

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Britt Mc-Kinney
Vice President Plant Operations
and Plant Manager

JAN 21 2000

WO 00-0004

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 1999-016-00

Gentlemen:

The enclosed Licensee Event Report (LER) 1999-016-00 is being submitted, pursuant to 10 CFR 50.73(a)(2)(i)(B), regarding Wolf Creek Nuclear Operating Corporation's identification of a condition that rendered two trains of the Emergency Core Cooling System inoperable at the same time.

The attachment to this letter identifies there are no additional actions committed to by Wolf Creek Nuclear Operating Corporation in the enclosed LER.

If you should have any questions regarding this submittal, please contact me at (316) 364-4112, or Mr. Michael J. Angus at (316) 364-4077.

Very truly yours,



Britt Mc-Kinney

BTM/rlr

Enclosure
Attachment

cc: J. N. Donohew (NRC), w/e, w/a
W. D. Johnson (NRC), w/e, w/a
E. W. Merschoff (NRC), w/e, w/a
Senior Resident Inspector (NRC), w/e, w/a



LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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WOLF CREEK GENERATING STATION

DOCKET NUMBER (2)
05000482

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TITLE (4)
Potential for Both Trains of Safety Injection to be Inoperable Due to Erroneous Valve Test Procedure Line Up

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
12	23	1999	1999	016	00	01	21	2000	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		MODE 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		100%	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)	
			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
Michael J. Angus
Manager Licensing and Corrective Action

TELEPHONE NUMBER (Include Area Code)
(316) 364-4077

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (16):

On December 23, 1999, Wolf Creek Nuclear Operating Corporation (WCNOC) determined that the procedure line up for the Safety Injection (SI) System Train Inservice Valve Test, in conjunction with an out-of-service SI pump, would have rendered both trains of SI inoperable. Wolf Creek Technical Specifications do not address a condition where both SI trains are inoperable while in Modes 1, 2, or 3; therefore, entry into Technical Specification 3.0.3 was required. An example of this condition was found to have existed on January 6, 1999. This condition is reportable in accordance with 10 CFR 50.73 (a) (2) (i) (B) and NUREG-1022, Revision 1. The condition was caused by out-of-sequence procedure steps. The procedure error has been in existence since June, 1984. When discovered, the procedure was corrected to ensure the valve line up does not render SI trains inoperable. Safety significance is based on a large break Loss of Coolant Accident (LOCA). The Wolf Creek Generating Station probabilistic safety assessment does not include any consideration for operation of the SI pumps for event mitigation. Accordingly, there would be no core damage frequency impact due to loss of SI pump function following a large break LOCA. Therefore, the safety significance is minimal.

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

Plant Conditions Prior to the Event:

Mode -- 1
 Power -- 100 percent
 Temperature -- 586.2 degrees Fahrenheit
 Pressure - 2238.2 pounds per square inch gauge

Basis for Reportability:

WCGS Technical Specification 3.5.2 requires that two independent Emergency Core Cooling Systems (ECCS) be operable with each subsystem comprised of:

- One operable centrifugal charging pump (CCP),
- One operable Safety Injection (SI) pump,
- One operable Residual Heat Removal (RHR) heat exchanger,
- One operable Residual Heat Removal pump, and
- An operable flow path capable of taking suction from the refueling water storage tank on a Safety Injection Signal and automatically transferring suction to the containment sump during the recirculation phase of operation.

While the plant was in Mode 1, the "B" SI Pump (PEM01B) was removed from service. Procedure STS EM-201B, "Safety Injection System Train A (B) Inservice Valve Test," was performed with Valve EM HV-8821B and Valve EM HV-8802B both open. During the time both valves were open, the potential existed for the "A" SI pump to fail due to pump runout if a Large Break LOCA would have occurred. Therefore, both SI trains were inoperable and entry into Technical Specification 3.0.3 was required, because no condition under Technical Specification 3.5.2 allows having both ECCS trains inoperable while in Modes 1, 2, or 3.

As discussed in NUREG-1022, Revision 1, conditions requiring entry into Technical Specification 3.0.3 are reportable in accordance with 10 CFR 50.73 (a) (2) (i) (b).

Event Description:

On December 23, 1999, during reviews associated with the implementation of the Improved Technical Specifications, WCNOG personnel discovered a condition that could result in both trains of Safety Injection being inoperable at the same time. Performance Improvement Request 1999-4044 was generated to investigate. The investigation identified one instance in early 1999 when a configuration existed that could have rendered both trains inoperable at the same time.

Surveillance test procedures STS EM-201A and STS EM-201B, "Safety Injection System Train A (B) Inservice Valve Test," are performed quarterly. These procedures stroke time test some safety injection system (EM) containment isolation valves in accordance with the Inservice Testing Program. The tests partially satisfy Surveillance Requirement (SR) 3.6.3.5, "Containment Isolation Valve Isolation Time," and Technical Specification 5.5.8, "Inservice Test Program." These test procedures require applying control power to and then opening valves EM HV-8802A and EM HV-8802B respectively, which are the SI Pump A and B Discharge Hot Leg Injection Valves.

In Modes 1, 2, and 3, in order to satisfy SR 3.5.2.1, EM HV-8802A and EM HV-8802B are required to be in the CLOSED position with power to the valve operators removed. This configuration renders the valves passive components and ensures that they cannot change

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position as a result of an active failure or be inadvertently misaligned. Misaligning these valves can disable the function of both ECCS trains and invalidate the accident analyses. However, opening EM HV-8802A or EM HV-8802B would not cause both SI trains to be inoperable, due to pump runout during a large break LOCA, provided both SI pumps are available or EM HV-8821A or EM HV-8821B remains closed. On January 6, 1999, while the plant was in Mode 1, the 'B' SI Pump (PEM01B) was removed from service at 0600. Procedure STS EM-201B was performed between 0915 and 0937. Pump PEM01B was returned to service at 1527. During the performance of STS EM-201B, EM HV-8802B was open for less than two minutes, between 0929 and 0931. During these two minutes, valve EM HV-8821B remained open. For the time that both EM HV-8802B and EM HV-8821B were open, the potential existed for the "A" SI pump to fail due to pump runout if a Large Break LOCA would have occurred.

Root Cause:

PIR 1999-4044 was generated to evaluate this event. Procedure STS EM-201, issued June 14, 1984, did not include precautions or limitations to have EM HV-8821A(B) closed when EM HV 8802A(B) was opened. Therefore, it has been concluded that the root cause of the inappropriate procedure step sequence is indeterminate due to the historical nature of the procedural inadequacy.

A contributing cause to this event was a lack of information in the original Technical Specification Bases. Little or no information was included in the bases to alert procedure writers to the potential for disabling both SI trains when EM HV-8802A(B) is stroked open. In the Improved Technical Specifications, implemented December 18, 1999, the Bases for SR 3.5.2.1 clearly describe the importance of having EM HV-8802A(B) closed while in Modes 1, 2, or 3. It states:

"Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removal of power or by key locking the control in the correct position ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type that can disable the function of both ECCS trains and invalidate the accident analyses."

Corrective Action Taken:

Revisions to procedures STS EM-201A and B were issued on December 30, 1999, to include an operability precaution and to re-sequence the steps to ensure valve EM HV-8821 A(B) is closed prior to opening EM HV-8802A(B).

Actions to Prevent Recurrence:

Technical Specification SR 3.5.2.1 lists the following valves that are required to be in the proper position with power removed while in Modes 1, 2 or 3:

- BN HV-8813, Safety Injection to RWST Isolation Valve - OPEN
- EM HV-8802A, SI Hot Legs 2 & 3 Isolation Valve - CLOSED
- EM HV-8802B, SI Hot Legs 1 & 4 Isolation Valve - CLOSED
- EM HV-8835, Safety Injection Cold Leg Isolation Valve - OPEN
- EJ HV-8840, RHR/SI Hot Leg Recirculation Isolation Valve - CLOSED
- EJ HV-8809A, RHR to Accumulator Injection Loops 1 & 2 Isolation Valve - OPEN

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- EJ HV-8809B, RHR to Accumulator Injection Loops 3 & 4 Isolation Valve - OPEN

The following surveillance procedures stroke time test these valves per the Inservice Testing (IST) program:

- STS BN-202 for BN HV-8813 (Performed during refuel Shutdown)
- STS EM-201A for EM HV-8802A (Performed quarterly in any mode)
- STS EM-201B for EM HV-8802B (Performed quarterly in any mode)
- STS EM-202 for EM HV-8835 (Performed during refuel Shutdown)
- STS EJ-202A for EJ HV-8809A (Performed during refuel Shutdown)
- STS EJ-202B for EJ HV-8840 and EJ HV-8809B (Performed during refuel Shutdown)

A review of the above surveillance procedures indicates that only EM HV-8802A or (B) are stroke time tested in Modes 1, 2, 3 or 4. STS EJ-202A and (B), "Train A/B RHR System Inservice Valve Test," reference the applicable Technical Specification LCOs that apply in Modes 5 or 6 for required RHR operability. Therefore, the deficiencies of surveillance procedures STS EM-201A (B) are not generic to the other valves included in SR 3.5.2.1.

A review of other Operations procedures that could open EM HV-8802A(B) was performed. Procedure SYS EM-410, "Fill And Vent Of Safety Injection System After Maintenance," was identified that throttles open EM HV-8802A(B). However, this procedure is used during refueling outages after the SI System has been drained and maintenance performed on the system. EMG ES-13, "Transfer to Hot Leg Recirculation," also opens EM HV-8802A(B), as designed, to mitigate a Loss of RCS Inventory Accident. However, procedure EMG ES-13, requires the SI pump be stopped, then EM HV-8821A(B) is closed, and then EM HV-8802A(B) opened.

Procedure SYS EP-200, Safety Injection Accumulator Operations, was reviewed to determine whether a potential for pump runout exists due a similar line-up when the accumulators are filled by the SI pumps. This procedure ensures that EM HV-8821A(B) is closed for the SI pump/train that is being used to fill the accumulators. Also a note refers to Technical Specification LCO 3.5.2 when EMHV8821A(B) is closed because the SI pump discharge to the cold legs injection path becomes inoperable. With EM HV08821A (B) closed, the potential for either SI pump to operate in runout conditions does not exist. The deficiencies identified in procedures STS EM-201A and (B) are not generic to SYS EP-200.

Other valves have been identified that, if mispositioned, could result in entry into Technical Specification 3.0.3. Following is the list of additional Motor Operated Valves:

- EJ HV-8716A, RHR Train A to Safety Injection System Hot Leg Recirculation Isolation Valve
- EJ HV-8716B, RHR Train B to Safety Injection System Hot Leg Recirculation Isolation Valve
- EM HV-8923A, Refueling Water Storage Tank to SI Pump A Suction Isolation Valve
- EM HV-8924, Chemical Volume Control System to SI Pump A Isolation Valve

Procedure STS EJ-202A(B) stroke time tests EJ HV-8716A(B); however, the test is restricted to Modes 5, 6 or Defueled. Valve EM HV-8924 is not tested per the IST program. Procedure STS EM-203 performs a two-year position indication test (PIT) of EM HV-8923A. There are no precautions or limitations related to opening EM HV-8923A in STS EM-203. PIR 1999-3942 associated to LER 1999-015-00 is evaluating the deficiencies in this procedure.

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Safety Significance:

The intermediate head safety injection pumps (PEM01A/B) are designed to supply borated water to all four cold legs by means of a common header during injection and cold leg recirculation phases of ECCS operation. With EM HV-8802A or B open, a portion of the safety injection pump flow will be diverted to two hot legs of the Reactor Coolant System. The diversion of flow to the hot legs may result in SI pump runout. Pump runout would not occur if both pumps start, since the pumps share the same discharge header to the cold legs, and the maximum flow is based on single pump operation. If only a single pump is available, the pump would exceed its runout flow limit following large break LOCA scenarios. During a small break LOCA, the conditions described in this PIR would not cause failure of an SI pump, because the SI pump will not deliver flow at or above its maximum flow rate. This is due to the relatively high RCS pressures following a postulated small break LOCA. Therefore, this concern only applies to the large break LOCA scenarios.

During the performance of STS EM-201A(B), the Control Board Operator opens EM HV-8802A(B) using the Control Board Handswitch and then immediately closes the valve in the next step. The Operator is stationed at the handswitch ready to close the valve upon indication that it is fully open. STS EM-201A(B) has a precaution step that directs the operator to immediately place valve(s) and pump(s) under test in their Safety Injection Signal (SIS) position if a SIS occurs during the performance of this surveillance. Therefore, simple, proceduralized instructions for the operator are in place to close EM HV-8802A(B) after it is time-stroked open and immediately upon indication of a SIS. Closing EM HV 8802A(B), eliminates the potential for the opposite train SI pump to fail due to runout. Based on the above criteria, Safety System Availability was maintained for the duration of the surveillance.

Operating a pump beyond its actual runout limit would challenge its operability, cause pump damage, and eventually result in its failure. A loss of SI flow represents a degraded condition for the ECCS performance during event mitigation of a Large Break LOCA and may incur a penalty for the peak cladding temperature (PCT) calculation. However, because the reduction in ECCS flow due to SI pump failure is small relative to accumulator and RHR pumped flow, the expected penalty would not be significant. There is reasonable assurance that the resultant PCT for a Large Break LOCA would remain within the regulatory limit of 2200°F. Therefore, a basis for continued licensed operation still existed during the identified configuration.

The best estimate Probabilistic Safety Assessment (PSA) does not include any consideration for operation of the SI Pumps or Centrifugal Charging Pumps for event mitigation of a Large Break LOCA. Accordingly, there would be no Core Damage Frequency (CDF) impact due to loss of SI Pump function following a large break LOCA.

Based on the above discussion, the condition described in this LER would not have resulted in the loss of safety function or unavailability of the ECCS system for event mitigation of design basis accidents.

Other Previous Occurrences:

LER 1999-015-00, dated January 12, 2000, documented a condition in which a combination of inoperable components resulted in a violation of WCGS Technical Specification 3.5.2. Corrective action plans associated with LER 1999-015-00 were being implemented during the time that this LER was generated and therefore would not have precluded this event.

LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation (WCNOC) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Michael J. Angus, Manager Licensing and Corrective Action at Wolf Creek Generating Station, (316) 364-4077.

COMMITMENT	Due Date/Event
NONE	