

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-155/85020

Docket No. 50-155

License No. DPR-06

Licensee: Consumers Power Company  
212 West Michigan Avenue  
Jackson, MI 49102

Facility Name: Big Rock Point Nuclear Plant

Inspection At: Charlevoix, MI

Inspection Conducted: October 23 through November 6, 1985

Inspector: *[Signature]*  
S. M. Hare

*11/21/85*  
Date

Approved By: *[Signature]*  
W. G. Guidemond, Chief  
Operational Programs  
Section

*11/21/85*  
Date

Inspection Summary

Inspection on October 23 through November 6, 1985 (Report No. 50-155/85020(DRS))

Areas Inspected: Routine, announced inspection, by a region based inspector of the Containment Integrated Leak Rate Test (CILRT); CILRT results; Technical Specifications; local leak rate test results; and as found CILRT results. The inspection involved 56 inspector-hours onsite by one NRC inspector, including 38 inspector-hours onsite during offshifts. An additional 6 inspector hours were expended in the Region III office.

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

## DETAILS

### 1. Persons Contacted

#### Consumers Power Company

- \*D. Hoffman, Plant Superintendent
- \*G. Withrow, Maintenance Superintendent
- \*R. Alexander, Technical Engineer
- \*L. Manshor, Quality Assurance Superintendent
- W. Trubilowicz, Operation Superintendent
- \*D. Mogenburg, Engineering Supervisor
- \*J. Toskey, Technical Engineer
- D. Desnoyer, Corporate Headquarters Engineer

#### U.S. NRC

S. Guthrie, Senior Resident Inspector

The inspector also contacted and interviewed other licensee personnel during this inspection.

\*Denotes personnel present at the exit teleconference on November 6, 1985.

### 2. Containment Integrated Leak Rate Test (CILRT)

#### a. Procedure Review

The inspector reviewed Revision 16 of Procedure TV-06 entitled "Containment Integrated Leak Rate Test" for technical adequacy and conformance with regulatory requirements. With the exception of the following open items, the procedure appeared adequate.

- (1) Step 3.12 allows local leak rate test corrections to be made to the Type A test results. The inspector noted that this is the only place in the procedure that refers to correcting the Type A test results and is vague in that it does not specify what type of correction(s) is to be made. The inspector stated that provisions should be made in the procedure to; monitor all water levels in containment and assign a penalty to the Type A test results if water levels increase during the test (e.g.-steam drum); monitor the pressure of any unvented pressurized vessel within containment and take a penalty if pressures decrease during the test (e.g.-control rod drive accumulators); take penalties for penetrations that should, but are not, exposed to the Type A test pressure. This considered an open item (155/85020-01(DRS)) pending inspector review of the revised CILRT procedure.

- (2) The inspector noted that the procedure has no data rejection criteria to determine if a sensor is faulty or if whole data sets are bad. The inspector stated that the only time sensors/data sets may be rejected is if they satisfy these rejection criteria or a strong physical reason exists to do so (e.g.-sensors output goes to zero/data is invalidated due to inadvertent pumping of air into containment). This is considered an open item (155/85020-02(DRS)) pending the inspector's review of the revised CILRT procedure.
- (3) Step 5.33 pertaining to the use of the Integrated Leak Rate Monitoring system specified that data is taken at 15 minute intervals and after any 24 hours of successive data, the data are compiled and a final integrated leakage rate will be computed. This step implies that if a test took 30 hours or greater to obtain satisfactory results, it would be acceptable to use the last 24 hours of data for the official test results. This interpretation was confirmed when the inspector questioned licensee personnel involved in the test. The inspector informed the licensee that this is not acceptable and that all data must be used unless a legitimate reason (e.g. data rejection criteria, physical anomaly or inadvertent change in test conditions) exists not to use certain data. This is considered an open item (155/85020-03(DRS)) pending the inspector's review of the revised CILRT procedure.
- (4) The inspector noted that the procedure specified that the size of the superimposed leak for the purpose of the supplemental verification test be 0.75 La. This is contrary to the requirement of ANSI N45.4-1972 and is not consistent with the NRC position that the quantity of gas bled from containment be between 0.75 and 1.25 La. The inspector ensured that the size of the superimposed leak for this test was greater than 0.75 La. This is considered an open item (155/85020-04(DRS)) pending the inspector's review of the revised CILRT procedure.

b. Summary of Appendix J Requirements

To ensure the licensee's understanding of Appendix J requirements the inspector had numerous discussions with licensee personnel during the course of the inspection. The following is a summary of the issues discussed with the licensee.

- (1) 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. An acceptable penetration leakage penalty is determined using the minimum pathway 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 or Steam Drum

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.

- (2) 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 or Technical Specification 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.
- (3) 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  $L_a$  or  $L_t$ . 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 and the BN-TOP-1 method of data reduction must be used.
- (4) An acceptable method for determining if the sum of Type B and C tests exceeds the 0.60  $L_a$  Appendix J and Big Rock Technical Specification limits is to utilize the "maximum pathway leakage" method. The maximum pathway methodology as it applies to Big Rock is discussed further in Paragraph 5.0. 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 test.
- (5) Future periodic Type A, B, and C test must include both as found and as left results. In order to perform 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 repairs 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. This further discussed in Paragraph 6.0.

c. Instrumentation

The inspector reviewed the instrumentation calibration data associated with performing the CILRT. A multipoint calibration of all the instrumentation was performed. Correction values were generated based on the difference between measurements from an NBS verified standard and actual measurements. All corrections were placed as an array or equation into the CILRT computer.

The following instrumentation was used in the CILRT:

<u>Type</u>	<u>Quantity</u>
RTDs	20
Flow meters	2
Pressure Gauges	2
Dewcells	10

d. Valve Lineup Verification

Valve lineups for the following systems were verified correct to ensure that no fluid could enter the containment atmosphere and that proper venting was provided or penalties taken:

- Treated Waste System
- Reactor and Fuel Pit Drain
- Core Spray and Post Incident System
- Demineralized Water
- Instrument Air
- Service Air
- Containment Vents
- Air Compressors for CILRT

e. Containment Survey Requirements

This inspector reviewed "Instrumentation Recommendations for Integrated Leak Rate Testing at Big Rock Point" to determine if the document satisfied the requirements of ANSI N45.4-1972 for temperature average. The inspector noted that this document, coupled with the uniform containment temperatures encountered during the performance of the Type A and Supplemental test is indicative of a containment model which does marginally satisfy the requirements of ANSI N45.4-1972.

Problems encountered during the supplemental test believed to be due to diurnal effects (localized heating of the containment shell due to sunshine) should have been picked up by the instrumentation system but was not. The inspector stated that some effort should be made to measure the air space temperature close to the shell of the containment to monitor and compensate for these diurnal effects.

f. Test Witnessing

The licensee began pressurization on October 25, 1985. After the containment was declared stable, the measured leakage phase of the test began the morning of October 25. After a successful 24 hour test, a supplemental leak was imposed and the supplemental verification test began. Due to the aforementioned diurnal, effects the supplemental verification test took 10.25 hours to stabilize within the acceptance criterion. Following the successful supplemental verification test, preparations began for the depressurization of the containment structure.

No violations or deviations were identified.

3. Test Results

a. CILRT Data Evaluation

The inspector independently monitored and evaluated leak rate data to verify the licensee's calculation of leak rate. There was 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>
Leakage rate calculated (Ltm)	0.09154	0.09154
Ltm at 95% confidence level	0.09587	0.09588

Appendix J acceptance criterion at the 95% confidence level =  $0.75 \text{ Lt} = 0.75 (0.3569) = 0.2677$  weight percent per day. 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 the satisfactory completion of the Type A test on October 26, a known leakage of 0.2788 weight percent per day was induced. The inspector independently calculated the supplemental induced flow rate and independently monitored and evaluated leak rate data to verify the licensee's calculation of the supplemental leak rate. There was excellent 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	0.2918	.2919
Induced leakage rate (Lo)=	3.45 SCFM	

Appendix J acceptance criterion:  $Lo+Ltm-0.25La < Lc < Lo+Ltm+0.25La$ ,  $(0.2811 < Lc < 0.4595)$ . As indicated above, the supplemental test results satisfied the requirements of 10 CFR Part 50, Appendix J.

No violations or deviations were identified.

4. Review of Technical Specifications

The inspector reviewed the Big Rock Point Technical Specifications for conformance with 10 CFR 50, Appendix J, requirements and NRC policy regarding Type A, B and C testing. The inspector found the Technical Specifications consistent with current requirements.

No violations or deviations were identified.

5. Local Leak Rate Results Review

The inspector reviewed the most recent local leak rate test (LLRT) results for acceptability and conformance with regulatory requirements. The results appeared to be indicative of adequate corrective action for excessively leaking isolation valves. For clarification, the inspector noted to the licensee that the maximum pathway methodology explained in paragraph 2.b is the correct methodology to add locals to determine Technical Specification 3.7(a) and Appendix J compliance.

No violations or deviations were identified.

6. As Found Condition of CILRT Results

The "as found" condition of the containment is the condition at the beginning of an outage prior to any repairs or adjustments (RAs) to the containment boundary. 10 CFR 50, Appendix J, Paragraph III.A.1 requires that during the period between the initiation of the containment inspection and the performance of the Type A test, no repairs or adjustments shall be made so that the containment can be tested in as close to the "as is" condition as practical. ANSI N45.4-1972, Paragraph 4.2 requires "For retesting, an initial record proof test shall be conducted at time periods and pressures established by the responsible organization, before any preparatory repairs are made. This will disclose the normal state of repair of the containment structure and a record of the results shall be retained." The NRC's position on the "initial record proof test" requirement is that it may be waived provided the Type A test results are back corrected for all RAs to the containment boundary made prior to the performance of the Type A test.

If RAs are made to the containment boundary prior to the Type A test, local leak rate tests must be performed to determine the leakage rates before and after the RAs. The as found Type A test results can then be obtained by adding the difference between the affected path leakages before and after RAs to the overall Type A test results. The as found leakage rate results are required and carry the same reporting requirements as the other Type A and Supplemental test results. The correct methodology for back correcting the Type A test results, as

described in section 2.b(5) of this report, is the minimum pathway methodology.

To insure the licensee's understanding of how to calculate an as found penalty the inspector and a member of the licensee's staff went over in detail the methods to determine an as found penalty. The following is a summary of what was discussed:

- (1) In the case where individual leak rates are assigned to two valves in series, the penetration through leakage would simply be the smaller of the two valves' leak rates.
- (2) In the case where a leak rate is obtained by pressurizing between two isolation valves and the individual valve's leakage is not quantified, the as found penetration through leakage would be 50 percent of the measured leakage and the as left penetration through leakage would be zero (this assumes one or both of the repaired valves leaks zero).
- (3) In the case where a leak rate is obtained by pressurizing between two isolation valves and only one valve is repaired, the as found penetration through leakage would conservatively be the final measured leak rate and the as left penetration through leakage would be zero (this assumes the repaired valve leaks zero).

The inspector stated that the licensee should incorporate the above methodology into a procedure to ensure the correct interpretation of the requirements in the future. This is considered an open item (155/85020-05(DRS)) pending the inspector's review of the procedure.

The inspector reviewed the quantified as found and as left local leak rate test results to determine an as found penalty to apply to this outage's Type A test results. The following is a summary of the as found containment leak rate for this outage (units are in weight percent per day):

#### Measurement

Penalties incurred due to quantified repairs or adjustments prior to the CILRT	0.03419
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As found Type A test result	0.13006
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Appendix J, Acceptance Criteria for the as found condition of the containment =  $0.75 \text{ Lt} = 0.2677 \text{ wt \% / day}$ . As indicated above the as found containment leakage rate was less than the Appendix J acceptance criterion.

No violations or deviations were identified.

7. Open Items

Open items are matter 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 Paragraph 2.a and 6.

8. Exit Interview

The inspector had a teleconference with licensee representatives listed in Paragraph 1 on November 6, 1985, and summarized the scope and findings of the inspection. The inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary.