



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

December 13, 2021

Mr. David P. Rhoades
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO)
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 AND DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3— PROPOSED ALTERNATIVE TO ELIMINATE CERTAIN DOCUMENTATION REQUIREMENTS FOR PRESSURE RETAINING BOLTING (EPID NOS. L-2021-LLR-0029 AND L-2021-LLR-0030)

Dear Mr. Rhoades:

By application dated December 1, 2020 (ADAMS Accession No. ML20336A008), as supplemented by letters on April 20, May 18, and July 7, 2021 (ADAMS Accession Nos. ML21110A092, ML21188A242, and ML21138A839, respectively), Exelon Generation Company, LLC (Exelon, the licensee) submitted a request for a proposed alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," requirements on the basis that the alternative provides an acceptable level of quality and safety, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1) for the Exelon-fleet plants, which included Quad Cities Nuclear Power Station, Units 1 and 2 (Quad) and Dresden Nuclear Power Station, Units 2 and 3 (Dresden). The December 1, 2020 request indicated that the proposed alternative is applicable to the current fifth 10-year in-service inspection (ISI) interval at Quad and Dresden. The U.S. Nuclear Regulatory Commission (NRC) staff authorized the licensee use of the December 1, 2020, proposed alternative, as supplemented, on August 5, 2021 (ADAMS Accession No. ML21216A220).

In the April 20, 2021 supplement, Exelon provided a new request from the original December 1, 2020, proposed alternative for Quad and Dresden regarding ASME Section XI repair/replacement documentation for replacement of pressure retaining bolting to apply to the next or the sixth 10-year ISI interval in accordance with 10 CFR 50.55a(z)(1). The enclosed safety evaluation discusses this request.

Specific editions and addenda of Section XI of the ASME BPV Code are incorporated by reference in 10 CFR 50.55a with conditions. Section XI specifies, in part, requirements for documentation of repair and replacement activities at nuclear power plants. The proposed alternative would allow the licensee to forgo preparation and completion of a repair and replacement plan and certain forms for the routine replacement of pressure retaining bolting that is not included within Examination Categories B-G-1, B-G-2, or C-D at Quad and Dresden.

The regulations in 10 CFR 50.55a(z) state, in part, that alternatives to the requirements in paragraphs (b) through (h) of 10 CFR 50.55a may be authorized by the NRC if the licensee demonstrates that: (1) the proposed alternative provides an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The NRC staff has reviewed Exelon's application, and concludes, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for the sixth 10-year inservice ISI at Quad and Dresden. Therefore, the NRC staff authorizes Quad and Dresden to use the proposed alternative described in its application. This authorization is for the Quad sixth 10-year ISI interval beginning April 2, 2023, and ending April 1, 2033, and for the Dresden sixth 10-year ISI interval beginning January 20, 2023, and ending January 19, 2033.

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

If you have any questions, please contact Russell Haskell at 301-415-1129 or via e-mail at Russell.Haskell@nrc.gov.

Sincerely,

Nancy L. Salgado, Chief (Joel S. Wiebe for)
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-254, 50-265, 50-237, and
50-249

Enclosure:
Safety Evaluation

cc: Listserv



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE TO ELIMINATE

CERTAIN DOCUMENTATION REQUIREMENTS FOR PRESSURE RETAINING BOLTING

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

EXELON GENERATION COMPANY, LLC

DOCKET NOS. 50-254, 50-265, 50-237, and 50-249

1.0 INTRODUCTION

By application dated December 1, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20336A008), as supplemented by letters dated April 20, May 18, and July 7, 2021 (ADAMS Accession Nos. ML21110A092, ML21188A242, and ML21138A839, respectively), Exelon Generation Company, LLC (Exelon, the licensee) submitted a request in accordance with paragraph 50.55a(z)(1) of Title 10 of the *Code of Federal Regulations* (10 CFR) for a proposed alternative to certain requirements of 10 CFR 50.55a, "Codes and standards," for Braidwood Station, Units 1 and 2; Byron Station, Unit Nos. 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3 (Dresden); James A. FitzPatrick Nuclear Power Plant; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Peach Bottom Atomic Power Station, Units 2 and 3; Quad Cities Nuclear Power Station, Units 1 and 2 (Quad); and R. E. Ginna Nuclear Power Plant (collectively, the facilities).

Specific editions and addenda of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code are incorporated by reference in 10 CFR 50.55a with conditions. Section XI specifies requirements for documentation of repair and replacement activities at nuclear power plants. The proposed alternative request of December 1, 2020, would allow the licensee to forgo preparation and completion of a repair and replacement plan and certain forms for pressure retaining bolting that is not included within Examination Categories B-G-1, B-G-2, or C-D of the ASME Code, Section XI, Table IWB-2500-1 at these facilities. Further the licensee's application dated December 1, 2020, indicated that the proposed alternative is applicable to the current fifth 10-year in-service inspection (ISI) interval at Quad and Dresden. The U.S. Nuclear Regulatory Commission (NRC) staff authorized the licensee's use of the Dec 1, 2020 proposed alternative request, as supplemented, on August 5, 2021 (ADAMS Accession No. ML21216A220).

In addition, the licensee's April 20, 2021, and July 7, 2021, supplements were in response to a request for additional information issued by the NRC staff on March 1, 2021 (ADAMS Accession No. ML21062A065). In its April 20, 2021, letter, the licensee requested to apply the proposed alternative in the original relief request dated December 1, 2020 to the sixth 10-year ISI interval at Quad and Dresden, which resulted in two new proposed alternative requests for NRC staff review and approval. This safety evaluation (SE) only applies to the review of the proposed alternative for the sixth 10-year ISI intervals at Quad and Dresden.

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.55a(g)(4) state, in part, that ASME BPV Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in Section XI of the applicable editions and addenda of the ASME BPV Code to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Paragraph 10 CFR 50.55a(g)(4)(ii) requires that in-service examination of components and system pressure tests conducted during successive 10-year ISI intervals (i.e., after the initial 10-year interval) must comply with the latest edition and addenda of the ASME BPV Code (or the optional ASME Code Cases) incorporated by reference in 10 CFR 50.55a(a) 18 months before the start of the 10-year interval (with some exceptions) subject to the conditions listed in 10 CFR 50.55a(b).

The NRC Regulatory Guide (RG) 1.147, Revision 19, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," dated October 2019 (ADAMS Accession No. ML19128A244), is incorporated by reference into 10 CFR 50.55a(3)(ii). RG 1.147 identifies ASME BPV Code Cases that the NRC has approved for use as a voluntary alternative to the mandatory ASME Code, Section XI, provisions that are incorporated by reference into 10 CFR 50.55a. Licensees are permitted to use the Code Cases listed in RG 1.147 without prior NRC approval provided that they meet the conditions of 10 CFR 50.55a(b)(5).

The regulations in 10 CFR 50.55a(z) state that alternatives to the requirements in paragraphs (b) through (h) of 10 CFR 50.55a may be authorized by the U.S. Nuclear Regulatory Commission (NRC) if the licensee demonstrates that: (1) the proposed alternative provides an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 establishes quality assurance requirements for the design, fabrication, construction, and testing of structures, systems, and components (SSCs). The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of those SSCs and include designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying SSCs.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Proposed Alternative Requests (For the sixth 10- year ISI interval)

3.1.1 ASME Code Components Affected

All pressure retaining bolting subject to the ASME BPV Code, Section XI, that is not classified as Examination Category B-G-1 (Class 1 pressure retaining bolting greater than 2 inches in diameter), B-G-2 (Class 1 pressure retaining bolting that is 2 inches in diameter or less), or C-D (Class 2 pressure retaining bolting greater than 2 inches in diameter).

3.1.2 Applicable Code Edition and Addenda

The licensee identified the applicable code editions for the sixth ISI interval for Quad and Dresden as shown in the table below. In addition, the table shows the start and end dates of the sixth ISI interval for each plant.

PLANT	ISI INTERVAL	ASME BPV CODE EDITION	START	END
Quad Cities, Units 1 and 2	Sixth	2017 Edition	4/2/2023	4/1/2033
Dresden, Units 2 and 3	Sixth	2017 Edition	1/20/2023	1/19/2033

3.1.3 Applicable Code Requirements

The licensee has requested an alternative to the following ASME BPV Code, Section XI, requirements:

- IWA-4141 (2017 Edition) requires the Owner to provide or cause to be provided a Repair Replacement Program, a Repair Replacement Plan, and specification requirements for repair/replacement activities.
- IWA-4142 (2017 Edition) requires the organization that performs repair/replacement activities shall establish a Quality Assurance Program for control of their activities in accordance with the Repair/Replacement Program and Plans.
- IWA-4150(c) (2017 Edition) requires that a Repair/Replacement Plan be prepared in accordance with the Repair/Replacement Program whenever a repair/replacement activity is to be performed.
- IWA-4511 (2017 Edition) requires that personnel performing nondestructive examination required by the Construction Code shall be qualified and certified in accordance with the Construction Code identified in the Repair/Replacement Plan.
- IWA-6211(d) (2017 Edition) requires the Owner to prepare the Owner's Repair/Replacement Certification Record, Form NIS-2 (Form NIS-2) upon completion of all required activities associated with the Repair/Replacement Plan to place the item in service.
- IWA-6220 (2017 Edition) provides the requirements for tracking and approval of Repair/Replacement plans and Form NIS-2.

- IWA-6350 (2017 Edition) requires that Repair/Replacement Plans and Form NIS-2 be retained.

Code Case N-532-5, "Repair/Replacement Activity Documentation Requirements and Inservice Inspection Summary Report Preparation and Submission, Section XI, Division 1," (unconditionally approved for use under Regulatory Guide 1.147, Revision 19) provides alternatives to the ASME Section XI requirements stated above and substitutes the Form NIS-2 with Form NIS-2A.

3.1.4 Licensee's Proposed Alternative and Basis for Use

The proposed alternative for the sixth 10- year ISI interval would allow the licensee to forego preparation and completion of a Repair/Replacement Plan and associated Form NIS-2 (or NIS-2A) for replacement of pressure retaining bolting that is not classified as Examination Category B-G-1, B-G-2, or C-D at Quad and Dresden. The proposed alternative will not be applied to activities that involve replacement of bolting that has experienced unacceptable service-induced degradation or when involving a design change. This proposed alternative will apply to bolting replacement during normal maintenance work activities due to damage or loss for components other than Examination Category B-G-1, B-G-2, or C-D components. Unacceptable service-induced degradation that cannot apply this proposed alternative is defined as follows:

- Fractures and crack-like flaws not caused by maintenance activities.
- More than one deformed or sheared thread in the zone of thread engagement that is due to a service-induced condition.
- Corrosion that reduces the bolt cross sectional area by more than 5 percent.
- Bending, twisting, or deformation of bolts determined to be from a service-induced condition.
- Degradation of protective coatings on bolting surfaces.

Replacement bolting will receive Construction Code and Owner's Requirements nondestructive examination (NDE) as part of the normal procurement and receipt inspection processes which identify applicable Construction Code and Owner's Requirements. The Construction Code and Owner's Requirements for NDE will be documented in the procurement and receipt records.

Documentation of the work activity and replacement bolting will be achieved through the normal processes of procurement, planning, and maintenance. The proposed alternative would use current work control, procurement, and records retention processes to assure adequate controls of these routine bolting replacements. A log will be maintained that identifies the work packages where the proposed alternative has been used. The Authorized Inspection Agency (AIA) will have access to the site work control systems and the log, which will allow the AIA to review work package instructions and associated procurement documentation. Close-out reviews will continue to be completed through the normal post-work review process to assure appropriate documentation of work performed and material traceability is achieved.

In the application the licensee states:

The procurement and work activity records will document technical requirements and work activities to allow subsequent review for adequacy and traceability, thereby meeting the intent of Code requirements and maintaining an acceptable level of quality and safety.

3.2 NRC Staff's Evaluation

The licensee requested to forego preparation and completion of a Repair/Replacement Plan and the associated Form NIS-2 (or NIS-2A) for routine replacement of pressure retaining bolting that is not classified as Examination Category B-G-1, B-G-2, or C-D. Instead, the documentation of the work activity and replacement bolting will be achieved using current work management systems, procurement specifications, installation procedures, work order documentation, and record retention processes in accordance with the licensee's Quality Assurance Program (QAP). For example, in accordance with the licensee's QAP, safety-related bolting materials receive a quality receipt inspection by a qualified individual, which includes physical inspections and a review of the applicable documentation. When bolting materials are installed, material traceability information, such as a unique material identifier or purchase order number, is documented in the work order and available for review as part of the completed work order package. Close-out reviews will continue to be completed through the normal post-work review process to assure appropriate documentation of work performed and material traceability is achieved. These processes and work control systems, including the associated work orders and procurement documentation, will be available at each site for review by the AIA and the NRC when requested.

The current Form NIS-2 (or NIS-2A) is used to document that repair/replacement activities were performed in accordance with the requirements of Section XI of the ASME BPV Code. Since this proposed alternative would forgo preparation and completion of the Form NIS-2 (or NIS-2A), the AIA will have access to the site work control systems for review at their discretion. Should the AIA choose to review completed work orders that fall under this proposed alternative, the work management system will be used to document any AIA comments during the review of the work order records.

The licensee's July 7, 2021, supplement states, in part:

For routine replacement of bolting, where no service induced degradation has been identified (i.e., lost bolting, bolting damaged during disassembly), the only ASME Section XI requirements currently invoked beyond normal work and procurement processes are administrative in nature and include completion of a Repair/Replacement Plan and completion of a Form NIS-2 (or NIS-2A). For these replacements, the Repair/Replacement Plan provides no additional information other than reiteration of the work package instructions for bolting replacement. Similarly, since there are no additional technical requirements under Section XI for routine bolting replacement, completing the Form NIS-2 (or NIS-2A) is merely generating an additional document for activities that are already covered through the work control process and procedures, along with the procurement process and procedures. The NIS-2 (or NIS-2A) does not contain

any specific information; therefore, it does not provide any information beyond indicating the bolting was replaced in accordance with the Owner's processes and procedures, which ensure the Owner's responsibilities under ASME Section XI have been met.

Furthermore, the licensee stated that a log will be maintained that identifies the work packages where the proposed alternative has been used. The AIA and the NRC will have access to the log, providing them the opportunity to review the work package instructions and associated procurement documentation.

The NRC staff reviewed the licensee's application, as supplemented, for the proposed alternative applicable to sixth 10-year ISI interval for Quad and Dresden, to eliminate the preparation and completion of a Repair/Replacement Plan and associated Form NIS-2 (or NIS-2A) for pressure retaining bolting that is not included within Examination Categories B-G-1, B-G-2, or C-D. The proposed alternative will only be used for routine replacement of bolting (i.e., replacement of lost bolting or bolting damaged during disassembly) where no service induced degradation has been identified. The NRC staff determined that this proposed alternative is limited to certain administrative requirements in the ASME BPV Code, Section XI, and it does not change any technical requirements in the ASME BPV Code, Section XI, or the Construction Code associated with bolting materials, installation, or maintenance. In addition, the proposed alternative does not change any process associated with repair/replacement activities or the QAP except for the documentation process for the routine replacement of bolting and the licensee will use its QAP when implementing this proposed alternative. As such, the NRC staff finds that there is reasonable assurance that the licensee's implementation of the proposed alternative for routine replacement of bolting will continue to meet the requirements of Appendix B to 10 CFR Part 50. Therefore, the NRC staff concludes that the proposed alternative will provide an acceptable level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determined that the licensee's proposed alternative to eliminate certain documentation requirements for pressure retaining bolting provides an acceptable 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)(1). Therefore, the NRC staff authorizes the licensee to use the proposed alternative described in its application, as supplemented, at Quad and Dresden. This authorization is for the Quad Cities sixth 10-year ISI interval beginning April 2, 2023, and ending April 1, 2033, and for the Dresden sixth 10-year ISI interval beginning January 20, 2023, and ending January 19, 2033.

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

Principal Contributors: Yamir Diaz-Castillo

Dated: December 13, 2021

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 AND DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 - PROPOSED ALTERNATIVE TO ELIMINATE CERTAIN DOCUMENTATION REQUIREMENTS FOR PRESSURE RETAINING BOLTING (EPID NOS. L-2021-LLR-0029 AND L-2021-LLR-0030) DATED DECEMBER 13, 2021

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