

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, D.C. 20555

August 22, 1985

IE INFORMATION NOTICE NO. 85-71: CONTAINMENT INTEGRATED LEAK RATE TESTS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP):

Purpose:

This information notice is provided as a notification of a potentially significant problem pertaining to containment integrated leak rate tests (CILRTs). It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, the suggestion contained in this information notice (namely, that licensees review their programs with respect to the guidelines provided), does not constitute an NRC requirement. Therefore, no specific action or written response is required.

Description of Circumstances:

Recent staff reviews of the CILRTs performed at San Onofre, Kewaunee, and Monticello nuclear power plants have indicated that many utilities are misinterpreting the relationship between local leak rate testing and CILRTs. 10 CFR 50, Appendix J, discusses containment leakage testing in terms of Type A, B, and C tests. The Type A test is a measurement of the overall integrated leakage rate of the primary containment; whereas Type B and C tests are local leak rate tests designed to detect and measure local leakage across each pressure-containing or leakage-limiting boundary for primary containment.

As a result of Type B and C tests, some utilities are performing repairs and adjustments before conducting Type A tests without properly adjusting the Type A test results for the Type B and C leakage rates. Without this adjustment, the "as found" condition of the primary containment cannot be properly determined.

In some cases, when this adjustment is made properly, a Type A test may fail to meet the acceptance criteria of Appendix J with regards to the "as found" condition. When two successive Type A test failures occur, Appendix J requires more frequent CILRTs. However, if Type B and C leakage rates constitute an identified contributor to this failure of the "as found" condition for the CILRT, the general purpose of maintaining a high degree of containment integrity might be better served through an improved maintenance and testing program for

containment penetration boundaries and isolation valves. In this situation, the licensee may submit a Corrective Action Plan with an alternative leakage test program proposal as an exemption request for NRC staff review. If this submittal is approved by the NRC staff, the licensee may implement the corrective action and alternative leakage test program in lieu of the required increase in Type A test frequency incurred after the failure of two successive Type A tests.

Discussion:

Sections III.D.1.a, 2.a and 3.a of Appendix J require that a set of three periodic Type A tests be performed at approximately equal intervals during each 10-year service period, and that Type B and C tests be performed during reactor shutdown for refueling but in no case at intervals greater than 2 years. Under these test requirements, there are many occasions when Type A, B, and C tests must be performed during the same reactor shutdown period. Questions are frequently raised concerning the correct sequence of conducting the Type A, B, and C tests and the potential impact of the results of the Type B and C tests on the success or failure of a periodic Type A test.

The NRC staff has previously provided partial guidance to utilities on these questions on an individual case basis with respect to inspection and enforcement activities (see Attachment 1). The staff position on these questions, as previously employed in inspection and enforcement, may be summarized as follows:

1. Section III.A.3 of Appendix J requires that all CILRTs be conducted in accordance with the provisions of ANSI N45.4-1972. Paragraph 4.2 of ANSI N45.4-1972 states that for periodic CILRTs no repairs or adjustments are to be made to the containment structure prior to conducting the test in order to disclose the normal state of repair of the containment structure.
2. Type B and C tests may be performed either before the start of or after completion of the periodic Type A test provided that the pretest requirements of Paragraph 4.2 of ANSI N45.4-1972 and Section III.A.1.a of Appendix J are met; i.e., no repairs or adjustments to the primary containment boundary are made so that the containment can be tested in as close to the "as is" condition as practical. As such, the leakage information obtained from the "as is" (sometimes called "as found") Type A test results can be used to assess the containment condition and its integrity following a period of plant operation.
3. If repairs or adjustments performed as a result of the Type B and C testing programs or for any other reasons are made to the primary containment boundary before the Type A test sequence, local leak tests must be performed on the affected portion of the containment boundary to determine the minimum pathway leakage rates before and after the repairs or adjustments are made. The minimum pathway leakage would be the smaller leakage rate of in-series valves tested individually, one-half the leakage rate

for in-series valves tested simultaneously by pressurizing between the valves, and the combined leakage rate for valves tested in parallel. The "as found" Type A test results can then be obtained by adding the differences between the affected minimum path leakage before and after repairs or adjustments to the overall measured Type A test result. A periodic Type A test would be called a "failure" if the "as found" Type A test result (with appropriate correction from local leak tests) exceeds the acceptance criteria of Appendix J.

4. The question has been raised by various utilities as to how far in advance of the Type A test the Type B and C tests may be conducted without having to add the leakage differences to the Type A test results. The staff position on this question has been that after Type B and C tests, the penetrations and valves should experience some period of normal service conditions before the Type A test. If the Type B and C tests are conducted before the Type A test during the same refueling outage, the service condition criterion would not be met. If, however, some operating service time is achieved, the Type A test can be conducted essentially independent of the time duration of exposure to the normal service conditions. Thereafter, a Type A test could be conducted without having to consider the local leak rate results in determining the "as found" condition.

The continuance of containment leak-tight integrity is the primary importance in performing Type A, B, and C tests. Therefore, it may be beneficial for licensees to implement improved maintenance and testing programs for containment penetrations to ensure that known or likely leaking penetrations will not result in the overall loss of containment leak-tight integrity and in the ensuing penalties for Type A test failure.

It should also be noted that containment leak-tight integrity is monitored between CILRTs through the Type B and C test programs. Failure to meet the acceptance criteria of Appendix J for those tests generally constitutes a loss of containment integrity as defined in the Technical Specifications and may be reportable by the licensee under the provisions of 10 CFR 50.73., Sections (a)(2)(ii) and (a)(2)(v)(C).

It is suggested that licensees review their CILRT program with respect to the above guidelines.

No specific action or written response is required by this information notice; however, if you have any questions regarding this notice, please contact the Regional Administrator of the appropriate NRC regional office or the technical contacts listed below.

  
Edward L. Jordan, Director  
Division of Emergency Preparedness  
and Engineering Response  
Office of Inspection and Enforcement

Technical Contacts: Y. S. Huang, NRR  
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**Attachments:**

1. Documentation from NRC to Utilities, Related to Repairs and Adjustments Done Prior to Type A Tests
2. List of Recently Issued IE Information Notices

Documentation from NRC to Utilities, Related to  
Repairs and Adjustments Done  
Prior to Type A Tests

1. Letter to Consumers Power Company from R. L. Spessard, "Big Rock Point CILRT Schedule," February 3, 1983

This letter informed the licensee of the necessity to increase the CILRT frequency because of the failure of two consecutive Type A tests conducted in 1977 and 1982. During the 1982 refueling outage, Type B and C tests were conducted and several valves were found to leak excessively and were repaired. Subsequently the Type A test was conducted and the licensee reported a successful test, but it did not include the initial Types B and C leakage in the Type A test results. The NRC staff reviewed the tests and determined that the Type B and C leakage should be added to the Type A test results, because the plant had not been in service between the time of the Type B and C tests and the Type A test. With the addition of the Type B and C leakage to the Type A test result, the leakage was excessive and the containment was deemed to have failed the "as found" test condition.

2. Letter to Commonwealth Edison Company from R. L. Spessard, "Quad Cities Unit 1 Containment Integrated Leak Rate Test Frequency," October 7, 1983.

This letter also informed the licensee of the necessity to increase the CILRT frequency because of the failure of two consecutive Type A tests. These tests were conducted in 1979 and 1982. Type B and C tests conducted during the 1982 refueling outage, prior to the Type A test, showed that the combined leakage from several valves exceeded the allowable Technical Specification. In addition, the seal between the drywell head and the drywell vessel flange was found to be leaking to such an extent that the leakage could not be measured. The licensee repaired these leaks and then conducted a Type A test that showed the leakage to be within the allowable limits. The NRC staff, however, determined that the containment had failed the CILRT with respect to the "as found" condition. This determination was based on the position that the Type B and C test results could be excluded from the "as found condition" only if some period of normal station service existed between Type B and C tests and the Type A test.

3. Inspection Report No. 50-305/84-19 (DRS), Kewaunee, November 27, 1984 and Notice of Violation to Wisconsin Public Service Corporation - Docket No. 50-305, November 28, 1984.

The inspection report discusses an exemption to Appendix J issued to Wisconsin Public Service Corporation by the NRC. The exemption permitted Type B and C tests and repair work on penetrations to be performed at Kewaunee before Type A tests were conducted. The exemption required that leakage reduction caused by the repairs be added to the Type A test result for the purpose of evaluating the "as found" condition. The licensee then wrote to the NRC stating that it did not believe that an exemption was required to perform Types B and C tests before performing a Type A test. The licensee based this on the belief that Type A testing and Type B and C testing were two separate events performed on two separate schedules.

In 1984, the licensee performed Type B and C tests before performing the Type A test and failed to add the pre- and post-repair differential leakage to the "as found" Type A test results in its CILRT report. As stated in the inspection report, the NRC staff did not agree with the licensee's position because Type B and C testing (with repair) would invalidate part of the purpose of the Type A test (that is, to establish the "as found" condition). As a result, the notice of violation covering this failure was issued on November 28, 1984.

4. Inspection Report No. 50-206/85-12 San Onofre Unit 1, April 5, 1985.

Paragraph 6 of this report discusses the results of the CILRT performed at San Onofre during 1985. Type C testing and repair work was performed on six sets of valves just before the Type A test was conducted. However, differential leakage resulting from the repair was not added to the Type A test results reported. As a result a notice of violation covering this failure is under consideration.

LIST OF RECENTLY ISSUED  
 IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-70	Teletherapy Unit Full Calibration And Qualified Expert Requirements (10 CFR 35.23 And 10 CFR 35.24)	8/15/85	All material licensees
85-69	Recent Felony Conviction For Cheating On Reactor Operator Requalification Tests	8/15/85	All power reactor facilities holding an OL or CP
85-68	Diesel Generator Failure At Calvert Cliffs Nuclear Station Unit 1	8/14/85	All power reactor facilities holding an OL or CP
85-42 Rev. 1	Loose Phosphor In Panasonic 800 Series Badge Thermo-luminescent Dosimeter (TLD) Elements	8/12/85	Materials and fuel cycle licensees
85-67	Valve-Shaft-To-Actuator Key May Fall Out Of Place When Mounted Below Horizontal Axis	8/8/85	All power reactor facilities holding an OL or CP
85-66	Discrepancies Between As-Built Construction Drawings And Equipment Installations	8/7/85	All power reactor facilities holding an OL or CP
85-65	Crack Growth In Steam Generator Girth Welds	7/31/85	All PWR facilities holding an OL or CP
85-64	BBC Brown Boveri Low-Voltage K-Line Circuit Breakers, With Deficient Overcurrent Trip Devices Models OD-4 and 5	7/26/85	All power reactor facilities holding an OL or CP
85-63	Potential for Common-Mode Failure of Standby Gas Treatment System on Loss of Off-Site Power	7/25/85	All power reactor facilities holding an OL or CP

OL = Operating License  
 CP = Construction Permit