U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-373/92015(DRS); No. 50-374/92015(DRS)

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

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

Facility Name: LaSalle County Station - Units 1 and 2

Inspection At: LaSalle Site, Marseilles, Illinois

Inspection Conducted: June 15 through July 9, 1992

Inspectors: _____ 7-27-92
M. P. Huber Date

_____ 7-27-92
A. Dunlop Date

Approved By: _____ 7-27-92
J. M. Jacobson, Chief Date
Materials & Processes Section

Inspection Summary

Inspection conducted June 15 through July 9, 1992 (Reports No. 50-373/92015(DRS); No. 50-374/92015(DRS))
Areas Inspected: Announced safety issues inspection of the licensee's Inservice Testing Program (TI 2515/110), the licensee's program on check valves (TI 2515/114), and licensee self assessment in these areas.
Results: The inspection disclosed one open item (Paragraph 3.a). No violations or deviations were noted.

The licensee demonstrated a weakness in the following area:

- The programmatic control for tracking and evaluating post-maintenance testing data and completed technical evaluations.

The licensee demonstrated a strength in the following area:

- The use of non-intrusive testing in developing check valve baseline data for determining valve degradation.

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DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*G. J. Diederich, Station Manager
*W. R. Huntington, Technical Superintendent
*J. W. Gieseker, Project Management
*M. G. Santic, Assistant Superintendent of Maintenance
*J. E. Lockwood, Regulatory Assurance Supervisor
*R. Shields, Technical Staff Supervisor
D. A. Spencer, Assistant Technical Staff Supervisor
*M. J. Oclon, Technical Staff ISI/IST Group Lead
*D. Carlson, NRC Coordinator/Regulatory Assurance
*M. A. Smith, Check Valve Coordinator
*D. M. Gullott, IST Coordinator
M. J. Ralph, Diagnostic Testing, Technical Staff
*J. A. Vega, Corporate Check Valve Principal Engineer
*T. A. Hammerich, Technical Staff
*J. Shields, Nuclear Licensing Administration
*J. A. Born, Nuclear Quality Programs
*J. Kocek, Onsite Nuclear Safety

Illinois Department of Nuclear Safety (IDNS)

*J. Roman, Resident Inspector

U. S. Nuclear Regulatory Commission (NRC)

*D. E. Hills, Senior Resident Inspector
G. D. Replogle, Reactor Inspector, RIII
*R. Elliott, Acting Resident Inspector

*Denotes those personnel attending the exit meeting on July 9, 1992.

2. IST Program Developed by LaSalle in Response to Generic Letter (GL) 89-04

The NRC issued Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," on April 3, 1989. CECo submitted the IST program for the LaSalle County Station, Units 1 and 2, by letter dated July 28, 1987. A Safety Evaluation (SE) for the LaSalle IST program was issued by the NRC on August 16, 1988. Subsequent to the issuance of GL 89-04, CECo reviewed the GL to determine its impact on the LaSalle IST Program and associated procedures. Based on that review, LaSalle revised its IST Program and submitted Revision 2 to the NRC by letter dated October 2, 1989. The NRC inspectors

reviewed the licensee's responses to, and the implementation of, the recommendations of GL 89-04.

Conduct of IST was administered by the licensee through the use of surveillance procedures and was controlled by LTP-600-4, "ASME Section XI IST of Pumps and Valves." The procedure provided detailed guidance for the various aspects of IST at LaSalle.

a. Program Scope

Pumps and valves that are safety-related and important to safety are to be tested to ensure they will perform satisfactorily in service. Selected plant systems were reviewed to ensure that the program scope was adequate. Technical Specifications (TS) and Emergency Operating Procedures (EOP) were also reviewed to evaluate the program scope. Based on the inspectors' review, the scope appeared adequate. Manually operated components that were safety-related were also included in the program.

b. Pump Testing

The NRC inspectors reviewed the completed surveillances, various procedures, and program/relief requests for pumps included in the licensee's IST program to determine the extent to which the guidance provided in GL 89-04 was followed. The following observations were noted.

(1) Allowable Ranges of Test Quantities

The allowable ranges of inservice test quantities (flow rate, differential pressure (dp), and vibration) in relation to the reference values used at LaSalle differ from the allowable ranges specified in ASME Section XI (Code) Table IWP-3100-2. The Code allows the licensee to specify reduced range limits in lieu of the ranges given in Table IWP-3100-2 when the Code specified ranges cannot be met. However, justification is necessary for each case where an alternate range was to be implemented.

The licensee established range limits that were higher than the Code specified ranges for dp measurements. The upper ranges established were 105 percent of the reference value for the alert range and 106 percent of the reference value for the required action range. Justification for the expanded ranges was that apparent changes in pump

performance could only be caused by the cumulative effect of the pressure and flow instrument tolerances. The NRC inspectors informed the licensee that instrumentation inaccuracy is not adequate justification for expansion of pump test ranges. However, the expanded ranges for test parameters included in ANSI/ASME OM-6, which were greater than those the licensee had established, had been accepted by NRC. Therefore, to address concerns about the expanded ranges used in lieu of the allowable ranges specified in Table IWP-3100-2, the licensee committed to submit a request for relief from Table IWP-3100-2 and use the ranges specified in ANSI/ASME OM-6. The licensee indicated that the programmatic and procedural changes needed to implement the change would be completed by the September 1992 refueling outage.

(2) Analysis of IST Results

When an ASME Section XI pump has undergone maintenance which may have affected the reference values, new values need to be determined or the previous values reconfirmed by an inservice test prior to return of the pump to operable status. At LaSalle, normally the "applicable portions" of the operating surveillance were performed following maintenance to acquire the "baseline data" (reference values) and determine operability. If the post-maintenance test (PMT) data was within the acceptance criteria of the operating surveillance, the test was considered acceptable and the pump could be considered operable prior to a thorough review of the data by the IST Coordinator.

Based on discussions with the licensee, the NRC inspectors noted that the review of PMT results by the IST Coordinator may not occur in a timely fashion. The IST Coordinator's review needs to be timely to ensure that pump performance characteristics that may be different from previously established reference values are addressed. Changes may need to be implemented in surveillance procedure acceptance criteria used for operability determinations, trending data, and other programmatic records of tests prior to the next scheduled surveillance. The inspectors considered the licensee's programmatic controls in this area to be weak. This could result in a completed PMT that, although the results met the acceptance criteria, had pump performance

characteristics that required a new set of reference values.

Reference values were normally recorded on LTP-600-4, Attachment C, "Technical Review of Pump Performance Parameters." However, the vibration reference values for the standby liquid control and water-leg pumps of the high-pressure core spray and low-pressure core spray systems were not easily retrievable. The ASME Code Section XI requires that IST plans include the reference values. It was determined that the licensee had no method to track PMT results or technical reviews of pump performance parameters. Additionally, LTP-600-4 did not have controls to preclude untimely technical evaluations.

The programmatic control for tracking and evaluating PMT surveillance data and completed technical evaluations was considered a weakness. The licensee initiated Action Item Requests (AIR) to revise the procedures to better control the ASME Section XI reviews.

c. Valve Testing

The inspectors reviewed IST procedures and completed IST surveillances. Generally, the test methods used for testing of valves were adequate. The test frequencies and acceptance criteria were specified and provisions were made for prompt operability determinations. Some problems were noted and are discussed below.

(1) Position Indication Testing (PIT)

Nuclear Quality Programs (NQP) conducted a surveillance (QAS 01-91-001) of the IST program at the end of 1990. The inspectors reviewed the results and concluded that the scope and performance of the assessments were of good quality and several findings were identified and in most cases adequately resolved. The exception was the response to Items 9 and 10 which concerned position indication tests (PIT) for several valves in LOS-PC-Q2. The finding stated that there was no documented objective evidence that PITs were being performed. Section XI of the ASME Code, Subsection IWV, IWV-3300 requires that valves with remote position indicators be observed to verify that valve operation is accurately indicated. The response stated that PITs were performed on the

valves when they were stroke timed from the control room; however, as stated in the finding, no documentation exists to verify that the test was performed. The licensee committed to revising the procedure to include specific documentation of PITs.

(2) Scram Discharge Volume Vent and Drain Valves

The scram discharge volume vent and drain valves 1(2)C11-F380, 381, 388, and 389, are air-operated valves that the Code required a full stroke exercise and stroke time test quarterly. In the IST Program submitted to NRC by letter dated July 27, 1987, the licensee requested relief from measuring the stroke time of these valves quarterly and proposed to measure stroke time of the group of valves during refueling outages. The Safety Evaluation Report (SER) issued by NRC dated August 16, 1988, denied the relief request. In Revision 2 of the IST program, the licensee submitted a request for relief from the requirement to measure the individual stroke time of each valve. The alternate testing proposed was a full stroke exercise quarterly without timing.

This relief request was submitted prior to the issuance of GL 89-04 and generic approval would have been granted by the NRC if the relief request complied with the three conditions listed in GL 89-04, Section B, "Programs Currently Under NRC Review". The third condition stated that the relief request "conform with the applicable Code requirement or the staff approved alternate testing in Attachment 1, Positions 1, 2, 6, 7, 9, and 10". Position 7 on testing individual control rod scram valves stated, in part, that ASME Code Class valves that must change position to provide a scram function be tested in accordance with the requirements of Section XI except where relief has been granted in a previously issued SER or as discussed in the alternate approved testing.

The inspectors informed the licensee that the testing being performed at LaSalle Station and described by the relief request in Revision 2 to the IST program was not in strict accordance with the Code or GL 89-04, Attachment 1, Position 7. It was also determined that the scram discharge vent and drain valves could be stroke timed individually on a refueling outage frequency. Based on this information, the licensee agreed to

perform the individual stroke time testing while maintaining a quarterly exercise schedule and initiated a deviation report to track the required programmatic and surveillance procedure changes.

(3) Normally Closed Check Valves

Although the Code does not require closure tests for passive valves, step F.2.d. of procedure LTP-600-4 stated that the closure function for normally closed check valves would be verified periodically if a normally closed check valve had a safety function in the closed position. However, check valves whose safety function was to remain closed and for which seat leakage was not limited to specific maximum amount were not being closure tested as stated in the procedure.

The licensee considered closure tests a good practice and committed to clarify step F.2.d. of LTP-600-4 and revise surveillance procedures to perform closure function verification tests for check valves that were normally closed.

3. Check Valve Program

a. Scope

In response to INPO SOER 86-03, "Check Valve Failures and Degradation," Architect Engineer (AE) Sargent & Lundy performed an evaluation for all CECo stations that determined which check valves should be included in the program. This study was then incorporated into Corporate Nuclear Operations (NO) Directive NOD-TS.9, "Check Valve Directive," dated May 15, 1989. LaSalle's program was adopted from this directive as delineated in procedure LAP-300-30, Revision 2, "Check Valve Preventive Maintenance Program." CECo issued Revision 1 to the directive on February 20, 1992, which the LaSalle Station planned on incorporating into their program prior to the next refueling outage in September 1992.

The check valve program is divided into two parts. The major activities of one part consist of the ASME Code Section XI IST requirements as implemented by LTS-600-22, Revision 1, "ASME Section XI Inservice Testing Check Valve Disassembly and Inspection Program." The second part includes preventive maintenance (PM) activities for valves in selected safety-related and reliability-related systems. PM activities will be revised as part of the optimization phase of the

program. Evaluations will be performed in order to increase or decrease the priority level of a particular valve. These evaluations would be based on past history and results of the program. Several evaluations had been completed and were reviewed by the inspectors. In most cases the priority levels were increased due to past history, while priority levels were only decreased where valve disassembly was not practical.

There were approximately 500 check valves in the IST program and 305 valves in the check valve program. There were 163 valves included in both programs, which was considered an adequate overlap of the two programs. Most of the valves in the IST program that were excluded from the check valve program were 2 inch diameter and smaller valves which the licensee made a corporate decision to exclude. This issue was identified during the NRC audit of the Byron Station check valve program and is discussed in the following paragraph.

During the NRC check valve audit at Byron Station in July 1991, several issues were discussed in the audit report dated September 13, 1991, concerning the program and corporate directive. The licensee's response to these issues, dated November 27, 1991, stated that three issues were generic and would be reviewed by September 1, 1992, for all CECo stations. The first issue concerned the generic exclusion of 2 inch diameter and smaller check valves from the check valve program without addressing criteria such as system cleanliness, operational frequency, chemical stressors or component wear. The second issue was that the corporate directive allowed the use of IST program testing as an indicator of check valve degradation in lieu of preventive maintenance (PM) (i.e., disassembly and inspection (D/I) or nonintrusive testing). This statement was included in LAP-300-30; however, the LaSalle station practice was to perform check valve program PM as scheduled. The third issue identified several containment isolation valves greater than 2 inches in diameter that were in the IST program, but not included in the check valve program. Four 4 inch diameter valves [1(2)HG-007, 1(2)HG-016] fell into this category at LaSalle. The licensee had agreed to review this category of valves at each station using the same criteria as other check valves to determine if they

should be included in the check valve program. These three issues will be considered an open item (50-373/92015-01; 50-374/92015-01) pending the licensee response to these issues and subsequent review by the inspectors.

The scope of the check valve program was consistent with the SOER and had the proper amount of management support. Interactions between corporate and other CECo stations were noted with the quarterly check valve coordinator meetings held to discuss check valve program activities and to exchange information on check valve issues.

b. Design Application Review

The corporate directive included the study performed by AE Sargent & Lundy that determined which check valves should be included in the program. This study was developed from information in INPO SOER 86-03 and EPRI report NP-5479, "Application Guidelines for Check Valves in Nuclear Power Plants." Included in this information was the development of a centralized check valve data base that will be maintained at the corporate level with input from the station. The study was based on criteria such as valve sizing, type, location/orientation, flow stability, and past history. Valves were categorized according to a check valve applicability matrix, where one axis of the matrix was flow stability and the other axis was system severity. The application matrix was used to classify each valve into one of five priority levels. The top two levels, 1 and 2, were the valves determined to be the most likely to experience wear, which should be disassembled and inspected. The next two levels, 3 and 4, were the valves less likely to experience wear or degradation but still required monitoring by diagnostic testing. The last level, 5, consisted of valves not exhibiting failure characteristics, which would be periodically reviewed to determine if the priority level should be increased. The D/I and diagnostic testing would be performed on a repetitive four outage cycle.

Except for the generic exclusion of 2 inch diameter and smaller check valves, the inspectors found that the engineering evaluation was comprehensive, considered appropriate vendor and industry data and information, and provided a rational basis for screening potential problem valves from the total population of check valves analyzed.

c. Preventive Maintenance

Preventative maintenance of check valves was divided into two parts: disassembly and inspection (D/I); and non-intrusive testing (NIT).

A significant amount of D/I was identified as the preventive maintenance requirement for the check valve program. The licensee was using the D/I to gather base line data on each valve. In addition, in most cases, although their program does not require it, NIT was being performed on valves prior to and after D/I. By performing both types of PM, the licensee should be able to validate the results of diagnostic testing. This base line data should be valuable information for the optimization phase of the check valve program that would revise the priority levels of the valves after obtaining sufficient data.

Non-intrusive testing of valves as implemented by LTP-300-19, Revision 0, "Check Valve Non-Intrusive Acoustic Emission Monitoring," has been used extensively in the check valve program to examine for valve degradation. The licensee uses an acoustic monitoring system to identify the disc hitting the seat, backstop, or the side of the valve to detect possible hinge pin problems. The licensee has not identified many valve degradation problems using non-intrusive testing, but where known problems have existed, the licensee was able to identify these problems with the acoustic monitoring equipment. Data from the monitoring equipment was analyzed by a computer program and stored for future reference and trending. Several valves that have failed were being diagnostically tested on a semi-annual basis to check for degradation. Non-intrusive testing was also being performed on check valves that are not included in the program when requested by system engineers due to indications of problems. The use of non-intrusive testing was considered to be a strength.

No formal trending program had been established at this point. The data which could be used in a trending program, however, was being recorded and analyzed. Corporate CECo has stated that in an upcoming revision to the directive, trending guidance would be made available to the stations.

d. Disassembly and Inspection Results

The D/I data sheets (LAP 300-30, Attachment F) along with the check valve inspection outage reports for each unit's last outage were reviewed. Approximately 100 valves were D/I, which included valves in the IST program, check valve program, and additional valves selected due to indicated problems. Approximately 70% of the check valve program level 1 and 2 valves have been disassembled and inspected. The data sheets recorded disc full-stroke tests, as found condition of valve internals, and disposition of recorded conditions. The data sheets did not record, nor did the procedure require, a post reassembly stroke test to verify that the valve was reassembled correctly such that the disc moved freely. Revision 2 to LAP-300-30, however, updated the data sheets to include this requirement.

Valve internal components were not normally measured when valves were disassembled. When degradation was identified, the check valve coordinator revised the work request to require specific measurements to be taken. Work requests reference the administrative procedures and require completion of the applicable data sheets. In most cases, there were no formal maintenance procedures for disassembling valves. As a result of the quarterly check valve coordinator meetings, maintenance procedures developed at CECo stations may be used company wide, as applicable.

In some cases data sheets identified problems; however, valve inspections were considered satisfactory (SAT) with no valve failure noted. In most cases this occurred during the Unit 1 outage in early 1991, while during the Unit 2 outage starting in late 1991, valve failures and as-found conditions were better identified. For example, the Unit 1 LPCS pump motor cooler check valve (1DG036) disc was frozen to the seat, but the inspection was considered SAT. During the Unit 2 outage, valve 2DG036 was found with the disc stuck inside the valve body due to excessive corrosion. In this case a check valve failure was noted and a discrepancy report written. In both cases the valves were repaired or replaced as necessary to return them to an operable condition. Subsequent to these inspections, these valves, which prevent service water backflow through the cooler, were determined not to be needed. A modification to remove these valves had been initiated. Another example was the 1B diesel generator air compressor discharge check valve (1DG049B) disc which only traveled a 1/4 inch inside the valve due to

corrosion. Although the valve was replaced, it was not considered a failure. The same valve on Unit 2 (2DG049B) also would not full-stroke; however, it was identified as a failure and a discrepancy report initiated. A clogged drain line on the air dryers which allowed moisture to flow through the valves caused the corrosion and wear on the valve body and piston. Subsequent NIT also noted that the spring in the piston check valve was causing degradation of the valve. The licensee decided to modify the valves by removing the spring after discussions with the manufacturer, Edward Valve Inc. Although documentation and classification of identified problems could have been better, the corrective actions implemented appeared to be comprehensive.

4. 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. One open item was identified during this inspection and is described in Paragraph 3.a.

5. Exit Meeting

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on July 9, 1992. The inspectors summarized the purpose and scope of the inspection and the findings. The inspectors informed the licensee of one open item identified during this inspection and discussed the likely informational content of the inspection report. The licensee did not identify any of the documents or processes reviewed by the inspectors during this inspection as proprietary.