



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 1, 2012

Mr. Adam C. Heflin
Senior Vice President and Chief
Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
CALLAWAY PLANT UNIT 1, LICENSE RENEWAL APPLICATION, SET 13 (TAC
NO. ME7708)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company d/b/a Ameren Missouri (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54) for renewal of Operating License No. NPF-30 for the Callaway Plant Unit 1 (Callaway). The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Sarah G. Kovaleski, of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-2946 or by e-mail at Samuel.CuadradoDeJesus@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Cuadrado de Jesús".

Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
As stated

cc w/encl: Listserv

CALLAWAY PLANT UNIT 1
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION, SET 13

RAI B2.1.13-2a

Background:

The "detection of aging effects" program element of NUREG-1801, "Generic Aging Lessons Learned Report," (GALL Report) aging management program (AMP) XI.M26, "Fire Protection," states that visual inspections of fire barrier penetration seals, walls, ceilings, floors, doors, and other fire barrier materials are performed by fire protection qualified personnel. During the audit, the staff noted that Fire Protection Program inspections are performed by personnel qualified as Quality Control Inspectors and Operations personnel.

In RAI B2.1.13-2 issued by letter dated July 5, 2012, the staff requested that the applicant explain the minimum training and qualifications required for personnel who perform Fire Protection Program inspections and how only personnel with the required training and experience are assigned to perform Fire Protection Program inspections since a fire protection qualification is not used. In its response dated August 6, 2012, the applicant stated that the personnel performing the Fire Protection Program inspections are qualified consistent with American National Standards Institute (ANSI) N45.2.6-1978, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants." The applicant also stated that the quality control personnel are trained and qualified to perform their activities in accordance with procedure QCP-ZZ-01000, "QC Inspector Qualification." The applicant further stated that the operations personnel who perform fire door inspections are qualified by a specific watch- station qualification program.

Issue:

The applicant's response did not discuss any specific fire protection related training or qualifications required for personnel performing Fire Protection Program inspections. The staff noted that ANSI N45.2.6-1978 requires that personnel performing inspections be qualified within their respective areas of responsibility. However, since the personnel performing Fire Protection Program inspections are quality control or operations personnel, their qualifications could only be related to quality control or operations and that would be consistent with ANSI N45.2.6-1978. It remains unclear to the staff how only personnel with the required training and experience in fire protection are assigned to perform Fire Protection Program inspections since a fire protection qualification is not used.

Request:

Explain the specific fire protection related training and experience that the quality control and operations personnel who perform Fire Protection Program inspections receive and how only the personnel with fire protection related training and experience are used to perform Fire Protection Program inspections.

RAI B2.1.15-2a

Background:

The response to RAI B2.1.15-2 (part d) provided by letter dated August 6, 2012, stated that the condensate storage tank (CST) acrylic rubber sealant is credited as preventative measure for the CST urethane foam insulation and CST metallic surface.

The response to RAI B2.1.15-3 Part (a) provided by letter dated August 6, 2012, stated in part, "[e]xternal wall surface inspection will require insulation to be removed on 25 locations on the tank external walls to allow inspection for loss of material and cracking. At least 10 of the 25 locations will be near the base of the tank wall. Each location will measure approximately one square foot in area."

In addition, the response to B2.1.15-3 Part (a) stated, "[t]he tank bottom internal surface will be examined by measuring thickness along 12-inch wide bands of the bottom. The tank thickness measurements will be performed once within the five years of entering the period of extended operation and whenever the tank is drained.

Issue:

External visual inspections conducted by the Aboveground Metallic Tanks Program could detect cracking or blistering in the acrylic rubber sealant; however, minor cracks could occur between inspections and admit water that would leach through the urethane foam insulation. The staff agrees that a one-time inspection of 25 one square foot samples of the tank's external wall surfaces prior to entering the period of extended operation is an acceptable method to confirm that leakage through the insulation is not occurring. Inspecting only portions of the external surface of the tank is not consistent with GALL Report AMP XI.M29, and therefore the staff requires further information to ensure that the intended function(s) of the tank will be met during the period of extended operation.

- It is not clear to the staff when in the period prior to the period of extended operation the one-time inspection of the tank walls will be conducted. Inspection timing is important to ensure that adequate operating time has occurred such that degradation should be observable if it is occurring.
- The response stated that only wall inspections would be conducted; however, the dome region is important because water would be less likely to dissipate than from the vertical sides of the tank.
- Neither the program nor the Final Safety Analysis Report (FSAR) Supplement was revised to include details on the inspections, including the number and size. The basis for the staff's finding that the one-time inspection program is acceptable is in part based on the size of the inspections and locations where they will be occurring.

For tank bottom inspections, it is not clear to the staff how many bottom measurements will be obtained in each 12-inch band.

Request:

State the timing of the one-time inspection of external surfaces of the tank. State whether and how many inspections will be conducted in the external metallic surface of the dome region, or state the basis for why no inspections are necessary in the dome region. State how many inspection points will be conducted in each 12-inch band of the tank bottom. Amend the program and FSAR Supplement to include the timing of the one-time inspection, the size of the wall and dome inspections, and the number of inspections for the wall and dome.

RAI B2.1.15-4a

Background:

The response to B2.1.15-4 provided by letter dated August 6, 2012, stated that the fire water storage tanks (FWSTs) are cleaned and inspected on an alternating refueling outage (RFO) frequency and will be recoated prior to the period of extended operation to remove the coating delaminations and prevent them from becoming an impact on the intended function(s) of downstream components. The response also stated that the outlets of the FWSTs consist of 14-inch pipe that extends 3 feet inside the tank and ends in a 90 degree radius elbow turned downward ending 6 inches above the bottom of the tank and therefore, in the event of delamination, this geometry would preclude any large pieces of coating from entering the outlet of the tank and affecting downstream equipment.

The Callaway Addendum to the FSAR, Section 9.5.1.2.1 states, “[t]he FPS water supply is separated from all other site water supply systems and is based on providing 2300 gallons per minute of water for two hours to sprinkler systems with a simultaneous total flow of 1000 gallons per minute to hose stations.”

Issue:

While the replacement of the coatings and subsequent inspections are beyond the recommendations in GALL Report AMP XI.M29, the plant-specific operating experience cited in RAI B2.1.15-4 results in the staff requiring further information to ensure that the intended function(s) of the tank and downstream in-scope components will be met during the period of extended operation. The staff understands that the coatings will be replaced prior to the period of extended operation; however, given past plant-specific operating experience, subsequent delamination of coatings could occur.

The fluid velocity corresponding to 3300 gpm in a 14-inch pipe is approximately 7.8 feet per second. Given the six inch clearance to the bottom of the tank, delaminated particles could be carried into the flow stream. The staff lacks sufficient information to determine that downstream components will not be impacted by delaminated coatings if the coatings are not managed for aging.

Request:

Revise the fire water system or Aboveground Metallic Tanks Program, and the corresponding FSAR supplement, to indicate the frequency of coating inspections to confirm that delamination of the coatings is not occurring. Alternatively, provide the basis for why the smallest size delaminated particle that could prevent an in-scope intended function from being performed will not be transported from the tank.

RAI B2.1.25-5a

Background:

By letter dated August 6, 2012, in response to RAI B2.1.25-5 related to utilization of the 100 mV criterion the applicant stated:

The Buried and Underground Piping and Tanks program will use the 100 mV polarization as an acceptance criterion based on protecting the most noble metal in a dissimilar metal environment consistent with NACE RP0169-2007 Section 6.2 criteria. Protection of the most noble buried in-scope material will consist of evaluating the buried metallic piping and tanks that are electrically tied together. Using published industry galvanic series charts, the most anodic material will be identified and then raised 100 mV greater than the published number in relation to the copper-copper sulfate half-cell. Instances where protection cannot be demonstrated with this method will be entered into the Corrective Action Program. The EPRI sponsored Cathodic Protection User's Group will be used to provide operating experience associated with the 100 mV criteria.

Issue:

Given that LR-ISG-2011-03, "Generic Aging Lessons Learned (GALL) Report," Revision 2, AMP XI.M41, "Buried and Underground Piping and Tanks," Table 6a, "Cathodic Protection Acceptance Criteria," provides specific cathodic protection criteria and does not cite NACE RP0169-2007, the intent of the reference to NACE RP0169-2007 is not clear.

In relation to the statement, "[p]rotection of the most noble buried in-scope material will consist of evaluating the buried metallic piping and tanks that are electrically tied together," it is not clear to the staff why the copper grounding grid is not considered in the evaluation.

The staff could not determine how the galvanic series chart will be utilized in relation to as-found cathodic protection survey data.

Finally, the staff believes that when the 100 mV polarization criterion is used, there must be some means (e.g., buried coupons, electrical resistance probes) to verify that the most anodic material is being protected.

Request:

- a) Justify the use of RP0169-2007 Section 6.2 criteria if the 100 mV criterion will be used absent a means to verify its effectiveness in preventing corrosion of the least noble metal.
- b) State why the copper grounding grid was not included in the scope of buried items to be evaluated.
- c) State specifically how the 100 mV criterion will be applied in relation to the galvanic series chart and for which materials the criterion will be utilized.
- d) State what methods will be utilized to confirm the results of the cathodic protection surveys. Revise the Buried and Underground Piping and Tanks Program and FSAR Supplement to reflect the use of this method. State what actions will be taken if the chosen method indicates that corrosion of in-scope buried components is occurring more rapidly than expected. This response should not be limited to a reference to entering the condition in the corrective action program.

RAI B2.1.25-6a

Background:

The staff noted that based upon a review of the response to RAI B2.1.1-1, dated August 21, 2012, associated with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program, leaks in essential service water (ESW) piping have been categorized as being caused by microbiologically influenced corrosion (MIC), and since 2005, no leaks have occurred. The response to RAI B2.1.10-6, dated August 21, 2012, associated with the Open-Cycle Cooling Water System program, states that only one leak has occurred to date in buried ESW piping. This leak was caused by MIC.

LR-ISG-2011-03, "Generic Aging Lessons Learned (GALL) Report," Revision 2, AMP XI.M41, "Buried and Underground Piping and Tanks," revised the recommendation related to the number of buried piping inspections for instances where cathodic protection does not meet availability and effectiveness goals from four per 10-year period starting 10 years prior to the period of extended operation to 7, 10 and 12 inspections in each of the 10-year periods, respectively.

The response to RAI B2.1.25-6 dated August 6, 2012, states that while the cathodic protection system is not currently being operated in accordance with the recommendations in the AMP, the ESW piping coatings and backfill do meet AMP XI.M41 recommendations, and therefore, four inspections in the 10-year period prior to the period of extended operation would be appropriate. It also states that if operation of the cathodic protection system were to be brought into conformance with the recommendations in AMP XI.M41 during the period of extended operation, one inspection would be conducted in each 10-year period.

Issue:

It is not clear to the staff if any of the leaks in ESW piping occurred due to external corrosion. The staff noted that based on its review of plant-specific operating experience, three leaks and one instance of coating degradation occurred in fire protection piping. It is not clear to the staff whether the buried fire protection piping leaks and coating degradation occurred in locations with less rigorous specifications for backfill. If the ESW piping leaks originated from the outside surface of the buried piping or the fire protection buried piping leaks occurred in locations where the backfill specifications were the same as for the ESW piping, four inspections in the 10-year period prior to the period of extended operation would not be consistent with the recommendations in LR-ISG-2011-03.

Four inspections in each 10-year period starting 10 years prior to the period of extended operation where the cathodic protection system is not meeting availability or effectiveness goals is not consistent with LR-ISG-2011-03.

Request:

- a) State whether any of the ESW leaks cited in the responses to the above RAIs originated from the outside surface of the buried piping.
- b) State whether buried fire protection leaks originating from the outside surface of the buried piping occurred in locations where the backfill specifications were the same as those for the in-scope ESW piping.
- c) State the basis for why four inspections would be sufficient to ensure that the buried in-scope ESW piping would meet its intended function(s) for instances where cathodic protection does not meet availability and effectiveness goals recommended in LR-ISG-2011-03.

RAI B2.1.25-7

Background:

The response to RAI B2.1.14-5, dated August 6, 2012, related to the Fire Water System Program, stated, “[t]he coal tar enamel that is on the FPS can be expected to have a service life ranging from 15 to 50 years depending on soil environment. Plant operating experience reflects that some of the coating for buried fire protection system piping is nearing the end of its service life.”

Issue:

It is not clear to the staff whether the portion of the fire water system where the coating is nearing the end of its service life is within the scope of license renewal. If coatings are nearing the end of their life, and the cathodic protection system is not meeting availability or effectiveness goals, the staff does not believe that four inspections in each 10-year period starting 10 years prior to the period of extended operation are sufficient to ensure that the intended function(s) of the piping will be met. If in-scope piping is affected, then LR-ISG-2011-03 recommends that 15, 20, and 25 inspections be conducted in each respective 10-year period (e.g., 15 inspections in the 30 – 40 year period) starting 10 years prior to the period of extended operation if the cathodic protection system is not meeting availability or effectiveness goals.

Request:

- a) State whether the portion of the fire water system where the coating is nearing the end of its service life is within the scope of license renewal.
- b) State whether the coating on any other buried in-scope piping is nearing the end of its service life.
- c) If the coatings on any buried in-scope steel piping are approaching the end of life, state the basis for why four inspections would be sufficient to ensure that the buried in-scope ESW piping would meet its intended function(s) for instances where cathodic protection does not meet availability and effectiveness goals recommended in LR-ISG-2011-03.

October 1, 2012

Mr. Adam C. Heflin
Senior Vice President and Chief
Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
CALLAWAY PLANT UNIT 1, LICENSE RENEWAL APPLICATION, SET 13 (TAC
NO. ME7708)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company d/b/a Ameren Missouri (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54) for renewal of Operating License No. NPF-30 for the Callaway Plant Unit 1 (Callaway). The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Sarah G. Kovaleski, of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-2946 or by e-mail at Samuel.CuadradoDeJesus@nrc.gov.

Sincerely,
/RA/
Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
As stated
cc w/encl: Listserv
DISTRIBUTION:
See next page

ADAMS Accession No.: ML12255A287

*concurrence via e-mail

OFFICE	LA:DLR/RPB1*	PM:DLR/RPB1	BC:DLR/RPB1	PM:DLR/RPB1
NAME	YEdmonds	SCuadrado	DMorey	SCuadrado
DATE	09/18/2012	09/20/2012	09/24/2012	10/01/2012

OFFICIAL RECORD COPY

Letter to A. Heflin from S. Cuadrado DeJesus dated, October 1, 2012

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
CALLAWAY PLANT UNIT 1 LICENSE RENEWAL APPLICATION, SET 13 (TAC
NO. ME7708)

DISTRIBUTION:

E-MAIL:

PUBLIC

RidsNrrDirResource

RidsNrrDraAfpb Resource

RidsNrrDraApla Resource

RidsNrrDeEmcb Resource

RidsNrrDeEeeb Resource

RidsNrrDssSrxb Resource

RidsNrrDssSbpb Resource

RidsNrrDssScvb Resource

RidsOgcMailCenter Resource

SCuadrado

FLyon

THartman

CFells

DMorey

MSpencer (OGC)

GPick (RIV)