

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-295/80-17; 50-304/80-17

Docket No. 50-295; 50-304

License No. DPR-39, DPR-48

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, Il. 60690

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

Inspection Conducted: August 1 through September 30, 1980

Inspectors: *J. E. Kohler*
J. E. Kohler

J. R. Waters
J. R. Waters

10/10/80

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R. L. Spessard
Approved By: R. L. Spessard, Chief
Reactor Projects Section 1

10/14/80

Inspection Summary

Inspection on August 1 through September 30, 1980 (Report No. 50-295/80-17; 50-304/80-17)

Areas Inspected: Routine, unannounced resident inspection of reactor trips, safeguards systems actuation, SVAG valve operation, fuel building charcoal filter operations, technical specifications on radiation monitors, Unit 2 NIS channel, high radiation components in the spent fuel pit, testing of ESF reset controls, loss of power to E.N.S., modification to W-2 switches, failure of Pzr. sample valve, operational safety verification, maintenance activities, surveillance activities and LER and bulletin follow-up. The inspection involved 321 inspector-hours onsite by 2 NRC inspectors including 44 hours onsite during off-shifts.

Results: Of the areas inspected, one item of noncompliance (deficiency-violation of H₂ purge fan surveillance requirements, paragraph 18) was identified.

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DETAILS

1. Persons Contacted

- *K. Graesser, Superintendent
- *L. Soth, Operating Assistant Superintendent
 - R. Ward, Senior Operating Engineer
 - J. Gilmore, Unit 2 Operating Engineer
 - E. Fuerst, Unit 1 Operating Engineer
 - K. Kofron, Maintenance Assistant Superintendent
 - H. Studtmann, Quality Assurance Manager
- *T. Rieck, Assistant Technical Staff Supervisor
 - B. T'Niemi, Technical Staff Engineer
 - A. Ockert, Technical Staff Engineer
 - F. Lentine, Technical Staff Engineer
- *G. Pliml, Assistant Superintendent Administrative and Support Services
 - B. Naughton, Nuclear Licensing Administrator
 - D. Waldon, Fuel Handling Supervisor
- *P. Kuhner, Quality Assurance Department
- *T. Lukens, Quality Control Supervisor

*Denotes those present at management exit of September 29, 1980

2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (295/79-18; 304/79-17): Reactor Coolant Isolation Valve Limit Switches. The licensee replaced NAMCO D2400X limit switches on reactor coolant isolation valves with acceptable NAMCO-EA-180 limit switches.

(Closed) Unresolved Item (LER 304-78-69; 295-78-24): Silting of three way MSIV control pilot. The Licensee replaced existing MSIV D.C. solenoids with poppet type which will not silt closed. A high pressure filter at discharge of MSIV hydraulic pump was installed.

(Closed) Unresolved Item (295/80-14-02): Regulatory Guide 1.108 Classification of Fifth Diesel Generator. The licensee withdrew this request.

(Closed) Unresolved item (295/80-14-03): Safety starts of diesel generators less than one hour in duration. Tests of diesel generators less than one hour in duration may be counted in diesel generator start/failure to start data base. (Reference SER dated September 11, 1980 from NRR to Commonwealth Edison)

(Closed) Noncompliance identified in inspection report 295/80-14 regarding lake discharge tank releases: The licensee indicated in response to noncompliance regarding improper administrative controls on lake discharge releases that a new procedure (ACP-300) was being written.

The procedure has been written and the standing order in effect has been removed. The inspector reviewed ACP-300 and has no further questions.

3. Summary of Operations August 1 -September 29, 1980

Unit 1

The unit operated at power levels up to 100%. The inspector reviewed the following forced shutdowns:

September 14, 1980 Loss of letdown isolation valve control

September 15, 1980 Turbine trip, reactor trip (paragraph 4)

Both events were reviewed and it was determined that all safety systems operated as required.

Unit 2

The unit operated at power levels up to 100%. The following forced shutdowns were reviewed:

August 9, 1980 Loss of stator water cooling

September 3, 1980 Reactor trip, safety injection-water hammer (see paragraph 5)

September 5, 1980 Reactor trip due to loss of feedwater pump C.

The events were reviewed and it was determined that all safety systems operated as required.

4. Unit 1 Reactor Trip on September 15, 1980

On September 15, 1980 at 1616 Zion Unit 1 tripped from approximately 95% power. The sequence was EHC trouble, turbine trip, reactor trip. All safety systems operated as required. The Senior Resident Inspector witnessed the recovery.

The station checked various turbine trips and EHC components and could not determine the cause of the initial EHC trouble.

Reactor was made critical at 0045 on September 16, 1980; Unit on-line was at 0450.

No items of noncompliance were identified.

5. Zion Unit 2 Water Hammer - Safety Injection of September 3, 1980

At approximately 5:40 AM on September 3, 1980, Zion Unit 2 tripped from 93% reactor power due to low steam generator level. The low level condition was caused by loss of the 2B steam driven feedwater pump. At the time of the feedpump trip, the unit was operating with one steam and one electric pump. The third steam driven pump was out of service.

When the 2B feedpump tripped, the operator immediately ramped the EHC system down from 93% to below 50% power in an effort to "save the unit." Operator action was subsequently unsuccessful and the unit tripped on low steam generator level. Auxiliary feedwater started as designed (three pumps) and initially injected at about 270 GPM and the operator throttled back on auxiliary feed as required procedurally.

The procedure calls for a further throttling back of auxiliary feed as narrow range steam generator level is recovered. Normally recovery of narrow range level takes about two hours. The throttling back is a precaution against water hammer in the feed ring.

Well before the onset of narrow range steam generator level, a thundering was heard, followed by the 100 pound Δ P safety injection and automatic safety injection. All safety systems operated as designed. SI was terminated when all primary secondary and radiation monitoring equipment showed nominal values. No unexpected leakage was evident. These observations were verified by the Senior Resident.

The initiating event was loss of the 2B feedwater pump which lead to a reactor trip. The SI is believed to have been caused by a water hammer occurring below the feedring which shook the Δ P transmitters.

Review of the steam generator feedwater flow strip charts showed spiking in the B loop indicating that a water hammer had occurred.

Zion Station has previously committed to perform the J tube modification on all steam generators and the C & D generators have had the J tube modification completed. The next Unit 2 steam generator scheduled for the modification is 2A steam generator.

A conference call was held on September 3, 1980 between the Zion Resident Inspector's Office, IE Region III office, IE Headquarters and Zion Station. The purpose of the conference call was to discuss the causes of the water hammer and any changes to operational procedures that might be required. It was the consensus among the participants that:

- (1) The water hammer was minor compared to previous water hammers based on magnitude of feedwater spiking
- (2) No structural damage occurred inside or outside containment
- (3) Only one limitorque valve actuator was damaged (FW-0016 feedwater isolation to B steam generator)
- (4) Water hammer was in some way related to the lack of J tubes on the B steam generator

The licensee sent an expedited report to the Commission dated October 1, 1980 which described the analysis and corrective action taken to further minimize the probability of water hammers. The corrective action calls for continuing the schedule in effect for installing J tubes on the

steam generators (one generator each refueling outage until completion) and procedural modifications. The procedural modifications will direct the operator after a reactor trip to first reduce auxiliary feedwater flow to the steam generators that are not modified with J tubes.

This item is open pending further review and is designated 304/80-17-01.

6. SVAG Valves

Quarterly safeguards testing of containment isolation valves at Zion Unit 1 identified a condition whereby key locked valves will hunt between safeguards and non-safeguards positions until the valve motor control center trips on thermal overload.

Zion Station technical specifications identify specific critical valves that were to be protected against spurious valve actuation. The control board identifies these valves with the tag SVAG. For many years, the protection against spurious valve actuation was to de-energize the valve in its safeguards position. Surveillance testing would re-energize the valve and place it in the non-safeguards position. A safety injection signal would then be superimposed to confirm that the valve would move to its safeguards position.

After the Three Mile Island 2 incident, it was identified that it would be disadvantageous to have some of the SVAG valves de-energized because valve movement was required during ECCS recirculation. Consequently, some of the SVAG valves were energized with a key locked valve positioner locking the valve in the safeguards position.

Surveillance testing of the key locked SVAG valves has determined that key locking the valve in its non-safeguards position acts as a manual override of the safeguards signal. With the safeguards signal superimposed, while the valve is keylocked in the non-safeguards position, the valve will cycle open and closed until the motor control center trips on thermal overload.

Zion Station has verified that all safeguards valves are positioned correctly and the keys have been pulled. The station is investigating historical records to determine why key locks on some valves are required.

Actions by the licensee also include possible revisions to periodic test procedure PT-10, instructing the operators not to lock SVAG valves in the nonpreferred condition during surveillance testing.

The valves in question are standard Limitorque valves with key lock on the control room valve positioner.

This item is open pending further review by the licensee (295/80-17-02).

7. Fuel Building Charcoal Filter Unavailability

On August 21, 1980, while Unit 1 and Unit 2 were operating, the licensee discovered a system deficiency in the Auxiliary Building Ventilation

System which made the charcoal filters serving the fuel building unavailable during non-refueling modes of operation. In the as found condition, a high radiation signal in the fuel building would not have automatically or manually routed fuel building exhaust through charcoal filters as designed. Immediate action on the part of the licensee involved failing the air supply to the ventilation damper actuators which had the effect of placing the fuel building in the continuous charcoal mode.

Subsequent investigation determined that an abnormal air connection was required to be made to the damper actuators because of a deficiency identified during preoperational testing. It was determined that the abnormal air connection was connected in a manner contrary to that prescribed by the preoperational testing program. The abnormal air connection to the damper actuators was required because preoperational testing discovered the damper motors to be installed backwards. The licensee has returned the damper motors to the correct position and eliminated the abnormal air connection to the dampers.

The inspector investigated the possible consequences involving the unavailability of the charcoal filters in the fuel building. This investigation determined that the fuel building charcoal filtering system was available during refueling activities and fuel pool re-racking. (Procedures required continuous charcoal filtering and the air supply to the dampers was failed, thereby placing them in the charcoal mode). The limiting condition for charcoal unavailability then becomes a high radiation condition in the fuel building.

The licensee is reviewing the consequences of high radiation in the fuel building without charcoal filters and will submit a revised LER.

This item will be classified as Open Item 295/80-17-03, and will remain open pending the submitting of a revised LER.

The inspector also alerted the licensee to Technical Specification Amendment No. 56. This revision to the technical specifications requires continuous charcoal filtering in the fuel building whenever fuel is being handled in the fuel building with less than sixty days decay. Because implementing procedures have not been generated, the inspector requested the licensee to issue a standing order requiring the Shift Engineer to prohibit any fuel movement unless the filter system is positively verified to be in the charcoal mode. This standing order was issued.

The regulatory classification of this event is a deviation from a FSAR commitment since the requirement for continuous charcoal filtering during all forms of fuel movement was not in effect until after the event discovery. No citation will be given since the item was licensee identified.

The licensee is performing design studies to determine whether the fuel building filter system has sufficient capacity to exhaust both the fuel building and the pipe tunnel simultaneously. As a result of this design review, certain administrative and/or hardware changes may also be made prior to the next refueling. Completion of the auxiliary building design review and any design changes, if necessary, is considered unresolved item 295/80-17-04.

8. Technical Specification Requirement on Radiation Monitors

During the review of licensee event report 50-295/80-06, the inspector determined that in certain cases radiation monitors that have control functions in addition to normal alert functions may be taken out of service with no limiting conditions placed on the control functions. Specifically, radiation monitor PR-07 alerts the operator to high radiation conditions in the fuel building. In addition, PR-07 alarming sends a signal to the auxiliary building ventilation system to switch the fuel building exhaust to charcoal filters.

Technical specifications on PR-07 out of service requires shiftly grab samples of fuel building. However, present technical specifications do not acknowledge or require any additional conditions to be met to supplant the inoperability of the control function.

The inspector requested the licensee to look at all radiation monitors in the plant in order to determine whether adequate compensatory steps are being taken when radiation monitors with control functions are out of service.

This item is unresolved and is designated 295/80-17-05.

9. Unit 2 NIS Channel N-41 Detector Drift

As documented in LER 50-304/80-05, both upper and lower detectors of NIS channel N-41 drifted out of calibration. They were recalibrated and subsequently the upper detector again drifted out of calibration. These are the originally installed detectors and the licensee is trending their performance with consideration to eventual replacement.

This item is open pending licensee resolution (304/80-17-06).

10. Storage of High Radiation Components in Spent Fuel Pool

The inspector examined the disposition of three high radiation components which had been suspended from the spent fuel pool rail. The components have been moved to the floor of the spent fuel pool to prevent unauthorized removal until the licensee can arrange for permanent disposition.

The licensee's actions are acceptable and the inspector has no further questions on this matter.

11. Test of ESF Reset Controls (I.E.B.80-06)

The inspector examined the Licensee's testing program to verify ESF components do not return to non-ESF status upon reset of ESF signal. The Licensee has satisfactorily completed testing on all Unit 2 components and partially completed testing of Unit 1 components. The licensee has committed to completion of all testing by December 9, 1980.

This item is open pending completion of all testing (295/80-17-07).

12. Response to I.E. Bulletin 80-15 Concerning Loss of Power to Emergency Notification System

In response to I.E. Bulletin 80-15 the licensee committed to:

- a. Performance of a modification to power the E.N.S. phone from an essential bus (I.E.B. 80-15 item #2)
- b. Performance of a test subsequent to above modification to verify E.N.S. phone operability in the event of loss of off-site power. (I.E.B. 80-15 item #3)
- c. Issuance of a procedure for notification of the NRC operations center within one hour of loss of operability of one or more E.N.S. extensions. (I.E.B. 80-15 item #5)

This item is open pending completion of above items (295/80-17-08).

13. Modification to W-2 Switch Indicating Lights (I.E.B. 80-20)

As documented in licensee response to I.E.B. 80-20, the licensee has committed to modifying on both Unit 1 and Unit 2 the indicating light circuitry of Westinghouse W-2 switches to facilitate continuity checks of the auto start contacts. This modification is to be completed by December 31, 1980.

This is open item (295/80-17-09).

14. Failure of Pressurizer Sample Valve (LER 50-295/80-39)

On March 3, 1980, during monthly containment isolation valve operability testing, pressurizer sample valve LAOV-SS9355A failed to close. Subsequent licensee investigation revealed that failure was due to a malfunction in the valve itself as opposed to a malfunction in the control circuit or operating air. The valve was closed with manual assistance. The licensee has committed to repair of valve during next refueling outage. At that time exact cause of valve failure can be determined and generic implications evaluated.

This item is open pending valve repair (295/80-17-10).

15. Operational Safety Verification

The inspector observed control room operations, reviewed applicable logs and conducted discussions with control room operators during the months of August and September, 1980. The inspector verified the operability of selected emergency systems, reviewed tagout records and verified proper return to service of affected components. Tours of the auxiliary building and turbine building were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, and excessive vibrations and to verify that maintenance requests had been initiated for equipment in need of maintenance. The inspector by observation and direct interview verified that the physical security plan was being implemented in accordance with the station security plan.

The inspector observed plant housekeeping/cleanliness conditions and verified implementation of radiation protection controls. During the month of September, 1980, the inspector walked down the accessible portions of the charging system to verify operability. The inspector also witnessed portions of the radioactive waste system controls associated with radwaste shipments and barreling.

These reviews and observations were conducted to verify that facility operations were in conformance with the requirements established under technical specifications, 10 CFR, and administrative procedures.

No items of noncompliance were identified.

16. Monthly Maintenance Observation

Station maintenance activities of 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 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 prevention controls were implemented. Work requests were reviewed to determine status of outstanding jobs and to assure that priority is assigned to safety related equipment maintenance which may affect system performance.

The following maintenance activities were observed/reviewed:

1. Repair of OA B.A. transfer pump recirculation valve

2. Core thermocouple readout modification (U-1)

3. Repair of containment spray additive discharge valve (U-2)

Following completion of maintenance on the B.A. transfer pump recirc valve, the inspector verified that the system had been returned to service properly.

No items of noncompliance were identified.

17. Monthly Surveillance Observation

The inspector reviewed technical specifications required surveillance testing on the 0, 1A and 1B Diesel Generators and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting conditions for operation were met, that removal and restoration of the affected components were accomplished, that test results conformed with technical specifications 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.

No items of noncompliance were identified.

18. Licensee Event Reports Follow-up

Through direct observation, discussion 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.

Unit 1

LER No.

80-03	OB L.D.T. discharge without sample
80-04	OA L.D.T. inadvertent discharge
80-06	Unavailability of fuel building discharge filters
80-26	1RT-PRO7B failed low
80-31	OR-AR09 failed low
80-34	Insufficient indication of dilution accident in time to permit operator action
80-35	Low Ph of W.T.F. effluent
80-36	Pzr. Lvl. channel IL-460 drifted low

80-37	Non-Conservative setting of 63AST Tx trip switches
80-39	Pzr. sample valve failed to close
80-40	Erratic T _c Amplifier Output

Unit 2

LER NO.

80-03	Loss of hydraulic pump - 2D M.S.I.V.
80-05	NIS Channels 41 and 43 inoperable
80-07	Inadvertent activation of IVSW system

No items of noncompliance were identified, except as described below.

Regarding LER 50-295/80-33, the licensee exceeded the technical specification time limits for reporting. The inspector's review verified that the licensee's management control system was aware of the late reporting and had taken corrective action to prevent recurrence. This is considered licensee identified.

Regarding LER 50-295/80-38, the inspector determined that the licensee's management controls identified the missed surveillance and took steps to prevent recurrence. This is considered licensee identified.

Regarding LER 50-295/80-03 and LER 50-295/80-04, the licensee's release of lake discharge tanks did not follow procedures. These two occurrences are related to LER 50-304/80-23 in which a noncompliance was issued. The licensee has revised the lake discharge tank release procedure to ensure compliance with administrative and technical specification requirements. These two items are considered licensee identified since they are examples of a previous administrative breakdown in which noncompliance was issued.

Regarding LER 50-304/80-21, the licensee initially believed the failure to be in the conservative direction. A subsequent management review determined that the failure was in the nonconservative direction and, therefore, reportable. The late reporting is a licensee identified item.

Regarding LER 50-295/80-07, the licensee reported that a hydrogen purge fan was taken out of service improperly. The event involved failure on the part of the licensee to perform an operability test on the redundant hydrogen purge fan prior to the out of service action.

During the exit held on September 29, 1980, the inspector stated this failure to perform a periodic test was contrary to requirements of technical specification 4.8.8.A.2 and would be classified as a deficiency.

The licensee responded that since the item was licensee identified no deficiency should be given. The inspector stated that improper out of service events as well as events involving lack of administrative control during radiation releases would almost always result in noncompliance even if licensee identified.

The inspectors are satisfied with the licensee's corrective action and no response is required.

19. IE Bulletin Followup

For the IE Bulletins listed below, the inspector verified that the written response was within the time period stated in the bulletin, that the written response included the information required to be reported, that the written response included adequate corrective action commitments based on information presentation in the bulletin and the licensee's response, that licensee management forwarded copies of the written response to the appropriate onsite management representatives, that information discussed in the licensee's written response was accurate, and that corrective action taken by the licensee was as described in the written response.

IE Bulletin Number

80-05 Vacuum condition resulting in damage to CVCS Holdup Tanks

80-09 Hydramotor Actuator Deficiencies

80-12 Decay heat removal systems operability

80-15 Loss of ENS with loss of offsite power

80-17 Misapplication of Rosemont Pressure transmitters

80-20 Failures of Westinghouse type W-2 switch

No items of noncompliance were identified.

20. Meetings, Training, Offsite Functions

The inspectors attended the following offsite functions during the inspection period:

Joel Kohler

August 6-7, 1980 Quad Cities Security Trial, Rock Island, IL

September 12, 1980 NRC Regional Training Session, Glen Ellyn, IL

September 23, 1980 NRC Meeting on TMI Action Plan, Arlington Park, IL

September 25, 1980 Commonwealth Edison NRC Meeting on Outstanding
Licensing Items, Chicago, IL

September 27, 1980 Town Meeting of Illinois Atomic Energy Commission
in Zion, IL

Joe Waters

August 18-28, 1980 PWR Advanced Technology Course, Bethesda, Maryland

September 8-14, 1980 PWR Simulator Course, Chattanooga, Tennessee

21. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of non-compliance or deviations. Ten unresolved items were disclosed during this inspection.

22. Exit Interview

The inspectors met with licensee representatives (denoted in Section 1) throughout the inspection period and at the conclusion of the inspection on September 29, 1980 and summarized the scope and findings of the inspection activities.

The licensee acknowledged the inspectors' comments.