



Order No. EA-13-109

RS-15-148

June 30, 2015

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

Dresden Nuclear Power Station, Units 2 and 3  
Renewed Facility Operating License Nos. DPR-19 and DPR-25  
NRC Docket Nos. 50-237 and 50-249

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-14-058)
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-14-302)
7. NRC letter to Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 1 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC No. MF4462 and MF4463), dated February 11, 2015

On June 6, 2013, the U.S. 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.

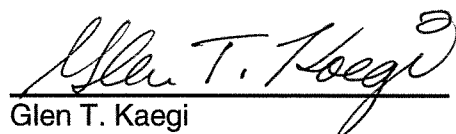
Reference 1 required submission of a Phase 1 Overall Integrated Plan pursuant to Section IV, Condition D by June 30, 2014. Reference 2 endorses industry guidance document NEI 13-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial answer to the Order regarding reliable hardened containment vents capable of operation under severe accident conditions. Reference 5 provided the Dresden Nuclear Power Station, Units 2 and 3 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 Dresden 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 30<sup>th</sup> day of June 2015

Respectfully submitted,



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

Enclosure:

Dresden Nuclear Power Station, Units 2 and 3 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 III  
NRC Senior Resident Inspector - Dresden Nuclear Power Station, Units 2 and 3  
NRC Project Manager, NRR - Dresden Nuclear Power Station, Units 2 and 3  
Mr. Charles H. Norton, NRR/JLD/PPSD/JOMB, NRC  
Mr. John P. Boska, NRR/JLD/JOMB, NRC  
Illinois Emergency Management Agency - Division of Nuclear Safety

**Enclosure**

**Dresden Nuclear Power Station, Units 2 and 3**

**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

# Dresden Nuclear Power Station, Units 2 and 3 Second 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

Dresden Nuclear Power Station, Units 2 and 3 (Dresden Station) 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 Overall Integrated Plan, 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 the development of the Overall Integrated Plan (Reference 1), and are current as of June 30, 2015.

- Held preliminary/conceptual design meeting
- Kickoff meeting for S&L contract for Engineering Services, December 2, 2014
- First Six-Month Update, December 30, 2014
- 50% Design Review held on May 20, 2015 and May 26, 2015
- Second Six-Month Update (complete with this submittal)

## 3 Milestone Schedule Status

The following provides an update to Attachment 2 of 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 which are 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
<b>Phase 1 HCVS Milestone Table</b>			
Submit Overall Integrated Plan	June 2014	Complete	
<b>Submit 6 Month Updates:</b>			

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Milestone	Target Completion Date	Activity Status	Comments
<b>Phase 1 HCVS Milestone Table</b>			
Update 1	<b>December 2014</b>	Complete	
Update 2	<b>June 2015</b>	Complete with this submittal	
Update 3	<b>December 2015</b>	Not Started	
Update 4	<b>June 2016</b>	Not Started	
Update 5	<b>December 2016</b>	Not Started	
Update 6	<b>June 2017</b>	Not Started	
Update 7	<b>December 2017</b>	Not Started	
<b>Modifications:</b>			
Hold preliminary/conceptual design meeting	June 2014	Complete	
Kickoff Meeting with S&L	December 2014	Complete	
U3 Initial Design Engineering Modification Complete	October 2015	Started	
U3 Implementation Outage (Phase 1)	October 2016	Not Started	
U2 Initial Design Engineering Modification Complete	October 2016	Not Started	
Operations Procedure Changes Developed	November 2016	Not Started	
Site Specific Maintenance Procedure Developed	November 2016	Not Started	
U3 Training Complete	November 2016	Not Started	
U3 Procedure Changes Active	November 2016	Not Started	
U3 Walk Through Demonstration/Functional Test	November 2016		
U2 Implementation Outage	October 2017	Not Started	
U2 Training Complete	November	Not Started	

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Milestone	Target Completion Date	Activity Status	Comments
<b>Phase 1 HCVS Milestone Table</b>			
	2017		
U2 Procedure Changes Active	November 2017	Not Started	
U2 Walk Through Demonstration/Functional Test	November 2017	Not Started	
Submit Completion Report	May 2018	Not Started	

#### 4 Changes to Compliance Method

Dresden intends to make the following changes to the compliance method for Phase 1 as documented in the Phase 1 Overall Integrated Plan (Reference 1):

- The Dresden HCVS Design is replacing references to a Secondary Containment Isolation Valve (SCIV) with a rupture disc rated for a pressure sufficient to withstand leakage through the downstream PCIV during a Design Basis Accident or LLRT.
- An Argon purge system has been chosen as the method to prevent hydrogen deflagration. The Argon purge system will be used to rupture the disc to allow anticipatory venting.

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

Dresden 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.

Open Item	Open Items from OIP	Status
1	Confirm that at least 6 hours battery coping time is available.	Deleted. Closed to ISE Open Item number 1.
2	Determine actions to enable wetwell (WW) venting following a flooding around the torus.	Deleted. Closed to ISE Open Item number 2.
3	Determine how Motive Power and/or HCVS Battery Power will be disabled during normal operation.	Deleted. Closed to ISE Open Item number 3.

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4	Confirm that the Remote Operating Station (ROS) will be in an accessible area following a Severe Accident (SA).	Deleted. Closed to ISE Open Item number 12.
5	Confirm diameter on new common HCVS Piping.	Deleted. Closed to ISE Open Item number 5.
6	Confirm suppression pool heat capacity.	Deleted. Closed to ISE Open Item number 6.
7	Determine the approach for combustible gases.	Deleted. Closed to ISE Open Item number 7.
8	Provide procedures for HCVS Operation.	Deleted. Closed to ISE Open Item number 18.

	<b>Interim Staff Evaluation (ISE) Open Items</b>	<b>Status</b>
1	Make available for NRC staff audit documentation confirming that at least 6 hours battery coping time is available.	Complete. EC 391973 Rev. 0 was completed to evaluate proposed battery load shed to support FLEX events. The evaluation addressed both 125V and 250V battery systems. The evaluation identified that with the load shed, the 125V and 250V batteries will maintain acceptable capacity for a minimum of six (6) hours. This time supports the FLEX Strategy time line actions.
2	Make available for NRC staff audit documentation that confirms the ability to operate HCVS following flooding around the suppression pool.	Started.
3	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.
4	Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Started.
5	Make available for NRC staff audit documentation of the licensee design effort to confirm the diameter on the new common HCVS piping.	Started. Refer to the response to ISE open item 6.
6	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	Started. The required 1% vent capacity at the lower of PCPL or containment design pressure is being verified using RELAP which models the line size and routing.  In addition, MAAP analyses are being



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	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.	credited to verify that venting can be delayed for at least three (3) hours, which supports assuming a maximum decay heat rate of 1%.
7	Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Started. Argon purge system design in progress.
8	Make available for NRC staff audit documentation of a determination of seismic adequacy for the ROS location.	Started.
9	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.
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. As described in the OIP, the HCVS torus vent path in each Dresden unit, starting at and including the downstream PCIV, will be a dedicated HCVS flow path. There are no interconnected systems downstream of the downstream, dedicated HCVS PCIV. Interconnected systems are upstream of the downstream HCVS PCIV and are isolated by normally shut, fail shut PCIVs which, if open, would shut on an ELAP. There is no shared HCVS piping between the two units.  The vent path will rely on an Argon purge system to prevent line failure due to hydrogen deflagration and detonation.
11	Provide descriptions of design details that minimize unintended cross flow of vented fluids within a unit and between units on the site.	Started. Refer to the response to ISE item 10. This eliminates the possibility of cross flow of vented fluids within a unit and between the two units.
12	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. Component location design in progress. The HCVS primary control panel will be located in the Main Control Room (MCR).
13	Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Started.
14	Make available for NRC staff audit documentation of the HCVS nitrogen	Started. Nitrogen system design in

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	pneumatic system design including sizing and location.	progress.
15	Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Started. Instrument design in progress.
16	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. Component location design in progress. The HCVS primary control panel will be located in the MCR.
17	Make available for NRC staff audit documentation of an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during BDBEE and severe accident wetwell venting.	Started. The existing containment isolation valves are being evaluated for their performance under wetwell venting conditions.
18	Make available for NRC staff audit procedures for HCVS operation.	Not Started.

## 7 Interim Staff Evaluation Impacts

There are currently no 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. Dresden Nuclear Power Station, Units 2 and 3, 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-14-058.
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.
3. NEI 13-02 [Rev. 1], "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" dated April 2015.

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4. NRC Interim Staff Guidance JLD-ISG- 2015-01 [Rev. 0], "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions", 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. NRC letter to Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 1 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC No. MF4462 and MF4463), dated February 11, 2015