WOLF CREEK
NUCLEAR OPERATING CORPORATION

Russell A. Smith
Plant Manager

July 25, 2011

WO 11-0058

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

Subject: Docket No. 50-482: Licensee Event Report 2011-006-00, "Auxiliary Feedwater Actuation due to Operators Inability to Control Steam Generator Level in Mode 4"

Gentlemen:

The enclosed Licensee Event Report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) regarding an Engineered Safety Features Actuation at the Wolf Creek Generating Station.

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

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)

# LICENSEE EVENT REPORT (LER)

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



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**4. TITLE**
Auxiliary Feedwater Actuation due to Operators Inability to Control Steam Generator Level in Mode 4

| 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 |
| 05 | 24 | 2011 | 2011 | - 006 - | 00 | 07 | 25 | 2011 | FACILITY NAME | DOCKET NUMBER 05000 |

**9. OPERATING MODE:** Mode 4

**10. POWER LEVEL:** 0

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

| | | | |
|---|---|---|---|
| ☐ 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) |
| ☐ 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) |
| ☐ 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) |
|---|---|
| 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 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| 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 May 24, 2011 at 1120 CDT, Wolf Creek Generating Station (WCGS) was in Mode 4 during a startup at the end of Refueling Outage 18. A reactor trip signal, a Feedwater Isolation Signal actuation and an Auxiliary Feedwater actuation occurred due to a Lo-Lo Steam Generator level. Steam Generator levels were being maintained at 30 – 35% level in anticipation of full flow auxiliary feedwater testing which would increase the steam generator levels. The cause of the event was inadequate operator control of steam generator levels. Remedial training was conducted for the control room staff.

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

PLANT CONDITIONS AT THE TIME OF THE EVENT

Mode 4
RCS temperature 325-330 degrees F
RCS pressure 513 psig

DESCRIPTION OF THE EVENT

While in Mode 4, a reactor trip signal, a Feedwater Isolation Signal (FWIS) actuation and a motor-driven (MD) Auxiliary Feedwater actuation occurred due to Lo-Lo level in the "B" Steam Generator (SG) [EIIS Code: SB] on May 24, 2011 at 1120CDT. Wolf Creek Generating Station (WCGS) was starting up at the end of Refueling Outage 18, using procedure GEN 00-002, "Cold Shutdown to Hot Standby." Due to the length of the shutdown, the reactor core was xenon free and had low decay heat. No structures, systems, or components were inoperable that contributed to the event.

Prior to the event, reactor trip breakers were closed to perform Digital Rod Position Indication (DRPI) [EIIS Code: AA] testing. All control rods were fully inserted. Preparations were being made to perform full flow auxiliary feedwater (AFW) [EIIS Code: BA] testing per procedure STS AL-212, "MD AFP Comprehensive Pump Testing, Flow Path Verification & CV Testing." The start up main feedwater pump (MFP) [EIIS Code: SJ-P] was providing feedwater to the SGs. SG levels were supposed to be maintained at 30 – 35% level in anticipation that the full flow AFW testing would increase the SG levels. The SG atmospheric relief valves (ARV) [EIIS Code: SB-RV] were in automatic. The balance of plant operator was controlling SG levels and pressures to maintain conditions for the AFW testing and Mode 4.

The "B" SG level was approximately 28-30%. Feedwater flow was increased using the main feedwater regulating bypass valve being supplied by the start up MFP. The "B" SG pressure started increasing, the SG ARV went nearly closed and the "B" SG level rapidly dropped to the Lo-Lo setpoint of 23.5%. A reactor trip signal, a FWIS actuation and a motor-driven AFW actuation occurred due to Lo-Lo level in the "B" SG.

BASIS FOR REPORTABILITY

The reactor trip signal and actuation of the Engineered Safety Feature Actuation Signals (ESFAS) instrumentation 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."

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ROOT CAUSE

Control Room Operators failed to adequately maintain SG levels in Mode 4 using the main feedwater regulating bypass valves. As a result, the "B" SG level reached the Lo-Lo level setpoint causing a reactor trip signal, a FWIS actuation and a motor-driven AFW actuation. In addition, non-conservative decision making occurred in establishing the 30% steam generator level in preparations for the AFW flow testing.

CORRECTIVE ACTIONS

Remedial training was conducted for the control room staff. The training included understanding the phenomenon associated with SG level control for shrink and swell, understanding and complying with controlling bands, proper use of resources, proper alarm response and providing margin in controlling bands to the staff.

The following procedures will be enhanced:
- GEN 00-002, "Cold Shutdown to Hot Standby," to include specific guidance for the operation of the SG ARVs.
- STS AL-212, "MD AFP Comprehensive Pump Testing, Flow Path Verification & CV Testing," to provide more definitive guidance on the required SG level for full flow testing.

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 AFW 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.

OPERATING EXPERIENCE/PREVIOUS SIMILAR OCCURRENCES

LER 2010-005-00 described a reactor trip at 100% power due low SG levels due to a trip of a main feedwater (MFW) pump. The failed transfer of an inverter to its alternate power supply caused the MFW pump trip.

LER 2010-006-00 described a reactor trip at 42% power due to a trip of the "A" MFW pump. The control room operators manually tripped the reactor due to decreasing SG levels. The cause of the MFW pump trip was a failed servo in the MFW control circuitry.

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LER 2010-012-00 described a reactor trip at 15% power due to low SG levels. The cause was operation of the plant during power ascension outside the main feedwater regulating bypass valves optimum operating region and the feedwater preheating limitations. Procedures were revised to correct this condition.