



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

August 1, 2013

Mr. Michael P. Gallagher
Vice President, License Renewal Projects
Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
LIMERICK GENERATING STATION, UNITS 1 AND 2, LICENSE RENEWAL
APPLICATION (TAC NOS. ME6555 AND ME6556).

Dear Mr. Gallagher:

By letter dated June 22, 2011, Exelon Generation Company, LLC submitted an application pursuant to Title 10 of the *Code of Federal Regulations* (CFR) Part 54, to renew the operating license NPF-39 and NPF-85 for Limerick Generating Station, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC) staff. The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information, outlined in Enclosure 1, were discussed with Christopher Wilson, 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 at 301-415-1427 or by e-mail at Richard.Plasse@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard A. Plasse".

Richard A. Plasse, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosure :
Requests for Additional Information

cc: Listserv

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/RA/

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DISTRIBUTION: See next page

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*concurred via email

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NAME	IKing	R Plasse	Y Diaz-Sanabria	R Plasse
DATE	7/24/2013	7/26/2013	7/31/2013	8/01/2013

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Letter to M. Gallagher from Richard A. Plasse dated August 1, 2013

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LIMERICK GENERATING STATION, UNITS 1 AND 2,
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION

RAI B.2.1.29-4

Background:

During the review of the license renewal application (LRA), the staff was developing license renewal interim staff guidance (LR-ISG), LR-ISG-2011-03, "Changes to the Generic Aging Lessons Learned (GALL) Report Revision 2 Aging Management Program (AMP) XI.M41, 'Buried and Underground Piping and Tanks.'" The staff issued the final LR-ISG on August 2, 2012, while the Safety Evaluation Report (SER) with open items was issued on July 31, 2012 and the final SER was issued on January 10, 2013. By letter dated June 17, 2013, LRA Sections A.2.1.29 and B.2.1.29 were amended to address the changes that were incorporated into LR-ISG-2011-03.

Issue:

The staff reviewed the changes as indicated in the June 17, 2013, amendment and has the following issues:

1. LRA Section B.2.1.29 states that direct inspections of buried piping are not required because of the preventive and mitigative measures included in the program. However, this was based in part because GALL Report, Revision 2, AMP XI.M41, "Buried and Underground Piping and Tanks," Table 4a, "Inspections of Buried Pipe," did not include any recommendations for inspecting buried nonsafety related systems. The circulating water and plant drainage systems are within the scope of license renewal and are nonsafety related. While these systems are coated and buried in acceptable backfill, only the circulating water system is cathodically protected. LR-ISG-2011-03, Table 4a, no longer distinguishes between code class safety related, hazmat, and nonsafety related piping; therefore, all in-scope piping is subject to the inspection recommendations of Table 4a. In addition to the recommended number of inspections in Table 4a, LR-ISG-2011-03, Section 4.b.vi, states, "[t]able 4a inspection quantities are for a single-unit plant. For two-unit sites, the not to exceed (NTE) inspection quantities are increased by 50 percent. For a three-unit site, the NTE inspection quantities are doubled."

LRA Section B.2.1.29, Enhancement No. 5 states training requirements for the coatings inspector for the visual inspections of underground service water piping. Given that there are no planned buried piping inspections, there is no corresponding statement for buried piping. The staff recognizes that most, if not all, of the plant drainage system is buried in controlled low strength material backfill and, therefore, a coating inspector would not necessarily be required to inspect the pipe if the excavations only involve exposing the controlled low strength material backfill.

2. LRA Section B.2.1.29 states that inspection locations for underground piping would be based on susceptibility to degradation and consequences of failure. Given that there are no planned buried piping inspections, there is no corresponding statement for

ENCLOSURE

buried piping. LR-ISG-2011-03, Section 4.b.iii, as well as GALL Report AMP XI.M41, state that buried pipe system inspections should be based on risk.

3. LR-ISG-2011-03, Section 2.a.iv, states that, if cathodic protection is not provided, a 10-year search of plant-specific operating experience (OE) should be conducted to determine if adverse conditions have occurred in the impacted systems. Given that the plant drainage system is not cathodically protected, this 10-year search should be conducted. The search should include components that are not in scope if they are constructed from similar materials and buried in a similar environment. In addition, LR-ISG-2011-03, Section 2.a.iii, states that a basis should be provided for why cathodic protection is not provided during the period of extended operation.

4. LR-ISG-2011-03, Table 6a, "Cathodic Protection Acceptance Criteria," footnote 2, states that the 100 mV polarization criterion is limited to electrically-isolated piping sections or areas of grounded piping where the effects of mixed potentials are shown to be minimal. The amended Enhancement 7 states, in part, "[i]n performing cathodic protection surveys, only the -850mV polarized potential criterion for steel piping will be used for acceptance criteria and determination of cathodic protection system effectiveness, unless the -100mV polarization criterion can be demonstrated effective through use of buried coupons, electrical resistance probes, or placement of reference cells in the immediate vicinity of the piping being measured." While the staff recognizes that buried coupons, electrical resistance probes, or placement of reference cells can be used as effective means to detect corrosion rates or localized effectiveness of cathodic protection, the program does not state details such as what industry consensus documents will be used to install the devices (e.g., NACE Standard TM0169, ASTM G1, ASTM G16, ASTM G 46.), device placement, coupon characteristics, analysis of device results (e.g., how pitting rates versus general corrosion rates will be differentiated), how acceptance criteria will be established, and how many inspections of buried pipe will occur during the time period when the effectiveness is indeterminate (e.g., if a coupon is used, it will take several years for the actual pitting or general corrosion to proceed beyond nominal thickness measurements of the coupon).

Request:

1. State the number of inspections that will be conducted per unit on in-scope buried plant drainage system piping during each 10-year period starting 10 years prior to the period of extended operation. Revise LRA Sections B2.1.29 and A.2.1.29 accordingly. Alternatively, state the basis for why inspections would not be conducted.

State whether all of the buried in-scope plant drainage system piping is buried in cementitious backfill. For portions of the system not buried in controlled low strength material backfill, or for inspections where exposure of the coating is performed in lieu of inspecting surrounding controlled low strength material backfill, state whether the direct excavated inspections of the coatings of these systems will be conducted by a NACE- or EPRI- qualified individual. Revise LRA Sections B2.1.29 and A.2.1.29 accordingly.

2. State whether the inspection locations selected for the buried in-scope plant drainage system piping will be based on risk, or state that basis for not doing so.

3. State the results of a 10-year search of plant-specific operating experience related to the plant drainage system. State the basis for why cathodic protection will not be provided for this system during the period of extended operation.
4. Respond to the following:
 - a. State which industry consensus documents will be used to install and use the corrosion rate monitoring devices or reference electrodes.
 - b. State the acceptance criteria for general and pitting corrosion rates when using electrical resistance probes or coupons.
 - c. State how many inspections of buried pipe will occur during the time period when the cathodic protection effectiveness is indeterminate.
 - d. If coupons will be used, respond to questions 5 through 7.
5. Describe the corrosion coupon characteristics, including:
 - The 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).
 - The surface condition (e.g., presence of scale and corrosion products, surface finish) of coupons.
 - The composition of the coupon compared to the pipe (e.g., chemical composition and microstructure).
6. Describe the coupon placement, including:
 - 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).
 - The number of coupons that 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 and elevation the coupons will be installed to the pipe; and whether coupon will be perpendicular or parallel with the pipe.
 - The length of time coupons will allow to be buried.
 - How many years the coupons will be buried prior to accepting results.
 - 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).

7. Describe the analysis of coupon results, including:
 - What guidance will be used regarding coupon cleaning, corrosion rate calculations, and data reporting.
 - How pitting rates versus general corrosion rates will be differentiated.