



Order No. EA-13-109

RS-16-233

December 14, 2016

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: Fifth Six-Month Status Report For Phases 1 and 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)

References:

1. NRC Order Number EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013
2. NRC Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions", Revision 0, dated November 14, 2013
3. NRC Interim Staff Guidance JLD-ISG-2015-01, "Compliance with Phase 2 Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions", Revision 0, dated April 2015
4. NEI 13-02, "Industry Guidance for Compliance With Order EA-13-109, BWR Mark I & II Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions", Revision 1, dated April 2015
5. Exelon Generation Company, LLC's Answer to June 6, 2013, Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated June 26, 2013
6. Exelon Generation Company, LLC Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated June 30, 2014 (RS-14-059)
7. Exelon Generation Company, LLC First Six-Month Status Report Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated December 17, 2014 (RS-14-303)
8. Exelon Generation Company, LLC Second Six-Month Status Report Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated June 30, 2015 (RS-15-149)

9. Exelon Generation Company, LLC Phase 1 (Updated) and Phase 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated December 16, 2015 (RS-15-300)
10. Exelon Generation Company, LLC Fourth Six-Month Status Report For Phases 1 and 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), dated June 30, 2016 (RS-16-107)
11. NRC letter to Exelon Generation Company, LLC, LaSalle County Station, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 1 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC Nos. MF4456 and MF4457), dated March 31, 2015
12. NRC letter to Exelon Generation Company, LLC, LaSalle County Station, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC Nos. MF4456 and MF4457), dated August 2, 2016

On June 6, 2013, the Nuclear Regulatory Commission (“NRC” or “Commission”) issued an Order (Reference 1) to Exelon Generation Company, LLC (EGC). Reference 1 was immediately effective and directs EGC to require their BWRs with Mark I and Mark II containments to take certain actions to ensure that these facilities have a hardened containment vent system (HCVS) to remove decay heat from the containment, and maintain control of containment pressure within acceptable limits following events that result in loss of active containment heat removal capability while maintaining the capability to operate under severe accident (SA) conditions resulting from an Extended Loss of AC Power (ELAP). Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an Overall Integrated Plan (OIP) by June 30, 2014 for Phase 1 of the Order, and an OIP by December 31, 2015 for Phase 2 of the Order. The interim staff guidance (References 2 and 3) provide direction regarding the content of the OIP for Phase 1 and Phase 2. Reference 3 endorses industry guidance document NEI 13-02, Revision 1 (Reference 4) with clarifications and exceptions identified in References 2 and 3. Reference 5 provided the EGC initial response regarding reliable hardened containment vents capable of operation under severe accident conditions. Reference 6 provided the LaSalle County Station, Units 1 and 2, Phase 1 OIP pursuant to Section IV, Condition D.1 of Reference 1. References 7 and 8 provided the first and second six-month status reports pursuant to Section IV, Condition D.3 of Reference 1 for LaSalle County Station. Reference 9 provided the LaSalle County Station, Units 1 and 2, Phase 1 updated and Phase 2 OIP pursuant to Section IV, Conditions D.2 and D.3 of Reference 1. Reference 10 provided the fourth six-month status report pursuant to Section IV, Condition D.3 of Reference 1 for LaSalle County Station.

The purpose of this letter is to provide the fifth six-month update report for Phases 1 and 2, pursuant to Section IV, Condition D.3 of Reference 1, that delineates progress made in implementing the requirements of Reference 1 for LaSalle County Station, Units 1 and 2. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if

any. The enclosed report also addresses the NRC Interim Staff Evaluation open items contained in References 11 and 12.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 14th day of December 2016.

Respectfully submitted,

A handwritten signature in cursive script, reading "Glen T. Kaegi", is written over a horizontal line.

Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

LaSalle County Station, Units 1 and 2 Fifth Six-Month Status Report for Phases 1 and 2
Implementation of Order EA-13-109, Order Modifying Licenses with Regard to Reliable
Hardened Containment Vents Capable of Operation Under Severe Accident Conditions

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region III
NRC Senior Resident Inspector - LaSalle County Station
NRC Project Manager, NRR - LaSalle County Station
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Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure

LaSalle County Station, Units 1 and 2

**Fifth Six-Month Status Report for Phases 1 and 2 Implementation of Order EA-13-109,
Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable
of Operation Under Severe Accident Conditions**

(11 pages)

COMBINED PHASES 1 AND 2 SIX MONTH UPDATE

Enclosure

LaSalle's Fifth Six Month Status Report for the Implementation of Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions"

1 Introduction

LaSalle developed an Overall Integrated Plan (Reference 1), documenting the installation of a Hardened Containment Vent System (HCVS) that provides a reliable hardened venting capability for pre-core damage and under severe accident conditions, including those involving a breach of the reactor vessel by molten core debris, in response to NRC Order EA-13-109 (Reference 2). Updates of milestone accomplishments are based on the combined Phases 1 and 2 Overall Integrated Plan (Reference 7), documenting:

1. The installation of a Hardened Containment Vent System (HCVS) that provides a reliable hardened venting capability for pre-core damage and under severe accident conditions, including those involving a breach of the reactor vessel by molten core debris, in response to Reference 2.
2. An alternative venting strategy that makes it unlikely that a drywell vent is needed to protect the containment from overpressure related failure under severe accident conditions, including those that involve a breach of the reactor vessel by molten core debris, in response to Reference 2.

This enclosure provides an update of milestone accomplishments since submittal of the latest status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone(s) have been completed since May 15, 2016, and are current as of November 11, 2016:

- Fifth Six-Month Update (complete with this submittal)
- Begin Phase 1 Online Installation for Unit 2

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the combined Phases 1 and 2 Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Submit Phase 1 Overall Integrated Plan	Jun 2014	Complete	
Submit 6 Month Updates			
Update 1	Dec 2014	Complete	
Update 2	Jun 2015	Complete	
Update 3 and Phase 2 Overall Integrated Plan	Dec 2015	Complete	
Update 4	Jun 2016	Complete	
Update 5	Dec 2016	Complete	This submittal
Update 6	Jun 2017	Not Started	
Update 7	Dec 2017	Not Started	
Update 8	Jun 2018	Not Started	
Update 9	Dec 2018	Not Started	
Phase 1 Specific Milestones			
Phase 1 Unit 2 Modifications			
Begin Conceptual Design	Jun 2014	Complete	
Complete Conceptual Design	Jun 2014	Complete	
Begin Detailed Design	Jun 2015	Complete	
Complete Detailed Design and Issue Modification Package	Nov 2016	Started	New target: Jan 2017 based on revising the design for tying-in to primary containment
Begin Online Installation	Jun 2016	Complete	
Complete Online Installation	Feb 2017	Started	
Begin Outage Installation	Feb 2017	Not Started	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Complete Outage Installation and put system into service	Mar 2017	Not Started	
Phase 1 Unit 2 Procedure Changes			
Operations Procedures Developed	Dec 2016	Started	
Maintenance Procedures Developed	Dec 2016	Started	
Procedure Changes Active	Mar 2017	Not Started	
Phase 1 Unit 2 Training			
Training Complete	Dec 2016	Started	New Target: Jan 2017 based on completion of simulator training
Phase 1 Unit 2 Completion			
Unit 2 HCVS Phase 1 Implementation	Mar 2017	Not Started	
Phase 1 Unit 1 Modifications			
Begin Conceptual Design	Jun 2014	Complete	
Complete Conceptual Design	Jun 2014	Complete	
Begin Detailed Design	Jun 2015	Complete	
Complete Detailed Design and Issue Modification Package	Mar 2017	Started	
Begin Online Installation	May 2017	Not Started	
Complete Online Installation	Feb 2018	Not Started	
Begin Outage Installation	Feb 2018	Not Started	
Complete Outage Installation and put system into service	Mar 2018	Not Started	
Phase 1 Unit 1 Procedure Changes			
Operations Procedures Developed	Dec 2017	Not Started	
Maintenance Procedures Developed	Dec 2017	Not Started	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Procedure Changes Active	Mar 2018	Not Started	
Phase 1 Unit 1 Training			
Training Complete	Dec 2017	Not Started	
Phase 1 Completion			
Phase 1 Unit 1 Implementation	Mar 2018	Not Started	
Phase 2 Specific Milestones			
Phase 2 Unit 1 Modifications			
Begin Conceptual Design	Jun 2015	Complete	
Complete Conceptual Design	Jun 2015	Complete	
Begin Detailed Design	Jun 2016	Not Started	New Target: Jan 2017
Complete Detailed Design and Issue Modification Package	Mar 2017	Not Started	New Target: Aug 2017
Begin Online Installation	May 2017	Not Started	New Target: Aug 2017
Complete Online Installation	Feb 2018	Not Started	
Begin Outage Installation	Feb 2018	Not Started	
Complete Outage Installation and put system into service	Mar 2018	Not Started	
Phase 2 Unit 1 Procedure Changes			
Operations Procedures Developed	Dec 2017	Not Started	
Maintenance Procedures Developed	Dec 2017	Not Started	
Procedure Changes Active	Mar 2018	Not Started	
Phase 2 Unit 1 Training			
Training Complete	Dec 2017	Not Started	
Phase 2 Unit 1 Completion			

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Phase 2 Unit 1 Implementation	Mar 2018	Not Started	
Submit Unit 1 Phases 1 & 2 Full Compliance Report	May 2018	Not Started	
Phase 2 Unit 2 Modifications			
Begin Conceptual Design	Jun 2015	Complete	
Complete Conceptual Design	Jun 2015	Complete	
Begin Detailed Design	Jun 2017	Not Started	
Complete Detailed Design and Issue Modification Package	Mar 2018	Not Started	
Begin Online Installation	May 2018	Not Started	
Complete Online Installation	Feb 2019	Not Started	
Begin Outage Installation	Feb 2019	Not Started	
Complete Outage Installation and put system into service	Mar 2019	Not Started	
Phase 2 Unit 2 Procedure Changes			
Operations Procedures Developed	Dec 2018	Not Started	
Maintenance Procedures Developed	Dec 2018	Not Started	
Procedure Changes Active	Mar 2019	Not Started	
Phase 2 Unit 2 Training			
Training Complete	Dec 2018	Not Started	
Phase 2 Completion			
Phase 2 Unit 2 Implementation	Mar 2019	Not Started	
Submit Unit 2 Phases 1 & 2 Full Compliance Report	May 2019	Not Started	

4 Changes to Compliance Method

1. Rather than “as close as possible” (Ref. 7, pg. 14), the PCIVs will be located “as close as reasonably possible” (Ref. 3, Step 4.1.2.1.2) or as close “as practical” (UFSAR Ch. 3.2, GDC 56) to the penetration into primary containment. (Ref. 9)
2. The motive gas supply to the PCIVs will be nitrogen, not argon. (Ref. 7, pg. 15; Ref. 9)
3. Downstream of the outboard PCIV, the piping classification changes from Safety Related to Seismically Supported and Augmented Quality (including the rupture disc). This is similar to safety classification changes for the existing Containment Vent & Purge System where piping downstream of the outboard PCIV is Seismically Supported and Non-Safety Related and then penetrates through Secondary Containment. (Ref. 7, pg. 17; Ref. 9, DCS Sec. 4.1.4.2)

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

LaSalle expects to comply with the order implementation date and no relief/relaxation is required at this time.

6 Open Items from Combined Phases 1 and 2 Overall Integrated Plan and Interim Staff Evaluations

The following tables provide a summary of the open items documented in the combined Phases 1 and 2 Overall Integrated Plan or the Interim Staff Evaluation (ISE) and the status of each item.

Combined Phases 1 and 2 OIP Open Items		Status
Phase 1 Open Items		
7	Perform radiological evaluation for Phase 1 vent line impact on ERO actions.	Started. The calculation is currently under review.
Phase 2 Open Items		
1	Evaluate feasibility of strategy due to radiological conditions.	Started. The calculation is currently under review, but preliminary results indicate a portion of the water injection pathway in the Reactor Building may need to be hard piped, rather than flexible hose. Additional shielding may not be required for the personnel operating the Flex pump (used for SAWA).
2	Verify required modifications to support SAWA/SAWM.	Started

No.	Phase 1 Interim Staff Evaluation Open Item	Status
1	Make available for NRC staff audit documentation of a method to disable HCVS during normal operation to provide assurances against inadvertent operation that also minimizes actions to enable HCVS operation following an ELAP.	Started. The motive and purge gas systems will be isolated by one locked-closed manual valve in each system during normal operation. Main Control Room (MCR) controls will be via key-locked switches. PCIVs are air-to-open, spring/fail closed.
2	Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Started. The sizing evaluation of the HCVS batteries is complete. The results show a margin of approximately 7% after 24 hours with all Unit 1 and Unit 2 HCVS loads drawing maximum current. The revision to the FLEX DG loading calculation is not complete.
3	Make available for NRC staff audit documentation of the HCVS argon pneumatic system design including sizing and location.	Started

4	Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.	Started. Preliminary results from the radiological evaluation show no additional shielding is required to safely access and operate controls and equipment. The evaluation of temperature is in progress.
5	Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.	Started. Analyses are in progress to show that the HCVS has the capacity to vent the steam/energy equivalent of 1% of rated thermal power while maintaining containment pressure below PCPL.
6	Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Started. LaSalle design complies with the reasonable tornado protection criteria of Reference 6.
7	Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	Started
8	Make available for NRC staff audit documentation that demonstrates adequate communication between the remote HCVS operation locations and HCVS decision makers during ELAP and severe accident conditions.	Started
9	Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Started. LaSalle design will use argon purge system to ensure the flammability limits of gases passing through the system are not reached.

10	Provide a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings.	Complete. LaSalle wetwell vent line has a dedicated HCVS flowpath from the wetwell penetration to the outside with no interconnected system. The discharge point meets the guidance of HCVS-FAQ-04 (Att. J of Reference 3).
11	Make available for NRC staff audit documentation of a seismic qualification evaluation of HCVS components.	Started
12	Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Started
13	Make available for NRC staff audit the procedures for HCVS operation.	Started
	Phase 2 Interim Staff Evaluation Open Item	Status
1	Licensee to confirm through analysis the temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment. (ISE Section 3.3.1)	Started. Preliminary results from the radiological evaluation show no additional shielding is required to safely access and operate controls and equipment.
2	Licensee to evaluate the ingress and egress paths for the expected severe accident conditions (temperature, humidity, radiation) for the sustained operating period. (ISE Section 3.3.2.3)	Not started
3	Licensee to demonstrate that containment failure as a result of overpressure can be prevented without a DW vent during severe accident conditions. (ISE Section 3.3.3)	Not started
4	Licensee shall demonstrate how the plant is bounded by the reference plant analysis that shows the SAWM strategy is successful in making it unlikely that a DW vent is needed. (ISE Section 3.3.3.1)	Not started
5	Licensee to demonstrate that there is adequate communication between the MCR and the operator at the FLEX pump during severe accident conditions. (ISE Section 3.3.3.4)	Not started

6	Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions. (ISE Section 3.3.3.4)	Not started
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7 Interim Staff Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation(s) identified at this time.

8 References

The following references support the updates to the combined Phases 1 and 2 Overall Integrated Plan described in this enclosure.

1. LaSalle's "Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," dated June 30, 2014 (Accession No. ML14184A016).
2. NRC Order Number EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" dated June 6, 2013 (Accession No. ML13143A321).
3. NEI 13-02, "Industry Guidance for Compliance with NRC Order EA-13-109, 'To Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions,' Revision 1, dated April 2015.
4. NRC Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," Revision 0, dated November 2013 (Accession No. ML13304B836).
5. NRC Endorsement of industry "Hardened Containment Venting System (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0" (Accession No. ML14128A219).
6. Industry White Paper HCVS-WP-04, "Missile Evaluation for HCVS Components 30 Feet Above Grade," Revision 0, dated August 17, 2015
7. LaSalle's "Phase 1 (Updated) and Phase 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," dated December 16, 2015 (Accession No. ML15352A109).
8. NRC Interim Staff Guidance JLD-ISG-2015-01, "Compliance with Phase 2 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," Revision 0, dated April 2015 (Accession No. ML15104A118).

9. Engineering Change EC 392353 Revisions 0, 1, and 2, "U2 Hardened Containment Vent System (HCVS)." Revision 2 approved 11/11/16.
10. NRC "Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 1 of Order EA-13-109," dated March 31, 2015.
11. NRC "Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109," dated August 2, 2016.