U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-295/90013(DRP); 50-304/90015(DRP)

Docket Nos. 50-295; 50-304 License Nos. DPR-39; DPR-48

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

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

Inspection At: Zion, IL

Inspection Conducted: June 3, 1990 through July 14, 1990

Inspectors: J. D. Smith

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Date 8/9/90

Inspection Summary

Inspection from June 3, 1990 through July 14, 1990 (Reports No. 50-295/90013(DRP); 50-304/90015(DRP))

Areas Inspected: Routine, unannounced resident inspection of licensee action on previous inspection findings; summary of operations; operational safety verification and engineered safety feature system walkdown; monthly surveillances; monthly maintenance; engineering and technical support; Zebra mussel infestation; emergency preparedness practice drill; training; and NUREG-0737, Item III.D.3.4.

Results: Of the 10 areas inspected, no violations or deviations were identified in 9 areas, and 1 violation was identified in the remaining area (Paragraph 7 - failure to follow procedure regarding emergency diesel generator fuel oil analysis timeliness). Three Unresolved Items were identified during this inspection (Paragraph 4.c technical specification boric acid tank level limit, Paragraph 4.c steam generator atmospheric relief setpoints, and Paragraph 7 as-found flood level in containment). During this inspection

period, a NRC Diagnostic Evaluation Team was onsite. Significant findings of the team included setpoint control for torque switch settings on motor operated valves and design deficiencies of the service water system.

Poor communications between the instrument maintenance personnel, the control room operators and the technical staff caused a time delay before the technical staff became involved in the annunciator blown fuse issue. Also, planning and performing out of services appear to be a weakness.

DETAILS

1. Persons Contacted

*T. Joyce, Station Manager
T. Rieck, Superintendent, Technical
*W. Kurth, Superintendent, Production
R. Budowle, Director, Services
P. LeBlond, Assistant Station Superintendent, Operations
R. Johnson, Assistant Station Superintendent, Maintenance
J. LaFontaine, Assistant Station Superintendent, Work Planning
N. Valos, Unit 2 Operating Engineer
W. Demo, Unit 1 Operating Engineer
*M. Carnahan, Unit 0 Operating Engineer
E. Broccolo, Jr., Director of Performance Improvement
*E. Fuerst, Project Manager, ENC
T. Vandervoort, Quality Assurance Supervisor
*C. Schultz, Quality Control Supervisor
*W. Stone, Regulatory Assurance Supervisor
W. T'Niemi, Technical Staff Supervisor
R. Smith, Security Administrator
*T. Saksefski, Regulatory Assurance
W. Mammoser, PWR Projects
*J. Madden, Assistant Technical Staff Supervisor
*R. Whittier, Nuclear Quality Programs

*Indicates persons present at the exit interview.

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 (295/87015-07): Failure to provide adequate administrative controls and reviews which resulted in improper information in Licensee Event Report (LER) 295/87005. The licensee revised ZAP 15-52-3, Licensee Event Report Preparation and Disposition, to include an independent verification of corrective actions taken as stated in LERs and a requirement to track those corrective actions not completed before the issuance of the LER. The residents periodically review LERs for content, implementation of corrective actions, and adequacy of the corrective actions and have not identified any significant discrepancies. This violation is considered closed.

(Closed) Violation (295/86032-02; 304/86031-03): Failure to implement and maintain surveillance procedures for the TSC portable area radiation monitor. The violation was administratively closed in inspection report 295/89029; 304/89026 only for Unit 1. The violation should have also been closed for Unit 2. This violation is closed for both units.

Unresolved

(Closed) Unresolved Item (295/86028-05; 304/86028-05): On December 8, 1986, the licensee notified the NRC of EQ concerns regarding cubicle cooler fan motor lead splice/cable assemblies. These lead assemblies were spliced with various types of non-EQ tapes and Sections of non-EQ PVC cable. The licensee could not provide adequate EQ documentation to qualify these splice/cable assemblies to the requirements of 10 CFR 50.59. The resident inspectors identified this issue in an inspection report as an unresolved item pending an inspection by a Region III EQ specialist. Subsequently, an inspection was conducted on December 30, 1986 through January 14, 1987 by a Region III specialist which resulted in Severity Level IV violation (295/86030-01; 304/86030-01) which is still not resolved. The original item should have been closed when the violation was issued but was not. The original item is now closed.

Open Items

(Closed) Open Item (295/86022-05; 304/86020-06): Followup of Part 21 Report on Valcor Valve Spring Failures. The open item was administratively closed in inspection report 295/89008; 304/89008 only for Unit 2. The violation should have also been closed for Unit 1. This open item is closed for both units.

No violations or deviations were identified.

3. Summary of Operations

Unit 1

The unit entered the report period in cold shutdown from a forced outage which started on April 3, 1990. On June 11, at approximately 9:15 p.m., the unit went critical and on June 13 at 12:23 p.m., the unit was synchronized to the grid. Operations continued at power levels up to 100% power for the remainder of this period. On June 20, the main turbine was placed in economic generation control (EGC) for the first time in Zion's history.

Unit 2

The unit remained in cold shutdown for the cycle 11 refueling outage during the entire inspection period.

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

a. Operational Safety

During the inspection period between June 3 through July 14, 1990, 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 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 for operability.

The resident staff monitored the unit 1 startup by reviewing startup packages, valve lineup check lists, and equipment out-of-service logs; attending working on-site review committee meetings; and monitoring control room activities. No significant problems were identified.

On June 20, 1990, the licensee placed unit 1 main turbine in EGC control for the first time in Zion's history. The controller allows the load dispatcher to vary the turbine load within a band of 100 MWe which was later changed to a 50 MWe band due to operator concerns. Presently, all control rod banks are fully withdrawn. Discussions with the unit 1 operators indicated that on several occasions, the EGC decreased the load on the turbine which caused the reactor coolant system temperature to swing. As the operators compensated for temperature, the load was then increased causing problems in maintaining a constant temperature. The residents will monitor the licensee's actions to resolve the operators' concerns.

b. 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 TS, 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 system; safety injection systems; charging systems; containment and support system; auxiliary feedwater systems; radiation monitoring system; service water system; component cooling water system; main and auxiliary steam system; condensate, feedwater system; process sampling system; circulating water system; diesel generator and auxiliaries system; plant air system; plant compressed gas system; make-up demineralizer system; plant fire protection system; and the control room were inspected to verify operability. The inspectors verified the operability of the selected emergency systems, reviewed tagout records, and verified proper return to service of affected components.

During the inspection period, the inspector reviewed the licensee's method of taking specific gravity readings for the station batteries. Discussions with the technical staff indicated that the specific gravities were appropriately corrected for temperature and cell level. The inspector had no further concerns.

c. Onsite Event Follow-up (93702)

Inoperable Nitrogen System

On June 28, 1990, at approximately 3:24 a.m., the penetration pressurization (PP) air compressors were taken out of service (OOS) in preparation for a technical staff test. Technical Specification 3.9.2.B.a states, in part, that with two of the three PP air compressors inoperable, the nitrogen supply system shall be verified operable. TS 4.9.2.B.2 states that the system shall be demonstrated operable daily by verifying sufficient capacity is available. Prior to taking the PP system OOS, the nitrogen pressure was verified to be greater than 1970 psig, the TS required capacity. At 11:00 a.m., it was determined that the nitrogen bottle pressure had fallen below 1970 psig; therefore, causing the licensee to enter TS 3.0.3. The nitrogen compressor was immediately started to increase system pressure. At 11:45 a.m., pressure was restored at 2040 psig. Discussions with the licensee indicated that although the nitrogen was verified operable per TS, the frequency, daily, was not sufficient to guarantee continuous operability. The licensee monitored the pressure shiftly until the PP air compressors were returned to service.

Inadequate Out of Service

On June 29, 1990, unit 2 was in cold shutdown less than 200F with the 2A residual heat removal (RHR) pump operating. The licensee had prepared an OOS for one of the 2B RHR room coolers. The room

coolers are required support equipment for the 2B RHR train and 2 of 3 coolers need to be operable for the 2B RHR train to be considered operable. At approximately 5:30 a.m., the power supply to the 2B RHR pump room coolers was deenergized, causing all three of the room coolers to be inoperable, thus, rendering the 2B RHR train inoperable. This condition existed until the unit 2 operating engineer noted that the OOS deenergized all 3 fans and immediately notified the shift engineer. Technical Specification 3.13.9.A. requires two RHR systems to be operable, with one loop operating. With less than the required systems operable, corrective actions are to be immediately initiated to return the system to operability. The room coolers were returned to service at approximately 8:20 p.m.

The root cause of the event was personnel error, in that, the OOS deenergized all of the cooler fans, not just one as desired. The shift supervisors did not review the electrical drawings to verify the OOS. Inspection Report 50-295/90006; 50-304/90006 identified two examples of inadequate OOS jobs. This Unresolved Item (295/90006-02(DRP); 304/90006-02(DRP)) is currently being reviewed by the resident staff.

Unit 1 Boric Acid Tank Level Low

On June 29, 1990, while increasing the level to the unit 1 refueling water storage tank (RWST), a low level (54%) annunciator for the "A" common (OA) boric acid storage tank (BAT) was received. The operator secured the RWST make-up; however, the OA BAT level continued to decrease to below 51% level which was believed to be equivalent to the TS limit of 5140 gallons. Investigation found that a manual boric acid filter drain valve was partially opened and was immediately closed. The level of the OA BAT was recovered approximately 30 minutes later by transferring boric acid from the OB BAT to the OA BAT. The OB BAT was available to provide additional boric acid to unit 1 during the event.

Discussions with the licensee indicated that the TS limit of 5140 gallons corresponded to 40% level in the tank; therefore, the level did not fall below the TS limit. This issue is considered an Unresolved Item (295/90013-01) pending review of the engineering evaluation and the root cause analysis.

Steam Generator Atmospheric Relief Valves Questionable Setpoints

On June 11, 1990, at approximately 9:15 p.m., the unit 1 B and D steam generator safety valves lifted during the unit startup and power increased to 1.5% power. The cause of the safety valves lifting was due to entering the power range with a startup rate which caused the reactor coolant average temperature to increase from 547°F to approximately 555°F. It was believed at the time of the event that the atmospheric relief valves (reliefs) had also opened to relieve pressure in the steam generators.

Subsequent reviews of the SG pressure strip charts indicated that although pressure had increased above 1050 psig, the first safety setpoint, the reliefs did not open. The licensee and the Westinghouse onsite service representative were unable to explain why the reliefs did not open as designed. Extensive computer analysis was performed by Westinghouse to determine the root cause. Investigation identified three possible causes: stem binding, inadequate air supply to the reliefs, or controller proportional setpoint not matching the as designed setpoint. This is considered an Unresolved Item (295/90013-02(DRP)) pending further investigation and subsequent corrective actions by the licensee.

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 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. During the plant tours, the inspectors observed in the main steam tunnel a few discrepancies concerning the proper identification of radiological areas. These examples were discussed with the licensee and immediately corrected.

f. Security (71707)

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 a one-hour notification was not made until four days after the event. This matter was discussed with the licensee's management by the senior resident inspector. The inspector verified that all other reports were made to the NRC on security matters in a timely manner.

On July 9, 1990, at 4:27 a.m., a small electrical fire occurred in the inverter room vent fan control box which is located in the Central Alarm Station. A security supervisor, with assistance from the fire brigade, extinguished the fire. No security functions were lost. Although the inverter room fan was disabled, auxiliary

ventilation equipment was available. Four security officers complained of burning eyes, sore throats, and chest pains and were transported to a local hospital for treatment. They were later released and returned to the site.

5. Monthly Surveillance Observation (61726)

The inspector observed Technical Specifications required surveillance testing on the emergency diesel generator systems and verified that testing was performed in accordance with adequate procedures, test instrumentation was calibrated, limiting conditions for operation (LCOs) were met, removal and restoration of the affected components were accomplished, test results conformed with TS and procedure requirements and were reviewed by personnel other than the individual directing the test, and that 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:

GOP-1 Plant Heatup

GOP-2 Plant Startup

MI-2 Reactor Coolant System Fill and Vent

PT-2A Safety Injection System Tests

PT-10 Safeguards Actuation Unit 1

PT-11 Diesel Generator Loading Test

No violations or deviations were identified.

6. Monthly Maintenance Observation (62703)

Station 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 TS.

The following items were considered during this review: the LCOs 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.

During this inspection period, the licensee completed maintenance activities on the 2A emergency diesel generator (EDG), repaired the Unit 1 volume control tank relief valve, investigated and repaired a unit 1 resistant temperature detector bypass orifice flange leak, repaired the unit 1 personnel airlock hatch, completed unit 2 reactor coolant pump seal replacements, reassembled the unit 2 reactor head, inspected torque switch settings for motor operated valves, and assisted in the inspection and repair of the No. 1 Component Cooling Water heat exchanger.

No violations of deviations were identified.

7. 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.

Containment flooding issue

On July 3, 1990, the licensee identified that the design calculations for the containment flood levels were incorrect. The design calculations estimated a containment flood level of three and one-half feet; however a review showed a flood level of five feet, three inches. The licensee indicated that the original calculations assumed that the reactor vessel cavity would flood; however, due to the reactor cavity ventilation duct work, this cavity may not flood up. This issue is considered an Unresolved Item (295/90013-03(DRP);304/90015-01(DRP)) pending further analysis and resolution by the licensee.

Component Cooling Water Heat Exchanger

In early June, the operators noted a decrease in Component Cooling Water (CCW) surge tank level and an increase in chromates in the service water systems as identified by chemical sampling. An investigation by the technical staff indicated that the source of the leakage was from the No. 1 CCW heat exchanger. Pressure testing on the shell-side identified 15 leaking tubes. Additionally, eddy current testing found 48 tubes with indications of reduced wall thickness greater than 40%. All of the identified degraded tubes were plugged. The "as found" visual inspection and evaluation conducted by a contracting firm indicated that the heat exchanger had a performance factor of 60% - 70% which was more efficient than the assumed design performance rate of 45%. The remaining tubes were cleaned to reduce heat transfer fouling. An engineering evaluation determined that the "as found" condition of the heat exchanger was capable of performing its function; therefore, concluded that the No. 0 and No. 2 heat exchangers were also operable. The licensee intends to inspect the remaining heat exchangers in accordance with the stations response to Generic Letter 89-13, Service Water Problems Affecting Safety-Related Equipment.

Loss of Nuclear Steam Supply System (NSSS) Annunciators:

On July 7, 1990, at 3:45 a.m. and again at 5:05 p.m., the licensee declared an Alert condition due to a loss of most of the NSSS and balance of plant (BOP) annunciators in the control room. During subsequent discussions with the technical staff, the licensee informed the NRC that a blown fuse in the annunciator power supply module resulted in the loss of all NSSS annunciators. The potential cause given for the blown fuse was DC system grounds. A concern was raised about the adequacy of the design related to the annunciators and the program to control system grounds.

A regional specialist was dispatched to Zion. The inspector reviewed pertinent design drawings, procedures, shift engineer and control room logs, ground detector charts and work requests. In addition, the inspector performed a visual inspection of the annunciator panels and power supplies, control room windows and the ground detectors. The inspector also interviewed several engineers involved in determining the root cause of the event.

Based on this review, the inspector determined that only one NSSS annunciator window box (bypass and permissive panel) was completely lost on July 7, 1990. Other NSSS and BOP annunciator window boxes did not respond to test push buttons but would have illuminated on incoming alarm conditions. A blown fuse in power supply #7 resulted in the loss of power to the Test/Acknowledge/Reset and Silence push buttons and the complete loss of power to the bypass and permissive window box.

During this review, the following observations were made:

* Prior to the event, between July 1 and July 7, 1990, fuses blew in various NSSS and BOP annunciator power supplies on eleven different occasions. As a result, portions of control room annunciator panel windows were lost. Electrical Maintenance personnel (EMs) and operators continued to replace the blown fuses without contacting the technical staff engineers for assistance to determine the root cause of the excessive fuse failures until after the event on July 7th.

* During the work performed under WR Z93721, the licensee identified potentially "old and incorrectly sized fuses" installed in some of the NSSS power supplies. A vendor drawing specified the use of 250VDC, 6A fuses. The licensee noted that fuses rated 32VDC, 6A were installed. A review of the vendor schematic diagram for the power supply indicated the feed as 125VDC. The fuse manufacturer stated that "the voltage rating of a fuse must be at least equal to the circuit voltage. It can be higher but never lower . . . under some fault current conditions, the fuse may not safely clear the overcurrent." As of July 18, it was not clear from the vendor data provided to the licensee, what type fuses were to be installed in the power supplies.

* On July 6, 1990, the EMs replaced power supply #2 in 2CB250, bay 2, under WR Z93651. Subsequently, on several occasions the power to the BOP annunciators was lost due to blown fuses in the newly

installed power supply. The licensee then realized that the newly installed power supply was incompatible with the existing power supply due to the resulting AC ripple voltages.

* Zion has had low level grounds (approximately +30V) in the DC system for an extended period of time. Some of the grounds, as measured by the ground detectors and recorded on the charts were as high as +85V;-85V. During the inspection, the licensee had identified existing grounds in a safety-related containment sample valve limit switch which contained water. After the water was removed, the existing DC system grounds decreased from -55V;+20V on July 11, to -25V;+35V on July 12, 1990. These grounds could have contributed to the recent fuse problems. The licensee is reviewing the grounds issue.

* Until questioned by the NRC in July, the technical staff believed/stated that one blown fuse in a power supply feeding the annunciators had resulted in the loss of all NSSS annunciator windows. Review of the design drawings indicated that loss of one fuse would result only in a loss of a limited portion of the annunciators.

* The EMs and control room operators often do not document replacement of blown fuses in the power supplies. As a result, it was very difficult to determine from existing records, which fuses blow in which power supplies. This information is necessary for root cause determination. Also, the EMs failed to document that the output voltages on the newly installed power supplies had been adjusted to the appropriate voltages (+12V, +24V) to preclude potential overloads. In addition, one could not easily determine from the ground detector recorder charts the exact time a ground occurred on the DC system because the recorder chart motor runs twice as fast as the chart paper was configured to run. This resulted in difficulties in correlating the time the fuses blow with the time the grounds occurred. The licensee is considering new chart paper.

* The inspectors noted that on November 11, 1989, when unit 2 was operating at 99% power, a similar failure occurred when two BOP annunciator power supplies failed. This resulted in the loss of three annunciator panels and four others would not reset and could not be acknowledged. It appeared that the same power supplies (PS1 and PS2) that failed in 1989 failed also in July 1990.

The possible root causes for the annunciator problems appear to be:

1. Intermittent and low level grounds in the DC system.
2. Potential design problems and overloading of the power supply circuitry (incompatibility).
3. Possibly underrated fuses and AC ripple voltage.

The licensee is investigating the annunciator problems to determine the root causes. As part of the review, the licensee has placed a temporary recorder across a power supply to monitor power supply behavior for possible voltage spikes. Also, a correlation review of system grounds to

the blown fuses was being performed and the Operational Analysis Department was called in to assist in the investigation. In addition, a vendor and an architect engineering representative were on site to assist.

EDG Fuel Oil Samples

On June 20, 1990, a shipment of EDG fuel oil was received at the Zion station. Samples of the oil were drawn prior to delivering the fuel to the 0 EDG and the 1A EDG storage tanks. On July 5, the samples were sent to the offsite laboratory for a complete analysis. On July 13, the lab concluded that the sample contained jet fuel, not number No. 2 fuel oil as ordered. The licensee immediately pulled samples from the 0 and 1A storage tanks to determine the contents and evaluate the affect of the fuel oil/jet fuel mixture on the EDGs' operability. Analysis of the tank samples indicated that only number No. 2 oil was present. The licensee suspects that the shipment tank had jet fuel residue present which concentrated to the bottom of the tank where the original sample was collected. Also, in a letter to the licensee, the EDG vendor, Copper Bessemer, stated that the EDGs would remain operable up to a concentration of 25% jet fuel.

Zion Administrative Procedure (ZAP) 13-52-9, Visual Inspection for Receiving Diesel Fuel Oil, requires that the analysis of the fuel oil for properties listed in ASTM-D-975 be completed within two weeks. The samples were sent to the laboratory after two weeks and the analysis was not complete until twenty-two days after the samples were drawn. Technical Specification 6.2.1 states, in part that written procedures shall be prepared, implemented and maintained for normal startup, operation and shutdown of the reactor and other systems and components involving nuclear safety of the facility. Failure to follow procedure ZAP 13-52-9 is considered a Violation (295/90013-04(DRP)). In addition, the residents were concerned with the potential of operating the EDGs with an undetected mixture of fuels since the the procedure allowed a two week time delay before the complete analysis of the shipped fuel oil is received.

One violation was identified.

8. Zebra Mussel Infestation (92701)

During the inspection period, the inspectors requested a briefing on the status of Zebra mussel infestation at the Zion facility after reading reports of problems at other facilities located in the Great Lakes area. Discussions with the technical staff engineer indicated that zebra mussels are expected to infest Lake Michigan within the next three years. On July 10, 1990, substrates were placed in the forebay to be used to predict and detect when the mussels have begun infesting the immediate cooling water source. Also, per Generic Letter 89-13, Service Water Problems Affecting Safety-Related Equipment, various heat exchangers will be inspected or tested to determine if heat transfer capabilities have degraded. These inspections will also provide indications on the mussels migration. Currently, there are no programs to counteract the infestation of the zebra mussel; however, corrective actions will be implemented as the need arises.

No violations or deviations were identified.

9. Emergency Preparedness Practice Drill (71707)

In June, the licensee conducted a practice emergency preparedness drill in preparation for the annual drill scheduled for July 18. The resident inspector monitored the simulator control room activities during the practice drill. The resident observed that the control room personnel were slow in performing the original off-site dose calculation prior to the technical support center manning and later forwarding radiation monitor readings to the technical support center. The resident discussed these issues with the drill coordinator.

No violations or deviations were identified.

10. Training (41400)

During the inspection period, the inspectors reviewed abnormal events and unusual occurrences which may have resulted, in part, from training deficiencies. Selected events were evaluated to determine whether the classroom, simulator, or on-the-job training received before the event was sufficient to have either prevented the occurrence or to have mitigated its effects by recognition and proper operator action. Personnel qualifications were also evaluated. In addition, the inspectors determined whether lessons learned from the events were incorporated into the training program.

Events reviewed included the events discussed in this report. In addition, LERs were routinely evaluated for training impact. No event reviewed this period was found to have significant training deficiencies as contributors.

No training sessions were attended by the resident inspectors.

No violations or deviations were identified.

11. NUREG-0737, Control Room Habitability

During an inspection in March 1985, on the status of the licensee's commitments in NUREG-0737, Item III.D.3.4, Region III inspectors were informed that in 1983, as part of the control room emergency air cleaning system modification and repair program, the mechanical lock longitudinal internal duct seams were sealed with tape and an overlay of sealant. Also, the filter housings were partially caulked. These sealing methods appeared to be contrary to accepted industry standards and practice and to Regulatory Guide 1.52, Regulatory Position 5.c which states, in part, that the use of silicone sealant or any other temporary patching material on housings or ducts should not be allowed. On April 9, 1985, Region III contacted NRR concerning the technical adequacy of these sealing methods. In June 1985, three representatives from NRR toured the plant to observe the control room ventilation duct sealant used and discussed the matter with licensee representatives.

NRR, by memorandum to Region III dated August 26, 1985, concluded that the licensee's modifications and repairs at Zion Station are not presently acceptable and that there is a need for some form of corrective action.

On February 4, 1986, a conference call was conducted to discuss this matter with participation by NRR, Region III, and licensee representatives. During that conference call, the licensee agreed to conduct a quantitative leakage test of the control room emergency air filtration system to verify the validity of the licensee's NUREG-0737, III.D.3.4 safety evaluation assumptions, to demonstrate that the 1983 repairs and modifications (involving the application of silicone sealant and other temporary patching material) have not significantly degraded, and to determine the need for and frequency of any required periodic retests based on the quantitative test results. On March 6, 1986, Region III sent a letter to the licensee to confirm the licensee's commitments, state the NRC's intention to witness the leakage tests, request that Region III and NRR be notified of the licensee's test schedule at least 30 days before the tests are to begin and request that the licensee's test procedures be made available to Region III and NRR personnel in sufficient time to allow their review prior to conduct of the tests. The licensee, by letter date July 25, 1986, transmitted the test procedure to the NRC for review. During the review of the licensee's test procedure, certain NRC concerns were identified regarding the ability to obtain the necessary quantitative leakage data.

Before these concerns could be resolved with the licensee, an incident took place at the station which raised other control room habitability concerns not directly related to application of silicone sealant and other temporary patching material during the 1983 control room emergency air filtration system repairs and modifications. This incident, which took place on September 11, 1986, involved the intrusion of radiative noble gas into the control room while the control room ventilation system was operating in the accident mode. This event was caused by improperly installed relief dampers within the control room ventilation system. The licensee performed necessary repairs and returned the ventilation system to operation. Subsequent to the event, NRR performed certain calculations indicating the possibility that even after the repairs were made to limit unfiltered inleakage, the control room habitability system, as it now exists, may not be functioning as originally designed. On July 9, 1987, NRR requested the licensee to furnish additional information to enable NRR to determine if the system can function originally designed. The licensee responded to the request on August 13, 1987, by providing all the information that NRR requested including a control room ventilation system duct work inleakage test completed on March 11, 1987. The licensee committed to additional modification in an October 30, 1987 submittal. On November 4, 1987, the Division of Reactor Projects (NRR) requested the Division of Engineering (NRR) to conduct a review of the licensee submittals to determine whether the modified control room habitability system meets GDC-19.

On August 28, 1988, the licensee was verbally requested to provide additional information to the staff. The NRC could not find any evidence that the above request was transmitted to the licensee in writing. The

licensee also could not locate a submittal that provided this information. On April 5, 1989, the Division of Engineering, (NRR) informed the Division of Reactor Projects, (NRR) that they were unable to complete their review because the August 28, 1988, licensee request had not been responded to. Subsequently, the licensee transmitted the requested information to NRR on May 21, 1990. The licensee is currently waiting for NRR to respond.

No violations or deviations were identified.

12. Management Meetings (30703)

a. On June 19, Mr. W. Shafer, Chief, Reactor Projects Branch, and Mr. M. Farber met with Mr. T. Joyce, Zion Station Manager, and other management personnel to review the May monthly status report and to discuss current status of the Performance Improvement Plan.

b. On June 20, Commissioner James Curtiss, Mr. Edward Greenman, Director, Division of Reactor Projects, and other NRC personnel met with Mr. Bide Thomas, President, Commonwealth Edison Company, Mr. Cordell Reed, Senior Vice President, Nuclear Operations, and Mr. T. Joyce, Zion Station Manager at the Zion site. During the visit, the licensee conducted a plant tour and made a presentation on the status of the Zion facility.

c. On June 29, 1990, Mr. John Zwolinski, Assistant Director for RIII Reactors, NRR; Mr. Martin Farber, Chief, Reactor Projects, Section 1A, Region III; and other staff members attended the exit meeting of the second phase of the Zion Diagnostic Evaluation Team inspection.

d. Diagnostic Evaluation Team (DET) Summary

During the month of June, a 16 member DET were on site to inspect the Zion facility. Two potentially significant issues identified involved torque switch settings on motor-operated valves and design deficiencies of the service water system.

No violations or deviations were identified.

13. 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. Three Unresolved Items disclosed during this inspection are discussed in paragraphs 4c and 7.

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 July 20, 1990, 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.