



Russell A. Smith  
Site Vice President and Chief Nuclear Operating Officer

May 13, 2013

WO 13-0032

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

Subject: Docket No. 50-482: Licensee Event Report 2013-005-00, "Fatigue Failure of Jacket Water Pressure Switch Diaphragm Results in Loss of the 'B' Diesel Generator"

Gentlemen:

The enclosed Licensee Event Report (LER) 2013-005-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(v).

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4156, or Mr. Michael J. Westman at (620) 364-4009.

Sincerely,

A handwritten signature in black ink, appearing to read "RAS", followed by a long horizontal flourish.

Russell A. Smith

RAS/rlt

Enclosure: LER 2013-005-00

cc: A. T. Howell (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 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2013			
<b>LICENSEE EVENT REPORT (LER)</b>  (See reverse for required number of digits/characters for each block)										
1. FACILITY NAME <b>WOLF CREEK GENERATING STATION</b>					2. DOCKET NUMBER <b>05000 482</b>		3. PAGE <b>1 OF 4</b>			
4. TITLE <b>Fatigue Failure of Jacket Water Pressure Switch Diaphragm Results in Loss of the 'B' Diesel Generator</b>										
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
03	13	2013	2013	005	00	05	13	2013		05000
9. OPERATING MODE  <b>Defueled</b>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)							
10. POWER LEVEL  <b>0</b>			<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 checked="" 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 checked="" 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 checked="" 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 <b>Michael J. Westman, Manager Regulatory Affairs</b>								TELEPHONE NUMBER (Include Area Code) <b>(620) 364-4009</b>		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	
B	EK	PIS	C470	Y						
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE				
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO				
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)  <p>At 0134 Central Daylight Time (CDT) on 03/13/2013, Control Room annunciators 23B, "DG NE02 UV or UF," and 23D, "DG NE02 Trouble," were received for the 'B' diesel generator (DG). At 0149 CDT on 3/13/2013 the Shift Manager declared a Notification of Unusual Event (NUE) for Loss of Electrical Power/Assessment Capability, as both DGs were not available. At the time of the event, the reactor vessel was defueled with all fuel located in the spent fuel pool. The 'A' DG was out of service for maintenance. Power to the safety related busses were being supplied from the offsite power sources.</p> <p>The cause of the event was failure of the 'B' DG Jacket Water Pressure Switch (KJPS0162) due to water intrusion in the electrical portion of the switch. Excessive pressure oscillations in the jacket water pressure sensing line led to high cycle fatigue failure of the KJPS0162 diaphragm. The pressure switch was replaced.</p> <p>The 'B' DG was returned to service at 0221 CDT on 03/14/2013. The NUE was terminated at 0239 CDT on 03/14/2013.</p>										

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**PLANT CONDITIONS AT THE TIME OF THE EVENT**

Mode - Defueled

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: approximately 65 degrees Fahrenheit

No structures, systems or components (SSCs) were inoperable that contributed to the event other than the 'A' diesel generator (DG) [EIS: EK, DG].

**DESCRIPTION OF THE EVENT**

On 03/13/2013, with Wolf Creek Generating Station (WCGS) in Refueling Outage 19, the 'A' DG was out of service for scheduled maintenance and the 'B' DG [EIS: EK, DG] was operable and in standby. Power to the safety related busses were being supplied from the offsite power sources.

At 0134 Central Daylight Time (CDT) on 03/13/2013, Control Room annunciators 23B, "DG NE02 UV or UF," and 23D, "DG NE02 Trouble," were received for the 'B' DG. At 0149 CDT on 3/13/2013 the Shift Manager declared a Notification of Unusual Event (NUE) for Loss of Electrical Power/Assessment Capability, as both DGs were not available.

Troubleshooting determined that a false actuation of the high speed relay resulted in enabling the control circuitry to a running condition, despite the 'B' DG being in standby. This resulted in the actuation of protective relays due to the perceived malfunction of an operational parameter of the 'B' DG. The protective relays initiated a shutdown sequence and subsequent lockout, preventing the 'B' DG from being automatically or manually started. As a result, the 'B' DG was unavailable to perform its intended safety function.

Further troubleshooting discovered that the 'B' DG jacket water pressure switch (KJPS0162) [EIS: EK, DG, PIS] failed due to water intrusion in the electrical portion of the switch. The failure of KJPS0162 resulted in a false signal to the 'B' DG start logic circuitry since KJPS0162 acts as a back-up to the speed switch and is an input to the high speed relay. The high speed relay of the 'B' DG falsely closed due to the water intrusion. The false closure enabled the control circuitry to replicate a running state despite the 'B' DG being in standby.

This issue was not associated with the 'A' DG. The KJPS0162 jacket water pressure switch for the 'B' DG was replaced. The 'B' DG was returned to service at 0221 CDT on 03/14/2013. The NUE was terminated at 0239 CDT on 03/14/2013.

**BASIS FOR REPORTABILITY**

This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(B), (C) and (D) as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (B) Remove residual heat; (C) Control the release of radioactive material; or (D)

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mitigate the consequences of an accident. Specifically, the guidance in NUREG-1022, Rev. 2, states: "Both offsite electrical power (transmission lines) and onsite emergency power (usually diesel generators) are considered to be separate functions by GDC17. If either offsite power or onsite emergency power is unavailable to the plant, it is reportable regardless of whether the other system is available. GDC-17 defines the safety function of each system as providing sufficient capacity and capability, etc., assuming that the other system is not available."

**ROOT CAUSE**

The 'B' DG jacket water pressure switch stainless steel diaphragm had circumferential cracks in three locations. The fracture surfaces were characteristic of fatigue. This issue does not affect the 'A' DG.

An issue of jacket water pressure oscillations on the 'B' DG is documented in the corrective action program. Excessive hunting of the jacket water pressure transmitter (KJPT0164) [EIS: EK, DG, PIT] produced pressure oscillations in the jacket water pressure sensing line, which led to high cycle fatigue failure of the pressure switch diaphragm.

**CORRECTIVE ACTIONS**

The 'B' DG jacket water pressure switch was replaced.

An inspection was performed at locations with the same model pressure switch on the 'A' and 'B' DG. No water intrusion was found with these switches.

The following actions are being tracked in the WCGS corrective action program by Condition Report 65624:

A preventative maintenance change will be implemented to inspect the interior of the jacket water pressure switch for water intrusion moisture, or physical degradation at a frequency that will not exceed 22.5 months.

A preventative maintenance change will be implemented to replace the jacket water pressure switches on the 'A' and 'B' DGs at a frequency that will not exceed seven and one-half years.

**SAFETY SIGNIFICANCE**

At the time of the event, the plant was in a refueling outage. The entire core was in the spent fuel pool (SFP) and the SFP water inventory was full. The SFP time to boil was 11.7 hours.

When the 'A' and 'B' DGs are inoperable, there are no remaining onsite stand-by AC sources. Thus, with an assumed loss of offsite electrical power, sufficient stand-by AC sources are not available to power the minimum required engineered safety feature (ESF) functions. There was no demand for onsite power during the time that both DGs were inoperable. Power was available from the offsite power sources.

**LICENSEE EVENT REPORT (LER)**

U.S. NUCLEAR REGULATORY COMMISSION

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**OPERATING EXPERIENCE/PREVIOUS SIMILAR OCCURRENCES**

Licensee Event Report (LER) 2011-002-00 reported the 'A' DG inoperable due to a control pin that was not completely inserted and not secured on the fuel rack. A review of past operating history showed instances where both DGs were inoperable. The control pin was replaced and secured.

LER 2009-005-00 reported the loss of the 'A' DG with the 'B' DG out of service for a refueling outage. The cause of the event was the speed switches on the 'A' DG had actuated due to a wiring error by the control cabinet supplier. The annunciator power supply and speed switch were replaced and the new switch calibrated.