

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-219/84-26

Docket No. 50-219

License No. DPR-16 Priority - Category C

Licensee: G.P.U. Nuclear Corporation
P.O. Box 388
Forked River, NJ 08731

Facility Name: Oyster Creek Nuclear Generating Station

Inspection At: Forked River, New Jersey

Inspection Conducted: August 21-24, 1984 and September 7-14, 1984

Inspectors: D.J. Vito 10/15/84
D. J. Vito, Reactor Engineer date

Approved by: L.H. Bettenhausen 10/15/84
L. H. Bettenhausen, Chief date
Test Programs Section

Inspection Summary: Inspection on August 21-24, and September 7-14, 1984
(Report No. 50-219/84-26)

Areas Inspected: Routine, unannounced inspection of the containment leakage testing program including the review of the Containment Integrated Leak Rate Test (CILRT) and Local Leak Rate Test (LLRT) Procedures, CILRT and LLRT test witnessing, CILRT and LLRT test results review, followup to previous inspection findings, and general tours of the facility. The inspection involved 87 hours onsite by one region based inspector.

Results: No violations were identified.

DETAILS

1. Persons Contacted

General Public Utilities

- K. Blevins, Computer Applications Department
- #*P. Czaya, Licensing Engineer
- *T. Dunn, Operations QA Lead Monitor
- *P. Fiedler, Vice President and Director - Oyster Creek
- S. Fuller, Manager, QA/QC Modifications/Operations
- K. Hutko, Core Engineer
- J. Molnar, Manager, Core Engineering
- #D. Notigan, Core Engineer
- #*A. Rone, Manager, Operations Engineering
- #W. Smith, Director, Plant Engineering
- #J. Sullivan, Director Plant Operations
- #B. Tilton, QC Inspection Supervisor
- C. Tracy, QA Manager

Volumetrics

- P. Lord
- D. Peyvan

NRC Personnel

- C. Cowgill, Senior Resident Inspector
- *J. Wechselberger, Resident Inspector

*Denotes those present at exit meeting on August 24, 1984

#Denotes those present at exit meeting on September 14, 1984

2. Licensee Action on Previous Inspection Findings

(Closed) Violation 50-219/82-06-01. This item dealt with the failure of the licensee to properly report local leak rate testing results in excess of allowable Technical Specification limits. The licensee has acknowledged that local leak rate testing resulting in exceedence of the Technical Specification limits should be reported under the requirements of 10 CFR 50.73 as well as in the CILRT summary report required by Appendix J to 10 CFR 50. These reporting requirements have been included in the licensee's LLRT procedures. During outage periods when containment integrity is not required, the licensee intends to notify the NRC of the initial discovery of an LLRT failure, and supplement that notification with a single LER supplement after the completion of the remaining local leak rate tests. The inspector reviewed LER 50-219/83-09-017 (MSIVs NS04A, B Local Leak Rate Test Failures) and the preparations for the LER supplement and found this approach to be acceptable. This item is closed.

(Closed) Unresolved Item 50-219/82-06-02. The CILRT procedure provided an incorrect equation for correcting the calculated leakage rate for liquid volume changes in the containment. The inspector reviewed the revised equation and found it to be technically accurate. This item is closed.

(Closed) Violation 50-219/82-26-03. After the CILRT conducted March 30-April 3, 1982, the licensee was cited for several problems indicative of inadequate procedural compliance and poor test control. The inspector noted the following changes and improvements in test and procedural control exhibited by the licensee during the current test:

1. The CILRT procedure has undergone major revision to make it more informative, easier to follow and technically accurate.
2. The procedure was signed off as required and in a timely manner throughout the performance of the test.
3. Temporary procedure changes were documented, approved, and filed in accordance with station administrative procedures. Temporary procedure changes made during the performance of the test did not affect or alter the intent of the original procedure.
4. All personnel involved with the test appeared to be familiar with procedural precautions and with their roles in the performance of the test.

Based on these findings, the inspector concluded that the NRC concerns delineated in Inspection Report 50-219/82-06 which resulted the identification of a Technical Specification procedural compliance violation have been addressed by the licensee and appropriately resolved. This item is closed.

3. Local Leak Rate Testing

3.1 Documents Reviewed

- Procedure 665.5.006, Local Leak Rate Tests, Revision 10
- Procedure 665.5.003, MSIV Leak Rate Test, Revision 4
- Procedure 665.5.004 Feedwater Isolation Valve Leak Rate Test
- Procedure 665.5.020, Integrated Local Leak Rate Summary, Revision 2
- LER 50-219/83-09-01T MSIVs N504A, B Local Leak Rate Test Failures
- Calibration Records for Local Leak Rate Monitors

- Local Leak Rate Test Results, Repair and Retest Documentation
- Selected Piping and Instrument Drawings

3.2 Scope of Review

The inspector reviewed the documents listed above to determine compliance with the regulatory requirements of Appendix J to 10 CFR 50, Technical Specifications, applicable industry standards and with station administrative guidelines. The inspector also 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" conditions of containment as applied to CILRT results. The inspector also witnessed local leak rate testing performed on one containment isolation valve and on the drywell airlock.

3.3 Findings

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 inspector verified by review of the LLRT procedures that containment isolation valve penetrations which had been modified during the current outage by the addition of test connections to allow proper Type C testing were included and had been tested as part of the LLRT program. The test personnel interviewed by the inspector were familiar with the use of the procedures and knowledgeable of the test equipment used.

The inspector reviewed the local leak rate test results summary and discussed the analysis of the test results with the licensee. The inspector found that the licensee had appropriately reported the failure of Type C testing performed on MSIVs NSO4A and NSO4B in a Licensee Event Report as total Type B&C leakage was determined to be greater than the Technical Specification prescribed limit of 0.6%. LLRT failures encountered during the remainder of the outage are to be included in a supplement to the initial LER. The inspector was satisfied with the licensee's understanding of the application of local leak rate test results to the "As-Found" and "As-Left" conditions of containment. However, the inspector found that although the licensee performs an "As-Found" Type A test result calculation by adding the difference of total "As-Found" and "As-Left" Type B&C leak rates to the current Type A test result, no procedural provisions have been made for performing a similar calculation when a local leak rate test program is performed between Type A tests. The licensee stated that Oyster Creek has always performed a Type A test immediately following the completion of a Type B&C test program. The licensee has made a procedure change to Procedure 665.5.020, Integrated Local Leak Rate Summary to incorporate the calculation of an "As-Found" containment integrated leakage should a Type B&C program be performed without a subsequent Type A test. The inspector had no further questions with regard to this item.

The inspector witnessed local leak rate testing performed on drywell vent valve V-27-4 and on the drywell air lock. The inspector noted that the procedures were available in the test area and were being properly adhered to. The leak rate monitoring instruments were used properly by the test technicians and were marked with current calibration stickers. The documentation of these calibrations was reviewed and verified by the inspector. No unacceptable conditions were identified with regard to the performance of the tests as related to procedural compliance. However, the inspector noted during the performance of the drywell airlock LLRT that other personnel working in the area were rather careless and paid very little attention to the fact that a test was being performed. During a thirty minute period, the inspector noted at least ten instances where a worker, not associated with the LLRT, either bumped into the test rig or stepped on the pressurization line. Although these occurrences did not appear to affect the results of the test, the inspector commented that every effort should be made to ensure that test equipment is not disturbed during testing. The licensee stated that efforts would be made to prevent this from happening in the future. The inspector had no further questions.

4. Containment Integrated Leak Rate Test (CILRT)

4.1 Documents Reviewed

- Procedure 666.5.007, Primary Containment Integrated Leak Rate Test, Revision 7
- Calibration Records for CILRT Instrumentation
- Oyster Creek Nuclear Power Plant Primary Containment Design Report, General Electric Company
- Calculation No. C-1302-243-5360-006, CILRT Volume Fraction Calculations for RTD's (1/13/84)
- Calculation No. C-1302-243-5360-009, CILRT Dewcell Volume Fraction Calculations (3/7/84)
- Engineering Calculations for:
 - 1) Reactor vessel water level change CILRT calculations
 - 2) Drywell sump water level difference calculations
- GPU ILRT System Technical Manual 990-1300, 6/18/84 (CILRT Computer Program Description)
- GPU ILRT System Users Manual 990-1302, 6/18/82

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 and subsequent verification test. The inspector also performed an independent calculation of the test results.

4.3 Procedure Review

The inspector reviewed the "as-run" copy of the CILRT procedure with related changes, attachments and test log for technical adequacy and for consistency with regulatory requirements, guidance, and licensee commitments. Review of procedure acceptance criteria, test methods, and references indicated adequate conformance with Appendix J to 10 CFR 50. The procedure referenced and was in general conformance with industry standard ANSI/ANS 56.8-1981, Containment System Leakage Testing Requirements. The CILRT valve lineups were reviewed 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. The valve lineups were also reviewed to verify that modifications made to containment isolation valve penetrations to facilitate local leak rate testing were included. A large sample of valve lineups was physically verified by the inspector during tours taken before and during the performance of the test. The test was performed and the test log and test data were maintained in accordance with the procedure. No unacceptable conditions were identified.

4.4 Test Instrumentation/Data Acquisition

The inspector reviewed the calibration records for the resistance temperature detectors, dewcells, and precision pressure detectors. The calibrations met applicable accuracy requirements and were traceable to the National Bureau of Standards.

During the CILRT temperature stabilization period, the inspector noted a large discrepancy between the raw RTD data being generated by the Volumetrics Data Acquisition System (DAS) and the average containment temperature being generated by the licensee's CILRT computer program. The inspector then reviewed the CILRT computer program subroutine which converts the raw RTD values to actual temperature readings and determined that the raw values and the computer calculated temperature readings should be very close to each other. Further investigation revealed a problem in the CILRT computer program subroutine which reassigns containment volume fractions after an RTD is taken out of service. The volume fraction reassignment subroutine in the computer program did not reassign the volume fractions of the eight RTDs which were taken out of service. Eight of the thirty installed RTDs had been taken out of service due to an electrical problem. The computer had calculated the proper temperatures for the

RTDs in service but had not reassigned the volume fractions to total 100 percent. The licensee acknowledged the problem and reassigned the volume fractions manually on the computer. The licensee has committed to correcting the computer problem for future tests. This item is unresolved (50-219/84-26-01) pending licensee modification of the computer program. The inspector also suggested that part of the licensee's corrective action should include a procedural verification by the test director that all data used to calculate leak rates or verify acceptance criteria are valid.

4.5 Test Chronology

A large portion of the CILRT test sequence was witnessed by the inspector. The test chronology was as follows:

TEST CHRONOLOGY

9/9/84	2130	Completed pre-test inspection of containment.
9/12/84	0530	Commenced pressurization of containment
	1318	Reached test pressure (37.3 psig). Commenced taking data for temperature stabilization.
	1700	Inspector noted discrepancy between raw RTD data values from data acquisition system and computer generated average containment temperature. Investigation revealed improper reassignment of containment volume fractions for RTDs taken out of service. (See Section 4.4 of this report for more detail).
9/12/84	1800	Recalculation of average containment temperature using corrected volume fractions indicates temperature stabilization criteria are met. Commenced taking data for CILRT.
	1934	Initial leak rate calculations indicate a leak of approximately 4.0 wt%/day ($L_t = 0.5$ wt %/day). Activated leak search teams. This initial CILRT attempt will be considered a test failure.
9/13/84	0700	Isolated major leaks discovered during leak search
		- Flanged connection on line to V-27-17, Torus to Reactor Building Vacuum Breaker

- V-23-21, Containment Spray Heat Exchanger Relief Valve.
- V-21-5, Containment Spray Discharge Check Valve (packing leak)

Recommended taking data for CILRT (second attempt).

9/14/84	0700	Completed taking data for CILRT. Measured leak rate (L_{tm}) = 0.2042 wt%/day. Leakage at 95% upper confidence limit (UCL) = 0.2091 wt%/day.
	0730	Imposed leak of 3.0 SCFM (approximately 0.59 wt%/day) for supplemental verification test).
	1200	Acceptance criteria met for supplemental verification test.

4.6 Test Results Review

The licensee evaluated the test results for the 24 hour period starting at 0700 on September 13, 1984 and ending 0700 on September 14, 1984. The calculated leakage rate at the 95% upper confidence level was 0.2091 wt % per day. The acceptance criterion is 0.375 wt % per day.

The calculated leakage rate has yet to be corrected for the leakages from the penetrations isolated after the aborted first CILRT attempt as well as the Type C leakage additions from other penetrations isolated or in use during the performance of the test. The Technical Summary Report will include both the "As-Found" and the "As-Left" integrated leak rates using pre-and post-repair leak rates to indicate leakage improvement.

The licensee has acknowledged that the first CILRT attempt is to be considered as a test failure. As such, the "As-Found" leakages from those leaks isolated after the first test attempt will not be used to determine the passing or failure of the subsequent test. The licensee has also acknowledged that the total integrated leakage rate with Type C additions included shall be verified to be less than the Type A test acceptance criterion prior to startup.

The inspector performed an independent calculation of the results of the second test attempt using a sample of raw data from the test. The results were identical to and verified the accuracy of the licensee's leak rate calculations.

4.7 Conduct of Test and Procedural Control

The licensee has made a concerted effort to improve the CILRT program in response to previous NRC concerns regarding test control problems and procedural inadequacy. The inspector made the following observations during the performance of the test relating to test and procedural control:

1. Test personnel were aware of the requirements and precautions related to the test and were cognizant of their roles during the performance of the test.
2. The procedure was technically accurate and complete and was easy to follow.
3. In response to specific NRC concerns brought up during the previous CILRT, test personnel were diligent in signing off procedure steps as required, filling out the test log, and documenting and obtaining approval of temporary procedure changes in accordance with station administrative procedures.
4. A lesser number of temporary procedure changes were required during the course of the current test than during the previous test. This would appear to be a result of increased effort given and attention paid to the preparation of the procedure. The temporary procedure changes made during the test did not effect or alter the intent of the original procedure.
5. External work in the reactor building was kept to a minimum during the performance of the CILRT. In addition, the area around the data acquisition system equipment was partitioned off and specific access requirements were posted.

Based on these observations, the inspector found licensee control of test related activities to be appropriate. The items relating to previous NRC concerns with regard to test control have been closed (See Section 2 of this report).

5. QA/QC Involvement

The inspector interviewed management representatives of the plant QA Department to determine QA/QC involvement in containment leak rate testing activities. The inspector found that leak rate testing activities were included on the surveillance audit list and that total coverage of the CILRT was scheduled. The inspector also reviewed the comments generated by the QA department with respect to the CILRT procedure and the draft QA checklist for monitoring of CILRT activities and found them to be useful and comprehensive. Round-the-clock QA coverage of CILRT activities was verified by inspector observation. The inspector concluded that QA/QC coverage of containment leakage testing activities is appropriately planned and documented.

6. Tours

The inspector made several tours of various areas of the facility to observe CILRT and LLRT test activities, component tagging, implementation of radiological controls, other work in progress, and general housekeeping. No unacceptable conditions were identified.

7. Exit Interview

A management meeting was held on August 24, 1984 and on September 14, 1984 to discuss the scope and findings of the inspection as detailed in this report. No written information was provided to the licensee at any time during the inspection.