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AEP
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POWER

September 11, 2000

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating Licenses DPR-58 and DPR-74
Docket Nos. 50-315 and 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

LER 315/1998-059-01, "Single Failure In Containment Spray System Could Result In Containment Spray pH Outside Design."

This revision replaces LER 315/1998-059-00 in its entirety, and is submitted to provide the results of the root cause investigation.

No commitments were identified in this submittal.

Should you have any questions regarding this correspondence, please contact Mr. Wayne J. Kropp, Director Regulatory Affairs, at 616/697-5056.

Sincerely,

A. Christopher Bakken, III
Site Vice President

/mbd
Attachment

c: J. E. Dyer, Region III
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IE22

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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)
Single Failure In Containment Spray System Could Result In Containment Spray pH Outside Equipment Qualification Design

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION N	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	30	1998	1998	059	01	09	11	2000	Cook Nuclear Plant Unit 2	05000-316
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5
POWER LEVEL (10)	0%

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

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
M. B. Depuydt, Regulatory Compliance	(616) 465-5901 x1589

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

This revision replaces LER 315/98-059-00 in its entirety. This supplement is being issued to include the results of the root cause investigation.

In December 1998, plant personnel identified a potential single failure in the Containment Spray System (CTS) that could result in loss of sodium hydroxide chemical addition to one train of CTS during the injection phase. On December 30, 1998, it was determined that this potential single failure could expose equipment in the containment to a pH lower than the 8.5 to 12.9 pH range that it had been qualified to withstand. This was determined to represent a condition outside the design bases. This LER is submitted in accordance with 10 CFR 50.73 (a)(2)(ii)(B) as a condition outside the design bases of the plant.

A root cause could not be determined because limited information is available today relating to the specific single failure design decisions during the original CTS design. The most likely root cause was determined to be that the potential failure mode was not considered in the CTS design. Immediate corrective actions were not required, since the plant was shut down and CTS was not required.

An evaluation was performed for equipment in the environmental qualification program exposed to CTS spray without sodium hydroxide addition. It was determined that this equipment is qualified for spray without the chemical additive and that protective coatings and structures will perform their functions in this environment. Since structures, systems and components will perform their safety functions when exposed to CTS spray without additive, it has been concluded that the identified condition is of minimal safety significance.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

CONDITIONS PRIOR TO EVENT
Unit 1 Mode 5, Cold Shutdown
Unit 2 Mode 5, Cold Shutdown

DESCRIPTION OF THE EVENT
In December 1998, a postulated single failure in the Containment Spray System (CTS) related to sodium hydroxide addition was identified that could result in spraying water into the containment with a pH different than analyzed. If the motor operated sodium hydroxide eductor supply valve failed closed on one train, flow through the eductor piping would be isolated and the addition of sodium hydroxide would be affected on that train. The resulting CTS spray from the affected train would have a pH outside the current range for environmentally qualified (EQ) equipment inside containment.

The CTS eductor supply valves are motor operated valves. The valve control circuit open and close relays have an ungrounded "double break" contact design. This ungrounded "double break" contact circuit design is credited with preventing spurious operation of motor operated valves. Level switches on the spray additive tank function to actuate a relay in the valve control circuit to close the valve on a spray additive tank low level. This part of the valve control circuit does not have the "double break" contact design. Based upon this, the open and close relay valve control circuit sections cannot be credited in preventing the valve from failing to the closed position, and this lends credibility to the postulated event. A malfunction at the level instrumentation area of the valve control circuit could cause the valve to fail closed. Possible malfunctions in the electrical control circuit would include an electrical short across the non-double break contact or a malfunction of the level switches.

On December 30, 1998, it was determined that the potential loss of sodium hydroxide addition during the injection phase of a Loss of Coolant Accident (LOCA) represented a condition outside the design bases. This LER is submitted in accordance with 10 CFR 50.73 (a)(2)(ii)(B), and replaces LER 315/98-059-00 in its entirety.

CAUSE OF THE EVENT
The root cause for this condition could not be identified because limited information related to original CTS design activities is available today. The most likely cause was determined to be that the postulated failure mode was not considered in the CTS design, and the potential for this type of failure has existed since original plant design.

ANALYSIS OF THE EVENT
The CTS operates in response to a LOCA or Main Steam Line Break inside containment. Sodium hydroxide solution from the spray additive tank is added to the spray using an eductor for each train of CTS. The volume of the spray additive tank is sized so that, when its complete volume is educted into the containment, CTS spray and sump pH are within established limits. In the postulated event that a single valve supplying CTS flow through the eductor for one CTS train fails closed, chemical addition to that train would be stopped. Lack of sodium hydroxide addition results in borated water from the Refueling Water Storage Tank (RWST), with a pH of 4.5, being sprayed on components inside containment from the affected CTS train. The equipment in the containment is qualified for a pH range of 8.5 to 12.9. Therefore, spray from the affected train would have a pH outside the equipment's qualified range.

An evaluation was performed to determine the pH range to which EQ equipment in the containment could be qualified. This evaluation included the determination that EQ equipment could be qualified for a pH as low as 4.3 for 30 days in addition to the previous range of qualification. This range covers the possible pH from CTS spray without spray additive in the postulated event described in this LER. This evaluation also established that protective coatings and structures will retain their functions for the same ranges of spray pH and time. Since structures, systems, and components can be relied upon to perform their safety functions for this injection phase spray without additive, this condition has minimal safety significance.

Problems associated with containment sump pH were reported in the LER 315/98-020 series, "Containment Recirculation Sump pH Upper Limit Exceeded Due to Analysis Input Omission", and will not be discussed here.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

CORRECTIVE ACTIONS

No immediate corrective actions were necessary as the units were in cold shutdown at the time of discovery.

An evaluation was performed to determine the pH range to which EQ equipment in the containment could be qualified. Part of this evaluation determined that EQ equipment can be exposed to a spray pH as low as 4.3 for 30 days and still function.

The impact of the single failure postulated in this LER on radiological consequence analyses was examined. The method used to determine iodine removal rates for spray does not credit the positive effect of spray additive. The elemental iodine removal rate is conservatively reduced during the recirculation phase to address the loading of the re-circulating solution with elemental iodine. Sump pH analysis with the postulated single failure has determined that the sump pH remains above 7.0 during the recirculation phase for long term iodine retention in the sump solution. Therefore, this postulated single failure does not affect the radiological analyses.

As previously stated in correspondence AEP:NRC:1260GH, dated March 19, 1999, "Enforcement Actions 98-150, 98-151, 98-152 and 98-186, Reply to Notice of Violation Dated October 13, 1998," a comprehensive review of systems with significant safety impact was to be performed to insure that single failure has been adequately included in the design bases. This review was tracked as Restart Action Plan # 3D, "Inadequate Consideration for System / Component Failure Modes." The NRC has completed their evaluation of the adequacy of the corrective actions taken and planned, and has closed this action.

SIMILAR EVENTS

315/98-019-02
315/98-031-01
315/98-029-00
315/98-046-00
315/88-014-00
315/87-024-00
315/87-020-00
315/98-049-00