

NRR-PMDAPEm Resource

From: Dave Lochbaum [DLochbaum@ucsusa.org]
Sent: Tuesday, July 07, 2015 9:15 AM
To: Dean, Bill
Cc: Dapas, Marc; Markley, Michael; Lyon, Fred
Subject: [External_Sender] Flood protection at Fort Calhoun
Attachments: 20150707-fc-ucs-nrc-intake-amendment.pdf

Hello Bill:

Attached is a letter with two concerns about an amendment recently issued by the NRC about flood protection at Fort Calhoun.

As described in the letter, the "fix" approved by the NRC with this amendment seems to now make the plant vulnerable to a single failure; something the "unfixed" design avoided.

Also as described in the letter, whereas the NRC staff compelled the licensee to seismically qualify new valves and piping needed for the "fix," neither the licensee nor the NRC staff addressed the seismic qualification of the non-safety-related sluice gates. If all the sluice gates do not close all the way, it matters little whether the valves and piping survive or not - the flood protection won't work at all (unless there's not a flood).

Bottom line - it looks like the "fix" is little more than a different way of not adequately protecting the raw water pumps from flooding damage.

Thanks,
Dave Lochbaum
UCS

Hearing Identifier: NRR_PMDA
Email Number: 2296

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From: Dave Lochbaum

Created By: DLochbaum@ucsusa.org

Recipients:

"Dapas, Marc" <Marc.Dapas@nrc.gov>
Tracking Status: None
"Markley, Michael" <Michael.Markley@nrc.gov>
Tracking Status: None
"Lyon, Fred" <Fred.Lyon@nrc.gov>
Tracking Status: None
"Dean, Bill" <Bill.Dean@nrc.gov>
Tracking Status: None

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July 7, 2015

William Dean, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Fort Calhoun's Revised Flood Protection Standards

Dear Mr. Dean:

The Nuclear Regulatory Commission (NRC) issued Amendment No. 282 to the operating license for the Fort Calhoun Station (ML15111A399) on June 30, 2015. Mr. Richard Andrews emailed the amendment to me along with safety concerns he had about it. After reviewing the amendment including its safety evaluation, the original amendment request (ML13231A178), and associated responses to requests for additional information (ML14226A738, ML15050A246, and ML15083A359) sent to the licensee by the NRC during its review, I was unable to resolve either of Mr. Andrews's concerns. The NRC staff may have considered both concerns during its deliberations, but it is not apparent from the available documents that the concerns were evaluated and found to have been addressed. With Mr. Andrews's knowledge and consent, I am communicating the concerns to you with a request for a written response within a reasonable period.

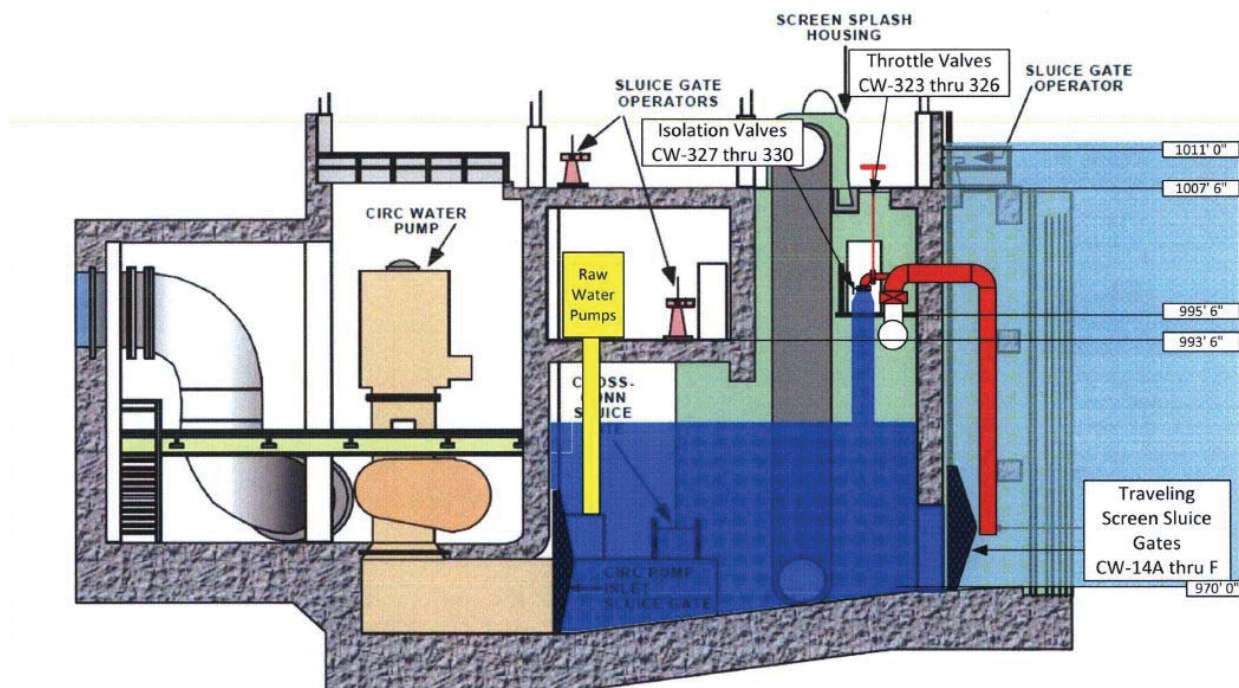
Flooding Protection Background

The intake structure pump house at Fort Calhoun contains six circulating water pumps and four raw cooling water pumps (FSAR Chapter 9.8, ML012890116). The circulating water pumps do not have a nuclear safety role—they supply river water to the main condenser to cool the steam exhausted from the main turbine. The raw water pumps have a nuclear safety role—they supply river water to the component cooling water system's heat exchangers and return the warmed water to the Missouri downstream of the intake structure pump house. The component cooling water system is a closed-loop system supplying cooling water to numerous components with safety functions. When lowered into positions from their normally raised positions, six traveling screen sluice gates (CW-14A through CW-14F) block the flow of river water into the intake structure pump house.

In the original design, the electric motors for the raw water pumps were protected against damage by submergence during a flood by closing five of the six traveling screen sluice gates (the circulating water pumps would not be running) and controlling the water level by cycling raw water pumps on and off. The component cooling water system's needs can be met by fewer than four raw water pumps. By periodically starting an "extra" raw water pump, the operators can send more water from the intake structure pump house through the plant to the discharge point downstream, thus lowering the water level.

The license amendment request (ML13231A178) submitted to the NRC by Fort Calhoun's owner on August 16, 2013, sought approval to revise the flood protection scheme. The revised scheme closes all six traveling screen sluice gates and uses four newly installed throttle valves (CW-323 through CW-326) to

meter the flow into the raw water pump pit. With some minor changes, the NRC approved the request and amended the plant's operating license accordingly.



Cross-section of the Intake Structure Pump House at Fort Calhoun

(Source: OPPD ML13231A178)

Single Failure Criterion

Appendix A to 10 CFR Part 50¹ contains 64 general design criteria for nuclear power plants. Appendix A also defines four terms, including Single Failure:

Single failure. A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure. Fluid and electric systems are considered to be designed against an assumed single failure if neither (1) a single failure of any active component (assuming passive components function properly) nor (2) a single failure of a passive component (assuming active components function properly), results in a loss of the capability of the system to perform its safety functions.

The revised flood protection scheme at Fort Calhoun does not seem to be designed against an assumed single failure.

In the original design, five of six traveling screen sluice gates were assumed to close in order to restrict the river flow into the intake structure to the point where jockeying raw water pump operation adequately controlled the water level in the raw water pump pit. If a single failure prevented one sluice gate from closing, adequate flood protection was provided through the closure of the remaining five sluice gates.

In the revised design, all six traveling screen sluice gates must be closed to assure adequate flood protection. A single failure can prevent one sluice gate from closing. The inability to adequately control the water level in the raw water pump pit could result in the electric motors and/or controls for the pumps

¹ Online at <http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appa.html>

being submerged, disabling the pumps. Without proper cooling water flow, the safety equipment supplied by the component cooling water system may be impaired or disabled.

Neither the licensee nor the NRC addressed how the single failure requirement was met by the revised design or explained why this longstanding safety requirement is now not applicable.

The closest that the single failure requirement came to be addressed was in a question posed by the NRC and answered by the licensee in a letter dated August 13, 2014 (ML14226A738):

NRC's Question: *"Should a sluice gate fail to travel to the fully closed position, operators must be able to set it into place by other means. Describe the methods available to move a sluice gate that fails to travel to the fully closed position."*

Owner's Answer: It *"takes approximately two days before large flows [from heavy rainfall] reach Fort Calhoun Station, which is sufficient time to prepare for the design basis flood. ... in the event there is a degraded flood barrier ... the degraded barrier (i.e., sluice gate) would be reviewed and action implement (e.g., flush seat, lower gate with rigging equipment, divers, etc.) to fully shut the gate."*

The 'sufficient time for needed repairs' argument made by the owner in this case is not used for safety components like the emergency diesel generators (EDGs). The safety systems powered from the EDGs have mission times lasting up to 30 days following an accident. To comply with Appendix A to 10 CFR Part 50 and its single failure provisions, designs feature diverse, redundant components. The single failure requirement is NOT satisfied by fixing something that has broken or malfunctioned.

The revised flood protection design at Fort Calhoun simply does not comport with Appendix A to 10 CFR Part 50 and its single failure provision.

Seismic Qualification

In its license amendment request (ML13231A178), the owner contended that the four new valves to be installed and the associated piping did not have to be seismically qualified. Their argument essentially was that the valves and piping were not required to mitigate a seismic event, only a flooding event.

The NRC staff did not agree, as indicated by these passages from the amendment (ML15111A399) the agency issued:

...the licensee originally concluded that the valves did not need to be qualified as Seismic Category I. However, should a flooding event occur after a seismic event (e.g., a Fukushima-type scenario), the valves must still be able to perform their safety function. Therefore, the valves must be seismically qualified.

and

Therefore, the NRC staff concluded that the intake cell flood water inlet valves and their connecting piping must be seismically qualified.

and

The NRC staff noted that although the valves are not required to be functional during a seismic event, they must maintain their functionality after a seismic event in order to be credited for a flooding event.

Thus, the revised design must protect against a flooding event after a seismic event—otherwise, the four new valves and associated piping would not need to be seismically qualified. But the NRC would not and

did not approve the license amendment request until the owner committed to seismically qualify the valves and piping.

But what about the traveling screen sluice gates? It's not clear that they are seismically qualified. It appears that the owner applied the same logic to the sluice gates' qualification as it applied—without success—to the new valves and piping.

It's not a stretch to postulate that a seismic event could damage the mechanism used to raise and lower one or more sluice gates since none is seismically qualified. (If all were seismically qualified, it would not be a stretch to postulate that one, per the aforementioned single failure provision, mechanism is damaged. Absent seismic qualification, the single failure provision does nothing to limit the damage to just one sluice gate and all six could be impaired by a seismic event.

Returning to the previously cited Q&A regarding the "what if" one sluice gate fails to fully lower, the owner contended that any and all damage could be remedied in the two-day warning that flooding events conveniently provide. But this two-day window of opportunity has not been proven to apply to seismic events and subsequent flooding events. Thus, there's no reasonable assurance that workers could work around six damaged, non-seismically qualified sluice gates in time to provide the necessary protection against flooding.

The NRC staff required the owner to seismically qualify the four new valves and associated piping because a flooding event could follow a seismic event. Likewise, it follows that the NRC must also require that the sluice gates and their associated movement and control devices be seismically qualified.

I look forward to the NRC's response on these unresolved safety issues.

Sincerely,

A handwritten signature in blue ink that reads "David A. Lochbaum". The signature is fluid and cursive, with the first name "David" being the most prominent.

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