January 22, 1985

Attachment to Letter from D. C. Hintz to W. S. Little

Supplement to

Kewaunee's 1984 ILRT Report

Originally Submitted

August 20, 1984

Introduction

This report presents the 'as-found' containment leakage rate calculation for the Kewaunee Nuclear Plant Containment at the end of Cycle IX. Type C leakage, greater than the capacity of the local leak rate tester, was identified through a containment penetration with redundant isolation valves in series. The 'as-found' integrated leakage rate is determined by combining the directly measured containment leakage with a conservative measure of (pre-post) repair differential leakage. The combination of the directly measured 1984 integrated leakage rate and the (pre-post) repair differential leakage could not be quantified. This is considered a failure of the 1984 Type A test.

As stated in 10 CFR 50, Appendix J, V.B.3, upon failure of a Type A test the following points shall be covered in a summary report:

- An analysis and interpretation of the test data
- The least squares fit analysis of the test data
- The instrumentation error analysis
- The structural conditions of the containment or components, if any, which contributed to the failure in meeting the acceptance criteria
- Results and analyses of the supplemental verification test employed to demonstrate the validity of the leakage rate test measurements shall also be included.

Section I of this report contains the 'as-found' leakage rate calculation and sections II through VI discuss the five (5) points required by 10 CFR 50, Appendix J, V.B.3.

I. 'As Found' Containment Leak Rate

Type B and C leakage tests were performed during the 1984 Refueling Outage prior to the Type A test. This order of testing is consistent with KNPP Technical Specifications and exemptions granted to WPSC from Appendix J provided a conservative measure of (pre-post) repair differential leakage is added to the Type A results.

When Type C leakage repairs are made prior to and during the same outage as a Type A test, (pre-post) repair differential leakage added to the Type A test will include improvements in the penetration's overall ability to isolate containment; e.g.,

(1) Penetration with 2 testable isolation valves in series:

Before repair:	Valve 1 leaks	8 SCFH
	Valve 2 leaks	6 SCFH
After repair:	Valve 1 leaks	2 SCFH
	Valve 2 leaks	1 SCFH

'Repaired leakage': 5 SCFH

(2) Penetration with 2 testable isolation valves in series:

Before repair:	Valve 1 leaks	8 SCFH
	Valve 2 leaks	6 SCFH
After repair:	Valve 1 leaks	2 SCFH
	Valve 2 leaks	5 SCFH

'Repaired leakage': 4 SCFH

Penetration geometries other than those with 2 testable isolation valves in series will be evaluated on a case-by-case basis using appropriate conservatisms. Type B leakage repaired prior to and during the same outage as a Type A test will also be evaluated on a case-by-case basis using appropriate conservatisms.

1984

As-Found Integrated Leakage Rate Determination

Kewaunee Nuclear Power Plant

Table 1 Leakage Repaired in 1984 Prior to the Type A Test

Penetration Repaired	Initial Leakage	Final Leakage	Repaired Leakage
12	0.088SCFH	0.053SCFH	0.035SCFH/1.54 x 10^{-5} wt.%/day
11[1]	>20SCFH	0.068SCFH	>20SCFH/>8.77 x 10^{-3} wt.%/day

As Found Integrated Leakage Rate = Leakage Rate Determined With Type A Test + Type B&C Leakage Repaired Prior to Type A Test

As Found Integrated Leakage Rate = 0.0162 wt%/day + 1.54 x 10^{-5} wt%/day + >8.77 x 10^{-3} wt%/day

= >0.0250 wt%/day

Note that the 'as-found' leakage rate is indeterminate. This resulted from the leakage through redundant isolation valves at penetration #11 exceeding the capability of the measuring device.

[1]See LER 305-84-006

Since the 'as-found' 1984 Type A test results are not quantified it cannot be positively said that the test passed, nor can it be positively concluded that the test was a failure. Conservatively, the 'as-found' 1984 Type A test is considered a failure.

II. Analysis and Interpretation of the Test Data

The 1984 ILRT test data were analyzed using the Mass Point Method (ANSI 56.8-1981). A summary of the data reduction method can be found in Appendix B of Kewaunee's 1984 ILRT Report (reference 1). The raw data and intermediate calculation results are in Appendix D of the same report.

The calculated leakage rate, 0.0162 wt%/day (at 95% UCL), demonstrates the leak tightness of Kewaunee's Containment for Cycle X.

III. Least Squares Fit Analysis of the Test Data

A least squares analysis was performed with the following as the independent and dependent variables, respectively:

(Change in time measured from t=0 , Weight fraction of containment atmosphere remaining up to and including data set i)

The slope of the curve is the containment leakage rate in weight fraction per hour and the y intercept is the weight fraction in containment at time zero.

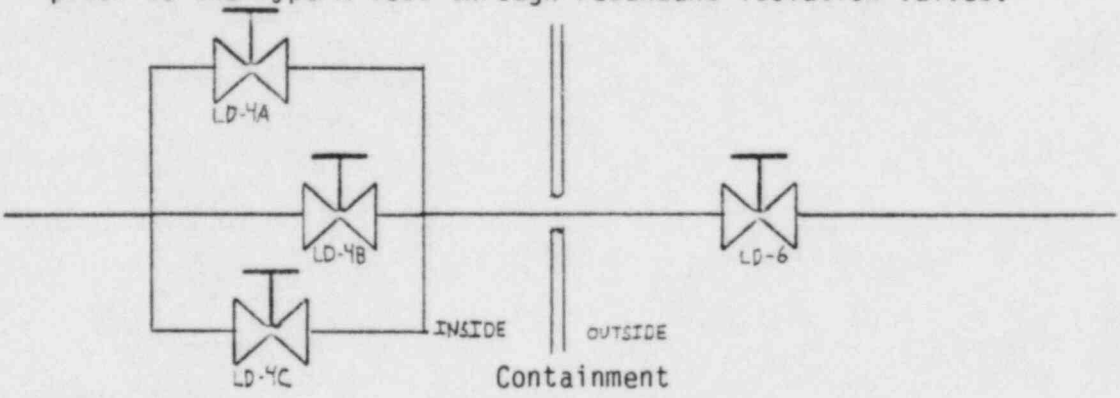
This calculation was performed via computer; the data and results are found in the 1984 Kewaunee ILRT report, Appendix D.

IV. Instrumentation Error Analysis

A figure of merit analysis for the instruments used in the 1984 ILRT is presented in Appendix B of the 1984 Kewaunee ILRT report (reference 1). The analysis is consistent with ANSI 56.8-1981, Appendix G. The instruments were determined to be suitable for their intended use.

V. Conditions Which Contributed to Failure of the Type A Test

Kewaunee's 1984 'as-found' Type A test was considered a failure since Type C leakage greater than the capacity of the local leak rate tester was identified prior to the Type A test through redundant isolation valves.[1]



The leakage was repaired by replacing the seat ring gaskets in valves LD-4A and LD-4B and adjusting the stroke on LD-6. Note that LD-4A is in parallel with LD-4B which together are in series with LD-6. These repairs resulted in reducing the Type C leakage through penetration #11 from >20SCFH to 0.068 SCFH.

VI. Results and Analyses of Supplemental Verification Test Employed to Demonstrate the Validity of the Leakage Rate Test Measurement

The condition which caused the Type A test failure was corrected prior to performance of the Type A tests, i.e., B and C tests were performed prior to the A

[1] See LER 305-84-006

test. Therefore, the relevant supplemental test is the same supplemental verification test that illustrated acceptable results of Kewaunee's 1984 Type A test. The supplemental test was successful and is described in section I.1 of Kewaunee's 1984 Type A test report (reference 1).