



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

Report Nos.: 50-269/89-16, 50-270/89-16, and 50-287/89-16

Licensee: Duke Power Company
 422 South Church Street
 Charlotte, N.C. 28242

Docket Nos.: 50-269, 50-270, 50-287 License Nos.: DPR-38, DPR-47, DPR-55

Facility Name: Oconee Nuclear station

Inspection Conducted: May 30 - June 2, 1989

| | | |
|--------------|-----------------------------|----------------|
| Inspectors: | <u><i>G. A. Belisle</i></u> | <u>7-10-89</u> |
| | H. Whitener | Date Signed |
| | <u><i>John Zeiler</i></u> | <u>7-10-89</u> |
| | J. Zeiler | Date Signed |
| Approved by: | <u><i>G. A. Belisle</i></u> | <u>7-10-89</u> |
| | G. A. Belisle, Chief | Date Signed |
| | Test Programs Section | |
| | Engineering Branch | |
| | Division of Reactor Safety | |

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of containment local leak rate testing, verification of containment integrity, and action on previous inspection findings.

Results:

The licensee's LLRT program was adequate in all areas inspected. LLRT and containment related procedures were developed and were being implemented in accordance with the regulatory requirements. The inspectors witnessed leak rate testing and concluded that personnel were knowledgeable of test practices and requirements. One weakness was identified involving the reverse testing of containment isolation valves, paragraph 2.a.

The inspection findings indicated that adequate procedures and controls were established and were being implemented accordingly to ensure containment integrity.

In the areas inspected, violations or deviations were not identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *S. Benesole, Performance Engineer
- *S. Curtis, Compliance
 - J. Davis, Technical Services Superintendent
 - D. DeNard, Performance Test Supervisor
- *D. Hubbard, Performance Engineer
- *C. Harlin, Compliance Engineer
 - E. Legette, Assistant Engineer Compliance
- *M. Tuckman, Station Manager

Other licensee employees contacted during this inspection included engineers, technicians, operations and administrative personnel.

NRC Resident Inspectors

- P. Skinner, Senior Resident Inspector
- *L. Wert, Resident Inspector

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Local Leak Rate Testing (61720)

An important part of monitoring and maintaining containment integrity is the periodic testing performed to verify the leak tightness of containment leakage barriers. As part of the evaluation of containment integrity, the inspectors witnessed the performance of LLRTs, reviewed the LLRT procedures, evaluated the test results, and verified that the summation of local leak rate tests meets the allowable leakage limit.

a. LLRT Procedure and Control Review

Documents reviewed either totally or in part to verify that the licensee has established adequate procedures and controls included:

- PT/0/A/0150/04, Equipment Hatch Leak Rate Test
- PT/2/A/0150/06, Mechanical Penetration Leak Rate Test
- PT/0/A/0150/08A, RB Personnel O-Ring Seal Test
- PT/0/A/0150/08B, RB Emergency Airlock Leak Rate Test
- PT/0/A/0150/09, RB Personnel Hatch Outer Door O-Ring Seal Leak Rate Test

PT/O/A/0150/09A, RB Emergency Hatch Outer Door O-Ring Seal Leak Rate Test
 PT/O/A/0150/20, Electrical Penetration Leak Rate Test
 PT/O/A/0150/27, Local Type B Leak Rate Test of Penetrations 19 and 20

The inspectors reviewed selected procedures to verify that the content was technically adequate and that procedural instructions were adequate to accomplish the intended activity. Although not all of the above procedures were reviewed in step by step detail, the inspectors concluded that the licensee has developed a program and implemented procedures to meet leak rate test requirements.

A detailed walk-through was performed for the following penetrations to verify adequate alignment, venting, and draining.

| | |
|----------------|---------------------------------------|
| Penetration 3 | Component cooling water inlet line |
| Penetration 5 | RB normal sump drain line |
| Penetration 7 | Reactor coolant pump seal return line |
| Penetration 18 | Quench tank vent line |
| Penetration 19 | RB purge inlet line |
| Penetration 20 | RB purge outlet line |
| Penetration 29 | Quench tank drain line |
| Penetration 38 | Quench tank cooler inlet line |
| Penetration 43 | Steam generator drain line |
| Penetration 54 | Component cooling water outlet line |
| Penetration 60 | RB outlet sample line |
| Penetration 61 | RB inlet sample line |

The inspectors' LLRT procedure and penetration review identified several containment isolation valves that were tested in a direction opposite to accident pressure. Upon further review by the licensee, a total of twelve isolation valves were identified to be reverse tested.

10 CFR 50, Appendix J, Section III.C.1 states in part: "Type C tests shall be performed by local pressurization. The pressure shall be applied in the same direction as that when the valve would be required to perform its safety function, unless it can be determined that the results from tests for a pressure applied in a different direction will provide equivalent or more conservative results."

The majority of the valves tested in the reverse direction were determined to be diaphragm valves. By the nature of their design, diaphragm valves typically display similar leakage characteristics in either direction. The NRC has generally accepted that the reverse testing of these valve types provides equivalent results. However, this does not imply that reverse testing is always acceptable, especially if the means exists to properly test the valves in the accident direction.

Three of the valves being reverse tested were determined to be globe valves. However, based on information obtained from the licensee, these valves were oriented in a direction such that equivalent or conservative leakage results could be expected.

Containment purge valves were also being reverse leak rate tested. The inspectors were told that an evaluation was already in progress to determine if reverse testing the valves is conservative as testing the valves in the accident direction. This matter was identified as IFI 269, 270, 287/89-16-01, pending NRC review of the licensee's evaluation.

Within the areas inspected, no violations or deviations were identified.

b. LLRT Witnessing

On May 31, 1989, the inspectors witnessed various aspects of the "As-Found" leak rate test for Unit 2 containment isolation valves in the steam generator drain lines, penetration Nos. 4 and 43. The inspectors discussed the system lineups for the test and determined that they were in correct test configurations. Test personnel followed approved procedures and utilized qualified test equipment. The inspectors observed that test personnel were familiar with the test equipment and the use of the test procedure.

Within the areas inspected, no violations or deviations were identified.

c. Leak Rate Test Maintenance Controls

The inspectors tracked the repair and retest of several valves to verify that controls to ensure maintenance and retest of the valves were adequate. Unit 2 components reviewed included:

| <u>Penetration</u> | <u>Valve</u> | <u>Work Request</u> | <u>Description</u> |
|--------------------|--------------|---------------------|---|
| 3 | 2CC-23 | 52266-C | Component cooling inlet line inside CIV |
| 3 | 2CC-23 | 92180-C | Component cooling inlet line inside CIV |
| 5b | 2CR-164 | 92185-C | RB sump drain line outside CIV |
| 5b | 2CR-164 | 92190-C | RB sump drain line outside CIV |
| 46 | 2FW-65 | 92186-C | Reactor head-wash filtered water inlet inside CIV |
| 54 | 2CC-7 | 91356-C | Component cooling outlet line inside CIV |

A work request for maintenance is generated by the Performance Department when a valve fails to pass a local leak rate test. This

request is sent to maintenance planners who prescribe the work procedures and post-maintenance testing procedures required. When maintenance is completed, the work request package is routed to the Performance Department and leakage retest of the valve is accomplished. Completion of the work request constitutes verification that all tests have been performed as required. The requirements for Type B and C leakage summation are contained in PT/O/A/0150/34. After valve retests, the LLRT procedures require that PT/O/A/0150/34 be performed to ensure that the Type B and C leakage summation is within the TS limit.

Based on the limited sample, the inspectors concluded that the licensee has implemented a workable system to ensure that maintenance and retest of CIVs are satisfactorily completed.

Within the areas inspected, no violations or deviations were identified.

3. Verification of Containment Integrity (61715)

The inspectors' objective was to verify the adequacy and implementation of procedures designed to ensure and maintain containment integrity and verify the adequacy and implementation of procedures designed to mitigate contamination releases in the event of a loss of containment integrity following a LOCA. The following containment related systems were inspected for compliance with plant TSS.

Containment Hydrogen Control
 Reactor Building Purge System
 Reactor Building Cooling System
 Penetration Room Ventilation System

a. Procedures Reviewed

PT/O/A/0160/04, Containment Hydrogen Control System Piping Flow Test, (Frequency: Refueling)

PT/O/A/0150/41, Leak Rate Test of the Hydrogen Recombiner and Piping, (Frequency: Refueling)

PT/O/A/0150/38, Hydrogen Recombiner Piping Flanges Leak Rate Test, (Frequency: Refueling)

PT/O/A/110/05D, Reactor Building Hydrogen Purge System Filter Test, (Frequency: Refueling)

PT/O/A/0161/03, Reactor Building Hydrogen Purge Unit Performance Test, (Frequency: Refueling)

PT/2/A/0150/27, Local Type B Leak Rate Test of Penetration 19 & 20, (Frequency: Refueling)

PT/O/A/0150/22D, Individual Valve Functional Test, (Frequency: When Required)

PT/O/A/0204/09, Reactor Building Spray System Engineered Safeguard Test, (Frequency: Refueling)

PT/O/A/0204/08, Reactor Building Spray System Air Test, (Frequency: 5 Years)

PT/O/A/0160/02, Reactor Building Cooling System Performance Test, (Frequency: Refueling)

PT/O/A/0160/03, Reactor Building System Engineered Safeguard Test, (Frequency: Refueling)

PT/2/A/0204/07, Reactor Building Spray System Performance Test, (Frequency: Quarterly)

PT/O/A/0170/05, Penetration Room Ventilation System Monthly Performance Test, (Frequency: Monthly)

PT/O/A/0110/04, Penetration Room Ventilation System Filter Test, (Frequency: Refueling)

b. Scope of Procedure and Record Review

The inspectors reviewed the above surveillance procedures either totally or in part to verify applicable plant TS requirements were met, adequate information and instruction were provided, and adequate acceptance criteria and limits were specified. The inspectors also reviewed test records of completed surveillance tests to verify their performance. The following table describes the records reviewed and gives the applicable TS which requires the surveillance test.

| <u>Containment System</u> | <u>Procedure No.</u> | <u>Records Reviewed</u> | <u>TS</u> |
|---------------------------|----------------------|--|---------------|
| Hydrogen Control System | PT/O/A/0160/04 | 03/08/88 | 4.4.3.1.a,b,c |
| | PT/O/A/0150/41 | 03/05/88 | 4.4.3.2.b |
| | PT/O/A/0150/38 | 03/09/88 | 4.4.3.2.b |
| | PT/O/A/110/05D | 08/06/86 | 4.4.3.3 |
| | PT/O/A/0161/03 | 09/08 to 25/89 | 4.4.3.3 |
| RB Purge System | PT/2/A/0150/27 | 10/10/86, 03/25/88, 03/26/88, & 07/13/88 | 4.4.4.1 |
| | PT/2/A/0150/22D | 07/13/88 & 05/20/89 | 4.4.4.4 |

| <u>Containment System (Cont.)</u> | <u>Procedure No.</u> | <u>Records Reviewed</u> | <u>TS</u> |
|-------------------------------------|----------------------|-------------------------|-----------------|
| RB Cooling System | PT/O/A/0204/09 | 04/04/88 | 4.5.2.1.1.a,c |
| | PT/O/A/0204/08 | 09/11/86 | 4.5.2.1.1.b |
| | PT/O/A/0160/02 | 03/30/88 | 4.5.2.1.2.b |
| | PT/2/A/0204/07 | 04/04/88 | 4.5.2.2.1 |
| Penetration Room Ventilation System | PT/O/A/0170/05 | 01/23/89 to 04/24/89 | 4.5.3.1.a |
| | PT/O/A/0110/04 | 03/21/88 | 4.5.3.1.b,c,d,e |

c. Procedure and Record Finding Summary

The procedures reviewed were technically accurate and in conformance with plant TSS. Unacceptable conditions were not observed.

Surveillance test records reviewed by the inspectors identified no discrepancies. The inspectors verified the following: surveillance tests were performed at the required frequencies; test results met acceptance criteria or limits; and appropriate sign-offs, test reviews, and test concurrences were performed.

The findings indicated that required plant systems and components designed to ensure containment integrity are being tested as required by plant TSS.

Within the areas inspected, no violations or deviations were identified.

4. Action on Previous Inspection Findings (92701)

- a. (Closed) Unresolved Item 269/86-13-01 related to the required test duration of the Type A test, the authority to change the length of the test, and the validity of the test data (see NRC Inspection Report 50-269/86-13 for details).

Subsequent to the inspection, the licensee corrected the data for the instrumentation problems and recalculated the leak rate. The following actions were taken:

- (1) The six RTDs which were not functioning for the first 5 hours during the 24 hour test duration were eliminated by reassigning the RTD volume fractions.
- (2) The validity of the reassigned volume fractions was demonstrated by showing that, for a portion of test data where the six RTDs were functioning, the calculated leak rates using the original volume fractions and using the reassigned volume fractions were in agreement.

- (3) A post test pressure instrument calibration showed that the pressure gauge was functional but a 0.03 psi increase in the calibration curve had occurred since the pretest instrument calibration. The nature of the calibration shift indicated that the change was a one time event resulting from a severe jolting of the instrument. This finding is consistent with the test data which showed a large step increase in the containment mass eleven hours into the test. Subsequent to the step increase the mass trend resumed the slope observed prior to the increase. The step change in mass was also consistent with a 0.03 psi step increase in pressure.

Reanalysis of the data yielded an acceptable leak rate for a 24 hour duration test. The licensee submitted a corrected leak rate report.

In response to a request from Region II, NRR issued a memorandum to Albert F. Gibson, Director DRS, RII from Gus C. Lainas, Assistant Director for Reactor Project II, dated July 1987, to clarify the NRC position on ANSI N45.4, Paragraph 7.6. This position stated that the Type A test duration is 24 hours. Any change in test duration must be reviewed and approved by the NRC prior to implementation. Further, the 24 hour test requirement for mass point analysis has been incorporated into Appendix J by a change published in Federal Register, Volume 53, No. 220, November 15, 1988. As already discussed, with correction for instrument problems, the licensee has demonstrated a test of 24 hours duration and acceptable leak rate.

- b. (Closed) Unresolved Item 269/86-13-02 related to the calibration for RTDs by performing a single point verification of the original calibration curve. In this case the RTDs had become contaminated and could not be shipped off site. In lieu of the multipoint calibration at the Standards Lab, a one point calibration in an ice bath was performed to verify that the instruments were in agreement with the original multipoint calibration curve. Subsequently, the licensee has provided protection for the instruments while in the containment and routinely sends the RTDs to the Standards Lab for a pretest multipoint calibration.

5. Exit Interview

The inspection scope and results were summarized on June 2, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

IFI 50-269, 270, 287/89-16-01: Review licensee's evaluation for conservative leak rate testing of purge valves, paragraph 2.a.

6. Acronyms and Initialisms Used in This Report

CIV - Containment Isolation Valve
IFI - Inspector Followup Item
LLRT - Local Leak Rate Test
LOCA - Loss-of-Coolant Accident
RB - Reactor Building
RTDs - Resistance Temperature Devices
TS - Technical Specification
URI - Unresolved Item