



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA ST., N.W., SUITE 3100
 ATLANTA, GEORGIA 30303

Report No. 50-395/82-52

Licensee: South Carolina Electric and Gas Company
 Columbia, SC 29218

Facility Name: V. C. Summer

Docket No. 50-395

License No. NPF-12

Inspection at Summer site near Jenkinsville, SC

Inspector: *P. T. Burnett* *2 Nov 82*
 P. T. Burnett Date Signed

Approved by: *Frank Jape* *11/3/82*
 F. Jape, Section Chief Date Signed
 Engineering Inspection Branch
 Division of Engineering and Technical Programs

SUMMARY

Inspection on October 19-25, 1982

Areas Inspected

This routine, unannounced inspection involved 62 inspector-hours on site in the areas of precritical data review, witness of initial criticality, and witness of low power tests.

Results

For the three areas inspected, no violations or deviations were identified in either of two areas; and one apparent violation was found in one area (Inadequate surveillance procedure - paragraph 5).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

O. S. Bradham, Station Manager
*J. G. Connelly, Deputy Station Manager
*L. F. Storz, Assistant Manager - Operations
*B. G. Croley, Assistant Manager - Technical Support
M. D. Quinton, Assistant Manager - Maintenance Services
K. Woodward, Supervisor of Operations
*S. F. Fipps, Director of Technical Services
G. Taylor, Reactor Engineer
L. Faltus, Chemistry Supervisor
*M. N. Browne, ISEG
*A. B. Harrison, Nuclear Licensing
*H. C. Fields, Technical Services Engineer
*A. R. Koon, Technical Services Coordinator

Other licensee employees contacted included four shift supervisors, six operators, four test engineers, and four office personnel.

Other Organizations

Westinghouse Electric Corporation

L. A. Wooldridge
C. Bowman

NRC Resident Inspector

J. C. Skolds, Senior Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 25, 1982, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings and commitments described below.

Violation, 395/82-52-01: Inadequate procedure - paragraph 5.

Inspector followup item, 395/82-52-02: Confirm acceptability of flow and coastdown rates at fifty percent power - paragraph 5 (not discussed at the exit interview).

Inspector followup item, 395/82-52-03: Evaluate alternative alternate dilute modes for use with new cores - paragraph 6.b.

Inspector followup item, 395/82-52-04: Perform an engineering evaluation addressed to minimizing radiation exposure in taking pressurizer boron samples - paragraph 7.a.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Precritical Data Review (72596)

Testing of reactor protection trip circuits and manual scram functions were confirmed from review of the operations log for the period October 18-24, 1982, and review of GOP-3, "Reactor Startup from Hot Standby to Startup (Mode 3 to Mode 2)".

Review of HST-10, "Rod Drop Time Measurement RCS Hot-Full Flow", Revision 0 (incorporating changes 1-4) confirmed that the drop time for each rod cluster control assembly (RCCA) was less than the 2.3-second limit of technical specification 3.1.3.4.

Review of STP-114.002, "Operational Leak Test", Revision 0 revealed it to be inadequate to accomplish reliably the surveillance required by technical specification 4.4.6.2.1.d. The procedure in step 5.2 allowed temperature to vary plus or minus one degree from the average RCS temperature. In step 6.7, a minimum test duration of one hour was specified. No correction for a change in RCS temperature over the test period was implemented by the procedure. Failure to account for a one degree temperature rise in a one-hour test period would lead to underestimating the RCS leak rate by more than one gallon per minute at no-load conditions, and by about 1.3 gallons at full-load conditions. Additionally, the procedure did not account for changes in pressurizer level. Since the procedure could not reliably accomplish the required surveillance, the licensee was in violation of the basic requirement to have surveillance procedures, technical specification 6.8.1.C. (Violation 395/82-52-01).

Review of ZPT-1, "Initial Criticality" confirmed that the source range high level trips had been set at 100,000 cps (step 3.3.7.1), and prior to withdrawing RCCAs, a successful statistical reliability test (Chi-squared test) had been obtained for each source range channel (step 6.5).

Review of HST-3, "Rod Position Indication" confirmed that the digital rod position indication system (DRPI) for each rod indicated within plus or minus four steps of the respective demand (step) counter when tested.

However, during the approach to initial criticality and in the startup after the first scram, one DRPI gave momentary false indication of a dropped rod. This was judged to be an operational inconvenience to be corrected during a later maintenance outage. During the first scram, another DRPI gave false indication of a stuck rod. That was corrected by replacing a circuit board prior to restart.

Proper mechanical operation of the incore movable detectors was confirmed through test CST-4, "Incore Movable Detector System Checkout". HST-1, "RTD/Thermocouple Cross Calibration" confirmed proper operation of those instruments. Following discussions of the two tests with the test engineers, the inspector had no further questions.

Flow coastdown, hot flow, and flow characteristics with the core in place, were measured using tests HST-4, "Reactor Coolant System Flow Measurements" (Revision 8, incorporating changes 1-3), and HST-5, "Reactor Coolant System Flow Coastdown" (Revision 0, incorporating changes 1-3). The measured flow rate was higher than predicted, but not to the point of concern for core lift. The normalized flow coastdown rate dropped more rapidly than expected but upon considering the higher initial flow rate, the DNBR requirements were satisfied. Two handwritten memoranda from the staff of the NSSS supplier, SSM-082 (dated 10/8/82) and SSM-084 (dated 10/16/82), attest to the acceptability of the results for proceeding with power escalation with the caveat that the acceptability will be re-examined at fifty percent power. (Inspector followup item 395/82-52-02: Confirm acceptability of RCS flow and coastdown rates at fifty percent power.)

Inspection of reactor internals for adverse effects of vibration was conducted following the second hot functional test. Review of RC-2, "Reactor Internals Vibration Inspection", Revision 0, confirmed that no adverse effects had been observed.

6. Initial Criticality Witnessing (72592)

a. Procedures Reviewed:

ZPT-0, "Technical Specification Surveillance and Periodic Data Acquisition During Low Power Physics Testing", and

ZPT-1, "Initial Criticality".

From the above procedures and review of the operations log for the period October 18-24, 1982, the inspector confirmed that the surveillances required by Technical Specifications to enter mode 2 from mode 3 and to remain in mode 2 were completed satisfactorily. (One exception is noted in paragraph 5.)

The inspector also witnessed a demonstration of the RCS boron analysis procedure.

b. Activities Witnessed and Results

The inspector witnessed the approach to initial criticality from the withdrawing of safety bank A to the early stages of dilution. Criticality was achieved at 0525, October 22, 1982. At 0620, after extended mixing of the RCS, a critical configuration of D bank at 116 steps and a boron concentration of 1288 ppm was established. The movement of D bank from 160 steps to 116 steps reflected a significant overshoot of dilution. Steps placed in procedure ZPT-1 to prevent such an occurrence had proved ineffective since the normal method of operating in the alternate dilute mode resulted in diluting the VCT more than the RCS. Hence, when deliberate dilution stopped, normal charging from the VCT continued the dilution process. This event and possible future corrective actions were discussed during the exit interview. The licensee made the following commitment: (Inspector followup item 395/82-52-03): Evaluate alternative alternate dilute modes for use with new cores.

Subsequently, the all-rods-out boron concentration was determined to be 1317 ppm, which was in good agreement with the predicted value of 1302 ppm.

Other activities of ZPT-1 that were witnessed included determining the zero power testing range, by first determining the point (power) of adding heat, and the confirmation of reactivity computer calibration.

The inspector also witnessed the second criticality of the reactor, using normal plant procedures, following the first scram on October 23, 1982.

7. Low Power Test Witnessing (72522)

a. Boron End Point Measurements

Portions of tests to measure boron end points, ZPT-2.1, -2.2, and -2.3 were witnessed and the results reviewed. In all cases, the results agreed with the predicted values within plus or minus 50 ppm, the acceptance criterion.

In the course of performing the end point measurements and other tests, it was necessary to obtain pressurizer boron samples. Because of recent modifications to the boron sampling line to the pressurizer to make it also serve as a drain for the PORV loop seals, manipulation of a manual valve to isolate the drain function was required. That manipulation required entering containment and, in at least one case, entering the pressurizer cubicle. The inspector expressed concern that a routine, often-performed operation should, once power is increased, have such a high potential for radiation exposure. At the exit

interview, licensee management expressed a like concern and made a commitment: inspector followup item 395/82-52-04): Perform an engineering evaluation addressed to minimizing radiation exposure in taking pressurizer samples.

b. Isothermal Temperature Coefficient of Reactivity Measurement (61708)

The inspector witnessed portions of the performance and reviewed the data and results for tests ZPR-3.1 and ZPT-3.2. These tests measured the isothermal and moderator coefficients for the configuration of all-rods-out (ARO) and D-bank-inserted, respectively. Both isothermal coefficients were negative, but the moderator coefficient for the ARO calculation was positive. That result was different from prediction and counter to Technical Specification 3.1.1.3a. The licensee was reminded immediately after the observation and again at the exit interview that they had only a limited time remaining to conform to action statements of that specification.

c. Control Rod Worth Measurements (61710)

The inspector witnessed portions of the worth measurement of control bank D and reviewed the results of the test, ZPT-5.1. The measured worth of 1446 pcm was in good agreement with the predicted value of 1390 pcm.