

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/31(DRP); 50-304/31(DRP)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

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

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

Inspection At: Zion, Illinois

Inspection Conducted: October 22 through December 10, 1990

Inspectors: W. G. Rogers

P. B. Moore

Approved By: *R. B. Landsman*  
M. J. Farber, Chief  
of Reactor Projects Section 1A

1-4-91  
Date

Inspection Summary

Inspection from October 22 through December 10, 1990 (Reports No. 50-295/31(DRP);  
No. 50-304/31(DRP))

Areas Inspected: Special inspection of licensee action on Diagnostic  
Evaluation Team inspection findings.

Results: Of the areas inspected, two violations of NRC requirements were  
identified; three examples of a failure to follow procedure and one example of  
a failure to maintain sufficient records of activities affecting quality.  
Followup actions were performed in response to the DET concerns about work  
request prioritization and an open item was identified on the issue of ASME  
code pump testing for the emergency diesel generator fuel oil transfer pumps.  
Weaknesses were identified concerning annunciator etiquette in the control room  
and the methods for the prioritization of maintenance work requests. A  
potential strength was identified regarding the efforts to rewrite maintenance  
procedures.

## DETAILS

### 1. Persons Contacted

#### Licensee Personnel

- \*T. Joyce, Station Manager
- T. Rieck, Superintendent, Technical
- \*W. Kurth, Superintendent, Production
- T. Broccolo, Director, Services
- \*D. Karjala, Director, Performance Improvement
- W. Stone, Assistant to Technical Superintendent
- D. Redden, Assistant to Production Superintendent
- \*P. LeBlond, Assistant Superintendent, Operations
- \*R. Johnson, Assistant Superintendent, Maintenance
- \*J. LaFontaine, Assistant Superintendent, Work Planning
- \*D. Wozniak, Project Manager, ENC
- D. Bump, Quality Assurance Supervisor
- C. Schultz, Quality Control Supervisor
- R. Cirzanowski, Regulatory Assurance Supervisor
- W. T'Niemi, Technical Staff Supervisor

#### NRC Personnel

- \*M. Farber, Zion Oversight Chief
  - \*J. Smith, Senior Resident Inspector, Zion
  - \*R. Leemon, Resident Inspector, Zion
  - \*A. Bongiovanni, Resident Inspector, Zion
  - \*W. Rogers, Zion Oversight Senior Resident Inspector
  - \*P. Moore, Zion Oversight Resident Inspector
- \* Indicates persons present at the exit interview on December 18, 1990.

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

### 2. Followup on Previously Identified Inspection Findings (92701)

- a. (Closed) Unresolved Item 50-295,304/90030-02: On-Shift Personnel Adherence to the Established Administrative Controls.  
  
A violation (50-295,304/90031-01.A(DRP)) was issued regarding this item. See paragraph 3.a.
- b. (Open) Open Item 50-295,304/90030-03: Burdensome Administrative Controls over Equipment Out of Service.  
  
This item is discussed in paragraph 3.b and 3.c.
- c. (Open) Open Item 50-295,304/90030-12: Concerns Regarding the Prioritization of Maintenance Work Requests.

This item is discussed in paragraph 3.b.

- d. (Closed) Unresolved Item 50-295,304/90030-13: Lost Maintenance Work Requests.

A violation (50-295,304/90031-02(DRP)) was issued regarding this item. See paragraph 4.a.

3. Operations (71707)

The inspectors reviewed operations activities both in the control room and out in the plant. This consisted of control board observations, plant walkdowns, a selective review of logs and records, as well as discussions with operations personnel. Particular attention was given to observations made in the Diagnostic Evaluation Team (DET) report.

a. Control Room Activities

The DET noted weaknesses in shift crew teamwork and supervisory effectiveness along with failures of shift personnel to adhere to established administrative procedures. This area is further discussed in paragraph 3 of report 295,304/90030.

Annunciator etiquette was virtually nonexistent in that the inspectors repeatedly observed Nuclear Station Operators (NSOs) silencing and lamping annunciators without any communication to the Unit Supervisor (US) or the other NSO. Queries of the control room personnel about this yielded responses that suggested that the US did not have to look up or turn around to know what was happening, and if it was important, the NSO would draw the US's attention to it. This would be a valid comment had the inspectors not observed it with a frequency that suggested routine. The specific concern here is the appearance of a casual attitude toward annunciator alarms in the control room.

Deficiencies in performing logkeeping duties were observed.

- o The control room unit logs are stamped at the beginning of each shift and routine information is filled in the blanks of the stamp. The information logged into these spaces for each shift includes boron concentration, T ave, and power level. What was absent from the Unit log is a notation detailing which equipment is out of service. While this information is covered in the shift turnover packages, its absence from the shift log weakens the focus of the shift on the OOS equipment.
- o Operators write down activities that are occurring on shift on a tablet of paper and transfer it to the log later in the shift. There are two concerns here: (1) whether the operators are familiar with what items should be written in the log; and (2) the inspectors on several occasions noted that there were no log entries into the log book for as many as five hours into

the shift. In one instance, the Shift Engineer (SE) had not made any initial entries into the SE log book for over four hours.

- While following up on concerns related to the operability of the EDG fuel oil transfer pumps, the inspectors noted that a performance of a surveillance, PT-11B, on August 13, 1990, had not been logged into the appropriate Control Room Unit log. As a result of this, the inspectors performed an audit of 1990 SE and NSO Unit logs for the periods from July 13 through July 19, August 10 through August 16, and October 21 through October 26. During these periods there were eight surveillance tests performed that were entered into the SE log, but were not entered into the NSO unit log. These tests are listed below:
  - PT-120, Extraction Steam Air Operated Check Valve Test, performed on 7/15/90, not logged for unit 1;
  - PT-16, Functional Tests for Boric Acid Tank Pumps, performed on 7/16/90, not logged for unit 1;
  - PT-8A, Component Cooling Pumps Operability Test, performed on 7/18/90, not logged for unit 1 or unit 2;
  - PT-6, Containment Spray System Tests and Checks, performed on 7/18/90, not logged for unit 1 or unit 2;
  - PT-6A, NaOH Spray Additive Tanks Test, performed on 8/10/90, not logged for unit 1;
  - PT-120, Extraction Steam Air Operated Check Valve Test, performed on 8/12/90, not logged for unit 1;
  - PT-6, Containment Spray System Tests and Checks, performed on 10/23/90, not logged for unit 2;
  - PT-2G, Accident Monitoring Instrument Channel Check Test, performed on 10/26/90, not logged for unit 1.

The inspector noted that the quality of the logs visibly improved between the audited dates in July and October. This coincides with increased attention and emphasis being placed on logkeeping by the licensee. There were other less significant surveillances that were not logged. The surveillances noted above required the signature, participation, or notification of the unit NSO.

Zion Administrative Procedure 10-52-2, states that the NSOs will record shift activities and significant events including periodic tests or tests following maintenance whether completed satisfactory, failed, or incompleted.

This is an example of a failure to follow procedure and is a violation of 10 CFR 50, Appendix B, Criterion VI (50-295,304/90031-01.A (DRP)).

b. Configuration Control

Out of Service Practices

This item was discussed in paragraph 5 of Inspection Report 295,304/90030 regarding the administrative controls over Out of Service (OOS) activities for testing and maintenance of plant equipment.

The methods used to control the configuration of plant systems is cumbersome. Plant systems alignment could be altered and controlled and described using a combination of any of 32 books that are located in the control room.

The Out of Service (OOS) log is used to isolate components for maintenance or modifications. There are separate OOS log books for each unit and separate logs for each units' refueling outage. There are OOS log books from 1983 through 1990 with the oldest active OOS dated January 8, 1983 for the drain cooler sample pumps that were isolated for the purpose of repairing a pump. There are a total of six OOSs still in effect from 1983.

The OOS logs reference the OOS log card sheets that are filed by system in three binders for unit 1, two binders for unit 2 or three binders for common unit isolations. Partial clears can be initiated in order to partially remove an OOS for the purpose of post maintenance testing or engineering testing. There is a partial clear log book for each unit and another two binders per unit that contain the actual partial clears. None of the partial clears was more than eight weeks old.

Another form of partial clearance is called a modification temporary clear. This is similar to a partial clear except that it is imposed on an OOS that was written for a modification. There are two binders each for 1989 and 1990 and another binder that contains temporary modification clears for the years 1985 through 1988. The oldest temporary modification clear was dated July 31, 1985 and was for the modification to install a boric acid crystallization system.

Finally there are three books that are used to control temporary alterations of plant equipment. One of these is a log and the other two contain the temporary alteration packages on the affected equipment for each unit.

The inspectors performed a very limited audit and field verification of the OOS logs. No problems were noted in this review. The inspectors also reviewed the quarterly audits performed by the licensees Quality Control department and found them to be very limited in scope and sample size when compared to the number of OOS



cards in existence and the complicated system used to perform OOSs. On the other hand, the audits and surveillances performed by the Nuclear Quality Programs (NQP) department were more thorough and regular.

NQP performs a specific audit of operations OOSs a minimum of once a year. Four separate audits were performed on OOSs last year that focussed on both operations and contractor work activities. The suggested minimum surveillance schedule for OOSs is monthly. OOSs are also reviewed when the NQP inspectors review other areas such as maintenance activities. In total, surveillance was performed on the OOSs twice in September, six times in October, and six times in November with two minor problems noted in November involving caution cards and personnel protection.

The licensee is investigating implementing an OOS system similar to the ones in place at their other PWRs. This system uses computer applications to simplify tagging and processing and has better human factor attributes.

In summary, while the inspectors believe that the licensee's OOS system is difficult and overly complicated, it appears to be performing its function with appropriate oversight and review by the corporate quality assurance department.

#### Temporary Alteration Control

During a review performed of the material condition of the plant, the inspectors noted that the licensee had attached a hose to the fire header located behind the travelling screens. The isolation valve to this hose was open and the hose ran over to a hole in the wall and outside around to the back of the crib house where it was used to clean out fish baskets. This hose was attached to the fire protection system, without any isolation, and was not being treated as a temporary alteration in accordance with Zion Administration Procedure 3-51-4, Section B, which states: "Temporary Alterations are changes made to plant equipment intended to be temporary, that do not conform with approved drawings or other design documents. This procedure shall be used to make temporary alterations to all safety related and non-safety related instrumentation, control circuits, alarm circuits, components, and systems."

This is an example of a failure to follow procedure and is a violation of 10 CFR 50, Appendix B, Criterion VI (50-395,304/90031-01.B (DRP))

#### c. Material Condition

The inspectors performed several walkdowns of the plant to observe equipment condition, cleanliness, and orderliness.

The most apparent deficiency in the material condition of the plant is the preponderance of fluid leaks. Several valves were noted to be gushing water. Two examples of leaks are the service water outlet valve to the #1 CCW heat exchanger and the unit 1 high pressure turbine gland seal housing. Extensive efforts are being made to funnel and channel these leaks into floor drains.

The crib house containing the travelling screens, the service water and fire pumps, and the circulating water pumps appeared to be in satisfactory material condition with the exception of the drain lines off of the service water strainers which were corroded or missing valve handles. Also, the Emergency Diesel Generator (EDG) rooms were relatively clean with the exception of the number of towels placed in and around the diesel to collect numerous oil leaks.

d. Out Plant Procedure Control

The inspectors performed an audit of procedures located in the EDG rooms, which revealed that most of the procedures there were annunciator response procedures. In the 1A EDG room there was a copy of SOI-11, "Diesel Generators." The stated purpose of this procedure is to describe the steps necessary to start, load, and shutdown the EDG. The inspectors found a copy of this procedure hanging in a plastic protective folder attached to the EDG control panel. This procedure was dated as being revised on October 20, 1989. The controlled copy of this procedure was last revised in December 30, 1989. It appears that an operator may have taken the procedure down to the EDG room several months ago and left it hanging on the control panel.

The inspector questioned operations and document control personnel as to why this procedure, as well as the local annunciator response procedures were not controlled under the auspices of Zion Administrative Procedure 5-51-4C, "Control of Posted Instructions." The purpose of this procedure is to describe the method of authorization, documentation, and review of Posted Instructions to ensure that they are current, complete, and necessary. Posted instructions are audited on a quarterly basis and the licensee feels that it is more expedient to control the distribution of SOIs and ARPs that may be located at equipment locations throughout the plant through Zion Administrative Procedure 5-51-4, Rev.15, Procedure Control and Approval. The purpose of this document is to provide direction for establishing new procedures, for changing existing procedures, and for controlling the station review of all plant procedures. Specifically, the procedure states in Section E.2.3, that: "The holder of a controlled procedure shall keep a copy up to date."

This is an example of a failure to follow procedure and is a violation of 10 CFR 50, Appendix B, Criterion VI (50-395,304/90031-01.C (DRP))

4. Maintenance & Surveillance (62703, 61726)

The inspectors reviewed the maintenance program and activities with an emphasis on areas and findings identified within the DET report. This included an investigation and audit of the activities associated with the loss of several hundred work requests (DET report Section 2.2.16). Additionally, assessment of maintenance prioritization methods was performed.

a. Lost Maintenance Work Requests

The licensee initiated the Work Request Tracking System (WRTS) in June 1989. The impetus behind this program was that plant personnel were having a difficult time locating Maintenance Work Requests (MWRs) that were somewhere between being written and being completed. WRTS tracks MWRs as they pass from department to department and has greatly enhanced the licensee's ability to track and locate MWRs.

The group that manages the MWR database is referred to as Total Job Management (TJM). In April of 1990, TJM sought to locate all MWRs in an effort to improve the description of the MWR backlog. This effort initially identified over one thousand MWRs spanning a period from 1980 to 1990 that could not be located. Organizations involved in the processing of MWRs were requested, by letter, to search all files, desks, office and work areas for misplaced MWRs. The results of this search reduced the number of missing MWRs to 616 by September 1990.

These 616 MWRs were listed in the computer with work descriptions. The problem being that the hardcopy documentation had been misplaced raising concerns about whether or not the work had been performed. To address this issue, TJM sent a list of the 616 MWRs to the Technical Staff for review. This Technical Staff review consisted of a walkdown by the System Engineers of each missing MWR and the associated component to make a determination of whether or not the work had been performed or still needed to be performed. This review resulted in the identification of 173 MWRs that were considered "valid." By an Operations Safety Review Committee letter dated September 29, 1990, TJM cancelled all 616 MWRs and rewrote the 173 that were identified.

The inspectors performed a review of these 616 MWRs. One of the reviews centered around MWRs that were part of modification packages. There were 140 MWRs associated with modification packages that were cancelled on September 29, 1990. The inspectors reviewed 30 MWRs contained in 11 modification packages and found seven MWRs that had been listed as missing. These were all found in modification packages that were located in the technical engineering area; none of the modifications had been closed out. This raises two concerns: (1) Technical Engineering did not actively pursue locating the missing MWRs; and (2) MWRs associated with modification



packages were being indiscriminately closed without review as to their effect on the modifications.

Discussions with licensee personnel involved in this effort indicated that much of the work described in the MWRs associated with modification packages is also covered in travellers within the package. In addition, the engineers had reviewed all of the packages for the MWRs and in some cases, the modification is scheduled to be cancelled. Finally, any MWRs that were cancelled and are subsequently found will be added to the TJM history. The inspector communicated to the licensee that while this was acceptable, it suggested that the efforts to locate the missing MWRs were less than diligent, and that additional attention should be directed toward their potential effect on the open modification packages.

The licensee has yet to determine a root cause for the loss of the MWRs. Several potential causes or combination of causes have been postulated, but no definite determination has been made.

The inspectors foremost concern is that documentation written for work to be performed on plant equipment was lost. Therefore, the licensee cannot determine whether or not the work was performed. If work was performed, then the licensee has no evidence documenting the work activities.

The loss of several hundred MWRs documenting work activities in the plant is a violation of 10 CFR 50, Appendix B, Criterion XVII. (50-295,304/90031-02(DRP)).

b. MWR Prioritization

The DET report questioned the prioritization of MWRs written for and the attention given to the service water system. This item is further discussed in paragraph 12.a of report 295,304/90030. The inspectors reviewed the licensee's MWR prioritization system.

The inspectors reviewed several work requests associated with work being performed on the Emergency Diesel Generators (EDGs). Of particular interest was the work being performed on the 1B EDG east and west fuel oil transfer pumps. MWR Z94528 was written on August 13, 1990 for the EAST fuel oil transfer pump due to inadequate pump capacity exhibited during the performance of a regularly scheduled surveillance. One EDG fuel oil transfer pump is required for EDG operability. The work was authorized to start September 6, 1990 and none was actually performed. The work package was signed off as complete on September 14, 1990 with a statement by the technical staff that an improved testing method was needed to more accurately determine the actual flow of the fuel oil transfer pumps (see section 4). This testing to demonstrate operability of the EAST fuel oil transfer pump was performed on October 25, 1990. On October 23, 1990, the WEST fuel oil transfer pump failed its

surveillance test due to an indication of low flow. This rendered the 1B EDG inoperable. MWR Z96445 was written to calibrate the day tank level indicating gauge. The work performed on October 25, 1990 stated that the gauge required no adjustment, and operability testing was completed on October 25, 1990.

The first MWR for the EAST fuel oil transfer pump written on August 13, 1990 was initially submitted by operations as a priority B1, which according to Zion Administrative Procedure 3-51-1, Initiating and Processing a Work Request, Appendix B, is "Urgent, hinders station operation (schedule within 24 hours)." The MWR was sent to the work package signing meeting on August 16, 1990 where it was downgraded to a priority B3, which according to ZAP 3-51-1 is "Needed, schedule as time permits". When the WEST fuel oil transfer pump failed its surveillance test on October 23, 1990, it was classified as a priority B1 and was completed by October 25, 1990.

This highlights a weakness regarding the prioritization of MWRs. Within the purview of ZAP 3-51-1, the maintenance department can adjust the priority of the MWR from B1 to B3. MWR Z94528 for the EAST transfer pump was given a high priority by the operating engineer, but when it progressed to the MWR signing meeting, the maintenance department, with the approval of the operating engineer, downgraded it to a B3 as time permits status. In this instance, it appears that a philosophy of "one pump is inoperable, but we have two" along with the fact that operations and engineering were aware of the shortcomings of the operability surveillance test for the fuel oil transfer pumps seemed to justify the downgrading of the MWR priority from the originators request of a B1 to the maintenance departments determination of a B3. The fact that the administrative procedure grants the maintenance department such latitude in adjusting the priority of work in the plant is of concern to the inspectors. This concern will be followed as the inspectors monitor the licensee's DET corrective actions in this area.

In response to the DET report concerns, the licensee stated that they would implement an improved MWR prioritization system by December 31, 1990. Due to the large amount of interest expressed by various plant departments, full implementation is being delayed until the various departments inputs can be integrated into the program. The licensee stated that they intend to have the MWR prioritization action plan completed by December 31, 1990 with full implementation scheduled for April 30, 1991.

c. Maintenance Procedure Rewrite Program

The inspector observed licensee progress made towards improving the quality of the maintenance procedures. The focus of this program is to develop procedures that better utilize the skills of the maintenance technicians to improve troubleshooting analyses and reduce rework.

The new procedures employ an improved format and layout through the use of a desktop publishing system. Significant differences include an introduction section with a detailed explanation of system operation and interfaces with other systems, greatly improved graphics and illustrations of equipment with clearly labelled parts identification, and an improved procedure feedback form on the last page of all new procedures.

To date, the licensee has rewritten/validated twenty procedures, including eight on the EDGs; and generated/validated eleven new procedures, including 2 for the EDGs. These new procedures cannot be approved for use in the station until the administrative procedure describing work procedure format is updated. Preliminary response from maintenance personnel has been positive.

The inspectors were generally impressed with the effort and scope of the rewrite program. The procedures lend a great deal more latitude to the maintenance technicians, and utilize their talents and craft experience in more constructive ways. This effort is viewed as a potential strength of the maintenance department. The implementation of the new procedures will be observed to assess the effectiveness of this effort.

#### 5. Engineering and Technical Support (61726)

The inspectors reviewed this area as a follow up to concerns about the adequacy of the procedure used for testing the Emergency Diesel generator fuel oil transfer pumps.

The inspectors reviewed PT-11B, a surveillance test for the EDG fuel oil transfer pump. This test is used to measure pump capacity, discharge pressure, and vibration. The Technical Specification requirement states that the fuel oil transfer pumps must be capable of supplying at least 6 gpm. The fuel oil usage of the EDG at full load is calculated at approximately 4.5 gpm.

The engineering staffs method of determining the flow rate of the fuel oil transfer pump is to drain approximately 100 gallons of fuel oil from the day tank, wait five minutes for the level to stabilize and record the level indicated on fuel oil day tank gauge which has a range of from 0 to 600 gallons. The fuel oil transfer pump is then operated for a period of 5-6 minutes. After waiting another five minutes, the final day tank level is recorded.

The procedure references the applicable ASME Section XI, 1980 edition, including the 1981 addenda. The acceptance criteria for this test is  $> 6.5$  gpm, the alert range is  $< 6.5$  gpm, and the action range is  $\leq 6.0$  gpm. Technical staff stated that the acceptance criteria for the pump was generated by choosing the alert range to be halfway between the nominal value and the Technical Specification limit. This is not in

accordance with the ASME code, which specifies an alert range of [7.14 gpm < pump flow < 6.58 gpm] and an action range of [7.21 gpm < pump flow < 6.3 gpm], based upon a nominal pump flow of 7 gpm. In addition, the test performance data for the past year contains values of 486, 483, and 494 gallons. The inspectors question whether a technician could read a 600 gallon scale with such accuracy. The test procedure also fails to take into account the instrumentation inaccuracy of the 600 gallon gauge, which according to the ASME code, should be ±12 gallons.

The licensee recognized the shortcomings of the testing method employed PT-11B, and pursued developing a more accurate test that is described in MWR 294528. The licensee revised the procedure on October 24, 1990, the day after the second fuel oil transfer pump failed its surveillance (see paragraph 3.b), to allow the use of a different test method should the pumps fail the first test. Step 3 c) the precautions section states: "IF the pump capacity does not meet acceptance criteria by option 'A' then rerun test using option 'B'." Option "B" consists of attaching tygon tubing to the outside of the day tank and measuring the change in level and converting that measure to gallons pumped. Option "B" still uses the same questionable acceptance criteria. The licensee is investigating the installation of flowmeters for the fuel oil transfer pumps as a part of their diesel generator upgrade program.

The inspectors have determined that the pump testing as it is presently performed is marginally satisfactory. Testing performed using option "B" adequately demonstrated that one fuel oil transfer pump can supply enough fuel oil to meet the Technical Specification requirements, even taking into account the ASME code accuracy tolerances. The concern of the inspectors is that PT-11B, which references the ASME code, does not follow the guidance of the ASME code for determining alert and action ranges for the pump performance or instrumentation tolerance. Furthermore, the inspectors feel that this procedure potentially casts doubt on other procedures that reference the ASME code for pump testing. The resolution of pump test methodology and acceptance criteria for the surveillance test for the fuel oil transfer pump will be further reviewed by the inspectors as an Open Item 50-295,304/90031-03 (DRP).

#### 5. 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 December 18, 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.