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Braidwood Generating Station
Route #1, Box 84
Braceville, IL 60407-9619
Tel 815-458-2801

ComEd

January 5, 1996
BW/96-0005

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

Gentlemen:

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

This report is number 95-012-01, Docket No. 50-456.

Yours truly,

T.J. Tulon
Station Manager
Braidwood Nuclear Station

TJT/BJM/ema
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Encl: Licensee Event Report
456-95-012-01

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Records Center
ComEd Distribution Center
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) Management decisions lead to Positive reactivity events while shutdown with one Source Range Nuclear Instrument Inoperable. (Supplement)

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
10	04	95	95	-- 012 --	01	12	01	95	FACILITY NAME	DOCKET NUMBER

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
OPERATING MODE (9)	5	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0	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)	X 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)	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)
M. Olson, Root Cause Team	(815)458-2801 x2028

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)

(Supplement to Section C, Cause of Event)
During scheduled refueling outage A1R05, with the unit in Mode 5 and one Source Range Nuclear Instrument inoperable, LCOAR 3.1-1a, Action #5, was in effect for the unit. This action requires the Reactor Trip breakers to be open, Boron Dilution Prevention valves to be closed and secured in position, and no positive reactivity additions are allowed. Between October 4th and 5th, 1995, two events occurred which introduced positive reactivity to the core. With all Reactor Coolant Pumps stopped, the 1D RCP was started and later stopped to support chemistry and crud burst activities. Each case caused a temperature swing of 3-5 degrees above and below the initial value, resulting in a positive reactivity addition. In addition, because normal Reactor Coolant makeup was isolated by means of the closed Boron Dilution Prevention Valves, makeup to the Volume Control Tank via the Refueling Water Storage Tank was made. The latest boron samples at the time showed the RCS to be at 2391 ppm and the RWST to be at 2364 ppm. This resulted in a slight dilution and positive reactivity addition. Both events were the result of cognitive management decisions. Immediate corrective actions included providing all additional makeups to the VCT via the Boric Acid Storage Tank. No further RCP runs were performed while the SR Nuclear Instrument remained inoperable.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Braidwood Unit 1	05000456	95	-- 012 --	01	2 OF 6

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

A. PLANT CONDITIONS PRIOR TO EVENT:

UNIT: Braidwood 1 EVENT DATE: 10/04/95 - 10/05/95
EVENT TIME: 0900 on 10/04/95 - 1155 on 10/05/95
MODE: 5 RX POWER: 0%
RCS [AB] TEMPERATURE/PRESSURE: Cold Shutdown, Mode 5

B. DESCRIPTION OF EVENT:

There were no plant systems of equipment inoperable at the beginning of this event that contributed to the severity of this event.

At 0227 on 09/30/95, all control rod banks were fully inserted into the core and the unit placed in Mode 3 following a normal plant shutdown in preparation for scheduled refueling outage A1R05. The Technical Specification Limiting Condition for Operation (LCOAR) 3.1-1a, Action #5, was in effect for one Source Range Nuclear Instrument channel, N-31, being inoperable at the time of shutdown. This allowed for 48 hours to restore the instrument to an OPERABLE status or within the next hour open the Reactor Trip breakers, suspend all operations involving positive reactivity changes, and verify closed and secured in position all Boron Dilution Prevention Valves (1CV111B, 1CV8428, 1CV8439, 1CV8441, and 1CV8435).

At 0318 on 09/30/95, the Reactor Trip breakers were opened. The Reactor Trip breakers remained open throughout the remainder of this event.

The unit was subsequently cooled down and the RCS borated to >2300 ppm to meet the Technical Specification requirement for cycle 6 refueling operations. With the unit in Mode 5, the last Reactor Coolant Pump was shutdown at 1400 on 10/01/95.

At 0900 on 10/04/95, with RCS temperature at 111 degrees, 1D RCP was started to support chemical mixing and crud burst activities. RCS temperature fluctuated down 3-4 degrees following the pump start, then returned to where it started over the next 5 minutes. It then increased to approximately 116 degrees over the next 15 minutes while operators utilized RHR to stabilize and return temperatures to normal.

At 1605 on 10/04/95, the 1D RCP was subsequently shut down. RCS temperature increased from 111 degrees to approximately 115 degrees over a 5 minute period. RH system cooling was increased and temperature was restored to 111 degrees.

Each of the above events resulted in a slight positive reactivity addition to the RCS because of the temperature fluctuations.

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Braidwood Unit 1	05000456	95	-- 012 --	01	3 of 6

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

B. DESCRIPTION OF EVENT (continued):

At 2200 on 10/04/95, it was identified by the Control Room Operators that a problem existed in how to provide normal makeup to the Volume Control Tank to compensate for normal inventory loss. A Problem Identification Form (PIF) was generated and the following issues were raised: 1) The latest chemistry samples showed the RCS to be at 2391 ppm boron and the RWST to be at 2364 ppm boron with RCS temperature at 105 degrees. 2) It was noted that the required RCS boron concentration to meet the shutdown margin surveillance requirement was 542 ppm. 3) Normal makeup to the VCT now comes from the RWST (the Boron Dilution Prevention Valves are secured closed and cannot be opened in accordance with Tech Spec 3.1-1a, Action #5 for 1 SR NI inoperable). 4) SR Nuclear Instrument N-31 is still inoperable which requires NO positive reactivity additions, also in accordance with 3.1-1a. 5) Raising RWST boron concentration so that it can be used to makeup to the RCS will render the RWST not available to fill SI Accumulators which have an upper boron concentration limit of 2400 ppm.

The Shift Operations Manager and Regulatory Assurance Supervisor were contacted to provide resolution and an acceptable means of RCS inventory/makeup control. With no detailed guidance available for this specific situation, there were several references used to determine an acceptable course of action. These included precautions as found in BwGP 100-1, "Plant Startup and Heatup" and BwOP RC-8, "Restoring a Reactor Coolant System Loop to Service". It was determined through discussions among the Operations Manager, Regulatory Assurance Supervisor, and Licensing Supervisor that it would be acceptable to provide normal makeup to the VCT via the flowpath from the RWST as specified in the Emergency Boration procedure, BwOA PRI-2, pending clarification of actions taken with Nuclear Licensing.

At 0805 on 10/05/95, it was determined via discussions with Corporate Nuclear Licensing that this method of makeup to the VCT (via the RWST) could not be supported through any existing documentation. The decision was subsequently made to perform all future such makeup evolutions utilizing the Emergency Boration flowpath from the Boric Acid Storage Tank, a 7000 ppm borated water source.

This event is being submitted pursuant to 10CFR50.73(a)(2)(i)(B) - any operation or condition prohibited by the plant's Technical Specifications.

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Braidwood Unit 1	05000456	95	--012 --	01	4 OF 6

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

C. CAUSE OF EVENT:

The root cause of this event was a management deficiency. While sound reasoning and judgement were used in determining the acceptable course of action, the risks and consequences of that direction were not completely identified or assessed.

This supplement is being provided to clarify the cause of the event.

As identified earlier, there was no specific written guidance available to either management or operations personnel for the current plant conditions. Therefore, other references were utilized to determine an acceptable course of action. These included the Precautions section of BwGP 100-1, "Plant Startup and Heatup" and BwOP RC-8, "Restoring a Reactor Coolant System Loop to Service". Information in these sources seemed to support a decision to use the Refueling Water Storage Tank (RWST) as a make-up source even though it's boron concentration was slightly below that of the Reactor Coolant System (2364 ppm vs. 2391 ppm). As an example, BwOP RC-8, Section E, "Limitations and Actions" #5 states, "The boron concentration of the isolated loop must be greater than or equal to that of the operating loops or the isolated loop greater than or equal to 2000 ppm boron concentration. This concentration must be determined within 2 hours prior to opening the Loop Stop Valves". The conclusion that was drawn from this requirement is that there is a certain ppm boron concentration, in this case 2000 ppm, where shutdown margin requirements are completely satisfied and minor differences in boron concentration between the RCS and additional water sources have been determined to be of no consequence.

In addition, although specifically applicable to modes 1-4, the Basis which defines RWST OPERABILITY under Tech Spec 3/4.5.5 states that; "The limits on RWST minimum volume and boron concentration ensure that: (1) sufficient water is available within containment to permit recirculation cooling flow to the core, and (2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly".

Because RWST boron concentration was significantly greater than 2000 ppm (2364 ppm), management incorrectly assumed that it could be utilized as an acceptable source of make-up to the RCS.

This assumption seemed further validated by guidance in the Station procedure for Emergency Boration, BwOA PRI-2. This procedure also identifies the flowpath from the RWST as an acceptable make-up water source in the case of inadequate shutdown margin.

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In addition to providing this guidance to shift operations personnel, management also directed that Corporate Nuclear Licensing be consulted at the earliest opportunity, since it was currently 2200, to clarify the correctness of this decision. At 0805 the following morning, Corporate Nuclear Licensing determined that make-up from the RWST in this situation could not be supported by any existing documentation. Management then directed that all subsequent make-up evolutions utilize the Boric Acid Storage Tank, a 7000 ppm borated water make-up source.

D. SAFETY ANALYSIS:

At the time that the RWST was used to makeup inventory to the VCT, RCS boron concentration was at 2391 ppm and the RWST boron concentration was at 2364 ppm, both values well above the boron concentration needed to meet the shutdown margin requirements of 540 ppm at the time. The VCT was filled from 37% to 55% with 2364 ppm water from the RWST. According to chemistry samples of the RCS following this event, RCS boron concentration decreased from 2391 ppm at 1530 on 10/04/95, to 2384 ppm on 10/05/95. This represented a total decrease in RCS boron concentration of 7 ppm. Throughout this time period, the Reactor Trip breakers remained open and the RCS boron concentration remained above the 2300 ppm lower limit as called for in cycle 6 refueling. As a result, there was no safety significance to the plant or the public.

E. CORRECTIVE ACTIONS:

Immediate corrective actions were to perform all subsequent makeups to the VCT from the Boric Acid Storage Tank via the normal emergency boration flowpath. No further RCP evolutions were performed while the SR Nuclear Instrument remained inoperable.

The Operating Procedure, BwOP RC-8, for returning an isolated RCS loop to service, contained an erroneous statement that, as long as the loop was greater than 2000 ppm boron concentration, there was no restriction on returning the loop to service. This statement factored into the decision process to allow the RWST makeup. This has now been revised to remove the specific number to state that the isolated loop boron concentration must be greater than or equal to the concentration of the operating loops.

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Management awareness of consequences associated with decisions and actions taken during similar circumstances has been heightened as a result of this event.

Long term corrective actions will be included in the improved Technical Specifications which will allow operations in Modes 3, 4, and 5 if one Source Range channel is inoperable without limiting reactivity excursions of this type.

F. PREVIOUS OCCURRENCES:

While there have been previous occurrences of management decisions factoring into undesirable actions taken, none were similar in nature to the set of circumstances surrounding this event.

G. COMPONENT FAILURE DATA:

MANUFACTURER	NOMENCLATURE	MODEL	MFG PART NO.

(No components failed during or as a result of this event)