



Commonwealth Edison  
Braidwood Nuclear Power Station  
Route #1, Box 84  
Braceville, Illinois 60407  
Telephone 815/458-2801

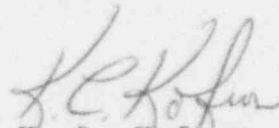
April 10, 1993  
BW/93-0128

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

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you with the requirement of 10CFR50.73(a)(2)(i) which requires a 30-day written report.

This report is number 93-001-00, Docket No. 50-457.

  
K. L. Kofron  
Station Manager  
Braidwood Station

KLK/AJS/dla  
o:corresp/zcreg

Enc: Licensee Event Report  
No. 93-001-00

cc: NRC Region III Administrator  
NRC Resident Inspector  
INPO Record Center  
CECo Distribution List

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## LICENSEE EVENT REPORT (LER)

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

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  
(MHB 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.FACILITY NAME (1)  
Braidwood 2DOCKET NUMBER (2)  
05000457PAGE (3)  
1 OF 7

TITLE (4)

Technical Specification Violation Due To Head Vent Valve 2RC8070 Being Closed

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
03	11	93	93	-- 001 --	00	04	05	93	None	05000
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		000	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)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in	
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		Abstract below	
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		and in Text, NRC Form 366A)	

LICENSEE CONTACT FOR THIS LER (12)

NAME  
P. Lau, Regulatory AssuranceTELEPHONE NUMBER (Include Area Code)  
(815)458-2801 x2957

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS
				No					

SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X

NO

EXPECTED  
SUBMISSION  
DATE (15)

MONTH

DAY

YEAR

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

Unit 2 was in a Refuel Outage in Mode 5. The RCS was in process of being drained down to the reactor flange level in preparation for removal of the reactor head. The conoseals were being removed to allow removal of the reactor head. The drain down was completed and the level was being stabilized at 399'. The Unit 2 Nuclear Station Operator (NSO) noted that vessel level indication was increasing, immediately notified the Unit Supervisor of the anomaly, and stopped all RCS draining. A Field Supervisor in the Unit 2 containment was sent to investigate the RCS vent paths for proper alignment. He verified the Pressurizer vent was correct, and went to verify the reactor head vent. The Head vent path was found isolated as valve 2RC8070 was found to be in the locked closed position. At this time reactor level had stabilized at 404' 6". No water was spilled, since the level was below the open conoseals. With valve 2RC8070 being closed the reactor head was not vented, which maintained the level in the head near the 404' 6" level. The indication in the control room was affected and indicated the incorrect level of 399' prior to opening the conoseals. There has been one previous non-reportable occurrence associated with reactor vessel level indication, which was on Unit 1 and was due to an improper vent of the pressurizer.

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

**A. PLANT CONDITIONS PRIOR TO EVENT:**

Unit: Braidwood 2; Event Date: March 11, 1993;  
Event Time: 0130;  
Mode: 5 - Cold Shutdown; Rx Power: 000%;  
RCS [AB] Temperature/Pressure: Atmospheric;

**B. DESCRIPTION OF EVENT:**

There were no components or systems unavailable that contributed to this event.

Unit 2 was in its third refuel outage in Cold Shutdown (Mode 5). Reactor Coolant System (RCS) level was being drained down to the level of the reactor flange (399'). The procedure to drain down the RCS has the Nuclear Station Operator (NSO) place letdown in divert mode to remove the RCS inventory. The vessel level is monitored on level indicators 2LI-RY046, 2LI-RY048, and 2LI-RY049. The other evolution in progress at the time was the opening of the conoseals.

The NSO brought the vessel level to an indicated level of 399' and was beginning to stabilize the level by adjusting letdown flow. He then noted that indicated level was increasing, but Volume Control Tank (VCT) level had remained constant. He immediately notified the Unit Supervisor and the Shift Engineer. The group concluded that, being unsure of actual vessel level, they should make no efforts to further affect RCS inventory. The immediate actions were to secure all RCS inventory changes, notify the personnel at the Rx head to leave the area, and to dispatch an Operator to the containment. The shift used the VCT level as an indication of inventory status during this time. By maintaining the VCT level constant they were assured that no actual level changes were occurring in the vessel.

The Field Supervisor, who was already in the containment, went immediately to verify the status of the pressurizer vent path. He verified that this vent path was properly lined up and functioning correctly. He then proceeded to the reactor head vent system to determine its status.

The head vent system consists of a manual locked valve (2RC8070) in series with two sets of solenoid-operated vent valves (2RC014A/C and B/D). The Field Supervisor unlocked 2RC8070 and found it to be closed. He then opened the valve. A check with the control room determined that no further indicated level changes had occurred and that level was 404'6".

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(5-92)

U.S. NUCLEAR REGULATORY COMMISSION

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

The direct cause of the inaccurate level indication was an inadequate vent path. With the 2RC8070 closed, no other vent path existed to allow the head to drain down to the flange elevation. When the Conoseals were opened by the maintenance personnel, a vent path was created to the reactor head. This caused the indicated level to change. The vessel level change was negligible.

On March 11, 1993 an investigation committee was established to determine the cause of the 2RC8070 being placed in the locked closed position. The committee reviewed the shift logs, key check out logs, surveillances performed on the valve, and operating evolutions that require manipulation of the valve to determine when the 2RC8070 had been manipulated.

During A2R02 (the Unit 2 Refuel Outage in the fall of 1991), 2RC8070 was verified to be locked open (per BWOS 4.11-a-1) on November 5, 1991 while the Unit was in Mode 5. The valve was then manipulated numerous times to vent the RCS. Venting operations were performed on November 6, 7, 8, 9, 10, and 11 while in Mode 5. No venting operations occurred after November 11, 1991. The control room logs, maintenance history, and the general surveillance history were reviewed to determine if the 2RC8070 had been manipulated during subsequent operating cycle or the Unit 2 shutdowns. The review indicated that the Unit 2 reactor head vent had not been manipulated in any of the subsequent operations. The determination was made that 2RC8070 had been left in the locked closed position since November 11, 1991 and had been out of its required position for the entire operating cycle.

The investigation team interviewed the operators involved with the venting operations from November 1991. The operators described the venting to be generally conducted as follows: The 2RC8070 valve is normally left closed during the course of the several-day venting operation. To vent the reactor vessel head, the operator calls the control room and has NSO open the solenoid-operated vent valves from the control room. The field operator will then throttle the 2RC8070 until water is observed in a vent bottle. The field operator then closes the 2RC8070 and notifies the Control Room to close the solenoid-operated vent valves. Since the 2RC8070 is not required to be open until Mode 4, this practice was acceptable until Mode 4 was entered, and Technical Specification 3.4.11 became applicable.

The unit entered Mode 4 on November 17, 1991. Technical Specification 3.4.11 was not satisfied from November 17, 1991, until the Unit re-entered Mode 5 on March 6, 1993.



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The investigation team felt it was necessary to determine the position of the corresponding Unit 1 valve. The team reviewed the shift logs, key check out logs, surveillances performed on the valve, and operating evolutions that require manipulation of the valve to determine when the 1RC8070 had been manipulated. The review found that valve lineup checklist BWOP RC-M1 was performed as the last manipulation of 1RC8070 prior to the Mode 5 to Mode 4 change and indicated 1RC8070 was placed in the locked open position.

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

C. CAUSE OF THE EVENT:

The cause of the event was a deficiency in the configuration control mechanisms for the position of the 2RC8070 valve. After an initial system lineup, component position is controlled either under specific procedural direction or by use of the Component Abnormal Position Log as described in BWAP 340-2, Use of Mechanical and Electrical Lineups.

There is no procedural guidance provided for the valve manipulations used in venting the reactor head. BWOP RC-3, Reactor Vessel Fill and Vent, describes the venting operation. The specific valve manipulations were not called out in the procedure. Operations department practice is to leave a component in the position found unless direction to the contrary is given. However, with the lack of procedural guidance in RC-3, there was no clear direction to verify the 2RC8070 locked open at the end of a vent cycle.

The intent of the Component Abnormal Valve Position Log is to prevent a crew turnover from occurring with an abnormally positioned valve in an undocumented condition. The log is used if a valve will be placed in an abnormal position for longer than one shift. The log was not used for any of the venting operations because the crews did not realize that the procedure BWOP RC-3 was not providing positive control of the valve position and that the valve was being left in abnormal position. Further, operations personnel were uncertain of the intent of notes in the procedure requiring use of the log when re-positioning locked valves.

The position verification surveillance (2BWOS 4.11-b) is only performed one time prior to entry into Mode 4 from Mode 5. Because the surveillance was performed before the venting operation, rather than after all other manipulations are complete, the surveillance failed to detect the improper valve position. The surveillance had been performed in the proper sequence during the Unit One refueling outage, but this was not procedurally or programmatically directed.

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**D. SAFETY ANALYSIS:**

The safety significance of inoperability of the reactor head vent relates to the need to use the remotely operated head vents to respond to accidents occurring at power. These valves appear in three procedures. In BWFR H.1, Loss of Secondary Heat Sink, in response to a critical safety function status tree red path for loss of heat sink, the head vent is opened when no feedwater flow of any kind can be established to the steam generators and less than two pressurizer PORV's can be opened for feed-and-bleed. In BWFR C.1, Inadequate Core Cooling, in response to a red path for inadequate core cooling, they are opened when core exit temperature exceeds 1200 degrees F, establishing ECCS injection has been unsuccessful, starting Reactor Coolant Pumps (RCP) has failed to cool the core, and pressurizer PORV's have failed to open. In BWFR I.3, Response to Voids in Reactor Vessel, in response to a yellow path for inventory control, the head vent is opened when pressurizer level is greater than 17%, pressurizer level and pressure are more or less stable, at least one RCP running, and the Reactor Vessel Level Information System (RVLIS) indicates less than 100%. The head vent valves are not used in any BWEP (Emergency Operating Procedure) or BWES (Event Specific Subprocedure).

The reactor head vent valves are not modeled in any current accident analysis.

Using a Probabilistic Risk Assessment (PRA) approach, the Commonwealth Edison PRA Group concluded that the event was of minimal safety significance. This was based upon evaluation of Zion PRA data and estimates of applicability of this data to Braidwood. These estimates showed the frequency of events in which these valves would be needed falls below 10 E-7 per year. Events below this frequency are commonly considered of negligible risk.

**E. CORRECTIVE ACTIONS:**

This event, including causes and proposed corrective actions was discussed with senior station management at a Braidwood Event Review Presentation.

Unit One documentation was reviewed to determine if a similar sequence of events could have occurred during start-up from its recent refueling outage. The review determined that the 1RC8070 valve had been verified in its proper position after all valve manipulations were completed.

BwOP RC-3 has been revised to provide positive control of the position of 1/2RC8070. Additionally, a procedure will be developed to provide guidance for venting the reactor head in conditions when BwOP RC-3 would not apply. This will be tracked to completion by action item 457-180-93-00101.

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BWGP 100-1 has been revised to specify the sequence for performing 1/2BwOS 4.11.b-1.

A review of additional surveillances that manipulate locked valves was conducted to identify any locked valves that did not positively address the as left position of the valve. This review identified three procedures that needed revision. These surveillances were BwVS 0.5-2.RC.2, BwVS 0.5-2.SI.2-3, and BwVS 6.1.2.D-1.9. This action will be tracked to completion by action item 457-180-93-00102 and will be completed prior to the next entry into Mode 4 for either unit.

The locked valve program will be revised to place the required position of the valve on the key tag. In addition, BwAP 330-3 will be revised to require the operator returning the key to log the as-left position of the valve. This action will be tracked to completion by action item 457-180-93-00103.

The investigation team contacted other nuclear stations to attempt to identify other configuration control processes that could have prevented this event. The results identified improvements in locked valve control and Abnormal Component Log usage. In addition to contacting these stations, the team reviewed other process changes that could improve component configuration control. As a result of these reviews, the following additional corrective actions were determined:

The Component Abnormal Log procedure will be revised to include new usage rules. These rules will clarify when use of the log is required, and will require that all log forms be retained for future reference. This action will be tracked to completion by action item 457-180-93-00104.

Further actions will be taken to improve the effectiveness and control of valve lineups during restoration from outages. These items are being reviewed and will be docketed separately in a presentation to NRC regional management.

A training module on the component configuration control process used by the operating department will be developed and incorporated into initial and continuing training for licensed and non-licensed operators. This training will include the use of initial lineups, procedures, the component abnormal position log, and the key check out log described above. The training will also emphasize the need for awareness of manipulations that are being conducted outside of procedural control. This action will be tracked to completion by action item 457-180-93-00105.

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F. PREVIOUS OCCURRENCES:

456-200-92-0420 Vessel Overfill due to Improper Pressurizer Venting

The corrective actions associated with that event involved modifying the procedure for venting the pressurizer. The corrective actions associated with that event are not applicable to this event. A problem associated with venting the reactor head, specifically operation of the RC8070 valve, was not postulated at that time and was therefore, not addressed.

G. COMPONENT FAILURE DATA:

This event was not the result of component failure, nor did any components fail as a result of this event.