

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Otto L. Maynard
Vice President Plant Operations

January 4, 1995

WO 95-0003


U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Subject: Docket No. 50-482: Licensee Event Report 94-013-00

Gentlemen:

The attached voluntary Licensee Event Report (LER) is being submitted concerning an unanticipated loss of coolant due to human error.

Very truly yours,



Otto L. Maynard

OLM/jad

Attachment

cc: L. J. Callan (NRC), w/a
D. D. Chamberlain (NRC), w/a
J. C. Stone (NRC), w/a
J. F. Ringwald (NRC), w/a

110042
9501120219 950104
PDR ADDCK 05000482
S PDR

P. Box 411 / Burlington, KS 66839 / Phone: (316) 364-8531

An Equal Opportunity Employer M/F/HC/VET

IF22
11

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 (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.

FACILITY NAME (1)

WOLF CREEK GENERATING STATION

DOCKET NUMBER (2)

05000482

PAGE (3)

1 OF 7

TITLE (4)

Personnel Error Resulted in an Unanticipated Loss of Reactor Coolant Level

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	17	94	94	013	00				FACILITY NAME	DOCKET NUMBER
OPERATING			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
4			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
POWER			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
0%			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)		Voluntary	
			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

Richard D. Flannigan
Manager Regulatory Services

TELEPHONE NUMBER (Include Area Code)

316-364-4117

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
N/A									

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED

MONTH

DAY

YEAR

YES

X

NO

(If yes, completed EXPECTED SUBMISSION DATE)

ABSTRACT:

On September 17, 1994, with the plant in MODE 4 at 300 °F and 340 psig, Wolf Creek Generating Station experienced an unanticipated decrease in Reactor Coolant level due to personnel error. The "A" Residual Heat Removal (RHR) [BP] train was lined up to the Reactor Coolant System (RCS) [AB] providing cooldown. Efforts were in progress to place the "B" RHR train in recirculation to sample and adjust boron concentrations prior to aligning the train to the RCS. Maintenance was performed to correct a packing leak and the Control Room Operators were stroking valve EJ HV-8716A (the "A" RHR to Safety Injection System (SIS) Hot Leg Recirculation Loops 2 & 3 isolation valve) to seat the packing and to perform motor operated valve testing. When the Control Room operators stroked valve EJ HV-8716A, they noted a rapid drop in pressurizer level. They immediately diagnosed the problem and shut valve EJ HV-8716A. The root cause of this event was that Licensed Operators inappropriately allowed two incompatible evolutions to occur simultaneously. At the time of the event the "B" RHR train was being lined up for RWST recirculation concurrent with the stroking of EJ HV-8716A. Corrective Actions include improved physical and administrative controls and additional operator training.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATICS 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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station	05000				
	482	94	013	00	2 OF 7

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

Plant Conditions:

Operational Status = MODE 4
Reactor Coolant Temperature = 300 °F
Reactor Coolant Pressure = 340 psig
Two Reactor Coolant Pumps running
Four Steam Generators operable and available
"A" Residual Heat Removal Train in service and providing cooling to the core

Basis for Reportability:

Due to the potential generic implications of this event, WCNOG is voluntarily submitting this Licensee Event Report.

Description of Event:Initial Conditions:

At 4:00 a.m., Wolf Creek Generating Station was in MODE 4, cooling down at the beginning of the Seventh Refueling Outage. The Reactor Coolant System (RCS) [AB] was at 300 degrees F and 340 psig. The Control Room operators were in the process of taking the Pressurizer solid. The "A" Residual Heat Removal (RHR) [BP] train was lined up to RCS providing cooldown. The valve line up for recirculating the "B" RHR train to the Refueling Water Storage Tank (RWST), to bring boron concentration within specification of the RCS boron concentration, was in progress.

System Description:

The "A" and "B" RHR trains are cross-connected downstream of the heat exchangers. The line cross-connecting the trains has a motor-operated valve at either end: EJ HV-8716A and EJ HV-8716B. Between these two valves, manual valve BN 8717 isolates a 8 inch line to the RWST via the common Emergency Core Cooling System (ECCS) pump suction header.

Event Description:

Valves EJ HV-8716A, EJ HV-8716B, and BN 8717 had been closed. To accomplish the recirculation of the "B" RHR to the RWST, Control Room operators dispatched a Nuclear Station Operator (non-licensed) (NSO) to open BN 8717.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station	05000 482	94	013	00	3 OF 7

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

On September 16, 1994, with the plant in MODE 3, the pre-planned outage work on EJ HV-8716A was performed. The work on the valve actuator was completed early in the evening, and Maintenance personnel contacted the Control Room to discuss motor-operated valve testing for EJ HV-8716A. The purpose of this discussion was to ensure the plant configuration was satisfactory for the required testing. The Shift Supervisor and the Supervising Operator discussed the test with Maintenance personnel and correctly determined that plant conditions were acceptable. At 9:00 p.m., EJ HV-8716A was tested satisfactorily. Part of the maintenance performed on EJ HV-8716A was to repack the valve. To ensure the packing was installed correctly, Maintenance personnel had to wait for pressure to be at the valve after the Residual Heat Removal System was placed in service. Residual Heat Removal Train A was placed in service after the plant entered MODE 4 later that evening. Maintenance then rechecked the packing on EJ HV-8716A and noticed it was leaking.

On September 17, 1994, at approximately 3:00 a.m., the Shift Supervisor held discussions with Maintenance personnel concerning EJ HV-8716A. Permission was granted to adjust the packing which would require stroking EJ HV-8716A for motor-operated valve testing provided appropriate plant conditions existed as per the direction of the on-shift Supervising Operator (SO). Following the packing adjustment (approximately 4:00 a.m.), Maintenance personnel contacted the Control Room to stroke the valve. The Balance of Plant (BOP) Operator took the call. He conferred with the SO and inappropriately received concurrence to conduct the valve stroke.

Meanwhile, the NSO had arrived at BN 8717 and proceeded to slowly open the valve as directed to place the "B" Train RHR on recirculation to the RWST.

At 4:10 a.m., the BOP Operator stroked EJ HV-8716A, Control Room operators did not observe anything out of the ordinary. About 30 seconds later, the BOP Operator commenced a second stroke of EJ HV-8716A at about the time BN 8717 was fully opened. This provided a flow path from the RCS, via the "A" RHR train through EJ HV-8716A and BN 8717, to the RWST suction header. Pressurizer level dropped rapidly concurrent with a high RWST level alarm. The Control Room operators immediately diagnosed the problem and closed EJ HV-8716A, terminating the flow. During the response, the Control Room operators also isolated low pressure letdown, maximized charging, and secured the operating Reactor Coolant Pumps (RCPs).

During the 66 seconds that EJ HV-8716A was not fully closed, approximately 9,200 gallons of RCS water transferred to the RWST. This overfilled the RWST resulting in about 650 gallons flowing to the Waste Hold Up Tank (WHUT) [WH] via the installed overflow piping. Pressurizer level never went below the top of the heaters. RCS pressure stabilized at

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station	05000 482	94	013	00	4 OF 7

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

about 225 psig, maintaining a sub-cooling margin of greater than 90 degrees F. The temperature of the RCS increased about seven degrees F due to the Pressurizer outsurge.

Evaluation:

Equipment:

Subsequent evaluation of the "A" RHR pump, RWST, RCPs and Pressurizer determined that no equipment damage occurred as a result of this event.

Recirculation of the RHR system was required because minor back leakage of the RHR line check valves during normal operation, slowly diluted the water in the RHR piping over the 18 month cycle. The back leakage was well below the Technical Specification limit of one

gallon per minute. This is not a concern for accident conditions since the RHR will always be at or above the RCS boron concentration during normal operations.

Personnel Actions:

Two activities were performed simultaneously: (1) "B" RHR lineup for recirculation to RWST, and (2) EJ HV-8716A packing adjustment. The second activity was incompatible with the first because EJ HV-8716A was a boundary valve between the primary system and the reactor coolant. The BOP Operator and SO erred by stroking EJ HV-8716A.

Administrative controls were not sufficient to guard against a potential RCS drain down should a misalignment occur with valves EJ HV-8716A or EJ HV-8716B and BN 8717.

Once the event initiated, the response by the Control Room operators was prompt and correct. This minimized the extent of water transfer and prevented any equipment damage or degradation. The Control Room operators closed Valve EJ HV-8716A. Closure of this valve isolated the flow path to the RWST. Additionally, the Control Room operators had assessed the event and determined four acceptable alternate actions which would have terminated the event if valve EJ HV-8716A had not closed on demand. The alternate actions included:

1. The closure of BN 8717 (this action had been ordered), or
2. The closure of either RCS loop suction valves (BB PV-8702A or EJ HV-8701A), or
3. The closure of the RHR heat exchanger outlet valve and bypass valve (EJ FCV-618 and EJ HCV-606), or

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station	05000 482	94	013	00	5 OF 7

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

4. The closure of the RHR pump manual outlet valve (EJ 8724A) and tripping of the RHR pump (EJ-HIS-1)

Following the event WCNOG personnel performed an evaluation to determine if the event should be classified in accordance with the WCNOG Emergency Response Plan. This evaluation included a review/evaluation of:

1. Event duration,
2. Time required to terminate the event,
3. The lack of any radioactive material being released from the system,
4. Water volumes remaining contained within plant systems,
The RCS remaining subcooled,
5. The health and safety of the public (this review clearly showed the event did not impact the public health and safety)

This review determined that the event did not meet the event classification scheme used by WCNOG (as supported by the NEI methodology), nor did it warrant the activation of the emergency response organization.

WCNOG maintained ECCS makeup capability and the ability to place the plant in cold shutdown.

Root Cause and Corrective Actions:

Root Cause:

The root cause of this event was that Licensed inappropriately allowed two incompatible evolutions to occur simultaneously. At the time of the event the "B" RHR train was being lined up for RWST recirculation concurrent with the stroking of EJ HV-8716A.

Causal Factors:

1. The stroking of EJ HV-8716A was not compatible with the boundary conditions for RCS cooldown using "A" RHR train.
2. Minor check valve leakage led to the reduction of the "B" RHR train boron concentration, thus requiring recirculation prior to placing this train in service for normal cooldown during an outage.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)	
				YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Wolf Creek Generating Station		05000						
		482		94	013	00	6 OF 7	

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

Corrective Actions:

Immediate:

The Manager Operations thoroughly discussed, at the Management Meeting on the morning of the event, perceived cause, immediate actions taken, and all planned corrective actions.

The Manager Operations briefed all operating crews on this event. Management's expectations were clearly delineated at the briefings.

Procedure SYS EJ-120, "Startup Of A Residual Heat Removal Train," has been revised to preclude future occurrence of this event.

A placard has been placed on BN 8717 to require the NSO to check with the Control Room to verify that EJ HV-8716A and EJ HV-8716B are in the appropriate position before opening BN 8717.

A unique lock has been placed on BN 8717 and Administrative Procedure ADM 02-102, "Control Of Locked Component Status," requires the approval of either Vice President Operations or the Manager Operations before opening.

An engineering evaluation determined that recirculation of the RHR trains prior to placing them in service is not required provided:

1. The boron concentration in the applicable train exceeds the boron concentration required for shutdown margin, or
2. The boron concentration is less than 100 ppm below the concentration required for shutdown margin, and at least two RCPs are running.
3. The boron concentration is greater than or equal to the required shutdown margin boron concentration and no Technical Specification Action Statement limiting positive reactivity addition is in effect.
4. If the boron concentration is not acceptable, the RHR system will be aligned to the RHUT via the low pressure letdown system and the water volume will be changed. The use of BN 8717 will not be required for this activity.

The above note criteria has been incorporated in to System Operating Procedures SYS EJ-120, "Startup Of A Residual Heat Removal Train," and SYS EJ-121, "RHR Train Startup In Cooldown Mode."

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
			YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Wolf Creek Generating Station		05000				
		482	94	013	00	7 OF 7

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

Longterm.

Training will be provided to the operators covering the potential consequences of this type of event. This training is scheduled for completion in the first quarter of 1995.

Procedure OFN BB-031, "Shutdown LOCA," is being revised to require immediate tripping of the RCPs for a rapid depressurization event, to enhance the RCP tripping criteria, and to enhance the safety injection reduction criteria for cold over-pressurization or pressurized thermal shock concerns. Further evaluation of the mitigation strategy is ongoing. The revised procedure will be issued by 3/1/95.

WCNOC is continuing to evaluate this event. WCNOC Incident Investigation Team Report 94-04 will be revised as appropriate based on further review of this event. WCNOC's review activities will be completed by 3/1/95. Final IIT Recommendations will be evaluated and implemented as appropriate.

Safety Significance:

During the RCS drain down to the RWST in MODE 4, high temperature water was transferred to the RWST through the RHR train A return line. The RCS pressure began dropping due to rapid decrease of the RCS inventory. Based on preliminary calculations, the event was terminated prior to there being significant voiding in the ECCS piping to cause steam binding of any ECCS pump. If the event would not have been terminated when it was, and if the event would have occurred earlier in MODE 4 than it did, flashing would have eventually occurred in the RCS and a steam/water mixture would have been released to the ECCS piping. A thermal-hydraulic analysis has been initiated to determine the fluid conditions in the RCS and the ECCS piping. This analysis will provide conclusions on whether the ECCS pumps would fail during the recovery period. The preliminary analysis results have determined that a void fraction of less than 5% would have occurred at the ECCS pump suction under various conditions including those supported by operator action times from a simulator run in November, 1994. The ECCS pumps would not fail under any of these conditions although some pump degradation could be expected due to the low void fractions at the ECCS pump suctions. Based on the preliminary analysis results and Westinghouse findings, it is concluded that the ECCS make up capability can be maintained to bring the plant to cold shutdown conditions.

Other Previous Occurrences:

None.