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

REGION III

Report No. 50-295/79-20; 50-304/79-19

Docket No. 50-295; 50-304 License No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

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

Inspection At: Zion Site, Zion, IL

Inspection Conducted: September 1-30, 1979

Inspector: R. L. Spessard
J. E. Kohler for 10/17/79

Approved By: R. L. Spessard
R. L. Spessard, Chief 10/17/79
Reactor Projects Section 1

Inspection Summary

Inspection on September 1-30, 1979 (Report No. 50-295/79-20; 50-304/79-19)
Areas Inspected: Routine, unannounced inspection of reactor operation, maintenance, IE Bulletin followup, licensee event reports, physical security, changing pump shaft material, RHR system restraint nonconformances and non-routine events. The inspection involved 76 inspector-hours onsite by one NRC inspector.
Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

N. Wandke, Station Superintendent
*C. Schumann, Operating Assistant Superintendent
*L. Soth, Administrative Assistant Superintendent
*E. Murach, Maintenance Assistant Superintendent
R. Ward, Unit 2 Operating Engineer
*E. Fuerst, Unit 1 Operating Engineer
*J. Marianyi, Technical Staff Supervisor
J. Gilmore, Assistant Technical Staff Supervisor
J. Reiss, Technical Staff Engineer
J. Joosten, Technical Staff Engineer
J. Montgomery, Maintenance Engineer
A. Rasmussen, Maintenance Engineer
P. LeBlond, Technical Staff Engineer
T. Parker, Assistant Technical Staff Supervisor
*P. Kuhner, Quality Assurance
L. Pruett, Shift Engineer
G. Armstrong, Shift Engineer
R. Landrum, Nuclear Station Operator
D. Kaley, Nuclear Station Operator
R. Turner, Shift Foreman
F. Lentine, Shift Foreman

*Denotes those persons present at the exit interview.

2. Monthly Operating Summary

Unit 1

The unit operated at power levels up to 95%. One unscheduled shutdown occurred on September 24, 1979 when a malfunction in the rod control system was discovered during surveillance testing. Unit 1 began coastdown in preparation for the scheduled refueling on October 6, 1979.

Unit 2

The unit operated steady at approximately 95% power. One reactor trip occurred on September 11, 1979 due to the loss of a DC bus which was bumped into by a maintenance employee.

3. Maintenance

Station maintenance activities of safety related systems and components were reviewed to ascertain that they are conducted in accordance with approved procedures, regulatory guides and industry codes or standards and in conformance with Technical Specification requirements.

The following items were considered during this review: the limiting conditions for operations were met while components or systems were removed from service; approvals were obtained prior to initiating the work; maintenance activities were accomplished using approved procedures; maintenance activities were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to an operating status; quality control records were maintained for maintenance activities; and maintenance activities were accomplished by qualified personnel.

The inspector observed maintenance in progress concerning the following work requests: Unit 1 RHR pipe restraints, Unit 2 RHR pipe restraints and Unit 2 turbine shaft. The inspector reviewed the following completed work packages: Unit 1 and 2 component cooling water pipe restraints. Unit 1 Rod Control System Malfunction.

No items of noncompliance were identified.

4. Plant Operations

The inspector reviewed the plant operations including examinations of control room log books, routine patrol sheets, shift engineer log book, equipment outage logs, special operating orders, and jumper and tagout logs for the month of September 1979. The inspector observed plant operations during three offshifts during the month of September 1979. The inspector also made visual observations of the routine surveillance and functional tests in progress during the period. This review was conducted to verify that facility operations were in conformance with the requirements established under Technical Specifications, 10 CFR, and Administrative Procedures. A review of the licensee's deviation reports for the period was conducted to verify that no violations of the licensee's Technical Specifications were made. The inspector conducted a tour of auxiliary and turbine buildings throughout the period and noted that the monitoring instrumentation was recorded as required, radiation controls were properly established, fluid leaks and pipe vibrations were minimal, seismic restraint oil levels appeared adequate, equipment caution and hold cards agreed with control room records, plant housekeeping conditions/cleanliness were adequate, and fire hazards were minimal. The inspector observed shift turnovers to verify that plant and component status and problem areas were being turned over to relieving shift personnel.

The following nonroutine events were followed up by the inspector:

a. Unit 2 Reactor Trip September 12, 1979

At 1056 hours on September 12, 1979, with Unit 2 at 95% power, a reactor trip occurred. The cause of the trip was indicated to be Reactor Coolant Pump Bus Undervoltage and loop 1 and 2 low flow.

Further investigation revealed that an electrician had bumped a key lock from the 011 Battery which feeds the 011-2 Battery Bus. Bumping the key caused the 011-2 battery feed breaker to trip which resulted in a partial loss of reactor protection and subsequent reactor trip.

The resident inspector was in the control room at the time the trip occurred. All safety systems were verified to be operating as required.

b. Unit 2 Reactor Turbine Vibration

During the reactor startup following the Unit 2 reactor trip on September 12, 1979, excessive vibration was recorded on control room turbine vibration monitoring equipment. The vibration was coming from the turbine shaft.

Further investigation determined that the shaft had been taken off the turning gear for a period of time in excess of the two hours specified by the maintenance engineer while trouble shooting an unrelated event on the number 4 bearing. While the shaft was off of the turning gear, differential cooling caused the shaft to heat up on the top and cool down on the bottom. The temperature differential caused an upward bow in the shaft.

The high point of the eccentricity was found and rotated to the top. The eccentricity was then rotated 180° to the bottom. The shaft sat idle for about an hour while a differential temperature expansion caused the high point to migrate to the top of the shaft.

Subsequently, the turbine was rolled on September 13, 1979 through turbine criticals without trip points coming in. The reactor was on the line at about 1500 hours on September 13, 1979.

The inspector observed work performed while locating the shaft eccentricity and observed measurements taken on the shaft during corrective action. The inspector further observed the turbine roll through criticals and sink on to grid.

c. Unit 1 Rod Control System Malfunction

Unit 1 was taken off the line on September 24, 1979 after a malfunction was discovered in the rod control system while performing PT-1. The malfunction was found to be caused by a bad pulsar card which was replaced.

The resident inspector reviewed the completed maintenance packages associated with this event.

No items of noncompliance were identified.

5. Physical Protection - Security Organization

The inspector verified by observation that at least one full time member of the security organization who has the authority to direct the physical security activities of the security organization was onsite at all times; verified by observation that the security organization was properly manned for all shifts; and verified by observation that members of the security organization were capable of performing their assigned tasks.

No items of noncompliance were identified.

6. Physical Protection - Physical Barriers

The inspector verified that certain aspects of the physical barriers and isolation zones conformed to regulatory requirements and commitments in the physical security plan (PSP); that gates in the protected area were closed and locked if not attended; that doors in vital area barriers were closed and locked if not attended; and that isolation zones were free of visual obstructions and objects that could aid an intruder in penetrating the protected area.

No items of noncompliance were identified.

7. Physical Protection - Access Control (Identification, Authorization, Badging, Search, and Escorting)

The inspector verified that all persons and packages were identified and authorization checked prior to entry into the protected area (PA), all vehicles were properly authorized prior to entry into a PA, all persons authorized in the PA were issued and displayed identification badges, records of access authorized conformed to the PSP, and all personnel in vital areas were authorized access; verified that all persons, packages, and vehicles were searched in accordance to regulatory requirements, the PSP, and security procedures; verified that persons authorized escorted access were accompanied by an escort when within a PA or vital area; and verified that vehicles authorized escorted access were accompanied by an escort when within the PA.

No items of noncompliance were identified.

8. Review and Followup on Licensee Event Reports

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.

Unit 1	Unit 2
79-01	79-08
79-17	79-36
79-42	79-38
79-44	79-40
79-48	79-41
79-51	79-42
79-52	79-43
79-53	79-44
79-56	
79-57	
79-63	

With respect to Unit 1 LER 79-63, which involved the failure to close a redundant containment isolation valve, and thus, resulted in a violation of containment integrity for a 12 hour period, this is considered a licensee identified item of noncompliance.

No other items of noncompliance were identified.

9. 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.

79-21, Temperature Effects on Level Measurements

79-19, Packaging Low-Level Radioactive Waste for Transport and Burial

79-18, Audibility Problems Encountered on Evacuation

79-16, Vital Area Access Controls

No items of noncompliance were identified.

10. Notch Sensitive Shaft Material in Charging Pumps

IE informed RIII that shaft material for the two centrifugal charging/ safety injection pumps at Zion 1 was notch sensitive and was from the same heat numbers used in shafts which had failed in 1977 and 1979. Based on this information, RIII requested the licensee to evaluate this matter, and the following information has been reported by the licensee:

The shaft material for the Unit 1 pumps, while suspect, is not conclusively known to be notch sensitive. This is based on the licensee's October 1977 inspection of the pump shafts (coupling end) when the heat numbers were obtained and reported to Westinghouse. These shafts have approximately 20,000 hours of operation, and the vibration data for these pumps (measured monthly) indicate no changes in baseline vibration since measurements began in 1976.

The shaft material for the Unit 2 pumps has been determined (by inspection and review of heat numbers by Westinghouse) not to be notch sensitive.

Further investigation by the licensee was performed during the inspection; however, the heat numbers for 1A and 1B charging pumps could not be ascertained. Brinell hardness numbers were taken by CECo Operational Analysis Division personnel and were determined to have a Brinell hardness value of 25 on the Rockwell C scale. This value is within the hardness tolerance (24-28Rc) specified by Westinghouse for shafts fabricated with the re-tempered heat treatment process, and would indicate that the present shafts in the 1A and 1B charging pumps are satisfactory (metallurgically) for continued duty.

The licensee is continuing the investigation. Resolution of this item is expected to be obtained during the Unit 1 refueling outage scheduled for October 6, 1979. This item is designated an unresolved item. (295/79-20-01)

No items of noncompliance were identified.

11. RHR Piping Restraint Nonconformances

On September 17, 1979, while pursuing IEB No. 79-02, the licensee identified a potentially underdesigned seismic anchor point in the RHR system. The restraint anchors a four-way pipe junction and is mounted to the ceiling in the auxiliary building. The piping involves the cross tie between train A and train B downstream of the RHR heat exchangers. The restraint conforms to the as-built piping isometric and is the same on both Units.

The A-E (Sargent and Lundy) advised that should RHR cold leg injection be required during a seismic event, the as-built anchor point may not be adequate. Should the anchor separate from the ceiling, the A-E advised that the piping system forces would exceed 1/2 yield, but would be below ultimate yield.

A short term fix, recommended by the A-E, was the immediate fabrication and installation of two temporary pipe supports or saddles that would rest underneath the RHR piping and serve as a support should the four-way piping junction become detached. This fix was completed on both Units within 24 hours. The A-E made an engineering judgment regarding the adequacy of the temporary fix and planned to back up this judgment with calculations by 1500 hours on September 18, 1979. A permanent fix was expected to take two to three weeks.

The licensee received the results of the A-E's analysis which showed that the temporary fix was not adequate and that three additional rigid restraints (sway struts) would be necessary on each Unit so that the RHR Piping would be restrained in three axes, as the original four-way anchor provided. The licensee completed the necessary sway struts installation on September 19, 1979.

Both Units 1 and 2 were operating at time of discovery and continued to operate while corrective actions were being implemented. This decision was based on earthquake criteria established in the snubber Technical Specification which allow 72 hours of operation while repairs are made. An LER (Prompt) was submitted by the licensee.

The resident inspector reviewed the work in progress during installation as well as completed work packages. During the Unit 1 outage the temporary restraints are planned to be upgraded to permanent quality. This item is designated an unresolved item. (295/79-20-02)

No items of noncompliance were identified.

12. Meetings Attended

The resident inspector attended the following meetings offsite during the inspection period:

September 6-9, 1979	ACRS	Washington, DC
September 20, 1979	CECo Corporate HQ	Chicago, IL
September 21, 1979	TMI Lessons Learned	Rosemont, IL

13. Regional Director Visit

The NRC Region III Director, Mr. James Keppler visited the resident inspector at the site on September 27, 1979. The purpose of the visit was to assess the progress to date of the initial resident inspector deployment from an operational and an administrative standpoint.

Mr. Keppler met informally with Mr. Wandke, Zion Station Superintendent during the visit.

14. 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. Unresolved items disclosed during the inspection are discussed in Paragraphs 10 and 11.

15. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) throughout the month and at the conclusion of the inspection on September 28, 1979 and summarized the scope and findings of the inspection activities. The licensee acknowledged the information presented which included a licensee identified item of nonconformance.

Additionally, the licensee and the inspector discussed the performance of the scheduled Unit 1 ECCS integrated actuation test. The discussion was related to the status of the Unit 1 ECCS during the test, the steps taken to minimize ECCS equipment out of service and the optimum time during the refueling outage to perform the test.