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

REGION III

Report No.: 50-254/79-17

Docket No.: 50-254 License No.: DPR-29

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

Facility Name: Quad Cities Nuclear Power Station, Unit 1

Inspection At: Cordova, Illinois

Inspection Conducted: June 26-29, 1979

Inspector: RFW for E. T. Chow 7-12-79
Date

Approved By: RFWarnick for J. F. Streeter, Chief 7-12-79
Nuclear Support Section 1 Date

Inspection Summary

Inspection on June 26-29, 1979 (Report No. 50-254/79-17)
Areas Inspected: Routine, unannounced inspection of control rod scram time tests; control rod sequence and reactivity checks; determination of shutdown margin; determination of reactivity anomalies. The inspection involved 25 inspector-hours onsite by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

*N. Kalivianakis, Superintendent
*G. Spedl, Lead Nuclear Engineer
*T. Lihou, Assistant Lead Nuclear Engineer
B. Strub, Nuclear Engineer
*J. Heilman, QA Engineer
R. Soenksen, Instrumentation Foreman
G. Tietz, Thermal Engineer
*N. Chrissotimos, Resident Inspector

*Denotes those present during the exit interview.

2. Verification of Conduct of Startup Physics Testing

The inspector reviewed the startup physics testing and verified that the licensee conducted the following:

(a) Control Rod Scram Time Tests

(b) Control Rod Sequence and Reactivity Checks

(c) Core Power Distribution Limits

(d) LPRM Calibration

(e) APRM Calibration

(f) Core Thermal Power Evaluation

(g) Determination of Shutdown Margin

(h) Determination of Reactivity Anomalies

3. Control Rod Scram Time Tests

The inspector reviewed information relating to Cycle 5 control rod scram time tests as described in Quad-Cities Technical Staff Surveillance Procedure QTS 130-4, "Control Rod Scram Timing".

The Technical Specifications limit the average scram insertion time of all of the operable control rods to 3.5 seconds for 90% insertion, and the average scram insertion time for the three fastest control rods of all groups of four rods in a two by two array to 3.8 seconds for 90% insertion.

The inspector noted that prior to scram time tests, the licensee verified the original fully withdrawn positions of control rods and measured the accumulator pressures. The results which were based on scram testing of 177 control rods indicated that the maximum 90% insertion time was 3.34 seconds for Control Rod Drive N-9, and Technical Specifications requirements were met.

The inspector noted that the summary report dated May 8, 1979 of the Cycle 5 startup test which was submitted to NRC contained typing errors in the average scram time for 90% insertion for both criteria. The licensee stated that a letter of correction would be submitted to NRC.

No items of noncompliance or deviations were identified.

4. Control Rod Sequence and Reactivity Checks

The inspector reviewed information relating to Cycle 5 control rod sequence and reactivity checks as described in Quad-Cities Temporary Procedure 1193, "Initial Insequence Criticality Estimate Evaluation", dated February 24, 1979.

The inspector noted that with Control Rod Sequence B1 and Rod J9 at position 04, the reactor was critical at 194°F on February 26, 1979. The difference between the reactivity of the actual critical rod pattern and that of the GE predicted pattern at 68°F was -0.1696% which included the effects due to discrepancy between rod patterns, temperature difference, and period correction.

The inspector concluded that the results met the acceptance criterion.

No items of noncompliance or deviations were identified.

5. Determination of Shutdown Margin

The inspector reviewed information relating to Cycle 5 determination of shutdown margin as described in Quad-Cities Technical Staff Surveillance Procedure QTS 1104-1, "Shutdown Margin Face Adjacent Rod Subcritical Demonstration". The acceptance criterion for shutdown margin is that if a shutdown margin of 0.29% of reactivity cannot be demonstrated with the strongest control rod fully withdrawn, the core loading must be altered to meet this margin.

The inspector noted that GE supplied the rod worth curve for Rod K8, the strongest worth rod, and J8, the strongest worth face adjacent rod. The inspector noted that on February 26, 1979, Rod K8 was fully withdrawn and Rod J8 was withdrawn to position 06, the reactor was still subcritical at 205°F; a shutdown margin was determined to be at least 0.94% of reactivity.

The inspector concluded that the acceptance criterion was met.

No items of noncompliance or deviations were identified.

6. Determination of Reactivity Anomalies

The inspector reviewed information relating to Cycle 5 determination of reactivity anomalies as described in QTS 1300-S1, "Anomaly Surveillance Data Sheet", dated June 18, 1979.

The Technical Specifications require that the reactivity equivalent of the difference between the actual rod configuration and the expected configuration during power operation shall not exceed 1% delta K, and a comparison will be made at least every equivalent full power month.

The inspector noted that GE supplied a reactivity anomaly curve at rated conditions. The curve depicted the total expected number of control rod positions inserted as a function of exposure in Cycle 5. The inspector further noted that GE provided a procedure for calculating reactivity anomaly. The procedure utilized normalization coefficients of core power, core flow, inlet enthalpy and core pressure to apply the reactivity anomaly curve to conditions other than rated.

The inspector verified that the determination of reactivity anomalies was performed at least every equivalent full power month. The results indicated that the difference between the actual rod configuration and the predicted one contributed to a reactivity anomaly of 0.012% which met the Technical Specification requirement.

No items of noncompliance or deviations were identified.

7. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on June 29, 1979. The inspector summarized the purpose and the scope of the inspection and the findings.