



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

December 27, 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 19
(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 "Samuel 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 19

RAI B2.1.25-5b

Background:

A Close-Interval Survey and Direct Current Voltage Gradient Survey Buried Fire Water Protection Piping report, dated May 7, 2008, recommended that for locations not meeting the -850 mV criterion, the station should determine whether the alternative 100 mV potential shift criterion would demonstrate acceptable cathodic protection. The response to RAI B2.1.25-5a stated that corrosion coupons will be used to ensure that the cathodic protection system is providing sufficient protection for buried steel components within the scope of license renewal instead of using the 100 mV criterion.

Issue:

While the staff will consider using buried coupons to demonstrate the effectiveness of the cathodic protection system, the application lacks sufficient detail on what type of coupons will be used, how the corrosion coupons will be installed, the utilization of results, quantity of inspections that will occur while the level of protection is indeterminate, etc. In addition, no industry standards related to coupon testing were referenced (e.g., NACE Standard TM0169, ASTM G1, ASTM G16, ASTM G46).

Request:

Provide the following information:

a) Coupon Characteristics

- type of coupon to be used (e.g., free-corrosion coupon, polarized and native coupon pair, gravimetric, electrical resistance probe)
- whether the coupons will be coated with an intentionally embedded holiday (e.g., pitting rates would be expected to be higher at a holiday versus bare metal buried coupon) or will be bare metal and the surface condition (e.g., presence of scale and corrosion products, surface finish)
- composition of the coupon compared to the pipe (e.g., chemical composition and microstructure)

b) Coupon Placement

- how coupon locations will be selected so that they will be representative of the cathodic protection conditions at the point of interest? (i.e., not receiving preferential or diminished protection compared to the piping system of interest)
- how many coupons will be buried for each linear length of buried pipe?

- coupon size and orientation with respect to the pipe, for example, how close both in distance (e.g., no greater than a foot away from the pipe) and elevation (e.g., between bottom and up to one-third pipe diameter above bottom of pipe) the coupons will be installed to the pipe; and whether coupons will be perpendicular or parallel with the pipe?
 - how long coupons will be allowed to be buried? (e.g., not to exceed seven years)
 - how many years the coupons will be buried prior to accepting results?
 - how for a given portion of pipe, how will the impact of localized soil parameters such as soil resistivity, soil chemistry, moisture content, temperature and microbiological activity be considered?
 - how voids in the backfill will be avoided when installing coupons?
 - how seasonal variability will be accounted for on soil characteristics? (e.g., cyclic wetting and drying can be more corrosive than soils that are constantly wet, diffusion of oxygen into the soil)
- c) Analysis of Coupon Results
- what guidance will be used regarding coupon cleaning, corrosion rate calculations, and data reporting?
 - how pitting rates versus general corrosion rates will be differentiated?
- d) Acceptance Criterion
- how the acceptance criterion for corrosion rates for general and pitting corrosion will be established?
- e) Compensatory Excavated Direct Visual Inspections of In-Scope Buried Pipe
- how many inspections of buried pipe will occur during the time period when the effectiveness is indeterminate? (i.e., it will take several years for the actual pitting or general corrosion to proceed beyond nominal thickness measurements of the coupon)

RAI B2.1.25-6b

Background:

The response to RAI B2.1.25-6a stated that if the availability and effectiveness criteria in LR-ISG-2011-03 for portions of cathodically protected, in-scope pipe are not met, then the number of inspections corresponding to Preventive Action Category E would be conducted.

LR-ISG-2011-03, Table 4a, "Inspections of Buried Pipe," states in part that "[s]oil testing should be conducted prior to submitting the application and once in each 10-year period starting 10 years prior to the period of extended operation."

Issue:

The staff does not agree that all of the conditions for the applicability of the Category E inspection quantities have been met. In that regard, Table 4a, footnote 2.E.ii.c., states that to use Category E, the soil must have been demonstrated to be not corrosive for the material type. Footnote 7 of this table provides the recommendations related to soil sampling. The staff recognizes that in its response to RAI B2.1.25-2 the applicant provided soil sample results for portions of buried stainless steel piping. Given the potential for variability in soil corrosivity, these sample results do not meet the intent of the recommendations in Footnote 7 for steel piping because no steel piping was buried in the vicinity of the samples. In addition, the staff recognizes that corrosion coupons will be used in areas where the cathodic protection system has been demonstrated to be ineffective; however, at this time, the staff does not believe that corrosion coupons can be substituted for soil sample results in regard to selection of the appropriate inspection category.

Request:

- a) If available, provide soil sample results from the vicinity of buried in-scope steel piping sufficient to meet the recommendations of Footnote 7 of LR-ISG-2011-03 Table 4a.
- b) If these results are not available, commit to completing the soil sampling during the 10-year period prior to the period of extended operation and in each subsequent 10-year period of extended operation and based upon the results, select the appropriate inspection category. Alternatively, or if the soil is demonstrated to be corrosive, revise the Buried and Underground Piping and Tanks Program to ensure that the number of buried pipe inspections will meet Category F in the 10-year period prior to the period of extended operation and in each subsequent 10-year interval for those portions of buried in-scope steel piping where the cathodic protection system does not meet the availability and effectiveness criteria of LR-ISG-2011-03.
- c) Revise the FSAR supplement to reflect the need to conduct soil sampling in each 10-year period starting 10 years prior to the period of extended operation for portions of buried in-scope steel piping where the cathodic protection system does not meet the availability and effectiveness criteria of LR-ISG-2011-03 if the inspection quantities of Category E will be used.

RAI B2.1.6-4a

Background:

Ameren (the applicant) provides its final safety analysis report (FSAR) supplement summary description for license renewal application (LRA) AMP B2.1.6, "PWR Vessel Internals," in LRA Appendix A (LRA FSAR Supplement) Section A1.6, "PWR Vessel Internals." In this FSAR Supplement, the applicant states, in part, that "industry and plant-specific operating experience will be evaluated in the development and implementation of this program." LRA FSAR Supplement Table A4-1 includes LRA Commitment No. 4, in which the applicant commits to implement the PWR Vessel Internals Program within two (2) years of the date of issuance of Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) Technical Report No. 1022863, "Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-A)." MRP-227-A was issued by the EPRI MRP by letter dated January 9, 2012. On October 24, 2012, the applicant submitted its response to RAI Set 12. In this letter, the applicant responded to RAI B2.1.6-4, in which the applicant addressed plans for submitting a reactor vessel internal (RVI) inspection plan to the staff for review and for resolving the staff's applicant/licensee actions items (A/LAIs) that were issued on the MRP-227-A report. These A/LAIs were identified in the staff's revised safety evaluation (SE) Revision 1 on the MRP-227-A report methodology, which was issued to the EPRI MRP by letter dated December 6, 2011. As part of its review of the A/LAI response summaries that were provided in the letter dated October 24, 2012, the staff was able to resolve all of Ameren's A/LAI response bases with the exception of the response bases to A/LAIs #1, #5, and #8, Item 5.

Issue, Part 1:

In the response to RAI B2.1.6-4, the applicant states, in part:

Callaway will provide specific responses to the Applicant/Licensee Action Items (A/LAIs) identified in the December 16, 2011 staff Safety Evaluation on the MRP-227-A methodology in LRA Appendix C. The LRA Appendix C supplement for the staff Safety Evaluation A/LAIs will be provided consistent with the LRA Table A4-1 item #4 commitment to implement the PWR Vessel Internals program as described in LRA Section B2.1.6 within 24 months after the issuance of MRP-227-A. LRA Table A4-1 item #4 also includes the Callaway reactor vessel internals inspection plan noted in part (b) of A/LAI item 8 of the staff Safety Evaluation on the MRP-227-A methodology. The Callaway reactor vessel internals inspection plan will be provided within 24 months after the issuance of MRP-227-A.

On this basis, the staff finds that the applicant needs to provide A/LAI responses to those A/LAIs that were not resolved as part of the staff's review of the A/LAI summary response bases that were included in the response to RAI B2.1.6-4. However, the current version of LRA Commitment No. 4 does not include any provisions that the applicant will be submitting the Callaway RVI component inspection plan for staff review and approval by January 9, 2014, which is two years from the date of issuance of the staff-endorsed MRP-227-A report. Nor does

LRA Commitment No. 4 include any provisions that the submittal of the RVI component inspection plan will specifically address those matters that were left as unresolved in the applicant's A/LAI response summary bases to A/LAIs #1, #5, and #8, Item 5. These matters are:

- A/LAI #1 – Addressing: (a) whether the actual design stress values, temperature values, and neutron fluence values for the Callaway RVI components are bounded by the upper bound values assumed for these components in the MRP-191 report; and (b) justifying why the program is considered to be adequate or clarifying and justifying how the program will need to be appropriately adjusted if it is determined that the actual design stress values, temperature values, and neutron fluence values for the Callaway RVI components are not bounded by the corresponding values assumed for these components in the MRP-191 report.
- A/LAI #5 – Defining and justifying: (a) the physical measure techniques that will be used to determine RVI hold-down spring height when physical measurements are performed on the component in accordance with the MRP-227-A methodology basis; (b) the analysis basis that will be used to project hold-down spring height through 60 years of licensed operations; and the acceptance criteria that will be used to evaluate RVI hold-down spring height that is projected at 60 years of licensed operation.
- A/LAI #8, Item 5 – For those RVI components that are defined as American Society of Mechanical Engineers (ASME) Section III, Subsection NG core support structure components and that have been analyzed in accordance with an ASME Section III, Subsection NG required fatigue analysis, clarifying and justifying how the impacts of the reactor coolant environment on the cumulative usage factor (CUF) values for the components will be addressed, or else how cumulative fatigue damage will be managed in a manner that resolves these impacts.

Request Part 1:

Provide your basis and justify why LRA Commitment No. 4 does not include commitment provisions that address the applicant's intent to submit an RVI inspection plan for staff review and approval and the A/LAI matters summarized in the Issue Section of this part of the RAI; otherwise, the staff requests that Commitment No. 4 be amended to include these commitment provisions. If the applicant's conclusion is that the LRA does not need to include a commitment on submittal of a RVI component inspection plan, provide your responses to the three A/LAIs mentioned above.

December 27, 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 19
(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.: ML12342A172

*concurrence via e-mail

OFFICE	LA:DLR/RPB1*	PM:DLR/RPB1	BC:DLR/RPB1	PM:DLR/RPB1
NAME	YEdmonds	SCuadrado	DMorey	SCuadrado
DATE	12/12/2012	12/18/2012	12/21/2012	12/27/2012

OFFICIAL RECORD COPY

Letter to A. Heflin from S. DeJesus dated December 27, 2012

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
CALLAWAY PLANT UNIT 1 LICENSE RENEWAL APPLICATION, SET 19 (TAC
NO. ME7708)

DISTRIBUTION:

HARD COPY:

DLR R/F

E-MAIL:

PUBLIC

RidsNrrDlrResource

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)