



May 31, 2018

ULNRC-06440

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

10CFR50.54(f)

Ladies and Gentlemen:

**DOCKET NUMBER 50-483  
CALLAWAY PLANT UNIT 1  
UNION ELECTRIC CO.  
RENEWED FACILITY OPERATING LICENSE NPF-30  
RESPONSE TO GENERIC LETTER 2016-01, "MONITORING OF NEUTRON-ABSORBING  
MATERIALS IN SPENT FUEL POOLS" - REQUEST FOR SUPPLEMENTAL  
INFORMATION (ML17304B153)**

On April 7, 2016, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools," ADAMS Accession No. ML16097A169, to address the degradation of neutron-absorbing materials (NAM) in wet storage systems for reactor fuel at power and non-power reactors.

GL 2016-01 requested that licensees provide information to allow the NRC staff to verify continued compliance through effective monitoring to identify and mitigate any degradation or deformation of NAM credited for criticality control in spent fuel pools.

Union Electric Company (Ameren Missouri) provided a response for the Callaway plant on November 3, 2016 via letter ULNRC-06339, "Generic Letter 2016-01: 'Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools,'" ML1608A443. This response demonstrated that credited neutron-absorbing materials in the Callaway plant spent fuel pool are in compliance with the licensing and design basis, as well as applicable regulatory requirements, and that there are measures in place to maintain this compliance.

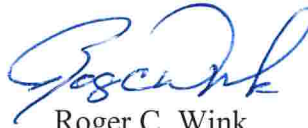
On December 18, 2017, the NRC issued "Generic Letter 2016-01, 'Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools - Request for Supplemental Information,'" ML17304B153. In this document, and in order to complete its review, the NRC staff requested licensees to provide the supplemental information requested in Enclosures 3 and 4 of the document.

Pursuant to that request, the supplemental information is provided in the enclosure to this letter.

Please contact Tom Elwood, Supervising Engineer, Regulatory Affairs and Licensing at 314-225-1905 for any questions you may have regarding this issue.

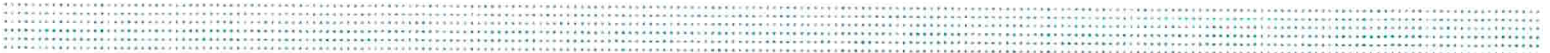
This letter does not contain new commitments.

Sincerely,



Roger C. Wink  
Manager, Regulatory Affairs

Enclosure



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Supplemental Information Requested in Enclosure 3 to "Generic Letter 2016-01,  
'Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools - Request for  
Supplemental Information,'" (ML17304B153)

The Nuclear Regulatory Commission's 12/18/2017 Request for Supplemental Information states that Callaway Plant *does not have a site-specific monitoring program, and consequently, is relying on general industry operating experience as a surrogate for the condition of the Boral installed in the Callaway Plant Spent Fuel Pool (SFP).*

**Request**

a) *Describe how industry operating experience bounds the condition of the Boral at Callaway Plant, thereby providing assurance that any degradation or deformation that may affect the Boral at Callaway Plant is identified.*

**Response**

Through its nuclear safety culture, procedures, and processes, Callaway Plant systematically and effectively collects, evaluates, and implements relevant internal and external operating experience (OE) in a timely manner. Issues emerging from the use of Boral in spent fuel racks are monitored through the Callaway Plant OE and Corrective Action Programs.

The site will continue to monitor industry OE related to Boral, which includes ongoing participation in the EPRI Neutron Absorber Users Group (NAUG) and its related programs (e.g., industrywide learning aging management). Industrywide, there have been no indications of a loss of Boral material of a nature that diminished neutron-absorbing capability (EPRI Report 1021052, "Overview of BORAL Performance Based Upon Surveillance Coupon Measurements"). Callaway Plant follows the EPRI Water Chemistry Control Program, and there have been no indications of loss of Boral neutron-absorbing capabilities at a plant following the guidelines. In addition, there are no plant-specific operating conditions or rack attributes that merit concern for which the industry OE does not bound Callaway Plant. Finally, EPRI Report 3002013119, "Evaluation of the Impact of Neutron Absorber Material Blistering and Pitting on Spent Fuel Pool Reactivity," documents that observed and foreseen degradation and deformation of the Boral has an insignificant impact on SFP criticality.

The NAUG, through EPRI, is currently developing an industrywide program to aid in monitoring indications of potential Boral degradation and deformation. To date, this program has collected more than 70,000 water chemistry data points, representing more than 30 SFPs. 100 Boral coupon data points from more than 20 SFPs have also been collected. The program, supported by EPRI NAUG and industry participants, is described in EPRI document 3002013122, "Roadmap for the Industrywide Learning Aging Management Program (i-LAMP) for Neutron Absorber Materials in Spent Fuel Pools," and includes insights and feedback received from numerous communications with the NRC. Relevant issues emerging from this industry effort will be monitored through the Callaway Plant OE and Corrective Action Programs.

**Request**

*b) Discuss the criticality impact due to relevant material deformation identified in general industry operating experience, and how it can be accommodated by the nuclear criticality safety analysis of record for Callaway Plant without exceeding subcriticality requirements.*

**Response**

To date, industry OE has revealed no instances of impact on SFP criticality due to observed Boral deformation (e.g., blistering) or degradation (e.g., pitting). The NAUG, through EPRI, recently completed a study (EPRI Report 3002013119) analyzing the criticality impact of blisters and pits on Boral. Simulations were performed for various enrichments, burnups, and areal density values at unborated conditions, which is conservative for pressurized water reactors such as Callaway Plant. The study results demonstrate that pitting and blistering on a scale much larger than previously observed in industry has an insignificant impact on SFP criticality. Therefore, the SFP criticality safety analysis of record remains applicable.