



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

February 7, 2018

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

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 – SAFETY
EVALUATION OF RELIEF REQUEST 01A-VRR-3 REGARDING THE FIFTH
10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM
(EPID L-2017-LLR-0096)

Dear Mr. Hanson:

By letter dated September 29, 2017, Exelon Generation Company, LLC (Exelon, the licensee) submitted Relief Requests GVRR-2, 01A-VRR-2, 01A-VRR-3, and 01A-VRR-4 to the U.S. Nuclear Regulatory Commission (NRC). In these relief requests, Exelon proposed alternatives to certain inservice testing requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) for Peach Bottom Atomic Power Station (Peach Bottom), Units 2 and 3. The subject relief requests are for the fifth 10-year interval of the inservice testing program at Peach Bottom, Units 2 and 3, which will begin on August 15, 2018.

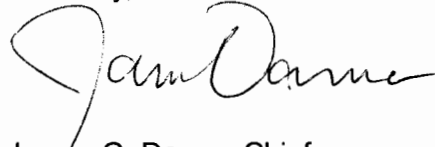
The purpose of this letter is to provide the results of the NRC staff's review of Relief Request 01A-VRR-3, as documented in the enclosed safety evaluation. In this relief request, Exelon proposed an alternative to extend the test interval for certain safety valves and safety relief valves on the basis that the proposed alternative provides an acceptable level of quality and safety. Our safety evaluation concludes that the proposed alternative will provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in Title 10 of the *Code of Federal Regulations* 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternative for the fifth 10-year inservice testing interval at Peach Bottom, Units 2 and 3.

By letter dated October 13, 2017 (ADAMS Accession No. ML17286A083), Exelon withdrew Relief Request 01A-VRR-2. By letter dated December 7, 2017 (ADAMS Accession No. ML17332A019), the NRC authorized the proposed alternative for Relief Request 01A-VRR-4. The NRC staff will provide separate correspondence regarding the review of Relief Request GVRR-2.

All other ASME OM Code requirements for which relief was not specifically requested and approved in Relief Request 01A-VRR-3 remain applicable.

If you have any questions concerning this matter, please contact the Peach Bottom Project Manager, Ms. Jennifer Tobin, at (301) 415-2328 or by e-mail to Jennifer.Tobin@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "James G. Danna". The signature is fluid and cursive, with the first name "James" being more prominent than the last name "Danna".

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

Docket Nos. 50-277 and 50-278

Enclosure:
Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST 01A-VRR-3 FOR THE

FIFTH 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM

EXELON GENERATION COMPANY, LLC

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By letter dated September 29, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17275A061), Exelon Generation Company, LLC (Exelon, the licensee) submitted Relief Requests GVR-2, 01A-VRR-2, 01A-VRR-3, and 01A-VRR-4 to the U.S. Nuclear Regulatory Commission (NRC or the Commission). In these relief requests, Exelon proposed alternatives to certain inservice testing (IST) requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) for Peach Bottom Atomic Power Station (Peach Bottom or PBAPS), Units 2 and 3. The subject relief requests are for the fifth 10-year interval of the IST program at Peach Bottom, Units 2 and 3, which will begin on August 15, 2018.

The purpose of this safety evaluation is to provide the results of the NRC staff's review of Relief Request 01A-VRR-3. In this relief request, Exelon proposed an alternative to certain IST requirements of the ASME OM Code for testing certain safety valves (SVs) and safety relief valves (SRVs) on the basis that the proposed alternative provides an acceptable level of quality and safety. The relief request was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1) on the basis that the proposed alternative provides an acceptable level of quality and safety.

By letter dated October 13, 2017 (ADAMS Accession No. ML17286A083), Exelon withdrew Relief Request 01A-VRR-2. By letter dated December 7, 2017 (ADAMS Accession No. ML17332A019), the NRC authorized the proposed alternative for Relief Request 01A-VRR-4. The NRC staff will provide separate correspondence regarding the review of Relief Request GVR-2.

2.0 REGULATORY EVALUATION

Section 50.55a(f), "Preservice and inservice testing requirements," of 10 CFR requires, in part, that IST of certain ASME Boiler and Pressure Vessel Code (B&PV Code) Class 1, 2, and 3 components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized by the NRC pursuant to paragraphs (z)(1) or (z)(2) of 10 CFR 50.55a.

Enclosure

In proposing alternatives, a licensee must demonstrate that the alternatives provide an acceptable level of quality and safety in accordance with 10 CFR 50.55a(z)(1), or that compliance would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety in accordance with 10 CFR 50.55a(z)(2).

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request, and the Commission to authorize, the alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Relief Request 01A-VRR-3

Components Affected

Alternative testing is requested for the following valves associated with the main steam safety valves (MSSVs) and main steam SRVs:

| Valve | Description | Class | Category | Unit |
|--------------|--------------------------------|--------------|-----------------|-------------|
| RV-2-02-070A | Main Steam Safety Valve | 1 | C | 2 |
| RV-2-02-070B | Main Steam Safety Valve | 1 | C | 2 |
| RV-2-02-070C | Main Steam Safety Valve | 1 | C | 2 |
| RV-2-02-071A | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071B | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071C | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071D | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071E | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071F | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071G | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071H | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071J | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071K | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-2-02-071L | Main Steam Safety Relief Valve | 1 | C | 2 |
| RV-3-02-070A | Main Steam Safety Valve | 1 | C | 3 |
| RV-3-02-070B | Main Steam Safety Valve | 1 | C | 3 |
| RV-3-02-070C | Main Steam Safety Valve | 1 | C | 3 |
| RV-3-02-071A | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071B | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071C | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071D | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071E | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071F | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071G | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071H | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071J | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071K | Main Steam Safety Relief Valve | 1 | C | 3 |
| RV-3-02-071L | Main Steam Safety Relief Valve | 1 | C | 3 |

Applicable Code Edition/Addenda

The applicable ASME OM Code edition and addenda for Peach Bottom, Units 2 and 3, is the 2012 Edition with no Addenda.

Applicable Code Requirements

ASME OM Code, Mandatory Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants," Section I-1320, "Test Frequencies, Class 1 Pressure Relief Valves," paragraph (a), "5-Year Test Interval," states, in part, that "Class 1 pressure relief valves shall be tested at least once every 5 years. The test interval for any installed valve shall not exceed 5 years. The 5-year interval shall begin from the date of the as-left set pressure test for each valve."

Licensee's Proposed Alternative and Basis for Use

As an alternative to the ASME Code-required 5-year test interval per Appendix I, paragraph I-1320(a), Exelon proposes that the subject Class 1 pressure relief valves be tested at least once every three refueling cycles (approximately 6 years/72 months) with a minimum of 20 percent of the valves tested within any 24-month interval. This 20 percent would consist of valves that have not been tested during the current 72-month interval, if they exist. The test interval for any individual valve would not exceed 72 months, except that a 6-month grace period is allowed to coincide with refueling outages to accommodate extended shutdown periods and certification of the valve prior to installation.

The licensee provided the following basis for the relief request:

After as-found set-pressure testing, the valves shall be disassembled and inspected to verify that parts are free of defects resulting from time-related degradation or service induced wear. As-left set-pressure testing shall be performed following maintenance and prior to returning the valve to service. Each valve shall have been disassembled and inspected prior to the start of the 72-month interval. Disassembly and inspection performed prior to the implementation of this alternative based on Code Case OMN-17 may be used.

The relief valve testing and maintenance cycle at PBAPS consists of removal of the SRV/SV complement requiring testing and transportation to an off-site test facility. Upon receipt at the off-site facility, the valves are subject to an as-found inspection and set pressure testing. Prior to the return of the complement of SRVs/SVs for installation in the plant, the valves are disassembled and inspected to verify that internal surfaces and parts are free from defects or service-induced wear prior to the start of the next test interval. During this process, anomalies or damage are identified and dispositioned for resolution. Damaged or worn parts, springs, gaskets and seals are replaced as necessary. Following reassembly, the valve's set pressure is recertified. This existing process is in accordance with ASME OM Code Case OMN-17, paragraphs (d) and (e). PBAPS previously reviewed the as-found set point test results for all of the SRV/SVs tested since 2000 as detailed in Table 1 of the original alternative request associated with the PBAPS fourth IST interval dated July 29, 2013. The test results from the original request are summarized in the following paragraph.

Since 2000, the PBAPS, Units 2 and 3 SRVs/SVs have a history of 96 as-found lift tests. Of these 96 tests, 99% were found within a +/-3% tolerance. During the PBAPS Fall 2012 Unit 2 outage, one of the MSSVs (S/N 1095) as-found lift pressure was identified to be 3.4% above the setpoint. An expanded scope removal of the other SV was performed with a satisfactory lift (the S/N 1093 as-found test (November 2012) was exactly at set pressure). An investigation was performed regarding the one valve that lifted outside of a +/-3% tolerance. It was identified that the previous certification practices were not using the current best-known practices and procedure enhancements have been implemented to prevent recurrence. Additionally, PBAPS implemented enhanced subcomponent replacement and testing criteria to provide further assurance of repeatable as-found lift results.

Accordingly, the proposed alternative of increasing the test interval for the subject Class I pressure relief valves from 5 years to 3 fuel cycles (approximately 6 years/72 months) would continue to provide an acceptable level of quality and safety while restoring the operational and maintenance flexibility that was lost when the 24-month fuel cycle created the unintended consequences of more frequent testing. This proposed alternative will continue to provide assurance of the valves' operational readiness and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

Duration of Proposed Alternative

The proposed alternative would apply to the fifth 10-year IST interval at Peach Bottom, which is currently scheduled to begin on August 15, 2018, and end on August 14, 2028.

3.2 NRC Staff Evaluation

The ASME Code requires that the reactor pressure vessel be protected from overpressure during upset conditions by self-actuated SRVs and/or SVs. As part of the nuclear pressure relief system, the size and number of SRVs and SVs are selected such that peak pressure in the nuclear system will not exceed the ASME Code limits for the reactor coolant pressure boundary. At Peach Bottom, the SRVs are Target Rock three-stage pilot operated safety/relief valves (11 SRVs per unit). The SVs are Dresser spring-loaded SVs (3 SVs per unit). The SRVs and SVs are located on the main steam lines between the reactor vessel and the first isolation valve within the drywell. The SRVs can actuate by either of two modes: the safety mode or the depressurization mode. In the safety mode, the pilot disc opens when steam pressure at the valve inlet expands the bellows to the extent that the hydraulic seating force on the pilot disc is reduced to zero. Opening of the pilot stage allows a pressure differential to develop across the second stage disc, which opens the second stage disc, thus venting the chamber over the main valve piston. This causes a pressure differential across the main valve piston, which opens the main valve. The SVs are spring-loaded valves that actuate when steam pressure at the inlet overcomes the spring force holding the valve disc closed. This satisfies the ASME Code requirement. The proposed changes do not impact the depressurization mode function of the SRVs.

ASME OM Code, Mandatory Appendix I, requires that Class 1 pressure relief valves be tested at least once every 5 years. However, Mandatory Appendix I does not require that pressure relief valves be disassembled and inspected prior to the start of the 5-year test interval. In lieu of the 5-year test interval, the licensee proposed to implement ASME OM Code Case OMN-17, which allows a test interval of 6 years plus a 6-month grace period. The ASME Committee on Operation and Maintenance developed Code Case OMN-17 and published it in the 2009 Edition of the OM Code. ASME OM Code Case OMN-17 imposes a special maintenance requirement to disassemble and inspect each pressure relief/safety valve to verify that parts are free from defects resulting from time-related degradation or service-induced wear prior to the start of the extended test interval and at each required test during the interval. The purpose of this maintenance requirement is to reduce the potential for SRV/SV setpoint drift.

ASME OM Code Case OMN-17 is now in Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," and is incorporated by reference in 10 CFR 50.55a. However, its use in conjunction with the 2012 Edition of the ASME OM Code (Peach Bottom code of reference) is still precluded by the applicability language in the code case itself, which limits its use to OM Code editions prior to the 2006 Addenda. Nonetheless, the NRC has allowed licensees to use OMN-17 with later OM Code editions, provided all requirements in the code case are met. Consistent with the special maintenance requirement in ASME OM Code Case OMN-17, each SRV/SV at Peach Bottom is disassembled and inspected to verify that internal surfaces and parts are free from defects or service-induced wear prior to the start of the next test interval. During this process, anomalies or damage are identified for resolution. Damaged or worn parts, springs, gaskets, and seals are replaced as necessary. Following reassembly, the valve's set pressure is recertified. This existing process is in accordance with ASME OM Code Case OMN-17, paragraphs (d) and (e).

Furthermore, ASME OM Code Case OMN-17 is performance-based in that it requires that the SRVs/SVs be tested more frequently if test failures occur. For example, ASME OM Code Case OMN-17 requires that two additional valves be tested when a valve in the initial test group exceeds the set pressure acceptance criteria. All remaining valves in the group are required to be tested if one of the additional valves tested exceeds its set pressure acceptance criteria.

The licensee has provided a summary of test data since 2000 to show that the subject valves have historically exhibited very limited susceptibility to time-related degradation or setpoint drift. The licensee plans to implement a disassembly and inspection program in conjunction with the extended test interval, as required by ASME OM Code Case OMN-17.

Based on the historical performance of the setpoint testing of SRVs/SVs and the disassembly and inspection of the SVs/SRVs after as-found set-pressure testing and prior to use, the NRC staff finds that implementation of ASME OM Code Case OMN-17 for the testing of the designated SRVs/SVs, in lieu of the requirements of the 2012 Edition with no Addenda and the requirements of Mandatory Appendix I, Section 1320, of the ASME OM Code, provides an acceptable level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff has determined that the proposed alternative testing proposed by Relief Request 01A-VRR-3 provides an acceptable level of quality and safety for the Peach Bottom main steam safety relief valves/main steam SVs listed in Table 1 above. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, on the basis of the above

determinations, the NRC authorizes the licensee to use the alternative as proposed in Relief Request 01A-VRR-3 for the fifth 10-year IST interval at Peach Bottom, Units 2 and 3, which is currently scheduled to begin August 15, 2018, and end on August 14, 2028.

All other ASME OM Code requirements for which relief was not specifically requested and approved in Relief Request 01A-VRR-3 remain applicable.

Principal Contributor: J. Billerbeck

Date: February 7, 2018

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EVALUATION OF RELIEF REQUEST 01A-VRR-3 REGARDING THE FIFTH
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(EPID L-2017-LLR-0096) DATED FEBRUARY 7, 2018

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