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

Report No. 50-261/82-30

Licensee: Carolina Power and Light Company
411 Fayetteville Street
Raleigh, NC 27602

Facility Name: H. B. Robinson, Unit 2

Docket No. 50-261

License No. DPR-23

Inspection at H. B. Robinson plant site near Hartsville, SC

Inspector: P. T. Burnett — Date Signed: 1 Sept 82

Approved by: F. Jape, Section Chief — Date Signed: 9/2/82
Engineering Inspection Branch
Division of Engineering and Technical Programs

SUMMARY

Inspection on August 10-12, 1982

Areas Inspected

This routine, unannounced inspection involved twenty inspector-hours on site in the areas of post refueling startup tests and closeout of an earlier enforcement item.

Results

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. B. Starkey, Plant General Manager
*J. M. Curley, Manager, Technical Support
*F. Gilman, Project Specialist-Regulatory Compliance
C. W. Crawford, Manager, Operations and Maintenance
F. Lowery, Operating Supervisor
T. Cleary, Reactor Engineer
J. Huntley, I&C Foreman
B. Murphy, Senior Maintenance Engineer

Other licensee employees contacted included four shift foremen, eight operators, four test engineers, and two office personnel.

NRC Resident Inspector

*S. Weise

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on August 12, 1982, with those persons indicated in paragraph 1 above. The licensee acknowledged the findings, the comments on test administration (paragraph 5), the commitment discussed in paragraph 5.c, and the comments on applicability of PT-8 in paragraph 6.

3. Licensee Action on Previous Enforcement Matters

(Closed) Level IV Violation (261/82-08-01): Procedure (PT-8) not adequate for evaluation of test results. Carolina Power and Light Company's (CP&L) letter of response dated April 23, 1982, has been reviewed by Region II and determined to be acceptable. The inspector examined the corrective actions stated in the letter and applications of the procedure for the period July 2 - August 11, 1982. The inspector concluded that the procedure could satisfy Technical Specification Table 4.1-3, Item 9. The issue of monitoring primary system leakage is discussed further in paragraph 6.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Startup Testing-Refueling (72700)

The inspector observed the startup tests discussed in the subparagraphs below. The tests were conducted in accordance with Periodic Test R-6.0, "Refueling Startup Procedures". The predicted tests results and acceptable ranges (numerical acceptance criteria) were given in the fuel supplier's document XN-NF-82-33(P), "H. B. Robinson Unit 2, Cycle 9, Startup Operations Report", June 1982.

The tests were conducted without position indication for control rod H-10. The licensee stated that the position of that control rod had been verified using a recording oscillograph to record actuation of the movable gripper coil and then the actuation steps were counted. The licensee planned to verify the rod was out using flux mapping once thirty percent power was reached. The rod is in a shutdown bank.

These actions and plans are in conformance with Technical Specification 3.10.1. Satisfying the surveillance requirements of Technical Specification Table 4.1-3 Item 2 is possible, but more difficult than usual.

At the end of the inspection period the reactor was in a tripped condition as the result of an error by an electronic technician in restoring a power range nuclear instrument channel to the normal alignment at the end of zero-power testing. Restart of the reactor was delayed in part by the need to take special instrumentation into containment to verify the position of rod H-10.

One general comment on the administration of periodic test R-6.0 was made to management at the exit interview: the use of a single initial in the initial block of many procedure steps did not appear to uniquely identify the person performing the steps. Management agreed to review their requirements in that area.

a. Initial Criticality

The all-rods-out critical boron concentration was 1094 ppm, which was within the acceptance band of plus or minus 50 ppm of the predicted concentration of 1135 ppm. Based upon the calculated reactivity worth of the boron, the error was less than one-half percent in reactivity. A reactivity anomaly is defined in Technical Specification 4.9 as an error of one percent.

Adequate overlap between source-range and intermediate-range nuclear instruments was then demonstrated, followed by a determination of sensible heat to set the upper power limit for zero-power testing. During the approach to critical the inspector witnessed one analysis of the coolant system boron concentration. The procedure and the familiarity of technicians with the procedure were adequate.

b. Reactimeter

The reactimeter is a special-purpose digital computer for making real-time measurements of core reactivity by analysis of the temporal variations in flux level. In addition to an analog flux signal input from one of the power-range nuclear instruments, digital input of delayed neutron group constants appropriate to the control rod configuration in use is also required.

Proper calibration of the reactimeter was demonstrated by comparing the reactimeter solutions with reactivity values obtained by measuring the reactor period with a stopwatch and finding the corresponding reactivity from a curve of the independently calculated reactivity-period (inhour) relationship. In the demonstration, a series of three increasingly positive transients was followed by a series of three increasingly negative transients. For the latter it was found that the stopwatch measurements did not agree with the reactimeter unless initiating the stopwatch measurement was delayed for about one period after the end of control rod motion. Since the reactimeter solution was nearly constant from the end of rod motion onward, the lack of early agreement was judged to be a weakness of the stopwatch-based methodology.

The accepted measurements did agree with the reactimeter indications within plus or minus ten percent of the measurement as required by procedure.

c. Isothermal Temperature Coefficient (61708)

The isothermal temperature coefficient was performed in accordance with Appendix C to periodic test R-6.0. To perform the measurement the separate axes of an X-Y recorder were feed reactimeter and core coolant temperature signals. The slope of the resulting trace yielded the isothermal temperature coefficient. After correcting for a calculated doppler coefficient of -1.66 pcm of the moderator coefficient was obtained.

Two measurements were made in the all-rods-out configuration: a five-degree-fahrenheit cooldown followed by a five-degree heatup. This pair of measurements was repeated for the D-Bank-in configuration. The moderator coefficient was positive but less than two pcm per degree for all rods out and negative for the second configuration. The requirements of Technical Specification 3.1.3.1 were satisfied.

In reviewing this procedure and observing its application, the inspector noted that the reactivity scaling factor of the X-Y recorder was fixed by the procedure. As a consequence only a fraction of available span was used in the measurements and the resolution of the coefficients suffered. Had a scaling factor been calculated based upon the anticipated value of the coefficient and the planned temperature

swing, better use of the available span would have resulted. This subject was discussed with the test engineer and later with management at the exit interview. Management made a commitment that prior to the next refueling outage, procedure R-6.0 would be revised to allow flexibility in scaling the X-Y plotters: IFI (261/82-30-01).

d. Control Rod Worth Measurements (61710)

Starting from the all-rods-out (ARO) configuration the reactivity worths of control banks D and C were measured in sequence. D bank had a measured worth of 730 pcm and for C bank the measured worth was 1584 pcm. The predicted worths were 789 and 1470 pcm, respectively. Since the measured values were within ten percent of prediction, the results were acceptable.

Precise boron end points were measured at three conditions: ARO, D-bank-in, and C-bank-in. From those measurements an average boron worth of -11.6 pcm/ppm was obtained.

Following review of selected portions of the reactimeter traces, Appendix D to procedure R-6.0, and discussions with test personnel, the inspector had no questions on the conduct of the test or the test results.

No violations or deviations were identified.

6. Primary System Leakage (61727)

In addition to reviewing the corrective action in response to violation 261/82-08-01, which is discussed in paragraph 3, the inspector reviewed PT-8, Reactor Coolant System Leakage Evaluation, from the standpoint of broad applicability. The procedure requires stable plant conditions to be valid. In applications which lead to unsatisfactory results, the operators appeared, from the comments on the data sheet, to assign the poor result to unstable plant conditions although instability was not evident from the data collected to perform the test. Poor results always led to reperforming the test and not always with better results. On July 17, 1982, for example there was, in fact, a steam generator tube leak.

The procedure recommends, but does not require, that data for PT-8 be obtained over a period of at least an hour. Of the eighteen tests reviewed six had been performed in thirty minutes or less. The apparent cause for the shortened test was changing plant conditions. At the exit interview the comment was made to and acknowledged by management that either the plant should be stabilized for the test or the procedure expanded to address transient conditions.

By review of PT-30, completed July 9, 1982, and the maintenance instructions and data sheets specified therein, LP 4-5, LS 4-6, LP 4-22, and LP 4-25, the inspector verified that level instruments used by P-8 for the pressurizer,

volume control tank, and accummulator levels were properly calibrated during the refueling outage. In all cases the as-found conditions were also acceptable.

The process of collecting parametric data to perform an independent calculation of primary coolant system leak rate using the hand computer program RCSLK7 was completed. The independent evaluation was not performed because the plant was shutdown at the end of the inspection period.

No violations or deviations were identified.