U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-245/85-16
50-336/85-22

Docket Nos. 50-245
50-336

License Nos. DRP-21
DRP-65

Priority --

Category C

Licensee: Northeast Nuclear Energy Company

P. O. Box 270

Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Power Station, Unit 1 & 2

Inspection At: Waterford, Connecticut 06385

Inspection Conducted: June 3 - 7, 1985 and June 12 - 17, 1985

Inspectors: S. D. Kucharski
S. D. Kucharski, Reactor Engineer — 8/6/85 date

Approved by: Jon R. Johnson
J. R. Johnson, Chief, Operational Programs Section, OB, DRS — 8/6/85 date

Inspection Summary: Inspection on June 3 - 7, 1985 and June 12 - 17, 1985 (Inspection Report Nos. 50-245/85-16, 50-336/85-22

Areas Inspected:

Unit 1: Special, unannounced inspection, June 13, 1985, of the calibration records for the instrumentation used in Local Leak Rate Tests (LLRT). The inspection involved 4 hours onsite by one region based inspector.

Results: No violations were identified.

Unit 2: Routine, announced inspection of the containment leakage testing program including review of the Containment Integrated Leak Rate Test (CILRT) and Local Leak Rate Test (LLRT) procedures, CILRT witnessing, CILRT and LLRT test results review, and general tours of the facility. The inspection involved 68 hours onsite by one region based inspector.

Results: One violation was identified (Failure to follow approved procedures for test instrument calibration, paragraph 2.6).

DETAILS

1. Persons Contacted
Northeast Utilities

*R. J. Ashey, Control Room Operator
**R. Bates, Senior Engineer
*G. J. Closuis, QA/QC Supervisor
**T. Dominguez, Reilability Engineer
**L. Georgian, Engineer
*J. J. Keenan, Operations Assistant
**J. J. Kelley, Unit 2 Superintendent
**D. Kross, Unit 2, I & C Supervisor
*P. Pikul, Reliability Engineer
**W. Romberg, Station Superintendent
*R. Schleicher Jr., Unit 2, I & C Assistant Supervisor
*J. Smith, Engineering Supervisor
*S. Stadnick, Plant Engineer

Bechtel Corporation

**G. Bone, Shift Test Director - ILRT

U.S. NRC Personnel

**J. T. Shedlosky, Senior Resident Inspector

* Denotes those present at exit meeting on June 7, 1985.

** Denotes those present at exit meeting on June 17, 1985.

2. Containment Local Leakage Rate Testing

2.1 Documents Reviewed

-- SP 2605C, Containment Leak Test-Type B, Revision 6, 12/2/83

-- SP 2605D, Containment Leak Test-Type C, Revision 6, 3/29/84

-- SP 2605E, Containment Personnel Airlock Leak Test, Revision 5, 11/30/84

-- IC 2436B, Local Leak Rate Test (LLRT) Box Calibration, Revision 1, 5/23/84

-- LLRT Calibration records, Unit 1 and 2

-- Records of LLRT activities conducted during the recent outage including test results, related repairs and retest documentation
-- Selected system Drawings, Piping and Instrumentation Diagrams.

2.2 Scope of Review

The inspector reviewed the above documents to ascertain compliance with regulatory requirements of Appendix J to 10 CFR 50, Millstone Unit II Technical Specifications, applicable industry standards and with station administrative guidelines. The inspector also witnessed local leakage testing, held discussions with the licensee regarding the documentation of test results, the repair and retesting following failed tests, and the relationship of these items to the "As-found" and "As-left" condition of containment as applied to CILRT results. Further details are discussed below.

2.3 Procedure Review

The procedures reviewed were technically accurate and in conformance with the regulatory requirements of Appendix J to 10 CFR 50 and applicable industry standards. The LLRT coordinator and associated licensee personnel have inspected piping configurations to assure that the appropriate line up drawings in the LLRT procedures are accurate and in accordance with leakage testing requirements. The inspector verified several of these valve line ups during inside and outside tours of the containment building. No unacceptable conditions were identified.

2.4 Test Witnessing

On June 5, 1985, the inspector witnessed a type C LLRT of penetration 40 which involved the containment purge exhaust valves (AC-6 and 7). The test was conducted with procedure SP 2605D using a licensee manufactured test box. The results of the test for the total leakage of the penetration was 1616 SCCM which is below the acceptable limit.

The inspector verified that the test was being conducted in accordance with the approved procedure, and that the technicians involved in the test were knowledgeable of requirements and use of the test instruments.

No unacceptable conditions were identified.

2.5 LLRT Instrumentation Calibration (Unit 1)

The inspector reviewed the calibration records for the flow transmitters, temperature gages and pressure gages used in the LLRT test rig. The instruments were appropriately calibrated and marked with current calibration stickers. The inspector did note that on one of the flow indicators there was no identification tag. The identification tag is the only means of identifying that instrument with the calibration records. The inspector brought this to the attention

of the licensee, who in turn agreed to permanently mark the instrument. Once the instrument was removed from the test box it was noted by the licensee that the identification tag was on the back side of the instrument which was not in view during the inspection. No unacceptable conditions were identified.

2.6 LLRT Instrument Calibration (Unit 2)

The inspector reviewed the calibration records for the flow indicators, temperature gages and pressure gages used in the LLRT test rigs. From a review of these records the inspector determined that all the instruments have not been calibrated. The following discrepancies were noted:

-- There were no calibration stickers on the flow indicator for all three LLRT test rigs.

-- There were no calibration stickers on the temperature gages for all three LLRT test rigs.

-- Section 2.1, of IC 2436B, Local Leak Rate Test Box Calibration, requires the flow indicator to be returned to vendor for calibration every three years. The last calibration date shown for the flow meter was October, 1980 and the licensee was unable to provide more recent calibration records.

-- Section 7.2 of IC 2436B requires recording on I & C form 2436B-1 the date the flow indicator was last calibrated and the date calibration is due. There was an "N. A." recorded in both spaces.

-- Section 7.2.1 of IC 2436B states, "If the flow indicator is due for calibration - remove and return to vendor for calibration." This was not performed.

-- The method of calibration for the temperature gage on the LLRT box is not specified in IC 2436B.

The licensee removed the LLRT test boxes and sent the flow indicators to the vendor to be calibrated. Based on the results of the calibration check it was determined that none of the type B and C tests had to be redone.

Performance of LLRT with noncalibrated instrumentation is a violation (50-336/85-22-01).

2.7 Test Results

The inspector reviewed the LLRT results summary and discussed analyses of test failures, repairs and retests with the licensee. The inspector noted that the licensee was recording a minimum leakage for LLRT's during which there was no movement in the rotameter scale. This is an acceptable conservative approach by the licensee.

The "As-found" and As-left" leak rate for every test done on each Type B and C penetration are documented by the licensee in the LLRT summary and are planned to be in the CILRT test report. Based on a preliminary review of the data, the "As-found" leakage was approximately 34,000,000 SCCM which is greater than the allowable leakage of 0.6 La and the "As-left" leakage was approximately 124511.7 SCCM which was within the allowable leakage total of 0.6 La. Based on these results the licensee submitted an Licensee Event Report No. 85-003/3L-0 on April 4, 1985 when they first suspected a problem with their LLRT. No unacceptable conditions were identified.

3. Containment Integrated Leak Rate Test (CILRT)

3.1 Documents Reviewed

-- Section 5.2.9 of the FSAR

-- Section 3.6.1.2 of the Technical Specifications

-- SP 2605B, Containment Leak Rate Test - Type A Revision 4, 6/4/85

-- ACP-QA-9.05, Monitoring of QA Activities, Revision 12, 2/28/83

-- Monitor 285-03, Integrated Leak Rate Test (ILRT), Revision 0, 6/10/85

-- Engineering Calculation Z-ENG-098, ILRT Support/Deviation of Equation Expressing Containment Dome Volume as a Function of Dome Radius, Revision 0, 11/22/83

-- Engineering Calculation 2-ENG-102, ILRT Support/RTD Failure Analysis, Revision 1, 11/22/83

-- GRE-83-236, Internal Free Volume of Millstone Unit 2 Containment, Revision 0, June 9, 1983

-- CILRT Log Book

-- CILRT Instrumentation Calibration

-- Test Results

-- Selected Piping and Instrument Drawings.

3.2 Scope of Review

The inspector reviewed the above listed documents for technical adequacy and to ascertain compliance with the regulatory requirements of Appendix J to 10 CFR 50, Technical Specifications and applicable industry standards. The inspector noted the procedure required a minimum test duration. This is acceptable to the NRC based on the procedure meeting the requirements of Bechtel Power Corporation's Topical Report BN-TOP-1, "Testing Criteria for ILRT of Primary Containment Structures for Nuclear Power Plants." The procedure referenced (and was in general conformance with) industry standard ANS/ANSI 56.8 - 1981, "Containment System Leakage Testing Requirements." The inspector witnessed activities related to the CILRT and the subsequent verification test. The inspector also performed an independent calculation of the test results.

3.3 Procedure Review

The inspector reviewed the documentation for technical adequacy and for consistency with regulatory requirements, guidance and licensee commitments. Review of the procedures' acceptance criteria, test methods, and references indicated adequate conformance with Appendix J to 10 CFR 50.

In a random sampling basis, the inspector reviewed the procedure valve line ups for piping penetrations. This review was to ensure that systems were properly vented and drained to expose the containment isolation valves to containment atmosphere and test differential pressure with no artificial boundaries. No unacceptable conditions were identified.

3.4 CILRT Instrumentation

The inspector reviewed the calibration records for the resistance temperature detectors (RTD's), dewpoint instruments, precision pressure detectors, and verification test flow meters. Their calibrations prior to CILRT were found to meet applicable accuracy requirements and were traceable to the National Bureau of Standards. No unacceptable conditions were identified.

3.5 CILRT Chronology

June 14, 1985

1200 - Completed test preparation and the containment inspection

2248 - Commenced Pressurization

2347 - Lost Dewcell ME 8064 - increase volume fraction of Dewcell ME 9772

June 15, 1985

0240 - Pressure at 10.2 psig - performed walk through to check for leakage. Minor leaks found.

1200 - Pressure at 48.54 psig - performed walk through with NRC inspector. Minor leaks.

1400 - Completed Pressurization at 54.2 psig

1600 - Temperature and Pressure dropping

1715 - Started to re-pressurize due to low pressure

1750 - Completed Pressurization at 54.2 psig

1808 - Commenced Stabilization Period

2159 - Secured stabilization period due to dropping pressure - Pressure was still above minimum but it was a precautionary move

2223 - Completed Pressurization at 54.2 psig

2243 - Commenced Stabilization period

June 16, 1985

0243 - Minimum stabilization time of 4 hours and temperature criteria have been satisfied.

1100 - Conducted walk through to check penetrations for possible leaks

1700 - Completed official test period. Duration 14 hours-15 minutes

1830 - Commenced Supplemental verification test

1845 - Stopped stabilization period due to problems with flow meter

2045 - Changed arrangement of flow meter for verification test

2122 - Commenced 1 hour stabilization period

2222 - Commenced flow verification test

June 17, 1985

0222 - Completed verification test

0339 - Commenced depressurization of containment

3.6 Test Performance/Control

The CILRT was performed within the procedural guidelines. Procedural precautions were adhered to, especially those relating to manipulations of containment boundaries after the commencement of testing. No unacceptable conditions were identified.

3.7 Test Results Reviewed

The licensee evaluated the test results for the June 16, 1985 14.25 hour period, between 0245 and 1700. The calculated leakage rate at the upper confidence limit was 0.129 wt %/day for the mass point calculation and 0.363 wt %/day for the total time method. The test acceptance criteria is based on a 0.75 La which is equivalent to 0.375 wt %/day. The inspector performed an independent calculation of the test results using the raw data from the test to estimate the accuracy of the licensee's leak rate calculation. The inspector performed the calculation using first the air mass data and then the average temperature, pressure and vapor pressure. The results are as follows:

1. Licensee

Mass point - 0.127 wt %/day, UCL - 0.129 wt %/day
Total time - 0.132 wt %/day, UCL - 0.363 wt %/day

2. NRC

a. Air mass Calculation
Mass point 0.12697 wt %/day, UCL - 0.12913 wt %/day
Total time 0.15821 wt %/day, UCL - 0.29783 wt %/day

b. Average temperature, pressure, vapor pressure
Mass point 0.12717 wt %/day, UCL - 0.12931 wt %/day
Total time 0.16103 wt %/day, UCL - 0.31028 wt %/day

The above values do not include the results of the LLRT's that were performed prior to the ILRT. A preliminary review of that data incorporated into the inspection calculations shows the following results.

1. Licensee
   a. "As-Found" leakage = 19.348 wt %/day

      (1) "As-found" data exceeds the 0.5 wt %/day

   b. "As-left" leakage = 0.0014 wt %/day

      (1) Mass point - 0.1284 wt %/day, UCL = 0.1304 wt %/day

      (2) Total Time - 0.1334 wt %/day, UCL = 0.3644 wt %/day

2. NRC
   a. Air Mass Calculation

   (1) "As-Found" Leakage = 19.348 wt %/day

      (a) "As-Found" data exceeds the 0.5 wt %/day

   (2) "As-Left" leakage = 0.0014 wt %/day

      (a) Mass point - 0.12837 wt %/day, UCL - 0.13053 wt %/day

      (b) Total time - 0.15961 wt %/day, UCL - 0.29923 wt %/day

The inspector concluded and the licensee concurred that the "As-found" results based on a 1.0 La resulted in a failed ILRT.

The results of the "As-left" ILRT based on a 0.75 La was an acceptable test. The inspector informed the licensee based on the failed 1.0 La ILRT that a schedule applicable to subsequent Type A tests is required to be submitted to the NRC for review.

The CILRT was followed by a successful superimposed leak verification test. The licensee imposed a leak of 29.76 SCFM or 0.500 wt %/day on the existing leak. The measured verification test leak was 0.178 wt %/day for mass point calculation and 0.364 wt %/day for total time based on the 95% UCL. The test results were within the acceptance criteria band. The inspector also verified these results by independent calculations. The results were as follows:

a. Licensee

   1. Mass Point Band
      (.504 < 0.678 < .754)

   2. Total Time Band
      (0.638 < 0.864 < 0.988)

b. NRC

1. Mass Point Band
(0.504 < 0.67807 < 0.754)

2. Total Time Band
(0.638 < 0.86322 < 0.988)

No unacceptable conditions were identified.

4. Facility Tours

The inspector made several tours of the facility, including the control room, auxiliary building and containment building. During these tours the inspector observed operations and activities in progress, implementation of radiological controls, and the general condition safety related equipment. In addition, the inspector examined the containment system boundaries, component tagging, and instrumentation to support the CILRT. During these tours the inspector also observed licensee personnel checking for evidence of leakage and verifying selected valves to be in the correct position according to procedure requirements. The inspector also checked for leakages using the licensee ultrasonic leakage detector, the Ultra Probe 2000. No unacceptable conditions were identified.

5. Independent Calculations

The inspector performed independent calculations of the test results of the CILRT and the subsequent verification test. Details are included in Section 3.7 of this report.

6. QA/QC Involvement

During the performance of the ILRT the inspector verified QA involvement in monitoring the test. When questioned, the QA personnel were knowledgeable of their responsibilities on how to perform their duties and who to report their findings to. The inspector, however did observe that there was no QA involvement to monitor the end of the test, the verification test or the depressurization of containment. This observation was brought to the attention of licensee management.

7. Exit Meeting

A meeting was held on June 7, 1985 and on June 17, 1985 to discuss the scope and findings of the inspection as delineated in this report. At no time during this inspection was written information provided to the licensee.