



November 22, 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 315/1998-045-01, "Insufficient Deliverable Volume in Containment Spray System Chemical Additive Tank"

This revision replaces LER 315/98-045-00 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 handwritten signature in black ink that reads 'Joseph E. Pollock'.

Joseph E. Pollock
Plant Manager

/bwo
Attachment

- c: J. E. Dyer, Region III
- D. Hahn
- B. A. McIntyre
- T. P. Noonan
- A. C. Bakken III
- R. P. Powers
- R. Whale
- NRC Resident Inspector
- Records Center, INPO

Handwritten initials 'JED22' in black ink, located in the bottom right corner of the page.

NRC Form 366 (6-1998)	U.S. NUCLEAR REGULATORY COMMISSION <h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 0;">(See reverse for required number of digits/characters for each block)</p>	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 <small>ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND 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</small>
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FACILITY NAME (1) Donald C. Cook Nuclear Plant Unit 1	DOCKET NUMBER (2) 05000-315	PAGE (3) 1 of 3
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TITLE (4)
 Insufficient Deliverable Volume in Containment Spray System Chemical Additive Tank

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	
10	09	98	1998	-- 045 --	01	11	22	2000	Cook Plant Unit 2	05000-316	
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)											
OPERATING MODE (9)	5		20.2201 (b)			20.2203(a)(2)(v)			50.73(a)(2)(i)	50.73(a)(2)(viii)	
POWER LEVEL (10)	0		20.2203(a)(1)			20.2203(a)(3)(i)			<input checked="" type="checkbox"/> 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 Rhonda Allen, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) 616 / 465-5901, x2027
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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 SUBMISSION DATE (15)				
<input checked="" type="checkbox"/> YES	(If Yes, complete EXPECTED SUBMISSION DATE)				<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO	MONTH	DAY	YEAR

Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)
 This revision replaces LER 315/1998-045-00 in its entirety. This supplement is being issued to include the results of the apparent cause investigation.

On October 9, 1998, an issue was identified regarding the minimum deliverable volume from the Containment Spray System (CTS) Spray Additive Tank (SAT), as to whether sufficient sodium hydroxide (NaOH) would be available for the duration of the injection phase following a Main Steam Line Break (MSLB) inside containment. Lack of sufficient NaOH to last through the injection phase could expose environmentally qualified (EQ) equipment in the containment to a CTS pH lower than the range used for environmental equipment qualification. On October 23, 1998, it was determined that this condition represented a condition outside the design bases, reportable under 10 CFR 50.73 (a)(2)(ii)(B).

The apparent cause is that the personnel involved in EQ program did not consider the potential pH levels of the chemical spray during a MSLB accident scenario because of a belief that a Loss-of-Coolant Accident (LOCA) was the worst case scenario. Additionally, organizations responsible for the CTS and the EQ Program implementation failed to communicate adequately during the implementation of the EQ Program.

An evaluation for equipment in the EQ program exposed to CTS spray without NaOH addition determined that this equipment is qualified for spray without the chemical additive and will perform its 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.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
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		1998	--	045	--	

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 Event

On October 9, 1998, a question was raised regarding the minimum deliverable volume from the Containment Spray System (CTS) (EIIS: BE) Spray Additive Tank (SAT) (EIIS: TK), as to whether sufficient sodium hydroxide (NaOH) would be available for the duration of the injection phase following a Main Steam Line Break (MSLB) inside containment. Lack of sufficient NaOH to last through the injection phase could expose environmentally qualified (EQ) equipment in the containment to a CTS pH lower than the pH range used for equipment environmental qualification (EQ).

The CTS operates in response to a Loss-of-Coolant Accident (LOCA) or MSLB inside containment. NaOH from the SAT is added to the spray using an eductor, and ensures that the pH of the spray and sump are maintained within the established limits. The Emergency Core Cooling System (ECCS) (EIIS: BQ, BP) pumps (EIIS: P) flow rates from the Refueling Water Storage Tank (RWST) (EIIS: TK) are less following a MSLB, as compared to post-LOCA, and the RWST drains more slowly. As a result, the deliverable volume of the SAT may be exhausted prior to the end of the injection phase. This could result in borated water from the RWST, with a pH of approximately 4.5, being sprayed on components inside containment until the injection phase is complete. The equipment in containment is qualified for a pH range of 6.8 to 12.9. Therefore, spraying RWST water without NaOH additive results in spray pH outside the range used for equipment qualification.

On October 23, 1998, it was determined that the potential loss of NaOH addition during the injection phase of a MSLB 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 315/1998-045-00 in its entirety.

Cause of Event

The apparent cause is believed to be that an unawareness existed among personnel associated with the EQ Program and the CTS, concerning the expected pH levels of the chemical spray during a MSLB accident scenario. The SAT was designed to keep the radioactive iodine levels down during and following a LOCA. It is believed that the system designer did not consider spray additive or pH control to be required for a MSLB accident because the radiation levels would be insignificant during this type of accident. For the EQ Program, expected pH levels during a MSLB accident were a concern, but it is believed that a perceived mindset existed that resulted in a decision that accepted the LOCA analysis as a worst case scenario. Therefore, incorrect assumptions were made that were not discovered until the review of draft calculations during Donald C. Cook plant's (CNP) restart efforts.

It is believed that poor organization-to-organization oversight may have contributed to this event, in that the organizations responsible for the CTS and the EQ Program implementation failed to communicate adequately during the implementation of the EQ Program.

Analysis of Event

The CTS operates in response to a LOCA or MSLB inside containment. NaOH solution from the SAT is added to the spray using an eductor for each train of CTS. The volume of the SAT is sized so that, when its minimum deliverable volume is educted into the containment, CTS spray and sump pH are within established limits. The CTS operates in response to a LOCA or MSLB inside containment. The ECCS pumps flow rates from the RWST are less following a MSLB, as compared to post-LOCA, and the RWST drains more slowly. As a result, the minimum deliverable volume of the SAT may be exhausted prior to the end of the injection phase. This would result in borated water from the RWST, with a pH of approximately 4.5, being sprayed on components inside containment until the injection phase is complete. The equipment in containment is qualified for a pH range of 6.8 to 12.9. Therefore, spraying RWST water without NaOH additive results in spray pH outside the range used for equipment qualification.

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		1998	--	045	--	

Donald C. Cook Nuclear Plant Unit 1

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

A calculation was performed that determined that for a MSLB, the longest time that equipment would be exposed to spray without the chemical additive would be 25 minutes. An evaluation was then performed to determine the pH range to which EQ equipment in the containment could be qualified. This evaluation determined that EQ equipment would be qualified for a pH as low as 4.3 for 60 minutes in addition to the previous range of qualification. This range covers both the length of time and the lowest possible pH from CTS spray without spray additive in a postulated MSLB. 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.

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. The evaluation determined that EQ equipment can be exposed to a spray pH as low as 4.3 for 60 minutes and still function as required.

As part of the Unit 2 Restart effort, system and programmatic assessments were performed during the Expanded System Readiness Reviews to reestablish and document the plant's design and licensing basis. In CNP's March 19, 1999, response to NRC letter, "Enforcement Actions 98-150, 98-151, 98-152 and 98-186 Reply to Notice Of Violation October 13, 1998," which identified programmatic weaknesses in the plant design and licensing basis, and the training and qualification of plant personnel, CNP established an Engineering Leadership Plan to develop a new design control process that encompassed design input and verification, calculations and design document control. A Training and Qualification of Personnel Leadership Plan was also established to reinforce a nuclear safety culture for site personnel. This training included human error reduction and conservative decision making during the performance of engineering activities. These plans in combination will help to preclude similar events from occurring in the future. No further actions are required.

Previous Similar Events

The apparant cause of this event is historical having occurred during original system design and during initial EQ program implementation. Previous similar events could not be found.