

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

Matthew W. Sunseri  
Vice President Operations and Plant Manager

March 7, 2008

WO 08-0008

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

Subject: Docket No. 50-482: Licensee Event Report 2008-001-00,  
Completion of a Technical Specification Required Shutdown

Gentlemen,

As a result of Technical Specification surveillance testing, gas voids were found in the suction piping of the Emergency Core Cooling System (ECCS). The plant conservatively entered Technical Specification 3.0.3 and placed the unit in Mode 3. Engineering evaluation of the void content concluded that the ECCS would still have performed its safety function. The enclosed Licensee Event Report (LER) 2008-001-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(A) to document this condition.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4008, or Mr. Richard D. Flannigan, Manager Regulatory Affairs at (620) 364-4117.

Sincerely,



Matthew W. Sunseri

MWS/rlt

Enclosure

cc: E. E. Collins (NRC), w/e  
V. G. Gaddy (NRC), w/e  
B. K. Singal (NRC), w/e  
Senior Resident Inspector (NRC), w/e

JE22

NRR

# LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

<b>1. FACILITY NAME</b> WOLF CREEK GENERATING STATION	<b>2. DOCKET NUMBER</b> 05000 482	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Completion of a Technical Specification Required Shutdown

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	10	2008	2008	- 001 -	00	03	07	2008	FACILITY NAME	DOCKET NUMBER
										05000
										05000

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> <i>(Check all that apply)</i>									
<b>10. POWER LEVEL</b> 100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER						
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A						

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Richard D Flannigan, Manager Regulatory Affairs	TELEPHONE NUMBER <i>(Include Area Code)</i> (620) 364-4117
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="radio"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="radio"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR

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

On 01/10/2008 and 01/11/2008 air (voids) was found entrapped on the suction side of the Centrifugal Charging and Safety Injection (SI) pumps. Wolf Creek Operations conservatively declared both trains of the Emergency Core Cooling System (ECCS) inoperable, entered Technical Specification 3.0.3 and the plant entered Mode 3.

An ultrasonic examination of piping from the Residual Heat Removal (RHR) discharge to the Centrifugal Charging pumps (CCP) and SI pumps suction line, called the piggy-back line, found a void. The void collected at high points in the piping. These high points were the result of fabrication and construction during the original installation of the piping.

Engineering evaluation of the void content in the suction piping concluded that the ECCS would still meet its safety function.

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

**PLANT CONDITIONS PRIOR TO EVENT:**

MODE – 1  
Power – 100

**BACKGROUND:**

The safety function of the Safety Injection (SI) pumps is to provide intermediate pressure injection and recirculation flow to the Reactor Coolant System (RCS) following a Design Basis Accident (DBA). The safety function of the Centrifugal Charging Pumps (CCPs) is to provide high-pressure injection and recirculation flow to the RCS following a DBA.

**EVENT DESCRIPTION:**

Technical Specification surveillance requirements state that once every 31 days the Emergency Core Cooling System (ECCS) piping is verified to be full of water by venting the ECCS pump casings and accessible discharge piping high points. Procedure STS BG-002, "ECCS Valve Check and System Vent", performs this surveillance and allows for the use of ultrasonic examination techniques.

On 1/2/2008, procedure STS BG-002 was conducted and all the locations vented met the guidance in the procedure except one location, the "A" train SI pump hot leg discharge line. On 1/3/2008, the "A" train SI hot leg discharge line was vented again to verify that the pipe was water solid and the intrusion of gas was eliminated. The discharge line again exceeded the guidance of procedure STS BG-002. The source of the gas was found to be nitrogen desorption, from the Safety Injection accumulator water, leaking through multiple valves.

In response to the nitrogen gas found in the SI discharge line, additional inspections of both discharge and suction piping for the ECCS pumps, using ultrasonic testing (UT), were performed to determine if other voids were present.

On 1/10/2008, a UT examination of piping from the Residual Heat Removal (RHR) discharge to the CCPs and SI pumps suction line, called the piggy-back line, found a void. Both trains of ECCS were conservatively declared inoperable and Technical Specification (TS) 3.0.3 was entered. The pipe was vented to remove the voiding and TS 3.0.3 was exited.

Subsequently, on 1/11/2008, UT examinations were made at additional locations along the high point of the piggy-back piping, and it was determined that the venting had not reduced the size of the void volume along the entire length of the piping. When it was determined that the void volume could not be reduced to an acceptable size by venting, both trains of ECCS were conservatively declared inoperable, TS 3.0.3 was entered, and the plant entered Mode 3.

Analysis of the gas from the piggy-back line determined it was air with 4.6% hydrogen. This line is connected to the suction of the CCPs and the Volume Control Tank (VCT), which has a hydrogen overpressure. When the local conditions downstream of the VCT no longer support hydrogen saturated conditions, hydrogen can come out of solution.

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

Engineering evaluated the effect of the gas void volumes found in the ECCS suction piping. Engineering concluded that there would be no effect on the ECCS pumps. All pumps would have had the required net positive suction head (NPSH) with the identified voids present. All ECCS pumps would have remained functional during and following ingestion of gas from the voids identified in the suction piping. Therefore, the gas voids identified in the ECCS suction piping would not have prevented the system from performing its safety function.

**BASIS FOR REPORTABILITY:**

10 CFR 50.73(a)(2)(i)(A) requires reporting 'the completion of any nuclear plant shutdown required by the plant's Technical Specifications'.

**ROOT CAUSE:**

Although the suction lines were built within acceptable construction tolerances, it was found that some of the original ECCS piping was not optimized to prevent gas voiding. Fabrication of the pipe is believed to have resulted in a bow of the line. Another portion of the piping had a reverse slope that is also believed to have occurred during original plant construction. Both of these issues, the bowed line and reverse slope, created conditions where voids could collect and not be vented.

Prior to the extent of condition inspections performed due to the voiding found in the discharge piping, the suction side of ECCS piping was not inspected or vented. Standard TS surveillance requirements for the monthly ECCS venting did not include suction pipe venting, only the pump casings and the accessible discharge piping high points.

**CORRECTIVE ACTIONS:**

Actions that were taken included:

1. Two vent valves were installed at the high points found during the inspections.
2. An UT inspection plan was developed that included UT testing of 105 locations on the suction and discharge of the ECCS systems most susceptible to void accumulation.
3. For the pipe locations with identified voids, the inspection frequency was increased to daily until at least 3 UTs identified no increase in the gas void.
4. Engineering dispositions evaluated the voids remaining in the ECCS suction and discharge piping.
5. Procedure STS BG-002 was revised to include additional suction and discharge locations for UT inspections and venting.

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

**SAFETY SIGNIFICANCE:**

The presence of non-condensable gas volumes in the suction side of the ECCS pumps has the potential to gas-bind the pump or to reduce the discharge pressure, affecting the pump function during cold leg recirculation. Of specific concern at Wolf Creek was the gas volumes found in the piggy-back piping between the RHR discharge and the high and intermediate head injection pumps. Depending on which RHR pump is operating, this piping provides a common flow path to both trains of the CCPs or both trains of the SI pumps. Gas volumes in this piping could potentially affect either both CCPs or both SI pumps. Depending upon which RHR pump or train has failed, flow through this piping will only flow to one subsystem (CCP or SI), but not both. Thus it could not adversely affect both subsystems simultaneously.

This event had a low safety significance since the presence of the voids would not have prevented the ECCS pumps from performing their safety function.

**OPERATING EXPERIENCE/PREVIOUS EVENTS:**

None.