U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-423/85-33

Docket No. 50-423

Permit No. CPPR-113 Priority -- Category C

Licensee: Northeast Nuclear Energy Company

P. O. Box 270

Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Power Station, Unit No. 3

Inspection At: Waterford, Connecticut

Inspection Conducted: July 5-15, 1985

Inspectors: Jon R. Johnson, for. 8/14/85
S. Kucharski, Reactor Engineer date

Harold D Gregg, for 8/14/85
A. A. Varela, Lead Reactor Engineer date

Approved by: Jon R. Johnson 8/14/85
J. Johnson, Chief, Operational Programs, Section, OB, DRS date

Inspection Summary: Inspection on July 5-15, 1985 (Inspection Report No. 50-423/85-33)

Areas Inspected: Routine, announced inspection of the containment leakage testing program including procedural review of the preoperational integrated leak rate test (ILRT), Structural Integrity Test (SIT) and Local Leak Rate Test (LLRT); ILRT, SIT and LLRT witnessing; CILRT, SIT, and LLRT test review; on-line primary containment leakage monitoring and general tours of the facility. The inspection involved 106 hours of on-site inspection by two region based inspectors.

Results: No violations were identified.

DETAILS

1. Persons Contacted

Northeast Utilities

*K. Burton, Operations Supervisor
*M. Gentry, Assistant Startup Supervisor
*J. Laware, Engineering Technologist
*T. Lyons, SIT/ILRT Millstone Director
*L. Nateau, Assistant Project Engineer
*J. Selvidis, QA/QC inspector
*R. Thompson, QA/QC inspector
K. Lakshmi, Structural Engineer
D. Hoisington, Senior Engineer

Stone and Webster Engineering Corporation

*J. Busa, Assistant to Chief Engineer, Advisory Operations
B. Laugton, Engineer
*W. Matejih, Project Advisory Engineer
*R. Martel, SIT/ILRT List Coordinator
*R. Parry, Supervisor, Mechanical Test Engineer
A. Morales, QC Supervisor - Structural Integrity Test

Teledyne Engineering Services

V. Wallace, Test Supervisor

NRC

*T. Rebelowski, Senior Resident Inspector
*Denotes those present at exit meeting on July 15, 1985.

2. Follow-up on Previous Inspection Findings

(Closed) Unresolved Item (423/85-11-01): There were several minor deficiencies in the CILRT/SIT procedure. They were as follows:

-- Errors in the volume fraction calculations

-- Documentation for the exemption of venting weld channels

-- Unavailability of ILRT calibration records

The inspector reviewed the reanalysis of the containment volume fractions for humidity sensors, temperature sensor placement analysis and the calibration records for both the dewcells and the RTD's. Even though the licensee does not calibrate each element individually a loop calibration and a calibration check with hand held calibrated instrumentation is performed. The inspector reviewed documentation from NRR exempting the licensee from venting of the weld channels during the CILRT/SIT. The inspector had no further questions. This item is closed.

3. Containment Local Leakage Rate Testing (LLRT)

3.1 Documents Reviewed

-- Test Results for LLRT's

-- Selected Piping and Instrument Drawings

3.2 Test Witnessing

On July 6, 1985, the inspector witnessed the type B leakage testing of the equipment hatch. The test was conducted in accordance with an approved procedure with acceptable results. The inspector verified the documentation of the test results. The inspector observed that the test personnel were familiar with the test equipment and of the procedure. The inspector also witnessed several times during the week of July 8, 1985 the Type B leakage testing of the Personnel Air lock.

No unacceptable conditions were identified.

3.3 Test Results

Prior to this inspection the licensee had been recording zero leakage when the float material in the lowest scale rotameter did not move. This was considered a non-conservative approach by the licensee and they agreed to change their procedure. The licensee now records one-half of the smallest increment marked on the rotameter scale.

No unacceptable conditions were identified.

4. Containment Integrated Leakage and Structural Integrity Test Documentation Review

4.1 Documents Reviewed

-- Preoperational Test Procedure 3-INT-2002, Integrated Leak Rate Test and Structural Integrity Test, Rev. 0, April 24, 1985

-- CILRT Computer Program

-- CILRT Log book

-- Stone & Webster calculation US(B)-320, Containment Volume fraction for humidity sensors, Rev. 0, July 8, 1985

-- Stone & Webster calculation US(B)-297, Temperature Sensor Placement Analysis, Rev. 2, June 14, 1985

-- CILRT Test Results

-- SIT Test Results

-- QA 1312, Guidelines for QA Surveillance Activities on Millstone Unit 3, Rev. 0, February 1, 1985

-- ACP-QA-9.07, Quality Assurance Surveillance Program, Rev. 0, February 1, 1985

-- Selected Piping and Instrument Drawings

4.2 Scope of Review

The inspector reviewed the test procedure and related documents for technical adequacy and to determine compliance with the regulatory requirements of Appendix J to 10 CFR 50, Technical Specifications and applicable industry standards. The inspector witnessed a large portion of the CILRT/SIT and subsequent verification test. The inspector also performed independent measurements and calculations of the test results.

4.3 Procedure Review

The inspector reviewed the CILRT/SIT procedure along with documents listed in paragraph 4.1 for technical adequacy and to ascertain compliance with requirements of Technical Specifications and 10 CFR 50, Appendix J. This review was based on the licensee changing the test duration from an eight hour test to a twenty-four hour test. The licensee does not revise the procedure when changes are made but incorporates a test change which has to be PORC and JTG approved for each change.

On a random sampling bases, the inspector reviewed the revised valve line ups for many of the piping penetrations. This review was to insure 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.

4.4 CILRT/SIT Instrumentation

The inspector reviewed the calibration records for the resistance temperature detector (RTD's) and dew point instruments for the CILRT. Details of this review are included in Section 2 of this report. The inspector also reviewed the calibration records for strain gages and linear variable differential transformers (LVDT's). Their calibrations prior to the SIT were found to meet applicable accuracy requirements and were traceable to the National Bureau of Standards.

No unacceptable conditions were identified.

4.5 CILRT/SIT Chronology

July 10, 1985

0430 - Commenced containment inspection.

0600 - Completed containment inspection.

0730 - Completed type B test of personnel air lock.

0820 - Started pressurization of containment.

0900 - Control room instrumentation was recording 0.0 psig for containment pressure.

0930 - Pressurization was ceased due to open penetrations (penetration 2 and 33).

1633 - Commenced repressurization of containment for SIT.

1907 - Reached first pressure level 28.183 psia for SIT. Hold for one hour.

2007 - Pressure at 28.0380 psia notified SIT personnel to take measurements.

2130 - Pressure at 28.0269 psia SIT personnel completed readings. Pressurizing to next level.

July 11, 1985

0125 - Pressure at 41.343 psia. Notified structural personnel for one hour hold.

0126 - Pressure at 41.093 psia. Notified SIT personnel to take measurements.

0345 - SIT personnel completed readings. Pressurizing to next level.

0347 - Emergency Door Alarm on personnel hatch is in the alarm mode. Stopped pressurization.

0415 - No problem with emergency door. Removed power to alarm signal upon shift supervisors concurrence. Began pressurization.

0830 - Pressure at approximately 54.0 psia. Notified structural personnel for one hour hold.

0930 - Notified SIT personnel to take measurements.

1015 - SIT personnel completed readings. Pressurizing to maximum level.

1345 - Pressure at 67.39 psia. Notified structural personnel for one hour hold.

1445 - Notified SIT personnel to take measurements

1625 - SIT personnel completed readings. Started depressurization to lower level.

1854 - Secured blowdown, pressure at 54.106 psia. Notified structural personnel one hour hold.

1955 - One hour hold completed - pressure at 54.326 psia SIT personnel began readings.

2017 - SIT personnel completed readings. Started depressurization to lower level.

2331 - Secured blowdown, pressure at 41.057 psia. Notified structural personnel one hour hold.

July 12, 1985

0031 - One hour hold completed - pressure at 41.264 psia. SIT personnel began readings.

0100 - SIT personnel completed readings. Started depressurization to lower level.

0400 - Secured blowdown, pressure at 28.292 psia. Notified structural personnel one hour hold.

0500 - One hour hold completed - pressure at 28.492 psia. SIT personnel began readings.

0520 - SIT personnel completed readings, started depressurization to lower level.

0810 - Pressure less than 1. psig

0910 - Personnel air lock open

0920 - SIT personnel began readings. Containment inspection began.

0954 - SIT personnel completed reading, SIT is completed.

1130 - Completed containment inspection.

1510 - Completed LLRT on personnel air lock, Started pressurization for ILRT.

July 13, 1985

0200 - Reached test pressure - 56.013 psia. Started stabilization period.

0628 - Stabilization period completed - ILRT Started.

2300 - Lost RTD Channel 7 - redistributed volume fraction to RTD's 8, 9, and 10.

July 14, 1985

0500 - Lost dewcell (D1) reassigned contribution to channel 2 (D2).

0634 - Completed 24 hour ILRT.

0822 - Started verification test - established leak rate is 52.57 SCFM.

1222 - Completed verification test.

1400 - Started depressurization at approximately 5. psi/hr.

4.6 Test Performance/Control

The majority of the test was performed within the guidelines of the procedure. Slight problems did occur at the beginning of the test when the licensee started to pressurize. The containment pressure gage in the control room was not registering any pressure increase while the computer showed an increase in containment pressure. The licensee stopped the test to investigate. The licensee discovered two 3/4" pipes open to the atmosphere. Further investigation showed that the leakage monitoring system lines were not properly installed, even though according to the blueprints the piping inside and outside containment was correct. The error was in the continuity between the inside and outside piping system. The licensee will issue a Construction Deficiency Report (CDR). For an interim fix the licensee installed a temporary jumper so that the test could continue.

This is an unresolved item pending further review of cause and licensee corrective actions and subsequent NRC:RI inspection. (50-423/85-33-01)

4.7 ILRT Result Review

The licensee evaluated the test results for the twenty-four hour period between 0628 or July 13, 1985 and 0634 on July 14, 1985. The calculated leakage rate at the upper 95% confidence limit was 0.0676 weight percent per day. The test acceptance criterion is 0.675 weight present per day. The inspector noted that the above calculated leakage rate did not include corrections for changes in free volume and penetrations in use during the test. This value represents the containment system "As Left" overall leakage. The corrected value will be reported in the CILRT Final Report submitted by the licensee.

The inspector performed an independent calculation of the test results using a sample of raw data from the test to estimate the accuracy of the licensee's leak rate calculations. The results were as follows:

	LTM (Mass Pt.)	UCL (Mass PT)
Millstone III	.0653	.0676
NRC	.06536	.06765

The inspector concluded that the licensee's calculations were appropriately performed and accurate. The CILRT was followed by a successful superimposed leak verification test. The licensee imposed a leak of 52.64 SCFM or 0.893 weight percent per day on the existing leak. The measured verification test leak was 0.9550 weight percent per day. The test result (0.7333) was within the acceptance criteria band ($\leq$ 1.1833). The inspector also verified this result by independent calculation.

No unacceptable conditions were identified.

5. Observation of Structural Acceptance Test for Containment

The structural acceptance test of the containment was successfully performed starting at 4:30 p.m. on July 10, 1985. The pressure reached 52 psig at 2:50 p.m. July 11 and was depressurized at 9:55 a.m. July 12. The inspector reviewed SWEC specifications and the implementing test procedure for conformance of licensee's commitment in the FSAR, Section 3.8.1.7.1 to Regulatory Guide 1.18 Revision #1. The inspector interviewed cognizant licensee, SWEC and Teledyne/Brewer personnel to ascertain and evaluate their knowledge of requirements to conduct the test. During the test he performed observations of crack mapping prior to and during some intervals of the test. In conjunction with licensee personnel he assisted in crack mapping at accessible areas other than painted areas. At available locations, the exterior of containment concrete wall was also micro-gauged for deflection prior to and during the test by the licensee. The above observations indicated that the containment structural acceptance test was conducted in accordance with R.G. 1.18 and demonstrated licensee involvement in assuring quality.

As required by R.G. 1.18, the NRC will review the final report at a later date for comparison of radial, vertical and strain gage test measurements, the estimated accuracy of the measurements and deviations and the containment's safety margin as deduced from the test results.

6. Facility Tours

The inspector made several tours of the facility including the control room, auxiliary building, ESF building and containment. During these tours the inspector examined the containment system boundaries, component tagging and instrumentation used to support the CILRT. During these tours the inspector observed Stone and Webster personnel checking for evidence of leakage and verifying selected valves to be in the correct position according to procedural requirements. The inspector also made several tours with the ultraprobe 2000 (which is an ultrasonic leak detector) to verify the licensee's findings regarding leakage. No unacceptable conditions were identified.

7. Independent Calculation

The inspector performed independent calculations of the test results of the CILRT and the subsequent verification test. Details are included in Section 4.7 of this report.

8. QA/QC Involvement

During the performance of the ILRT/SIT the inspector verified QA involvement in test monitoring. When questioned the QA personnel were knowledgeable of their responsibilities and duties and how to report their findings.

No unacceptable conditions were identified.

9. Exit Meeting

A meeting was held on July 15, 1985 to discuss the scope and findings of the inspection as delineated in this report (See Section 1 for attendees). At no time during this inspection was written information provide to the licensee.