

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No: 50-373/92002(DRS); 50-374/92002(DRS)

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

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

Facility Name: LaSalle County Nuclear Station

Inspection At: Marseilles, IL 61341

Inspection Conducted: January 13-17 and 21-23, 1992

Inspectors: N. C. Choules 2/10/92
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Maintenance & Outages Section

Inspection Summary

Inspection on January 13-17 and 21-23, 1992 (Reports No. 50-373/92002(DRS); No. 50-374/92002(DRS))

Areas Inspected: Routine, announced inspection of maintenance activities using selected portions of NRC Inspection Procedure 62700 to ascertain whether maintenance was effectively accomplished and assessed by the licensee.

Results: The inspectors determined through a detailed evaluation of the reactor core isolation cooling (RCIC) system, that the system availability was high; the corrective maintenance backlog was low and did not affect operability of the system; materiel condition was good; and surveillance test results demonstrated the ability of the system to operate on demand. Based on the results of the evaluation of RCIC performance; good materiel condition of the plant; ongoing work activities that were

performed well; and the adequate self-assessment of maintenance, overall performance in maintenance was considered good. There were, however, some weaknesses noted in maintenance procedures regarding acceptance criteria.

Six open items were closed; no violations of NRC requirements were identified.

DETAILS

1. Principal Persons Contacted

Commonwealth Edison Company (CECo)

- *G. Diederich, Station Manager
- *W. Betourne, Superintendent, Nuclear Quality Programs
- *S. Henrikson, Maintenance Staff
- *W. Huntington, Superintendent, Technical Services
- *J. Kodrick, Senior Work Analyst
- *J. Lockwood, Supervisor, Regulatory Assurance
- *T. O'Connor, Master Mechanic
- *M. Santic, Assistant Superintendent, Maintenance
- *J. Schmeltz, Superintendent, Production
- *M. Smith, Technical Staff Engineer

U.S. Nuclear Regulatory Commission (NRC)

- D. Hills, Senior Resident Inspector
- *C. Phillips, Resident Inspector
- *M. Ring, Chief, Engineering Branch

*Denotes those present at the exit meeting on January 23, 1992.

Other persons were contacted as a matter of course during the inspection.

2.0 Licensee Action on Previous Inspection Findings

(Closed) Violation 373/89010-01(DRS); 374/89010-01(DRS): Failure to start the emergency diesel generators (EDGs) from ambient temperature conditions as required by Technical Specifications 4.8.1.1.2a.4 and a.5. The inspector reviewed licensee actions to correct this problem, including those described in the response letter dated July 28, 1989. The inspector verified that the licensee had revised procedures LOS-DG-SA1, LOS-DG-SA2, and LOS-DG-SA3, "Diesel Generator Operability Test with Response Time," to require the diesel generators to have been shutdown 24 hours prior to the fast start test. The inspector noted that there was no sign off in the procedures to indicate the 24 hour shutdown requirement had been met; however, the licensee will revise the procedures accordingly. The inspector verified that the fast starts of the EDGs had been made since 1989 using the revised procedures. This item is closed.

(Closed) Violation 373/89010-02(DRS); 374/89010-02(DRS): Failure to test the control circuitry involved in the by-passing of some diesel protection systems for EDG auto starts. Existing surveillance procedures did not provide for the necessary checks. The inspector reviewed licensee actions taken to correct this problem, including those described in the response letter dated July 28, 1989. Correction of this problem required the revision

of procedures LES-HP-102*, LES-HP-202, LES-RH-100, LES-RH-101*, LES-RH-200*, and LES-RH-201. The inspector selected procedures identified by the asterisk (*) and verified that the appropriate changes had been made. This item is closed.

(Closed) Violation 373/8910-03(DRS) 374/89010-03(DRS): Failure to inspect or correct motor operated valves (MOV) that were subject to common mode failures of torque switches made of melamine material as described in a 10 CFR Part 21 report dated November 23, 1988. The inspector reviewed licensee actions taken to correct this problem, including those described in the response letter dated July 28, 1989. The licensee had written nuclear work requests (NWRs) to inspect torque switches for all affected MOVs and the torque switches were changed if necessary. The documentation was reviewed for a sample of MOVs to ensure that the correct torque switches are currently installed. In addition, procedure LES-EQ-112, "Preventive Maintenance Inspection of Motor Operated Valves," had been revised to require the mechanic to verify and record the torque switch color. This item is closed.

3.0 Evaluation and Assessment of Maintenance

The purpose of this inspection was to evaluate and assess maintenance at the LaSalle County Nuclear Station, which was accomplished while Unit 1 was operating and Unit 2 was in a refueling outage. The inspection concentrated on the reactor core isolation cooling (RCIC) system, which has the purpose of supplying high pressure makeup water to the reactor vessel when the reactor is isolated from the main condensor and the condensate/feedwater system is not available. The inspection was accomplished by review of past operating experience results, observation of the materiel condition and ongoing maintenance activities, review of corrective, preventive, and predictive maintenance; review of completed maintenance activities, review of a recently completed reliability centered maintenance (RCM) analysis and evaluation of maintenance backlogs for the RCIC system. Critical electrical and mechanical components and instrumentation selection was based on the results of a probabilistic risk analysis.

The inspectors also observed other maintenance activities and assessed the quality verification process related to maintenance. This was accomplished by review of audits and field monitoring reports, and implementation of corrective actions. Results of the inspection are documented in the following sections.

3.1 Maintenance on the RCIC and other Systems

3.1.1 Materiel Condition and Housekeeping

The inspectors performed general inspections of the plant as well as a detailed inspection of the RCIC system's electrical and mechanical components and equipment, and instrumentation. The Unit 1 RCIC system was out of service for maintenance and testing during the first week of the inspection, but was back in service during the second inspection week. During the walkdown, RCIC equipment and components, as well as adjacent areas, were observed for proper identification, accessibility, scaffolding, radiological controls, and unusual conditions. Unusual conditions included but were not limited to water, oil or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting. The inspectors also verified that NWRs had been initiated for broken or defective equipment. Results of the inspection were as follows:

- o RCIC equipment was generally clean and well kept. Most defective or broken equipment had been previously identified and was tagged with equipment deficiency tags.
- o RCIC equipment identification appeared to be satisfactory and no identification problems were noted.
- o Housekeeping in the areas around and adjacent to RCIC equipment was good and no significant problems were noted.

Plant housekeeping and materiel condition of the general plant, RCIC equipment, and adjacent areas were considered good. The materiel condition appeared to maintain operability of components at a level commensurate with the components' functions and most components in need of repair had been previously identified.

The inspectors also reviewed the availability of the RCIC during plant operations. RCIC system availability was good for both units, with the systems available more than 90% of plant operating time. System down time included periodic system outages for planned and preventive maintenance as well as necessary down time to repair equipment failures.

3.1.2 Evaluation of RCIC History

The inspectors reviewed maintenance work history of selected RCIC components to determine if repeated maintenance problems were adequately tracked and analyzed for root cause. RCIC and other system water leg pumps indicated a frequent occurrence of bearing, seal, and leakage problems. The licensee was working with a contractor and the vendor to improve instructions for

maintenance on the pumps and had two extra pumps available for advance repair as spares. The use of spare pumps is considered to be a good preventive measure, but only if the spares are rebuilt prior to the next pump failure.

The inspectors reviewed calibration records for those instruments used to actuate and isolate the RCIC system, including low and high reactor water levels. The records indicated the instruments were properly calibrated. The licensee maintained a computer history of WRs for instruments. The current RCIC reactor water level instruments (Rosemount Transmitters) replaced the original Static O-Ring switches during May 1990 for Unit 1 and February 1991 for Unit 2. There were no work request histories for any of the current transmitters.

The licensee had recently completed a reliability centered maintenance (RCM) analysis on the RCIC system. The conclusions of the RCM were that the established preventive maintenance (PM) program was such that only a few recommendations were needed to enhance the PM program. The RCM report identified components that had greater than three failures in three years. The inspectors reviewed each of the components with the licensee to determine what was being done to improve the component's performance. The components were as follows:

- E51-C002 Turbine
- E51-C004 Condenser Condensate Pump
- E51-C005 Condenser Vacuum Pump
- E51-F008 Containment Isolation
- E51-F045 Steam Supply Stop Valve
- E51-F063 Isolation MOV
- E51-F064 Isolation MOV
- E51-F360 Turbine Trip/Stop Valve
- E51-F361 Turbine Governor Valve

With the exception of Valves F045, F063, and F064, the licensee had taken corrective actions to improve performance; for the F045, F063, and F064 valves, the only apparent problems were packing leaks and the licensee was still evaluating potential valve packing improvements.

3.1.3 Review of Completed Work Requests

The inspectors reviewed maintenance work requests and maintenance records to determine whether required maintenance was properly executed as specified in maintenance procedures and other requirements.

The PM requirements for the RCIC components were controlled as part of the automated general surveillance (GSRV) system database. The inspectors reviewed the GSRV maintenance requirements and found that the tasks had been completed for the

specific RCIC components reviewed. For Unit 2 components, all GSRV tasks required to be done during the current outage were in fact scheduled for completion during the outage.

The inspectors reviewed 45 completed NWRs on the RCIC system for completeness, accuracy, and technical content. Some of the specific areas evaluated were adequacy of work instructions, engineering and technical support in the resolution of concerns identified during the performance of the work, and documentation of work performed. Observations made in this review were as follows:

- o General -- The acceptance criteria in some maintenance procedures and NWR packages was not always correctly stated. For example, in some packages the acceptance criteria for MOV motor current were stated as specified values. Discussions with licensee personnel indicated that the actual acceptance criteria for motor current was equal to or less than the specified values. An example of this practice was noted on page 8 of the data sheets for procedure LMP-GM-1, which was included in completed NWR L98149. No misinterpretations of acceptance criteria by maintenance personnel were noted due to this practice.
- o General -- Some portions of the copies of a few of the packages reviewed were not readable. For example some portions of NWR L87554 were illegible.
- o NWR L87554 -- The acceptance criteria for maximum motor current for this MOV were exceeded in both the open and closed direction. Maximum motor currents were specified as equal to or less than .495 amps. Recorded values were .51 in both the open and closed direction. There was nothing in the package to indicate that this problem was addressed. A letter from Sargent and Lundy Engineering evaluating this failure was found in NWR package L98149, which was a mechanical package for repair of valve leakage. NWRs L87554 and L98149 were both performed in the same time period.

Except as noted above, the inspectors concluded that the NWRs were generally satisfactory in scope and content. Thorough work instructions were normally provided and post maintenance testing was complete and appropriate. In general, the work performed was adequately documented.

3.1.4 RCIC Work Request Backlog

The inspectors reviewed the backlog of NWRs on the RCIC systems. On January 13, 1992, there was a backlog of 124 NWRs on the Unit 1 and 2 systems. None of the backlog appeared to affect operability of the systems. The backlog consisted of minor modifications, preventive maintenance, 10 CFR Part 21

replacements and corrective maintenance with 109 of the NWRs requiring an outage. The inspectors had a concern with work request L73660, which was originated November 24, 1987, for a small leak on the Unit 2 RCIC turbine trip/throttle valve and had not been completed at the time of the inspection. From discussions with the licensee, the inspectors determined that the licensee had problems getting parts to make the repairs on the valve. The licensee had obtained parts by December 1990 and planned to make the repair during the outage that started in March 1991. The licensee decided not to make the repair during the outage because the valve vendor representative was not available and the leak had not increased. The licensee planned to complete the work request during the current outage.

The inspectors reviewed the backlog of instrument calibrations for RCIC instruments. There was a total of 21 calibrations that the records indicated were overdue. However, 20 of the items were for U-2 and were to be completed during the current outage. The other calibration was not considered a problem.

3.1.5 Observation of RCIC Maintenance Activities

The inspectors observed ongoing work on the RCIC System in electrical, mechanical and instrument maintenance areas. The activities were selected from the daily plan and through discussions with maintenance foremen.

Maintenance was observed to determine if activities were adequately performed and to determine if administrative and technical requirements were followed. Maintenance work activities were assessed in the following areas: work control and planning, management presence and involvement, procedure availability, adequacy and use; personnel training and qualifications, material availability; measuring and test equipment application and calibration; and adequacy of post maintenance testing, including proper acceptance criteria.

The inspectors observed portions of maintenance activities that were performed under the NWRs and surveillances listed below:

L06649 - Rebuild RCIC water pump and balance impeller.

L12470 - Remove, reinstall, and align RCIC water leg pump.

L12584 - Rebuild spare water leg pump.

L71270 - Install new RCIC full flow and water leg pump.

Surveillance - LES-RI-201B "Unit 2 RCIC System Cooling System Relay Logic Function Test".

Surveillance - LIS-RI-11 "RCIC Low Steam Supply Isolation

Response Test".

Surveillance - LOP-RI-06 "Controlled Start of RCIC Pump in the Condensate Storage Tank Mode".

Surveillance - LOP-RI-07, "Replace Oil in RCIC Turbine".

Surveillance - LOS-RI-M1, "RCIC Inservice Test".

Surveillance - LOS-RI-Q3, "RCIC Pump Operability and Valve IST".

Surveillance - LOS-RI-Q4, "RCIC Cold Quick Start".

The inspectors concluded that the maintenance activities in the areas inspected were adequate and were accomplished by skilled maintenance personnel. Parts and materials were available and properly certified. Work instructions were at the job site and were followed. Surveillance test results indicated that the RCIC system was available to perform its functions on demand. There were minor concerns regarding acceptance criteria, precision of measurements, and confusing steps in procedures as noted below:

- o L06649 - Draft procedure LMP-GM-26, "Crane Deming Model 3060 Pump Maintenance," Draft 4, used to repair and rebuild the water leg pump had some conflicting and confusing acceptance criteria regarding shaft measurements, bearing measurements, and clearance fit. Also, there were two places where measurements were only recorded to the thousandth, even though the acceptance criteria required a measurement to the ten-thousandth. These discrepancies were considered significant due to the high incidence of bearing and seal failures on water leg pumps. The licensee took appropriate action to resolve the adequacy of measurements for the water leg pump being worked and revised the procedure to incorporate necessary corrections.
- o LOS-RI-Q3 - Operators encountered confusing steps at the conclusion of RCIC system quarterly operability testing, resulting in a slight delay in completion of the test. While performing procedure LOS-RI-Q3, "RCIC System Pump Operability and Inservice Test," Revision 19, step F.11 directed operators to perform part of procedure LOP-RI-05, without specifying which steps to perform. The operator was confused because most of procedure LOP-RI-05 was not applicable for the system line-up at the time and he appropriately contacted his supervisor for assistance. The supervisor provided guidance on which steps to perform and the procedure was revised to clarify the instructions. The inspectors considered the actions taken to be appropriate.
- o LOP-RI-07 - Operators experienced oil leaks after performing procedure LOP-RI-07, "Replacing Oil in RCIC Turbine,"

Revision 2. After the oil, filter, and gaskets were replaced, the system was run in accordance with LOP-RI-06 and oil was leaking at filter gaskets. The operators tightened the filter and lined up to perform LOP-RI-06 again, at which time the filter gaskets continued to leak. Operators decided to replace filter and gaskets this time and looked for any apparent causes of the leak. The gasket was found to be forced over to one side and pieces of previously used gasket were found in the sealing area. The third time LOP-RI-06 was performed, there were no oil leaks. The system engineer was present during the testing and decided to look into improving steps in the procedure to prevent further leaks. During this third test per LOP-RI-06, the minimum flow valve 1E51-F019 failed, apparently due to excessive cycles. This is discussed further in Section 3.3.2. Because the oil leaks were identified during the post maintenance testing, the safety significance was minor; however, the plant was in a LCO and maintenance on systems should be more efficient during those times.

3.1.6 Observation of Other Maintenance Activities

The inspectors observed portions of seven maintenance activities that were performed under the NWRs and surveillance listed below:

- L04861 - Replace moisture separator temperature recorder.
- L05733 - Replace control switch for DG cooling water pump.
- L07696 - Inspect and clean Reactor Recirculation MG Set.
- L09194 - Remove and replace MSIV actuator.
- L10677 - Inspect wiring lugs in DG panel ODG02JB.
- L97912 - Replace damaged washers on circuit breaker 2VP02CB.
- Surveillance - LIS-06-204 "Offgas Post Treatment Calibration Procedure".

The inspectors concluded that maintenance and surveillance activities in the areas inspected were adequate and accomplished by skilled and knowledgeable maintenance personnel. With one exception adequate procedures and instruction were included in the NWR packages, and maintenance personnel followed procedures and instructions while performing the maintenance activities. The following observation was made:

- L09194 - Instructions provided in draft procedure for MSIV actuator replacements were incomplete. The mechanics did not have some of the special tools and parts required for the job and the procedure did not list these required tools

in the tool list. The inspector discussed this matter with the foreman, who indicated that a comment sheet would be sent to the procedure writers to make the necessary changes.

3.2 Engineering and Technical Support

The inspectors evaluated engineering and technical support of maintenance in the areas inspected. This included system engineering support of MOVs and the RCIC and electrical dc system areas as well as engineering department involvement in resolving maintenance related questions raised during the inspection, which was satisfactory. The RCIC system engineer was actively involved in surveillance testing and resolution of system failures and operational problems, but was less involved in actual support of maintenance on components. System engineers were not always knowledgeable of possible generic problems and issues related to the assigned system; nevertheless, the system engineers did seem to have ownership responsibilities for the systems and no examples of inadequate support were noted. The MOV system engineer's knowledge and support of maintenance and testing was good.

The inspector noted that NWR L97022 was designated as non-safety related. The inspector questioned this classification because the RCIC electrical schematics indicated the system was safety related. The engineering evaluation report from Sargent and Lundy Engineers included the statement, "The reactor core isolation cooling system is nonsafety-related," which conflicted with design drawings and the safety analysis report. Discussions with licensee personnel, including the RCIC system engineer, indicated that confusion existed as to the safety classification of this system. A re-evaluation of the valve safety classification was performed during the inspection and the valve function and safety classification were resolved. The confusion as to the proper safety classification of the RCIC system appeared to be due to a lack of communication and definition within engineering. The safety classification of RCIC components, as indicated on the NWRs reviewed during the inspection, were appropriately classified per the applicable design drawings.

Temporary changes 1-0495-89 and 2-0531-89, which changed the primary suction for the high pressure core spray (HPCS) system, were installed June 3, 1985 and May 25, 1985, respectively. These changes were still considered temporary even though the changes had been installed for more than six years. Permanent modifications were to be completed during the current outage. The temporary system change log had a number of temporary changes that had been in place for several years. The inspectors were concerned that the licensee was carrying temporary system changes for long periods of time without resolution or conversion to

permanent modifications. The inspectors were told that a concentrated effort was being made to reduce the number of temporary changes with emphasis on the older ones. Personnel also stated that the number of temporary changes was decreasing and that the number had declined in the recent past.

An engineering performance monitoring group used vibration and oil analysis techniques for the RCIC and other plant systems. There were no specific instances noted where these methods had detected impending failures or significant problems for RCIC components, but the programs appeared to be good tools for the analysis of plant equipment conditions and the early detection of equipment problems. Overall, engineering and technical support was determined to be satisfactory.

3.3 Licensee Assessment of Maintenance (Quality Verification)

The inspectors reviewed field monitoring reports, two audit reports, corrective action documents, and three monthly onsite nuclear safety reports to evaluate the licensee's quality verification process. The documents were reviewed for root cause analysis, timely corrective action, technical assessments, and justification for close out of corrective action documents.

3.3.1 Audits, Field Monitoring and Onsite Nuclear Safety Reports

The inspectors reviewed one maintenance audit report (01-91-02) performed by the Nuclear Quality Program (NQP) organization on June 10-28, 1991, several field monitoring reports performed during 1991 by NQP and three monthly reports for July, September, and October, 1991, published by the onsite Nuclear Safety Group. The inspectors also reviewed a comparative audit report performed by the company maintenance team. Many maintenance activities were observed during the audits and the field monitoring. Other areas of maintenance such as plant materiel condition, procedures, work planning, training and completed work requests were reviewed during the audits and field monitoring. Findings and observations resulted from the audits and field monitoring reports. The Nuclear Safety Group looked at reactor scrams, equipment problems and failures, and emergency safety feature actuation and the results were documented in monthly reports. The inspectors concluded that the licensee provided good quality verification in the maintenance area.

3.3.2 Corrective Actions

The inspectors reviewed the results of two corrective action and nonconformance audits and an audit of maintenance. In addition, the actions taken to determine and correct the cause of two recent hardware problems were reviewed.

- o Corrective Action and Nonconformance Audits -- The inspectors reviewed two corrective action and nonconformance audit reports (01-91-08 and 09) performed during March 15 - April 15, 1991, and September 20 - October 16, 1991, respectively. The audits reviewed noncompliance reports, deviation reports, discrepancy reports, NRC commitments, INPO commitments, and corrective action commitments from previous audit deficiencies. The audits each resulted in one finding and one unresolved item which indicated that most of the licensee's corrective actions were complete and timely.
- o Maintenance Audit -- The inspectors reviewed the licensee's corrective action records from the maintenance audit conducted in June 1991. Corrective actions were generally adequate and timely, which facilitated timely closeout of most of the findings. The inspectors noted that quality assurance followup on audit findings was aggressive. For example, most findings were reviewed once a month until the finding was closed.
- o Hardware Failures -- The inspectors reviewed the action taken to determine and correct the cause of the failure of Unit 2 "A" LPCS injection valve (2E12-F042A) motor as documented on NWR L12541 and the failure of the Unit 1 RCIC mini-flow valve (1E51-F019) as documented on NWR L12933. Actions taken on NWR L12541 had been completed and appeared to be adequate. Actions on NWR L12933 were still in progress. Since the valve was an isolation valve required for Unit 1 operability, actions were proceeding cautiously in order that the operation of Unit 1 would not be jeopardized.

Overall, the corrective actions taken to determine and correct the cause of maintenance related problems and hardware failures appeared to be adequate and well controlled.

4.0 Conclusions

Based on the results of the inspection activities described in this report, the inspectors concluded that maintenance was effective and no safety issues were identified.

5.0 Exit Meeting

The inspectors met with licensee representatives (denoted in Paragraph 1) at the LaSalle County Nuclear Station on January 23, 1992, to summarize the purpose, scope, and findings of the inspection. The inspectors discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee identified the detailed methods of analysis of the RCM

evaluation for the RCIC system as proprietary. The conclusions and recommendations of the evaluation were noted as being non-proprietary. No other documents or processes were identified as proprietary.