



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

April 22, 2021

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

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT 1 – PROPOSED ALTERNATIVE TO THE INSERVICE TESTING REQUIREMENTS OF THE ASME OM CODE FOR THE FIFTH 10-YEAR PROGRAM INTERVAL (EPID L-2020-LLR-0136 AND L-2020-LLR-0137)

Dear Mr. Rhoades:

By letter dated October 8, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20282A331), Exelon Generation Company, LLC (the licensee) submitted alternative requests to the U.S. Nuclear Regulatory Commission (NRC). The licensee requested an alternative test plan in lieu of certain inservice testing (IST) requirements of the American Society of Mechanical Engineers (ASME) *Operation and Maintenance of Nuclear Power Plants*, Division 1 (OM Code) associated with the IST of certain pumps at Nine Mile Point Nuclear Station, Unit 1 (Nine Mile Point 1), during the fifth 10-year IST program interval.

Specifically, pursuant to Section 50.55a(z)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR), the licensee requested to use the proposed alternatives 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.

As set forth in the enclosed safety evaluation, the NRC staff determined that the proposed alternatives CTNSP-PR-01 Rev. 0 and CS-PR-01 Rev. 0 provide reasonable assurance that the components listed in Tables 1 and 2 of the safety evaluation are operationally ready. The NRC staff also determined that the licensee has justified that compliance with the testing requirements in the ASME OM Code (2012 Edition) for the pumps listed in Tables 1 and 2 would result in hardship 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(a)(z)(2).

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable.

Therefore, the NRC staff authorizes the proposed alternatives CTNSP-PR-01 Rev. 0 and CS-PR-01 Rev. 0 for the fifth 10-year IST interval at Nine Mile Point 1, which began on January 1, 2019, and is currently scheduled to end on December 31, 2028.

If you have any questions, please contact the Nine Mile Point 1 Project Manager, Michael Marshall, at (301) 415-2871.

Sincerely,

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

Docket No. 50-220

Enclosure:
Safety Evaluation

cc: ListServ

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT 1 – PROPOSED ALTERNATIVE TO THE INSERVICE TESTING REQUIREMENTS OF THE ASME OM CODE FOR THE FIFTH 10-YEAR PROGRAM INTERVAL (EPID L-2020-LLR-0136 AND L-2020-LLR-0137) DATED APRIL 22, 2021

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ADAMS Accession No.: ML21109A216

*by safety evaluation dated

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UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE REQUESTS CTNSP-PR-01, REV. 0 AND CS-PR-01, REV. 0

RELATED TO THE INSERVICE TESTING PROGRAM FIFTH 10-YEAR INTERVAL

EXELON GENERATION COMPANY LLC

NINE MILE POINT NUCLEAR STATION UNIT 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By letter dated October 8, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20282A331), Exelon Generation Company, LLC (the licensee) submitted alternative requests to the U.S. Nuclear Regulatory Commission (NRC). The licensee requested an alternative test plan in lieu of certain inservice testing (IST) requirements of the American Society of Mechanical Engineers (ASME) *Operation and Maintenance of Nuclear Power Plants*, Division 1, (OM Code) associated with the IST testing of certain pumps at Nine Mile Point Nuclear Station, Unit 1 (Nine Mile Point 1) during the fifth 10-year IST program interval.

Specifically, pursuant to Section 50.55a(z)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR), the licensee requested to use the proposed alternatives 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

Section 50.55a(f)(4), "Inservice testing standards requirement for operating plants," of 10 CFR states, in part, that throughout the service life of a boiling, or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the IST requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in 10 CFR 50.55a(f)(2) and (3) and that are incorporated by reference in 10 CFR 50.55a(a)(1)(iv), to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Section 50.55a(z) of 10 CFR states, in part, that alternatives to the requirements of 10 CFR 50.55a(f) may be used, when authorized by the NRC, if the licensee demonstrates (1) the proposed alternatives would provide 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.

3.0 TECHNICAL EVALUATION

3.0.1 Applicable ASME OM Code

The following request is an alternative test plan in lieu of certain IST requirements of the 2012 Edition of the ASME OM Code for the IST program at Nine Mile Point 1 for the fifth interval, which began on January 1, 2019, and is currently scheduled to end on December 31, 2028.

3.1.1 Licensee's Alternative Request CTNSP-PR-01, Rev. 0

ASME OM Code Requirements

ISTB-1400, "Owners Responsibility" (d), states "establishing a pump periodic verification test program in accordance with Division 1, Mandatory Appendix V."

Mandatory Appendix V-2000, "Definitions," states that a "pump periodic verification test: a test that verifies a pump can meet the required (differential or discharge) pressure as applicable, at its highest design basis accident flow rate."

Alternative testing is requested for the following pumps

Pump ID	Function	Class	Group
PMP-80-03	Containment Spray Pump # 121	2	B
PMP-80-04	Containment Spray Pump # 111	2	B
PMP-80-23	Containment Spray Pump # 122	2	B
PMP-80-24	Containment Spray Pump # 112	2	B

The licensee recently started its fifth IST interval at Nine Mile Point 1 following the requirements of the 2012 Edition of the ASME OM Code. The 2012 Edition of the ASME OM Code added Division 1, Mandatory Appendix V Pump Periodic Verification Test Program requirement. This Mandatory Appendix requires safety-related pumps to be tested once every 2 years at their highest design-basis accident flow rate.

The pumps listed in Table 1 of this safety evaluation (SE) and their associated system components were not designed to be tested at their full design-basis accident flow rate. The current tests are performed quarterly via permanently installed test return lines that are designed to test at a representative point (approximately 80 percent) of the pump's performance curve to demonstrate pump condition and performance. In order to test at the required highest design-basis accident flow rate, the pumps need to test via normal piping flow path, and discharge water into the drywell or torus airspace. This would result in spraying electrical equipment in the drywell and spreading radioactive contamination, which would be detrimental to the long-term integrity of the equipment in the drywell and torus and increase radiation levels, which can increase worker radiation dose. To comply with the new requirement, the system would require an extensive, and expensive, system redesign and modification.

In lieu of the modifications, the licensee proposes to continue testing using quarterly and comprehensive test methods in accordance with the ASME OM Code. In addition, condition

monitoring of pump parameters such as motor-bearing temperatures, vibration monitoring, and periodic sampling of the lube oil shall be completed. In its request, the licensee stated that testing at a stable representative flow rate of approximately 80 percent and the additional monitoring of pump parameters is an effective way for detecting mechanical and hydraulic degradation and provides reasonable assurance of pump operational readiness.

3.1.2 NRC Staff Evaluation

The ASME OM Code Mandatory Appendix V requires safety-related pumps to have a periodic verification test program where the pumps are tested at their highest design-basis accident flow rate and pressure (differential or discharge as applicable). The test shall be completed at least once every 2 years. To comply with this new requirement, the system would have to be updated with an extensive modification. Compliance to meet the requirement to test these pumps at the highest design pressure value per Mandatory Appendix V would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The NRC staff reviewed the licensee's request and noted that in lieu of performing the periodic verification test once every 2 years per Mandatory Appendix V, the licensee has proposed to perform quarterly comprehensive testing. The quarterly comprehensive test requires more accurate pressure-monitoring instrumentation with a tighter acceptance band, flow measurement, and vibration monitoring for trending. Vibration analysis can detect bearing faults, motor/pump imbalances, impeller faults, and resonance problems. The pump test is performed at a reference value taken at approximately 80 percent of the pump's performance curve. In addition, the licensee monitors other pump parameters such as bearing temperatures and periodic oil analysis, which can detect bearing wear and abnormal system operation such as water intrusion. These pumps have a good performance history with minimal maintenance required and data to support the continued testing following the comprehensive test requirements. The staff has determined that testing at a reference point of 80 percent of the pump's performance curve while applying multiple condition monitoring technologies can detect degradation of pump performance over time and provides reasonable assurance that they are operationally ready.

3.2.1 Licensee's Alternative Request CS-PR-01, Rev. 0

ASME OM Code Requirements

ISTB-1400, "Owners Responsibility" (d), states "establishing a pump periodic verification test program in accordance with Division 1, Mandatory Appendix V."

Mandatory Appendix V-2000, "Definitions," states that a "pump periodic verification test: a test that verifies a pump can meet the required (differential or discharge) pressure as applicable, at its highest design basis accident flow rate."

Alternative testing is requested for the following pumps

Table 2			
Pump ID	Function	Class	Group
PMP-81-03	Core Spray System Pump # 121	2	B
PMP-81-23	Core Spray System Pump # 111	2	B
PMP-81-51	Core Spray System Topping Pump # 122	2	B
PMP-81-50	Core Spray System Topping Pump # 111	2	B

The licensee recently started its fifth IST interval at Nine Mile Point 1 following the requirements of the 2012 Edition of the ASME OM Code. The 2012 Edition of the ASME OM Code added Division 1, Mandatory Appendix V Pump Periodic Verification Test Program requirement. This Mandatory Appendix requires safety-related pumps to be tested once every 2 years at its highest design-basis accident flow rate.

The pumps listed in Table 2 of this SE and their associated system components were not designed to be tested at their full design-basis accident flow rate with the exception for injection to the reactor pressure vessel (RPV) with water from the torus. Testing at full design-basis accident flow rate via injection to the RPV with water from the torus would introduce lower quality water and contaminants into the RPV and reactor coolant system (RCS), which is contrary to guidelines for maintaining reactor coolant chemistry controls. These controls are necessary to maintain the long-term integrity of the fuel cladding, the RPV, and the RCS piping. Compliance to the new test requirements while maintaining proper RCS chemistry would require an expensive system redesign and modification.

Each core spray system (CSS) was designed for full flow-rated conditions. Data on flows and pressures at various points in the flow lines for each CSS pump was obtained during testing and was used to create the field-validated pump performance curves. These tests confirmed that each CSS pump set was capable to meet design-basis accident flow conditions.

The licensee proposes to continue testing using quarterly and comprehensive test methods in accordance with the ASME OM Code. In addition, condition monitoring of pump parameters such as motor-bearing temperatures, vibration monitoring, and periodic sampling of the lube oil will be completed. The licensee stated that testing at a stable representative flow rate of approximately 66 percent and the additional monitoring of pump parameters is an effective way for detecting mechanical and hydraulic degradation and provides reasonable assurance of pump operational readiness.

3.2.2 NRC Staff Evaluation

The ASME OM Code Mandatory Appendix V requires safety-related pumps to have a periodic verification test program where the pumps are tested at their highest design-basis accident flow rate and pressure (differential or discharge as applicable). The test shall be completed at least once every 2 years. To comply with this new requirement, the system would have to be updated with an extensive modification. Compliance to meet the requirement to test these pumps at the highest design pressure value per Mandatory Appendix V would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The NRC staff reviewed the licensee's request and noted that in lieu of performing the periodic verification test once every 2 years per Mandatory Appendix V, the licensee has proposed to perform quarterly comprehensive testing. The quarterly comprehensive test requires more accurate pressure-monitoring instrumentation with a tighter acceptance band, flow measurement, and vibration monitoring for trending. Vibration analysis can detect bearing faults, motor/pump imbalances, impeller faults, and resonance problems. The pump test is performed at a reference value taken at approximately 66 percent of the pump's performance curve. In addition, the licensee monitors other pump parameters such as bearing temperatures, and periodic oil analysis. Oil analysis can detect bearing wear and abnormal system operation such as water intrusion. These pumps have a good performance history with minimal maintenance required and data to support the continued testing following the comprehensive test requirements. The staff has determined that testing at a reference point of 66 percent of the pump's performance curve while applying multiple condition monitoring technologies can detect degradation of pump performance over time and provides reasonable assurance that they are operationally ready.

4.0 CONCLUSION

As set forth above, the NRC staff determined that the proposed alternatives CTNSP-PR-01 Rev. 0 and CS-PR-01 Rev. 0 provide reasonable assurance that the components listed in Tables 1 and 2 of this SE are operationally ready. The NRC staff also determined that the licensee has justified that compliance with the testing requirements in the ASME OM Code (2012 Edition) for the pumps listed in Tables 1 and 2 would result in hardship 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(a)(z)(2).

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable.

Therefore, the NRC staff authorizes the proposed alternatives CTNSP-PR-01 Rev. 0 and CS-PR-01 Rev. 0 for the fifth 10-year IST interval at Nine Mile Point 1, which began on January 1, 2019, and is currently scheduled to end on December 31, 2028.

Principal Contributor: Michael Farnan, NRR

Date: April 22, 2021