

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-295/89033(DRP)

Docket No. 50-295

License No. DPR-39

Licensee: Commonwealth Edison Company
P.O. Box 797
Chicago, IL 60690

Facility Name: Zion Nuclear Power Station, Unit 1

Inspection At: Zion, Illinois

Inspection Conducted: September 25 through October 5, 1989

Inspector: D. R. Calhoun

Approved By: *W.D. Shaffer for*
J. M. Hinds Jr., Chief
Reactor Projects Section 1A

10-17-89
Date

Inspection Summary

Inspection on September 25 through October 5 (Report No. 50-295/89033(DRP))

Areas Inspected: Special, safety inspection conducted by the project inspector of the licensee's failure to establish two operable flow paths from the motor-driven auxiliary feedwater (MDAFW) pumps to the steam generators (S/G) after the 1A turbine-driven auxiliary feedwater (TDAFW) pump was declared inoperable, within the time allowed by the action requirement.

Results: In the area inspected, one apparent Technical Specification violation was identified.

DETAILS

1. Persons Contacted

Commonwealth Edison Company

- *T. Rieck, Superintendent, Technical
- *W. Stone, Regulatory Assurance Supervisor
- *T. Saksefski, Regulatory Assurance Engineer
- *B. T'Niemi, Tech Staff Supervisor
- *C. Beinecke, Tech Staff Engineer
- *M. Carnahan, Operation Engineer
- *C. Moser, Regulatory Assurance
 - C. Gasner, Station Control Room Engineer
 - M. Stracka, Shift Engineer
- *S. Yuen, Technical Staff Engineer
- *G. Levy, Regulatory Assurance
 - L. Thorsen, Master Surveillance Coordinator
 - D. Kaley, Procedure Coordinator
 - M. Bennet, Training Instructor
 - M. Rdzok, Equipment Operator

NRC Resident

- *J. D. Smith, Senior Resident Inspector

*Indicates persons present at the Telecon exit interview.

2. Operation of Unit 1 with an inoperable flow path from the 1B AFW pump to the steam generators (S/G) in violation of Technical Specifications (71707)

Background

The auxiliary feedwater system at the Zion station is used to provide adequate cooling water to the Steam Generator (S/G) in the event of a unit trip concurrent with a loss of offsite power.

The AFW system consists of two subsystems, one of which utilizes a single turbine-driven pump, the other consisting of two motor-driven pumps. All three pumps are each capable of delivering the required amount of feedwater to all steam generators; however, the turbine-driven pump has twice the capacity of either motor-driven pump.

The AFW flow rates are control by throttling each of the motor-operated valves in the two auxiliary feedwater lines. Therefore, when the AFW system is set-up in its off-normal configuration, when the 1B pump is connected to the TDAFW pump header, the AFW throttle valves have to be reset in order to obtain the required flow rates.

Event Chronology

At approximately 6:40 p.m., on July 23, 1989, the 1A TDAFW pump was declared inoperable after failing a special test, TSSP 151.89. The test was performed by the tech staff personnel, to verify operability of the pump's manual overspeed trip mechanism. As the next course of action, the licensee started PT-14, No. 89-1-287, which is the mechanism used to track the LCO clock for inoperable equipment. At 7:40 p.m., the licensee split the AFW header by performing SOI-10, Section 4.3, AFW Pump Split Header Lineup, Revision 3; in order to meet Technical Specification requirements.

After the header was split, the Tech Staff engineer asked the operations staff when the motor-driven auxiliary feedwater pumps would be run to verify flow path operability. The operations personnel determined that there was no need to reverify the flow rates because a monthly PT-7, Auxiliary Feedwater System Checks and Test, had been successfully performed on all three pumps. Therefore, the operations crew concluded that there was no need for reverification because an operable pump (1B) was being connected to an operable header (1A). This logic had been standard practice at Zion.

The Tech Staff engineer followed-up on the issue the following morning on the first shift; and as a result, more Tech Staff and Operations personnel became involved. After several hours of analyzing and investigating the event, a concerted decision was made to run the pumps. At 11:48 a.m. on July 24, 1989, the 1B AFW pump was ran to determine flow path operability. The as-found flow rates from the pump to the S/Gs were inadequate (97 gpm to A, 88 gpm to B, 99 gpm to C, 92 gpm to D). After this deficiency was discovered, the proper AFW flow settings were valved in to obtain the required flow rates of 105 gpm to each S/G. The 1C AFW pump was also ran, to verify a second operable flow path. The test results indicated adequate flow rates of 105 gpm to each steam generators.

When the licensee had finally established two operable flow paths, the 8 hour time limit of Technical Specification action statement 3.7.2.c had been exceeded by 9 hours and 8 minutes.

Safety Significance

With the 1B pump flow rates being inadequate, the 1C pump was the only pump available to meet the required flow conditions. Therefore, based on single failure analysis, if the 1C pump was lost, it would have rendered the AFW system potentially unable to perform its intended function.

Concerns

The licensee took an excessive amount of time to determine that a safety function was lost.

Enforcement

Technical Specification 3.7.2.c requires that two operable flow paths shall be established from the MDAFW pumps to the steam generators within 8 hours, from the time the TDAFW pump is declared inoperable. Unit 1 operated at power levels up to 100% from 6:40 p.m. on July 23, 1989, to 11:48 a.m. on July 24, 1989, which exceeds the time allotted by Technical Specifications by nine hours and eight minutes, prior to establishing two operable flow paths from the MDAFW pumps to the steam generators. This is considered a violation of Technical Specifications (295/89033-01(DRP))

Corrective Actions

As immediate corrective actions, the licensee tested both the 1B and 1C AFW pumps. When inadequate flow rates were discovered from the 1B pump, proper AFW flow settings were valved in.

The licensee also revised the applicable section of SOI-10, which now requires reverifying the 1B pump flow rates after splitting the AFW header; and PT-7 was revised to specify AFW flow requirements following testing or header realignment. Also, an initial preliminary analysis was performed to ascertain that as-found flow conditions were within accident analysis.

For long term corrective actions, the licensee will provide a final analysis for the Loss of Normal Feedwater and a Technical Specification change will be made to provide a definition for flow path operability.

3. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) throughout the inspection period and held a telecon exit at the conclusion of the inspection on October 5, 1989, to summarize the scope and findings of the inspection activities. The licensee acknowledged the inspector's comments. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary.