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ComEd

November 25, 1996

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Licensee Event Report #96-008-01, Docket #050-373 is being submitted to your office in accordance with 10 CFR 50.73(a)(2)(i). This supplemental report updates the Corrective Action section.

Respectfully,

D. J. Ray
Station Manager
LaSalle County Station

Enclosure

cc: A. B. Beach, NRC Region III Administrator
M. P. Huber, NRC Senior Resident Inspector - LaSalle
C. H. Mathews, IDNS Resident Inspector - LaSalle
F. Niziolek, IDNS Senior Reactor Analyst
INPO - Records Center
DCD - Licen[illegible]g (Hardcopy: Electronic:)

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 05/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
LaSalle County Station Unit One	05000373	1 of 7

TITLE (4)
Foreign Material Injected Into Service Water Tunnel Causes Dual Unit Shutdown Due to Inadequate Work Control

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									LaSalle County Station Unit Two	05000374
06	28	96	96	008	01	11	25	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	2
POWER LEVEL (10)	001

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(iii)	☐ 73.71(b)
☐ 20.2203(a)(1)	☐ 20.2003(a)(3)(ii)	☐ 50.73(a)(2)(iv)	☐ 73.71(c)
☐ 20.2203(a)(2)(i)	☐ 20.2003(a)(4)	☐ 50.73(a)(2)(v)	☐ OTHER
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)	☐ 50.73(a)(2)(vii)	
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
☐ 20.2203(a)(2)(iv)	☒ 50.73(a)(2)(i)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2003(a)(2)(v)	☐ 50.73(a)(2)(ii)	☐ 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Dennis Pristave, System Engineering	(815) 357-6761 Extension 2081

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

☐ YES (If yes, complete EXPECTED SUBMISSION DATE)	☒ NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR	

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines 16)

At 2315 hours on June 28, 1996, with Unit 1 at 1% power and Unit 2 at 100% power, the station declared all Core Standby Cooling Systems (CSCS), Emergency Core Cooling Systems (ECCS), and Diesel Generators (DG) inoperable due to foreign material identified on the floor of the service water tunnel. The tunnel is the source for the Essential Service Water System, Non-essential Service Water Systems and the Fire Protection systems. The foreign material had the potential to cause a common mode failure of the Essential Service Water System. Although the systems were declared inoperable, they were available. The foreign material was an injectable sealant foam substance which had been used since May, 1996, in the Lake Screen House (LSH) to seal water seepage cracks in a portion of the floor of the building (the ceiling of the service water tunnel). After the units were shutdown, sealant material was removed from the tunnel. Systems and components which would have been affected by the foreign material were inspected, cleaned and tested to verify operability prior to returning the units to service.

The cause of the event was a breakdown in the procedural and work control process. The LSH crack repair had been incorrectly classified as minor facility maintenance and had not been adequately reviewed as a nuclear work request. Weaknesses in the policies and procedures for control of work of minor maintenance actions were identified and corrective actions scheduled.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

A. CONDITION PRIOR TO EVENT

Unit(s): 1/2 Event Date: 06/28/96 Event Time: 23:15 Hours
Reactor Mode(s): 2/1 Mode(s) Name: Startup/Run Power Level(s): 001/100%

B. DESCRIPTION OF EVENT

On May 21, 1996, workers began sealing cracks in the walls and floors of the Lake Screen House with an injectable sealant. This work was being done to stop ground water inleakage and prepare the building for painting. The work continued through June 21, 1996. The activity, evaluated to be minor maintenance work, was performed under an action request by the Station's Consolidated Facility Maintenance(CFM) group using contractors experienced with this type repair.

The process for performing the crack repair normally required drilling holes on each side of a crack along its length and injecting an expandable sealant into these holes to seal the crack. Cracks of 3 feet to 9 feet long were being repaired. Normally, this process would not require any drilling through the wall or floor. However, if a void was found, as indicated by excessive amounts of water, then the practice was to drill through near the crack and inject to fill the void. The sealant used would expand and block further water intrusion.

While doing floor repairs, the workers started fixing cracks on the top or ceiling of a service water tunnel which runs the length of the building approximately 20 feet below lake level (see sketch). This tunnel supplies cooling water to both the non-essential and essential(safety-related) cooling water pumps at the plant. As they repaired these cracks, the large amount of water at pressure indicated to the workers that a large void was present. The workers believed that they were working on a concrete floor laid over soil. They proceeded to drill five holes through the ceiling of the service water tunnel and inject sealant. Instead of being injected into a void under the building floor, the material was injected into the tunnel accumulating on the ceiling and floor or dispersing into the cooling water.

On June 19, 1996 with both units at approximately full power, high differential pressure occurred on the on-line non-essential service water strainers(WS)(KG). Operators also observed that service water header pressure had decreased below normal. Upon inspection, two of the three strainers were found in automatic backwash but failures on the backwash valve actuators and/or binding of the strainer basket diverters prevented proper flushing of accumulated material. Power reductions were done on both units to approximately 850 MWe to reduce the service water heat loads and isolate each strainer, one at a time, to repair the valve actuators and free the diverter.

Following this, the operators were able to manually backwash each strainer successfully. The initial investigation into what caused the high differential pressures identified that "corn cob" material used for sandblasting the exterior of the Lake Screen House was the potential problem. A large amount of this material was along the outside walls of the building and it was postulated that the material could have gotten into the water and been pulled into the strainers. Operators were stationed to periodically backwash the strainers and a contingency established to trip the units if service water header pressure could not be maintained.

On June 24, high strainer differential pressure occurred again on the on-line non-essential service water strainers. Prior to this, Operating had been conducting normal surveillance tests on the OA and OB Diesel Fire pumps (FP) [KP]. These pumps take their suction from the service water tunnel. After the OA pump was tested satisfactorily, the OB pump test was unsuccessful when the pump had to be stopped five minutes into it's run due to high cooling water temperature, an indication of a possible flow blockage. The OB and the OA Diesel Fire Pumps were declared inoperable at 0927 hours and Unit 1 and 2 were reduced in power to 850 MWe to reduce cooling water demand.

Based upon the observation of sealant material in the trash basket which collects the strainer backwash water and through discussions with the workers performing crack repair in the Lake Screen House, it was now concluded that sealant material was the probable cause of the problems with the strainers and fire pumps, not the corn cob material. When the strainers were again backwashed, it became clear from the material collected in the flush water that sealant material was the predominant foreign material. Chemical analysis of samples collected from several locations including the OB Diesel Fire Pump confirmed this. These samples did not reveal any "corn cob" material.

Along with this evaluation, further inspections of the tunnel and strainers were scheduled. In addition, the Residual Heat Removal (RHR) [BO] and Diesel Generator Service Water Systems were run to verify operability with satisfactory results. An Operability Evaluation was performed. Information was obtained from the vendor as to the expected behavior of the sealant when injected into the service water tunnel. This information indicated that the sealant would expand in the tunnel and that the resulting mass would float. Based on this, the evaluation concluded that there was no risk to the Essential Service Water System. This was determined by the fact that the material floated, that the suction points from the service water tunnel were relatively low in the tunnel, and given the velocity of water in the tunnel, it was not probable that floating material would be drawn into the pumps suction supply lines. A compensatory action taken was to bring two diesel fire pumper trucks on site to back up the non-essential service water pumps as the source of water for fire suppression. This equipment was manned on a round the clock basis. This action was taken because the diesel fire pumps had previously been declared inoperable.

On June 25, inspections in the Service Water Tunnel were started using divers and, later, robotic inspection equipment. Due to diver safety considerations, the first inspection was restricted to the area around the bottom of the ladder in the Service Water Tunnel. The diver inspection was delayed one day because of a unit 1 SCRAM on June 26. The SCRAM was not related to the sealant material in the service water tunnel. Divers with robotic equipment

reentered the Service Water Tunnel on June 27. They noticed sealant material attached at the top of the Service Water Tunnel but did not find sealant on the tunnel floor. On June 27, a Unit 2 service water strainer was inspected. This strainer is supplied by pumps close to where the sealant was injected. There were no signs of plugging and no signs of damage. Using this information together with the successful surveillance tests, the Operability Evaluation was completed on June 28, 1996 indicating that Essential Service Water systems were operable. Later that day divers encountered sealant material on the floor of the tunnel. The discovery that the sealant did not float invalidated the Operability Evaluation and as a result the Essential Service Water systems Core Standby Cooling System [VF], Emergency Core Cooling System, and Diesel Generator Cooling Water System were declared inoperable at 2315 hours on June 28, 1996. Unit 1 was at approximately 1% core thermal power in the startup mode at the time and Unit 2 was at 100% core thermal power. To comply with Technical Specification 3.0.3, Unit 1 was manually scrammed at 2338 and Unit 2 was reduced in power to 5% and manually scrammed at 0528 on June 29, 1996.

The station requested a Notice of Enforcement Discretion (NOED) to allow both Units to remain in Hot Shutdown until July 9, 1996, to maximize decay heat removal capability and minimize the probability of the material entering the essential service water system while cleanup and removal of the material were performed. This request was granted.

Extensive inspection and testing of plant equipment were performed to identify the presence of sealant material. Approximately eighty cubic feet of the material was removed, mostly from the tunnel. Some material was found in the essential service water equipment including large pieces in one of the residual heat removal service water strainers (Unit 2, Division I). Following successful cleanup and testing of affected equipment, the units were returned to service

This event is reportable in accordance with 10 CFR 50.73(a)(2)(i) because of entry into Technical Specifications 3.0.3.

C. CAUSE OF EVENT

The root cause of this event is that work affecting plant safety related structures was assigned and performed outside the controls of the Nuclear Work Request Process. This occurred when the work was approved without identifying a potential impact on the Seismic Category 1 Service Water Tunnel or the Service Water System from the sealant injection process used in concrete crack repairs and resulted in the work not being reviewed by Engineering. The sealant work being performed was considered "Materiel Condition" repair and incorrectly assumed to be non-intrusive. The workers were using "craft capability" to perform the sealant work, no Work Package was generated for the work. Two Action Requests (ARs) were used as the authorization for the repairs. Crack repair work was performed on walls as well as the floor at the Lake Screen House but also on the Seismic Category 1 Service Water Tunnel.

D. ASSESSMENT OF SAFETY CONSEQUENCES

This event resulted in degradation of station Non-Essential and Essential Service Water Systems and the Fire Protection Systems. The degradation occurred due to the presence of injectable sealant material which was free to move within the Service Water Tunnel. Since the material was free to move, in the event that Essential Service Water Pumps were required and had started, a loss of Essential Service Water could have occurred. In this case, the event is Safety Significant, and resulted in increased risks to the facility. The injected material created the potential for a common mode failure of Essential Service Water and Fire Protection Systems. However, the actual consequences of the event were minimal because the both units were maintained in a hot shutdown condition which did not require the use of essential service water pumps. By not operating these pumps, significant amounts of foreign material were not pulled into these systems. In addition, the residual heat removal and diesel generator service water systems were tested during the event with satisfactory results.

E. CORRECTIVE ACTIONS

1. Floor and wall repair work in the Lake Screen House was stopped.

2. The service water tunnel was cleaned and inspected.

3. Essential Service Water Systems and balance of plant equipment that could have been impacted by the intrusion of sealant were inspected, cleaned and tested to ensure that the systems and equipment would function as designed.

4. The structural integrity of the Seismic-Class I service water tunnel was evaluated to ensure that repair activities had not degraded the structure.

5. An Engineering Policy was published which outlined repair and controls associated with building structural repairs and use of sealants as a temporary or permanent repair requiring engineering review and approval.

6. Procedures and guidance documents were revised to ensure consistent direction is provided to personnel when assigning, preparing, and supervising work of this nature (sealing). The following documents were revised: LAP-1300-1, Work Request Procedure; LAP-240-6, Temporary Alteration Procedure; and Maintenance Memo 600-4, Use of Furmanite. Specifically, all "sealant" activities are now required to go through the Nuclear Work Request Process.

7. Appropriate Maintenance, Operations, and CFM personnel were coached on the expectations regarding sealant type work and the new engineering policy.

8. The Action Request (AR) screening review process has been changed to include multi-discipline involvement.

9. The Station has prepared and implemented a Consolidated Facilities Maintenance (CFM) Responsibilities Administrative Controls document to clearly delineate work scope boundaries and process limitations of the CFM organization. Guidance was provided to clearly outlines supervisory responsibilities for acceptance of work assignments within the area. This document also provided clarification of the expectation that Maintenance LAPs and Memo's application to the CFM organization.

10. Clear identification (by signs or other measures) of the operational safety significance of the Service Water Tunnel and Lake Screen House floor has been completed.

11. An investigation of this event was performed by an independent Corporate group and a report issued on September 11, 1996. The conclusions of the review basically corroborated the initial root cause as documented in Revision 0 of this document. Four fundamental causes cited in the report are inadequate change management for processes, weak problem identification and evaluation, weak event management and weak oversight performance. Key corrective actions in response to these fundamental causes are:

    a) The Action Request (AR) Screening Process has been improved to include a multi-discipline review of ARs. This review verifies that the ARs contain adequate information, address facility impact, properly classify work, indicate task priority, and are appropriately assigned.

    b) Station procedures have been revised to comply with existing ComEd standards for root cause investigations.

    c) We have reinforced the role of senior management as one of oversight and critical review of decisions made.

    d) The roles and responsibilities between Operations and Engineering for the Operability Assessment and Evaluation Process have been clarified.

12. An EPN assigned coding or equivalent system to accurately and easily determine structures and non-system specific components which may be safety, seismic, or regulatory related will be developed. This system will be part of the Q-List (or other engineering controlled document) and EWCS data base. This action will enable simple and accurate decision making when performing screening of new work through the EWCS System.

F. PREVIOUS OCCURRENCES

LER NUMBER	TITLE
None	

G. COMPONENT FAILURE DATA

Since no component failure occurred, this section is not applicable.

Lake Screen House Cross-section View