

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

John A. Bailey  
Vice President  
Operations

August 17, 1992

NO 92-0239

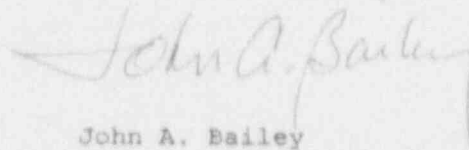
U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Station F1-137  
Washington, D. C. 20555

Subject: Docket No. 50-482: Licensee Event Report 91-025-01

Gentlemen:

The attached Licensee Event Report (LER) is submitted pursuant to 10 CFR 50.73(a)(2)(i) concerning Technical Specification violations. This revision to LER 91-025-00 provides clarification of the root cause.

Very truly yours,



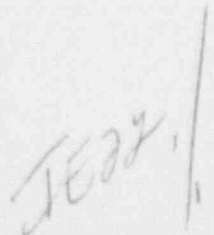
John A. Bailey  
Vice President  
Operations

JAB/jra

Attachment

cc: A. T. Howell (NRC), w/a  
J. L. Milhoan (NRC), w/a  
G. A. Pick (NRC), w/a  
W. D. Reckley (NRC), w/a

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## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Wolf Creek Generating Station										DOCKET NUMBER (2) 050004821					PAGE (3) 1 OF 05										
TITLE (4) Positive Reactivity Changes With No Operable Centrifugal Charging Pumps And Boron Injection Flow Path Results In Technical Specification Violations																									
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)															
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	DOCKET NUMBER (5)																
1	1	1	9	9	1	9	1	0	2	5	0	1	0	8	1	7	9	2	0	5	0	0	0		
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)																							
5		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)											
POWER LEVEL (10)		20.406(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)											
10		20.406(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)											
		20.406(a)(1)(iii)				X 50.73(a)(2)(i)				50.73(a)(2)(vii)(A)															
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(vii)(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															
Kevin J. Moles - Manager Regulatory Services										AREA CODE 316364-8831															
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC															
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)															
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO															
ABS. ACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																									

On November 19, 1991, from 1541 CST until 1914 CST and on November 20, 1991, from approximately 1930 CST until November 21, 1991, at 0655 CST, positive reactivity changes occurred when borated water was charged at a lower concentration than the Reactor Coolant System boron concentration while both Centrifugal Charging Pumps (CCPs) were inoperable. With no CCP operable, the action statements for Technical Specifications 3.1.2.1 and 3.1.2.3 require the suspension of all operations involving positive reactivity changes thus requiring the charging boron concentration to be higher than the Reactor Coolant System boron concentration even if the charging concentration exceeds shutdown requirements.

Several causes contributed to these events' occurrences, including procedural inadequacy and ineffective training on the Reactor Makeup Control System. One Reactor Operator did not have a complete understanding of the Reactor Makeup Control System and has been counselled on the proper operation of the system. To prevent recurrence, the appropriate procedures have been revised. Additionally, information concerning the control system default to the 120 gallon per minute setpoint when selected to automatic mode has been added to the licensed operator essential reading.

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TEXT CONTINUATION

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Wolf Creek Generating Station	0500048291	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	02 OF 05
		02	5	01	

TEXT (If more space is required, use additional NRC Form 366As) (17)

**INTRODUCTION**

On November 19, 1991, from 1541 CST until 1914 CST and on November 20, 1991, from approximately 1930 CST until November 21, 1991, at approximately 0655 CST, positive reactivity changes occurred when borated water was charged at a lower concentration than the Reactor Coolant System boron concentration while both Centrifugal Charging Pumps (CCPs) [CB-P] were inoperable. Technical Specifications (T/S) 3.1.2.1, applicable for Mode 4, Hot Shutdown, through Mode 6, Refueling, requires an operable boron injection flowpath which requires an operable CCP. In addition, T/S 3.1.2.3, also applicable for Mode 4 through Mode 6, requires one CCP in the boron injection flowpath to be operable. With no CCP operable, the action statements for T/S 3.1.2.1 and T/S 3.1.2.3 require the suspension of all operations involving positive reactivity changes thus requiring the charging boron concentration to be higher than the Reactor Coolant System (RCS) [AB] boron concentration even if the charging concentration exceeds shutdown requirements. Therefore, these failures to satisfy the action statements for T/S 3.1.2.1 and T/S 3.1.2.3 during these two events are being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as conditions prohibited by the plant's T/S.

**DESCRIPTION OF EVENTS**

On November 19, 1991, at 1541 CST, Control Room operators commenced filling the RCS with water from Recycle Hold-up Tank (RHUT) "A" [CA-TK] to facilitate Reactor Coolant Pump [AB-P] seal venting. The Shift Supervisor (SS) had reviewed a previously performed analysis of the RHUT "A" which showed that RHUT "A" contained 2473 parts per million (ppm) borated water, well above the 2400 ppm borated water required by technical specifications for the Refueling Water Storage Tank (RWST) [BP-TK] as the normal source of borated water and the limit in procedure SYS BB-110, "Reactor Coolant System Fill and Vent." On November 19, 1991, at 1914 CST, Control Room operators secured filling the RCS with water from RHUT "A".

Subsequently, while reviewing chemistry sample sheets at approximately 2100 CST, Control Room operators determined that the RCS had contained 2513 ppm boron concentration. Because RHUT "A" containing 2473 ppm borated water had been used to fill the RCS, this resulted in a positive reactivity change.

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

On November 20, 1991, Control Room operators were filling the RCS using the Reactor Makeup Control System [CB] selected in the manual mode of operation with the boron concentration set at approximately 2540 ppm in accordance with SYS BG-200, "Reactor Make-Up Control System Operation." Prior to shift turnover, the total flow rate was set at 90 gallons per minute (gpm) with a boric acid flow of 30.8 gpm. During the shift turnover, the on-duty Reactor Operator (RO) and the on-coming RO discussed the manual selection of the Reactor Makeup Control System to achieve the desired boron concentration since a high enough boron concentration could not be achieved with the control in the automatic mode.

Shift turnover was completed at 1854 CST, and subsequently, the RO set the flow at 100 gpm with a boric acid flow of 35 gpm and selected the Reactor Makeup Control System to the automatic mode of operation. Although the flow and boric acid would have been correct with the control system selected to the manual mode of operation, these settings resulted in 2040 ppm borated water to the RCS since the flow defaults to the 120 gpm setpoint with the control system selected to the automatic mode of operation.

On November 21, 1991, at approximately 0655 CST, the on-coming RO discovered this error while reviewing the board status during shift turnover. The on-coming RO restored the Reactor Makeup Control System to provide 2540 ppm borated water. An RCS sample was then requested and at 0945 CST, Control Room operators were notified that RCS boron concentration was 2498 ppm.

Control Room operators reviewed the flow recorder strip chart which indicates that the first automatic makeup occurred on November 20, 1991, between approximately 1930 CST and 2230 CST. Subsequent evaluation by Control Room operators concluded that approximately 4800 gallons of water at 2040 ppm boron concentration were added to the RCS while the Reactor Makeup Control System was in the automatic mode of operation. Because the Reactor Makeup Control System with 2040 ppm borated water had been used to fill the RCS, this resulted in a positive reactivity change.

**ROOT CAUSE AND CORRECTIVE ACTIONS**

The root cause of the November 19, 1991 event is procedural inadequacy. Procedure SYS BB-110, "Reactor Coolant System Fill and Vent," states that fill water must have a boron concentration greater than or equal to 2400 ppm, or greater than or equal to RCS boron concentration and must meet T/S 4.4.7

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requirements for RCS chemistry limits. The procedure step did not provide for occasions in which boron concentration of the fill water must be greater than or equal to RCS boron concentration to ensure compliance with T/S 3.1.2.1 and T/S 3.1.2.3 with no operable CCP. Because the SS verified the RHUT "A" boron concentration was greater than the 2400 ppm limit in the procedure step, the SS assumed that RHUT "A" boron concentration was within the proper limits. To prevent recurrence, the applicable procedures, including SYS BB-110, have been revised to clarify the appropriate limits for fill water with no operable CCP.

Several causes contributed to the November 20, 1991 event's occurrence. Procedure SYS BG-200, "Reactor Make-Up Control System Operation," states to compute the desired boric acid flow rate for blended flow from nomographs and formulas provided in an attachment to the procedure for the automatic mode of operation. The attachment includes a note which states that blended flow is based on 120 gpm automatic makeup and Boric Acid Tank [CB-TK] boron concentration of 7000 ppm. Additionally, a subsequent step in the procedure mistakenly indicates that the flow control can be adjusted in the automatic mode of operation if necessary. Following shift turnover, the on-coming RO mistakenly determined that the proper boron concentration could be achieved by adjusting the flow rate with an adjusted boric acid flow and selecting the control system to the automatic mode of operation. Because the training provided on the Reactor Makeup Control System was ineffective in that some licensed personnel were not aware that the system would default to the 120 gpm setpoint when selected to the automatic mode of operation, the RO was not aware that the flow would default to the 120 gpm setpoint when selected to the automatic mode of operation and could not be adjusted to a different flow rate. The RO who did not have a complete understanding of the Reactor Makeup Control System has been counselled on the proper operation of the system. To prevent recurrence, information concerning the Reactor Makeup Control System default to the 120 gpm setpoint when selected to the automatic mode of operation has been added to the licensed operator essential reading. Information concerning the Reactor Makeup Control System operation in the automatic mode of operation has been re-emphasized in the ongoing licensed operator initial training and the licensed operator requalification training. Additionally, a caution has been added to the applicable procedures, including SYS BG-200, to remind Control Room operators of the control system operation when selected to the automatic mode of operation. Additionally, the section of Procedure SYS BG-200 which addresses the operation of the system in the automatic mode of operation has been revised to eliminate the indication that the flow control can be adjusted.



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**ADDITIONAL INFORMATION**

During these events the plant was in Mode 5, Cold Shutdown. There was no damage to plant equipment or release of radioactivity as a result of these events. Adequate shutdown margin was maintained throughout these events and at no time did conditions develop that posed a threat to the health and safety of the public.

Licensee Event Report (LER) 482/86-061-00 and LER 482/88-025-00 discuss previous similar occurrences. LER 482/86-061-00 discusses performing core alterations with both CCPs inoperable when licensed operations personnel failed to ensure operability of the emergency power source for an operable CCP. The corrective actions discussed in LER 482/86-061-00 were specific to that event and had no effect on the events discussed in this LER. LER 482/88-025-00 discusses the continuation of core alterations when the emergency power source for the operable boron injection flow path and the operable CCP was removed from service for maintenance. The corrective actions discussed in LER 482/88-025-00 included the development of a check list that specifies the equipment being relied upon to maintain an operable CCP and boron injection flowpath. Because the events discussed in this LER occurred when both CCPs were inoperable, the corrective actions taken in LER 482/88-025-00 had no effect on this event.