WOLF CREEK
NUCLEAR OPERATING CORPORATION

Russell A. Smith
Site Vice President

July 31, 2014

WO 14-0062

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

Subject: Docket No. 50-482: Licensee Event Report 2014-004-00, "Condition Prohibited by Technical Specifications due to an Instrument Tunnel Sump Level Indication Transmitter Incompatible with the Containment Environment"

Gentlemen:

The enclosed Licensee Event Report (LER) 2014-004-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) regarding an operation or condition prohibited by Technical Specifications.

This letter contains no regulatory commitments. If you have any questions concerning this matter, please contact me at (620) 364-4156, or Mr. Steven R. Koenig at (620) 364-4041.

Sincerely,

Russell A. Smith

RAS/rlt

Enclosure

cc: M. L. Dapas (NRC), w/e
C. F. Lyon (NRC), w/e
N. F. O'Keefe (NRC), w/e
Senior Resident Inspector (NRC), w/e

IE22
NRR

NRC FORM 366 (01-2014)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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 Page 2 for required number of digits/characters for each block)

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4. TITLE Condition Prohibited by Technical Specifications due to an Instrument Tunnel Sump Level Indication Transmitter Incompatible with the Containment Environment

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
06	02	2014	2014	004	00	07	31	2014	FACILITY NAME	DOCKET NUMBER
										05000

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

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Steven R. Koenig, Manager Regulatory Affairs	(620) 364-4041

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	IJ	LIT	M120	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

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

On June 2, 2014, investigation of the erratic operation of the instrument tunnel sump level indication identified that the level indication had been inoperable from July 13, 2013 until November 20, 2013. As such, the Required Actions of Limiting Condition for Operation (LCO) 3.4.15, "RCS Leakage Detection Instrumentation," were not met. The event that led to this investigation was the identification that the instrument tunnel sump unidentified leak rate computer point was coming in and out of alarm high on May 28, 2014.

The apparent cause of the instrument tunnel sump level indication failure is the digital level transmitter design is not suitable for the instrument tunnel sump application. Compensatory measures were taken to maintain the capability of the instrument sump level indication to perform its specified function. Restoration of the instrument tunnel sump level transmitter from the degraded condition is being accomplished under the corrective action program.

APPROVED BY OMB: NO.3150-0104 EXPIRES: 01/31/2017

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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.

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NARRATIVE

PLANT CONDITIONS PRIOR TO THE EVENT

Mode - 1
Power - 100%
There were no systems, structures or components (SSC) that were inoperable at the start of the event and contributed to the event.

BACKGROUND

The instrument tunnel sump level transmitter [EIIS Code: IJ, LIT] (LFLT0079) is part of the dirty radwaste drain subsystem [EIIS Code: WD] of the Floor and Equipment Drain System [EIIS Code: WK]. The instrument tunnel sump is part of the Containment Sump Level and Flow Monitoring System. This system detects a leak in the Reactor Coolant System [EIIS Code: AB] (RCS) by level changes in the containment normal or instrument tunnel sumps [EIIS Code: IJ]. Indication of increasing sump level is transmitted from the sump to the control room level indicator by means of a sump level transmitter. The system provides measurements of low leakages by monitoring level increase versus time.

DESCRIPTION

On May 28, 2014 Control Room operators noted that the instrument tunnel sump unidentified leak rate computer point was coming in and out of alarm high. On May 28, 2014 at 2130 Central Daylight Time (CDT), operations declared the instrument tunnel sump level indication inoperable. Condition A of Limiting Condition for Operation (LCO) 3.4.15, "RCS Leakage Detection Instrumentation," was entered for the inoperable Containment Sump Level and Flow Monitoring System. Condition A requires an RCS water inventory balance, Surveillance Requirement (SR) 3.4.13.1, be performed once per 24 hours and restoration of the Containment Sump Level and Flow Monitoring System to operable status in 30 days.

Investigation found that the instrument tunnel sump level indication had become erratic at approximately 1800 CDT on May 21, 2014. Further review of the computer point identified that the level transmitter had "locked up" and produced a constant output signal. This lock up condition was observed on May 22, 2014 and during a few months in 2013. During this time frame from July 13 to November 20, 2013, the level transmitter stopped its downward trend of evaporation and appeared to be locked up. On November 20, 2013, the level transmitter output signal dropped from about 10.2 inches to about 5.2 inches in 2 seconds. The sudden drop suggests that either the level transmitter was mechanically bound or in lock out condition.

The current level transmitter model was installed in March 2013 and is a digital level transmitter. The previous transmitter model was used between 2000 and 2013 and was an analog design.

The factors and potential causes for the erratic signal and the potential lock up condition were broken down into the mechanical and electrical areas by Engineering. The level transmitter's vendor indicated that possible component degradation within the transmitter was causing the erratic behavior in output signal. One of the most likely causes for this degradation is radiation exposure of which the installed level transmitter has no qualification.

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The vendor has exposed similar level transmitter models to less than 30,000 Rads and has experienced no failures. When exposed from 30,000 to 80,000 Rads, intermittent failures were observed and above 80,000 Rads failure occurred. The current level transmitter was installed in March of 2013 and, using a dose estimate of 5 Rem/hr gamma, has been exposed to at least 30,000 Rads.

The lock up experienced from July 13 to November 20, 2013 was likely caused by the level transmitter's software; when a faulted condition is experienced, the transmitter defaults to a failsafe mode. In the failsafe condition, the level transmitter defaults to the last reading. The lock up observed on May 22, 2014 was confirmed to be the result of a fault.

Compensatory measures were taken to maintain the capability of the instrument tunnel sump level indication to perform its specified function. These measures involve introducing water at a known rate into the instrument tunnel sump by a temporary modification and averaging the instrument tunnel sump level over a 60 second interval for input into the RCS leak detection program. On June 7, 2014 at 1529 CDT, the instrument tunnel sump level indication was declared operable but degraded and Condition A of LCO 3.4.15 was exited.

REPORTABILITY

Technical Specification (TS) LCO 3.4.15 requires the Containment Sump Level and Flow Monitoring System to be operable in Modes 1, 2, 3, and 4. Condition A of LCO 3.4.15 requires an RCS water inventory balance, SR 3.4.13.1, be performed once per 24 hours and restoration of the Containment Sump Level and Flow Monitoring System to operable status in 30 days. If SR 3.4.13.1 is not performed once per 24 hours or the Containment Sump Level and Flow Monitoring System not restored to operable status within 30 days, Condition E is also entered. Condition E requires the unit be in Mode 3 in 6 hours and Mode 5 in 36 hours. The Containment Sump Level and Flow Monitoring System was inoperable from July 13, 2013 until November 20, 2013. The discovery date for this inoperability was June 2, 2014. This exceeded the Completion Times of the Required Actions of Condition A and Condition E for LCO 3.4.15 and is therefore reportable as a condition prohibited by TS per 10 CFR 50.73(a)(2)(i)(B).

CAUSE

The apparent cause is the digital level transmitter design is not suitable for the instrument tunnel sump application. The most likely cause of the erratic output signal of the level transmitter is electrical in nature and is component degradation within the transmitter. The vendor has exposed similar level transmitter models to less than 30,000 Rads and has not experienced any failures. When exposed to 30,000 to 80,000 Rads intermittent failures were observed and above 80,000 Rads failure occurred. The current level transmitter was installed in March of 2013 and, using a dose estimate of 5 Rem/hr gamma, has been exposed to at least 30,000 Rads.

CORRECTIVE ACTIONS

After the erratic behavior of the instrument tunnel sump level transmitter was identified on May 28, 2014, the instrument tunnel sump level indication was declared inoperable and Condition A of LCO 3.4.15 was entered.

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NARRATIVE

Compensatory measures were taken to maintain the capability of the instrument tunnel sump level indication to perform its specified function. These measures involve introducing water at a known rate into the instrument tunnel sump by a temporary modification and averaging the instrument tunnel sump level over a 60 second interval for input into the RCS leak detection program.

Restoration of the instrument tunnel sump level transmitter from the degraded condition is being accomplished under the corrective action program.

SAFETY SIGNIFICANCE

The actual nuclear safety significance of the instrument tunnel sump level indication is low. The level transmitter is a non-safety related component that is not required to mitigate the effects of a design basis accident or bring the plant to a safe shutdown condition.

The RCS Leakage Detection Instrumentation consists of the Containment Sump Level and Flow Monitoring System, one containment atmosphere particulate radioactivity monitor, and one Containment Air Cooler Condensate Monitoring System. One containment atmosphere particulate radioactivity monitor and one Containment Air Cooler Condensate Monitoring System were operable during this event. Also, the containment normal sump level indication was available.

OPERATING EXPERIENCE/PREVIOUS EVENTS

None.