



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

Report Nos.: 50-269/84-13 and 50-287/84-12

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

Docket Nos.: 50-269 and 50-287

License Nos.: DPR-38 and DPR-55

Facility Name: Oconee

Inspection Date: May 14-18, 1984

Inspection at Oconee site near Seneca, South Carolina

Inspector: H. L. Whitener
H. L. Whitener

6/11/84
Date Signed

Accompanying Personnel: L. S. Mellen

Approved by: F. Jape for
F. Jape, Section Chief
Engineering Branch
Division of Reactor Safety

6/11/84
Date Signed

SUMMARY

Scope: This routine, announced inspection involved 43 inspector-hours on site in the areas of witnessing the periodic integrated leak rate test; examination of test conditions; review of test performance and results; review of test procedures; and followup inspection of outstanding items.

Results: Of the three areas inspected, no violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *M. Tuckman, Station Manager
- *T. Barr, Superintendent, Technical Services
- *G. Davenport, Supervisor, Performance Engineer
- *T. Welch, Assistant Engineer, Nuclear Performance and Testing, GO
- R. Todd, Test Engineer, Performance
- K. Rohde, Associate Engineer, Performance
- *R. Bond, Compliance Engineer
- *T. Mathews, Technical Specialist, Compliance
- M. Baker, Performance Specialist
- W. Sullivan, Performance Technician

NRC Resident Inspector

- *J. Bryant, Senior Resident Inspector

*Attended exit interview.

2. Exit Interview

The inspection scope and findings were summarized on May 18, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings and made the following commitments:

- a. As found-as left leakage resulting from the Type C and Type C non-code required test programs will be analyzed for penetration leakage and included in the test report submitted to the NRC. This matter will be reviewed in the routine NRC inspection program.
- b. The licensee will revise the integrated leak rate test procedure to establish more rigorous review and control of changes to system leakage during a Type A test. This item is identified as IFI (287/84-12-01).

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Containment Integrated Leak Rate Test (61719) - Unit 3

The inspector reviewed and witnessed test activities to determine that the primary containment integrated leak rate test was performed in accordance with the requirements of Appendix J to 10 CFR 50, ANSI 45.4, FSAR, test procedure, PT/3/A/0150/03A, "Reactor Building Integrated Leak Rate Test," and the guidelines specified in ANSI/ANS 56.8, 1981.

Selected sampling of the licensee's activities included: (1) review of the test procedure to verify that the procedure conforms with the regulatory requirements listed above; (2) observation of test performance to determine that test prerequisites were completed, special equipment was installed, instrumentation was calibrated, and appropriate data were recorded; and (3) preliminary evaluation of leakage rate test results to verify that leak rate limits were met. Pertinent aspects of the test are discussed in the following paragraphs.

a. General Observations

The inspector witnessed and reviewed portions of the test preparation, containment pressurization, temperature stabilization, and data processing during May 14-18, 1984. The following items were inspected:

- (1) The test was conducted in accordance with the controlled procedure maintained at the test control center.
- (2) Selected test prerequisites were reviewed and found to be completed.
- (3) Selected plant systems, required to maintain test control, were reviewed and found to be operational.
- (4) Special test instrumentation was reviewed and found to be installed and calibrated.
- (5) Data required for the performance of the containment leak rate calculations were recorded at 5-minute intervals.
- (6) Problems encountered during the test were described in the test event log.
- (7) Pressurized gas sources were reviewed for proper isolation and venting to preclude in-leakage or interference of out-leakage through containment isolation valves.
- (8) Selected procedure valve alignments were reviewed against system drawings to verify correct boundary alignment and venting and draining of specific systems.

No violations or deviations were identified in the above areas.

b. Test Method

The licensee performed a reduced pressure (nominal 30 psig), short duration test. The test procedure specified a minimum test duration of six hours. This matter was discussed with licensee test personnel who agreed to a minimum of eight hour test duration after system stabilization as recommended by ANSI 56.8. Trend plots of reactor building pressure, temperature and air mass were reviewed periodically during the test. Leak rate, calculated for each data point at 5-minute intervals using the mass point linear regression analysis technique, was reviewed periodically during the test. A supplemental test was performed subsequent to the ILRT at the same test conditions.

c. Test Sequence

<u>Date</u>	<u>Time</u>	<u>Condition</u>
5/14	1650	Started pressurization of containment.
5/15	0230	Stopped pressurization at 45.4 psia.
	0240	Started stabilization period.
	0640	End of four hour stabilization period; Temperature criteria met and ILRT initiated.
	1640	Re-initialized time zero for the ILRT due to previous adjustment of certain system leakages.
5/16	0140	Completed ILRT: Leak rate was 0.1 wt% per day.
	0200	Initiated supplemental test: Imposed leak rate of 6.97 scfm.
	0600	Completed supplemental test: Verification criteria met.

d. Test Results

(1) Integrated Leak Rate Test (ILRT)

The licensee performed a nine hour ILRT after a 14 hour stabilization period. The measured containment leakage was 0.105 wt.% per day with a 95% upper confidence limit (UCL) of 0.108 wt.% per day calculated by the mass point analysis technique. These values are less than the specified containment allowable leakage limit of 0.75 Lt or 0.132 wt.% per day. At this time, the identified add-on leakage has not been quantified but is expected to be minimal. The above preliminary data analysis indicates an acceptable containment leakage. The final analysis will be submitted to the NRC within 90 days.

(2) Supplemental Test

Appendix J requires that a supplemental test be performed to verify the accuracy of the Type A test and the ability of the ILRT instrumentation to measure a change in leak rate. A known leak rate (L_o) is imposed on the containment and the measured composite leak rate (L_c) must equal, within $\pm 0.25 L_t$, the sum of the measured leak rate (L_{tm}) plus the known leak rate (L_o).

The acceptance criteria is expressed as:

$$L_o + L_{tm} - 0.25 L_t \leq L_c \leq L_o + L_{tm} + 0.25 L_t$$

Results of the supplemental test show that the composite leak rate L_c was within limits as follows:

L_c (measured)	0.2885 wt.% per day
L_o (imposed)	0.193 wt.% per day
L_{tm} (measured)	0.1048 wt.% per day
$0.25 L_t$	0.044 wt.% per day

These preliminary results indicate that the measured composite leak rate of 0.289 wt.% is within the specified acceptable range of 0.254 wt.% - 0.342 wt.%. The final analysis will be submitted to the NRC within 90 days.

e. Other Areas Inspected Relative to Leak Rate Testing

(1) Computer Program

During the inspection, a review was performed on the computer program used to calculate the containment integrated leak rate. The resulting evaluation indicated the licensee had performed and documented appropriate checks of the program accuracy and had correctly used the equations set forth in ANSI 56.8.

(2) Documents

During the inspection, the inspectors reviewed, either, in part or totally, documents as follows:

- (a) PT/3/A/0150/03B, Reactor Building Integrated Leak Rate Prerequisite Test.
- (b) SD 4.2.5, Independent Verification Procedure.
- (c) PT/3/A/0150/3A, Reactor Building Integrated Leak Rate Test.
- (d) TT/3/A/0375/08, Reactor Building ILRT Venting and Draining Procedure.

- (e) PT/3/A/0150/06, Local Type C Leak Rate Test.
- (f) TT/3/A/0111/08, Local Type C Leak Rate Test (Non-Code Required).
- (g) Documentation of Special Instrument Calibrations.
- (h) Technical Specification, Section 4.4.
- (i) FSAR, Section 6.2.

In review of item (d) and (e) above, the inspectors determined that the licensee has developed a step-by-step, detailed alignment procedure which accomplishes system venting, draining, and final test alignment. The required valve positions are specified. Penetration alignments were reviewed as follows:

<u>Penetration No.</u>	<u>ILRT</u>	<u>LLRT</u>
2	X	X
6	X	X
11	X	X
12	X	
18	X	
21	X	
22	X	
29	X	
39	X	
53	X	
58	X	X

In review of item (f), the inspector found that certain penetrations which are not required to be Type C tested by Technical Specification 4.4 are Type C tested under this procedure only during outages when a Type A test is performed.

Section III of Appendix J requires that the Type A leak rate be determined for the as-found containment condition. Consequently, leakage corrected through a special program prior to the Type A test must be considered in the evaluation of the containment performance. This same condition applies to item (e) above. In order to evaluate the containment performance, leakage corrected in the routine Type C test program must be quantified in terms of corrected integrated leakage for each penetration leak path and be included in the licensee's evaluation of containment performance. At the exit interview, the licensee agreed to perform and report the above evaluations. These evaluations will be reviewed as a part of the NRC routine evaluation of the licensee's leak rate report submittal. The inspector commented to the licensee that these evaluations relate to the analysis of the containment system performance and do not impact on readiness of the containment

system for plant operation. An acceptable integrated leak rate was demonstrated.

(3) Adjustment of System Leakage

Section III of Appendix J to 10 CFR 50 prohibits adjustment of system boundary leakage during the Type A test unless the change in leak rate can be quantified by a local measurement before and after the adjustment or unless the Type A leakage is established and the test is determined to be a failed test. Section III further specifies that valves will be closed in a normal manner without excessive tightening to prevent leakage. After the Type A test was initiated, the licensee adjusted and tightened certain valves as follows:

- (a) BS-1, adjusted packing
- (b) BA-5, adjusted packing
- (c) HP-155, tightened on seat
- (d) LP-96, adjusted packing
- (e) HP-16, adjusted packing
- (f) CC-7, isolated - to be Type C tested and added to Type A results
- (g) CC-54, isolated - to be Type C tested and added to Type A results

The inspector reviewed the above changes and concluded the following:

- (a) Items (d) and (e) above, were in the test boundary due to an unusual alignment for water purification and do not relate directly to the containment isolation boundary.
- (b) Items (f) and (g) above, were isolated for the Type A test. These valves will be Type C tested subsequent to the Type A test to determine the before and after repair leakages. These leakages will be reported to the NRC and the post repair leakage will be added to the Type A test results.
- (c) Item (b) above, is an isolation valve in the breathing air system and adjustment of packing without quantifying the leakage or before the Type A leak rate is established and determined to be unacceptable is not permitted by Appendix J. However, in this instance, the licensee had bubble tested this valve and found that no leakage existed through the packing just prior to adjusting the packing. This occurred due to incorrect valve identification on the work order. The leaking valve was a nearby block valve which was not a part of containment boundary. In that the containment leakage was not altered, no violation of Appendix J requirements occurred.

- (d) Item (a) above, is the outside isolation valve in the building spray system. This system is presumed to be in operation post accident at a pressure greater than the containment air pressure; consequently, air leakage would not occur. Further, any air leakage through the packing will leak into the penetration room which has a filtered exhaust system. The inspector agreed with the above technical considerations and no violation to Appendix J was issued. The intent of Appendix J is to determine the as-found condition of containment in order to evaluate the performance of the containment system as well as to verify the post test leakage. The intent of Appendix J was discussed with the licensee and it was explained that a more adequate review and control of changes to system leakage to preclude altering a leakage path without quantifying the change in leak rate is required or the ILRT could be declared a failed test.
- (e) Item (c) above is an outside manual isolation valve on the 1-inch core flood tank makeup line from the high pressure injection system. The licensee tightened this valve $\frac{1}{4}$ turn during the test. Duplication of this manipulation subsequent to the test indicated no measurable change in leak rate. While such a test cannot be precisely duplicated, it does indicate a minor leakage change which, based on a margin of about 1700 scf per day between the measured and allowable Type A leak rate, does not represent a failed test.

Based on the review of the above leakage adjustments, the inspector concluded that the licensee's review and control of changes to system leakage during the Type A test are weak. At the exit interview, licensee management agreed to revise the integrated leak rate test procedure to establish more rigorous review and control of changes to system leakages. This matter is identified for followup inspection as IFI (287/84-12-01): Review revision of the integrated leak rate test procedure to verify adequate test control relative to repair of system leakage during the Type A test and review the analysis of altered leakages in the licensee's ILRT Report.

6. Followup Inspection of Outstanding Items

- a. IFI (50-269/82-25-02) relates to the revision of section 4.8.10.3(b) of the Administrative Policy Manual (APM) to require that justification of the use of a supervisor as an independent reviewer be documented. The inspector determined that this requirement has been incorporated into the APM, Revision 21, page 4.8-11 and further requires that the extent of a supervisor's input into the analysis being verified will be documented.

This item is closed.

- (b) IFI (50-269/82-25-03) relates to revision of the APM to include reporting of errors in safety analysis as a departmental policy. The inspector determined that reporting of errors in safety analysis is now stated as Duke Power Company Policy in Section 4.8.12, page 4.8-12 of the APM.

This item is closed.