



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

June 21, 2019

LICENSEE: EXELON GENERATION COMPANY, LLC

FACILITIES: CLINTON POWER STATION, UNIT NO. 1; DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3; LIMERICK GENERATING STATION, UNITS 1 AND 2; NINE MILE POINT NUCLEAR STATION, UNIT 2; PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3; AND QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

SUBJECT: SUMMARY OF JUNE 4, 2019, MEETING WITH EXELON GENERATION COMPANY, LLC REGARDING A PLANNED REQUEST TO EXTEND THE TEST INTERVAL FOR SAFETY RELIEF VALVES (EPID L-2019-LRM-0024)

On June 4, 2019, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives of Exelon Generation Company, LLC (Exelon, the licensee). The purpose of the meeting was to discuss Exelon's planned submittal of a request to extend the test interval for safety relief valves (SRVs), also referred to as main steam safety valves in Exelon's presentation. The meeting notice and agenda are available in Agencywide Documents Access and Management System (ADAMS) at Accession No. ML19129A242. A copy of Exelon's presentation¹ and a list of attendees is enclosed.

Exelon plans to submit its proposed request in July 2019 for Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3 (Dresden); Limerick Generating Station, Units 1 and 2 (Limerick); Nine Mile Point Nuclear Station, Unit 2; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities) (the facilities). Exelon stated that it may submit similar requests for its other boiling-water reactors (BWRs), but it is still collecting data for these sites.

The American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code) requires Class 1 SRVs to be tested every 5 years with at least 20 percent of the valves in each group tested every 24 months. ASME Code Case OMN-17 allows licensees to extend this test interval to 6 years provided additional conditions are met. Except for Limerick, each facility listed above is currently authorized to use Code Case OMN-17. Exelon stated that it is also considering submitting a request to use Code Case OMN-17 at Limerick.

Exelon is proposing an alternative to these requirements which would allow it to extend the SRV test interval at the facilities to 8 years. In addition, Exelon is proposing to extend the test interval for "groups" with only one valve at Dresden and Quad Cities to 4 years. The proposed alternative would be based on improved performance as a result of Exelon SRV best practices which have reduced SRV setpoint drift and variation at its facilities. The license uses SRV data

¹ An earlier version of this presentation was made public prior to the meeting. The enclosed copy was used by Exelon at the public meeting.

from at least five cycles to project when each valve could fall outside of the setpoint tolerance. The presentation provided an example of one such calculation.

The licensee noted that the proposed alternative does not include any two-stage Target Rock valves, but it will include some three-stage Target Rock valves. The NRC staff suggested that the licensee review NRC Information Notice 2018-02, "Testing and Operations-Induced Degradation of 3-Stage Target Rock Safety Relief Valves" (ADAMS Accession No. ML18029A741).

The licensee stated that it planned to request approval of the proposed alternative for the remaining life of each facility. However, the NRC staff stated that the regulations do not permit the approval of alternatives to ASME OM Code editions not currently in the regulations. Therefore, the staff stated that the request should be limited to the current 10-year inservice test interval, unless it is near the end of the interval. The NRC staff can approve an alternative for the next 10-year inservice test interval when it is known what edition of the ASME OM Code will be required. This is typically known 1 year in advance of the next interval starting.

For Limerick, the licensee stated that it will also need to amend its technical specifications to permit it to use the proposed alternative. The licensee stated that it has not determined if it is necessary for it to adopt Code Case OMN-17 to use its proposed alternative. The NRC staff stated that if the request for Limerick will rely on Code Case OMN-17, then it should be submitted separately from the other facilities.

Since the phone was not working during the meeting, a member of the public submitted questions and comments via email. Questions not addressed above are discussed below.

1. How is the issue of aging factored into the BWR fleet SRV analyses?

SRVs are active components so there is no explicit treatment of aging. Per the ASME OM Code, surveillance intervals are based on component performance. If aging were to cause degraded performance, then corrective action would be taken and surveillance intervals adjusted accordingly.

2. For the single-valve groups, when would pressure tolerances be compromised?

This information was not provided during the meeting. Exelon provided a single example of a calculation for setpoint drift projections in its presentation.

3. How are these relief requests measured against defense in depth criteria?

Exelon indicated that it planned to submit an alternative to the ASME OM Code requirements in accordance with paragraph 10 CFR 50.55a(z)(1). Under this rule, the licensee must demonstrate that the alternative provides an acceptable level of quality and safety. Thus, the NRC staff can consider defense in depth during its review of the application. The Exelon presentation did not include a discussion of any changes that would impact defense in depth.

Please direct any inquiries to me at 301-415-1380, or Blake.Purnell@nrc.gov.

A handwritten signature in black ink, appearing to read 'BP Purnell', is positioned above the typed name.

Blake Purnell, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-461, 50-237, 50-249, 50-352,
50-353, 50-410, 50-277, 50-278,
50-254, and 50-265

Enclosure:

1. List of Attendees
2. Exelon presentation

cc: Listserv

LIST OF ATTENDEES

JUNE 4, 2019, MEETING WITH EXELON GENERATION COMPANY, LLC

Name	Affiliation
Blake Purnell	NRC
Stewart Bailey	NRC
Michael Farnan	NRC
Craig Shinafelt	Exelon
Phillip Twaddle	Exelon
David Neff	Exelon
William Reynolds	Exelon
Mark DiRado	Exelon
Thomas Basso	Exelon
Bret Collier	Exelon

ENCLOSURE 2

EXELON PRESENTATION

Exelon BWR Fleet MSSV/SRV

Testing Frequency Relief Request

NRC Pre-Application Meeting
June 4, 2019



Exelon Generation®

Introductions Purpose and Agenda

David Neff



Exelon Generation[®]

Attendees

Craig Shinafelt – Fleet Program Engineer	Exelon
Phillip Twaddle – SRV Subject Matter Expert	Exelon
David Neff – Principal Regulatory Engineer	Exelon
William Reynolds – Engineering Manager	Exelon
Mark DiRado – Senior Engineering Manager	Exelon
Thomas Basso - Director Engineering	Exelon
Bret Collier – Engineering Consultant	RC Engineering

Purpose

Brief the NRC on proposed Inservice Testing Relief Requests by covering the following:

- **Extension of test intervals for certain population of OMN-17 SRV/MSSVs to 8 years, based upon past performance.**
- **Extension of test intervals for Group-of-One SRVs from 24 months to 48 months, based upon past performance.**
- **Exelon's Best Practices for SRV/MSSVs Maintenance and Inspections, Testing, and Trending**
- **The Process used to forecast SRV/MSSV setpoint drift, based upon past performance.**
- **Benefits to minimizing dose exposure and maximizing system integrity.**

Agenda

- **Current Class 1 Relief Valve Frequency Requirements - Craig Shinafelt**
- **Current Exelon BWR SRV/MSSV Testing Frequency Requirements - Craig Shinafelt**
- **Best Practices - Phillip Twaddle**
- **The Process - Craig Shinafelt**
- **Relief Request Impacts - Craig Shinafelt**
- **Relief Request Duration - Craig Shinafelt**
- **Relief Request Submittal – David Neff**

Current Class 1 Relief Valve Frequency Requirements

The testing frequencies for ASME Class 1 Main Steam Safety Valves (MSSV) and Class 1 Safety Relief Valves (SRV) are established in section I-1320 of Appendix I, of the ASME OM Code, which is incorporated by reference in 10CFR50.55a.

The ASME OM Code requires every Class 1 SRVs to be tested every 5 years with at least 20% of the valves in each “group” (preferably untested within the previously 5 years), tested every 24 months.

Current Class 1 Relief Valve Frequency Requirements

As an alternative to the ASME OM Code, Mandatory Appendix I requirements, ASME Code Case OMN-17 was developed which allows utilities to extend the Code required 5 year test interval to 6 years, provided the Owner Disassembles and Inspects (D&I) each valve following As-Found testing to verify that parts are free from defects resulting from time-related degradation or service-induced wear.

Current Exelon SRV/MSSV Testing Frequency Reqmts

This presentation discusses the testing requirements of the over-pressurization protection devices used at 6 of Exelon's BWR sites. At these 6 BWR sites, which contain 10 individual units, a variety of ASME Class 1 Pressure Relief Devices are utilized to provide over-pressure protection of their Main Steam Piping. The number of Pressure Relief Devices per unit vary as does the manufacture/style of each Pressure Relief Device.

All sites requesting relief, except one, utilize Code Case OMN-17 for their current IST 10-year intervals.

Best Practices

Four Pillars of Exelon SRV/MSSVs Best Practices

- 1) Spring Testing – includes physical dimension measurements and compression rate evaluation.**
- 2) SRV/MSSVs Lapping Techniques and Tools.**
- 3) SRV/MSSVs Set Pressure Adjustment Methodology Precision.**
- 4) Target Rock SRV/MSSVs Average Delay Time Trending Performance Improvement.**

Best Practices

As-Found Variation Reduced 34%

Exelon SRV Best Practices have reduced as-found set point drift and set point variation by 34% over the past 10 years when compared to the 8-year pre-Best Practices period of historical performance at one of our sites.

- Lapping improvements reduced variation 7%.
- Springs and set pressure methodology improvements reduced variation by 27%.

The Process

Having seen an increase in the reliability of our valves over the years as a result of Exelon's applied Best Practices, an independent analysis was performed to determine whether valve performance improved to a level that would support an increased test interval.

Keeping in mind that, typically, when utilities request the use of OMN-17, they simply include a statement in their Relief Request attesting to how, over the past few refueling outages, few if any SRV have failed to maintain their set pressure within their required tolerances.

In this case, Exelon has taken it a step further. . . .

The Process

Exelon has gone back 5 or more cycles, identified the actual As-Left set pressure as well as the As-Found set pressure, incorporated these values and dates into spreadsheets which not only calculates the valves “drift” but projects, through a simple linear extrapolation, when that valve could fall outside of its set pressure tolerance.

The next slide provides one example of a spreadsheet calculation.

The Process

Below is an example of one such calculation for set point drift projections, which shows the drift at -1.0, -5.5 and -8.8 psig for years 1, 5 and 8 respectively based on the measured As-Left, As-Found measured set pressures and time between test.

B	C	D	E	F	G	H	I	J	K	L	M	N
Dikkers Model G-471												
Serial #												
				As Left		As Found		Time Between Test				
160535		As Left/Found Date		7/18/2001		7/7/2006		1665 days			-5	psig per cycle
		As Left/Found Pressure		1164		1159		4.56 years			-0.003003	psig per day
		Comp ID									-1.096096	psig per year
		Name Plate Pressure		1165		1165					-5.48048	psig over 5 yr
											-6.576577	psig over 6 yr
						3% of set pressure=		34.95 psig			-8.768769	psig over 8 yr
				This valve would have failed after					years		C1R10	

Based upon a +/- 3.0% set point tolerance, this valve is not expected to fall outside of tolerance until after 30.9 years.

The Process

This same process was also utilized when considering the proposed Relief Request dealing with valves in a “Group-of-One”, specifically those sole Target Rock 3-Stage Safety Relief Valves utilized in two of Exelon’s BWR sites.

- At the first site, calculations have identified that every valve installed since 2012, would have been able to maintain its set pressure tolerance for greater than (4) years.
- At the second site, calculations have identified that every valve installed since 2011, would have been able to maintain its set pressure tolerance for greater than (4) years.

Relief Request Impacts

Potential dose savings are calculated based upon individual station historical dose calculations. Saving at a station range from 1.31 rem to 6.5 rem over a 10-year period.

In addition to the dose savings, a reduction in the number of valves that are required to be tested during each outage will:

- Reduce Industrial Safety Concerns (Fewer heavy lifts)
- Reduced System Breaches (Fewer FME zones)
- Reduced number of activities with potential for spreading radioactive contamination
- No impact to PRA risk as a result of increased service time

Relief Request Duration

Exelon plans to request that these Relief Request be approved for the remaining licensed life of the plant.

Saves both time and effort for the Utility and Regulator by removing redundant future reviews and approvals.

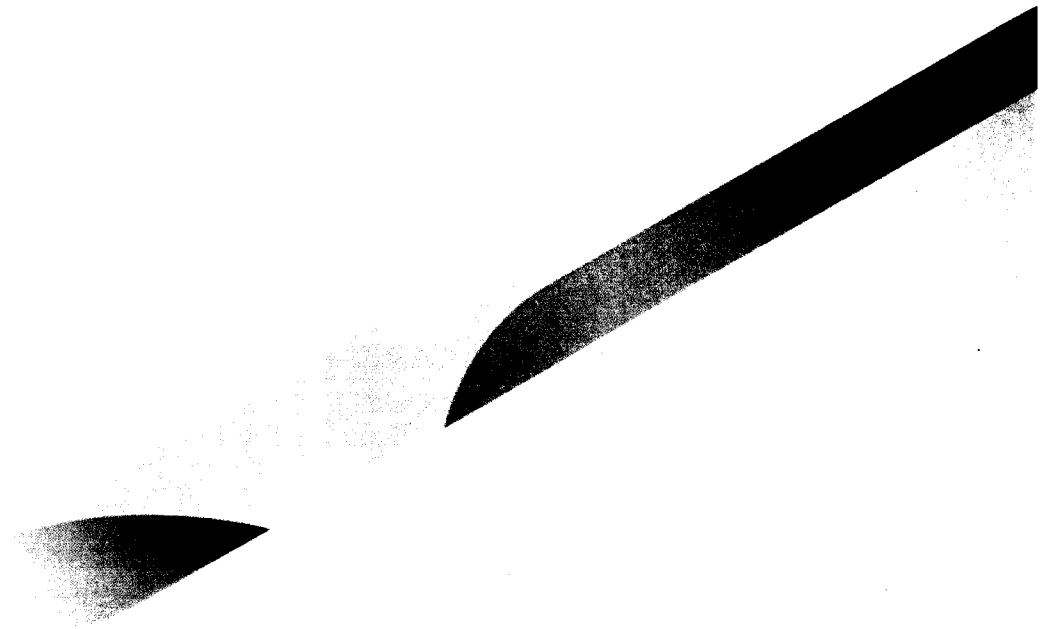
Relief Request Submittal

Submittal to include 5 site specific Relief Requests to extend the testing interval from its current 5/6 year frequency to 8 years.

Submittal to include a combined, multi-unit, Relief Request to extend testing interval for Class 1 SRVs in a Group-of-One from the current ASME OM Mandatory Appendix I, 24 month frequency to a 48 month frequency.

Submittal are planned for early July 2019.

Questions?



Exelon Generation[®]

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LBurkhart, EDO
MFarnan, NRR

ADAMS Accession No. Meeting Notice ML19161A257 Meeting Summary ML19162A027 PKG ML19162A113

OFFICE	NRR/DORL/LPL3/PM	NRR/DORL/LPL3/LA	NRR/DORL/LPL3/BC(A)	NRR/DORL/LPL3/PM
NAME	BPurnell	SRohrer	LRegner	BPurnell
DATE	6/19/19	6/11/19	6/20/19	6/21/19

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