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

REGION III

Report No.: 50-295/80-25 50-304/80-27

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 At: Zion Site, Zion, Illinois

Inspection Conducted: November 15-December 31, 1980

Inspector(s): J. E. Kohler 1/14/81

J. R. Waters 1-14-81

Approved By: Richard L. Spessard, Chief Projects Section 1 1/16/81

Inspection Summary

Inspection on November 15-December 31, 1980 (Report No. 50-295/80-25; 50-304/80-27)
Areas Inspected: Routine, unannounced resident inspection of reactor trips and unscheduled shutdowns, Part 21 Report-General Atomic Company radiation monitor, R-14 high alarm, inoperable hydrogen purge damper, missed surveillance on rad monitors, cross connecting of safety injection accumulators, nitrogen flow measuring equipment, correction of erroneous information in a previous inspection report, operational safety verification, monthly maintenance observation, monthly surveillance observation, licensee event reports and IE bulletin follow-up. The inspection involved 318 inspector-hours onsite by two NRC inspectors including 65 hours onsite during off-shifts.
Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

*K. Graesser, Superintendent
*L. Soth, Operating Assistant Superintendent
J. Marianyi, Technical Staff Supervisor
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
R. Budowle, Technical Staff Engineer
G. Pliml, Assistant Superintendent Administrative and Support Services
D. Waldon, Fuel Handling Supervisor
T. Lukens, Quality Control Supervisor
D. Howard, Rad-Chem Supervisor
R. Acker, Health Physicist
*P. Kuhner, Quality Assurance
*T. Miosi, Instrument Maintenance Supervisor

*Denotes those present at management exit of December 31, 1980

2. Summary of Operations

Unit 1

Unit 1 operated at power levels up to 99% during the inspection interval and experienced the following unscheduled shutdowns:

Date	Time	Event
11/16/80	0916	While performing periodic test PT-5B on reactor protection system, a nuclear station operator caused an inadvertant reactor trip from 99% power when the reactor trip bypass breakers were opened prior to resetting the main trip breakers. All safety systems responded as required.
12/03/80	0809	While performing maintenance on the 1C feedwater pump speed controller, the instrument mechanic uncoupled the M/A station which resulted in a loss of speed signal to the feedwater pump; pump speed became erratic and the operator manually tripped the pump which resulted in a

		reactor trip from 97% power on low steam generator A level. All safety systems functioned as required.
12/04/80	1400	Unit was taken to hot shutdown due to excessive hydrogen consumption in the main generator hydrogen cooling system; the unit entered a five day maintenance outage.
12/12/80	1750	During an operations maneuver to switch from the 1A to the 1C feedwater pump, the 1B feedwater pump tripped when its oil pump tripped. The feedwater pump trip resulted in a reactor trip from 98% power due to low steam generator A level. All safety systems responded as required. The cause of the oil pump trip was not conclusively determined.

Unit 2

The unit operated at power levels up to 93%. Power was limited to 93% due to isolation of one of the low pressure feedwater heater strings because of tube leakage. The following unscheduled shutdowns were experienced during the inspection interval:

11/15/80	1053	While calibrating the power range detectors by installing new 100% detector currents, the unit tripped from 93% power on high flux rate. Recovery systems responded as required. The trip appeared to have occurred when instrument maintenance cables required to install the detector currents were being unattached from one power range cabinet and installed on another.
11/15/80	2315	The unit tripped from low power during power ascension on low steam generator level; recovery systems responded as required.
12/08/80	1550	The unit was taken off the line from 93% power due to rod urgent failure alarms being experienced in the control rod drive logic cabinet. Shutdown was normal using control rods; see paragraph 5 for details.
12/26/80	1400	Power level was reduced to 50% in accordance with AOP-12 in response to high conductivity levels in the steam generators. The conductivity continued to increase and the unit was taken off the line at 0504 December 27, 1980. Investigation revealed a sheared condenser tube as the source of the impurities. The unit was restored to service December 31, 1980 following tube plugging and secondary system clean up.

3. Part 21 Report Follow-up

General Atomic Company notified the licensee that a high range containment radiation monitor scheduled for installation at Zion Station had a defect which required correction. The defect involved overstressed resistors when internal voltage is adjusted for voltages about 800 vdc. Zion Station received kits from the manufacturer to correct the defect. The unit was corrected as of October, 1980.

No items of noncompliance were identified.

4. R-14 High Alarm

On December 25, 1980 at 0230 a high alarm was received on R-14 auxiliary building vent stack gaseous monitor. Earlier in the shift a dilution was performed on Unit 1 with letdown being diverted to the "0" holdup tank. The boric acid evaporator was also taking suction on "0" holdup tank. Apparently radioactive gases from the raw coolant were being drawn out of solution by the boric acid evaporator and discharged to the filtered auxiliary vent header. Normally only a small portion of the gaseous activity in the coolant is released in the boric acid evaporator since most of the gases have already come out of solution in the holdup tank and are discharged to the waste gas system. Since the evaporator was drawing in essentially raw coolant there was no chance for this to occur. Shortly after receiving the alarm the evaporator was secured and the alarm cleared.

The licensee calculated the total release to be 6.1 curies with an average release rate of 305 uci/sec and a maximum release rate of 1011 uci/sec. From a sample drawn shortly after the alarm, the licensee estimates that the release was approximately 70% Xe-133 and 30% Xe-135. The release rates are well below the limit set by technical specifications.

This occurrance indicates the possibility of release of radioactive gases without the 45 day delay provided by the waste gas system. The licensee is reviewing the event to determine if any procedure changes are necessary.

This item is open pending completion of licensee evaluation (295/80-25-1; 304/80-27-1).

5. Unit 2 Rod Urgent Failure Alarm Resulting in Unit Shutdown

On December 8, 1980 at 1550 with the unit operating at 93% power, a rod urgent fai ure alarm was experienced at the control board during performance of routine surveillance testing on the control rod drive system. This failure resulted in loss of automatic, manual, and bank select movement of the following control rod banks gr 2 SA, gr 2 CA, gr 2 CC. The rod banks remained trippable because power was never interrupted to the rod drive M/G sets. The urgent failure alarm was traced to a blown fuse on group B of stationary gripper coil phase B. This fuse was replaced and rod bank movement was restored.

Subsequent checkout at 1750 resulted in a rod urgent failure alarm being experienced in the control rod drive logic section. This alarm resulted in

the loss of movement to gr 1 SC and gr 1 SD. The fuse replacement exhausted the allowable two hours of trouble shooting before a power reduction was required. At approximately 1750, with the logic alarm unable to be cleared, the unit commenced a four hour shutdown permitted by technical specification 3.2.3.B.3 and entered the hot shutdown mode at 2140. Shutdown was normal using control rods. Boron was added to achieve required shutdown margin.

The rod urgent failure alarm in the logic cabinet was traced to logic cabinet SCD. Using a technique involving remaking SCR card connections, the alarm cleared. No cards were replaced. The station believed the urgent failure alarm in the logic cabinet was caused by a bad connection in the slave cycler SCD cabinet because the alarm cleared when the connection was remade.

Unit startup was commenced promptly after the alarm cleared and was online by early morning on December 9, 1980.

Resident inspectors were in the control room throughout the initial trouble shooting phase as well as the reactor shutdown. Communications were established to the NRC Emergency Notification System duty officer and periodic calls were made on December 8, 1980 and December 9, 1980 to exchange technical information.

It is to be noted that at no time was reactor trip capability lost. This was known conclusively because tripping action is initiated when power is interrupted to the reactor trip breakers. This in turn interrupts power to the rod drive M/G sets. Since the rods are held in place by magnets, power interruption causes the rods to fall by gravity. At no time was power interrupted to the control rod drives.

Considerable confusion was experienced when transmitting the information over the ENS to the duty officer. During the management exit, the licensee expressed his concern that the confusion resulted because the NRC duty officer did not understand what was being transmitted and did not believe what the licensee was transmitting.

On December 22, 1980 with Unit 2 at 93% power, the control rod drive biweekly surveillance test was performed. A rod urgent failure alarm was again experienced while attempting to exercise shutdown bank C in the bank select mode. The plant began a two hour trouble shooting time period permitted by technical specifications. It was determined that the same card that initiated the previous urgent failure alarm on December 8, 1980 was bad. The card was replaced and the surveillance test performed satisfactorily. No power reduction was begun because the failure alarm was cleared within the two hour time period.

Resident inspectors were in the control room during the entire event and verified that the licensee was taking the appropriate action.

Surveillance testing of the control rod drive system on Unit 1 has shown no similar failures.

No items of noncompliance were identified.

6. Inoperable Hydrogen Purge Damper (LER 50-304/80-29)

On January 14, 1980, a work request was written to repair an inoperable damper in the hydrogen purge system. The surveillance test procedure in effect did not identify this damper as affecting operability of the system. Consequently, the licensee did not initiate any special testing required by technical specifications 4.8.8.A.2. This work request was not acted on.

On January 19, 1980 the unit, which had been in cold shutdown, returned to service. Normal monthly surveillance testing on the two hydrogen purge systems was performed. The tests were successful because the existing surveillance test only checked for operation.

During filter testing of the hydrogen purge filters on April 18, 1980, the suspect damper was found to be inoperable and the filter testing could not be performed. The unit entered the allowable 15 day time period for inoperable H_2 purge systems, repaired the damper and returned the system to operable status on April 23, 1980.

Early in November, 1980, the original work request surfaced during a management audit. The audit showed that the damper in the H_2 purge system was still inoperable. The operating department was contacted. Since two work requests to repair the same damper had been written and the April, 1980 work request acted on, there was no immediate concern that the hydrogen purge system was inoperable. However, the operating department began looking into the effect of the inoperable damper on H_2 purge system operability. It was then determined by operating that this damper affected operability. Procedure changes were initiated on November 7, 1980 and a revised procedure which includes all required dampers was approved and distributed on November 26, 1980.

The resident inspector was made aware of this event on December 2, 1980. A discussion ensued as to whether the event was a 14 or 30 day LER. Since technical specifications 4.8.8.A.2. allows only 15 days operation with an inoperable H_2 purge system, the LCO was violated in the January 19, 1980-April 18, 1980 time interval. Therefore, a 14 day report was determined to be appropriate. Since the determination that the event required a 14 day report was made on December 2, 1980, the date of LER 50-304/80-29 (December 15, 1980) is acceptable and meets the 14 day notification criteria.

The hydrogen purge system consists of two redundant fans and separate dampers. Operation of the system is not automatic, but would require changing a flange position and is needed some thirty days after a hypothetical LOCA. While one damper was inoperable, this in no way affected the other redundant train which has its own damper and was operable. In addition the hydrogen recombiner system was available at all times during the event.

Since redundant equipment was available, and the system has no automatic functions, the inoperable damper in itself would have had minor safety significance. In all probability, had the system been required to function,

it would have been tested out at which time the damper could have been repaired.

The inspector found through direct inspection and discussions with the licensee that the event was reported as required, was identified by the licensee, had minor safety significance, i.e. Severity Level VI and corrective action (revised procedures) made. Therefore, as defined by the revised enforcement requirements, this will be treated as licensee identified in which no citation will be issued.

7. Missed Surveillance on Rad Monitors (LER 50-295/80-48)

Technical specifications 4.14.1.B requires calibration of the following detectors with known sources of radiation fields every six months:

1RE-0012A, Containment gaseous monitor - Unit 1

2RE-0012A, Containment gaseous monitor - Unit 2

1RT-PR09A, Containment vent and purge gaseous monitor - Unit 1

This calibration is normally accomplished using vendor supplied Kr-85. The delivery of Kr-85 from the vendor was delayed over three months. Consequently, the calibration interval of six months $\pm$ 25% was exceeded. The Kr-85 arrived October 23, 1980 and calibrations were performed October 28, 1980. The previous calibration dates were March 10, 1980, February 21, 1980, and March 7, 1980 for 1RE-0012A, 2RE-0012A, and 1RT-PR09A respectively.

The 1 and 2 RE0012A detectors sample the containment atmosphere for gaseous activity. The 1RT-PR09A detector monitors the gaseous activity released during a containment purge or vent evolution. All three detectors receive daily source checks and all were operable between calibration expiration date and re-calibration date.

Since the detectors remained operable, the safety significance was minor, i.e. Severity Level VI. The occurrance was identified by the licensee and reported within the required time period. Corrective action (detector recalibration) was performed within a reasonable amount of time. Therefore, this event is considered as licensee identified in which no citation will be issued.

8. Cross Connecting of Accumulators

In the course of routine control room observations the inspector observed that operators were cross connecting safety injection accumulators via the vent lines. This is done to raise the nitrogen pressure in an accumulator by allowing it to equalize with a higher pressure accumulator. Such pressure adjustments are permitted by System Operating Instruction No. 4. Through conversations with operating personnel the inspector determined that it should take no more than one hour for accumulator pressures to equalize. The inspector observed that in some instances the accumulators

were left cross connected for periods of two to three hours. Since the plant safety analysis does not consider the consequences of an accident with accumulators cross connected and the interconnecting vent piping is not safety grade, the inspector considered that extended operation in this manner was undesirable. The inspector expressed his concern to operating personnel and was informed that a procedure change would be issued delineating requirements to minimize the time that accumulators are left cross connected.

This item is open pending issuance of above noted procedure change (295/80-25-2;304/80-27-2).

9. Nitrogen Flow Measuring Equipment

Zion Station has begun to install and monitor nitrogen flow measuring equipment on nitrogen addition manifolds supplying cover gas to various tanks. This installation is in response to an NRC concern raised in IE Inspection Report No. 295/80-07 and 50-304/80-07 regarding possible leakage from the holdup tanks or waste gas headers.

At the present time the following tanks have been supplied with nitrogen flow measuring equipment: hold up tanks, the #1 reactor coolant drain tank, the spent resin storage tanks, and the gas decay tanks. The pressurizer relief tank on Unit 1 will receive flow measuring equipment during the refueling outage commencing on January 15, 1981.

Subject to the performance of the installed meters, the company plans to install an additional six flow instruments by the end of 1981 to upgrade the accuracy of the cover gas inventory even further. The additional flow instruments would be installed on the nitrogen supplies to the boric acid evaporators, the Unit 2 reactor coolant drain tank, the Unit 2 pressurizer relief tank, the nitrogen distribution manifold's inlet manifold, and separate meters to each of the units' volume control tanks.

This item will be carried as open item 295/80-25-3; 304/80-27-3 and followed up during future inspections.

10. Correction of Erroneous Information in Previous Inspection Report

Paragraph 12.b of IE Inspection Report 50-295/80-20; 50-304/80-21 erroneously indicated that the first nuclear plant safety review committee meeting was held October 24, 1980. This was in fact the first meeting of a re-organized Nuclear Plant Safety Review Committee. The original committee was established in April of 1980 and was subsequently re-organized.

11. Operational Safety Verifications

The inspector observed control room operations, reviewed applicable logs and conducted discussions with control room operators during the months of November and December, 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 December, 1980 the inspector examined the piping and components in the 2A, 2B, and 2C charging pump rooms, and 1A and 1B safety injection pump rooms to observe housekeeping, valve status and equipment condition.

The inspector reviewed a Unit 1 containment venting operation.

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.

12. 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.

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 activity was observed: Trouble shoot and repair shutdown bank C urgent failure condition.

Following completion of maintenance on the rod control system, the inspector verified that this system had been returned to service properly.

No items of noncompliance were identified.

13. Monthly Surveillance Observation

The inspector reviewed technical specifications required surveillance testing on the 1A and 1B containment spray pumps, 0, 1A and 1B Diesel

Generators, and Unit 1 standby DC power supplies, 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.

14. Licensee Event Reports Follow-up

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished and corrective action to prevent recurrence had been accomplished in accordance with technical specifications.

LER NO.	
	UNIT 1
80-46	Failure of 1RT-PR15
80-48	Missed Calibration of 1RE-0012, 2RE-0012, and 1RT-PR09A
80-49	Failure of 1RE-017 Component Cooling Monitor
80-50	ORT-PR25 Out of Service
80-51	PP Zone 2 Low Pressure
80-52	1RT-PR07A & B Failure
	UNIT 2
80-25	Loss of 2A Diesel Generator while 0 Diesel Generator Out of Service
80-26	Inadvertant S.I. in Hot Shutdown
80-27	PZR Level Channel 2L-461 Drifted Low
80-28	SG 2B Feed Flow Channel Reading High
80-29	Inoperative H_2 Purge System Due to Inoperative Damper

Regarding LER 50-304/80-25, the licensee has committed to magnetic particle testing of diesel generator lube oil pump piping to check for

vibration induced cracking. This item is open pending completion of magnetic particle testing of subject piping on all diesel generators. (295/80-25-4; 304/80-27-4)

Regarding LER 50-304/80-29, this will be classified as a licensee identified item of noncompliance in which no citation will be issued since it resulted in an event of Severity Level VI, was identified and corrected by the licensee and was reported to the NRC as required by technical specification; see paragraph 6 for details.

Regarding LER 50-295/80-48, this will be classified as a licensee identified item of noncompliance in which no citation will be issued since it resulted in an event of Severity Level VI, was identified and corrected by the licensee, and was reported to the NRC as required by technical specification; see paragraph 7 for details.

No items of noncompliance were identified.

15. IE Bulleting 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, and that corrective action taken by the licensee was as described in the written response.

IEB NO.	
80-21	Valve yokes supplied by Malcolm Foundry Co., Inc.
80-23	Failures of solenoid valves manufactured by Valcor Engineering Corporation

No items of noncompliance were identified.

16. 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. Four unresolved items were disclosed during this inspection.

17. Exit Interview

The inspectors met with licensee representatives (denoted in Section 1) throughout the inspection period and at the conclusion of the inspection on December 31, 1980 and summarized the scope and findings of the inspection activities.

The licensee acknowledged the inspectors' comments.