

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

Matthew W. Sunseri  
Vice President Operations and Plant Manager

June 24, 2009

WO 09-0014

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

Subject: Docket No. 50-482: Licensee Event Report 2009-001-00, Reactor Protection System Actuation and Reactor Trip due to Main Feedwater Regulating Valve Failing Closed

Gentlemen,

The enclosed Licensee Event Report (LER) 2009-001-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) regarding an Engineered Safety Features Actuation and Reactor Trip at Wolf Creek Generating Station.

Commitments made by Wolf Creek Nuclear Operating Corporation in the enclosed LER are identified in the Attachment to this letter.

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

Attachment  
Enclosure

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



### LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation in this document. Any other statements in this letter are provided for information purposes and are not considered regulatory commitments. Please direct questions regarding these commitments to Mr. Richard Flannigan, Manager Regulatory Affairs at Wolf Creek Generating Station, (620) 364-4117.

REGULATORY COMMITMENT	DUE DATE
All remaining Westinghouse 7300 card frame fuse holders will be replaced in Refuel Outage 17 with all actions completed following the outage.	March 5, 2010
All power supply fuse holders will be replaced in Refueling Outage 18 with all actions completed following the outage.	July 8, 2011
An annunciator alarm will be added to the Main Control Board for the Westinghouse 7300 card frame fuse holders.	July 1, 2011
Procedural guidance will be provided that any fuse holder measured at or above 60 degrees Centigrade would require replacement of the fuse holder.	October 30, 2009

# 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**  
Reactor Protection System Actuation and Reactor Trip due to Main Feedwater Regulating Valve Failing Closed

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	28	2009	2009	- 001	- 00	06	24	2009	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> (Check all that apply)									
<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 checked="" 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 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 (Include Area Code) (620) 364-4117
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**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
E	JB	FUB	W351	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="radio"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <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 April 28, 2009 at 3:27 p.m. Central Daylight Time, Wolf Creek experienced an automatic actuation of the Reactor Protection System (RPS) including an automatic reactor trip due to low water level in the "B" steam generator (SG). The RPS actuation occurred after the "B" SG Main Feedwater Regulating Valve (MFRV) closed in response to failures of the primary and secondary fuses for the Westinghouse 7300 control card frame that contained the associated control cards for the MFRV. When the "B" MFRV closed, "B" SG level decreased below the reactor trip setpoint initiating a reactor trip. The unit received a feedwater isolation and auxiliary feedwater actuation (both motor-driven and turbine-driven) because of the low SG level. All control rods inserted fully and the RPS and the Engineered Safety Features (ESF) Systems performed as expected.

The cause of the "B" MFRV closure was the failure of the primary and secondary fuses for the Westinghouse 7300 card frames. All of the 7300 card frame fuse holders were inspected using thermography and 14 fuse holders and fuses were replaced. The degraded fuse holders and associated fuses were replaced before reactor start-up commenced on April 30, 2009.

The safety significance of this event is low. This event is bounded by analyses as reported in the Wolf Creek Generating Station (WCGS) Updated Safety Analysis Report (USAR) section 15.2.7, "Loss of Normal Feedwater Flow." There were no adverse effects on the health and safety of the public.

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17. NARRATIVE

BACKGROUND:

Steam generator (SG) [EISS Code: SG] water level is normally controlled automatically using circuitry that compares existing SG level with a programmed reference level. The result of this comparison, or "level error," generates a signal to the Main Feedwater System [EISS Code: SJ] regulating control valve (MFRV) for the respective SG, which results in adjustments in the MFRV position. Upon loss of power, the MFRV fails to its designed safe closed position.

PLANT CONDITIONS PRIOR TO EVENT:

MODE – 1  
Power – 100 percent  
Normal Operating Temperature and Pressure

EVENT DESCRIPTION:

On April 28, 2009 at 3:27 p.m. Central Daylight Time (CDT), Wolf Creek Generating Station (WCGS) automatically shut down from operating at approximately 100 percent power because the "B" Main Feedwater Regulating Valve (MFRV), which provides water to the "B" steam generator (SG), failed to the closed position. Overheating of the fuses due to degraded fuse holders in the Westinghouse 7300 card frame caused the primary and secondary card frame fuses to fail, which disrupted the control power to the "B" MFRV. In response to a loss of control power, the "B" MFRV closed to its designed safe position. As the water level decreased in the "B" SG, the reactor tripped at the low-low SG water level set point of 23.5 percent. As a result of the card frame fuse failures, power was also disrupted to indicators for pressurizer surge temperature, pressurizer liquid temperature, pressurizer pressure high and pressurizer safety temperature. Power was restored at 9:57 p.m. CDT on April 28, 2009.

At the time of the trip, all control rods inserted into the core. The Reactor Protection System (RPS) and the Engineered Safety Features (ESF) Systems performed as required. Main feedwater was isolated and motor-driven and turbine-driven auxiliary feedwater pumps started as expected.

All equipment functioned as expected except Intermediate Range Channel NI-36, which prevented clearing the P-6 permissive that would have allowed automatic re-energization of the Source Range channels. The Source Range channels were re-energized manually. Intermediate Range Channel NI-36, a compensated ion chamber detector, was found to be under-compensated. This instrument was replaced in the last refueling outage and had not had an opportunity to have its compensation voltage checked under full gamma radiation exposure. Steam emitted from the relief valve on the Steam Generator Blowdown Tank actuated fire alarms in the Turbine Building but no fire occurred.

No personnel were injured. Reactor operators completed the emergency procedures network at 4:05 p.m. CDT on April 28, 2009. Reactor start-up commenced at 11:29 p.m. CDT on April 30, 2009.

In July 1995, Westinghouse Infogram IG-95-004 was sent to the industry because of an overheating issue identified with Littelfuse card frame fuse holders on the 7300 system. WCGS evaluated the Infogram and thermography showed no elevated temperatures above 85 degrees Centigrade. Corrective actions included establishing a

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**17. NARRATIVE**

conditioned-based preventive maintenance activity and replacing the fuse holders on an as-needed basis with a Bussman fuse holder, as per the Westinghouse recommendation. The preventive maintenance activity put in place was determined to be less than adequate to detect the degrading condition of the fuse holders.

**BASIS FOR REPORTABILITY:**

The reactor trip and subsequent actuation of Engineered Safety Features (ESF) described in this event is reportable per 10 CFR 50.73(a)(2)(iv)(A), which requires reporting of "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." Paragraph (B)(1) of 10 CFR 50.73(a)(2)(iv) includes "Reactor protection system (RPS) including: reactor scram or reactor trip." Paragraph (B)(6) of 10 CFR 50.73(a)(2)(iv) includes "PWR auxiliary or emergency feedwater."

**ROOT CAUSE:**

WCGS instituted less than adequate actions to address known deficiencies of the Littelfuse fuse holders. Procedures did not require routine inspections of the indicating lights for the 7300 card frame fuses, or specify acceptance criteria for the 7300 system card frame fuse holders. Thermography was being used, but there were no specific criteria for card frame fuse holders.

Littelfuse fuse holder model number 342038A was used in an application for which it was not designed. Overheating of the Littelfuse fuse holders subjected the fuses to temperatures as high as 119.9 degrees Centigrade and was most likely caused by high resistance at the riveted connection and spade terminations. The maximum temperature rating of the fuses is 125 degrees Centigrade.

**CORRECTIVE ACTIONS:**

Westinghouse recommends replacing the Littelfuse fuse holder model number 342038A with a Bussman HKP-CC fuse holder, which is rated for higher current and higher temperatures than the Littelfuse fuse holder. Following the shutdown, all fuse holders in the Westinghouse 7300 system card frames were analyzed using thermography and a total of 14 fuse holders and fuses were replaced.

Other bayonet-style fuse holders used in applications critical to nuclear safety or plant operations were assessed and repaired or replaced if temperatures greater than 75 degrees Centigrade were identified. No other degraded fuse holders were identified during this assessment.

All other Westinghouse 7300 card frame fuse holders will be replaced in Refuel Outage 17 with all actions completed by March 5, 2010. All power supply fuse holders will be replaced in Refueling Outage 18 with all actions completed by July 8, 2011.

Future use of the Littelfuse fuse holder model number 342038A has been prohibited for this application through supply controls.

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**17. NARRATIVE**

By July 1, 2011 an annunciator alarm will be added to the Main Control Board for the Westinghouse 7300 card frame fuse holders to alert operators to failed primary or secondary card frame fuses.

Procedural guidance will be provided by October 30, 2009 that any fuse holder measured at or above 60 degrees Centigrade would require replacement of the fuse holder.

**SAFETY SIGNIFICANCE:**

The Safety Significance of this event is low. This event is analyzed as reported in WCGS Updated Safety Analysis Report (USAR) section 15.2.7, "Loss of Normal Feedwater Flow." Results of the analysis show that a loss of normal feedwater does not adversely affect the core, the reactor coolant system, or the steam system, since the auxiliary feedwater capacity is such that reactor coolant water is not relieved from the pressurizer relief or safety valves.

There were no adverse effects on the health and safety of the public.

**PREVIOUS OCCURRENCES:**

No failures of fuse holders have resulted in a previous reactor trip at Wolf Creek Generating Station. In February 2004, WCGS experienced a reactor trip due to a MFRV closure caused by the valve plug in the MFRV separating from the valve stem.