

May 8, 2003

Mr. John L. Skolds, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
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SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNIT 2 - RELIEF REQUEST RV-30D, INSERVICE TESTING PROGRAM RELIEF REGARDING MAIN STEAM POWER OPERATED RELIEF VALVES (TAC NO. MB8713)

Dear Mr. Skolds:

By letter dated April 25, 2003, Exelon Generation Company, LLC (the licensee) submitted a request for relief from the American Society of Mechanical Engineers/American National Standards Institute, Operation and Maintenance of Nuclear Power Plants, OM-1987, Part 1 (OM-1), requirements for the Quad Cities Nuclear Power Station, Unit 2. Specifically, Relief Request RV-30D proposed changes to OM-1, Section 3.4.1.1(d) requirements related to the remote actuation of main steam pressure relief devices with auxiliary actuating devices.

Based on the information provided in the Relief Request RV-30D, the Nuclear Regulatory Commission (NRC) staff concludes that the alternative proposed for the third 10-year inservice testing (IST) interval will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the IST program alternative proposed in Relief Request RV-30D for the third 10-year IST interval for Quad Cities Unit 2, which is scheduled to conclude on March 10, 2004.

The detailed results of the staff's review are provided in the enclosed safety evaluation. If you have any questions concerning this action, please call Mr. F. Lyon of my staff at (301) 415-2296.

Sincerely,

/RA/

Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-265

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF THE THIRD TEN-YEAR INTERVAL INSERVICE TESTING PROGRAM

REQUEST FOR RELIEF RV-30D

EXELON GENERATION COMPANY, LLC

QUAD CITIES NUCLEAR POWER STATION, UNIT 2

DOCKET NO. 50-265

1.0 INTRODUCTION

By letter dated April 25, 2003, Exelon Generation Company, LLC (the licensee), submitted a request for relief for Quad Cities Nuclear Power Station (Quad Cities), Unit 2, from certain American Society of Mechanical Engineers (ASME) Code inservice testing (IST) requirements pertaining to testing of the main steam power operated relief valves (PORVs). Specifically, the licensee's relief request RV-30D seeks relief from performing certain stroke testing of the PORVs. The affected components are the main steam PORVs listed below.

Equipment Piece Number	Description
2-0203-3B	Main Steam 3B Power Operated Relief Valve
2-0203-3C	Main Steam 3C Power Operated Relief Valve
2-0203-3D	Main Steam 3D Power Operated Relief Valve
2-0203-3E	Main Steam 3E Power Operated Relief Valve

2.0 REGULATORY EVALUATION

The Code of Federal Regulations, 10 CFR 50.55a, requires that IST of certain ASME Code Class 1, 2 and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where relief has been requested and granted or proposed alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a (f)(6)(i), (a)(3)(i), or (a)(3)(ii). In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) conformance is impractical for its facility; (2) the proposed alternative provides an acceptable level of quality and safety; or (3) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Pursuant to 10 CFR 50.55a, the Commission may authorize alternatives or grant relief from ASME Code requirements upon making the necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to the Code requirements that are acceptable to the NRC staff. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants."

For Quad Cities, Unit 2, the regulations in 10 CFR 50.55a require that the inservice testing program meet the requirements of the 1989 Edition of the ASME Code, Section XI, which

references the Operation and Maintenance (OM) standards, OM-1987, Part 1 (OM-1). Specifically, for main steam pressure relief valves with auxiliary actuating devices, OM-1, Section 3.4.1.1(d) requires that each valve that has been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled shall be remotely actuated at reduced system pressure to verify open and close capability of the valve prior to resumption of electric power generation. The licensee seeks relief from the OM-1, Section 3.4.1.1(d) requirement and requests approval of the proposed alternative for the duration of the third 10-year inservice testing interval for Unit 2, which ends on March 10, 2004.

The licensee's requested alternative is consistent with similar alternatives authorized for other facilities.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Basis for Relief

The licensee provides the following basis for the requested relief:

"Experience in the industry and at Quad Cities has indicated that manual actuation of the main steam PORVs during plant operation can lead to valve seat leakage. The main steam PORVs at Quad Cities are Model 93V PORVs manufactured by Target Rock and consist of a main valve disc and seat and a pilot valve. The 3B and 3E PORVs are currently in a degraded condition as indicated by high tailpipe temperatures. Based on previous testing and temperature trends, the most likely cause of the high tailpipe temperatures is leakage from the main valve disc and seat, rather than leakage from the pilot valve. PORV leakage from the main valve disc and seat has little safety significance, as long as the pilot valve retains its function and suppression pool temperature is maintained within Technical Specification limits. However, current leakage from the main seat of the 3B and 3E PORVs is of sufficient quantity to prevent detection of potential pilot valve leakage. Leakage from the pilot valve can eventually cause a PORV to fail open and cause the reactor to blowdown to the suppression pool and depressurize.

Because of the elevated tailpipe temperatures due to seat leakage, the 3B and 3E PORVs will be replaced. The relief request will allow the testing of the PORVs such that full functionality is demonstrated through overlapping tests, without cycling the valve. The use of an overlapping series of tests has been successfully applied at other stations.

Additionally, the Boiling Water Reactor Owners Group (BWROG) Evaluation of NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves," recommended that the number of safety relief valve openings be reduced as much as possible and unnecessary challenges should be avoided."

3.2 Proposed Alternative Testing

The Quad Cities, Unit 2 PORVs are solenoid-operated with a dual-stage pilot. The licensee states that they are similar to other multi-stage, pilot-actuated safety and relief valves (SRVs) in that lifting of the first stage pilot relieves loading from the second stage pilot, allowing it to change position, relieving pressure on the main disc. With this pressure relieved, the solenoid

is able to lift the main disc with the assistance of inlet pressure. This causes the main disc to move rapidly to its full open position.

The licensee states that the proposed testing uses overlapping tests to verify the valves function properly at operating conditions and are capable of being opened when installed in the plant. The licensee states that each valve will be sent to a steam test facility where it will be installed on a steam header in the same orientation as in the plant installation. The test conditions in the test facility will be similar to those in the plant installation, including ambient temperature, valve insulation, and steam conditions. The valve will be then leak tested, functionally tested to ensure the valve is capable of opening and closing, and leak tested a final time. Valve stroking time will be measured and verified to be within design limits. Valve seat tightness will be verified by a cold bar test, and if not free of fog, leakage will be measured and verified to be below design limits. Limit switch actuation may be tested prior to or during functional testing.

The licensee states that each valve will then be shipped to the plant without any disassembly or alteration of the valve components. Prior to installation, electrical continuity checks of the limit switches will be performed. The valve will be installed, insulated, and electrically connected. Proper electrical connections will be verified per procedure. Electrical power to the control panel and signals causing application of power to the PORV solenoid will be verified to be present at the control panel per procedure. Electrical continuity and resistance checks from the control panel to the relief valve will be performed. The licensee states that these verifications will provide a complete check of the capability of the valve to open and close.

3.3 Evaluation

The staff has reviewed the licensee's request for relief and finds that with the proposed alternative testing, the functional capability of the valve is verified. A manual actuation and valve leakage test will be performed at a certified test facility using test conditions similar to those for the installed valves in the plant, including valve orientation, ambient temperature, valve insulation, and steam conditions. This also demonstrates the solenoid coil is capable of actuating the PORV pilot valve. Following valve installation, the licensee's proposed testing includes verifying proper electrical connection and solenoid coil continuity. Therefore, all of the components necessary to manually actuate the PORVs will continue to be tested to demonstrate the functional capability of the PORVs, without the need to stroke-test the valves on-line with system steam pressure conditions. The staff also finds that the current testing requirements could result in seat leakage of the PORVs during power operation. Excessive seat leakage could interfere with detection and monitoring of pilot valve leakage and could result in excessive suppression pool temperatures. Also, leakage through the pilot valve could eventually result in the inadvertent opening of a PORV.

The staff finds that the proposed alternative testing of the PORVs and associated components provide reasonable assurance of adequate valve operation and readiness. Therefore, the staff finds that the proposed alternative testing method to that required by OM-1, Section 3.4.1.1(d), is acceptable.

4.0 CONCLUSION

Based on the above evaluation, the staff concludes that, pursuant to 10 CFR 50.55a (a)(3)(i), the proposed alternative is authorized for the remainder of the third 10-year inservice testing interval for Quad Cities, Unit 2, which ends on March 10, 2004, on the basis that the proposed alternative provides an acceptable level of quality and safety. The licensee's proposed testing provides reasonable assurance that the plant PORVs will perform their intended safety function.

Principal Contributor: G. Hammer

Date: May 8, 2003