



LIC-16-0101
October 21, 2016

10 CFR 50.73

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

Fort Calhoun Station, Unit No. 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

Subject: Licensee Event Report 2016-002, Revision 1, for the Fort Calhoun Station

Please find attached Licensee Event Report 2016-002, Revision 1. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B), 10 CFR 50.73(a)(2)(ii)(B) and 50.73(a)(2)(v)(D). There are no new commitments being made in this letter.

If you should have any questions, please contact Brad Blome, Manager, Site Regulatory Assurance, at (402) 533-7270.

Sincerely,

Shane M. Marik
Site Vice President and CNO

SMM/cac

Attachment

c: K. M. Kennedy, NRC Regional Administrator, Region IV
C. F. Lyon, NRC Senior Project Manager
S.M. Schneider, NRC Senior Resident Inspector

**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-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

Fort Calhoun Station

2. DOCKET NUMBER

05000285

3. PAGE

1 OF 3

4. TITLE

Unanalyzed Condition Shutdown Heat Exchanger Isolations

5. EVENT DATE

MONTH	DAY	YEAR
05	10	2016

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2016	002	01

7. REPORT DATE

MONTH	DAY	YEAR
10	21	2016

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
	05000

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

1

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)

10. POWER LEVEL

85

<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
<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)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
<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)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER**LICENSEE CONTACT**

Corey Cameron

TELEPHONE NUMBER (Include Area Code)

402-533-7337

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☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 10, 2016, at 1138 Central Daylight Time (CDT), during scheduled maintenance, an unanalyzed condition was discovered as a result of maintenance on Shutdown Cooling Heat Exchanger valves. This condition could have led to the inability of the Component Cooling Water (CCW) system to perform its design function of providing a cooling medium for the Containment atmosphere under Loss Of Coolant Accident (LOCA) conditions.

As part of the maintenance, HCV-484, Shutdown Heat Exchanger AC-4A CCW Outlet Valve, and HCV-481, Shutdown Cooling Heat Exchanger AC-4B CCW Inlet Valve, were open. Under these conditions, with the assumed single failure loss of DC control power and accident condition of a LOCA, CCW would be allowed to flow through both shutdown cooling heat exchangers, bypassing a portion of the flow to the Containment Cooling Units. These conditions are not assumed under plant design basis calculations, and therefore placed the plant in an unanalyzed condition. Both HCV-484 and HCV-481 were returned to service and the condition no longer exists.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Fort Calhoun Station	05000285	2016	- 002	- 01

NARRATIVE**BACKGROUND**

Fort Calhoun Station (FCS) is a two-loop reactor coolant system (RCS) of Combustion Engineering design. The Component Cooling Water (CCW) system is a closed loop system consisting of three motor driven circulating pumps, four heat exchangers (HX), a surge tank, valves, piping, instrumentation and controls. Shutdown Cooling Heat Exchangers AC-4A and AC-4B and the associated safety related isolation valves HCV-480/HCV-481/HCV-484/HCV-485 are some of the loads supplied by CCW.

The containment cooler capability analysis [FC07244 Rev. 1] assumes that CCW remains isolated from the shutdown cooling heat exchangers (SDC HXs). Revision 1 of EC40070 modified the control circuit for HCV-480/481/484/485, CCW to SDC HX supply and return valves, to remove the automatic open signal on Recirculation Actuation Signal (RAS). Thus, all four valves will remain closed following RAS. If one valve fails open, at least one CCW valve associated with each SDC HX will remain closed following RAS, preventing a single failure from causing unintended CCW flow to the SDC heat exchangers.

EVENT DESCRIPTION

On May 10, 2016, at 1138 CDT operating at 85 percent power level, during scheduled maintenance, the Fort Calhoun Shift Manager was notified via phone call and condition report of an unanalyzed condition which was the result of the maintenance on Shutdown Cooling Heat Exchanger valves. As part of the maintenance, HCV-484, Shutdown Cooling Heat Exchanger AC-4A CCW Outlet Valve, and HCV-481, Shutdown Cooling Heat Exchanger AC-4B CCW Inlet valve, were opened. Under these conditions, with the assumed single failure loss of DC control power and accident conditions of a LOCA, CCW would be allowed to flow through both shutdown cooling heat exchangers, effectively bypassing a portion of flow to the Containment Cooling Units.

This condition is not assumed under plant design basis calculations, and therefore placed the plant in an unanalyzed condition. It has not been demonstrated that the CCW system would adequately perform its design function of providing a cooling medium for the Containment atmosphere under Loss of Coolant Accident (LOCA) conditions with some CCW flow diverted through the Shutdown Cooling Heat Exchangers. This was identified by OPPD staff engaged in Design Basis Reconstitution.

Following clearance removal on May 10, 2016, at 1535, both HCV-484 and HCV-481 were returned to service and the condition described above no longer existed.

CAUSE OF THE EVENT

Fort Calhoun Station documented the condition in Condition Report (CR) 2016-04468. The station assembled a team to review the issue and determine the apparent cause of the problem. The station has determined that the apparent cause was:

Technical Data Book, TDB-VIII, "Equipment Applicability Guidance," did not consider all related safety functions and subsequent changes and only concentrated on the Condition Report issues and did not incorporate or utilize plant operating experience to ensure all safety functions of the Shutdown Cooling Heat Exchanger CCW Valves were addressed.

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Fort Calhoun Station	05000285	YEAR 2016	SEQUENTIAL NUMBER - 002	REV NO. - 01

NARRATIVE**CORRECTIVE ACTIONS****Short Term Corrective Actions**

An "Administrative Hold" was placed on TDB-VIII until the issue was evaluated and corrected.

Long Term Corrective Actions

TDB-VIII was retired to prevent further use.

SAFETY SIGNIFICANCE

The scenario of interest for this unanalyzed condition is a LOCA, followed by loss of a DC bus and partial diversion of CCW flow through the Shutdown Cooling Heat Exchangers. This combination of failures has a low probability of occurrence. Further, the maintenance configuration only occurred six times in the past three years for an average duration of approximately twelve hours. Had this unlikely scenario occurred, closing one valve on each shutdown heat exchanger would have ended the CCW diversion. Finally, the Emergency Operating Procedures direct the operators to use Containment Spray for containment heat removal for beyond design basis events if the performance of the Containment Cooling Units is inadequate.

SAFETY SYSTEM FUNCTIONAL FAILURE

This does represent a safety system functional failure in accordance with NEI 99-02, Revision 7. The condition could have prevented the fulfillment of a safety function of Containment Cooling system by diverting flow of CCW away from Containment Coolers to mitigate the consequences of a design basis accident (LOCA).

PREVIOUS EVENTS

The extent of condition identified an additional five incidents of this type at the station in 2015 and 2016. The additional occurrences are documented in CR 2016-05340.