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

January 22, 2015

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION, SET 45 (TAC NOS. MF1879, MF1880, MF1881, AND MF1882)

Dear Mr. Gallagher:

By letter dated May 29, 2013, Exelon Generation Company, LLC, submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating licenses NPF-37, NPF-66, NPF-72, and NPF-77 for Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2, respectively, for review by the U.S. Nuclear Regulatory Commission (NRC or the 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 were discussed with John Hufnagel, and a mutually agreeable date for the response is 30 days from the date of this letter. If you have any questions, please contact me at 301-415-4115 or e-mail Lindsay.Robinson@nrc.gov.

Sincerely,

/RA/

Lindsay R. Robinson, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-454, 50-455, 50-456, and 50-457

Enclosure:
Request for Additional Information

cc w/encl: Listserv

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Vice President, License Renewal Projects
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ADAMS Accession No.: ML15014A229 ***Concurred via e-mail**

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NAME	YEdmonds	LRobinson	YDiazSanabria	LRobinson
DATE	1/21/15	1/22/15	1/22/15	1/22/15

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Letter to M.P. Gallagher from Lindsay R. Robinson dated January 22, 2015

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BYRON STATION, UNITS 1 AND 2,
AND BRAIDWOOD STATION, UNITS 1 AND 2,
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION, SET 45
(TAC NOS. MF1879, MF1880, MF1881, MF1882)

RAI B.2.1.24-1b

Applicability:

Braidwood Station (Braidwood), Units 1 and 2

Background:

By letter dated October 31, 2014, the applicant provided a response to the staff's request for additional information (RAI) B.2.1.24-1a (ADAMS Accession No. ML14304A345). In the response, the applicant described problems encountered during the latest flux thimble tube inspections. Specifically, the applicant failed to obtain any useful data for most of the tubes it attempted to inspect. The response failed to provide an adequate root cause for the issues encountered during the last outages for Braidwood, Units 1 and 2. In addition, the response failed to provide a technical basis for the adequacy of the program.

By letter dated November 22, 2014, the applicant supplemented its response to RAI B.2.1.24-1a (ADAMS Accession No. ML14330A480). The supplemental response, in part, provided a license renewal commitment to replace flux thimble tubes every three refueling cycles if eddy current data is not obtained in accordance with the Flux Thimble Tube Inspection Program.

Issue:

In the license renewal application (LRA), the applicant stated that the existing Flux Thimble Tube Inspection Program is consistent with Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.M37, "Flux Thimble Tube Inspection." However, based on the available information, it is apparent that the applicant is currently not able to perform inspections of or obtain usable data from the thimble tubes. Therefore, the applicant's program does not meet the guidance provided in GALL Report AMP XI.M37. Specifically, in Element 3, "parameters monitored or inspected," the applicant's program does not provide adequate parameters monitored or inspected; in Element 4, "detection of aging effects," the applicant's program does not provide adequate detection of aging effect (wear); in Element 5, "monitoring and trending," the applicant's program does not provide adequate monitoring and trending; and in Element 7, "corrective actions," the applicant's corrective actions have not identified the causal factors of its inspection problems, and the implemented corrective measures have not mitigated the inspection problems. Therefore, the staff is not certain why the applicant has not identified these as exceptions to the GALL Report AMP XI.M37.

In addition, the staff noted in the applicant's RAI response dated June 9, 2014, that one tube installed in spring of 2009 experienced 37 percent wear "per cycle" during the fall 2010 outage at Unit 1. The tube was removed from service in 2012 after only two cycles of service. The staff also noted in the same response that a tube experienced 35 percent wear "per cycle" at Unit 2 in spring of 2011 outage. Based on plant-specific operating experience at Braidwood provided by the applicant, it appears that most tubes will last for more than three cycles and still meet the acceptance criteria of 80 percent tube wear. However, the staff is concerned that the

outliers, for example, locations that can experience higher wear of 35 percent or 37 percent “per cycle”, may not last for three cycles. In addition, there have been instances when a location that had historically experienced low wear for many cycles had unusually higher wear rates in a subsequent cycle. In addition, replacement tubes can have different wear rates than those that they replaced. Therefore, the staff is concerned that in these instances, degraded tubes would not be identified without successful inspections and that acceptance criteria may not be met at all times for all locations.

Furthermore, the staff noted that the applicant had prior issues related to obtaining wear data or completing scheduled inspections, which were entered in the applicant’s corrective action program to prevent recurrence. The applicant speculated possible causal factors in its response dated October 31, 2014, and stated that it may consider several additional “corrective actions.” However, based on the latest information, it appears the problems associated with successful completion of eddy current examinations (i.e., getting usable wear data) have worsened.

Finally, the staff noted that if movable detector(s) get stuck, the isolation valves would not be able to isolate the affected flux thimble tube(s) in the event of leakage due to wear.

Request:

1) Review the current Flux Thimble Tube Inspection Program for Braidwood, and identify all exceptions to GALL Report AMP XI.M37, “Flux Thimble Tube Inspection.” If necessary, provide a plant-specific AMP, which addresses the higher than usual wear rates, and justify the program’s long-term viability based on the possibility of not obtaining any inspection data on wear. Describe the technical basis that tube wear acceptance criteria are met and that the program is adequate.

2) Identify all cases of higher wear (27 percent per cycle or more). Justify the adequacy of the program if tube replacement is performed every three cycles with consideration of the operating experience of high wear rates as discussed above. Provide information on all instances when a tube was removed from service after three or less cycles of service.

3) Justify why the historical wear rates would be applicable during the period of extended operation if additional examinations are not performed or did not provide usable data, taking into consideration that wear rates can change.

4) Provide a root cause analysis which adequately identifies all the problems encountered during the recent inspections; discuss corrective measures which will be implemented to address these problems.

5) Provide information in regards to instances when detectors became stuck at Braidwood, Units 1 and 2. Explain how leakage would be isolated if detectors are stuck when a flux thimble tube develops a leak.