WOLF CREEK
NUCLEAR OPERATING CORPORATION

Russell A. Smith
Plant Manager

April 9, 2011

WO 11-0018

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

Subject: Docket No. 50-482: Licensee Event Report 2011-001-00, "Potential for a CVCS Through-Weld Leak to Affect Reactor Coolant System Inventory After a Loss of Coolant Accident"

Gentlemen:

The enclosed Licensee Event Report (LER) is being submitted pursuant to 10 CFR 50.73 regarding a leak from the Chemical Volume and Control System (CVCS) that occurred on January 3, 2011. Wolf Creek Nuclear Operating Corporation (WCNOC) determined on March 26, 2011 that this event was not required to be reported under 10 CFR 50.73 (a)(2)(i)(B) because this failure would not have prevented the CVCS from fulfilling the high-pressure safety injection (HPSI) function of the system.

However, on April 1, 2011, based on questioning by a Nuclear Regulatory Commission (NRC) inspector during an In-Service Inspection, it was determined that WCNOC did not address the extent to which the CVCS leak would impact Reactor Coolant System (RCS) inventory after a Loss of Coolant Accident (LOCA). WCNOC is conducting an additional evaluation to determine whether the CVCS leak could have prevented fulfillment of that system safety function. That evaluation is scheduled for completion on May 17, 2011.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4156, or Mr. Gautam Sen at (620) 364-4175.

Sincerely,

Russell A. Smith

RAS/rlt

Enclosure

cc: E. E. Collins (NRC), w/e
J. R. Hall (NRC), w/e
G. B. Miller (NRC), w/e
Senior Resident Inspector (NRC), w/e

IE22
NRR

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(10-2010)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
WOLF CREEK GENERATING STATION	05000 482	1 OF 3

4. TITLE
Potential for a CVCS Through-Weld Leak to Affect Reactor Coolant System Inventory After a Loss of Coolant Accident

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
										05000
01	03	2011	2011	- 001 -	00	04	09	2011	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☒ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☒ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Gautam Sen, Manager Regulatory Affairs	(620) 364-4175

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	CB	PSF		N					

14. SUPPLEMENTAL REPORT EXPECTED

☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
06	30	2011

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

At 1551 on January 3, 2011 with the plant at 100 percent power in Mode 1, operators identified a 300 drop-per-minute leak from a weld on a three-quarter-inch connection that joined a four-inch line in the Chemical Volume and Control System (CVCS) to a vent-valve assembly. A through-weld crack caused the leak and the weld was repaired on January 4, 2011. The vent-valve assembly was installed on October 24, 2009 during Refueling Outage 17.

Operations initiated a reportability evaluation on January 5, 2011 to determine whether this event should be reported as a condition prohibited by technical specifications under 10 CFR 50.73(a)(2)(i)(B). Wolf Creek Nuclear Operating Corporation (WCNOC) determined on March 26, 2011 that this event was not required to be reported under 10 CFR 50.73(a)(2)(i)(B) because this failure would not prevent the CVCS from fulfilling the high-pressure safety injection (HPSI) function.

However, on April 1, 2011, based on questioning by a Nuclear Regulatory Commission inspector during an In-Service Inspection, it was determined that WCNOC did not address the extent to which the CVCS leak would impact Reactor Coolant System (RCS) inventory after a Loss of Coolant Accident. WCNOC is currently evaluating this issue.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
WOLF CREEK GENERATING STATION	05000 482	2011	001	00	2 OF 3

NARRATIVE

PLANT CONDITIONS PRIOR TO EVENT

Mode 1
100% power
No equipment that was inoperable contributed to this event.

EVENT DESCRIPTION

At 1551 on January 3, 2011 with the plant at 100 percent power in Mode 1, operators identified a 300 drop-per-minute leak from a weld on a three-quarter-inch vent line in the Chemical Volume and Control System (CVCS) [EIIS Code: CB] and the CVCS was taken out of service. The shift manager declared the "A" Centrifugal Charging Pump (CCP) [EIIS Codes: BQ, P] inoperable until the CVCS leak was isolated and the CVCS restored to service at 1758 on January 3, 2011. One boron injection flow path for the "A" CCP was isolated but another flow path was available through the boron injection tank [EIIS Codes: BQ, TK].

The CVCS maintains the required water inventory in the Reactor Coolant System (RCS) [EIIS Code: AB] during normal operation, start-up and shutdown and provides normal make-up to the Refueling Water Storage Tank [EIIS Code: TK] and the Spent Fuel Pool. This system also controls the boron concentration to compensate for core burn-up during normal power operations and maintains the required shutdown margin during refueling. The charging subsystem of the CVCS provides injection flow to the RCS upon receipt of a safety injection signal. Portions of the CVCS associated with emergency boration and charging for the Emergency Core Cooling System (ECCS), reactor coolant pressure boundary isolation and containment isolation are required to function following a Design Basis Accident to achieve and maintain the plant in a safe shutdown condition.

Quality Control personnel initiated Condition Report (CR) 31799 on January 5, 2011 because the weld was undersized with respect to a 2:1 taper requirement. Operations reviewed CR 31799 and initiated a reportability evaluation on January 5, 2011 to determine whether this event should be reported as a condition prohibited by technical specifications under 10 CFR 50.73(a)(2)(i)(B). Wolf Creek Nuclear Operating Corporation (WCNOC) determined on March 26, 2011 that this event was not required to be reported under 10 CFR 50.73(a)(2)(i)(B) because this failure would not prevent the CVCS from fulfilling the high-pressure safety injection (HPSI) function.

However, on April 1, 2011, based on questioning by a Nuclear Regulatory Commission inspector during an In-Service Inspection, it was determined that WCNOC did not address the extent to which the CVCS leak could impact RCS inventory after a Loss of Coolant Accident (LOCA). WCNOC is currently evaluating this issue to determine to what extent the CVCS leak would have affected RCS inventory after a LOCA. The potential for the size and impact of the CVCS leak to have increased is also being evaluated. WCNOC expects to complete this additional evaluation by May 17, 2011.

BASIS FOR REPORTABILITY

The CVCS leak could have prevented fulfillment of the system safety function to maintain RCS inventory after a LOCA, which then could have affected the suction of the Residual Heat Removal (RHR) pumps [EIIS Codes: BP, P]. The CVCS leak is reported as an event or condition that could have prevented fulfillment of a safety function [10 CFR 50.73(a)(2)(v)(D)] and as a single cause that could have prevented fulfillment of the safety functions of two or more trains or channels in different systems [10 CFR 50.73(a)(2)(ix)(A)].

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
WOLF CREEK GENERATING STATION	05000 482	2011	-- 001 --	00	3 OF 3

ROOT CAUSE

The leak was caused by a through-weld crack. The cracking initiated and subsequently propagated from the gap created by a lack of fusion in welding. The lack of fusion ultimately led to the failure that caused the leak.

This weld was determined to be unacceptable because a 2:1 slope was not attained as required by the installation detail on the piping isometric drawing (M-13BG02, Rev. 07). The weld measures 8/32 to 9/32 inches in the short dimension and 11/32 to 12/32 inches in the long dimension. These dimensions did not conform to WCNOC's specification on the design drawing for a 2:1 taper on the weld, but did comply with ASME Code requirements for minimum size of a fillet weld for a socket connection. The purpose of the 2:1 taper requirement for the weld is to reduce the stress concentration at the toe of the weld on the pipe. Because the crack initiated from a weld root defect and propagated through the throat of the weld, the failure to meet the 2:1 taper requirement is not considered to have been a factor in the weld failure that caused the leak.

CORRECTIVE ACTIONS

The CVCS weld that leaked was removed and submitted to a materials testing firm for a hardware failure analysis. It was repaired on January 4, 2011. The CVCS vent valve assembly was installed on October 24, 2009 during Refueling Outage 17.

Other potentially defective (undersized) welds made during Refueling Outage 17 have been re-inspected and either repaired or determined to be acceptable. No other welds were found to be leaking. All of the similar welds fabricated in the welding shop for Refueling Outage 18 have been re-inspected and determined to be acceptable.

SAFETY SIGNIFICANCE

An unidentified and unisolated CVCS leak has the potential to prevent fulfillment of the safety function to maintain RCS inventory after a LOCA, which could then affect suction of the RHR pumps. WCNOC is currently evaluating this issue to determine to what extent the CVCS leak would have affected RCS inventory after a LOCA. The potential for the size and impact of the CVCS leak to have increased is also being evaluated. WCNOC expects to complete this additional evaluation by May 17, 2011.

OPERATING EXPERIENCE / PREVIOUS EVENTS

WCNOC installed 62 vent-valve assemblies in Refueling Outage 16, Refueling Outage 17 and a forced outage. The event described in this LER is the only through-weld crack associated with installation of these vent-valve assemblies.