



RS-17-098

10 CFR 50.90

July 17, 2017

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

LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: Response to Request for Additional Information Regarding LaSalle County Station License Amendment Request for Extension of Type A and Type C Containment Leak Rate Test Intervals (SBPB Branch)

- References:
- 1) Letter from D. M. Gullott (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request to Revise Technical Specifications 5.5.13, 'Primary Containment Leakage Rate Testing Program,' for Permanent Extension of Type A and Type C Leak Rate Test Frequencies," dated October 26, 2016 (ADAMS Accession No. ML16300A200)
 - 2) Letter from B. Vaidya (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation Company, LLC), "LaSalle County Station, Units 1 and 2, Request for Additional Information Regarding License Amendment Request for Extension of Type A and Type C Leak Rate Test Frequencies (CAC Nos. MF8700 and MF8701)," dated June 15, 2017 (ADAMS Accession No. ML17164A115)

In Reference 1, Exelon Generation Company, LLC (EGC) submitted an amendment request for LaSalle County Station (LSCS), Units 1 and 2. The proposed amendment would revise Technical Specifications (TS) 5.5.13, "Primary Containment Leakage Rate Testing Program," to allow for the permanent extension of the Type A integrated leak rate testing (ILRT) and Type C leak rate testing frequencies.

In Reference 2, the U.S. Nuclear Regulatory Commission (NRC) requested additional information related to its review of Reference 1. The requested information is provided in Attachment 1 of this letter.

There are no regulatory commitments contained within this letter.

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Should you have any questions concerning this letter, please contact Ms. Lisa A. Simpson at (630) 657-2815.

Respectfully,

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

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

Attachment: Response to Request for Additional Information

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector, LaSalle County Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
Response to Request for Additional Information

By letter to the Nuclear Regulatory Commission (NRC) dated October 26, 2016 (Reference 1), Exelon Generation Company, LLC (EGC) requested a license amendment to revise the Technical Specifications 5.5.13, "Primary Containment Leakage Rate Testing Program," for LaSalle County Station, Units 1 and 2, to allow for the permanent extension of the Type A integrated leak rate testing and Type C leak rate testing frequencies.

In a letter dated June 15, 2017, the NRC requested additional information to complete its review of the proposed LAR.

SBPB RAI-1

Referring to Table 3.2.5-1 "LSCS Unit 1 Type A Test History" and Table 3.2.5-2 "LSCS Unit 2 Type A Test History" of Attachment 1 to the submittal, please provide past Type A integrated leak rate testing (ILRT) results.

- a. Provide a breakdown of the results into "As-found minimum leakage rate" and "As-left maximum leakage rate," to enable the NRC staff evaluation of the results against performance criteria and restart acceptance criteria.

As discussed during a clarification call between the NRC and Exelon Generation Company, LLC (EGC) on June 14, 2017, the response to SBPB RAI-1 will include the results from the past two Type A ILRTs for LSCS Unit 1 and Unit 2.

EGC Response

1994 LSCS Unit 1 ILRT

As-Found:

The as-found leakage rate at the 95% upper confidence limit (UCL) was 0.266 wt.%/day. The as-found leakage rate is the sum of the 95% UCL (0.1685 wt.%/day) plus the non-vented pathways (0.0335 wt.%/day) plus the as-found adjustment (0.064 wt.%/day), which takes into account the improvements made to Type B and C pathways during the Type A outage in advance of the conduct of the ILRT. The as-found leakage rate was less than the acceptance criteria of 1.0 L_a (0.635 wt.%/day).

As-Left:

The as-left leakage rate at the 95% UCL was 0.202 wt.%/day. The as-left leakage rate is the sum of the 95% UCL (0.1685 wt.%/day) plus the non-vented pathways (0.0335 wt.%/day). There were no significant leaks requiring pathways to be isolated during the performance of the ILRT. The as-left leakage rate was less than the acceptance criteria of 0.75 L_a (0.47625 wt.%/day).

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2008 LSCS Unit 1 ILRT

As-Found:

The as-found leakage rate at the 95% UCL is 0.47044 wt.%/day. The as-found leakage rate is the sum of the 95% UCL (0.4213 wt.%/day) plus the non-vented pathways (0.04914 wt.%/day). The as-found leakage rate was less than the acceptance criteria of 1.0 L_a (0.635 wt.%/day).

As-Left:

The as-left leakage rate at the 95% UCL is 0.47044 wt.%/day. The as-left leakage rate is the sum of the 95% UCL (0.4213 wt.%/day) plus the non-vented pathways (0.04914 wt.%/day). There were no significant leaks requiring pathways to be isolated during the performance of the ILRT. The as-left leakage rate was less than the acceptance criteria of 0.75 L_a (0.47625 wt.%/day).

1993 LSCS Unit 2 ILRT

As-Found:

The as-found leakage rate at the 95% UCL was 0.4273 wt.%/day. The as-found leakage rate is the sum of the as-left leak rate (0.3164 wt.%/day), plus the non-vented pathways (0.0315 wt.%/day), and the back-correction leak rate (0.0794 wt.%/day) which takes into account the improvements made to Type B and C pathways during the Type A outage in advance of the conduct of the ILRT. The as-found leakage rate was less than the acceptance criteria of 1.0 L_a (0.635 wt.%/day).

As-Left:

The as-left leakage rate at the 95% UCL was 0.3164 wt.%/day. The as-left leakage rate is the sum of the calculated leakage rate of 0.28486 wt.%/day plus the leakage rate of all non-vented penetrations which is 0.0315 wt.%/day. There were no significant leaks requiring pathways to be isolated during the performance of the ILRT. The as-left leakage rate was less than the acceptance criteria of 0.75 L_a (0.47625 wt.%/day).

2009 LSCS Unit 2 ILRT

As-Found:

The as-found leakage rate at the 95% UCL is 0.3863 wt.%/day. The as-found leakage rate is the sum of the 95% UCL (0.3547 wt.%/day) plus the non-vented pathways (0.03158 wt.%/day). The as-found leakage rate was less than the acceptance criteria of 1.0 L_a (0.635 wt.%/day).

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As-Left:

The as-left leakage rate at the 95% UCL is 0.3863 wt.%/day. The as-left leakage rate is the sum of the 95% UCL (0.3547 wt.%/day) plus the non-vented pathways (0.03158 wt.%/day). There were no significant leaks requiring pathways to be isolated during the performance of the ILRT. The as-left leakage rate was less than the acceptance criteria of 0.75 L_a (0.47625 wt.%/day).

- b. Technical Specification (TS) 5.5.13 states that the peak calculated primary containment pressure for the design basis loss of cooling accident of P_a (pressure absolute), at 42.6 pounds per square inch gauge (psig). Section 9.2.3 "Extended Test Intervals" of Nuclear Energy Institute (NEI) 94-01, Revision 2-A, states that "in the event where previous Type A tests were performed at reduced pressure (as described in 10 CFR 50, Appendix J, Option B), at least one of the two consecutive periodic Type A tests shall be performed at peak accident pressure (P_a)." Provide the actual ILRT pressures employed during the last recent Type A tests for both LSCS units.

EGC Response

Note that Part B of SBPB - RAI -1 equates P_a to both "pressure absolute" and to "peak accident pressure." EGC's response is aligned with the TS 5.5.13 definition for P_a as the peak calculated primary containment pressure.

The pressures employed during the last recent Type A tests for both LSCS Units 1 and 2 are as follows:

- Final containment pressure during the LSCS Unit 1 2008 ILRT was 42.48 psig, which was greater than the minimum required pressure of 39.9 psig
- Final containment pressure during the LSCS Unit 2 2009 ILRT was 41.26 psig, which was greater than the minimum required pressure of 39.9 psig.

Both the Unit 1 2008 ILRT and the Unit 2 2009 ILRT were performed in accordance with ANSI/ANS 56.8-1994. The standard requires the Type A test pressure not be less than 0.96 P_{ac} (accident pressure) nor exceed P_d (design pressure). Calculated peak containment accident pressure at the time of the tests was 39.9 psig. The LSCS drywell design pressure is 45 psig. Therefore, the tests met the test pressure criteria specified in ANSI/ANS 56.8-1994.

Note: LSCS TS 5.5.13 states the peak calculated primary containment pressure for the design basis loss of cooling accident, P_a , is 42.6 pounds per square inch gauge (psig). This pressure is higher than the P_a used during the 2008 LSCS Unit 1 and 2009 LSCS Unit 2 ILRTs as a result of a TS change in January 2015 to resolve a non-conservative TS. Amendment Nos. 212 (LSCS Unit 1) and 198 (LSCS Unit 2) changed the peak calculated primary containment internal pressure value from 39.9 psig to 42.6 psig.

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SBPB RAI-2

In Table 3.7.1-1 "NEI 94-01 Revision 2-A Limitations and Conditions" of Attachment 1 to the submittal, it states that:

LSCS will utilize the definition in NEI 94-01 Revision 3-A, Section 5.0. This definition has remained unchanged from Revision 2-A to Revision 3-A of NEI 94-01.

Tables 3.2.5-1 and 3.2.5-2 provided the historical ILRT results for Units 1 and 2.

Provide the definition of "performance leakage rate" used in Tables 3.2.5-1 and 3.2.5-2 during historical ILRT results for LSCS Units 1 and 2, with a comparison and/or a conclusion that it is consistent with the definition in NEI 94-01, Revisions 2-A and 3-A, which includes the clarification provided in the NRC's safety evaluation (SE).

EGC Response

The definition of "performance leakage rate" was first introduced in NEI 94-01, Revision 0 following the addition of Option B to 10 CFR 50 Appendix J. On March 11, 1996, the NRC issued Amendment Nos 110 (LSCS Unit 1) and 95 (LSCS Unit 2) which revised TS 5.5.13 to incorporate 10 CFR Part 50, Appendix J, Option B at LSCS. Therefore, 1982, 1986, 1989, 1993 and 1994 Unit 1 ILRTs along with the 1983, 1987, 1990, 1992, and 1993 Unit 2 ILRTs were not performed under the performance-based standard as they were performed prior to the adoption of Appendix J, Option B.

The definition of performance leakage rate has remained unchanged from NEI 94-01, Revisions 0, 2-A, and 3-A. As noted in Section 3.1.1.1 of the NRC Safety Evaluation for NEI 94-01 Revision 2-A dated June 25, 2008, the "performance leakage rate" definition is different from that of ANSI/ANS 56.8-2002. The definition contained in NEI 94-01 Revisions 0, 2-A and 3-A is more inclusive as it considers excessive leakage in the performance determination. The following definition was used to calculate the 2008 Unit 1 ILRT and 2009 Unit 2 ILRT performance leakage rate:

The performance criteria for Type A test allowable leakage is less than 1.0 L_a . This allowable leakage rate is calculated as the sum of the Type A UCL and As-Left MNPLR leakage rate for all Type B and Type C pathways that were in service, isolated or not lined up in their test position (i.e., drained and vented to containment atmosphere) prior to performing the Type A test. In addition, leakage pathways that were isolated during performance of the test because of excessive leakage must be factored into the performance determination. If the leakage can be determined by a local leakage rate test, the As-Found MNPLR for that leakage path must also be added to the Type A UCL. If the leakage cannot be determined by local leakage rate testing, the performance criteria are not met.

The 2008 Unit 1 ILRT performance leakage rate was 0.470 wt.%/day, well below the 1.0 L_a limit of 0.635 wt.%/day. The included penalty for isolated pathways during the Unit 1 2008 ILRT performance was 0.049 wt.%/day. The 2009 Unit 2 ILRT performance leakage rate was 0.386 wt.%/day, which was below the 1.0 L_a limit of 0.635 wt.%/day. The included penalty for isolated pathways during the Unit 2 2009 ILRT performance was 0.032 wt.%/day.

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SBPB RAI-3

In Table 3.7.1.1 of Attachment 1 to the submittal, the licensee indicates that "...there are no major modifications planned." Section 9.2.4 of NEI Topical Report 94-01, Revision 2, indicates that Type A testing is required after major modifications to the containment, or upon approval by the NRC, the licensee may perform a short duration structural test of the containment. For minor modifications or modifications to the pressure boundary, a local leak rate test (LLRT) was indicated.

As the LSCS, Unit 1 and 2, containments have been in service for more than 40 years, provide a summary of all significant modifications to the Units 1 and 2 containments since the last ILRTs and the subsequent post-modification testing. The summary should discuss the extent to which actions were completed consistent with the NRC staff limitations and conditions in the staff SE dated June 25, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081140105), which endorsed NEI 94-01, Revision 2.

EGC Response:

No significant modifications requiring post-modification testing have been performed on the primary containments at LSCS Unit 1 or Unit 2 since the 2008 Unit 1 and 2009 Unit 2 ILRTs.

SBPB RAI-4

Table 3.4.5-3 "LSCS Unit 1 Type B and Type C LLRT Program Implementation Review" and Table 3.4.5-4 "LSCS Unit 2 Type B and Type C LLRT Program Implementation Review" of Attachment 1 to the submittal, identified components that were on extended intervals and have not demonstrated acceptable performance during the last two outages for Unit 1 (L1R15-2014 and L1R16-2016) and Unit 2 (L2R14-2013 and L2R15-2015).

Provide the "As-found" and "As-left" maximum pathway leakage rate and minimum pathway leakage values, respectively, for the penetrations associated with the failed components.

EGC Response

The following table shows the MNPLR and MXPLR for the penetrations associated with the failed components displayed in Table 3.4.5-3, "LSCS Unit 1 Type B and Type C LLRT Program Implementation Review," and Table 3.4.5-4 "LSCS Unit 2 Type B and Type C LLRT Program Implementation Review," of Attachment 1 to the submittal.

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L1R15 – 2014							
Penetration	Valves	Description	As-Found Measured Leak Rate (SCFH)	As-Found MNPLR	As-Left Measured Leak Rate (SCFH)	As-Left MNPLR	As-Left MXPLR
M-7	1E12-F008	RHR SHUTDOWN COOLING SUCTION	596	0.52	1.05	0.52	1.05
	1E12-F009		0.52		0.52		
	1E12-F460		0		0		
L1R16 - 2016							
Penetration	Valves	Description	As-Found Measured Leak Rate (SCFH)	As-Found MNPLR	As-Left Measured Leak Rate (SCFH)	As-Left MNPLR	As-Left MXPLR
M-45	1C51-J004E	TIP BALL VALVE E	19.8	19.8	19.8	19.8	19.8
M-101	1E51-F080	RCIC TURBINE EXHAUST VACUUM BREAKER	Note 1	Note 1	1.75	0.88	1.75
	1E51-F086						
L2R15 - 2015							
Penetration	Valves	Description	As-Found Measured Leak Rate (SCFH)	As-Found MNPLR	As-Left Measured Leak Rate (SCFH)	As-Left MNPLR	As-Left MXPLR
M-42	2C51-J004C	TIP BALL VALVE C	15.53	15.53	15.53	15.53	15.53
M-98	2RF012	DRYWELL FLOOR DRAIN SUMP	17.23	15.6	3.62	3.62	15.6
	2RF013		15.6		15.6		

Note 1: The test of M-101 is performed between the two containment isolation valves, 1E51-F080 and 1E51-F086. Due to excessive leakage past 1E51-F086, a satisfactory leakage test of the penetration could not be performed. Following repair of 1E51-F086, a successful test of the penetration was performed with a measured leakage rate of 1.75 SCFH.

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SBPB RAI-5

Provide a total count of Type B and Type C components at LSCS, Units 1 and 2, and how many of them are currently on extended performance-based test intervals of 120 months for Type B and 60 months for Type C.

EGC Response

The percentage of the total number of LSCS Unit 1 Type B tested components that are on extended performance-based test intervals is 91% (i.e., 98 of 108 total Type B tests).

The percentage of the total number of LSCS Unit 2 Type B tested components that are on extended performance-based test intervals is 88% (i.e., 78 of 89 total Type B tests).

Note: The LSCS Type B testing schedule is conservative, in that, only one component at Unit 2 has been extended to the maximum allowed 120-month test interval. The totals listed above are for varying frequencies beyond 30 months. The following is a breakdown of the component totals on the various extended test frequencies.

Unit 1:

Five-Year Test Frequency: 8 components
Six-Year Test Frequency: 5 components
Eight-Year Test Frequency: 72 components
Nine-Year Test Frequency: 13 components

Unit 2:

Four-Year Test Frequency: 1 component
Five-Year Test Frequency: 7 components
Six-Year Test Frequency: 5 components
Eight-Year Test Frequency: 57 components
Nine-Year Test Frequency: 7 components
Ten-Year Test Frequency: 1 component

The percentage of the total number of LSCS Unit 1 Type C tested components that are on 60-month extended performance-based test intervals is 65% (i.e., 95 of 147 total Type C tests).

The percentage of the total number of LSCS Unit 2 Type C tested components that are on 60-month extended performance-based test intervals is 59% (i.e., 86 of 147 total Type C tests).

Note: The remaining Type C components which are on either a fixed 30-month (i.e., Regulatory Guide 1.163 components) interval or an interval between 30 and 60-months are established and maintained under administrative controls in accordance with the LSCS Appendix J Program.

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SBPB RAI-6

In supplemental letter dated February 16, 2017, EGC stated that two new primary containment isolation valves (PCIVs) will be added to the 10 CFR Part 50, Appendix J, program at each of LPCS, Units 1 and 2. The valves are being added in response to the NRC issued Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," to all operating boiling-water reactor licenses with Mark I and Mark II containments.

Provide details regarding post-modification Appendix J leak rate testing of the subject penetrations that would be conducted prior to resuming power operations after the new PCIVs are installed during the spring 2017 refueling outage for Unit 2 and the spring refueling outage of 2018 for Unit 1, including the acceptance criteria of the test results, including information if a new opening through the primary containment is required or an existing opening would suffice.

EGC Response

A modification was completed at LSCS Unit 2 to install a hardened containment vent system in response to NRC Order EA-13-109 during refueling outage L2R16 in February 2017. The modification added two new primary containment isolation valves (PCIVs): 2PC009A and 2PC010A. This penetration modification taps into existing containment penetration M-104 located between the suppression pool and the drywell and is between existing PCIVs 2PC001A and 2PC003A. As a result, the installation of the hardened containment vent system and associated PCIVs did not require a new opening through the primary containment. The local leak rate test is performed between the two PCIVs and is administratively controlled by procedure LTS-100-57, "Hardened Containment Isolation Valves Local Leak Rate Test 2PC009A and 2PC010A," with the acceptance criteria below 30.0 standard cubic feet per hour (SCFH). The local leak rate test of the penetration was completed on February 16, 2017 with the following results:

- As-Found MNPLR: 0.655 SCFH
- As-Left MXPLR: 1.310 SCFH

A similar hardened containment vent system will be installed for LSCS Unit 1 with the same configuration as defined above and is scheduled for installation during the L1R17 refueling outage in February 2018. The local leak rate test will be administratively controlled by procedure LTS-100-57, with the acceptance criteria below 30.0 SCFH.

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REFERENCES

- 1) Letter from D. M. Gullott (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request to Revise Technical Specifications 5.5.13, 'Primary Containment Leakage Rate Testing Program,' for Permanent Extension of Type A and Type C Leak Rate Test Frequencies," dated October 26, 2016 (ADAMS Accession No. ML16300A200)

- 2) Letter from B. Vaidya (U.S. Nuclear Regulatory Commission) to B. C. Hanson, "LaSalle County Station, Units 1 and 2, Request for Additional Information Regarding License Amendment Request for Extension of Type A and Type C Leak Rate Test Frequencies (CAC Nos. MF8700 and MF8701)," dated June 15, 2017 (ADAMS Accession No. ML17163A422)