Commonwealth Edison Company
Braidwood Generating Station
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Braceville, IL 60407-9619
Tel 815-458-2801

ComEd

June 5, 1995
BW/95-0063

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted in accordance with the requirement of 10 CFR 50.73(a)(2)(ii), which requires a 30-day written report.

This report is number 95-005-00, Docket No. 50-456.

Yours truly,

T. J. Tulon
Station Manager
Braidwood Nuclear Station

TJT/BJM/dla
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Encl: Licensee Event Report
No. 456-95-005-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution
I.D.N.S.
I.D.N.S. Resident Inspector

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

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

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)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Braidwood Unit 1	05000456	1 OF 6

TITLE (4) Technical Specifications for Containment Spray and Spray Additive System Determined to be inconsistent with Plant Design Basis

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 NUMBERS
05	05	95	95	-- 005 --	00	06	05	95	Braidwood 2	05000457
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)	X	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
J. Tolar, Site Engineering	(815)458-2801 x2590

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)				EXPECTED SUBMISSION DATE (15)	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)

On April 18, 1995 at 0243 CDST the Spray Additive system that supplies sodium hydroxide (NaOH) to both trains of Containment Spray (CS) was isolated to both trains of CS due to an operator valving error for a period of approximately ten (10) minutes. At the time this was identified, a seven day Technical Specification LCOAR (3.6.2.2) for the Spray Additive system was properly entered and followed. No LCOAR was entered for the Containment Spray system, as it is covered by a separate Technical Specification (3.6.2.1).

After a review of the event, the applicable Technical Specifications, and the Updated Safety Analysis Report (UFSAR), the NRC Senior Resident Inspector raised the question of whether the design basis of the two systems (Containment Spray and Spray Additive) could support having separate Technical Specifications with different LCOAR times. A Site Engineering review subsequently concluded that the present licensing and design bases do not support the independence of the CS and Spray Additive System Technical Specifications. Immediate corrective action was to administratively combine the two LCOAR requirements. Additional engineering reviews will be performed to resolve the issue.

A. PLANT CONDITIONS PRIOR TO EVENT:

UNIT: Braidwood 1 EVENT DATE: 05/05/95
EVENT TIME: 1202 CDST
MODE: 1 RX POWER: 100%
RCS [AB] TEMPERATURE/PRESSURE: NOT/NOP

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of the event that contributed to the severity of the event.

On April 18, 1995 at 0243 CDST the Spray Additive system that supplies sodium hydroxide (NaOH) to both trains of Containment Spray (CS) was isolated to both trains of CS due to an operator valving error for a period of approximately ten (10) minutes. At the time this was identified, a seven day Technical Specification LCOAR (3.6.2.2) for the Spray Additive system was properly entered and followed. No LCOAR was entered for the Containment Spray system, as it is covered by a separate Technical Specification (3.6.2.1).

After a review of the circumstances surrounding the event, the applicable Technical Specifications, and the Updated Safety Analysis Report (UFSAR), the NRC Senior Resident Inspector raised the question of whether the design basis of the two systems (Containment Spray and Spray Additive) could support having separate Technical Specifications with different LCOAR times. An engineering review was initiated to address this question.

At 1110 CDST on May 5, 1995, it was concluded by Site Engineering that the present licensing and design bases do not support the independence of the CS and Spray Additive System Technical Specifications. The following is a discussion of the reviews that were performed by Site Engineering and the conclusions that were reached:

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LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Braidwood Unit 1	05000456	95	-- 005 --	00	3 of 6

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

FUNCTIONS OF CONTAINMENT SPRAY/SPRAY ADDITIVE

A. Containment temperature/pressure control
B. Iodine scrubbing (injection phase)
C. Long-term pH control (corrosion - EQ and Hydrogen generation)

The effect of the separate Technical Specifications for each of the three functions of Containment Spray and Spray Additive are discussed below.

A. CONTAINMENT TEMPERATURE/PRESSURE CONTROL

UFSAR Chapter 6.5.2.1 states that the CS System is designed to reduce Containment pressure at a rate that will ensure the design leakage is not exceeded...to limit post-LOCA off-site doses to values below those in 10CFR100. This function of CS is unaffected by the isolated Spray Additive System and would remain available/operable.

B. IODINE SCRUBBING

UFSAR Chapter 6.5.2.1 states that the CS System is designed...to remove sufficient iodine from the Containment atmosphere to limit post-LOCA off-site doses to values below those in 10CFR100. UFSAR Chapter 6.2.2 states that the objectives of the CS System (reduce elemental iodine concentration of the Containment atmosphere and raise the pH of the Containment sump) are completed in approximately 30 minutes, at which time the spray injection phase is terminated.

Two previous studies to remove the Spray Additive Systems and to reduce the required NaOH concentration at Braidwood and Byron were performed (Westinghouse documents WCAP-11611 (3/88) and WCAP-12635 (10/90), respectively). These studies showed that chemical addition (Spray Additive System) is NOT required during the injection phase since the post-LOCA iodine can be effectively controlled by boric acid sprays (CS), and by deposition on Containment surfaces. These studies followed the guidance provided in Revision 2 (1988) of the Standard Review Plan Section 6.5.2, which indicates that the fission product removal effectiveness of the CS system is independent of chemical concentration. Therefore, this function of CS is unaffected by the isolated Spray Additive System and would remain available/operable.

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

C. LONG-TERM pH CONTROL

UFSAR Chapter 6.5.2.3 states that CS eductor flows are stopped when the Spray Additive tank level indicates that the amount of NaOH has been added to achieve a pH of 8.5 in the Containment Sump. This ensures that at least 2766 gallons of 30-36 percent NaOH is added, which ensures that the required pH is achieved under worst case conditions of maximum RCS and RWST boration.

UFSAR Section 6.2.5.3.1.2 states that the data points used to calculate post-LOCA corrosion rates include the effects of temperature, alloy, and SPRAY SOLUTION conditions. Based on these corrosion rates and the aluminum and zinc inventories, the contribution of aluminum and zinc corrosion to hydrogen accumulation in the Containment following a Design Basis Accident (DBA) was calculated.

The Westinghouse WCAPs state that though chemical addition is not required during the CS injection phase, it IS required during the recirculation phase for long-term Containment Sump pH control. Per WCAP-11611, a pH of 7 to 9.5 is required to satisfy design requirements with respect to 10CFR100 limits, the potential for chloride stress corrosion cracking, hydrogen generation, and equipment qualifications. Per WCAP-12635, Spray Additive Tank NaOH concentrations of 5 to 15 percent (in lieu of the existing 30 to 36 percent) would also satisfy the design requirements.

With no chemical addition, the Containment Sump pH could be lower than assumed. The Westinghouse WCAPs document a pH of 4.5 to 5 resulting from CS spray with no chemical addition. This lower Containment Sump pH could result in a greater rate of iodine re-evolution than what was assumed in the design basis analysis. However, the UFSAR analysis also conservatively assumed an instantaneous release of activity from the core. Using more recent NRC guidance (NUREG 1465) and more realistically assuming a phased release of activity from the core would reduce the impact of this higher rate of iodine re-evolution. This is because with the phased release approach, there is minimal system pressure available to force iodine into the atmosphere at the time that it is assumed to be released from the core.

Westinghouse WCAP-11611 states that to minimize the occurrence of chloride stress corrosion cracking, the pH adjustment must occur prior to the initiation of cracking. Therefore, it was recommended that the pH of the containment sump solution be adjusted to > 7 within 8 hours of the accident initiation. UFSAR Table 6.5-4 indicates that in the worst case CS condition, switchover to the recirculation phase is completed in approximately 32 minutes and chemical addition is completed in approximately 47 minutes.

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

At lower pH values, hydrogen generation due to aluminum corrosion decreases and hydrogen generation due to zinc corrosion increases. The Braidwood hydrogen generation analysis was performed using a pH range of 7-11, and conservative pH values were chosen for aluminum (high pH) and zinc (low pH) corrosion contribution. Per UFSAR Figure 6.2-35, the major post-LOCA contributor to hydrogen production is radiolysis with the second and third contributors being zinc corrosion. Additional engineering review would be needed to evaluate the impact of the lower Containment Sump pH value on the existing hydrogen generation analysis.

The lower value for Containment Sump pH would also potentially impact EQ qualification of equipment. Table A-1 of IEEE 323-1974 recommends a pH of 10.5 for PWR in-Containment testing. The Braidwood EQ components were qualified to pH values of 8.5 to 11. No type test exists to support qualification of equipment at pH values of 4.5 to 5; however, Engineering analysis could be performed to justify continued operability. This would require a case by case evaluation of all EQ components.

SUMMARY

The present licensing and design bases do not support the independence of the CS and Spray Additive System Technical Specifications. The analyses that have been performed could support a revision to the Technical Specifications such as a concentration change for the Spray Additive Tanks. Additional evaluations could be performed to provide a reasonable Spray Additive allowed outage time.

This is being reported pursuant to 10CFR50.73(a)(2)(ii), "...any event or condition that results in the condition of the nuclear power plant....being in a condition that is outside the design basis of the plant or in a condition that is not covered by the plant's operating and emergency procedures."

C. CAUSE OF EVENT:

The cause of this problem is an initial design deficiency during the issuance of the plant's Technical Specifications. The UFSAR design requirements were not fully considered when the two Technical Specification sections were written and submitted.

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D. SAFETY ANALYSIS:

The Safety Analysis for this event is included in the Description of the event above. The safety significance of this event is minimal. Only one of the three functions of the combination of Containment Spray and Spray Additive could be affected, that being long-term pH control during the recirculation phase.

E. CORRECTIVE ACTIONS:

As a conservative measure, a temporary procedure change was initiated to identify that the associated train of Containment Spray inoperability requirements must be satisfied whenever the Spray Additive System Technical Specification is entered.

For a permanent solution, evaluations are being performed to provide a reasonable Spray Additive allowed outage time. These additional evaluations will be tracked to completion by action item 456-180-95-00501.

F. PREVIOUS OCCURRENCES:

There have been no occurrences of this type previously at Braidwood Station.

G. COMPONENT FAILURE DATA:

None.