

444 South 16th Street Mall Omaha, NE 68102-2247

LIC-11-0106 October 27, 2011

U.S. Nuclear Regulatory Commission Attn: Document Control Desk Washington, DC 20555-0001

Reference: Docket No. 50-285

Subject: Licensee Event Report 2011-008, Revision 1, for the Fort Calhoun Station

Please find attached Licensee Event Report 2011-008, Revision 1, dated October 25, 2011. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(x), 10 CFR 50.73(a)(2)(ii)(B) and 10 CFR 50.73(a)(2)(v). Changes are noted by revision bars.

If you should have any questions, please contact me.

Sincerely,

D. J. Bannister Vice President - Nuclear

DJB/rmc

Attachment

c: E. E. Collins, Jr., NRC Regional Administrator, Region IV L. E. Wilkins, NRC Project Manager J. C. Kirkland, NRC Senior Resident Inspector INPO Records Center

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NRC FORM 366A (10-2010)

LICENSEE EVENT REPORT (LER)

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| 1. FACILITY NAME | 1. FACILITY NAME 2. DOCKET | | | 6. LER NUMBER | | | |
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| Fort Colhour Station | 05000285 | YEAR | SEQUENTIAL NUMBER | REV NO. | 2 | OF | 5 |
| Fort Carlouri Station | | 2011 | - 008 - | 1 | 2 | OF | 5 |

NARRATIVE

BACKGROUND

Fort Calhoun Station (FCS) is a two-loop reactor coolant system of Combustion Engineering (CE) design. The plant has six safety-related 480 VAC (V) buses and three 480 V safety related "island" cross-tie buses. The island buses are fed from one side or the other of the main 480 V buses.

EVENT DESCRIPTION

On June 7, 2011, at approximately 0930 CDT, a failure of a safety related 480 V load center supply breaker occurred (Bus 1B4A). FCS was operating in Mode 5 at about 82 degrees Fahrenheit with the plant fully depressurized. FCS was in an emergency classification of a Notification of Unusual Event (NOUE) due to high Missouri river level (NOUE declared June 6, 2011).

At 0930 CDT, the control room received multiple alarms that were indicative of a fire in the west electrical switchgear room. The Halon system that protects the switchgear rooms discharged. The fire brigade responded and found a room filled with smoke, but no active fire. The fire brigade confirmed that there was no active fire in the switchgear room. Additionally, during the event both trains of class 1E Direct Current (DC) grounded due to extensive damage inside cubicle 1B4A. Accompanying the DC grounds were numerous control room alarms that are fed from the DC circuits. At about 0930 CDT, while de-energizing electrical buses to aid in damage mitigation and assessment, both trains of spent fuel pool cooling were de-energized. At 0940 CDT, an Alert was declared for a fire affecting the operability of plant safety systems required to establish or maintain safe shutdown. During the course of the event a local offsite fire department responded to assist. At 1147 CDT, on June 7, 2011, power was restored to one train of spent fuel pool cooling. Spent fuel pool temperature increased 3 degrees Fahrenheit while spent fuel pool cooling was out-of-service. The operating 4160 Volt (V) train that was powering the shutdown cooling system was not affected by the fire.

Per the control room logs, FCS exited the Alert at 1313 CDT on June 7, 2011. Plant shutdown cooling remained in-service during the event.

The circuit breaker that was damaged was the supply breaker to Bus 1B4A.

At 1021 CDT, the NRC Headquarters Operations Office (HOO) was notified per 10 CFR 50.72(a)(1)(i). This revised LER report is being made per 10 CFR 50.73(a)(2)(ii)(B), 10 CFR 50.73(a)(2)(x), 10 CFR 50.73(a)(2)(v)(A), 10 CFR 50.73(a)(2)(v)(B), 10 CFR 50.73(a)(2)(v)(C) and 10 CFR 50.73(a)(2)(v)(D).

CONCLUSION

The original General Electric (GE) AK-50 circuit breakers had been in-service for more than 40 years and due to aging issues and the lack of available spare parts for the original circuit breakers, twelve of these circuit breakers were replaced during the 2009 Refueling Outage (RFO) on ten 480 V buses. The GE original equipment was replaced with Square D circuit breakers supplied through Nuclear Logistics Incorporated (NLI).

The Square D circuit breakers were not an exact replacement for the GE equipment; therefore, a cradle assembly was utilized to ensure that the Square D equipment would match-up to the GE switchgear. The cradle assembly consists of finger clusters that engage the bus bars at the back of the GE

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) 10-2010) CONTINUATION SHEET 2. DOCKET **1. FACILITY NAME** 6. LER NUMBER 3. PAGE SEQUENTIAL NUMBER REV YEAR NO Fort Calhoun Station 05000285 3 5 OF 2011 800 1 NARRATIVE switchgear, and has stabs on the circuit breaker side of the cradle assembly that accept the circuit breaker finger clusters. An analysis determined that the root cause of the fire in 480 V Bus 1B4A was that the FCS design process failed to identify the silver plating of bus bar material as a critical interface when specifying replacements for the original General Electric (GE) AK-50 circuit breakers. Silver plating provides a non-reactive/corrosive material to most environments for the breaker stabs to remain in contact for long periods of time without incident. The circuit breaker cradle fingers, where they engage the bus bars, were longer than the original AK-50 circuit breakers and did not properly contact the silver plating of the stabs. The cradle fingers engaged the bus bar in a contact area of hardened grease and copper oxide build-up, which caused a high resistance connection at the stab to finger interface. The high resistance connection overheated the finger cluster resulting in bus grounding and phase-to-phase shorting. Other contributing causes include: An acrid odor that existed for three days preceding the bus fire was not adequately communicated to engineering, maintenance, or management. • FCS engineering had limited knowledge of GE AKD-5 switchgear resulting in overreliance on vendor knowledge and skill. An FCS modification procedure lacks requirements to identify and compare critical design characteristics of equipment being modified. Additionally, this procedure has weak requirements for the use of operating experience criteria. Maintenance procedures that govern 480 V bus cleaning are inadequate. Also, access to the bus side of the GE AKD-5 switchgear is difficult limiting the selection of inspection/testing methods. As-left resistance readings from the line to load side of the switchgear following circuit breaker replacement were not confirmed. During the 2009 RFO an additional ten Square D circuit breakers supplied by NLI, with the same finger cluster configuration as the 1B4A circuit breakers were installed in 1B3A and seven other safety-related 480 V buses. The major safety-related 480 V equipment that could have been affected by the installation of the 12 circuit breakers include: Bus 1B4A Bus 1B4B Bus 1B4C AC-3B Component • SI-3B Containment Spray • SI-2B High Pressure Cooling Water Pump Pump Safety Injection Pump VA-46B Control Room CH-1B Charging Ventilation Pump • AC-5B Spent Fuel Pool Cooling Pump VA-3B Containment

Cooler

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| 1. FACILITY NAME | 2. DOCKET | 2. DOCKET 6. LER NUMBER | | | | |
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| Fort Calhoun Station | 05000285 | YEAR 2011 | SEQUENTIAL NUMBER | REV NO. 1 | 4 OF | |
| ARRATIVE | | | | | | |
| Island Bus 1B-3A-4A SI-2C High Pressure Safety Injection Pump | Island Bus 1 SI-3C Conta Spray Pump CH-1C Char Pump | B3B-4B ainment o rging | Island • AC- Cod | d Bus 1 3C Con bling Wa | B3C-4C nponent ater Pump | |
| Bus 1B-3A SI-2A High Pressure Safety Injection Pump CH-1A Charging Pump AC-5A Spent Fuel Pool Cooling Pump VA-3A Containment Cooler | Bus 1B • AC-3A Com Cooling Wat • VA-46A Cor Air Condition | -3B ponent ter Pump ntrol Room ning | • SI-3 Spr | Bus 11 BA Cont ay Pum | 3-3C ainment p | |
| CORRECTIVE ACTIONS The affected bus was de-energized ar | nd the Halon syst | em exting | uished the fire | . The ⊦ | lalon system wa | |
| The station conducted inspections and the 480 V buses, and the 480 V bus til breakers passed their inspections and The station is replacing the affected bu | d testing of the ur e breakers. The testing. us (1B4A), which | naffected 4 tested 480 contains t | 80 V buses, t V supply bre wo 480 V sup | he supp akers a ply circi | oly breakers to nd bus tie uit breakers, | |
| 1B4A and BT-1B4A (supply breaker to | o the associated ' | "island" bu | s). | | | |
| As part of an extent of condition review bus tie circuit breakers are being inspe | w ten other unaffe ected, and re-pla | ected 480 ted with sil | V load center ver at the ven | bus sta dor sho | bs for supply an p. | |
| The silver plating on affected 480 V bu fingers properly contact the silver plate | us stabs is being ed surface of the | extended bus stabs | so the Square | D circu | it breaker cradle | |
| Affected circuit breaker cradles will be | realigned to ens | ure proper | fit in the 480 | V bus c | ubicles. | |
| Procedures are being developed or re practices. | vised that addres | ss 480 V b | us inspection | and ma | intenance | |
| Other corrective actions to address the | e fire and extent | of conditio | n are docume | nted in | the FCS | |

NRC FORM 366A (10-2010)

LICENSEE EVENT REPORT (LER)

U.S. NUCLEAR REGULATORY COMMISSION

| 1. FACILITY NAME | 2. DOCKET | 6 | . LER NUMBER | | 3. PAGE | | | |
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| Fort Camouri Station | 05000285 | 2011 | - 008 - | 1 | 5 | UF | 5 | |

NARRATIVE

SAFETY SIGNIFICANCE

As a direct result of the fire in bus 1B4A and the tripping of bus 1B3A, spent fuel pool cooling was lost for approximately 90 minutes. Shutdown cooling was powered from the unaffected 4160 V bus. The loss of both safety-related 480 V bus trains is a potentially unanalyzed condition in circuit breaker coordination and impacted nuclear safety.

The twelve 480 V Square D circuit breakers were installed during the 2009 RFO and were in-service for an 18 month operating cycle. As noted in the conclusion section above, an extent of condition existed in the remaining ten safety-related 480 V buses which could have impacted nuclear safety if a fire occurred while the plant was above 300 degrees F.

SAFETY SIGNIFICANT FUNCTIONAL FAILURE

This event does result in a safety system functional failure in accordance with NEI-99-02.

PREVIOUS EVENTS

None