



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

Report Nos.: 50-369/86-16 and 50-370/86-16

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

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Conducted: June 9-13, 1986

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

7-31-86

Date Signed

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

7/31/86

Date Signed

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of primary containment integrated and local leak rate testing.

Results: One violation was identified - Failure to determine the as-found leak rate for the Unit 2 primary containment, paragraph 7.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *T. McConnell, Station Manager
- *W. Suslick, Performance, General Office
- *R. Johansen, Performance
P. Roberson, Performance Engineer
- *D. Smith, Performance Engineer
- *N. McCraw, Compliance Engineer

NRC Resident Inspector

W. Orders, Senior Resident Operator

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 13, 1986, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee requested an opportunity to discuss the issues with Region II management subsequent to the Region review of the inspection findings.

This discussion was held via telephone on July 29, 1986.

New items identified during the inspection include:

Violation 370/86-16-01: Failure to obtain the as-found leak rate for the Unit 2 primary containment, paragraph 7.

Inspector Followup Item 370/86-16-02: Review the results of the licensee's examination of isolation valve maintenance to determine the "pass" or "fail" status of the Unit 2 as-found containment leakage, paragraph 7.a.

Inspector Followup Item 369/86-16-01: Review the procedures established to track and control determination of the as-found leak rate, paragraph 7.b.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during the inspection.

5. Containment Integrated Leak Rate - Unit 2

A 24-hour containment integrated (Type A) leak rate test and a four hour supplemental leak rate test were performed on the Unit 2 primary containment in the period May 25-26, 1986. Mass point-linear regression analysis was used by the licensee to determine the leak rate (Lam) and upper confidence limit (UCL) at 24 hours. The test met the acceptance criteria for both mass point and total time analysis as shown below; the values are expressed as weight percent per day.

	<u>Mass Point</u> wt%/day	<u>Total Time</u> wt%/day
La	0.3	0.3 (allowable leakage)
0.75 La	0.225	0.225 (test acceptance limit)
Lam at 24 hrs.	0.0785	0.0758
UCL at 24 hrs.	0.0833	0.095

A four hour supplemental test was performed in accordance with the recommendations of Appendix C of ANSI N45.4-1972. The measured composite leak rate was within the upper and lower acceptance limits specified by the equation:

$Lam + Lo - 0.25 La < Lc < Lam + Lo + 0.25 La$ for the mass point analysis. The values for the equation by mass point analysis in terms of weight percent per day are as follows:

	<u>wt%/day</u>
Composite leak rate, Lc	0.385
Type A test leak rate, Lam	0.0785
Imposed leak rate, Lo	0.241
Error limit, 0.25 La	0.075

Substitution of these values into the acceptance equation demonstrate that the specified inequalities are satisfied as follows:

$$0.2445 < 0.385 < 0.3945$$

Based on this review of the computer printout of test data, the inspector concluded that the Type A and supplemental tests demonstrate that the primary containment leakage rate is within the specified acceptance limits.

6. Leak Rate Test Program

Plant Procedures

The inspector reviewed the overall leakage rate program for McGuire to verify that procedures have been developed and implemented consistent with the regulatory requirements. Documents reviewed either totally, or in part, included:

- a. PT/2/A/4200/01A - Containment Integrated Leak Rate Test and Structural Integrity Test
- b. PT/2/A/4200/01B - Electrical Penetration Leak Rate Test
- c. PT/2/A/4200/01C - Isolation Valve Leak Rate Test
- d. PT/2/A/4200/01D - Fuel Transfer Tube Leak Rate Test
- e. PT/2/A/4200/01E - Upper Containment Personnel Lock Leak Rate Test
- f. PT/2/A/4200/01F - Lower Containment Personnel Lock Leak Rate Test
- g. PT/2/A/4200/01G - Mechanical Penetration Leak Rate Test (Bellows Test)
- h. PT/2/A/4200/01H - Equipment Hatch Leak Rate Test
- i. PT/2/A/4200/01J - Unit 2 Containment Leakage (Controlling procedure to ensure that the required leakage summations are completed)
- j. PT/2/A/4200/01N - VP (Purge and Ventilation) Valve Leak Rate Test
- k. PT/2/A/4200/01O - Air Lock Isolation Valve Leak Rate Test
- l. PT/2/A/4200/01P - Penetration (Ice Condenser) Leak Rate Test
- m. PT/2/A/4200/01Q - Penetration Leak Rate Test (Special Conditions)
- n. PT/0/A/4200/22 - New Penetration Leak Rate Test (Special Test)
- o. TT/2/A/9100/147 - 2NI120B Local Leak Rate Test (Special Retest)

Although every procedure listed above was not reviewed for total valve alignment in step by step detail, the inspector concluded that program-matically the licensee has developed and implemented a containment leak rate measurement program. The program is consistent with the regulatory requirements of the Technical Specification, Section 3/4.6; 10 CFR 50, Appendix J; and, ANSI N45.4 with the one exception of determining the as-found primary containment leakage rate. The as-found leakage rate is discussed further in paragraph 7.

A detailed walk-through was performed for the local leak rate (Type C) testing of three penetrations in procedure TP/A/4200/01C. These penetrations were M373, Glycol System; M353, Fire Protection System; and M280, Sample System. Partial review of other penetrations was also performed and no problems were identified relative to venting, draining, valve identification, valve alignment and system restoration. The inspector further verified that all penetrations requiring Type C testing in Technical Specification Table 3.6-1 are included in the test procedures.

As left leak rate results are tracked and summarized in procedure TP/A/4200/01J. Enclosures 13.1, 13.2, and 13.3 specify the results of the Type A test, Type C bypass leakage and the Total Type B and C leakage based on maximum leak paths, respectively. Appropriate acceptance criteria were specified in this procedure and compared with measured leakage as follows:

	<u>Limits</u>	<u>Measured Total</u>
Bypass leakage	0.07La (9514 SCCM)	2811 SCCM
Total Type B & C leakage	0.6La (81,552 SCCM)	4192 SCCM

The inspector concluded that the as left local leakage rates are well below the acceptable limits.

7. As-Found Leak Rate

Paragraph III.A.3(a) of Appendix J to 10 CFR 50 incorporates the requirements of ANSI N45.4 - 1972 into the regulations. Relative to the Type A leak rate test, paragraph 4.2 of ANSI N45.4 states, in part, "for retesting, an initial record proof test shall be conducted at time periods and pressures established by the responsible organization before any preparatory repairs are made. This will disclose the normal state of repair of the containment structure and a record of the results shall be retained."

By a memorandum, dated January 11, 1982, NRR provided a staff position to clarify the statement, "normal state of repair." This memorandum states that if repairs or adjustments are made to the containment isolation boundary prior to the Type A test, the leakage reduction effected by these repairs or adjustments must be quantified and the Type A test result adjusted in order to determine the containment "normal state of repair" or specifically the as-found containment leak rate. In that there appeared to be a misunderstanding by some licensee's as to what the regulations require, IE Notice 85-71, August 22, 1985, was promulgated to clarify the intent and the requirements of this regulation. The inspection findings in this area are discussed below for Units 1 and 2.

a. Unit 2

Review of local leak rate testing performed on McGuire Unit 2 during the current refueling outage indicates that the as-found leakage was not obtained for the Type C tests in all cases before repairs or adjustments were made. From the test records, nine penetrations were

characterized as having excessive leak rates. In some cases, the leakage exceeded the capability of the flow meter (>2000 SCCM) and in one case, the penetration could not be pressurized. However, the test data sheets, work requests, and a computer printout of maintenance job descriptions showed that after repair of only one valve in each of these nine penetrations the leak rate for the penetration was reduced to an acceptable low value. Thus the minimum path leakage through the penetration is available for these nine penetrations. The leakage from these penetrations was in the range of 0.001 wt% per day and will not significantly effect the Type A test result. However, it was found that preventive maintenance was intentionally performed on a number of the isolation valves before an as-found leak rate was obtained. Although precise data was not readily available, the licensee estimated that as many as 50% of the isolation valves were exposed to this maintenance which has the potential of affecting the leak rate.

At the exit interview, the inspector identified this matter as an apparent violation as follows: Violation 370/86-16-01: Contrary to the requirements of the Technical Specification, Section 4.6.1.2 and 10 CFR 50, Appendix J, paragraph III.A.3(a) which incorporate the requirements of ANSI N45.4-1972, paragraph 4.2 into the regulations; the licensee failed to determine the Unit 2 as-found containment leak rate prior to performing repairs or adjustments which can effect the measurement of the as-found leakage.

The matter of whether the Type A test performed on Unit 2 in May 1986 is a passed or failed test was also discussed with the licensee. The licensee believes that the maintenance records contain enough detail to determine if the type of maintenance performed could effect valve leak rates.

These records will be examined to see if the as-found leak rate can be quantified.

At the exit interview, the inspector identified the status of the Type A as-found leak rate as an inspector followup item: IFI 370/86-16-02: Review the results of the licensee's examination of isolation valve maintenance to determine the as-found leak rate status of Unit 2.

b. Unit 1

The inspector also reviewed the licensee's action to determine the as-found leakage on Unit 1 which is scheduled for a Type A test in July 1986. From discussions with management and personnel involved in performing the local leak rate testing, the inspector determined that the licensee has implemented controls to obtain the as-found leak rate for Unit 1.

For the current outage, the Planning group has the responsibility of routing all work requests involving maintenance on containment isolation valves to the Performance group prior to the maintenance. The Performance group evaluates the work requests to determine if a leak rate test must be performed prior to maintenance and/or post maintenance. Through coordination of the Planning, Performance, and Maintenance groups control of as-found leakage measurements has been established.

In addition to the current outage maintenance, the Performance group has reviewed all pre-outage scheduled maintenance to identify any required as-found leak rate tests.

While the controls established by the licensee appear adequate, these controls have not yet been formalized into procedures.

At the exit interview, the inspector identified this matter as an inspector followup item:

IFI 369/86-16-01: Review the procedures established to track and control determination of the containment as-found leak rate.