Exelon Generation®

Order No. EA-13-109

RS-15-150

June 30, 2015

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

Limerick Generating Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Second Six-Month Status Report For 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)

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-2015-01, "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 April 2015
3. NEI 13-02, "Industry Guidance for Compliance with NRC Order EA-13-109, BWR Mark I & II Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," Revision 1, dated April 2015
4. 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
5. 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-14-060)
6. 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-14-304)
7. NRC letter to Exelon Generation Company, LLC, Limerick Generating 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. MF4418 and MF4419), dated April 1, 2015

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 a Phase 1 Overall Integrated Plan pursuant to Section IV, Condition D by June 30, 2014. Reference 2 endorses industry guidance document NEI 13-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial answer to the Order regarding reliable hardened containment vents capable of operation under severe accident conditions. Reference 5 provided the Limerick Generating Station, Units 1 and 2 Phase 1 Overall Integrated Plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the Phase 1 overall integrated plan. Reference 3 provides direction regarding the content of the status reports. Reference 6 provided the first six-month status report pursuant to Section IV, Condition D.3 of Reference 1 for Limerick Station. The purpose of this letter is to provide the second six-month status report for Phase 1 pursuant to Section IV, Condition D.3, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. 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 Reference 7.

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 30th day of June 2015.

Respectfully submitted,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

Limerick Generating Station, Units 1 and 2 Second Six-Month Status Report for Phase 1 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 I
NRC Senior Resident Inspector – Limerick Generating Station, Units 1 and 2
NRC Project Manager, NRR – Limerick Generating Station, Units 1 and 2
Mr. Charles H. Norton, NRR/JLD/PPSD/JOMB, NRC
Mr. John D. Hughey, NRR/JLD/JOMB, NRC
Director, Bureau of Radiation Protection – Pennsylvania Department of Environmental Resources
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Enclosure

Limerick Generating Station, Units 1 and 2

Second Six-Month Status Report for Phase 1 Implementation of Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions"

(7 pages)

Enclosure

Limerick Generating Station, Units 1 and 2 Second Six Month Status Report for Phase 1 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

Limerick Generating Station, Units 1 and 2 developed an Overall Integrated Plan (Reference 1 in Section 8), 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 Reference 2. This enclosure provides an update of milestone accomplishments since submittal of the Phase 1 First Six Month 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 milestones have been completed since December 01, 2014, and are current as of June 01, 2015.

- Second Six-Month Update (complete with this submittal)

3 Milestone Schedule Status

The following provides an update to Part 5 included in the Overall Integrated Plan (OIP). 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 schedule does not impact the order implementation date.

Note: Phase 2 implementation milestones for Limerick will be provided with the December 2015 OIP submittal.

Milestone	Target Completion Date	Activity Status	Comments
Phase 1 HCVS Milestone Table			
Submit Overall Integrated Plan	June 2014	Complete	
Submit 6 Month Updates:			
Update 1	December 2014	Complete	
Update 2	June 2015	Complete with this submittal	
Update 3	December 2015	Not Started	Simultaneous with Phase 2 OIP
Update 4	June 2016	Not Started	
Update 5	December 2016	Not Started	
Update 6	June 2017	Not Started	
Update 7	December 2017	Not Started	
Modifications:			
Hold preliminary/conceptual design meeting	July 2014	Complete	
Modifications Evaluation	March 2016	Started	Started piping layout and line sizing
Unit 2 Design Engineering On-Site/Complete	March 2016	Started	
Unit 2 Implementation Outage	April 2017	Not Started	
Unit 2 Walk Through Demonstration/Functional Test	April 2017	Not Started	
Unit 1 Design Engineering On-site/Complete	March 2017	Started	
Unit 1 Implementation Outage	April 2018	Not Started	
Unit 1 Walk Through Demonstration/Functional Test	April 2018	Not Started	

Milestone	Target Completion Date	Activity Status	Comments
Phase 1 HCVS Milestone Table			
Procedure Changes Active			
Operations Procedure Changes Developed	December 2016	Not Started	
Site Specific Maintenance Procedure Developed	December 2016	Not Started	
Unit 2 Procedure Changes Active	April 2017	Not Started	
Unit 1 Procedure Changes Active	April 2018	Not Started	
Training:			
Training Complete	March 2017	Not Started	
Completion			
Unit 2 HCVS Phase 1 Implementation	April 2017	Not Started	
Submit Unit 2 Phase 1 Completion Report	June 2017	Not Started	
Unit 1 HCVS Phase 1 Implementation	April 2018	Not Started	
Submit Unit 1 Phase 1 Completion Report	June 2018	Not Started	
Full Site HCVS Phase 1 Implementation	April 2018	Not Started	

4 Changes to Compliance Method

The following changes are made to the compliance method for Phase 1 as documented in the Phase 1 Overall Integrated Plan (Reference 1):

- Limerick Generating Station HCVS Design has decided to replace all references to a Secondary Containment Isolation Valve (SCIV) with a rupture disc for a pressure sufficient to withstand leakage through the downstream Primary Containment Isolation Valve (PCIV) during a Design Basis Accident or testing.
- A purge system has been chosen as the method to prevent hydrogen deflagration. The purge system will be used to rupture the disc to allow anticipatory venting.

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

Limerick Generating Station expects to comply with the order implementation date; therefore, no relief/relaxation is required at this time.

6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

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

Overall Integrated Plan Phase 1 Open Item	Status
Determine how Motive Power and/or HCVS Battery Power will be disabled during normal operation.	Deleted (closed to ISE Open Item Number 1 below)
Confirm that the Remote Operating Station (ROS) will be in an accessible area following a severe accident.	Deleted (closed to ISE Open Item Number 3 below)
Determine wetwell line size to meet 1% venting criteria.	Deleted (closed to ISE Open Item Number 4 below)
Confirm suppression pool heat capacity.	Deleted (closed to ISE Open Item Number 4 below)
Determine the approach for combustible gases.	Deleted (closed to ISE Open Item Numbers 9 and 10 below)
Provide procedures for HCVS Operation.	Deleted (closed to ISE Open Item Number 13 below)

	Interim Staff Evaluation Open Item	Status
1	Make available for NRC staff audit a description of how HCVS dc power and/or motive power will be disabled during normal operation to provide assurances against inadvertent operation, but also minimize actions to enable HCVS operation during an ELAP.	Started (Reference 6)
2	Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Not Started
3	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 – The evaluation of temperature and radiological conditions under severe accident conditions has been started.

4	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 – The required one percent vent capacity at the lower of Primary Containment Pressure Limit or containment design pressure will be verified using Reactor Excursion and Leak Analysis Program (RELAP). In addition, Modular Accident Analysis Program (MAAP) analyses will be credited to verify that venting can be delayed for at least three hours and that anticipatory venting can be credited to maintain Reactor Core Isolation Cooling (RCIC) functional.
5	Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Not Started
6	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.	Not Started
7	Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Not 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.	Not Started
9	Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Started – The design will credit a purge system to prevent deflagration and detonation.

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.	Started – The vent path will rely on dedicated suppression pool paths and dedicated PCIVs in each Limerick unit with no interconnected systems. The vent path will rely on a purge system to prevent line failure due to hydrogen deflagration and detonation.
11	Make available for NRC staff audit documentation of a seismic qualification evaluation of HCVS components.	Not 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.	Not Started
13	Make available for NRC staff audit the procedures for HCVS operation.	Not Started

7 Interim Staff Evaluation Impacts

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

8 References

The following references support the updates to the Phase 1 Overall Integrated Plan described in this enclosure.

1. Limerick Generating Station, Units 1 and 2 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
2. 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
3. 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

4. NRC Interim Staff Guidance JLD-ISG-2015-01, "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 April 2015 (Accession No. ML15104A118)
5. NRC Endorsement of Industry "Hardened Containment Venting System (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0," dated May 14, 2014 (Accession No. ML14128A219)
6. Limerick Generating Station, Units 1 and 2 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, dated December 17, 2014
7. NRC Interim Staff Evaluation by the Office of Nuclear Reactor Regulation Related to Order EA-13-109 Phase 1, Modifying Licenses with regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, Exelon Generation Company, LLC, Limerick Generating Station, Units 1 and 2, Docket Nos. 50-352 and 50-353, dated April 1, 2015 (Accession No. ML15082A433)