U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/86008(DRP)

Docket No. 50-255 License No. DPR-20

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palisades Site, Covert, MI

Inspection Conducted: January 15 through March 14, 1986

Inspectors: E. R. Swanson

Steve M. Hare

Approved By: for John F. Svernoos
C. W. Hehl, Chief
Reactor Projects
Section 2A

April 7, 1986
Date

Inspection Summary

Inspection on January 15 through March 14, 1986 (Report No.50-255/86008(DRP))

Areas Inspected: Special inspection by resident inspector and regional specialist to followup on Unresolved Item No. 255/85034-06 related to an apparent failure to adequately evaluate identified leakage of two containment isolation valves. The inspection involved a total of 25 inspector-hours by two NRC inspectors including eight inspector-hours in the regional office.
Results: Of the areas inspected one violation and no deviations were identified. Inadequate review of and corrective action for a containment isolation valve leakage event identified in May and August 1985 resulted in the plant continuing to operate with containment isolation valve leakage in excess of the Technical Specification limit until the plant was shutdown for an outage on November 30, 1985.

DETAILS

1. Persons Contacted

Consumers Power Company (CPCo)

*J. F. Firlit, General Manager
*J. G. Lewis, Plant Technical Director
*R. D. Orosz, Engineering and Maintenance Manager
R. M. Rice, Plant Operations Manager
*R. Ward, Nuclear Operations Analyst
*G. L. Boyers, In Service Inspection Supervisor
*T. J. Palmisano, Plant Projects Superintendent
*J. Hager, Chemistry Supervisor
*R. A. Fenech, Technical Engineer
*D. L. Fitzgibbon, Licensing Engineer
*R. A. Vincent, Plant Safety Engineering Administrator
*R. E. McCaleb, Quality Assurance Director

*Denotes those present at the Management Interviews on January 31 and February 6, 1986.

Several other members of the plant Operations/Maintenance, Technical, and Chemistry Health Physics staffs were also contacted briefly.

2. Background

Unresolved Item 255/85034-06 tracked followup inspection associated with Licensee Event Report (LER) 85-029. The subject LER documented the failure of a local leak rate test (LLRT) conducted on December 4, 1985. The LER also reported that a problem with Primary Coolant System (PCS) leakage through the same penetration had been identified as early as May 1985 and that an evaluation performed at that time to further quantify the leakage through the penetration was done incorrectly. The incorrect evaluation resulted in the licensee failing to realize they had exceeded the Technical Specification limit for penetration and isolation valve leakage and had the potential for violating containment integrity. Initial review of the December 4 event, which culminated in a telephonic report to the NRC on December 16, 1985 and submittal of LER 85-029 on January 15, 1986, resulted in the issuance of a violation (see Inspection Report No. 50-255/85030(DRP)) for late submittal of the required telephonic 10 CFR 50.72 report. This inspection report focuses on the subsequent inspector followup actions associated with the review of LER 85-029 and Unresolved Item No. 255/85034-06, which led to a potential finding of a Technical Specifications violation warranting NRC evaluation for possible escalated enforcement action.

3. Chronology

May 1985 During power operation on May 2, 1985, the Chemistry Supervisor initiated a corrective action document (Deviation Report PAL 85-046) to resolve an operating problem that had plagued the chemists since December of 1984 (early in the operating cycle). He identified that Primary Coolant System (PCS) leakage through containment isolation valves CV-1910 and CV-1911, and other valves in the same PCS sample line, had made it impossible to obtain total gas samples of the PCS through the normal or post accident sample paths. The Resident Inspector was notified of this on May 28, 1985 and on the following day pursued the question of the operability of the containment isolation valves. He was told that an evaluation had been conducted which resolved the issue and that the penetration PCS leakage rate was measured at 500 ml/min, which correlated to 6400 sccm air leakage, and, based on this evaluation, penetration and isolation valve leakage limits were met. The Resident and Regional specialist inspectors agreed that, based on the information provided, the results appeared to be acceptable. The related issue of the operability of the Post Accident Sampling System was also reviewed and it was determined there was no basis for considering the system inoperable.

December 1985 On December 4, 1985, with the plant in cold shutdown, the results of a local leak rate test on penetration 40 exceeded the Technical Specification (TS) allowable value of 0.6 La (65,200 sccm). The leakage measured (78,913 sccm) was directly attributable to leakage through containment isolation valves (CIV) CV-1910 and CV-1911. The excessive CIV leakage resulted in, albeit late, a telephonic report to the NRC and the subsequent issuance of LER 85029 in January. The licensee also discovered that the leakage evaluation performed in May was incorrect and this was documented in Event Report PAL-85-128.

January-February 1986 An LER (Report 85-029) was submitted for this event on January 15, 1986. In this report the licensee identified that the engineering analysis of the leakage in May 1985 was incorrectly applied in an evaluation of the penetration and isolation valve TS leakage limit. Subsequent to the issuance of this LER, this inspection was begun. The inspectors reviewed the events and circumstances that led up to the issuance of this LER to determine why the licensee had not identified this problem earlier in May of 1985 when it had first been discovered. The inspectors made the following observations:

a. The penetration configuration existing at the time of the original leak test consisted of five closed control valves in series, two of them being containment isolation valves. PCS unidentified leakage was approaching the TS limit at the time and was one of the concerns that prompted a leak test of the penetration after the original Deviation Report (DR) had been generated. Containment isolation valve leakage was not a concern at this time.

b. Apparently at the request of plant operators, a leak test was performed with primary coolant pressure at approximately 2000 PSI in the Reactor Coolant System (RCS) and 500 psi at the test point (i.e., a 1500 psi delta P across all five valves). The measured leakage rate was 500

standard cubic centimeters per minute (sccm) of water. At this point, prompted by questions regarding containment integrity by Quality Assurance personnel, the results of the leak test were given to an engineer in the Plant Projects group with a request to evaluate the results as they related to the containment isolation valve leakage program. The result of his review, in the form of an engineering analysis transmitted via internal correspondence, was that the equivalent air leakage at Pa (55 psig) was 6400 sccm. The conclusion reached was that the leakage through the isolation valves presented no threat to the local leakage limits While the actual analysis received a technical review, the technical review looked at the calculations only. A review of the letter's conclusions and the testing methodology used to come up with a leakage rate by the Chemistry department had not been performed by the engineer's management prior to the letter's issuance.

c. There was a communication error involved between the person who had performed the initial leak test in May and the engineer in the Plant Projects group who performed the analysis of penetration leakage. This resulted in the misconception by the engineer that the leakage measured was representative of the containment isolation valve leakage, which subsequently resulted in an inadequate evaluation of penetration leakage. Another potential contributing factor was that the engineer was not experienced enough in the area of leak testing to determine if the leak rate information provided to him was adequate for the analysis he was performing.

d. The May 1985 Deviation Report was generated in accordance with Corrective Action Administrative Procedure 3.03, Revision 1, dated May 24, 1984. It was during the review portion of the DR process where the inadequate evaluation of the penetration leakage should have been discovered. The DR included, as part of the extent and causes section, a copy of the engineering evaluation that concluded the penetration leakage was not a problem. The DR was reviewed by the Chemistry Supervisor's superior, the Corrective Action Review Board (CARB) and the Plant Review Committee (PRC). It was in this DR review process where the problem regarding an inadequate local leak rate test and subsequent analysis should have been discovered.

   It was also noted concerning this evaluation that the leakage measurement used in this evaluation was taken on April 29, 1985 three days before the deviation report was written and it was not until approximately eight days later that the leakage was analyzed. Had the evaluation shown that the plant had exceeded the limits of Technical Specification 4.5.2, action to repair or shut the plant down should have been initiated within 48 hours. Even if the analysis had been done correctly, the licensee would have violated the action requirements of the Technical Specifications.

e. Further review of the issue in March 1986 identified that an additional Deviation Report, PAL-85-092, was generated on August 5, 1985 by a member of the Operations Department. Four specific concerns were identified, one of which was specifically the operability of the two containment isolation valves, CV-1910 and CV-1911. Again a leakage

measurement was made with the five valves closed and an engineering analysis was performed. The analysis concluded that LLRT limits were not exceeded. The engineers involved in this analysis and technical review were different than those involved in the first analysis but were similarly inexperienced in LLRTs. They also used the number provided for water leakage and converted it to air leakage. Timeliness of the analysis in this second case was acceptable. The number they calculated was approximately twice the value derived in May, yet none of the CARB members (several of whom reviewed the earlier deviation report) compared the two evaluations. Apparently there was no modification made to the total LLRT leakage based on the last analysis and the tracking of this number needs improvement.

f. Based on measurements made daily by the Chemistry Department the leakage condition evidently did not change over the period of May through December 1985.

g. The licensee committed in the LER to evaluate the failure mode of the valves, but during outage cleanup the valves were apparently thrown out.

h. Using the results of this outage's local leak rate test, integrated leak rate test results and the uncertainties surrounding the accuracy of the December local leak rate test on penetration 40, an overall containment leakage rate can be inferred from May through December 1985. This calculated leak rate exceeds the TS allowable for containment leakage, La, which is equal to 0.10 wt %/day. At the request of the inspector the licensee used this containment leakage to calculate an equivalent offsite dose for comparison with the 10 CFR 100 limits. The inspector reviewed their calculation and confirmed if they would have had a design basis accident during this time period, this containment leakage value would not have caused them to exceed the required Part 100 limits.

4. Corrective Actions

As a result of discussions at the Enforcement Conference held on March 13, 1986, the licensee outlined the following corrective actions in a letter dated March 14, 1986 to the Regional Administrator:

a. The Plant Manager will review the Containment Integrity event with the Palisades Managers/Directors/Superintendents on March 14, 1986. The purpose of this meeting and those described in Items b. and c. is to: (1) discuss the Containment Integrity problems that occurred, (2) stress the seriousness of a Containment Integrity problem, (3) discuss the corrective action that will be taken to prevent recurrence, and (4) stress the importance of timely action.

b. The Plant General Manager will review the Containment Integrity event with all Palisades supervisory and Engineering personnel by March 17, 1986.

c. The Plant General Manager will review the Containment Integrity event with Operations and Chemistry personnel by March 19, 1986.

d. Prepare and approve a procedure which addresses the control of engineering analysis by March 30, 1986.

e. Train all appropriate personnel on the contents of the engineering analysis procedure by March 30, 1986.

f. The Plant General Manager will meet with the PRC and CARB committee members by March 18, 1986 to stress the added role that is required considering the current plant specific experience level of our personnel. The PRC/CARB interface was enhanced last November 1985 by having PRC review corrective actions earlier in the corrective action process.

g. Perform a study of the Local Leak Rate Testing problems and have a corrective action plan available by June 30, 1986. The purpose of this study is to address the problems that have been experienced and to implement a program to correct this problem in the future.

h. The Management philosophy will be to continue the use of outside consultants and/or vendors when determined necessary.

The above aggressive actions will ensure that the following objectives are accomplished:

i. Prompt notification of potential problems involving containment integrity and other Technical Specification criteria to our PRC and CARB members.

j. Prompt initiation and evaluation of corrective action records.

k. Timely and complete corrective action.

5. Evaluation

As a result of the degraded penetration, the primary coolant system pressure boundary was essentially extended to the sample sink. Although the piping and valves associated with the physical extension of the boundary to the sink in this case were apparently seismically qualified, the isolation capability required by the plant's design and the Technical Specifications was rendered inoperable due to the identified leakage through the penetration.

The May 1985 communication error (regarding the leakage measured by the chemistry supervisor) and inadequate subsequent review of the analysis evidently resulted in the misunderstanding that the leakage measured was representative of the isolation valve leakage rate, when, in fact, it was not. Beginning with events associated with the May 1985 leakage quantification and subsequent analysis and review by several different technical organizations, the licensee had sufficient data available and opportunities to recognize a condition existed which was in violation of Technical

Specification (TS) 4.5.2.b which limits the LLRT leakage to 0.6 La and TS 3.6 which requires containment integrity during power operation. The condition, had it been properly recognized, would likely have required either the plant to shutdown pursuant to Technical Specification 3.0.3 to repair the leaking valves or the licensee to pursue emergency Technical Specification relief from the NRC in order to continue at power. More closely relating to the root cause of this event; 10 CFR 50, Appendix B, Criterion XVI, Corrective Action requires that conditions adverse to quality are promptly identified and corrected. In the above discussed event, the licensee did not demonstrate an ability to identify and correct the existing containment integrity violation.

As stated in Paragraph 3.h, although the overall containment leakage rate exceeded the TS allowable La value, evaluations showed that the licensee would not have exceeded the 10 CFR 100 limits for equivalent offsite dose during a design basis accident.

Prior to May 1985 the licensee had a history of repeated local leak rate test failures, with nine specific occasions dating back to March 1976 in which the as found total leakage from all penetrations and isolation valves exceeded the 0.6 La requirement. A September 14, 1979 occurrence warranted a substantial civil penalty. The licensee had sufficient information available in May and again in August 1985 to determine that containment integrity had been violated, yet, despite the existing management controls, the situation went undetected for a period of seven months.

In conclusion, the failure to properly investigate and review the indicated leakage through penetration No. 40 that resulted in the violation of TS 3.6, 4.5.1.b, and 4.5.2.b constitutes a violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action (Violation No. 255/86008-01). This violation will be forwarded by separate correspondence following additional NRC review for escalated enforcement. Unresolved Item No. 255/85034-06 is considered closed.

One violation and no deviations were identified.

6. Management Interview

Management interviews were conducted as indicated in Paragraph 1. The scope and findings of the inspection were discussed. The inspectors also discussed the likely informational content of the report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.