

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/84-29(DRS)

Docket No. 50-346

License No. NPF-3

Licensee: Toledo Edison Company  
Edison Plaza, 300 Madison Avenue  
Toledo, Ohio 43652

Facility Name: Davis-Besse 1

Inspection At: Oak Harbor, Ohio

Inspection Conducted: November 19, 1984 through January 10, 1985

Inspectors: *L. A. Reyes for*  
S. M. Hare

2/8/85  
Date

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Approved By: *L. A. Reyes*  
L. A. Reyes, Acting Chief  
Operational Programs Section

2/8/85  
Date

Inspection Summary

Inspection on November 19, 1984 through January 24, 1985 (Report No. 50-346/84-29(DRS))

Areas Inspected: Routine, announced inspection by Region based inspectors of Licensee Event Reports; containment integrated leak rate test (CILRT); Technical Specifications; local leak rate test results; and as found CILRT results. The inspection involved 70 inspector hours onsite by two NRC inspectors including 16 inspector hours onsite during off shifts and 8 inspector hours offsite.

Results: Of the five areas inspected, no items of noncompliance or deviation were identified in two areas. Of the remaining areas two items of noncompliance were identified (inadequate drawing - paragraph 3.e., failure to correctly total testable penetration and valve leakages as required by Technical Specifications and 10 CFR Part 50, Appendix J - Paragraph 5).

## DETAILS

### 1. Persons Contacted

- \*S. Wideman, Licensing
- \*J. Johnson, Operators Engineering Supervisor
- \*J. Wood, Facility Engineer Supervisor
- \*J. Byrne, Quality Assurance
- \*A. Motz, Shift Engineer
- \*D. Missig, Assistant Operations Engineer

#### NRC

- \*D. Kosloff, Resident Inspector
- \*W. Rogers, Senior Resident Inspector

\*Denotes those persons present at the January 24, 1985 exit interview.

The inspectors also contacted other members of the licensee personnel.

### 2. Licensee Event Report

- a. (Closed) Licensee Event Report (346/83-44-03): Four containment isolation valves were found leaking in excess of Technical Specification allowables. The licensee repaired the valves and satisfactorily leak tested them. One valve leaked in excess due to an improperly set torque switch. A procedure revision was generated to prevent reoccurrence of improperly set torque switches.

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

#### a. Procedure Review

The inspector reviewed procedure ST 5061.01, Revision 2 for conformance with 10 CFR Part 50, Appendix J and regulatory requirements and with the exception of item of Noncompliance in Paragraph 3.d, found it to be adequate.

#### 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 items discussed with the licensee.

- (1) Whenever the valve configurations during a CILRT deviate from the ideal valve lineup requirement, the results of local leak rate tests for such penetrations must be taken as a penalty to the CILRT results. 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, an increase

in containment sump, reactor water, or primary system pressurizer 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 or is less conservative with other Appendix J requirements.
- (3) For the supplemental test, the size of the superimposed leak rate must be between 0.75 and 1.25 La. 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 BY-TOP-1 methodology is being used, the length of the supplemental test cannot be less than approximately one half the length of the CILRT.
- (4) For determining if the sum of Type B and C tests exceed the Technical Specification or 0.6 La Appendix J limit an acceptable method 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.
- (5) Periodic Type A, B, and C tests must include as found results as well as left. In order to perform Type B and C tests prior to a Type A, an exemption from the Appendix J requirement must be obtained from NRR. The exemption must state how the licensee plans to determine the as found condition of the containment since local leak rate tests are being performed ahead of the CILRT. An acceptable method is to commit to add any improvements in leakage rates which are the results of repairs or adjustments (RAs) using the "minimum pathway leakage" methodology.
- (6) During the Type A test, the secondary side of the steam generator shall be lined up to reflect post-accident conditions. The water level shall be maintained at the level called for in the emergency procedures and the secondary side isolation valves shall be closed and vented to atmosphere on the feed and steam side of the steam generator.

c. Instrumentation

The inspector reviewed the calibration data associated with performing the CILRT. A multipoint calibration of all instrumentation was performed. Correction values were generated based on the difference between measurements of resistance from a NBS verified resistance box

and actual resistance measured. 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>	<u>Model/Serial Number</u>
RTDs	20	30401-30420, 30973
Flowmeter	2	5812-1
Pressure Gauge	2	776-1, 2
Dewcells	6	660-52

d. Witness of Test

The licensee performed a zero pressure test on December 8, 1984 to demonstrate the adequacy of containment modeling with the test instrumentation. Results of the zero pressure test demonstrated the adequacy of the containment instrumentation.

After the completion of the zero pressure test the licensee pressurized the containment and started the stabilization period at 5 p.m. on December 9, 1984. After the containment atmosphere was declared stable by the test director, the short duration CILRT started at 9 p.m. on December 9, 1984. The short duration test was performed in accordance with the methods described in the Bechtel Topical Report BN-TOP-1, the only presently acceptable methodology for tests of less than 24 hours duration. The inspector verified that the appropriate revision of the test procedure was in use by test personnel, test prerequisites were met and proper plant systems were in service.

e. Direct Observation of Valve Lineups

The inspector performed a sampling inspection of the CILRT valve lineup and with the exception of the following item of noncompliance, the valve lineups were completed in accordance with the test procedure and regulatory requirements.

During the walkdown of the containment pressure sensing instrumentation, the inspector found that the pressure switches for channel 3 of the Reactor Protection and Safety Features Actuation Systems were not exposed to containment pressure due to a closed manual valve in the line. Subsequent investigation revealed that the valve did not appear on any drawing or procedure. Finding this, the inspector inquired as to whether this valve had been closed during operation, disabling one channel of the Reactor Protection and Safety Features Actuation System. After a thorough review of the surveillances performed this outage, the test log and the control room log, the licensee concluded that the valve had not been closed during operation and that the manual valve had been used by test personnel to perform the required leak test on the penetration. Since the valve did not appear in the drawing, it was not in the leak test procedure, and when test personnel returned the penetration to its normal configuration, it was forgotten. Failure by the licensee to have an adequate procedures and drawings is contrary to the requirements of 10 CFR Part 50,



Appendix B, Criterion V and is considered an item of noncompliance (346/84-29-01(DRS)).

f. CILRT Penalties

Due to valve configurations which deviated from the ideal CILRT valve lineup and potential sources of containment in leakage that were monitored during the test, adjustments to the measured leakage at the 95% upper confidence level must be made. The following penalties must be added to Lam at the 95% upper confidence level (units are in wt%/day).

<u>Component</u>	<u>Penalty</u>
Sump level increase	$7.08 \times 10^{-4}$
N <sub>2</sub> added to electrical penetration	$8.34 \times 10^{-5}$
ILRT pressurization penetration	$6.0 \times 10^{-5}$
Penetrations 25, 26, 56, 73A	0.0
TOTAL	$8.51 \times 10^{-4}$

g. CILRT Data Evaluation

The 16 hour 45 minute CILRT was started on December 9, 1984, at 9 p.m. The inspector independently monitored and evaluated leak rate data every 15 minutes using the BN-TOP-1, Revision 1 (total time) formula, to verify the licensee's calculations of the 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>
Leakage rate measured (Lam) during CILRT	-0.019	-0.019
Lam at upper 95% confidence level	0.087	0.087
Lam at upper 95% confidence level adjusted to reflect penalties (refer to paragraph 3.f)	0.088	0.088

Appendix J Acceptance Criterion at upper 95% confidence level =  $0.75 \text{ La} = 0.75 (0.5) = 0.375$ . As indicated above, the adjusted Lam at the 95% confidence level was less than the maximum allowable by 10 CFR Part 50, Appendix J.

h. Supplemental Test Data Evaluation

After the satisfactory completion of the 16 hour 45 minute test on December 10, 1984, a known leakage of 0.3974 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>
Measured leakage (Lc) rate during supplemental test	0.405	0.405
Lc @ 95% confidence level	0.452	0.452
Induced leakage rate (Lo)= 28.55 SCFM = 0.3975 wt%/day		

Appendix J Acceptance Criterion:  $0.2539 < Lc < 0.5039$ .

As indicated above, the supplemental test results satisfied the requirements of 10 CFR Part 50, Appendix J.

No other items of noncompliance or deviations were identified.

#### 4. Review of Technical Specifications

During the course of the inspection, the inspector reviewed the Davis Besse Technical Specifications for conformance with 10 CFR Part 50, Appendix J requirements and NRC policy regarding Type A, B and C testing. Containment systems Technical Specification 4.6.1.2.C.3 "requires the quantity of gas injected into the containment or bled from the containment during the supplemental test to be equivalent to at least 25 percent of the total measured leakage rate at Pa, 38 psig."

This Technical Specification is contrary to the requirements of ANSI N45.4-1972 and is not consistent with the NRC position that the quantity of gas injected or bled from containment be between 0.75 and 1.25 La. This information will be forwarded to NRR for their review and correction of the Davis Besse Technical Specifications. This is considered an open item (346/84-29-02(DRS)) pending the revision of this portion of Davis Besse Technical Specifications.

No items of noncompliance or deviations were identified.

#### 5. Local Leak Rate Test Results Review

The inspector reviewed the 1980, 1982 and 1984 local leak rate test results for conformance with the requirements of 10 CFR Part 50, Appendix J. The inspector found, when reviewing the 1980 local leak rate tests that the licensee did not quantify the leakage from several isolation valves in the as found condition. For instance, purge valves CV5005 and CV5006 in 1980 were specified as leaking greater than 4000 standard cubic centimeters per minute (in 1984, these valves leaked 700,000 sccm). It is the NRC's position that when a valve's leakage is not quantified (as in this case) the valve's leakage is assumed to be infinite. Since this is the case for not just one, but several containment isolation valves in 1980, the licensee should have realized that when adding containment isolation valve and penetration leakage to determine Technical Specification 3.6.1.2.b compliance, that this value was indeterminate. Failure by the licensee to adequately add local leakages to determine Technical

Specification 3.6.1.2.b compliance is considered an item of noncompliance (346/84-20-3(DRS)).

No other items of noncompliance or deviations were identified.

6. As Found Condition

a. 1980 CILRT

The "as found" condition is the condition of the containment at the beginning of the 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, and 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, then 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. These "as found" leakage rate results are required and carry the same reporting requirements as the other Type A and supplemental test results.

During the course of the inspection, the inspector found that the licensee had not tested in accordance with the aforementioned requirements nor had they back calculated an as-found containment leakage for 1980. After discussions with the licensee and review of the 1980 LLRT's and maintenance records the inspector attempted to calculate an as found containment leakage but could not due to the lack of specifics in the maintenance records.

Contrary to the 10 CFR Part 50, Appendix J and ANSI N45.4 requirements, the licensee has been performing preparatory repairs prior to the performance of past Type A tests without an approved exemption to do so. Failure of the licensee to determine the as found leakage of containment resulted in the licensee not knowing if they had failed the 1980 Type A test in the as found condition. This subject is discussed further in the letter transmitting this report.

b. 1984 CILRT

The inspectors reviewed as found and as left local leak rate test results to determine an as found Type A test result. The following is a summary of the as found containment leakage rate (units are in weight percent/day):

Measurement

Penalties incurred due to repairs or adjustments prior to the CILRT: 0.1763

As Found Type A test results 0.2643

Appendix J acceptance criteria for the "as-found" condition of the containment =  $0.75La = 0.3750$  wt%/day.

No other items or noncompliance or deviations were identified.

7. 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. An open item disclosed during this inspection is discussed in Paragraph 4.

8. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 24, 1985 and summarized the scope and findings of the inspection activities. The inspector noted the good quality of the procedure used to conduct local leakrate tests and the good performance of the licensee's staff during the CILRT. The licensee acknowledged the inspectors statements.