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

Report Nos. 50-269/82-35, 50-270/82-35, and 50-287/82-35

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Facility Name: Oconee Units 1, 2, and 3

Docket Nos. 50-269, 50-270, and 50-287

License Nos. DPR-38, DPR-47, and DPR-55

Inspection at the Oconee station site near Seneca, South Carolina

Inspector: for P. T. Burnett Frank Jape 9/21/82
Date Signed

Approved by: Frank Jape 9/21/82
F. Jape, Section Chief
Engineering Inspection Branch
Division of Engineering and Technical Programs
Date Signed

SUMMARY

Inspection on September 8-10, 1982

Areas Inspected

This routine, unannounced inspection involved twenty-two inspector-hours on site in the area of reactor coolant system leakage calculations.

Results

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. E. Smith, Station Manager
J. N. Pope, Operation Superintendent
R. T. Bond, Licensing and Projects Engineer
*T. S. Barr, Performance Engineer
T. D. Curtis, Reactor Engineer
R. Todd, Assistant Engineer
*H. R. Lowery, Operations Engineer
D. Clardy, I&C Foreman

Other licensee employees contacted included two shift supervisors, four operators, and four office personnel.

NRC Resident Inspector

*W. J. Orders, Senior Resident Inspector
D. P. Falconer, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 10, 1982, with those persons indicated in paragraph 1 above. The inspector noted that the differences between NRC and station calculations of reactor coolant system leak rates, using the same data, were not consistent, but that no action would be required of the licensee unless and until review by the authors of the NRC method indicated the need. Management expressed a willingness to cooperate. Following the inspection, during a telephone call on September 17, 1982, a licensee representative was informed that an unresolved item had been identified (paragraph 5c).

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. One new unresolved item is discussed in paragraph 5c.

5. Measurements of Reactor Coolant System Leakage (61727, 61728)

a. Documents Reviewed

(1) Oconee Nuclear Station FSAR(1982), sections 5.2.3.10.3, 5.2.3.10.5, 7.4.2.2.3b and tables 5.3-1, 5.4-2, 5.4-3, 5.4-6, and 5.4-7

(2) Technical Specifications 3.1.6.2, Bases 3.1.6, 4.1.2 (Table 4.1-2, item 6),

(3) PT/1/A/600/10, RC Leakage Evaluation Test, including the computer records and data sheets for daily tests during June and August 1982,

(4) OP/01A/1103/13, Reactor Coolant System Leak Detection,

(5) IP/01A/0200/10, Reactor Coolant Pressurizer Level

(6) IP/01A/0202/01F, Letdown Storage Tank Level Instrument Calibration,

(7) IP/01B/0231/01, Coolant System Quench Tank Level Instrumentation Calibration

(8) Plant Setpoint Notebook

b. Preparation for Independent Measurement of RCS Leak Rates (61727)

From the documents reviewed and discussions with plant personnel the inspector obtained parametric data describing tank level calibrations, system capacity, normal volume, temperature and pressure ranges and design features. From these data plant specific data cards were prepared for use with a program (RCSLK7) prepared for operation on a Hewlett-Packard 41C calculator. [The program is described in a memorandum, SUBJECT: PLANT DATA FOR REACTOR COOLANT LEAKAGE CALCULATIONS, by R. L. Baer, Chief, Engineering and Technical Support Branch, Division of Engineering and Quality Assurance, IE, dated 16 February 1982.]

In compiling the data it was noted that the system capacity of Unit 1 is very slighty less (1.6%) than that of Units 2 and 3. This is a result of the Unit 1 reactor cooling pumps being of a different design than those for Units 2 and 3. This difference is not accounted for in the licensee's procedures, items 5.a(3) and 5.a(4) above.

Following dicussions with plant personnel, it was accepted that the difference would have an insignificant effect on the plant's calculations of Unit 1 leakage.

c. Measurement of RCS Leak Rate (61728)

Data from twelve of the plant tests reviewed, item 5.a(3), were input into RCSLK7 to compare results. In seven cases the results agreed within ±0.2 gpm. In all the remaining cases RCSLK7 produced a significantly lower RCS leak rate.

With the assistance of Unit 1 operators, who manipulated the operator assist computer, observations of the necessary system parameters were made at 0738, 0938 and 1136 on September 10, 1982. The parameters recorded were loop pressure, average coolant temperature, pressurizer level, letdown storage tank level and quench tank level. Using these observations and RCSLK7, three calcuations were made for test periods of 2 hrs., 1.97 hours and 3.97 hours. The results were -0.36 gpm, -0.05 gpm, and -0.21 gpm, respectively, or, in a sense, in leakages rather than losses. The plant measured value at 0228 to 0328 that day was 0.51 gpm out leakage.

In reviewing the plant calculations it was noted that letdown storage and quench tank level changes were converted to mass by division by the specific volumes corresponding to the average tank temperatures prevailing over the test period. Since the level instrumentation is based on differential pressure, variable specific volumes should not have been used. Instead, a specific volume appropriate to the level calibration temperature should have been used in each case. The licensee agreed that the program was incorrect, but demonstrated by use of extreme values that the net effect on the leak rate results was negligibly small. Hence, the program will not be changed unless additional reprogramming needs are identified.

After the inspection, additional questions on the performance of the plant computer calculation arose during in-office review of the results. In order to arrive at a judgement as to the adequacy of the calculation, more information is needed on the derivation and application of the BAW-supplied curve relating RCS water inventory to unit load. Also more information is required on the calculational mehtod of accounting for changes in average system temperature independent of load changes.

This need for additional information was discussed with licensee personnel by telephone on September 17, 1982, and a prompt response was promised. The license representative was informed that the issue would be identified as an unresolved item (269/82-35-01, 270/82-35-01, 287/82-35-02): Resolve methods of accounting for temperature changes in RCS leak rate calculations.

No violations or deviations were identified.