

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

Region I

Report No. 50-311/81-30

Docket No. 50-311

License No. DPR 75 Priority - Category C

Licensee: Public Service Electric and Gas Company

80 Park Plaza - 15A

Newark, New Jersey 07101

Facility Name: Salem Nuclear Generating Station - Unit 2

Inspection at: Hancocks Bridge, New Jersey

Inspection conducted: November 23 - 25, 1981

Inspectors: *L. H. Bettenhausen* 1/4/82
L. H. Bettenhausen, Ph.D. date signed

G. W. Meyer 1/4/82
G. W. Meyer, Reactor Inspector date signed

for *P. K. Eapen* 1/4/82
P. K. Eapen, Ph.D., Reactor Inspector date signed

Approved by: *S. D. Ebnetter* 1/6/82
S. D. Ebnetter, Chief date signed
Engineering Inspection Branch, DETI

Inspection Summary:

Inspection during November 23 - 25, 1981 (Report 50-311/81-30)

Areas of Inspection: Routine unannounced inspections of startup test program, test data, review of test results and conclusions by region based inspectors. The inspection involved 45 hours onsite by two region based inspectors and a supervisor.

Results: No items of non-compliance were identified.

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Details

1. Persons Contacted

Public Service Electric and Gas Company

- * A. C. Darelius, Quality Assurance
- * J. Driscoll, Chief Engineer
- * J. Jackson, Senior Reactor Staff Supervisor
- * J. O'Connor, Radiation Protection Senior Supervisor
- * J. L. Stillman, Quality Assurance

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- * W. Hill, Resident Inspector
- * M. McBride, Radiation Specialist
- * K. Plumlee, Radiation Specialist

The inspectors also talked with other licensee personnel during the course of the inspection, including operations, performance, maintenance and quality assurance personnel.

- * Present at the exit meeting, conducted jointly for inspections 50-311/81-30 and 50-272/81-30.

2. Actions on Previous Inspection Items

(Closed) Unresolved Item (311/81-22-01), RTD Response Time

The inspector reviewed the detailed analysis of the transient response for the hot leg RTD during the Generator Trip Test conducted on September 2, 1981. The analysis showed that RTD response time met acceptance criteria. The operation of the main steam relief valve was adequately explained. There were no further questions on this item.

3. Unit 2 Startup Test Data Review

The inspector reviewed completed test data for the following:

- identification of deficiencies or exceptions to test and their resolutions,
- proper administrative review of test changes, annotation of change in test procedure and verification that the changes did not alter test objectives,
- verification that test data and procedure steps were properly recorded, initialed and dated,

- Engineering Analysis and Evaluations of test results, including comparison of results with acceptance criteria,
 - Review and acceptance of test results in accordance with the startup manual.
- a. Test Program Review

- SUP 80.1, NSSS Startup Sequence, is the governing procedure for sequencing the required tests from initial core load to licensed full power operation. The completed test document, including procedures used, changes incorporated and exceptions taken, was reviewed and accepted by the Startup Group on November 4, 1981 and SORC on November 10, 1981.

The test program followed the sequence prescribed in SUP 80.1 with the following exceptions:

1. 21 changes were made to the Procedure.
2. 12 exceptions and test deficiencies were identified during the course of testing.

These exceptions and changes were reviewed and approved.

Listed below are some of the significant changes and exceptions to SUP 80.1:

- Step 10.6.3

The feed and condensate system performance test required by this step was not conducted to avoid an inadvertent trip of feed/condensate pumps. Problems with suction pressure and trips of feed and condensate pumps are under active investigation by the engineering staff. However, sufficient data was taken to establish the performance at the operating points specified.

- Appendix E

Snubber Data Collection required by Appendix E within the bioshield was deferred until the post startup outage.

- Step 10.5.12

This step was changed to compare the actual 100% values of T_{ave} and T_{ref} , instead of the extrapolated values at 100%, to the design values. T_{ref} was re-programmed using actual operating data at and below 100% of the Rated Thermal Power (RTP).

- Initial power coefficient measurements at 93% and 95% Rated Thermal Power did not meet the acceptance criteria for this test. Subsequent tests performed on 10/14/81 met the acceptance criteria.
- The initial moisture carryover test per SUP 82.7 failed to meet the acceptance criteria. A subsequent test on 10/12/81 met the acceptance criteria.
- SUP 82.8, NSSS Acceptance, was accepted by station management with a 68 hour continuous run above 95% RTP versus the acceptance criterion of 100 hours above 95%. The unit had accumulated 243 hours of operation above 95% at the time this acceptance was made.

b. Power Plateau Tests

- SUP 80.7, Startup Adjustment of the Reactor Control System, was reviewed and approved by the SORC on November 10, 1981. The tests did not require any changes, exceptions or deviations.
- SUP 81.7, Calibration of Steam and Feedwater Flow Instrumentation at Power, was completed on October 19, 1981. No changes were required to perform this procedure. The SORC reviewed and accepted this test report on November 10, 1981. The inspector reviewed the procedures and the calibration data and concluded that the calibration was conducted in accordance with adequate test and calibration procedures.
- SUP 81.11, Incore-Excore Calibration, was completed on August 5, 1981. The Startup Group and the SORC reviewed and accepted the results and conclusion of SUP 81.11 on September 23, 1981 and November 10, respectively. One change to the procedure and one exception to a procedure step during this calibration were duly implemented and approved. The inspector found this test report adequate, except that plots of incore vs. excore axial offset were not made for a number of cases. This was discussed with the licensee representatives. The licensee attributed this to the recent change of calculations from manual to computer. The computer calculation provides the mathematical form for the plot, but not the plot itself. The licensee advised the inspector that the necessary corrective actions, including a revision to Part 7 of the Reactor Engineers Manual and expansion of the computer calculations to generate the plots, will be instituted prior to the submittal of the Startup Report.
- SUP 81.12, State Point Data, was completed October 16, 1981, reviewed by the Startup Group and reviewed and approved by SORC on November 10, 1981. No changes to the procedure were

made, nor were any exceptions or deficiencies identified. The procedure is a compilation of plant data obtained at equilibrium conditions at each power plateau. The inspector had no further questions.

c. Transient Tests

- SUP 81.8, Power Coefficient and Integral Power Defect Measurements, was completed on October 15, 1981. Subsequent to the review by the Startup Group, the SORC reviewed and accepted these measurements on November 10, 1981.

No changes were required to the procedure. Two exceptions were taken to the procedural steps to accommodate operational characteristics of the core at the beginning of life.

These measurements were generally acceptable, except that a transcriptional error was noted in the calculations required to demonstrate compliance with acceptance criteria. The inspector discussed this matter with the licensee representatives, and the licensee agreed to complete a review of the calculations and comparison of results to acceptance criteria prior to the issuance of the Startup Report.

- SUP 82.9, Generator Trip from 100% Power, was performed on September 2, 1981. The results were reviewed by the Startup Group on September 23, 1981; SORC reviewed and approved these on November 10, 1981. Two changes were made to SUP 82.9. An exception was taken to the test conditions to accommodate the test requirements for SUP 90.9 which immediately followed this test.

The inspector found the Generator Trip Test acceptable after reviewing original test data and charts. A lack of explanatory notes showing how all acceptance criteria were met was discussed with licensee staff. The licensee agreed to review the test information in the course of preparing the Startup Test Report and add these explanatory notes to the test package.

- SUP 82.2, Large Load Reduction Tests, was performed on September 11, 1981. The Startup Group reviewed and approved this report on September 24, 1981. SORC reviewed and accepted the report on November 10, 1981. The management approved one change to SUP 82.2. This test required no exception from the SUP 82.2 procedural steps. The inspector found the test report to be adequate, except for the lack of explanatory notes to clearly demonstrate acceptance of the test results. The inspectors discussed this matter with the licensee staff. The licensee agreed to review the report and incorporate explanatory notes where clarification is required.

-- SUP 90.9, Boron Mixing and Cooldown Tests, was conducted on September 2, 1981. The Startup Group reviewed the test report on September 22, 1981. The SORC reviewed and approved the report on November 10, 1981. The management reviewed and approved one change to SUP 90.9. During the test, 130 ppm boron was added to the reactor coolant. The system took five hours to reach boron equilibrium concentration after the addition. The test also demonstrated a reactor coolant system cooldown of 65°F over a period of 4 hours following attainment of boron equilibrium concentration.

The inspector reviewed the procedures, results and conclusions and had no further questions on this matter.

4. Exit Interview

An exit interview was held with licensee representatives (participants identified in paragraph 1) on November 25, 1981. The purpose, scope and findings of this inspection were presented.