U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-373/87034(DRS); 50-374/87033(DRS)

Docket Nos. 50-373; 50-374 Licenses No. NPF-11; NPF-18

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, IL 60690

Facility Name: LaSalle County Station, Units 1 & 2

Inspection At: LaSalle Site, Marseilles, Illinois

Inspection Conducted: December 1, 1987 through January 5, 1988

Inspector: Rogelio Mendez Rogelio Mendez January 22, 1988
Date

Approved By: Monte P. Phillips, Chief
Operational Programs Section 1/25/88
Date

Inspection Summary

Inspection on December 1, 1987 through January 5, 1988 (Report No. 50-373/87034(DRS); No. 50-374/87033(DRS))
Areas Inspected: Routine, announced inspection by a Region based inspector of the Containment Integrated Leak Rate Test (CILRT) procedure, CILRT results and licensee event report followup. NRC modules utilized during this inspection included 61720, 70307, 70323 and 92701.
Results: One violation was identified (failure to adequately review the use of out of calibration measuring and test equipment - Paragraph 5.b.(2)).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*G. J. Diederich, Station Manager
*R. D. Bishop, Services Superintendent
*J. C. Renwick, Production Superintendent
*W. Huntington, Assistant Superintendent
*D. A. Brown, Quality Assurance Supervisor
*T. Hammerich, Technical Staff Supervisor
*M. Richter, Assistant Technical Staff Supervisor
*J. P. Peters, Technical Staff Engineer
*R. J. Cozzi, Quality Assurance
*P. F. Manning, Assistant Superintendent
*M. P. Vria, Technical Staff Engineer
*D. Winterhoff, Technical Staff Engineer
*A. C. Settles, Technical Staff Engineer

*Denotes persons attending the exits of either December 21, 1987 or January 5, 1988.

The inspector also contacted other licensee personnel including members of the technical, operating and regulatory assurance staff.

2. Licensee Event Report Followup

(Closed) Licensee Event Report (374/87002-01): Failure of Unit 2 as found CILRT due to the TIP Purge Assembly Supply Stop Valve and feedwater check valves. On January 17, 1987, local leak rate tests on containment isolation valves indicated a high leakage rate. A leakage summation of 510 SCFH was measured which was in excess of 0.6 La (231 SCFH). The measured leakage from the TIP Purge Assembly Supply Stop Valve 2IN031 was found to be 250 SCFH or approximately 0.65 La. Since there is no other containment isolation valve in series with the TIP valve, the entire leakage was added as a penalty to the CILRT. The licensee found that the cause of the leakage was a deformed O-ring and a corroded valve stem. The licensee issued Work Request No. L64931 on January 21, 1987, to repair the valve. The valve was disassembled and repaired and successfully local leak rate tested. A review of past local leak rates tests on valve 2IN031 did not indicate programmatic problems with this valve. With respect to the feedwater check valves, the licensee issued Work Request No. L64623 on January 12, 1987 to modify the valves. The licensee found that the valve disc was not seating properly. The repairs on the valve included machining the valve and disc and installing bushings on the pivot pins of the check valves. The feedwater check valves were repaired and successfully local leak rate tested. A review

of previous local leak rate tests performed on the feedwater check valves indicated unacceptable leak rates. On three occasions since 1983 the licensee was unable to quantify the leak rates on the Unit 2 valves. This item is open pending further review to determine whether the bushing modification reduces the leak rates on the feedwater check valves (373/87034-01; 374/87033-01).

3 Containment Integrated Leak Rate Test Procedure Review (Unit 2)

a. The inspector reviewed test procedure LTS-300-4, Revision 12, "Unit 1/2 Primary Containment Integrated Leak Rate Test (ILRT)", relative to the requirements of 10 CFR Part 50, Appendix J, ANSI N45.4-1972 and the FSAR. The inspector's comments were discussed with the licensee during the course of the inspection. All inspector comments were satisfactorily resolved.

b. Clarification of Appendix J Requirements

To ensure the licensee's understanding of Appendix J requirements, the inspector conducted several discussions with licensee personnel during the course of the inspection. The following is a summary of the clarifications discussed with the licensee.

(1) The only method of data reduction acceptable to the NRC are total time or point-to-point as described in ANSI N45.4-1972 including a statistically calculated instrument error analysis. The following options are available to the licensee.

(a) Total time (<24 hour duration test) in accordance with Bechtel Corp. Topical Report BN-TOP-1, Revision 1. Whenever BN-TOP-1 is used it must be followed in its entirety except for any section which conflicts with Appendix J requirements.

(b) Total time (≥24 hour duration test using single sided 95% UCL).

(c) Proposed Regulatory Guide MS 021-5, Regulatory Position No. 13. If this method is utilized, the licensee must submit an exemption request to NRC and receive approval for its use prior to the expiration of the Type A test frequency requirements stated in the Technical Specifications.

(2) Periodic Type A, B, and C tests must include as-found results as well as the as-left. If Type B and C tests are conducted prior to a Type A, the as-found condition of the containment must be calculated by adding any improvements in leakage rates, which are the results of Repairs and Adjustments (R&A), to the Type A test results using the "minimum pathway leakage" methodology. This method requires that:

(a) In the case where individual leak rates are assigned to two valves in series (both before and after the R&A), the penetration through-leakage would simply be the smaller of the two valves' leak rates.

(b) In the case where a leak rate is obtained by pressurizing between two isolation valves and the individual valve's leak rate is not quantified, the as-found and as-left penetration through-leakage for each valve would be 50 percent of the measured leak rate if both valves are repaired.

(c) 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 leak rate would conservatively be the final measured leak rate, and the as-left penetration through leak rate would be zero (this assumes the repaired valve leaks zero).

(3) Penetrations which are required to receive Type C tests, as described in the FSAR and SER, must be vented inside and outside the containment during the CILRT. All vented penetrations must be drained of water inside the containment and between the penetration valves to assure exposure of the containment isolation valves to containment air test pressure. The degree of draining of vented penetrations outside of containment is controlled by the requirement that the valves be subjected to the post-accident differential pressure, or proof that the system was built to stringent quality assurance standards comparable to those required for a seismic system.

(4) 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. The 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. Any increase in containment sump, fuel pool, reactor water, or suppression pool level during the course of the CILRT must also 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.

(5) The start of a CILRT must be noted in the test log at the time the licensee determines that the containment stabilization has been satisfactorily completed. Reinitializing a test in progress must be "forward looking," that is, the new start time must be the time at which the decision to restart is made. This also implies that the licensee has determined that the

test has failed and has enough data to quantify the leakage rate. Any deviation from these positions should be discussed, and documented, with the NRC inspector as they occur to avoid later invalidations of the test results. Examples of acceptable deviations of reinitializing the start time of the test in the past are: time at which a leaking penetration which has an obvious effect on the test data was secured, accidental opening and later closing of a valve which has an obvious effect on the test data, the time at which an airlock outer door was closed and the inner door was open.

(6) The supplemental or verification test should start within one hour after the completion of the CILRT. If problems are encountered in the start of the supplemental test, data recording must continue and be considered part of the CILRT until the problems are corrected and the supplemental test can begin.

(7) 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 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 to stabilize within the acceptance criteria, rather than the results 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 of the CILRT.

(8) During a CILRT, it may become necessary to reject or delete specific sensors or data points due to drifting or erroneous sensors, or data outliers. Data rejection criteria should be developed and used so that there is a consistent, technical basis for data rejection. One example of an acceptable method for data outliers is described in an appendix to ANSI/ANS 56.8-1981. Sensor data rejection criteria should be plant specific and based upon a sensor's trend relative to the average scatter, slope, and/or absolute output of the sensor.

(9) An acceptable method for determining if the sum of Type B and C test exceeds the 0.60 La Appendix J limit is to utilize the "maximum pathway leakage" method. This methodology is defined as the maximum leakage value that can be quantified though a penetration leakage path (e.g., the larger, not total, leakage of two valves in series). This assumes a single active failure to the better of two leakage barriers in series when performing Type B or C tests.

(10) Test connections must be administratively controlled to ensure their leak tightness or be subject to Type C testing. One way to ensure their leak tightness is to cap, with a good seal, the test connection after its use. Proper administrative controls should ensure valve closure and cap reinstallation within the local leak rate testing procedure, and with a checklist prior to unit restart.

(11) Whenever a valve is replaced, repaired, or replaced during an outage for which Type A, B, and/or C surveillance testing was scheduled, local leak rate testing for the as-found as well as the as-left condition must be performed on that penetration. In the case of a replaced valve, the as-found test can be waived if no other containment isolation valve of similar design exists at the site.

No violations or deviations were identified.

4. Review of LaSalle Unit 2 Integrated Leak Rate Test Report

a. CILRT Data Evaluation

The inspector reviewed the licensee's "Reactor Containment Building Integrated Leak Rate Test, LaSalle County Nuclear Power Station, Unit 2" report submitted to the NRC on August 25, 1987, and determined that it accurately reported the leakage rates and events except as noted below regarding the Unit 2 Type A test performed on May 30 - June 1, 1987. Additionally, the inspector independently evaluated the licensee's leak rate data using the total time (BN-TOP-1) formulas to verify the licensee's calculations of the leak rate and instrument performance. There was good agreement between the inspector's and licensee's final result as indicated by the following summary (units are in weight percent per day).

Measurement	Licensee	Inspector
Leak Rate measured during CILRT (Lam)	0.043	0.043
Lam at upper 95% confidence level	0.272	0.270

Appendix J acceptance criteria at 95% UCL _ 0.476 wt. %/day.

The licensee submitted a summary of the measured leak rates in their 90 day report to the NRC. Table 3 in the report listed data sets from 33 through 70. These data sets summarized the temperature, measures and leak rates obtained by the licensee. A review of the table by the NRC inspector indicated that data set 35, through 69 incorrectly listed the measured leak rate by an average of 0.20 wt %/day. The licensee reviewed the summary page and agreed

that except for the final result, the leak rates listed in Table 3 at the 95% upper confidence limit up to data set 69 were in error. The licensee has committed to submit a corrected table of the leak rates.

b. Supplemental Test Data Evaluation

After satisfactory completion of the CILRT, a known leakage (based on the inspector's independent readings and calculations) of 450 SCFH, equivalent to 0.645 weight percent per day was induced. Data was collected and analyzed by the licensee every 10 minutes. After three hours and 20 minutes, the supplemental test was terminated with satisfactory results as indicated by the following summary (units are in weight percent per day).

Measurement	Licensee	Inspector
Measured leakage rate during supplemental, Lc	0.741	0.744
Induced leakage rate Lo	0.645	0.645
Lc - (Lo + Lam)	0.053	0.056

Appendix J criteria:
$-0.159 \leq [Lc - (Lo + Lam)] \leq + 0.159$ as indicated above, the licensee's test results were satisfactory.

c. CILRT Valve Lineup Penalties

Due to penetration configurations which deviated from the penetration requirements for the CILRT, the results of local leak rate tests for each penetration must be added to Lam at the 95 percent UCL. The following penalties must be added using the minimum pathway leakage method:

Penetration	Local Leak Rate Test Valve (Limits are in SCFH)
RBCCW Supply	0.3
RBCCW Return	0.3
PCCW A&B Supply	2.9
PCCW A&B Return	3.9
RWCU Suction	0.4
Recirc Loop Sample	0.1
Drywell Equipment Sump	16.5
Drywell Floor Sump	0.4
Drywell Equipment Sump Cooling	19.3
Inboard MSIV Drain	0.7
RHR Shutdown Cooling Suction	0.1
RCIC Steam Supply	15.7
ECCS/RCIC	17.3
Unit 2 Hydrogen Recombiner	0.4
Standby Liquid Control	0.1

Total = 78.4 SCFH = 0.129 wt. %/day.

d. As Found Condition of CILRT Results

The as-found condition is the condition of the containment at the beginning of the outage, prior to any repairs or adjustments to the containment boundary. The as-found Type A test can then be obtained by adding the adjustments to the overall Type A test result. The licensee is limited to the Appendix J limit of <0.75 La or <0.476 wt. %/day leakage. The following is a summary of the as-found containment leak rate (units are in weight percent per day):

Measurement	
Penalties incurred due to repairs or adjustments prior to CILRT	0.848
CILRT valve lineup penalties	0.129
As-left Type A test results	0.270
Total As-found	1.247

As indicated above, the as-found condition of 1.247 wt. %/day is greater than the allowed leakage of 0.476 wt. %/day and exceeds the allowable limit of Appendix J (0.75 La). This is the first as-found Type A test failure for Unit 2.

5. Instrumentation

a. CILRT Instruments

The inspector reviewed the calibration data and determined all the instruments used in the CILRT had been properly calibrated and that the correct weighting factors had been placed in the computer. The following instrumentation was used throughout the test.

Type	Quantity
RTDs	30
Dewcells	10
Pressure Gauges	2
Flowmeter	1

b. Local Leak Rate Instruments

(1) The inspector reviewed a sample of flowmeter and pressure gauge calibration records used in the testing of containment isolation valves. The inspector was informed that pressure gauges were calibrated daily when the licensee performs local leak rate tests, while flowmeters have a three year frequency calibration schedule. The flowmeters were sent to an independent testing laboratory and returned to the licensee

with a certification cover letter and the test data results. A review of the records indicated that the testing laboratory does not include a serial or reference number of the primary standard used to calibrate the flowmeters. Additionally, the test data results do not allow a comparison with the true standard and flow indicated on the flowmeter. The units of the primary standard scales were not defined and were different than the flow indicated by the flowmeter. For example, Flowmeter No. 614 was calibrated on April 2, 1986, and the measured flow was 0.1879 SCFH, however; the true standard scale is listed as 10.5. The next calibration point is listed as 0.5770 SCFH and the standard is 25.5. The flowmeters were guaranteed an accuracy of one percent by the independent laboratory. The listing of unknown units on the calibration data sheets did not allow a determination of the one percent criterion. The inspector informed the licensee of the concern, however, the licensee could not provide information as to what actual flow the flowmeters were calibrated against. This matter is unresolved pending further review (373/87034-02; 374/87033-02).

(2) The inspector reviewed a sample of out of calibration flowmeters to determine whether the licensee evaluated the failure mode of out of calibration equipment. Whenever a flowmeter was found out of calibration or the testing laboratory was unable to determine as received data, the licensee issued a discrepancy report (DR). The DR form required that the cause of discrepancy and the effect on the system be documented. The inspector reviewed DR No. 86-244 issued on May 16, 1986, for Flowmeter No. 614 and noted that under the cause of discrepancy and effect on the system, the licensee stated that no documented usage of the instrument could be demonstrated in either the Tech Staff records or LAP 300-9 checkout sheets. This flowmeter was calibrated in November 1982 and found out of calibration in March 1986. The licensee concluded that since no acceptance criteria was derived from the flowmeter, there was no impact on plant instrumentation. The inspector reviewed a sample of individual local leak rate records to determine whether data was obtained from Flowmeter No. 614 between the date of its previous calibration in November 1982 and its subsequent calibration in March 1986. The inspector determined that as-found and as-left data was obtained with Flowmeter No. 614 during local leak rate tests on November 8, 1983, May 9, 1985, and June 10, 1985.

Similarly, the inspector reviewed DR No. 86-245 issued on May 16, 1986 for Flowmeter No. 622. The disposition of the DR stated that a review of both checkout sheets and Tech Staff leak rate records showed only two documented uses since its last calibration. The inspector reviewed a sample of local leak rate tests to determine its usage between the date of its

previous calibration in January 1983 and the date it was found out of calibration in April 1986. A review of the records indicates that in this period, data was obtained from the flowmeter during several local leak rate tests. The dates of usage were: October 25, 1983, January 3, 1984, July 26, 1984, and November 23, 1984 for local leak rate Test No. LTS-100-8; March 1, 1984 for LTS-100-6; August 15, 1984 and April 1, 1985 for LTS-100-5; February 28, 1984 and March 1, 1984 for LTS-100-5; and November 23, 1983 for LTS-100-3.

The licensee's Topical Report, CE-1-A Revision 45, committed the licensee to Regulatory Guide 1.33, Revision 2, which endorsed ANSI N18.7. ANSI N18.7-1976, Paragraph 5.2.16 required that "when calibration testing, or other measuring devices were found out of calibration, an evaluation shall be made and documented concerning the validity of previous tests and the acceptability of devices previously tested from the time of previous calibration.

Criterion XVI of Appendix B to 10 CFR Part 50, requires that measures be established to assure that conditions and deviations which are adverse to quality are identified and corrected. This failure to take adequate corrective action and to evaluate the past use of out of calibration equipment is considered a violation of 10 CFR Part 50, Appendix B, Criterion XVI (373/87034-03; 374/87033-03).

6. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which will involve some action on the part of the NRC or licensee or both. One open item disclosed ruing the inspection was discussed in paragraph 2.

7. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of violation, or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 5.b.(1).

8. Exit Interview

The inspector met with licensee representatives denoted in Paragraph 1 during and at the conclusion of the inspection on January 5, 1988. The inspector summarized the scope and results of the inspection and discussed the likely content of this report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.