U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-373/85026(DRS); 50-374/85027(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 and 2

Inspection At: LaSalle Site, Marseilles, IL

Inspection Conducted: August 12-14, 26-28 and September 3, 1985

Inspector: C. C. Williams for Z. Falevits 12/6/85
Date

Approved By: C. C. Williams, Chief
Plant Systems Section 12/6/85
Date

Inspection Summary

Inspection on August 12-14, 26-28, and September 3, 1985 (Reports No. 50-373/85026(DRS); 50-374/85027(DRS))

Areas Inspected: Routine, announced inspection of corrective action taken to reduce excessive temperatures in Unit 1 drywell; applicable surveillance procedures; environmental qualification program for safety-related equipment in the drywell; implementation of engineering modifications to electrical components; and proposed drywell temperature monitoring program. The inspection involved a total of 57 inspector hours on site by one NRC inspector and 8 hours at the AE offices.

Results: Of the areas inspected, four violations (failure to adhere to Technical Specification 3/4.7.7 Paragraph 2.a.(2); failure to establish adequate surveillance and work procedures-Paragraph 2.b; failure to initiate prompt corrective action to review and evaluate engineering changes-Paragraph 2.d; and failure to demonstrate that components were calibrated, tested and set to the stipulation of the caution tags affixed to control room CM recorders-Paragraph 2.a. (4)) and one deviation with four parts (failure to adhere to commitments made in correspondence with the NRC-Paragraph 2.e) were identified.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

#G. J. Diederich, Plant Manager
■+*#R. D. Bishop, Service Superintendent
*C. E. Sargent, Production Superintendent
*R. M. Jeisy, Station QA Supervisor
●■+*#H. Massin, Licensing Administrator
*#P. F. Manning, Technical Staff Supervisor
■+*#D. S. Berkman, Operating Engineer, Assistant Supervisor
*●B. K. Wong, Station Nuclear Engineering, Engineer
●T. Hammerick, Technical Staff Compliance Engineer
■+●K. C. Wittenburg, Technical Staff Engineer
+●J. L. Bieronski, Station Nuclear Engineering, EQ Engineer
△L. J. Corts, Station Nuclear Engineering, Senior Engineer
+#R. F. Janecek, Station Nuclear Engineering, Project Engineer
+W. P. Worden, Operation Manager
+L. O. DelGeorge, Assistant Vice President (Eng. and Lic.)

U.S. Nuclear Regulatory Commission (NRC)

+C. J. Paperiello, Director, Division of Reactor Safety (DRS)
+J. J. Harrison, Chief, Engineering Branch, DRS
+C. C. Williams, Chief, Plant Systems Section, Engineering Branch, DRS
●+R. B. Landsman, Project Manager, Division of Reactor Projects (DRP)
+A. S. Gautam, Reactor Inspector, DRS
■△●+Z. Falevits, Reactor Inspector, DRS

General Electric (G.E.)

●R. E. Spencer, Engineer

Sargent and Lundy Engineers (S&L)

+B. G. Treece, Senior Electrical Project Engineer
●A. . Behera, E.Q., Engineer
△D. C. Haan, Project Manager
△D. J. Benton, HVAC Engineer
△J. P. Wegyy, HVAC Project Supervisor
△J. . Sinnappan, CQD Supervisor
△E. P. Ricohermoso, HVAC Project Engineer
+△C. H. Furlow, Electrical Project Engineer
+■B. Y. Pikelny, Component Qualification Engineer

In addition to the above, other licensee and contractor personnel were contacted during this inspection.

●Denotes the persons attending the drywell cooling modification deferral meeting on August 12, 1985.

*Denotes the persons who attended the meeting at the Region III office on August 3, 1985.
^Denotes the persons attending the drywell cooling modification meeting at the Sargent and Lundy Engineers Office on August 14, 1985.
▪Denotes the persons attending the site meeting on August 27, 1985.
#Denotes the persons attending the site meeting on August 28, 1985.
+Denotes the persons attending the exit meeting on September 3, 1985 at Region III.

2. Licensee Deferral of Drywell Cooling Long Term Modification

In a CECo letter to the NRC dated August 21, 1985, the licensee described the deferral of certain Unit 1 high drywell temperature long-term modifications until the second refueling outage of Unit 1. The licensee's reason for this deferral was to reduce the scope of work scheduled for the first Unit 1 refueling outage. The licensee concluded that postponement of the modifications would not adversely affect the equipment qualification analyses on file. As part of the Region III review of the licensee's deferral request, the inspector reviewed the other short-term and long-term corrective actions taken by the licensee to reduce excessive drywell temperatures, to ascertain whether they had been effectively implemented.

a. Licensee Short-Term and Long-Term Corrective Actions to Reduce Excessive Drywell Temperatures

In 1983 LaSalle County Unit 1 had experienced excessively high drywell temperatures mainly in the upper areas. These high temperatures degraded some of the cabling and electrical and mechanical components. Damaged safety-related cables were remove above drywell elevation 796' and new cables were install as part of the short-term corrective actions.

The excessive temperatures were attributed to several deficiencies such as: poor air flow distribution within the drywell; inadequately sealed penetrations; gaps in installed thermal metallic reflective insulation; missing flashing; and the thermal insulation gap around the RPV. The licensee's evaluation of the effects on equipment and plant design is contained in a CECO letter to the NRC dated December 22, 1983, wherein the licensee described its corrective actions to decrease the drywell temperatures. As part of the corrective action commitments, the licensee installed 35 additional temporary thermocouples to monitor the temperatures at various locations inside the drywell which contain safety-related components. This was done to establish a more accurate drywell temperature profile to be used by Sargent and Lundy (S&L) for environmental qualification (EQ) analysis and to establish temperature correlations.

The inspector selected the following EQ analysis and calculations and other data for review:

(1) EQ Calculation No. CQD-002376 dated February 28, 1985, addressing environmental qualification of Crosby Solenoid pilot valve model No. IMF-2 (Group E&M steam relief valves (SRV)).

The qualification of the SRVs was performed by a combined method of type testing and analysis. The test results indicated that the Unit 1 SRVs were qualified to the requirements of NUREG 0588 Category II for 40 years at a solenoid housing temperature of 170°F.

(2) On August 8, 1985, the inspector requested that the licensee obtain temperature data at various locations in the Unit 1 drywell using the installed temporary thermocouples. The measured data was subsequently reviewed by the inspector on August 20, 1985. During this review, it was noted that:

(a) The data indicated the existence of local hot spots in excess of the Technical Specification and environmental qualification limits.

(b) The licensee had not reviewed and evaluated the temperature data within the seven day time limit required by Procedure LLP 84-21.

(c) Containment Monitoring (CM) recorders in the control room did not alert the plant staff of these high temperatures.

(d) The correlation study used to assure compliance with the temperature limitations imposed by the Technical Specifications (TS) and EQ requirements was erroneous in that the temperature limits were violated as indicated by actual measurements. This condition was not detected by the CM temperature indication devices in the control room.

Four CM thermocouples mounted at elevation 776' inside the drywell are connected to two CM recorders in the control room. The alarm setpoints for these recorders was specified by a S&L letter dated September 28, 1984, to be 155°F (5°F above the TS 3.7.7a Limit) for recorder 1TR-CM037, and 145°F for recorder 1TR-CM038. (Presently both of these setpoints are 140°F). These setpoints had been established through a study performed by S&L to correlate the temperatures at the SRV areas and other safety-related equipment areas in containment to the temperature readings provided by the CM recorders. The correlation study concluded that the specified recorder alarm setpoints are "high enough to avoid spurious alarms yet low enough to provide early indication

of possible high ambient temperatures around the SRV solenoids." This conclusion was erroneous as demonstrated by the detection of high localized temperatures without concurrent detection by the CM recorders.

Review of records of temporary thermocouple readings revealed the Technical Specification 3.7.7.a limits were exceeded at the SRVs during the following periods of time:

1. January 13 through July 11, 1984
2. July 17 through July 23, 1984
3. July 25 through August 30, 1984
4. December 27, 1984 through August 27, 1985

TS 3.7.7 requires that whenever the temperature limit (150°F at safety-related components located inside the drywell) is exceeded for more than eight hours, the licensee must submit a Special Report to the Commission within the next 30 days providing a record of the amount by which the cumulative time the temperature in the affected area exceeded its limit and an analysis to demonstrate the continued operability of the affected equipment.

Contrary to this requirement, a report was not submitted regarding the temperatures detected by the temporary thermocouples listed above that exceeded the TS 3.7.7.a values.

Based on the above findings, the inspector informed the licensee that failure to adhere to TS 3.7.7 requirements constitutes an example of a violation (373/85026-01(DRS)).

(3) The inspector noted that Unit 2 temperatures in the upper elevation of the drywell were excessively high. Temperature readings taken on August 6, 1985, indicated that four temporary thermocouples recorded higher temperatures than allowed by the EQ requirements (138°F ambient). Additional data taken on August 27, 1985, at the inspectors request, indicated that, in addition to detecting temperatures higher than the EQ limits on the four thermocouples, two of the thermocouples detected temperatures which exceeded the TS 3.7.7 limiting value of 150°F. These thermocouples (Nos. 2TE-VP204 and 2TE-VP207) indicated a temperature of 154°F. (These excessive temperatures did not constitute a violation of the Technical Specifications because of different commitments regarding the use of temporary thermocouple data between Units 1 and 2.) Some of the temperatures recorded on August 27, 1985, indicated temperatures in the higher levels of the drywell to be 100°F above readings taken at the same locations in January 1985. The inspector questioned licensee representatives regarding these excessive temperatures and was told that a daily monitoring program was being instituted to closely observe the Unit 2 drywell temperatures.

The licensee submitted a Special Report as required by TS 3.7.7 and committed to conduct daily temperature monitoring and perform an analysis of remaining qualified life on the components exceeding the limiting temperature requirements. This is an unresolved item pending NRC review of these licensee activities (374/85027-01).

(4) On August 12 and 28, 1985, the inspector observed yellow caution tags attached to both Unit 2 CM recorders (Nos. 2TR-CM037 and 2TR-CM038) located in the Unit 2 Control Room. The caution tags indicated that recorder alarms were set at 150°F per On Site Review 84-22 (WRL35938). This observation was brought to the licensee's attention. No dates could be observed on the yellow caution tags; however, the Shift Engineer's log indicated that these tags were placed on the recorders during September 1984. A review of latest calibration sheets (LIS-CM-204 revision 0) indicated that the alarm point for recorder 2TR-CM037 was set at 140°F and for recorder 2TR-CM038 at 141°F on January 26, 1984. The latter settings are the present field setpoints as verified by the Instrument Mechanic engineer.

Based on the above finding, the inspector informed the licensee that this is a violation of 10 CFR 50, Appendix B, Criterion XIV (374/85027-02).

(5) EQ Calculation No. CQD-001985 dated February 11, 1985, addressing environmental qualification of Samuel Moore instrumentation cables in accordance with the requirements of NUREG 0588 Category I.

Qualification of these cables was done by S&L through a combined method of type testing and analysis. Tests were performed in accordance with IEEE-323-1974 and IEEE-383-1974. The Arrhenius method was utilized in the evaluation of material degradation. The test results indicated that these cables were qualified to the requirements of NUREG 0588 Category I for 40 years at an ambient temperature of 170°F.

(6) Subsequent to the high temperature event in the Unit 1 drywell in 1983, the licensee removed three representative electrical cables below elevation 796' in the Unit 1 drywell and submitted them to Wyle Laboratories for testing under loss of coolant accident conditions. As a result of these tests two anomaly notices were issued. The test report indicated that "the suitability of the cables for use in the LaSalle County Nuclear Power Generating Station based on the results of this test program shall be determined by CECO and/or Sargent & Lundy." During the exit meeting on September 3, 1985, the responsible S&L engineer indicated that S&L had concluded that none of the test results were anomalous. S&L representative stated that the wrong

acceptance criteria was submitted by S&L to Wyle to evaluate the test results. Subsequently, an analysis of the test data was performed by S&L which concluded that the cables were acceptable (reference S&L letter SCE-2351 dated August 23, 1985). The inspector noted that the test results were received by S&L in February 1985; however, no effective action was taken to evaluate the results until August 1985 when the NRC inspector questioned the test results. This does not appear to have been timely.

Pending further review of this issue by NRC, this item is considered unresolved (373/85026-02).

b. Applicable Surveillance Procedures

The inspector reviewed Temporary Temperature Monitoring Procedures LLP 84-21 and LLP 84-25 whose purpose was to establish a timetable to monitor the drywell temperatures through the first refueling outage; however, the monitoring was terminated in December 1984. No written procedures were available to address the corrective actions to be taken when temperatures exceeded the TS limits. A procedure was not established to address frequency of data collection or to specify documented evidence to indicate when the data was reviewed by site personnel and transmitted to SNED and S&L for review and analysis of qualified life. No procedure was established requiring inspection of piping and equipment insulation gaps, heat loading, thermal protection, etc., before the drywell is closed for unit restart.

A license engineering evaluation indicated that ambient thermocouple readings near the SRVs are actually 23 degrees lower than component surface temperatures. The licensee failed to account for this temperature differential when evaluating the temperature data and this resulted in the acceptance of temperatures which exceeded maximum allowed values for operability and reliability (reference, Attachment A of procedure LLP-84-21 dated August 8, 1985).

Drywell temperature data was not obtained by CECo from the 35 temporary thermocouples between December 27, 1984, and August 8, 1985. Apparently the CECo Technical Staff engineers decided to stop the monitoring on December 27, 1984. This was contrary to the licensee's intent as noted in Procedure LLP-84-21 Section A to regularly monitor these temporary thermocouples during the first fuel cycle to assure that the qualified life of safety-related components and cables did not degrade beyond pre-defined thresholds.

Based on the above findings, the inspector informed the licensee that the lack of surveillance procedures, inadequate procedures to control the temperature monitoring program and implement corrective actions, and the failure to follow procedures is a violation of 10 CFR 50, Appendix B, Criterion V (373/85026-03; 374/85027-03).

c. Environmental Qualification Program for Safety-Related Equipment in the Drywell

During the exit meeting on September 3, 1985, the licensee presented the NRC with a temperature/time histogram analysis for the Unit 1 SRV solenoids performed on August 30, 1985. This histogram indicated that the remaining qualified life of those components from December 27, 1984, was 13.98 years @ 187°F . This determination was based on NUREG 0588 Category II requirements. The licensee also indicated that a qualified life evaluation had been performed on all safety-related components and cables located inside the drywell to assure that these components and cables have remaining qualified life equivalent to or exceeding the period of the current fuel cycle. During a September 19, 1985, telephone conversation between Region III and CECo, the licensee was asked if the drywell equipment would withstand the conditions of a design basis accident given the known increases in temperature loading in Unit 1 and 2 drywells. The licensee responded that based on its analysis and evaluations the equipment needed to mitigate the consequences of an accident would function as designed and would withstand a design basis accident with the increased temperature loading. This appears to be acceptable.

d. Implementation of Setpoint Changes to CM Recorders

The inspector reviewed the licensee's implementation of the recalculated control room CM recorder setpoints as specified in a S&L letter dated September 28, 1984, for Unit 1, and March 25, 1985 for Unit 2. S&L specified that the instruments were to be set at 145°F for 1TR-CM038, 155°F for 1TR-CM037, 146°F for 2TR-CM037, and 134°F for 2TR-CM038. All alarm points for these instruments were confirmed to be set at 141°F during this inspection.

Modification No. 1-1-84-128 dated November 27, 1984, was issued to implement the change in setpoints for the Unit 1 recorders, and Modification No. 1-2-85-012 dated December 13, 1984, was issued for the Unit 2 recorders. Action Item Record AIR-01-84-58195 dated December 3, 1984, directing these changes was transmitted by LaSalle plant personnel to SNED for review, evaluation and approval. Resolution was requested by January 2, 1985, for Unit 1. AIR-01-85-58017 dated January 28, 1985 was likewise transmitted to SNED for review, evaluation and approval for Unit 2. The AIRs included specified alarm setpoints which were calculated to prevent safety-related equipment from exceeding the EQ threshold temperatures. Resolution was requested by February 18, 1985. As of August 12, 1985, SNED had not acted on these two AIRs. The inspector informed the licensee that this example of lack of timely and prompt corrective action is a violation of the requirements of 10 CFR 50, Appendix B, Criterion XVI (373/85026-04; 374/85027-04).

e. Licensee Commitments

The licensee's commitments as stated in its December 22, 1983, letter were as follows:

(1) An augmented temperature monitoring program will be performed to monitor actual temperatures to assure safety-related equipment does not degrade beyond pre-defined thresholds. This will be performed through the first refueling outage.

(2) The temperature monitoring program will verify that temperature limits are. . . correlated to control room CM monitors to identify drywell hot spots.

(3) Should the temperature in an area where safety related equipment is located exceed the limiting temperature on which the 18-month life is based for that equipment for more than 24 hours, an analysis for continued operation will be completed within seven days or the unit will be temporarily shut down for a visual inspection and correction of the anomalous condition(s). This provision is met through the operation procedures that implement the temperature monitoring program.

(4) A temperature monitoring program has been defined to evaluate the results from the short-term fixes.

Documented evidence was unavailable to demonstrate that the licensee accomplished the above commitments. This item is considered to be a deviation (373/85026-05).

f. Licensee Proposed Drywell Temperature Monitoring Program

During the exit meeting on September 3, 1985, the licensee presented a temporary temperature monitoring program. The program included:

(1) Weekly monitoring of all Unit 1 drywell permanent and temporary thermocouples.

(2) Daily monitoring on Unit 2 of permanent and temporary thermocouples.

(3) All data collected to be transmitted to S&L through SNED for review and evaluation of qualified life of components.

(4) Formalization of the surveillance program to include procedures addressing: frequency of data collection; action required upon loss of a thermocouple; requirements of site review of data; method of transmittal of data to SNED and S&L; time limit for data evaluation; interface with QA program; calibration requirements; inspection of drywell thermocouples; and other applicable requirements.

The licensee agreed to contact Region III prior to the next Unit 1 and 2 shutdown and drywell entry to allow for a visual inspection of electrical components and cables by the inspector.

Based on the licensee's commitments to augment the temperature monitoring program to assure that safety-related equipment and cables do not degrade beyond pre-defined thresholds, and the fact that the licensee concluded that postponement of the modifications would not adversely affect the equipment qualification analysis or file, Region III agrees that the modification deferral is acceptable.

3. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 2.a.(3) and 2.a.(6).

4. Exit Interview

The inspector met with the licensee and contractor representatives denoted in Paragraph 1 on September 3, 1985, and summarized the scope and findings of the inspection. The licensee acknowledged the information. The inspectors also discussed the likely informational content of the inspection 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.