system.

Unit 1 Refueling Water Storage Tank (RWST) Leak

During this inspection period, the licensee identified leaks of approximately 1 gpm through three bullseye from the RWST channel welds. The licensee pressurized the RWST channels through the leak-off lines and a inspected the channels using a mini-sub. No leakage was identified; however, the desired pressurization of the channels could not be achieved since the leak off lines appear to be vented. The RWST will be drained and the welds inspected during the next refueling outage.

Centrifugal Charging Pump Oil Cooler Cooling Water Supply

PRA studies indicate that a significant portion of Zion Station's core damage frequency is attributed to Reactor Coolant Pump (RCP) seal failure. Maintaining seal injection flow, supplied by the centrifugal charging pumps (CCPs), is vital to the continued proper operation of the RCP seals. Protecting the operability of the CCPs thus gains increased significance. Although there is redundancy in the shared operation of the Component Cooling Water (CCW) system, which provides cooling water to the CCP oil coolers, a loss of CCW would jeopardize the RCP seals. To ensure a supply of water to the CCP oil coolers, the licensee committed to provide tools, fittings, hoses, and instructions in a location near to the CCPs to allow lining up the fire protection system to the CCP oil coolers. The licensee also committed to include instructions for the use of the fire protection system to supply CCP oil cooler water in the procedures covering the loss of CCW. The inspector verified the location of the equipment and instructions, reviewed the procedures, and walked through the process to ensure that the evolution could be accomplished in a short period of time. No problems were identified and the inspector has no further questions on this matter.

b. Assessment of Engineering and Technical Support

The engineering support for all departments continues to be good as evidenced by startup testing, maintenance support and root cause investigations. Technical management involvement with daily activities was strong. Implementation of system engineer procedures demonstrates the licensee commitment to improve engineering support.

No violations or deviations were identified.

9. Safety Assessment and Quality Verification

The effectiveness of management controls, verification and oversite activities in the conduct of jobs observed during this inspection were evaluated. Management and supervisory meetings involving plant status were attended to observe the coordination between departments. The results of licensee corrective action programs were routinely monitored by attendance at meetings, discussion with the plant staff, review of deviation reports, and root cause evaluation reports.

a. SAQV Related Events

State of the Station Address (Second Quarter)

On April 11, 1991, the licensee conducted a State of the Station Address for all station personnel. The purposes of the address were as follows: Improve station communication, provide a station overview from senior management perspactive, provide pride in their accomplishments, update the plant staff on the current outage situation, have the staff prepare for the upcoming INPO evaluation, and re-emphasize the station's top priorities. The production superintendent reviewed the past major work loads which included dual unit outages, the station auxiliary transformer (SAT) event and present outages. He noted the required work on the emergency diesel generators (EDGs) and the formation of a dedicated (EDG) work group. The plant manager made the following points: Staff motivation was kept up in spite of the plant set backs; NRC inspection and corporate quality assurance assessment personnel noticed an improved attitude in the Zion Staff; personnel errors are down; the staff should strive for procedure adherence and must exercise critical thinking and develop a questioning attitude. He also stated that senior management would be more accessible and would be involved in more activities. The station's top priorities include: improving the plant and the team; to be removed from the NRC watch list; to demonstrate a professional service; improve the root cause investigation process; and stress the importance of a questioning attitude and critical thinking. This address appears to be an effective tool by which the senior station management communicates with the staff, reviews the past station performance, and provide management expectations for the future performance.

Review of Open Work Requests

An independent review and evaluation of work requests not scheduled for completion during the Unit 0, Unit 1 and Unit 2 forced outage was conducted by the licensee's work request task force. The team consisted of senior managers, senior engineers from all disciplines, corporate personnel and probabilistic risk assessment and reliability centered maintenance experienced personnel. The goal of the team was to review the deferred work to determine if deferral would pose a significant transient initiator or would decrease accident mitigation. Work requests which could impact extended power generation were also to be identified by the team. The number of work requests screened for Unit 0 and Unit 1 was approximately 2,785. Of these, 35 NWRs were questioned by the team due to the lack of descriptive information and brought to station management's attention for resolution. The licensee determined that all but two of the NWRs were pending cancellation, were to be completed during operations or were scheduled for the next refueling outage. The remaining work two requests had not been scheduled, but due to the team's review, were completed during the forced outage.

The Unit 2 overview team conducted an independent review and evaluation of nuclear work requests not scheduled for completion during the current Unit 2 forced outage. The team reviewed approximately 1597 work requests. The team determined that deferral of all but three of work requests reviewed would not have impacted safe operation of the unit. The three NWRs were not previously scheduled; however, due to the team's concern, the work was completed.

Technical Specification Amendment Submittal for TSC

On May 15, 1991, the licensee submitted a technical specification amendment to reflect the radiation monitoring instrumentation and surveillances associated with the new technical support center (TSC). On May 24, 1991, the licensee notified the resident staff that the station planned to issue an internal TS interpretation to ensure that the new testing requirements for the monitors were completed since the TS amendment was not yet approved due to the late submittal. The staff determined that this method was unacceptable since the licensee was still obligated to follow the present version of the technical specification, specifically, testing the old TSC SPING. To resolve this discrepancy, the licensee performed a temporary alteration to temporarily rename the new SPING in order to meet the technical specification requirement until the amendment is approved. The root cause of this discrepancy was a late submittal from the licensing group.

Onsite Nuclear Safety (ONS)

The Onsite Nuclear Safety (ONS) group is new at the Zion station. Presently, the group consists of two individuals with good operations-related backgrounds. The ONS group routinely performs the following to detect potential safety concerns: reviews station's

logs; reviews LER and the adequacy of the root cause evaluation, attends the daily root cause meetings and participates as a member of the surveillance committee to reduce missed surveillances. Meetings attended by an ONS member include: department heads; MOV; quality council; corporate overview, board of director's oversite committee and lessons learned.

During this SALP period, the ONS group was involved with investigations relating to the RCS leakage from 1 MOV RC 8003-4; diesel generator wrinkle belly leakage; diesel generator flame arrestor problem; crib house flooding incident; evaluation of plant criticalities and power escalation component cooling heat exchanger task force; a field review of maintenance practices; control room ventilation degraded system event; and the Unit 2 SAT event. The ONS reviews the electronic mail box daily to retrieve and disseminate Lessons Learned Initial Notifications (LLINs) made by other sites and to discuss these LLINs at the 8:15 a.m. senior management meeting. ONS writes and enters significant Zion events into the LLINs system. Examples include the SAT trip which caused Unit 2 to have a partial loss-of-site power; Unit 2 RHR suction valve closure; spent fuel pool dilution below administrative limits and spent fuel pool overflow; Unit 2 inadvertent auxiliary feed water pump start; and diesel driven containment spray pumps improper adjustment.

At lease once a month, ONS members from all sites meet at corporate and review LLINs to select specific LLINs for all sites to follow-up. This follow-up is accomplished by entering the required corrective action in the nuclear tracking system. All the above activities were attended by ONS to provide CECo an independent safety overview and recommend actions to be taken on safety issues.

b. Assessment of SAQV

The licensee's root cause analysis for the inverter failures that resulted in two plant events was thorough, but due to the intermittent nature of the problem, was inconclusive. They are continuing to monitor the inverters. Senior management communication to the staff was evidenced by the State of the Station Address, which provided management expectations for future performance.

No violations or deviations were identified.

10. Licensee Event Reports (LERs) Followup (92700)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications. The LERs listed below are considered closed:

UNIT 1

LER NO.	DESCRIPTION
295/90014	N2 System Inoperable with PP Air Compressors Inoperable
295/91001	Failure to Perform Type C Leak Rate Testing on Two Penetrations
295/91002	Missed Surveillance for Projected Liquid Release, Containment Charcoal Filters and E-bar Samples.
295/91003	Failure to Issue a 30-day Special Report
295/91004	Failure to Perform Containment Type C Leak Rate Testing per TS 4.10.1.A.2.
295/91006	Blackout Signal Inadvertently Induced during the Performance of the System Auxiliary Transformer Backfeed Procedure

Regarding LER 295/90014, this event was discussed in inspection report (295/90013(DRP)). The root cause was attributed to procedural deficiency, in that, the frequency to ensure the nitrogen system operability was inadequate. This LER is considered closed.

Regarding LERs 295/91001 and 295/91004, this issue was discussed in inspection reports 295/91002 and 295/91004. A non-cited licensee identified violation was identified for the failure to perform 10CFR50 Appendix J Type C testing. The inspector noted that in LER 91004, the corrective actions for penetration P-76 did not specify that a gross leak rate test would be performed on 1(2) SI8933 prior to leaving every cold shutdown as was stated in the emergency technical specification and temporary waiver of compliance submittal. Discussions with the regulatory assurance personnel indicated that the licensee was knowledgeable of the commitment but failed to include it in the LER submittal. The licensee has added the requirement for the test to the general surveillance tracking system. The LERs are considered closed.

Regarding LER 295/91002, the three missed surveillances were discovered by the licensee during a Nuclear Quality Programs audit completed in February 1991. The missed projected liquid release resulted from personnel error, in that the wrong option on the computer program was selected and caused a gaseous release calculation for the October 1991 surveillance. The missed containment charcoal filter surveillance was caused by a misinterpretation of a 1980 licensee amendment which resulted in the licensee failing to revise the testing procedure. The third event occurred in November 1988 involved the failure to perform the E-bar surveillance in accordance with procedure. The safety significance of missing these surveillance is negligible. The corrective actions included revising procedures to clarify the testing requirements. This LER is considered closed.

Regarding LER 295/91003, the licensee failed to submit within 30 day a special report as required by TS 3.21.2.B when the OA fire pump was not returned to service within 7 days. The root cause was personnel error, in that, the system engineer failed to initiate an Onsite Review to review and submit the special report. A contributing cause was a lack of administrative mechanism for tracking the issuance of special TS required reports. This LER is administrative in nature and is considered closed.

Additionally, it was noted that the parts evaluation for the fire pump work request was not prioritized properly which caused a delay in its return to service. A similar event involving poor parts evaluation prioritization was discussed previously in inspection report 295/91002. This is considered an Open Item (295/91010-07) pending further observation of the licensee's parts evaluation prioritization system.

Regarding LER 295/91006, this event is discussed in paragraph 4.c. This LER is considered closed.

UNIT 2	DESCRIPTION
304/88016-1L	Missed Surveillance While Venting Containment due to Personnel Error
304/89004-1L	Unmonitored Effluent due to Temporary Blower Installed on Wrong Unit
304/90007	2A Emergency Diesel Generator (EDG) Auto Start
304/90014	Reactor Trip Breaker Tripped during Testing.
304/91001	Inoperable Safety Injection Pumps due to Low Recirculation Flow.

Regarding LERs 304/88016-01 and 304/89004-01, the licensee submitted supplemental reports to update the corrective actions taken. Additional actions taken include the implementation of the radiation monitor surveillance procedure and the reorganization of the radiological protection and chemistry departments which should minimize missed surveillances on radiation monitors. These supplemental LERs are considered closed.

Regarding LER 304/90007, when Operating Analysis Division (OAD) was adjusting a time delay relay, three auxiliary relays were inadvertently energized which caused an autostart signal to 2A EDG. The cause of the event was personnel error, in that, the AOD engineer jumpered +125 VDC to three parallel wired auxiliary relays instead of the time delay relay. Contributing causes included the lack of adequate work instruction and lack of a precautionary out-of-service for the work being performed. This LER was discussed with OAD and the operating crews. OAD has implemented a policy to provide documentation of lifted leads and jumpers which requires second verification. This LER is also to be covered in cycle training. This LER is considered closed.

Regarding LER 304/90014, this event occurred in November 20, 1990 and is discussed in inspection report (304/90026(DRP)). The corrective actions to prevent reoccurrence included clarifying the procedure and improving the training mechanism. Full implementation is expected by early summer This LER is considered closed.

Regarding LER 304/91001, the 2A and 2B safety injection (SI) pumps were declared inoperable during routine monthly testing and resulted in a Unit 2 shutdown. The licensee performed an extensive investigation to determine the cause for the restriction in the piping; however, the efforts were inconclusive. A precursor to this event occurred in November, 1990 when the recirculation flow for the 2A SI pump was below the acceptance criteria. The root cause for the November event has not been determined and is being followed by Open Item (304/90026-04). This LER is considered closed.

No violations or deviations were identified.

11. Open Items

Open Items are matters which have been discussed with the licensee which will be reviewed further by the inspector and which involve some action on the part of the NRC or licensee or both. Six Open Items disclosed during this inspection are discussed in paragraphs 4c, 8 and 10.

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance or deviations. One Unresolved Item disclosed during this inspection is discussed in paragraph 6.

13. Management Meetings (30703)

On April 24, 1991, the licensee held a meeting with local officials. The meeting included a basic introduction to the Zion Station operations, a plant tour and simulator exercise. The introduction and simulator exercise were attended by a resident inspector.

Zion Review Team Site Visit

On April 30 to May 2, 1991 the Zion Review Team (ZRT) conducted its third site visit to Zion Station. The team examined station performance in the areas of Operations, Engineering and Technical Support, Outage Planning, Outage Administrative controls, Emergency Diesel Generator program, Probabilistic Risk Assessment use, Master Action Plan Program effectiveness, Radiation Protection, and Emergency Preparedness. During this visit, the team was tasked with providing an assessment of Zion's Unit 1 readiness for restart and power operation. Considering the improvements noticed by the team, its assessment and the overall condition of the plant and equipment, the team considered the station and Unit 1 ready for restart and power operation.

The ZRT concluded that station management and staff shared a clear understanding of the new directions and priorities. More importantly, a positive attitude and a clear commitment to improvement is evident at all levels of station staff. In summary, Zion management has made decisions and committed resources in ways that can significantly improve plant performance. The ZRT recognized that plans and programs do not in themselves bring about lasting improvements. A sustained commitment over time is required to change attitudes, raise expectations, foster new work habits and create an environment where excellent performance is the everyday standard.

No violations or deviations were identified.

14. Exit Interview (30703)

The inspectors met with licensee representatives (denoted in Paragraph 1) throughout the inspection period and at the conclusion of the inspection on May 30, 1991 to summarize the scope and findings of the inspection activities. The licensee acknowledged the inspectors' comments. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents or processes as proprietary.