

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/35031(DRS)

Docket No. 50-440

License No. CPPR-148

Licensee: Cleveland Electric Illuminating Company  
Post Office Box 5000  
Cleveland, OH 44101

Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, OH

Inspection Conducted: May 20 through August 14, 1985

Inspectors: *S. M. Hare*  
S. M. Hare

8/21/85  
Date

*F. A. Maura*  
F. A. Maura

8/21/85  
Date

Approved By: *W. G. Guldemond*  
W. G. Guldemond, Chief  
Operational Programs Section

8/21/85  
Date

Inspection Summary

Inspection on May 20 through August 14, 1985 (Report No. 50-440/85031(DRS))

Areas Inspected: Routine, announced inspection by region based inspectors of containment integrated leak rate test (CILRT) procedures; CILRT performance; and CILRT results review. The inspection involved 52 inspector-hours onsite by one NRC inspector including 36 inspector-hours onsite during off-shifts. An additional 60 inspector-hours were expended by two NRC inspectors in the Region III office.

Results: Of the three areas inspected, no violations or deviations were identified.

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## DETAILS

### 1. Persons Contacted

#### a. Cleveland Electric Illuminating Company (CEI)

- \*M. Lyster, Manager, Perry Plant Operating Department
- \*C. Shuster, Manager, QA Department
- \*F. Stead, Manager, Nuclear Engineering Department
- \*G. Gerber, Administrative Element Supervisor
- +\*E. Root, Mechanical Element Supervisor
- \*G. Leidich, General Supervisor Engineer
- \*D. Thompson, Shift Test Engineer
- \*R. Shirk, Shift Test Engineer
- \*M. Kaminski, Lead Test Engineer
- \*P. Russ, Compliance Engineer
- \*K. Turosky, Staff Analyst

#### b. US NRC

- \*J. Grobe, Senior Resident Inspector, Operations
- D. Keating, Senior Resident Inspector, Construction

The inspector also contacted other personnel during this report period.

\*Denotes personnel present at the exit interview on August 5, 1985.

+Denotes personnel present at the exit teleconference on August 14, 1985.

### 2. Containment Integrated Leak Rate Test Preoperational Procedure Review

The inspectors reviewed preoperational test procedure TP 1E61-P-002, Revision 0, entitled, "Integrated Leak Rate Preoperational Test," for conformance with 10 CFR Part 50, Appendix J, and other industry standards which the licensee had committed to. The inspectors' comments were discussed with the licensee at a meeting held in the Region III office on June 19-20, 1985. The inspector verified that all concerns identified during the June meeting had been satisfactorily resolved in Revision 1 of the procedure prepared prior to the performance of the test.

In addition to matters discussed elsewhere in this report, the following requirements of Appendix J were discussed with the licensee (during the June 9-10, 1985 meeting) to ensure a common understanding of the regulations:

- a. Whenever penetration configurations during a CILRT deviate from the ideal, the results of LLRTs for such penetrations must be added as a penalty to the CILRT results at the 95% confidence level. This penetration leakage penalty is determined using the "minimum pathway leakage" methodology. This methodology is defined as the minimum leakage value that can be quantified through a penetration leakage

path (e.g., the smallest leakage of two valves in series). This assumes no single active failure of redundant leakage barriers. Additionally, any increase in containment sump, reactor water, or suppression pool level during the course of the CILRT must be taken as a penalty to the CILRT results. If penalties exist, they must be added (subtraction is never permitted) to the upper confidence level of the CILRT results.

- b. The Type A test length must be 24 hours or longer to use the mass point method of data reduction. If tests of less than 24 hours are planned, the Bechtel Topical Report, BN-TOP-1, must be followed in its entirety except for any Section which conflicts with Appendix J requirements. For either methodology, the acceptance criterion is that the measured leakage at the 95% upper confidence limit must be less than 75% of the maximum allowable leak rate for the pressure at which the test was performed.
- c. For the supplemental test, the size of the superimposed leak rate must be between 0.75 and 1.25 times the maximum allowable leak rate  $L_a$ . The higher the value the better. The supplemental test must be of sufficient duration to demonstrate the accuracy of the test. The NRC looks for the results stabilizing within the acceptance criteria, not just being within the acceptance criteria. Whenever the BN-TOP-1 methodology is being used, the length of the supplemental test cannot be less than approximately one-half the length of the CILRT.
- d. An acceptable method for determining if the sum of Type B and C tests exceeds the 0.60  $L_a$  Appendix J limit is to utilize the "maximum pathway leakage" method. This methodology is defined as the maximum leakage value that can be quantified through a penetration leakage path (e.g., the larger, not total, leakage of two valves in series). This assumes a single active failure of the better of two leakage barriers in series when performing Type B or C tests.
- e. Future periodic Type A, B, and C tests must include both as found and as left results. In order to perform Type B and C test repairs prior to a Type A test, an exemption from Appendix J requirements should be obtained from NRR. The exemption should state how the licensee plans to determine the as found condition of the containment since local leak rate tests are being performed prior to the CILRT. An acceptable method is to commit to add any improvements in leakage rates which are the result of repairs or adjustments (RAs) using the "minimum pathway leakage" methodology.

### 3. Containment Integrated Leak Rate Test Witnessing

#### a. Instrumentation

The inspector reviewed the calibration data and determined all the instruments used in the test had been calibrated and that the correct weightings were placed into the computer program as

required. The inspector noted that throughout the test the licensee was having difficulty with the stability of several dewpoint sensors. By the end of the test, the licensee had rejected 6 of the original 13 dewpoint sensors using appropriate data rejection criteria. (The inspector verified that the rejection of the six dewpoint sensors was procedurally acceptable, satisfied applicable standards and adequately measured the containment dewpoint in all of the major subvolumes).

The following instrumentation was used during the test:

<u>Type</u>	<u>Quantity</u>
Resistance temperature detectors	33
Dewpoint cells	7
Pressure gauges	4
Mass flowmeters	2

b. Pretest Requirements

The inspector performed a pretest containment inspection, including the drywell, to ensure the proper placement of test instrumentation. During the inspection of the annulus area the inspector noted several penetration guard pipe alignment plugs that had not been seal welded to the guard pipe. These plugs represent a potential containment leak path should one be inadvertently removed or loosened. The inspector noted to the licensee that all such potential containment leak paths be identified, and a comprehensive plan be developed to ensure against the inadvertent creation of such a containment leak path. This is considered an open item (440/85031-01(DRS)) pending licensee development of a plan to preclude these potential inadvertent containment leak paths. This item must be resolved prior to fuel load.

The inspector also verified the validity of the stabilization period and the conformance of the test prerequisites with procedural and regulatory requirements.

c. Valve Lineup Verification

To ensure that no fluid could enter the containment atmosphere and that penetrations were properly vented, the inspector independently verified that valve lineups for the following systems were correct:

- o Condensate supply
- o CRD hydraulic accumulators
- o CO<sub>2</sub> to fire protection
- o Backup H<sub>2</sub> purge
- o Instrument air
- o Service air
- o ADS accumulator supply

- o Main steam
- o Main steam line drains
- o Primary containment monitoring
- o Post accident sampling

d. Test Witnessing

Upon completion of the Structural Integrity Test, the licensee kept the containment at atmospheric pressure for 24 hours as required by ANSI 56.8-1981. During this time period the licensee was able to perform the required containment temperature surveys. At the conclusion of the 24-hour hold period, the licensee began pressurization and was at test pressure at 7:00 p.m. on August 2, 1985. Upon the satisfactory completion of the required stabilization period, the licensee noted an excessive leak rate of 0.46 weight percent per day (maximum allowable = 0.15 wt%/day). A thorough search for leaky valves and penetrations identified a temporary electrical penetration used for drywell structural integrity test instrumentation cables leaking excessively. After the licensee repaired the temporary electrical penetration, the measured leakage phase was started at 12:30 p.m. on August 3, 1985. Upon successful completion of the 24-hour leak test, a supplemental leak was imposed and the supplemental verification test was declared successful, with excellent agreement between the predicted and measure leak rate.

No violations or deviations were identified.

4. Test Results

a. CILRT Data Evaluation

The 24-hour CILRT was performed with data being collected and reduced by the licensee every 15 minutes. The inspector independently monitored and evaluated leak rate data using the ANSI 56.8 (mass point) and the BN-TOP-1, Revision 1, (total time) formulas, to verify the licensee's calculations of the leak rate. There was excellent agreement between the inspector's and licensee's results as indicated by the following summary (units are in weight percent per day):

<u>Measurement</u>	<u>Licensee</u> (mass point)	<u>Inspector</u>
Leakage rate calculated (Lam) during CILRT	0.0597	0.0597
Lam at upper 95% confidence level (does not reflect penalties - See Paragraph 4.c)	0.0612	0.0611

Appendix J Acceptance Criterion at 95% confidence level = 0.75  
 $La = 0.75 (0.2) = 0.15$ . As indicated above, the adjusted Lam at the 95% confidence level was less than the Appendix J acceptance criterion.

b. Supplemental Test Data Evaluation

After satisfactory completion of the 24-hour test a known leakage of 0.1949 weight percent/day was induced. The inspector independently monitored and evaluated leak rate data to verify the licensee's calculation of the supplemental leak rate. There was acceptable agreement between the inspector's and licensee's leak rate calculations as indicated in the following summary (units are in weight percent per day):

<u>Measurement</u>	<u>Licensee</u>	<u>Inspector</u>
Calculated leakage (Lc) rate during supplemental test	0.2695	0.2694

Appendix J Acceptance Criterion:  $Lo - Lam - 0.25La < Lc < Lo + Lam + 0.25La$  ( $0.2046 < Lc < 0.3046$ ). As indicated above, the supplemental test results satisfied the requirements of 10 CFR Part 50, Appendix J.

c. CILRT Valve Lineup Penalties

Due to valve configurations which deviated from the ideal penetration valve lineup requirements for the CILRT, the following penalties must be added using the minimum pathway leakage method:

<u>Component</u>	<u>Leakage Penalty (Weight Percent/Day)</u>
Isolated/nonvented penetrations	$4.2 \times 10^{-5}$
Electrical penetrations	0

At the conclusion of the inspection, the Feedwater Check Valves had not passed their local leak rate test. This is an open item (440/85031-02(DRS)) pending inspector review of the local leak rate test results.

No violations or deviations were identified.

5. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during this inspection are discussed in Paragraphs 3.b and 4.c.

6. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) for a preliminary exit interview following the conclusion of the CILRT on August 5, 1985, and summarized the scope and findings of the inspection activities to date. Additional inspection effort was expended in the Region III office reviewing the CILRT results. A telephone exit interview was held following the conclusion of the inspection on August 14, 1985, in which the inspector summarized the scope and findings of the inspection activities. The licensee acknowledged the inspector's statements. The inspector discussed the likely informational content of the inspection report with regard to documents reviewed by the inspector during the inspection. The licensee did not identify any such documents as proprietary.