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

April 20, 2020

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION, UNIT 1 – ISSUANCE OF RELIEF REQUEST I4R-23 ASSOCIATED WITH PANDEMIC-RELATED ISSUES – EXAMINATION OF CONTAINMENT SURFACES REQUIRING AUGMENTED EXAMINATION (CATEGORY E-C) (EPID L-2020-LLR-0044 [COVID-19])

Dear Mr. Hanson:

By letter dated March 28, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20088B022), Exelon Generation Company, LLC (the licensee), submitted a request for relief from the requirements of the American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME Code), Section XI, Subsection IWE, for the first period of the third 10-year containment inservice inspection interval for Limerick Generating Station (Limerick), Unit 1.

Specifically, pursuant to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to postpone required ASME Code, Section XI inspections of submerged areas of the suppression pool liner and suppression pool vent system on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

On March 31, 2020 (ADAMS Accession No. ML20089A007), the NRC verbally authorized the use of Relief Request I4R-23 at Limerick, Unit 1.

The NRC staff has determined that the proposed alternative in Relief Request I4R-23 would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the proposed alternative at Limerick, Unit 1, for the first period of the third 10-year inservice inspection interval.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Limerick Project Manager, V. Sreenivas, at 301-415-2597 or V.Sreenivas@nrc.gov.

Sincerely,

/RA/

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-352

Enclosure:
Safety Evaluation

cc: Listserv

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE REQUEST I4R-23 REGARDING CONTAINMENT SUPPRESSION POOL AUGMENTED INSPECTION REQUIREMENTS

EXELON GENERATION COMPANY, LLC.

LIMERICK GENERATING STATION, UNIT 1

DOCKET NO. 50-352

1.0 INTRODUCTION

By letter dated March 28, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20088B022), Exelon Generation Company, LLC (the licensee), requested relief from the requirements of the American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME Code), Section XI, Subsection IWE, for the first period of the third 10-year containment inservice inspection (ISI) interval for Limerick Generating Station (Limerick), Unit 1. Specifically, pursuant to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to postpone required ASME Code, Section XI inspections of submerged areas of the suppression pool liner and suppression pool vent system on the basis that complying with the specified requirement would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), throughout the service life of a nuclear power facility, components that are classified as Class MC pressure retaining components must meet the requirements set forth in the ASME Code, Section XI, Subsection IWE, as incorporated by reference in paragraph (a)(1)(ii), subject to the conditions listed in 10 CFR 50.55a(b)(2)(ix). The ASME Code, Section XI, Subsection IWE, provides rules for ISI of Class MC pressure-retaining components and of metallic shells of Class MC containment structures. The appropriate edition of the code to be used for successive 120-month inspection intervals is determined pursuant to 10 CFR 50.55a(g)(4)(ii). Alternatives to the requirements of 10 CFR 50.55a(g)(4) may be authorized by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(z)(2) if the licensee demonstrates that complying with the specified requirement would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4)(ii), the licensee's code of record for the third 10-year containment ISI interval is the 2007 Edition with 2008 Addenda of the ASME Code, Section XI. Subparagraph IWE-2420, "Successive Inspections," requires that when examination results detect flaws, areas of degradation, or conditions that require an engineering evaluation in accordance with IWE-3000 or IWE-2500(d), and the component is found acceptable for continued service, the areas shall be reexamined during the next inspection period in

accordance with Table IWE-2500-1 (E-C). Table IWE-2500-1 (E-C), "Examination Category E-C, Containment Surfaces Requiring Augmented Examination," Item E4.11, requires visual examination (VT-1) of identified surface areas each inspection period until the areas examined remain essentially unchanged for the next inspection period.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Proposed Alternative

The licensee's proposed alternative in Relief Request I4R-23 is applicable to submerged metal containment surfaces requiring successive inspections and augmented examination. Specifically, the request applies to portions of the submerged areas of the suppression pool liner and submerged areas of the downcomers and is against the following examination requirements of the ASME Code, Section XI, Subsection IWE.

- Subparagraph IWE-2420 requires that when examination results detect flaws, areas of degradation, or conditions that require an engineering evaluation in accordance with IWE-3000 or IWE-2500(d) and the component is found acceptable for continued service, the areas shall be reexamined during the next inspection period in accordance with Table IWE-2500-1 (E-C).
- Table IWE-2500-1 (E-C), Item E4.11, requires visual examination (VT-1) of identified surface areas each inspection period until the areas examined remain essentially unchanged for the next inspection period.

The licensee's proposed alternative corresponding to the above code requirements is a one-time deferral of the required inspections. The required inspections will be postponed and completed no later than the next refueling outage (Li1R19) in the spring of 2022. The alternative is requested for the duration of the first period of the third 10-year IWL ISI interval. The licensee requested authorization for use of the proposed alternative pursuant to 10 CFR 50.55a(z)(2) on the basis that complying with the specified requirement would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety, due to the ongoing national emergency related to the COVID-19 pandemic.

In its request, the licensee noted that on March 13, 2020, the U.S. government declared a national emergency associated with the COVID-19 outbreak. In response to the outbreak, the Centers for Disease Control (CDC) recommended social distancing, which is defined as remaining out of congregate settings, avoiding mass gatherings, and maintaining distance (approximately 6 feet or 2 meters) from others when possible. The licensee noted that the inspections of containment surfaces require work in close spaces and cannot be completed while implementing the recommendation for social distancing. Due to the COVID-19 pandemic, and to comply with CDC guidance, the licensee requested relief associated with performing successive and augmented inspections of the suppression pool liner and downcomers during the spring 2020 refueling outage (Li1R18). These inspections are required by ASME Code, Section XI, IWE-2420(b), and Table IWE-2500-1 (E-C), Item No. E4.11. These inspections are required for locations that did not meet acceptance criteria during the previous inspection (spring 2016, LiR16) and were accepted for continued service by engineering evaluation. The licensee proposed to perform the required inspections during the next refueling outage (spring 2022, Li1R19).

During the spring 2016 refueling outage, an underwater inspection of 100 percent of the accessible areas of the suppression pool liner and downcomers was performed. The results of that inspection are as follows:

- all areas of localized corrosion greater than 45 mils were recoated,
- the maximum depth of localized corrosion on the liner that was not recoated was 44.7 mils,
- the maximum depth of general area corrosion on the liner was 44 mils for the liner, and
- the maximum depth of localized corrosion identified on any downcomer was 35 mils.

In addition to the results from 2016, results from inspections during outages in 1996, 2004, 2012, and 2016 have been used to develop a general corrosion rate. This data has shown a corrosion rate of approximately 1 to 2 mils per year with a maximum rate of 3.6 mils per year between 2012 and 2016.

The licensee also developed site-specific acceptance criteria for the suppression pool and downcomers, which ensure the structural integrity of the components is maintained. Based on the analysis, the maximum allowable metal loss was determined to be 125 mils for the general area of the liner plate, 187.5 mils for localized areas, and 62.5 mils for the downcomers. Using the most recent data from the 2016 inspection and the corrosion rate of 3.6 mils, the licensee estimated the most restrictive location would be the downcomers and the metal loss at the beginning of the 2022 refueling outage on the downcomers would be 56.6 mils. This value is below the associated acceptance criteria of 62.5 mils.

3.2 NRC Staff Evaluation

The staff reviewed the information provided in the proposed alternative request and noted that the CDC has identified social distancing as a method for slowing the spread of the COVID-19 virus and noted that the subject inspections cannot be properly completed while following the social distancing guidelines. Therefore, completing the inspections as required would result in a hardship or difficulty.

In addition, the staff reviewed the licensee's data and noted that an average corrosion rate of 1 to 2 mils per year, with a maximum rate of 3.6 mils, are reasonable corrosion rates for uncoated carbon steel components in the suppression pool environment. To add conservatism to its estimates, the licensee used the maximum corrosion rate it has identified since monitoring the suppression pool, which was measured during the last inspection (2016). The NRC staff notes that with this maximum corrosion rate (3.6 mils per year), the estimated metal loss at the beginning of the 2022 refueling outage would be less than the acceptance criteria for all locations. Although the maximum rate occurred during the most recent inspection, it is likely due to general fluctuations in corrosion rate and not an indication of an increasing trend in corrosion rate. However, in the unlikely case that the corrosion rate is accelerating, the analysis is still acceptable, because the liner plate locations have significant margin, and the submerged portions of the downcomers can continue to perform their intended function (direct drywell atmosphere and steam into the suppression pool), even if a small hole were to form in the submerged portion. Therefore, conducting the required inspections during the spring 2020 refueling outage will not provide an increase in quality or safety commensurate with the increased hardship.

Based on its review, the staff finds it is acceptable for the licensee to defer the required ASME Code, Section XI, IWE-2420(b) inspections of the submerged portions of the suppression pool and downcomers until no later than the spring 2022 refueling outage. The proposed alternative will provide reasonable assurance that the structural integrity and leaktightness of the containment suppression pool liner and downcomers will be maintained until the next scheduled refueling outage, when the required ASME Code inspections will be completed.

4.0 CONCLUSION

As set forth above, the NRC staff determines that complying with the specified requirement would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the proposed alternative at Limerick, Unit 1, for the first period of the third 10-year IWE ISI interval.

All other ASME Code, Section XI requirements for which the alternative was not specifically requested and authorized in this proposed alternative remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: B. Lehman
M. Mitchell

Date: April 20, 2020

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