



444 South 16<sup>th</sup> Street Mall  
Omaha, NE 68102-2247

LIC-11-0039  
May 16, 2011

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

Reference: 1. Docket No. 50-285  
2. Letter from OPPD (J. A. Reinhart) to NRC (Document Control Desk), dated April 4, 2011 (LIC-11-0023)  
3. Letter from OPPD (T. R. Nellenbach) to NRC (Document Control Desk) dated May 16, 2011 (LIC-11-0051)

**Subject: Licensee Event Report 2011-003, Revision 1, for the Fort Calhoun Station**

Please find attached Licensee Event Report 2011-003, Revision 1, dated, May 16, 2011. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(v)(D). If you should have any questions, please contact me.

Sincerely,

T. R. Nellenbach  
Division Manager-Nuclear Operations

TRN /epm

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

# 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: 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 Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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> Fort Calhoun Station	<b>2. DOCKET NUMBER</b> 05000285	<b>3. PAGE</b> 1 OF 5
-------------------------------------------------	-------------------------------------	--------------------------

**4. TITLE**  
Inadequate Flooding Protection Due To Ineffective Oversight

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
2	3	2011	2011	- 003	- 1	5	16	2011	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> <i>(Check all that apply)</i>									
	<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)						
<b>10. POWER LEVEL</b>  100	<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 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 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 Erick Matzke	TELEPHONE NUMBER <i>(Include Area Code)</i> 402-533-6855
-------------------------------	-------------------------------------------------------------

**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>14. SUPPLEMENTAL REPORT EXPECTED</b> <input checked="" type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH 8	DAY 30	YEAR 2011
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------	------------	-----------	--------------

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

During identification and evaluation of flood barriers, unsealed through wall penetrations in the outside wall of the intake, auxiliary and chemistry and radiation protection buildings were identified that are below the licensing basis flood elevation.

A summary of the root causes included: a weak procedure revision process; insufficient oversight of work activities associated with external flood matters; ineffective identification, evaluation and resolution of performance deficiencies related to external flooding; and "safe as is" mindsets relative to external flooding events.

The penetrations were temporarily sealed and a configuration change was developed and implemented whereby permanent seals were installed. Comprehensive corrective actions to address the root and contributing causes are being addressed through the corrective action program.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Fort Calhoun Station	05000285	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 5
		2011	- 003	- 1	

**NARRATIVE**

**BACKGROUND**

As a result of a Nuclear Regulatory Commission (NRC) inspection conducted from January 1 to June 21, 2010, the NRC determined that Fort Calhoun Station (FCS) did not have adequate procedures to protect the intake structure and auxiliary building against external flooding events. Specifically, contrary to Technical Specification 5.8.1.a, the station failed to maintain procedures for combating a significant flood as recommended by Regulatory Guide 1.33, Appendix A, section 6.w, "Acts of Nature." The NRC identified the following violation of NRC requirements associated with a yellow significance determination process finding in the mitigating systems cornerstone in inspection report 05000285/2010008 dated October 6, 2010:

Technical Specification 5.8.1.a, "Procedures," states, "Written procedures and administrative policies shall be established, implemented, and maintained covering the following activities: (a) The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, 1978." NRC Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors," Section 6, recommends procedures for combating emergencies and other significant events. Section 6.w, "Acts of Nature," includes, in part, procedures for combating floods.

Contrary to Technical Specification 5.8.1.a, since 1978, written procedures and administrative policies were not maintained covering the applicable procedures recommended by NRC Regulatory Guide 1.33, Revision 2, Appendix A. Specifically, the licensee failed to maintain written procedures for combating a significant external flood as recommended by NRC Regulatory Guide, Appendix A, Section 6.w, "Acts of Nature." The licensee's written procedures did not adequately prescribe steps to mitigate external flood conditions in the Auxiliary Building and Intake Structure up to 1014 feet mean sea level, as documented in the Updated Final Safety Analysis Report [USAR].

The NRC reported that the station's flood protection strategy was not fully effective during worst-case Missouri River flooding scenarios. The strategy required workers to install floodgates in front of the doors to the plant's auxiliary building and intake structure, and then stack and drape sandbags over the top of the floodgates up to a height of five feet. The procedural guidance was inadequate because the cross-section on top of the floodgates would not support a stacked sandbag configuration that would retain five feet of moving water.

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

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Fort Calhoun Station	05000285	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 5		
		2011	- 003	- 1			

**NARRATIVE**

**EVENT DESCRIPTION**

During identification and evaluation of flood barriers (condition report (CR) 2010-2387), in response to NRC findings previously noted, unsealed through wall penetrations in the intake structure were identified that are below the licensing basis flood elevation. These penetrations were installed during the installation of upgrades to the plant fire protection system. As a result of the penetrations not being sealed, the intake structure was vulnerable to water inflow during an extreme flooding event. This inflow had the potential to affect the operability of both trains of safety related raw water pumps (ultimate heat sink).

On February 4, 2011, an eight (8) hour report was made under 10 CFR 50.72 (b)(3)(v)(D) to the NRC Headquarters Operation Office (HOO) at 1717 CST (Event Number (EN) 46594). The report should have been made on September 9, 2009. (Documented in Condition Report (CR) 2011-0801) During the extent of cause analysis for this issue the following penetrations were identified as not having been reported.

In addition, the extent of cause evaluation identified the following unsealed penetrations:

- Unsealed penetrations were created during the installation of the original plant security system and were abandoned when the security system was replaced (approximately 1985). The penetrations for the "new" security system were appropriately sealed. The old penetrations were abandoned and not sealed. As a result of the penetrations not being sealed, the intake structure was vulnerable to water inflow during an extreme flooding event. This inflow had the potential to affect the operability of both trains of safety related raw water pumps (ultimate heat sink). On February 27, 2011, an eight (8) hour report was made under 10 CFR 50.72 (b)(3)(v)(D) to the NRC Headquarters Operation Office (HOO) at 1640 CST (EN 46590). The report should have been made on January 27, 2011. (Documented in CR 2011-0609)
- Two additional conduits have been identified that are not sealed. These conduits penetrate the south wall of the auxiliary building near the transformers into Room 19 and were created as part of a station modification that was in progress at the time. Flooding through the penetrations could have impacted the ability of the station's auxiliary feedwater (AFW) pumps to perform their design accident mitigation functions. On March 31, 2011, an eight (8) hour report was made under 10 CFR 50.72 (b)(3)(v)(D) to the NRC Headquarters Operation Office (HOO) at 2232 CDT (EN 46716) (Documented in CR 2011-2470)
- A weakness in the flood protection strategy was discovered that would prevent protection of the raw water pumps for floods above 1007 feet-6 inches mean sea level (MSL). The flood protection strategy includes control of the intake cell level by throttling the sluice gates and running raw water pumps to maintain cell level. During the preparation of a calculation to demonstrate the validity of this method it was determined that the grid backwash pipe for each grid and the surface sluice penetrate the east wall of the intake structure through an unsealed penetration (7 penetrations). The grid backwash line is an 18 inch pipe passing through a 24 inch sleeve. Cell in-leakage through these penetrations would be beyond the capacity of the raw water pumps resulting in flooding of the intake structure and loss of the raw water pump function. On March 22, 2011, an eight (8) hour report was made under 10 CFR 50.72 (b)(3)(v)(D) to the NRC Headquarters Operation Office (HOO) at 1611 CDT (EN 46690). (Documented in CR 2011-2161)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Fort Calhoun Station	05000285	YEAR	SEQUENTIAL NUMBER	REV NO.	4 OF 5
		2011	- 003	- 1	

**NARRATIVE**

- An unsealed conduit (location 56E-S-43 in pull box 127) was identified that penetrates the auxiliary building into Room 56. Room 56 contains the safety related electrical switchgear. In addition, a drain flow path from the Chemistry and Radiation Protection (CARP) building into Room 23 which can drain into the rooms holding the Emergency Core Cooling System (ECCS) Pumps was identified. On April 8, 2011, an eight (8) hour report was made under 10 CFR 50.72 (b)(3)(v)(D) to the NRC Headquarters Operation Office (HOO) at 1240 CDT (EN 46741). (Documented in CRs 2011-2072 and 2011-2448)

Since each of these incidents are events that are related (i.e., they have the same cause and consequences) and they were discovered during a single activity (i.e., investigation to correct the initial problem) then per NUREG 1022, Revision 2, these are being reported in one LER. This report is being made per 10 CFR 50.73(a)(2)(v)(D).

**CONCLUSION**

A root cause determination was prepared in connection with CR 2010-2387 which documents the causes of the problem.

The following four (4) root causes explain why written procedures were inadequate to mitigate the external flood conditions prescribed by the Updated Safety Analysis Report (USAR). These root causes address the NRC issued yellow finding as well as the specific penetrations being addressed in this LER.

- Historically, when procedures for flooding protection were restructured or substantially augmented, a weak procedure revision process did not assure FCS met its USAR requirements.
- Supervisory and management oversight of work activities associated with external flood matters was not sufficient to prevent this issue from occurring.
- The FCS organization has not been effective in ensuring that performance deficiencies related to external flooding are adequately identified, evaluated, and resolved.
- Mindsets existed that FCS was "safe as is" relative to external flooding events. These mindsets collectively led to the incorrect conclusion that regulatory requirements were being met.

**CORRECTIVE ACTIONS**

Configuration changes were developed as needed and the penetrations sealed. Comprehensive corrective actions to address the root and contributing causes have been developed and will be addressed through the corrective action program. Additional corrective actions will be identified in a revision to this LER.

**SAFETY SIGNIFICANCE**

The Fort Calhoun Station is required to be protected from flooding within the station's licensing basis. The safety related equipment required to mitigate the consequences of an accident were affected by these findings. The openings could have jeopardized the ability of the safety related equipment to perform their design basis function during an accident. Other methods of removing decay heat and mitigating the consequences of a flooding event were available. Therefore, this external flooding concern has substantial importance to safety as indicated by the Yellow Finding issued for this event.

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

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Fort Calhoun Station	05000285	YEAR	SEQUENTIAL NUMBER	REV NO.	5	OF	5
		2011	- 003	- 1			

**NARRATIVE**

**SAFETY SYSTEM FUNCTIONAL FAILURE**

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

**PREVIOUS EVENTS**

No licensee event report prior to this has identified the flooding issue. LER 2011-001 which had been written to report a flooding penetration has been cancelled as indicated in Reference 3 to the cover letter to this LER. The penetration is discussed in this LER.