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

January 13, 2020

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

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 - SAFETY EVALUATION IN SUPPORT OF REQUEST FOR RELIEF ASSOCIATED WITH THE FIFTH INSERVICE INSPECTION INTERVAL RELIEF REQUEST I5R-04, REVISION 2 (EPID L-2019-LLR-0107)

Dear Mr. Hanson:

By letter dated November 12, 2019 (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML19316A745), Exelon Generation Company, LLC (the licensee) requested relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI. In Relief Request I5R- 04, Revision 2, the licensee proposed an alternative frequency for performance of the system leakage test of the isolation condenser (IC) shell and associated piping at the Dresden Nuclear Power Station (Dresden), Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(z)(2), the licensee requested to use the proposed alternative in Relief Request I5R-04, Revision 2, on the basis that conformance with the Code requirements imposes hardship without a compensating increase in the level of quality and safety.

If you have any questions on this action, please contact the NRC Project Manager, Russell Haskell at (301) 415-1129.

Sincerely,

Nancy L. Salgado

Nancy L. Salgado, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos.: 50-237 and 50-249

Enclosure: Safety Evaluation

cc: Listserv

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST I5R-04, REVISION 2, REGARDING

SYSTEM LEAKAGE TEST OF ISOLATION CONDENSER SHELL AND PIPING

EXELON GENERATION COMPANY, LLC

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

EPID L-2019-LLR-0107

1.0 INTRODUCTION

By letter dated November 12, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19316A745), Exelon Generation Company, LLC (the licensee) requested relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI. In relief request I5R-04, Revision 2, the licensee proposed to delay the inservice inspection (ISI) system leakage test of the isolation condenser (IC) shell and piping at the Dresden Nuclear Power Station (Dresden), Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee proposed an alternative testing frequency for the system leakage test of the IC shell and piping, 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), components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3, must meet the requirements in Section 50.55a throughout the service life of a boiling or pressurized-water reactor (BWR or PWR). The exception is the design and access provisions and preservice examination requirements set forth in Section XI of Editions and Addenda of the ASME Code that become effective subsequent to Editions specified in paragraphs (g)(2) and (3) of Section 50.55a, which are incorporated by reference in paragraph (a)(1)(ii) of Section 50.55a, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Pursuant to 10 CFR 50.55a(z), alternatives to the requirements of paragraph (b) through (h) of Section 50.55a or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The licensee must demonstrate that: (1) the proposed alternative would provide an acceptable level of quality and safety; or (2) compliance with the specified requirements of Section 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Based on the above, the U.S. Nuclear Regulatory Commission (NRC) staff finds that regulatory authority exists for the licensee to request and the NRC to authorize the alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Background

By letter dated September 4, 2003 (ADAMS Accession No. ML032370480), the NRC approved Relief Request I4R-06 for Dresden, Units 2 and 3, for the fourth 10-year ISI intervals. I4R-06 authorized the licensee to perform the ASME Code system leakage test of the IC shell and piping every 5 years during the operational test specified in the Technical Requirements Manual.

By letter dated September 30, 2013 (ADAMS Accession No. ML13260A585), the NRC approved Relief Request I5R-04 for Dresden, Units 2 and 3 (ADAMS Accession No. ML13025A161 and ML12275A069), for the fifth 10-year ISI intervals. I5R-04 authorized the licensee to perform the ASME Code system leakage test of the IC shell and piping every 60 months during the performance of TS SR 3.5.3.4 which is a Isolation Condenser System heat removal capability verification test.

3.2 Component Affected

The IC shell and piping are affected. For the purpose of ISI, the licensee divided the IC shell and piping into two test blocks. The upper portion of the IC shell and piping is designated as test block 2IC01 in Dresden, Unit 2 and test block 3IC01 in Dresden, Unit 3. The lower portion of the IC shell and piping is designated as test block 2IC02 in Dresden, Unit 2 and test-block 3IC02 in Dresden, Unit 3.

3.3 Applicable Code Edition and Addenda

The code of record for the fifth 10-year ISI interval is the 2007 Edition through the 2008 Addenda.

3.4 Applicable Code Requirement

The ASME Code requirements applicable to this request originate in Section XI, IWD-2500. Table IWD-2500-1, examination Category D-B, Item No. D2.10 requires all Class 3 pressure-retaining components be subject to a system leakage test according to IWD-5220 and a visual examination (VT-2) according to IWA-5240. This system leakage test shall be conducted each inspection period. According to paragraph IWD-5221, the system leakage test shall be conducted at the system pressure obtained while the system, or portion of the system, is in

service performing its normal operating function or at the system pressure developed during a test conducted to verify system operability (e.g., to demonstrate system safety function or satisfy technical specification (TS) surveillance requirements (SRs).

3.5 Duration of Relief Request

The licensee submitted I5R-04, Revision 2, for remainder of the fifth 10-year ISI interval which commenced on January 20, 2013, and is scheduled to end on January 19, 2023.

3.6 Proposed Alternative

The licensee proposed to perform the ASME Code system leakage test and VT-2 of the upper and lower portions of the IC shell and piping every 120 months, in conjunction with performing Dresden SR 3.5.3.4. Performance of SR 3.5.3.4 is required to verify operability and heat removal capability of the IC system when it is in service performing its normal operating function.

During remaining inspection periods of the fifth 10-year ISI interval, the licensee proposed to perform the system leakage test and VT-2 of the lower portions of the IC shell and piping at the static head pressure developed from the elevation of IC shell side water level which is maintained between 7 feet and 7.4 feet. This test is performed while the IC system is in a standby alignment with its shell side vented to the atmosphere

3.7 Basis for Use of Alternative

As a basis for proposed alternative, the licensee relied on the justifications discussed below:

In accordance with Dresden TS 5.5.15, "Surveillance Frequency Control Program," the licensee evaluated the surveillance frequency at which Dresden SR 3.5.3.4 is performed. The licensee determined that performing SR 3.5.3.4 every 120 months instead of every 60 months is adequate to provide reasonable assurance of operability and heat removal capability of the IC system. Since performance of the ASME Code required system leakage test and VT-2 of the IC shell and piping is similar to the performance of SR 3.5.3.4, delaying the system leakage test to 120 months reduces the hardship associated with performance of these tests. Hardship is discussed later in this section.

The IC system is not in service during normal operation, instead, it is in a standby alignment with its shell side vented to the atmosphere through a non-isolable vent line. The design pressure of the IC shell side is 25 pounds per square inch gauge (psig). It is not possible to pressurize the IC shell side to 25 psig because the IC is vented to atmosphere and the condenser is only 12 feet in height. Creating a hydrostatic head pressure of 25 psig requires 58 feet of water, which is not feasible. In accordance with Dresden TS, the IC system is normally aligned with the IC shell side water level of greater than or equal to 6 feet. However, the IC shell side water level is administratively maintained between 7 feet and 7.4 feet according to the plant procedures. During the inspection periods of the 10-year ISI interval that SR 3.5.3.4 is not performed, the licensee uses the static head pressure developed from the elevation of water on the shell side to conduct the system leakage test and VT-2 of the lower portions of the IC shell and piping.

In regard to hardship, the licensee stated the proposed I5R-04, Revision 2, request that conducting IC system heat removal capability tests for purpose of complying with the ASME Code leakage test necessitates a minimum of a 25 percent reduction in reactor power to perform the testing. This introduces an unnecessary transient on the reactor and a challenge to station operators. During actuation of the IC, one valve is opened to allow condensate in the IC tube bundle to return to the reactor vessel. As a result, a volume of relatively cold water is returned to the reactor resulting in an increase in reactor power.

The licensee stated that the radiation dose rates increase up to 100 millirem per hour (mrem/hr) on the IC floor during performance of the heat capacity testing of the IC as compared to the normal dose rates of less than 5 mrem/hr on the IC floor. This creates challenges to personnel who are performing the VT-2 while the IC system is in service. The total radiation dose personnel receive during performance of the IC system leakage test is typically about 125 mrem.

The licensee stated that during the IC heat removal test, the shell side water is used to condense reactor steam in the tube bundle. The shell side water volume boils and is exhausted through the IC vent pipe that extends through the reactor building wall and discharges to the local atmosphere. For the safety of plant personnel, access to the vicinity of the IC vent must be controlled during the performance of the IC heat capacity tests.

The licensee stated that the IC shell cannot be isolated and pressurized to meet the ASME Code, Section XI, IWD-5221 pressure requirements when in a standby alignment. Moreover, it would be an abnormal activity to fill the IC to the top simply to achieve a slight increase in static head for the additional system leakage test. Water added to the IC shell to raise level above the normal standby conditions would subsequently have to be drained and processed as radioactive waste.

3.8 NRC Staff Evaluation

The NRC staff has evaluated Relief Request I5R-04, Revision 2, pursuant to 10 CFR 50.55a(z)(2). The NRC staff evaluation focuses on whether compliance with the specified requirements of 10 CFR 50.55a(g), or portions thereof, would result in hardship or unusual difficulty, and if there is a compensating increase in the level of quality and safety despite the hardship.

3.8.1 Hardship Assessment

Within context of Relief Request I5R-04, Revision 2, the NRC staff acknowledges that the licensee provided adequate description and technical information to support the basis for a hardship or unusual difficulty if it were required to comply with the ASME Code required system leakage test. Therefore, the NRC staff concludes the bases for hardship, as discussed above in Section 3.7, constitute a justifiable hardship or unusual difficulty.

3.8.2 Structural Integrity and Leak Tightness Assessment

In its evaluation, the NRC staff assessed whether the licensee used an acceptable test pressure to conduct system leakage test and the manner in which the licensee adequately preformed the testing and VT-2 of the IC shell and piping for leakage. The NRC staff found that the licensee will specifically conduct the system leakage test as follows:

- During one inspection period of the 10-year ISI interval, the upper and lower portions of the IC shell and piping will be subjected to a system leakage test at the IWD-5221 required test pressure during performance of SR 3.5.3.4. According to SR 3.5.3.4, the verification of the heat removal capability of the IC system is required in accordance with the Surveillance Frequency Control Program.

- In the other two inspection periods during the 10-year ISI interval, the lower portion of IC shell and piping will be subjected to a system leakage test using the static head pressure developed from the elevation of between 7 feet and 7.4 feet of IC shell side water. This system leakage test is performed while the IC system is in a standby alignment with its shell side vented to the atmosphere through a non-isolable vent line. The upper portions of the IC shell and piping do not experience any pressure since they are open to atmosphere.

As part of the system leakage test, the licensee will perform the required VT-2 on the IC shell and piping in accordance with IWA-5240 to identify any leak. Therefore, the NRC staff determines that the licensee's proposed system leakage test is adequate because the VT-2 will identify any evidence of leak.

In addition, the NRC staff considered whether the licensee's proposed alternative provided reasonable assurance of structural integrity and leak tightness of the subject IC shell and piping based on the presence or absence of known active degradation mechanisms and the significance of a leak and/or structural failure. The NRC staff notes that the subject IC shell and piping are made of carbon steel and stainless steel, respectively. Fatigue (low cycle fatigue and high cycle fatigue) and stress corrosion cracking (SCC) are potential degradation mechanisms. Field experience has shown that fatigue and SCC under the conditions associated with the subject IC shell and piping is not expected. The NRC staff have concluded that any significant degradation of the subject IC shell and piping would be detected by the alternative leakage test accompanied by the VT-2 performed.

Therefore, the NRC staff finds that the proposed system leakage test and VT-2 is adequate to provide reasonable assurance of structural integrity and leak tightness of the subject IC shell and piping. Complying with the requirement in IWD-5220 would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determined that the proposed alternative provides reasonable assurance of structural integrity and leak tightness of the IC shell and piping, and 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 all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the use of Relief Request I5R-04, Revision 2, at Dresden, Units 2 and 3 for the remainder of the fifth 10-year ISI interval, which commenced on January 20, 2013, and is scheduled to end on January 19, 2023.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including the third-party review by the Authorized Nuclear In-service Inspector.

Principal Contributor: ARezai/NRR

Date: January 13, 2020

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 - SAFETY EVALUATION IN SUPPORT OF REQUEST FOR RELIEF ASSOCIATED WITH THE FIFTH INSERVICE INSPECTION INTERVAL RELIEF REQUEST I5R-04, REVISION 2 (EPID L-2019-LLR-0107) DATED JANUARY 13, 2020

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ADAMS ACCESSION NO.: Relief Request ML20008D276 by memo dated*

OFFICE	DORL/LPL3/PM	DORL/LPL3/LA	DNRL/NPHP/BC*	DORL/LPL3/BC
NAME	RHaskell	SRohrer	MMatthew	NSalgado
DATE	1/7/2020	1/8/2020	12/23/2019	1/13/2020

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