

February 3, 2015

ULNRC-06169

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

10 CFR 50.90

Ladies and Gentlemen:

**DOCKET NUMBER 50-483  
CALLAWAY PLANT UNIT 1  
UNION ELECTRIC CO.  
FACILITY OPERATING LICENSE NPF-30  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ROUND 3  
RE: APPLICATION FOR AMENDMENT TO FACILITY OPERATING  
LICENSE NPF-30 REVISION TO FINAL SAFETY ANALYSIS REPORT  
STANDARD PLANT SECTION 3.6 FOR HIGH DENSITY POLYETHYLENE  
PIPE CRACK EXCLUSION (TAC NO. MF3202, LDCN 13-0016)**

- References:
1. ULNRC-06043 dated December 6, 2013, "Revision to FSAR Standard Plant Section 3.6 for HDPE Crack Exclusion (LDCN 13-0016)"
  2. NRC Request for Additional Information, Carl F. Lyon (NRC) to Fadi Diya (Union Electric Company) dated July 1, 2014
  3. ULNRC-06137 dated September 2, 2014, "Response to NRC Request for Additional Information Regarding Application for Amendment to Facility Operating License NPF-30 (TAC NO. MF3202, LDCN 13-0016) Revision to FSAR Standard Plant Section 3.6 for HDPE Crack Exclusion"
  4. NRC Request for Additional Information Round 2, Carl F. Lyon (NRC) to Fadi Diya (Union Electric Company) dated October 28, 2014
  5. ULNRC-06152 dated December 11, 2014, "Response to Request for Additional Information Round 2 Re: Application for Amendment to Facility Operating License NPF-30 Revision to Final Safety Analysis Report Standard Plant Section 3.6 for High Density Polyethylene Pipe Crack Exclusion (TAC NO. MF3202, LDCN 13-0016)"
  6. NRC Request for Additional Information Round 3, Carl F. Lyon to Fadi Diya (Union Electric Company) dated December 22, 2014

In Reference 1 above, Ameren Missouri (Union Electric Company) submitted an application for amendment to Facility Operating License Number NPF-30 for the Callaway Plant. The proposed amendment would add a new pipe crack exclusion allowance to FSAR Standard Plant Section 3.6.2.1.2.4, "ASME Section III and Non-Nuclear Piping – Moderate-Energy," and FSAR Standard Plant Table 3.6-2, "Design Comparison to Regulatory Positions of Regulatory Guide 1.46, Revision 0, dated May 1973, titled 'Protection Against Pipe Whip Inside Containment,'" for the high density polyethylene (HDPE) piping installed in ASME Class 3 line segments of the essential service water (ESW) system. The amendment was submitted per the requirements of 10 CFR 50.59(c)(2)(viii).

In Reference 2 above, the NRC requested additional information to complete their review, which was provided by Ameren Missouri in Reference 3. In Reference 4 above, the NRC issued a second request for additional information, which was provided by Ameren Missouri in Reference 5. In Reference 6 above, the NRC issued a third request for additional information. The attachment to this letter provides the requested information.

No commitments are contained in this letter. If you have any questions on this amendment application, please contact me at (573) 676-8719 or Jim Kovar at (314) 225-1478.

I declare under penalty of perjury that the foregoing is true and correct

Sincerely,

Executed on: 2/3/2015



Scott A. Maglio  
Manager, Regulatory Affairs

JPK/nls

Attachment: RAI Response

cc: Mr. Marc L. Dapas  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

Senior Resident Inspector  
Callaway Resident Office  
U.S. Nuclear Regulatory Commission  
8201 NRC Road  
Steedman, MO 65077

Mr. Fred Lyon  
Project Manager, Callaway Plant  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Mail Stop O-8B1  
Washington, DC 20555-2738

**Index and send hardcopy to QA File A160.0761**

**Hardcopy:**

Certrec Corporation  
4150 International Plaza Suite 820  
Fort Worth, TX 76109  
(Certrec receives ALL attachments as long as they are non-safeguards and may be publicly disclosed.)

**Electronic distribution for the following can be made via Responses and Reports ULNRC Distribution:**

F. M. Diya  
D. W. Neterer  
L. H. Graessle  
T. E. Herrmann  
B. L. Cox  
S. A. Maglio  
T. B. Elwood  
Corporate Communications  
NSRB Secretary  
STARS Regulatory Affairs  
Mr. John O'Neill (Pillsbury Winthrop Shaw Pittman LLP)

Attachment  
to ULNRC-06169

**ATTACHMENT**

**RAI RESPONSE**

**REQUEST FOR ADDITIONAL INFORMATION  
LICENSE AMENDMENT REQUEST TO REVISE FSAR-SP 3.6  
UNION ELECTRIC COMPANY  
CALLAWAY PLANT, UNIT 1  
DOCKET NO. 50-483**

**References:**

1. Letter No. ULNRC-06043, from Scott Maglio, Regulatory Affairs Manager, Ameren Missouri, to U. S. Nuclear Regulatory Commission, Document Control Desk, "Revision to FSAR Standard Plant Sections 3.6 for HDPE Crack Exclusion," December 6, 2013. (ML13340A775)
2. Letter No. ULNRC-06137, from Scott Maglio, Regulatory Affairs Manager, Ameren Missouri, to U. S. Nuclear Regulatory Commission, Document Control Desk, "Response to Request for Additional Information Round 2 Re: Application for Amendment, Revision to Final Safety Analysis Report Standard Plant Sections 3.6 for High Density Polyethylene Pipe Crack Exclusion," September 2, 2014. (ML14245A653)
3. Letter No. ULNRC-06152, from Scott Maglio, Regulatory Affairs Manager, Ameren Missouri, to U. S. Nuclear Regulatory Commission, Document Control Desk, "Response to NRC Request for Additional Information Regarding Application for Amendment, Revision to FSAR Standard Plant Sections 3.6 for HDPE Crack Exclusion (TAC No. MF3202, LDCN 13-0016," December 11, 2014 (ML14345B052)

By application dated December 6, 2013 (Reference 1), as supplemented by letters dated September 2 and December 11, 2014 (References 2 and 3, respectively), to the U.S. Nuclear Regulatory Commission (NRC), Union Electric Company (dba Ameren Missouri, the licensee) submitted a license amendment request to revise the Final Safety Analysis Report-Standard Plant (FSAR-SP) Section 3.6.2.1.2.4, "ASME [American Society of Mechanical Engineers] Section III and Non-Nuclear Piping – Moderate-Energy," to include a new pipe crack exclusion allowance at Callaway Plant, Unit 1.

The NRC staff has determined that the additional information requested below is needed to complete its review.

**Fire Protection Branch (AFPB)-Callaway-MF3202-HDPE-RAI-9(d), Supplement 1**

The NRC reviewed the information provided in the letter dated December 11, 2014. The response indicates that no insulation or fire barrier materials are used on the exposed High Density Polyethylene (HDPE) Essential Service Water pipe sections. For the Ultimate Heat Sink Penetration Room and the Yard Vault, the licensee assumes "whole room burn-up" to occur.

1. *Please provide additional information regarding the expectation of performance of the HDPE piping in these areas, given failure of unprotected HDPE material in a whole room burnup scenario.*

2. *If the HDPE piping fails, provide a technical discussion of how plant safety is assured in the event of whole room burn-up of these areas, including HDPE pipe failure of exposed HDPE piping.*

**Response:**

HDPE Pipe Fire Hazard

The HDPE pipe, which is composed of high density polyethylene, is considered a combustible material; however, its ignition temperature is >300 degrees C and its auto-ignition temperature is 349 degrees C. If ignited, HDPE pipe will create dense smoke. In terms of susceptibility to ignition and smoke generation should ignition occur, the exposed HDPE pipe fire hazard could be considered comparable to electrical cable trays filled with IEEE rated electrical cables, which are used throughout the plant. The HDPE pipe is not an ignition source, and consequently, its addition does not affect the probability of a fire occurring in any fire area.

In a whole room burn-up scenario, all equipment in the affected area is assumed to be adversely affected by the fire. It is assumed the fire fails the HDPE piping in that area. As explained further below, and in light of the plant design for redundant and independent of the Essential Service Water (ESW) system, none of the equipment in the affected area would be required or credited for maintaining the reactor in a safe and stable condition regardless of the condition of the HDPE piping in the area of the fire. The effect of failed HDPE piping on equipment in applicable areas of the plant is location specific and is addressed in each of the sections below.

UHS Penetration Room

The ESW HDPE piping at the UHS Cooling Tower is separated into two separate fire areas that are train related, UNCT, "Ultimate Heat Sink Cooling Tower A," and USCT, "Ultimate Heat Sink Cooling Tower B," which are separated by rated fire barriers. Fire damage is evaluated in these two fire areas as whole room burn-up, therefore, the inclusion of the HDPE pipe has no impact on the fire damage assumed for the safety related equipment in the affected fire area. No specific failure mechanism for the HDPE piping is postulated, and detailed fire modeling has not been performed. For a fire affecting one train (UNCT/USCT), the Nuclear Safety Capability Assessment performance goal is satisfied by maintaining the opposite ESW train free of fire damage and by having offsite power and non-safety related Service Water available.

The postulated fire and its effects (i.e., potential flooding due to failure of HDPE) do not damage the opposite train; therefore, the opposite train is assumed to be available. The UHS Penetration Rooms are located on opposite sides of the UHS Cooling Tower Basin, which is roughly 116' wide and 110' long. The UHS Cooling Tower Basin drains (by gravity) back to the UHS Pond. The drains are sized to keep up with the return flow with both ESW pumps running at full capacity. An HDPE pipe failed by fire would not pose a threat to overflowing the Cooling Tower Basin (i.e., by

flow of spilled ESW from the UHS Penetration Room), and therefore would not affect the opposite train.

The UHS Cooling Tower is located away from other safety related buildings. Thus, no equipment in other safety related structures would be susceptible to the effects of the HDPE failure in the UHS Cooling Tower Penetration Rooms.

Because the opposite train would remain free of fire and water damage due to a failed HDPE pipe, a failure of the HDPE piping (due to whole room burn-up), and the resulting loss of inventory would not prevent the opposite train from performing its intended design function. Offsite power would be available, as well as non-safety related service water. The Callaway Energy Center would be able to achieve a safe and stable plant condition using the opposite train of ESW in accordance with licensing requirements identified in FSAR SP Section 9.5.1.

#### Yard Vault

The ESW HDPE piping in the yard vaults is ESW train specific and separated by rated fire barriers. There are no fixed ignition sources in the vaults, and fire damage is evaluated as whole room burn-up. No specific failure mechanism for the HDPE piping is postulated, and detailed fire modeling has not been performed. For a fire in one train of the ESW vaults, the Nuclear Safety Capability Assessment performance goal is satisfied by maintaining the opposite ESW train free of fire damage and by having offsite power and non-safety related Service Water available.

The postulated fire and its effects (i.e., loss of ESW inventory due to failure of HDPE) do not damage the opposite train; therefore, the opposite train is assumed to be available. The yard vaults are separated by a concrete wall such that no leak path exists. There are no safety related components in the yard vaults that would be susceptible to water intrusion (i.e. there are no electrical components or instrumentation).

In addition, the yard vaults are located away from the ESW Pumphouse, the UHS Cooling Tower, and the Control Building basement. Thus, no equipment in those structures would be susceptible to the effects of the HDPE failure.

Because there are no safety related components in the yard vaults that would be susceptible to water intrusion (i.e. there are no electrical components or instrumentation), a failure of the HDPE piping (due to whole room burn-up), and the resulting loss of inventory would not prevent the opposite train from performing its intended design function. Offsite power would be available, as well as non-safety related service water. The Callaway Plant would be able to achieve a safe and stable plant condition using the opposite train of ESW in accordance with the licensing requirements identified in FSAR SP Section 9.5.1.

Attachment  
to ULNRC-06169

Note that drawings M-U50211 and M-U50321 were included as enclosures in the response to previous RAIs 1-8. These drawings depict the general layout of the UHS Cooling Tower and the ESW Yard Vaults.