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November 21, 1986

EDE LTR: 86-186

Harold Denton
Director of Nuclear Regulatory Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Correction of Errors Found in Reactor Containment Building Integrated Leak Rate Test Report, Dresden Unit 3, Docket 050-249, DPR-25, dated October 26, 1986

Dear Mr. Denton:

Enclosed, please find corrected pages 1, 2, and 26 of the subject report. On pages 1 and 2, in Section A.3, the leak rate was stated to be 0.5034 weight %/day, with an associated 95% upper confidence level leak rate of 0.6567 weight %/day. These values were stated and intended to include several Type C test results for process lines not drained and vented, but in fact did not include these test results. These values have been corrected to 0.5874 and 0.7407 weight %/day, respectively. On page 26, the total weight %/day was stated as 0.0837 weight %/day. This value has been corrected to 0.0840 weight %/day. The difference between these values represents round off error created when the individual test results in weight %/day were added. The corrected value is the sum of the Type C test results in SCFH converted to weight %/day, and has been used throughout the report.

Sincerely,

E. D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE:MCL:hjb
Enclosure
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A. INTRODUCTION

The purpose of the Dresden Unit 3 primary containment Integrated Leak Rate Test was to measure the primary containment leak rate while at a test pressure equal to that postulated to occur during loss-of-coolant accident (LOCA) conditions. The system line-ups for the ILRT are intended to provide the normal isolations that are available under operation to prevent primary containment leakage should such conditions develop. This report is provided in order to give a detailed description of the test method and the final results. These results are reported in accordance with 10CFR 50, Appendix J, "Primary Containment Leakage Testing for Water Cooled Power Reactors".

A.2 Test Requirements

All leak rate tests performed during the recent refueling outage were done in accordance with schedules and acceptance criteria established by 10CFR 50, Appendix J, American National Standard ANSI N45.4 1972, and by the Dresden Unit 3 Technical Specifications. The maximum acceptable leak rates, as stated in the Technical Specifications are as follows:

Type "A" test (ILRT @ greater than 48 psig)

a. Measured Phase

1. 1.6 weight %/day (La) maximum allowable

2. 1.2 weight %/day (Lt) maximum operational

b. Supplemental Verification Phase

± 0.4 weight %/day (0.25 La)

Type "B" and "C" tests (Local Leak Rate Tests)

a. Testable penetrations and isolation valves must have a total combined leakage of less than or equal to 60 percent of La except for main steam isolation valves.

b. Any one air lock must have a leakage rate of less than or equal to 3.75 percent of La when pressurized to 10 psig.

c. Any one main steam isolation valve must have a leakage of less than or equal to 11.5 scfm when pressurized to 25 psig.

The Type "A" test was conducted in accordance with Technical Staff Surveillance Procedure DTS 1600-7, Rev. 8. This procedure incorporates all of the test requirements.

A.3 Summary of Results

The Dresden Unit 3 primary containment leak rate was found to be 0.5874 weight %/day (or 300.87 scfh) at a test pressure of 48 psig minimum. This total calculated leak rate includes the 12-hour phase Type A calculated test result and several Type C test results for process lines not drained and vented as required by 10CFR 50, Appendix J. The associated upper 95% confidence limit was 0.7407 weight %/day.

The supplemental test result was 2.1849 weight %/day. This result was compared with the sum of the 12-hour phase result of 0.5034 weight %/day and an induced leakage of 1.76 weight %/day.

B. TEST METHOD

B.1 Basic Technique

The Absolute Method was used to perform the Type A test. The Absolute Method uses the ideal gas law to calculate changes in dry air mass as a function of pressure and temperature. Compensation for water vapor pressure is taken into account when the dry air mass within the containment is calculated. Leakage of mass (which is assumed to be constant) from the containment during the Type A test interval can be determined by establishing the rate of mass loss.

B.2 Supplemental Verification Test

The verification test (induced leakage) was performed by intentionally inducing a controlled leak of magnitude approximately equal to the maximum allowable leakage (110% of La). This induced leak was superimposed on the previously determined leak rate. The degree of detectability of the combined leakage provided a basis for resolving any uncertainties associated with the 12-hour phase of the test.

B.3 Linear Regression Analysis

Since it is assumed that the leak rate is constant during the testing period, a plot of the measured contained dry air mass versus time would ideally yield a straight line with a negative slope (assuming a non-zero leak rate). Obviously, sampling techniques and test conditions are not perfect and consequently the measured values will deviate from the ideal straight line situation.

A "least square" statistical analysis was performed to establish a regression line for the mass versus time parameters after each set of data was obtained. The slope of the regression line is called the statistically averaged leak rate. It was this quantity that was compared to the Technical Specification limit La.

Associated with the statistical leak rate is the upper 95% confidence leak rate. The calculation of this upper limit is based on the standard deviation of the regression lines and the one-sided Student's T-Distribution function. A procedural requirement specified that the 95% confidence limit was to be less than 75% of the Technical Specification limit La.

Both the regression line and the associated confidence limit were calculated after each set of data was obtained.

SYSTEM DESCRIPTION	VALVE NUMBERS	LEAK RATE SCFH	WT. %/DAY
Primary Sample	220-44 & 45	0.017	0.000033
Drywell CAM	9207A & 9207B*	1.65	0.0032
	9208A & 9208B*	2.306	0.0045
	Total	43.026	0.0840

*LLRT results for these lines are included because these lines were used during the ILRT for test instrumentation.

The total containment leak rate, including local leak rate test results for unvented systems as shown in the preceding list, is 0.5874 weight %/day. The associated 95% upper confidence limit was 0.7407 weight %/day. It should be noted that the CRD cooling water return penetration, which was previously reported in the above table, was removed from Unit 3 as a part of this outage.

F. CONTAINMENT PRESSURIZATION

F.1 Preparation

The following major events were completed prior to containment pressurization as required by 10CFR Part 50, Appendix J, and ANSI/ANS 56.8-1981.

1. Satisfactory completion of all Type B and C Leak Rate tests.
2. Primary containment temperature survey.
3. Calibration of all instrumentation.
4. Instrumentation error analysis calculation.
5. Visual containment inspection.
6. Venting of the reactor vessel to the primary containment atmosphere.

Training was provided to all technical personnel involved in the ILRT. The 2 hours of training was designed to familiarize personnel with the test instrumentation, computer program, and necessary scheduling for the successful completion of the 1986 ILRT.

Two 3000 scfm electric compressors were brought on site to supply clean air to the primary containment through a 4-inch pipe tied into the LPCI system. These compressors not only served as a source of oil free air but enabled Dresden personnel to realize 48 psig containment pressure in a minimal amount of time.

F.2 Containment Instrumentation

ILRT sensors were placed within the containment shortly before the test. All sensors were kept at a distance of three feet or farther from any pump, motor, or piece of piping. This was done so local temperature variations would not overly influence the real average subvolume temperature recorded by the sensor in that subvolume.

In preparation for the test, special care was taken to keep all sensors out of any airflow which might be caused by the compressor during pressurization.