

RS-17-125

10 CFR 50.55a(z)

September 25, 2017

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

Byron Station, Units 1 and 2  
Renewed Facility Operating License Nos. NPF-37 and NPF-66  
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Relief Request RV-2 Associated with the Fourth Inservice Testing Interval

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), Exelon Generation Company, LLC (EGC), is requesting NRC approval of the attached relief request associated with the Fourth Inservice Testing (IST) Interval for Byron Station, Units 1 and 2. The fourth interval of the Byron Station IST Program is in effect from July 1, 2016 through June 30, 2026. As required by 10 CFR 50.55a(f)(4)(ii), the Byron Station Fourth IST Interval is required to comply with the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code, 2004 Edition through the 2006 Addenda.

The attached relief request proposes an alternative to the requirements of ASME OM Code Mandatory Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants," paragraph I-1350, "Test Frequency, Classes 2 and 3 Pressure Relief Valves." Specifically, the relief request is proposing to extend the test frequency for a limited number of pressure relief valves (PRVs) (i.e., 10 PRVs) from 48 months to 54 months to allow implementation of a "divisional outage strategy" during refueling outages. The basis of this request is that the proposed alternative would provide an acceptable level of quality and safety while effectively monitoring the associated components for degradation.

EGC respectfully requests NRC approval of the proposed relief request within one year of submittal; i.e., by September 25, 2018.

There are no regulatory commitments contained within this letter.

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Should you have any questions concerning this letter, please contact Joseph A. Bauer at (630) 657-2804.

Respectfully,

A handwritten signature in black ink, appearing to read 'D. M. Gullott', followed by a long horizontal line extending to the right.

David M. Gullott  
Manager – Licensing  
Exelon Generation Company, LLC

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cc: NRC Regional Administrator – Region III  
NRC Senior Resident Inspector – Byron Station  
NRC Project Manager, NRR – Byron Station  
Illinois Emergency Management Agency – Division of Nuclear Safety

**ATTACHMENT 1**  
**10 CFR 50.55a Request Number RV-2**

Test Interval for Classes 2 and 3 Pressure Relief Valves per Mandatory Appendix I, I-1350  
Proposed Alternative Requested in Accordance with 10 CFR 50.55a(z)(1)  
– Alternative Provides Acceptable Level of Quality and Safety –

1. **ASME Code Component(s) Affected**

**TABLE 1**  
**Byron Station Pressure Relief Valves, Units 1 and 2**

Component	Description	Class	Category	Byron IST RV Group
1SI8851	U-1 SI PPS DSCH XTIE TO CL RLF VLV	2	C	1
1SI8853A	1A SI PP TO 1D LOOP HL RLF VLV	2	C	1
1SI8853B	1B SI PP TO 1B/1C LOOP HL RLF VLV	2	C	1
1SI8856A	1A RH HX TO 1A/1D LOOP CL RLF VLV	2	C	2
1SI8856B	1B RH HX TO 1B/1C LOOP CL RLF VLV	2	C	2
2SI8851	U-2 SI PPS DSCH XTIE TO CL RLF VLV	2	C	3
2SI8853A	2A SI PP TO 2D LOOP HL RLF VLV	2	C	3
2SI8853B	2B SI PP TO 2B/2C LOOP HL RLF VLV	2	C	3
2SI8856A	2A RH HX TO 2A/2D LOOP CL RLF VLV	2	C	4
2SI8856B	2B RH HX TO 2B/2C LOOP CL RLF VLV	2	C	4

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) 2004 Edition through the OM Code 2006 Addenda

3. **Applicable Code Requirement**

ISTA-3120, Inservice Test Interval, subparagraph (a) states, "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

Mandatory Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants," paragraph I-1350, "Test Frequency, Classes 2 and 3 Pressure Relief Valves," subparagraph (a) *10-year Test Interval*, states, in part, that "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested during any single plant operating cycle; however, a minimum of 20% of the valves from each valve group shall be tested within any 48-month interval. This 20% shall consist of valves that have not been tested during the current 10-year test interval, if they exist. ..."

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**4. Reason for Request**

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), an alternative is proposed to the Classes 2 and 3 pressure relief valve test frequency requirements of the ASME OM Code. The basis of this request is that the proposed alternative would provide an acceptable level of quality and safety while effectively monitoring the associated components for degradation. Specifically, this alternative is requested for the associated inservice testing requirements of the Inservice Test (IST) Program pressure relief valves (PRVs) identified in Table 1, "Byron Station Pressure Relief Valves, Units 1 and 2." Note that all the subject valves are Class 2 valves.

Byron Station conducts a refueling outage on each unit once every 18 months. Each unit at Byron Station consists of two redundant safeguard divisions (i.e., Division "A" and Division "B"). Byron Station has implemented a "divisional outage strategy" for equipment maintenance where only either the "A" or "B" division/train equipment/components are taken out-of-service during a given refueling outage. This divisional outage strategy is designed to maintain one division/train of equipment/components fully operational and protected while performing maintenance/testing on the opposite division/train. Based on the 18-month refueling outage frequency, equipment/components of each train will be tested every other outage; i.e., once every 36 months.

There is a total of 65 Class 2 and 3 pressure relief valves in the Byron Station IST program subject to the testing requirements of Mandatory Appendix I, paragraph I-1350 described above. These valves are divided into 33 different valve "groups" based on manufacturer, type, system application and service media in accordance with the OM Code. The 10 PRVs identified in Table 1 are the valves that comprise valve groups 1 through 4. Group 1 and Group 3 each consist of three valves (i.e., one "A" division valve, one "B" division valve, and a common division valve (i.e., a pump discharge cross-tie valve that is not designated as division specific)). Group 2 and Group 4 each consist of two valves (i.e., one "A" division valve and one "B" division valve). Due to the small number of valves in each valve group, some valves in each group must be tested more than once during a 10-year test interval to satisfy the Appendix I, paragraph I-1350 criteria of testing a minimum of 20% of the valves from each valve group within any 48-month interval.

Due to system availability considerations, valve removal and testing must be performed when the valve's associated unit is in a shutdown mode of operation; therefore, all subject valves are tested during a scheduled refueling outage.

**Current PRV Testing Schedule**

The current Byron Station pressure relief valve testing schedule for the valves listed in Table 1 is presented in Table 3a, "IST Valve Groups 1-4, Current Pressure Relief Valve Test Schedule." As can be seen, it is not possible to align the scheduled PRV testing using the divisional outage strategy and still meet the current Mandatory Appendix I, paragraph I-1350 requirement of testing 20% of the valves in each group every 48 months without performing a valve test every other outage; i.e., every 36 months. This necessitates performing a test on a "B" division valve during an "A" division outage, or vice versa, contrary to the divisional outage strategy. For example, refer to Table 3a, Group 2 valves (i.e., 2 valves which are both Unit 1 valves). When maintaining a consistent test frequency for each valve in the group, the "B" train valve must be tested during the Unit 1 "A" train outage in Spring 2020; and again, the "B" train valve must be tested during the Unit 1 "A" train outage in

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Spring 2026. The "cross-division" testing problem could be solved by performing an associated division valve test each refueling outage; however, this approach would result in three additional unnecessary tests for the Group 2 valves. A similar number of additional unnecessary tests would also result for Groups 1, 3 and 4.

**5. Proposed Alternative and Basis for Use**

As an alternative to the ASME OM Code Mandatory Appendix I, I-1350(a), Byron Station proposes that the Table 1 Class 2 PRVs shall be tested every 10 years; and a minimum of 20% of the valves from each valve group shall be tested within any 54-month interval (where 20% shall consist of valves that have not been tested during the current 10-year test interval, if they exist).

The proposed change from "20% of relief valves tested within any 48-month interval" to "20% of relief valves tested within any 54-month interval," while maintaining the requirement that every relief valve in each group be tested within a 10-year interval, will allow Byron Station to perform PRV testing on division components during the associated division refueling outage. Specifically, this revised testing frequency (i.e., within any 54-month interval) allows deferring testing of a subject valve group by one outage (i.e., rather than testing a valve every other outage (36 months) to meet the "48-month" testing criteria; the valve may now be tested the following outage (at 54 months). The 54-month test frequency allows aligning a division valve test with its associated divisional outage consistent with the divisional refueling outage scheduling strategies, with the added benefit of reducing costs and maintaining radiation dose "As Low as Reasonably Achievable." Table 3b, "IST Valve Groups 1-4, Proposed Pressure Relief Valve Test Schedule," shows the details of the proposed alternative. As can be seen, in this hypothetical 10-year test interval, all Group 1 through 4 valves are tested during their associated divisional refueling outage; and each valve is tested effectively the same number of times as in the current schedule (i.e., a total net reduction of only one valve test over the 10-year interval), providing a similar level of quality and safety. Note that no change in test frequency is being proposed for Valve Groups 5 through 33 as these valves are not train-specific.

The small change in service time between tests does not represent a condition adverse to quality nor limit the effective monitoring of the subject valves for evidence of degradation. For each PRV identified in Table 1, for the purpose of determining the need to test additional valves, the as-found set-pressure acceptance criteria is  $\pm 3\%$  of valve nameplate set pressure in accordance with Mandatory Appendix I, subparagraph I-1350(c), *Requirements for Testing Additional Valves*, Item (1). Since 1999, 26 as-found set pressure tests have been performed for eight Crosby Model/Part JRAK-BS DS-C-56886 valves installed in six locations (IST RV Groups 1 and 3 from Table 1) and eight Crosby Model/Part JB-35-TD-WR DS-C-56902 valves installed in four locations (IST RV Groups 2 and 4 from Table 1). The tests were performed after the valves were installed for a minimum of two to a maximum of eight operating cycles.

As documented in the Byron Station Corrective Action Program Issue Report 04009661, one PRV in IST RV Group 2 and one in IST RV Group 4 were installed for approximately 12 years (i.e., 8 operating cycles), exceeded the maximum ASME allowable frequency requirement. As-found test results, as shown in Table 2, "Pressure Relief Valve History," were within  $\pm 3\%$  of the valve set pressure, with the exception of valve 2SI8853B, which lifted low (-8.0%) in 2013. This valve was found with rust in the internals, and the disc insert, nozzle, spindle, guide ring, and disc pin were replaced. The scope was expanded and 2SI8853A and 2SI8851 tested satisfactorily the next

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outage. The as-found seat leakage test results were within the Byron Station established seat leakage criteria with the exception of valve 1SI8856A, which exhibited a continuous drip in 2005. This valve was disassembled, cleaned, lapped, reassembled; and subsequently met the test acceptance criteria. There have been no other occurrences of seat leakage.

These test results show limited time-related degradation or setpoint drift and provide evidence of acceptable previous component performance. This data supports the acceptability of the requested test interval extension from the current 48 months to 54 months (i.e., three fuel cycles). As noted, the small change in service time between tests does not represent a condition adverse to quality nor limit the effective monitoring of the subject valves for evidence of degradation.

The Emergency Core Cooling System (ECCS) PRVs listed in Table 1 are located in water-filled piping outside the Primary Containment Building. The valves are installed downstream of their respective Safety Injection (SI) or Residual Heat Removal (RHR) pumps, which take a suction from the Refueling Water Storage Tank (RWST). The RWST fluid media is purified boric acid water. The subject valves have been operated in a controlled, mild environment with small swings in temperature and humidity. Test history has shown that the fluid media and environment have not accelerated degradation of the PRVs. Therefore, future accelerated degradation is not expected.

The ability to detect degradation and ensure the operational readiness of the Class 2, SI system PRVs to perform their intended function is assured based on the relief valve test history and by performing the required inspection and testing at the proposed alternative frequency.

Accordingly, the proposed alternative of increasing the interval from 48 months to 54 months (i.e., three fuel cycles) for testing 20% of PRVs in a group will continue to provide assurance of the pressure relief valves' operational readiness and provides an acceptable level of quality and safety in accordance with 10 CFR 50.55a(z)(1).

**6. Duration of Proposed Alternative**

This request, upon approval, will be applied to the Byron Station Fourth 10-Year IST Interval, which started on July 1, 2016, and ends June 30, 2026.

**7. Precedence**

None

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**TABLE 2**  
**Pressure Relief Valve History**

Valve Number	Unit / Division	As-Found Removal Test Date	Set Pressure	As-Found Set Pressure	As-Found Requirement	Deviation	Leakage
2SI8853A	2 / A	9/22/2002	1750	1770	1697-1803	1.1%	0
		5/1/2010	1750	1750	1697-1803	0.0%	0
		10/10/2014	1750	1720	1697-1803	-1.7%	0
2SI8853B	2 / B	9/29/2005	1750	1775	1697-1803	1.4%	0
		4/23/2013	1750	1610	1697-1803	-8.0%	0
2SI8851	2 / Common	11/3/1999	1750	1765	1697-1803	0.9%	0
		4/22/2007	1750	1755	1697-1803	0.3%	0
		10/7/2014	1750	1725	1697-1803	-1.6%	0
1SI8853A	1 / A	10/2/2000	1750	1750	1697-1803	0.0%	0
		9/29/2009	1750	1800	1697-1803	2.9%	0
1SI8853B	1 / B	9/28/2003	1750	1755	1697-1803	0.3%	0
		9/20/2012	1750	1760	1697-1803	0.6%	0
1SI8851	1 / Common	9/22/2006	1750	1705	1697-1803	-2.6%	0
		9/28/2015	1750	1770	1697-1803	1.1%	0
1SI8856A	1 / A	3/11/2005	600	612	582-618	2.0%	cont. drip
		3/29/2011	600	595	582-618	-0.8%	0
		3/11/2017	600	608	582-618	1.3%	0
1SI8856B	1 / B	3/19/2002	600	610	582-618	1.7%	0
		4/6/2008	600	612	582-618	2.0%	0
		3/19/2014	600	600	582-618	0.0%	0
2SI8856A	2 / A	3/31/2004	600	610	582-618	1.7%	0
		5/1/2010	600	610	582-618	1.7%	0
		4/26/2016	600	592	582-618	-1.3%	0
2SI8856B	2 / B	4/15/2001	600	594	582-618	-1.0%	0
		4/17/2007	600	600	582-618	0.0%	0
		4/18/2013	600	610	582-618	1.7%	0

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**TABLE 3a**  
**IST Valve Groups 1 – 4**  
**Current Pressure Relief Valve Test Schedule**

IST RV Group	2017		2018		2019		2020		2021		2022		2023		2024		2025		2026	
	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall
	Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage
1				A valve *						B valve						com valve				
2	A valve							B valve *					A valve						B valve *	
3		B valve								com valve				A valve *						B valve
4					B valve *						A valve						B valve *			

Note: (\*) indicates incorrect divisional outage alignment

**TABLE 3b**  
**IST Valve Groups 1 – 4**  
**Proposed Pressure Relief Valve Test Schedule**

IST RV Group	2017		2018		2019		2020		2021		2022		2023		2024		2025		2026	
	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall	spring	fall
	Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage		Unit 1 B-train outage	Unit 2 A-train outage		Unit 1 A-train outage	Unit 2 B-train outage
1	A valve									B valve						com valve			A valve	
2	A valve									B valve									A valve	
3		B valve								com valve			A valve							B valve
4										B valve							A valve			

Note: Correct train alignment is achieved using proposed 54-month interval