



June 29, 2011

Stephen E. Hedges
Site Vice President

WO 11-0035

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

Subject: Docket No. 50-482: LER 2011-005-00, Procedure Weakness Allowed
Entry Into Mode 6 With One Source Range Monitor Inoperable

Gentlemen:

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications. The LER involves entering Mode 6 with only one operable source range detector, instead of the required two operable source range detectors.

Attachment 1 describes a commitment associated with LER 2011-005-00. If you have any questions concerning this matter, please contact me at (620) 364-4190, or Mr. Gautam Sen at (620) 364-4175.

Sincerely,

A handwritten signature in black ink, appearing to be "SEH", written over a horizontal line.

Stephen E. Hedges

SEH/rlt

Enclosure
Attachment 1: List of Regulatory Commitments

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

IE 22

NRR

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2013												
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: 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.									
1. FACILITY NAME WOLF CREEK GENERATING STATION					2. DOCKET NUMBER 05000 482			3. PAGE 1 OF 4											
4. TITLE Procedure Weakness Allowed Entry Into Mode 6 With One Source Range Monitor Inoperable																			
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							
04	30	2011	2011	- 005	- 00	06	29	2011	FACILITY NAME			DOCKET NUMBER							
9. OPERATING MODE 6			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)																
10. POWER LEVEL 000			<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 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 checked="" 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 Gautam Sen, Manager Regulatory Affairs										TELEPHONE NUMBER (Include Area Code) (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										
X	IG	DET	IST	Yes															
14. SUPPLEMENTAL REPORT EXPECTED										15. EXPECTED SUBMISSION DATE									
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO									
										MONTH	DAY	YEAR							
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p>On April 30, 2011, during Refueling Outage 18, fuel was being loaded into the reactor vessel and the plant changed from a defueled condition to Mode 6. As the second fuel assembly was loaded next to source range detector SEN0031, the detector did not respond. Core alterations were suspended. A pulse shaper card required for source range detector operation had failed on April 14, 2011, and the failure was not detected at that time. The failed pulse shaper card was replaced later on April 30, 2011, and SEN0031 was declared operable and fuel loading resumed.</p> <p>The cause of the event was a procedural weakness in procedure STS CR-002, "Shift Log for Modes 4, 5, and 6," which did not require plant operators to check the operability of the source range detectors using the plant computer prior to loading fuel. All applicable surveillance requirements were met using instrumentation located in the control room, but those meters would not indicate an inoperable source range detector before fuel was loaded. Corrective action has been initiated to revise applicable procedures to direct the operator to check the plant computer before entering Mode 6 to ensure both source range channels are operable.</p>																			

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PLANT CONDITIONS PRIOR TO EVENT

Mode 6

0 percent power

Reactor Coolant System (RCS) pressure: the reactor vessel head was removed and RCS pressure was equivalent to the static head pressure of the Refueling Pool.

RCS temperature: 100 degrees Fahrenheit

EVENT DESCRIPTION

On April 30, 2011, during Refueling Outage 18, fuel was being loaded into the reactor vessel and the plant changed from a defueled condition to Mode 6. The plant entered Mode 6 at 0625 Central Daylight Time (CDT). The first fuel assembly was loaded next to source range detector SEN0032 [EIS: IG-DET], which responded properly with indication of an increase in the count rate to approximately 22 counts per second (cps).

When the second fuel assembly was loaded next to source range detector SEN0031 [EIS: IG-DET], Control Room operators identified that detector SEN0031 did not respond. SEN0031 was declared inoperable at 0706 CDT and core alterations were suspended in accordance with Condition A of Limiting Condition of Operation (LCO) 3.9.3, "Nuclear Instrumentation." Except for SEN0031, no other structures, systems, or components were inoperable that contributed to the event. SEN0031 and SEN0032 are model NY-1044 source range detectors, which were manufactured by the Imaging and Sensing Technology (IST) Corporation.

Source range detector SEN0031 failed to respond because a pulse shaper card required for source range detector operation had previously failed on April 14, 2011. The failure of the pulse shaper card was not detected at that time. The pulse shaper card is an electronic card and, as such, there are no visible signs of impending failure. The pulse shaper card is a run-to-failure subcomponent that failed after 26 years of acceptable service. The failed pulse shaper card was replaced on April 30, 2011 and SEN0031 was declared operable. On April 30, 2011, at 1435 CDT, Condition A of LCO 3.9.3 was exited. Fuel loading was recommenced on April 30, 2011 at 1523 CDT.

Procedure STS CR-002, "Shift Log for Modes 4, 5, and 6," is performed to ensure applicable Surveillance Requirements (SRs) are met before entry into a Mode or other specified condition in the Applicability. SR 3.9.3.1 requires performance of a channel check with a Frequency of 12 hours. The channel check was performed per procedure STS CR-002 prior to fuel being loaded into the reactor vessel and was satisfactory based on no fuel sources close to the detectors.

However, for the plant conditions that existed at the time of the event, operability of the source range detector could only be verified by reviewing plant computer data. Procedure STS CR-002 required only a channel check of the source range activity using the instrumentation located in the control room, which essentially read zero cps prior to loading fuel.

A careful review of the computer data showed that the source range detector SEN0031 had failed on April 14, 2011 while SEN0032 continued to provide indication that was slightly above zero cps. Source range detector SEN0031 last performed its function during off-loading of fuel for Refueling Outage 18. Off-loading of fuel for Refueling Outage 18 was completed on March 29, 2011.

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BASIS FOR REPORTABILITY

The procedural weakness that precluded recognition of the inoperable source range detector led to the plant entering Mode 6 under a condition specifically prohibited by Technical Specifications (TS). TS LCO 3.9.3 requires two operable source range neutron flux monitors during Mode 6. This condition was not met when the plant transitioned to Mode 6. TS LCO 3.0.4 allows entry into a Mode only under certain conditions. None of these conditions existed and, as such, the transition to Mode 6 was not performed in compliance with Technical Specifications. Therefore, this issue is reportable per 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications.

ROOT CAUSE

The cause of the event was a procedural weakness in procedure STS CR-002, "Shift Log for Modes 4, 5, and 6," which did not require plant operators to check the operability of the source range detectors using the plant computer prior to loading fuel. The operators monitored the source range activity with instrumentation located in the control room. However, those meters would not indicate an inoperable source range detector before fuel was loaded and could not determine that source range detector SEN0031 was inoperable due to the failure of the pulse shaper card. Procedure STS CR-002 did not direct the operators to review the plant computer data in order to verify operability of the source range detector channels. The pulse shaper card had been in service since initial plant start up and failed after more than 26 years of acceptable performance.

CORRECTIVE ACTIONS

The failed pulse shaper card was replaced on April 30, 2011. After replacement, source range detector SEN0031 responded properly and had comparable readings to source range detector SEN0032.

Corrective action has been initiated to revise the applicable procedure to direct the operator to check the plant computer before entering Mode 6 to ensure both source range channels are operable. Once the plant computer has been checked to verify that the channels are operable, then the source range detector readings will be taken from the safety-related meters on the main control board.

SAFETY SIGNIFICANCE

The source range neutron flux monitors provide a signal to alert the operators to unexpected changes in core reactivity, such as a boron dilution accident or an improperly loaded fuel assembly.

At the time of this event, two fuel assemblies were in the reactor vessel. One source range detector was fully operable with visible count rate indication, an audible high flux at shutdown alarm in the control room, and audible indication of count rate in the control room and containment. Both Gamma-Metrics source range neutron flux monitors were functioning correctly, but these detectors could not be used to satisfy LCO 3.9.3 because neither was coupled to a fuel assembly. In addition, Reactor Engineering personnel were monitoring and recording the neutron count rate during the core loading process.

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During this event, the boron concentration in the Reactor Coolant System (RCS) was verified to be within the Core Operating Limit Report (COLR) limits. All sources of unborated water that are connected to the RCS were secured closed to ensure the required boron concentration stated in the COLR would not be violated. Such controls, which are required by Technical Specifications, cumulatively prevent a dilution event. As a result, the overall safety significance of this event was determined to be minimal and there was no impact on the health and safety of the public.

The pulse shaper card could have failed under more severe conditions. In Modes 5, 4, 3 or 2 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted, then SEN0031 would not have been capable of performing the reactivity monitoring function and the Source Range Neutron Flux trip function required by TS 3.3.1, "RTS Instrumentation," Function 5. If only SEN0031 failed, then the opposite train source range detector and both post-accident detectors would be available to perform the reactivity monitoring function in Modes 5, 4, 3 or 2.

Only one of the two source range detectors would be available for the Source Range Neutron Flux trip function. The Source Range Neutron Flux Trips provide protection against an Uncontrolled Rod Cluster Control Assembly Bank Withdrawal From a Subcritical or Low Power Startup Condition as described in USAR section 15.4.1. The Safety Analysis does not credit the Source Range Neutron Flux trip to mitigate an accident but does credit the power range high neutron flux (low setting) to mitigate an accident. Thus, the reduction in Source Range Neutron Flux trip capability would present a reduction in a diverse redundant protection, but would not result in an unanalyzed condition or a loss of safety function needed to mitigate an accident. Since the source range instruments would display on-scale readings in Modes 5, 4, 3, and 2, the failure of a source range detector would be readily identifiable to an operator performing a channel check. Then, the appropriate conditions of TS 3.3.1 could be entered and the required actions could be performed.

OPERATING EXPERIENCE / PREVIOUS EVENTS

Wolf Creek Generating Station LER 2010-004-00, "Positive Reactivity Addition in Mode 2 with One Source Range Neutron Flux Channel Inoperable," Dated April 8, 2010. On 2/11/2010, the Nuclear Regulatory Commission issued violation 2009005-009, "Positive Reactivity Addition Prohibited by technical specifications while in Mode 2." A loss of off-site power event on 8/19/2009 caused a turbine and reactor trip and the plant entered Mode 3. As a result, power to the containment cavity cooling fans was lost.

During this period, Source Range Detector SEN0031 was reading lower than Source Range Detector SEN0032, then increased and stabilized significantly higher than SEN0032. On 8/20/2009, the cavity cooling fan was started and SEN0031 indication rapidly returned to near the same relative indication as SEN0032 that existed initially. The pulse shaper card is located in the Control Room and was not subjected to the high temperatures near SEN0031 during August 2009. During the subsequent reactor startup and power ascension to the point of de-energizing the source range instruments above the P-6 Intermediate Range Neutron Flux interlock, both source range instruments indicated normally and passed all normal channel checks.

The most probable cause of the behavior of SEN0031 following the loss of cavity cooling was increased temperature of the detector and associated cabling resulting in increased count rate indication. The violation occurred because after cavity cooling was restored and SEN0031 indication returned to normal, Wolf Creek Nuclear Operating Corporation did not consider SEN0031 to be inoperable prior to entering the mode of applicability. SEN0031 was replaced during Refueling Outage 17 in November 2009 and this prior corrective action would not have affected the capability to detect the failed pulse shaper card.

LIST OF REGULATORY COMMITMENTS

The following table identifies an action committed to by WCNOC in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments. Please direct questions regarding this commitment to Mr. Gautam Sen at (620) 364-4175.

REGULATORY COMMITMENTS

<u>Regulatory commitment</u>	<u>Due</u>
Revise procedure GEN 00-009, "Refueling," to direct the operator to check the Nuclear Plant Information System (NPIS) before entering Mode 6 to ensure both source range detector channels are operable.	August 31, 2011