



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 EAST LAMAR BLVD  
ARLINGTON, TEXAS 76011-4511

September 14, 2012

ML12258A293

EA-2012-095

Lou Cortopassi, Vice President  
and Chief Nuclear Officer  
Omaha Public Power District  
Fort Calhoun Station FC-2-4  
P.O. Box 550  
Fort Calhoun, NE 68023-0550

SUBJECT: DENIAL OF VIOLATION IN NRC INSPECTION REPORT 05000285/2012002

Dear Mr. Cortopassi:

In your letter to the NRC dated June 11, 2012 (ML12181A022), you took exception with a violation that was issued in inspection report number 05000285/2012002 dated May 11, 2012 (ML12132A395). The violation stated that a performance deficiency had been identified in that the licensee failed to meet design basis requirements in the Updated Safety Analysis Report. Specifically, the licensee failed to translate design basis requirements for protection of the safety-related raw water system during a design basis flood for flood levels between 1,010 and 1,014 feet mean sea level as identified in Updated Safety Analysis Report, Section 9.8, "Raw Water System." The design basis states that water level inside the intake cells can be controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells and this operation was not assured under all design basis conditions.

The basis of your denial, as stated in your letter, was that you believed that you were in compliance with the Updated Safety Analysis Report in that at water levels above 1,007.5 feet mean sea level, the water level inside the intake structure is controlled by positioning the exterior sluice gates to restrict the inflow into the wet wells to match the rate of pumped outflow. You stated that Abnormal Operating Procedure (AOP)-1, "Acts of Nature," directed operators to lower the sluice gates when river level was expected to reach 1,007 feet mean sea level. Procedure AOP-1 provided options of maintaining cell level by either adjusting the gates or starting additional raw water pumps to match water inflow. Based on this, the active safety function to position the sluice gates is completed prior to reaching a river level of 1,010 feet mean sea level. You stated a calculation was performed and concluded that five sluice gates closed and the sixth gate open one inch allows one raw water pump to maintain the water level inside the intake structure below 1,007.5 feet mean sea level even with the Missouri River level at 1,014 feet mean sea level. Cycling a second raw water pump would provide additional water removal capacity to compensate for leakage through the closed gates. This calculation validates that the gates are not required to be re-positioned after initial positioning.

In addition, you stated that you reviewed the potential for silting or sanding to occur that could block the open sluice gate. The conclusion of this review was that, although particles carried by the river flow could potentially reach the bottom of the sluice gate opening, the flow velocity through the gate is high enough to prevent particles from accumulating at the opening.

On July 3, 2012, a teleconference was conducted between NRC Region IV personnel and Susan Baughn, Manager, Nuclear Licensing and other members of your staff to clarify your position and to ensure a common understanding of the issues. During this conference, it was agreed that the focus of the violation was the requirement stated in the Updated Safety Analysis Report, Section 9.8, "Raw Water System," which stated that "water inside the intake cells can be controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells."

In response to your denial of this violation, the NRC performed a detailed review of the original violation to ensure that it was consistent with all established agency guidance. This review was performed by the inspector that identified and documented the original violation. In addition, we assigned another inspector, who was not involved in the original inspection, to review the facts associated with this condition as an independent review. These efforts were separate with no collaboration between the two in an attempt to remain as independent and non-biased as possible.

Based on the results of this independent review process, it was determined that the licensee had not provided an adequate justification to support their assertion that they were in compliance with their Updated Safety Analysis Report licensing basis. Specifically, as described in the enclosure to this letter, the Updated Safety Analysis Report establishes the design requirement that the water level inside the intake cells can be controlled during design basis flood conditions by positioning the exterior sluice gates to restrict the inflow into the cells. However, the accident mitigation coping strategy renders the flow control function through the intake structure sluice gates above 1,007 feet mean sea level non functional. This does not comply with the design basis requirement to control intake flow to the safety-related raw water system during a design basis flood for river levels between 1,010-1,014 feet mean sea level as defined in the Updated Safety Analysis Report. Therefore, the staff's independent review concluded that the finding described in VIO 05000285/2012002-03, "Failure to Meet Design Basis Requirements for Design Basis Flood Event" was substantiated.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

L. Cortopassi

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Sincerely,

**/RA/**

Thomas B. Blount, Acting Director  
Division of Reactor Safety  
Region IV

Docket No: 50-285  
License No: DRP-40

Enclosure

1. Statement of Violation VIO 05000285/2012002-03

Electronic Distribution to Fort Calhoun

Electronic distribution by RIV:  
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ADAMS: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		<input checked="" type="checkbox"/> SUNSI Review Complete	Reviewer Initials: TRF		
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RIV/EB1/C	DRP/Branch F/C	ACES	OE	EB1/C	DRS/AD
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<i>/RA/</i>	<i>/RA/</i>	<i>/RA/ per e-mail</i>	<i>/RA/per e-mail</i>	<i>/RA/</i>	<i>/RA/</i>
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## **Statement of Violation VIO 05000285/2012002-03**

As documented in NRC Inspection Report 05000285/2012002, the subject violation was described as follows:

### **Failure to Meet Design Basis Requirements for Design Basis Flood Event**

**Introduction.** The inspectors identified a violation of 10 CFR 50, Appendix B, Criterion III, Design Control, for failure to meet design basis requirements for protection of the safety related raw water system during a design basis flood for flood levels between 1,010-1,014 feet mean sea level as identified in Updated Safety Analysis Report, Section 9.8, "Raw Water System." Specifically, the design basis states that water level inside the intake cells can be controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells.

**Description.** The electric motor operators that position the six exterior sluice gates on the intake structure are located at an elevation of 1,010 feet mean sea level outside the east wall of the intake structure. At the design basis flooding elevation of 1,014 feet mean sea level, they would be completely submerged. Therefore, the motors that position the exterior sluice gates may not function when river water level rises above the 1,010 feet mean sea level. The licensee's flooding mitigation strategy involves closing five of the six exterior sluice gates and positioning the remaining gate such that a balance between inflow and raw water pump discharge are balanced (approximately one-inch open) prior to water level rising to 1,010 feet mean sea level.

The inspectors identified that changing river conditions above 1,010 feet mean sea level, could interrupt the pre-established flow balance and jeopardize the control of intake cell water level without the ability to reposition any of the external sluice gates. Should silting or sanding occur that blocks the one slightly open sluice gate, a lowering of cell water level could occur to a level below raw water pump minimum submergence requirements, resulting in loss of the raw water system – the ultimate heat sink. Similarly, should a water-borne hazard (floating tree or other large river debris) strike any of the sluice gates, or their motor operators, or their connecting rods such that inflow or leakage is increased to greater than the capacity of two raw water pumps, a raising of cell water level could occur to a level that results in flooding of the raw water pump vaults (1,007.5 feet mean sea level), resulting in a loss of the raw water system.

**Analysis.** The inspectors determined that the licensee's failure to meet design basis requirements in the Updated Safety Analysis Report was a performance deficiency. This finding was more than minor because it adversely impacted the equipment performance and protection against external events attributes of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding is bounded by the significance of a related Yellow finding regarding the ability to mitigate an external flooding event (Inspection Report 05000285/2010008). This finding has a cross-cutting aspect in the area of problem identification and resolution, corrective action program, for failure to thoroughly evaluate problems such that the resolutions address causes and extent of conditions [P.1(c)].

Enforcement. 10 CFR 50, "Design Control," Appendix B, Criterion III, states in part that measures shall be established to assure that applicable regulatory requirements and the design basis for those structures, systems, and components are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, the licensee failed to establish measures to assure that applicable regulatory requirements and the design basis for those components were correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to translate design basis requirements for protection of the safety related raw water system during a design basis flood for flood levels between 1,010-1,014 feet mean sea level as identified in Updated Safety Analysis Report, Section 9.8, "Raw Water System." Specifically, the design basis states that water level inside the intake cells can be controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells and this operation was not assured under all design basis conditions. This violation is not being treated as a new violation. Instead, it is considered as a related violation to the Yellow finding issued in October 2010, that, in general, dealt with issues related to mitigating a significant external flooding event. A separate citation will not be issued as this finding, and its corrective actions, will be managed by the Manual Chapter 0350 Oversight Panel VIO 05000285/2012002-03, Failure to Meet Design Basis Requirements for Design Basis Flood Event.

### **Summary of Licensee Response**

In response to violation VIO 05000285/2012002-03, the licensee provided a reply contained in a letter from D. Bannister to the NRC dated June 11, 2012, which denied the violation.

As stated in this letter, the licensee denied that a violation of NRC requirements had occurred in that the facility is in compliance with the flood protection requirements described in the Fort Calhoun Station Updated Safety Analysis Report. Specifically, the licensee indicated that in both the Updated Safety Analysis Report and the original plant Final Safety Analysis Report, the raw water pumps are protected against flood water up to 1,007.5 feet mean sea level by the Class I concrete structure of the intake building. Above 1,007.5 feet mean sea level, the water level inside the intake structure is controlled by positioning the exterior sluice gates to restrict the inflow into the wet wells to match the rate of pumped outflow.

At the time of the February 2012 NRC inspection, Abnormal Operating Procedure (AOP) -1, "Acts of Nature," lowered the sluice gates when river level was expected to reach 1,007 feet mean sea level. Procedure AOP-1 provided options of maintaining cell level by either adjusting the gates or starting additional raw water pumps to match water inflow. Based on this, the active safety function to position the sluice gates is completed prior to reaching a river level of 1,010 feet mean sea level. This response also states, in part, that the revised flood elevation design criteria were given in Amendment 12 to the Preliminary Safety Analysis Report, and essential structures were designed for the hydrostatic pressure resulting from flood elevations of 1,014 feet mean sea level.

Additionally, the licensee's response states that, Fort Calhoun Station Unit No. 1 was licensed for construction prior to May 21, 1971, and is committed to the draft General Design Criteria published for comment in the Federal Register on July 11, 1967 (32 FR 10213) in lieu of 10 CFR 50, Appendix A. Appendix G of the Fort Calhoun Station Updated Safety Analysis Report shows that draft General Design Criteria 2 states:

## CRITERION 2 - PERFORMANCE STANDARDS

“Those systems and components of reactor facilities which are essential to the prevention of accidents which could affect public health and safety or to mitigation of their consequences shall be designed, fabricated, and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice and other local site effects. The design bases so established shall reflect: (a) Appropriate consideration for the most severe of these natural phenomena that have been recorded for the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design.”

In conclusion the licensee’s response states that, the Fort Calhoun Station intake structure is designed to withstand hydrostatic and dynamic forces for flood events up to 1,007.5 feet mean sea level. Operation of the sluice gates is protected below 1,007.5 feet mean sea level. Impacts to the intake structure are bounded by the barge impact analysis below 1,007.5 feet mean sea level. From elevation 1,007.5 to 1,014 feet mean sea level, the licensing basis for the intake structure requires evaluation for hydrostatic and not hydrodynamic pressure. Therefore, Fort Calhoun Station is in compliance with the Current Licensing Basis and no violation of NRC requirements occurred.

### **Analysis**

Consistent with guidance provided in Region IV enforcement procedures, the NRC staff performed an independent review of the documentation associated with this finding. Based on the results of this review it was determined that the requirements of the draft General Design Criteria, Criterion 2, clearly establish the design function of systems and components of reactor facilities which are essential to the prevention of accidents which could affect public health and safety or to mitigation of their consequences. These systems and components are required to be designed, fabricated, and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as flooding conditions. Furthermore, the system design basis requirements contained in the Fort Calhoun Station Updated Safety Analysis Report, Section 9.8, “Raw Water System,” states, in part, that water level inside the intake cells can be controlled during a design basis flood by positioning the exterior sluice gates to restrict the inflow into the cells. No reference to the anticipated loss of this capability during a design basis flood event is made in the Updated Safety Analysis Report.

Contrary to the above, the design basis requirements and operation of the Raw Water System was not assured under all design basis conditions. Specifically, the licensee’s current accident mitigation coping strategy specified in Abnormal Operating Procedure AOP-1, “Acts of Nature,” is based on the loss of function of the non-safety related electric motor operators that position the six exterior sluice gates on the intake structure above 1,007 feet mean sea level and does not comply with the design basis requirement to control intake flow to the safety-related raw water system during a design basis flood for river levels between 1,010 and 1,014 feet mean sea level as defined in the Updated Safety Analysis Report. Therefore, the staff’s independent review concluded that the finding described in VIO 05000285/2012002-03, “Failure to Meet Design Basis Requirements for Design Basis Flood Event,” remains valid.