



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

June 26, 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: CLINTON POWER STATION, UNIT 1 – PROPOSED ALTERNATIVE I4R-04 TO
THE REQUIREMENTS OF THE ASME CODE (EPID L-2019-LLR-0115)

Dear Mr. Hanson:

By letter dated December 16, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19350C642), Exelon Generation Company, LLC (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements at Clinton Power Station, Unit 1 (CPS).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use alternative I4R-04¹ on the basis that complying with the specified requirement would result in hardship or unusual difficulty because of as low as is reasonably achievable (i.e. ALARA) concerns and industrial safety challenges.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject Class 3 piping components at CPS. The NRC staff finds that complying with the requirements of ASME Code, Section XI, 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 authorizes the use of alternative I4R-04 at CPS for the fourth 10-year inservice inspection interval, which is currently scheduled to begin on July 1, 2020, and end June 30, 2030.

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

¹ The other requests contained in the licensee's December 16, 2019, letter will be addressed by separate correspondence.

If you have any questions, please contact the Senior Project Manager, Joel S. Wiebe, at (301) 415-6606 or Joel.Wiebe@nrc.gov.

Sincerely,

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

Docket No. 50-461

Enclosure:
Safety Evaluation

cc: ListServ



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
PROPOSED ALTERNATIVE I4R-04 REGARDING CLASS 3 INSTRUMENT AIR PIPING
SUPPLYING EIGHT MAIN STEAM ISOLATION VALVES
EXELON GENERATION COMPANY, LLC
CLINTON POWER STATION, UNIT 1
DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated December 16, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19350C642), Exelon Generation Company, LLC (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative (I4R-04) to certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements at Clinton Power Station, Unit 1 (CPS) for performance of system pressure tests and VT-2 visual examination requirements for all inservice inspection (ISI) class 3 instrument air (IA) piping supplying eight main steam isolation valves (MSIVs). Other requests contained within the licensee's December 16, 2019, letter will be addressed by separate correspondence.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty because of as low as is reasonably achievable (ALARA) concerns and industrial safety challenges.

2.0 REGULATORY EVALUATION

Regulation 10 CFR 50.55a(g)(4), "Inservice inspection standards requirement for operating plants," states that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) that are classified as ASME Code Class 1, 2, and 3 must meet the requirements, except 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 10 CFR 50.55a and that are incorporated by reference in paragraph (a)(1)(ii) of 10 CFR 50.55a, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state that alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a, or portions

Enclosure

thereof, may be used when authorized by the Director, Office of Nuclear Reactor Regulation. Section 50.55a(z)(2) of 10 CFR states that alternatives to the requirements of paragraphs (b) through (h) may be used when authorized by the NRC, if the licensee demonstrates that “compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.”

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request the use of an alternative and the NRC to authorize the proposed alternative.

3.0 TECHNICAL EVALUATION

3.1 The Licensee's Proposed Alternative

ASME Code Components Affected

ASME Code Class:	Class 3
Reference:	ASME Section XI, Table IWD-2500-1 and IWD-5220
Exam Category:	D-B
Item Number:	D2.10
Components:	Instrument Air (IA) Piping for Main Steam Isolation Valves (MSIVs) <ol style="list-style-type: none">1. Drawing M10-9002, Sheet 5, lines – 1MS79AA/BA/CA/DA, 1MS79AC/BC/CC/DC, 1MS80AB/BB/CB/DB, 1MS80AA/BA/CA/DA, 1MS80AC/BC/CC/DC, and 1MS80AB/BB/CB/DB2. Drawing M10-9002, Sheet 5, valves - 1B21- F083A/B/C/D, 1B21F024A/B/C/D, 1B21-F084A/B/C/D, and 1B21-F029A/B/C/D3. Drawing M10-9002, Sheet 5, accumulators – 1B21- A001A/B/C/D and 1B21-A002A/B/C/D

Applicable ASME Code Requirements

The current Code of Record for CPS during the fourth 10-year ISI interval is the 2013 Edition of ASME Code, Section XI. The requirements of subarticle IWD-2500 state that components shall be examined, and pressure tested, as specified in Table IWD-2500-1(D-B). Table IWD-2500-1, Examination Category D-B, Item D2.10, requires that all ASME Code Class 3 pressure-retaining boundaries be subject to a system leakage test with a visual examination (VT-2) once each inspection period, in accordance with paragraph IWD-5220. Additionally, subsubarticle IWD-5210, states, in part, that the contained fluid in the system shall serve as the pressurizing medium, and if gas is the pressurizing medium, then the test shall include methods for detection and location of through-wall leakage of the components tested.

Reason for Proposed Alternative

Performance of the required examinations would require the application of a leak detection solution while these components are pressurized. The licensee states in its December 16, 2019, letter, that the affected IA piping components are located in elevated dose rate areas, with

limited access. The licensee further stated that performing the required VT-2 visual examinations would result in an estimated additional exposure of 0.5 rem (Roentgen equivalent man) as well as present industrial safety challenges because of the limited access to the piping without the benefit of an increase in the level of quality and safety.

Proposed Alternative and Basis for Use

In its December 16, 2019, letter, the licensee indicated that the majority of the subject IA piping for the inboard and outboard MSIVs is 1/2 inch, but also includes some 2-inch piping, and some 3/4-inch drain lines. The piping is seamless austenitic steel fabricated to the requirements of ASTM SA-312 or SA-376, Grade TP304.

The licensee further stated that CPS plant-specific surveillance procedure CPS-9061.11 verifies operability of MSIV closure capability and check valve repositioning in the IA supply lines to all eight MSIVs. The surveillance is performed for each individual MSIV as a requirement of the CPS inservice testing program. One specific test under this surveillance is the pressure decay test of the accumulators of the MSIV and associated air supply components. The design calculations for each MSIV indicate that 35 gallons of air is needed to close an MSIV following failure of the normal air supply. The MSIV air supply is sized based on continuous leakage of one standard cubic foot per hour (scfh) at a minimum air pressure of 100 pounds per square inch gauge (psig). Each of the accumulators are oversized at 39 gallons to provide for additional margin. The pressure decay test is performed by pressurizing and isolating these accumulators and associated piping at nominal operating pressure. The decay in pressure is then monitored through calibrated pressure measuring instrumentation. The pressure decay acceptance standard is based on half the allowed leakage assumed in the design of the air supply, or 0.5 scfh which equates to a pressure drop of 0.0242 per square inch per minute. For a test duration of 63 minutes this will equal to a pressure drop of 1.5 psig, which is detectable with the equipment used for monitoring the pressure drop.

If the pressure decay acceptance criterion is exceeded, the surveillance procedures identify appropriate troubleshooting steps to be performed, including application of soap solution to the surface of the component to locate the leakage. When through-wall leakage is located for a safety-related component, the component is repaired or replaced in accordance with the applicable ASME Code, Section XI, requirements.

The licensee stated that the pressure decay test performed as part of surveillance procedure CPS-9061.11 identifies any degradation of the Class 3 instrument air supply piping to the MSIVs and associated isolation check valves. The volume tested by this surveillance includes all piping components required to be tested under the ASME Code, Section XI, for the portions of the IA system. This surveillance is performed every 24 months during a refueling outage, which is at a greater frequency than the required testing frequency per Table IWD-2500-1 (i.e., every 40 months).

Furthermore, the procedure verifies the operability of all eight MSIVs and is performed for each MSIV as part of the required inservice testing program. Additionally, this test pressure is consistent with the pressure requirements of Table IWD-2500-1. Therefore, the testing performed during this surveillance has the potential to provide the same level of quality and safety as the pressure testing and VT-2 visual examinations performed per IWD-5220.

The licensee concluded that performing the required system leakage test for the subject piping components, would result in hardship or unusual difficulty without a compensating increase in

the level of quality and safety. The licensee proposes to perform the above described IA testing, as an alternative. In its letter dated December 16, 2019, the licensee cited as precedent a similar alternative, RR I3R-07, which was approved by NRC letter dated November 21, 2011, for use at CPS during the third 10-year ISI interval (ADAMS Accession No. ML112900885).

3.2 NRC Staff Evaluation

The requirements in ASME Code, Section XI, subsubarticle IWD-5210 state, in part that the contained fluid in the system shall serve as the pressurizing medium, and if gas is the pressurizing medium, then the test shall include methods for detection and location of through-wall leakage of the components tested. The NRC staff notes that a VT-2 performed for these components would require application of a leak detection solution to check for air leakage. This would require application of the solution to piping located in areas of elevated dose rates and may pose industrial safety challenges. The licensee stated that performing the required VT-2 would result in an estimated additional exposure of 0.5 rem. Therefore, the staff finds that performing the required examination under these conditions would result in hardship or unusual difficulty.

The licensee proposes to test the subject Class 3 piping components for leak tightness by means of monitoring for pressure decay of the subject piping system. Specifically, as part of the pressure decay test, the subject piping system is pressurized and isolated at its operating pressure. The decay in pressure is then monitored through a calibrated pressure gauge for a test duration of 63 minutes. The licensee's pressure decay acceptance criteria is a pressure drop of 1.5 psig for the subject piping system. In the event that the acceptance criteria is not met, the licensee stated in its December 16, 2019, letter, that it will locate the leakage and take appropriate corrective action.

The NRC staff determined the licensee's proposed pressure decay testing to be an acceptable alternative to the ASME Code-required VT-2 visual examination for the subject piping components. The proposed test ensures an adequate supply of instrument air to close the MSIVs will be available if the air supply is interrupted. Furthermore, the frequency of the proposed alternative offers additional assurance that the system can perform its intended safety function, because the pressure decay surveillance will be performed every 24 months instead of the ASME Code-required VT-2 visual examination frequency of every inspection period (i.e., 40 months). Therefore, the NRC staff concludes that the licensee's proposed alternative would provide reasonable assurance of structural integrity and leak tightness. Additionally, the staff finds that compliance with the ASME Code requirements for the subject piping components 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 finds that the proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject Class 3 piping components at CPS. The NRC staff finds that complying with the requirements of ASME Code, Section XI 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 authorizes the use of alternative I4R-04 at CPS for the fourth 10-year ISI interval, which is currently scheduled to begin on July 1, 2020, and end June 30, 2030.

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

Principal contributor: R. Kalikian

Date: June 26, 2020

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REQUIREMENTS OF THE ASME CODE (EPID L-2019-LLR-0115) DATED
JUNE 26, 2020

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