Exelon Generation®

Order No. EA-13-109

RS-17-063

June 27, 2017

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: Sixth 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-14-058)
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-14-302)
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-15-148)

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 15, 2015 (RS-15-299)
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-16-106)
11. Exelon Generation Company, LLC 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), dated December 14, 2016 (RS-16-232)
12. 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 Nos. MF4462 and MF4463), dated February 11, 2015
13. 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 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC Nos. MF4462 and MF4463), dated September 30, 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 Dresden Nuclear Power Station, Units 2 and 3, 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 Dresden Nuclear Power Station. Reference 9 provided the Dresden Nuclear Power Station, Units 2 and 3, Phase 1 updated and Phase 2 OIP pursuant to Section IV, Conditions D.2 and D.3 of Reference 1. References 10 and 11 provided the fourth and fifth six-month status reports pursuant to Section IV, Condition D.3 of Reference 1 for Dresden Nuclear Power Station.

The purpose of this letter is to provide the sixth 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 Dresden Nuclear Power Station, Units 2 and 3. 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 12 and 13.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David J. Distel at 610-765-5517.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of June 2017.

Respectfully submitted,

Patrick R. Simpson
Manager – Licensing
Exelon Generation Company, LLC

Enclosure:

Dresden Nuclear Power Station, Units 2 and 3 Sixth 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 - Dresden Nuclear Power Station
NRC Project Manager, NRR - Dresden Nuclear Power Station
Mr. Raj Auluck, NRR/JLD/TSD/JCBB, NRC
Mr. Brian E. Lee, NRR/JLD/JCBB, 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

Sixth 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

(23 pages)

COMBINED PHASES 1 AND 2 SIX MONTH UPDATE

Enclosure

Dresden Nuclear Power Station, Units 2 and 3

Sixth 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"

1 Introduction

Dresden 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 NRC Order EA-13-109 (Reference 2). Starting with the six month status report dated December 16, 2015 (Reference 6), updates of milestone accomplishments will be based on the combined Phases 1 and 2 Overall Integrated Plan. Reference 10 documents the Fifth Six-Month Status Report for combined Phases 1 and 2 implementation.

Dresden developed an updated and combined Phases 1 and 2 Overall Integrated Plan (Reference 6), 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 December 2016 update (Reference 10) of combined Phases 1 and 2 Overall Integrated Plan.

2 Milestone Accomplishments

The following milestone has been completed since the December 2016 update submittal (Reference 10). This is current as of June 6, 2017.

- Unit 2 Phase 2 detailed design is complete.

3 Milestone Schedule Status

The following provides an update to Part 5 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.

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Submit Overall Integrated Plan	June 2014	Complete	
Submit 6 Month Updates:			
Update 1	Dec. 2014	Complete	
Update 2	June 2015	Complete	
Update 3 [Simultaneous with Phase 2 OIP]	Dec. 2015	Complete	
Update 4	June 2016	Complete	
Update 5	Dec. 2016	Complete	
Update 6	June 2017	Complete with this submittal	
Update 7	Dec. 2017	Not Started	
Update 8	June 2018	Not Started	
Update 9	Dec. 2018	Not Started	
Phase 1 Specific Milestones			
Phase 1 U3 (Lead Unit) Modifications:			
Begin Conceptual Design	Sep. 2012	Complete	
Complete Conceptual Design	Mar. 2013	Complete	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Begin Detailed Design	Nov. 2014	Complete	
Complete Detailed Design and Issue Modification Package	Jan. 2016	Complete	
Begin Online Portion of the Installation	Nov. 2015	Complete	
Complete Online Installation	Oct. 2016	Complete	
Begin Outage Portion of the Installation	Oct. 2016	Complete	
Complete Outage Installation and put system into service	Nov. 2016	Complete	
Phase 1 Procedure Changes Active			
Operations Procedure Changes Developed	Oct. 2016	Complete	
Site Specific Maintenance Procedure Developed	Oct. 2016	Complete	
Procedure Changes Active	Nov. 2016	Complete	
Phase 1 Training:			
Training Complete	Oct. 2016	Complete	
Phase 1 Completion			
U3 Phase 1 HCVS Implementation	Nov. 2016	Complete	
Phase 1 U2 (Lag Unit) Modifications:			
Begin Conceptual Design	Sep. 2012	Complete	
Complete Conceptual Design	Mar. 2013	Complete	
Begin Detailed Design	Nov. 2014	Complete	
Complete Detailed Design and Issue Modification Package	Sep. 2016	Complete	
Begin Online Portion of the Installation	Mar. 2016	Complete	
Complete Online Installation	Oct. 2017	Started	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Begin Outage Portion of the Installation	Oct. 2017	Not Started	
Complete Outage Installation and put system into service	Nov. 2017	Not Started	
Phase 1 Procedure Changes Active			
Operations Procedure Changes Developed	Oct. 2017	Started	
Site Specific Maintenance Procedure Developed	Oct. 2017	Started	
Procedure Changes Active	Oct. 2017	Not Started	
Phase 1 Training:			
Training Complete	Oct. 2017	Not Started	
Phase 1 Completion			
U2 Phase 1 HCVS Implementation	Nov. 2017	Not Started	
Phase 2 Specific Milestones			
Phase 2 U2 (Lead Unit) Modifications:			
Begin Conceptual Design	March 2016	Complete	
Complete Conceptual Design	Aug. 2016	Complete	
Begin Detailed Design	Nov. 2016	Complete	
Complete Detailed Design and Issue Modification Package	June 2017	Complete	
Begin Online Portion of the Installation	June 2017	Complete	
Complete Online Installation	Oct. 2017	Started	
Begin Outage Portion of the Installation	Oct. 2017	Not Started	
Complete Outage Installation and put system into service	Nov. 2017	Not Started	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Phase 2 Procedure Changes Active			
Operations Procedure Changes Developed	Oct. 2017	Not Started	
Site Specific Maintenance Procedure Developed	Oct. 2017	Not Started	
Procedure Changes Active	Oct. 2017	Not Started	
Phase 2 Training:			
Training Complete	Oct. 2017	Not Started	
Phase 2 Completion			
U2 Phase 2 HCVS Implementation	Nov. 2017	Not Started	
Submit Unit 2 Phase 1 and Phase 2 full compliance Report [60 days after Unit achieves compliance]	Jan. 2018	Not Started	
Phase 2 U3 (Lag Unit) Modifications:			
Begin Conceptual Design	Mar. 2016	Complete	
Complete Conceptual Design	Aug. 2016	Complete	
Begin Detailed Design	Apr. 2017	Complete	
Complete Detailed Design and Issue Modification Package	Aug. 2017	Started	
Begin Online Portion of the Installation	Oct. 2017	Not Started	
Complete Online Installation	Oct. 2018	Not Started	
Begin Outage Portion of the Installation	Oct. 2018	Not Started	
Complete Outage Installation and put system into service	Nov. 2018	Not Started	
Phase 2 Procedure Changes Active			
Operations Procedure Changes	Oct. 2018	Not Started	

Milestone	Target Completion Date	Activity Status	Comments
Phases 1 and 2 HCVS Milestone Table			
Developed			
Site Specific Maintenance Procedure Developed	Oct. 2018	Not Started	
Procedure Changes Active	Oct. 2018	Not Started	
Phase 2 Training:			
Training Complete	Oct. 2018	Not Started	
Phase 2 Completion			
U3 Phase 2 HCVS Implementation	Nov. 2018	Not Started	
Submit Unit 3 Phase 1 and Phase 2 Full Compliance Report [60 days after full site compliance]	Jan. 2019	Not Started	

4 Changes to Compliance Method

The dose impact of HCVS on FLEX strategies has been evaluated. For Dresden, the Hardened Vent Line outside the Reactor Building (RB) is supported on a platform attached to the RB south wall. Previously, under flooding scenario, the FLEX Diesel Generators were to be staged on U2/3 Reactor Building Interlock roof to support FLEX strategies. U2 trackway is just below the HCVS platform, thus making it inaccessible during and after a venting event due to high dose rates. Consequently, the FLEX DGs will now be staged on the Turbine Deck (north side of RB) at elevation 561' where the dose rates are significantly lower and DGs can be operated to support FLEX strategies. FSG-62 provides details of FLEX Generator deployment during a flood.

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

Dresden 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. Phase 1 open item responses were discussed with NRC on June 1, 2017 and all items were adequately addressed and resolved. All additional information has been provided, and the Phase 1 open items are considered closed based on NRC review.

Combined Phases 1 and 2 OIP Open Items		Status
Item #	Phase 1 Open Items	
OI-1	Confirm that at least 6 hours battery coping time is available.	Closed to ISE Open Item number 1.
OI-2	Determine actions to enable wetwell (WW) venting following a flooding around the torus.	Closed to ISE Open Item number 2.
OI-3	Determine how Motive Power and/or HCVS Battery Power will be disabled during normal operation.	Closed to ISE Open Item number 3.
OI-4	Confirm that the Remote Operating Station (ROS) will be in an accessible area following a Severe Accident (SA).	Closed to ISE Open Item number 12.
OI-5	Confirm diameter on new common HCVS Piping.	Closed to ISE Open Item number 5.
OI-6	Confirm suppression pool heat capacity.	Closed to ISE Open Item number 6.
OI-7	Determine the approach for combustible gases.	Closed to ISE Open Item number 7.
OI-8	Provide procedures for HCVS Operation.	Closed to ISE Open Item number 18.
OI-9	Perform radiological evaluation for Phase 1 vent line impact on ERO response actions.	Complete with Dec. 2016 submittal.
Item #	Phase 2 Open Items	
OI-1	Determine SAWA flow control.	Complete with this submittal. EC 617659 describes SAWA flow control as below. The Dresden SAWA/SAWM strategy is illustrated in the case diagrams included in EC 617659. Different cases are identified

Combined Phases 1 and 2 OIP Open Items		Status
		based on which unit is experiencing a severe accident (SA) and which unit is implementing the FLEX strategy during both flooding and non-flooding scenarios. Two new portable manifolds (DCS 4.1.33) are designed to implement the SAWA strategy as described below: 1. <u>SAWA Manifold</u>: This manifold is positioned on the West side of the Reactor Building during non-flooding cases to direct/manage water flow as required. During flooding cases, this manifold is positioned in the Turbine Building at Floor El. 538'. This manifold is labeled as "SAWA Manifold" on the case diagrams. Note that the maximum flood level for Dresden is EL 529' including wave run-up. This manifold is equipped with a flow meter capable of measuring flow in the range of 80 to 2300 gpm. The flow meter uses a paddle wheel to determine flow and is, therefore, not sensitive to the conductivity of the water. 2. <u>Unit 3 FLEX Manifold</u>: Background: As part of the original FLEX strategy, a manifold was required to direct flow to station FLEX loads (Ref. ECs 394205 & 394206). Only one manifold was required for both units since both units remained accessible during FLEX (no core damage). The installed manifold is located on El. 545'. Similar functionality is required on the Unit 3 side to supply the required FLEX loads to Unit 3. A portable manifold will be utilized to implement this strategy.

Combined Phases 1 and 2 OIP Open Items		Status
OI-2	Resolve location of the FLEX DG to mitigate radiological consequences during severe accident conditions.	Complete with Dec. 2016 submittal.
OI-3	Validate time-line for Reactor Building hose connections does not exceed 1 hour.	Started

Item #	Phase 1 Interim Staff Evaluation Open Items	Status
ISE-1	Make available for NRC staff audit documentation confirming that at least 6 hours battery coping time is available.	Complete with June 2016 submittal.
ISE-2	Make available for NRC staff audit documentation that confirms the ability to operate HCVS following flooding around the suppression pool.	Complete with Dec. 2016 submittal.
ISE-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.	Complete with June 2016 submittal.

ISE-4	Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Complete with this submittal. The seismic and tornado missile design criteria for the HCVS stack is provided in the DCS Section 4.1.38 of EC 400578. The HCVS stack qualifications are provided in calculation DRE15-0038. Dresden does not require the consideration of contingencies discussed in Assumption No. 3 in HCVS white paper HCVS-WP-04. The Dresden HCVS vent pipes external to the missile-protected structure were installed greater than 30 feet above grade supported by a robust structural steel tower and have a target area less than ~300 ft^2. The pipes are 10" diameter Schedule 40 steel pipes. Dresden's HCVS systems are enveloped by the assumptions in the generic evaluation in Section 3 of HCVS-WP-04 and it is, therefore, concluded that the HCVS is unlikely to be damaged in a manner that prevents containment venting by a wind-generated missile from the same wind event that generates an ELAP or LUHS. In addition to the reasonable assurance evaluation in HCVS-WP-04; Dresden has two design basis missiles, the 1" diameter by 3 feet long steel rod (8 lbs.) and the 13.5" diameter by 35 feet long utility pole (1490 lbs.). Large mass tornado missiles are not considered credible above an elevation of 30 feet above grade, as discussed in HCVS-WP-04 and in the Design Considerations Summary (DCS) Section 4.1.38 of EC 400578. Therefore, only the 1" diameter steel rod missile is considered above 30 feet elevation. Dresden's HCVS pipe thickness is nominally 0.365" thick and the thickness of steel required to stop the 1" diameter steel rod missile is 1" thick steel. Therefore, the missile

		would penetrate the pipe section but is unlikely to crimp the pipe. This is discussed in the design criteria for the HCVS external piping and supporting structure in the DCS Section 4.1.38 of EC 400578. Applicable sections of EC 400578 and DRE15-0038 are available for NRC review on the ePortal.

ISE-5	Make available for NRC staff audit documentation of the licensee design effort to confirm the diameter on the new common HCVS piping.	Complete with June 2016 submittal.
ISE-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 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.	Complete with June 2016 submittal.
ISE-7	Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Complete with Dec. 2016 submittal.
ISE-8	Make available for NRC staff audit documentation of a determination of seismic adequacy for the ROS location.	Complete with Dec. 2016 submittal.
ISE-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	Complete with June 2016 submittal.

	accident conditions.	
ISE-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 with June 2016 submittal.
ISE-11	Provide descriptions of design details that minimize unintended cross flow of vented fluids within a unit and between units on the site.	Complete with June 2016 submittal.
ISE-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.	Complete with Dec. 2016 submittal.
ISE-13	Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Complete with Dec. 2016 submittal.
ISE-14	Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Complete with Dec. 2016 submittal.
ISE-15	Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Complete with Dec. 2016 submittal.

ISE-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.	Complete with Dec. 2016 submittal.
ISE-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.	Complete with Dec. 2016 submittal.
ISE-18	Make available for NRC staff audit procedures for HCVS operation.	Complete with Dec. 2016 submittal.

Item #	Phase 2 Interim Staff Evaluation Open Items	Status
ISE-1	Make available for NRC an evaluation for the locations of the SAWA equipment and controls, as well as ingress and egress paths for the expected Severe Accident conditions (temperature, humidity, radiation) for the Sustained Operating period.	Complete with this submittal. **Equipment and Controls** Plant instrumentation for SAWM that is qualified to RG 1.97 or equivalent is considered qualified for the sustained operating period without further evaluation. The following plant instruments are qualified to RG 1.97: DW Pressure 2(3)-1640-11A(B) Suppression Pool Level 2(3)-1640-10A(B) Passive components that do not need to change state after initially establishing SAWA flow do not require evaluation beyond the first 8 hours, at which time they are expected to be installed and ready for use to support SAWA/SAWM. **SAWA/SAWM flow instrument.** EC 617659 DCS section 4.1.36 describes details of SAWA flow meter. This flow meter will be attached to the SAWA manifold where flow rate will be measured and controlled. **SAWA/SAWM pump** SAWA/SAWM pump is a diesel driven and trailer mounted pump to be staged near the Cribhouse Intake. The pump is hydraulically driven with the hydraulic unit on the trailer and the pump head to be lowered in the Cribhouse Intake by the trailer mounted crane. Pump details are provided in EC 617659 DCS section 4.1.33 **SAWA/SAWM generator** Two FLEX generators (800 KW each) are

		onsite. One generator is in robust FLEX Building A. The second generator is in FLEX Building C, which is not robust. For flooding scenario, these generators will be moved to the Turbine Deck at EL 561' as part of flood preparations. These generators will support SAWA/SAWM phases. **Ingress and Egress** For locations outside the Reactor Building between 7 hours and 7 days when SAWA is being utilized, a quantitative evaluation (DRE16-0010) of expected dose rates has been performed per HCVS-WP-02 and found the dose rates at deployment locations including ingress/egress paths are acceptable. DRE16-0010 is provided on ePortal for NRC Staff review.

ISE-2	Make available for NRC staff an evaluation showing that instrumentation and equipment being used for SAWA and supporting equipment is capable to perform for the sustained operating period under the expected temperature and radiological conditions.	Complete with this submittal. Actions taken within the first 1.3 hour (prior to start of core damage for Dresden) from the start of the ELAP are acceptable from an environmental and radiological perspective without further evaluation. Actions performed within the MCR are acceptable for the entire period of Sustained Operation per HCVS-FAQ-06 Assumption 049-21. For actions within the Reactor Building and between 1.3 and 7 hours, a quantitative evaluation of expected dose rates has been performed (DRE16-0010) per HCVS-FAQ-12 and found the dose rates at deployment locations including ingress/egress paths are acceptable. For locations outside the Reactor Building between 7 hours and 7 days when SAWA is being utilized, a quantitative evaluation (DRE16-0010) of expected dose rates has been performed per HCVS-WP-02 and found the dose rates at deployment locations including ingress/egress paths are acceptable. DRE16-0010 is provided on ePortal for NRC Staff review.
ISE-3	Make available for NRC staff supporting documentation demonstrating that containment failure as a result of overpressure can be prevented without a drywell vent during severe accident conditions.	Complete with this submittal. The wetwell vent has been designed and installed to meet NEI 13-02 Rev 1 guidance, which will ensure that it is adequately sized to prevent containment overpressure under severe accident conditions. The SAWM strategy will ensure that the wetwell vent remains functional for the period of sustained operation. Dresden will follow the guidance (flow rate and timing) for SAWA/SAWM described in BWROG-TP-15-

<table>
<tr><td></td><td></td><td>008 and BWROG-TP-15-011. These documents have been posted to the ePortal for NRC staff review. The wetwell vent will be opened prior to exceeding the PCPL value as shown on Fig D of Dresden EOP procedures. Therefore, containment over pressurization is prevented without the need for a drywell vent.

DEOP-100 is provided on ePortal for NRC Staff review.</td></tr>
<tr><td>ISE-4</td><td>Make available for the NRC staff a description of 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.</td><td>Complete with this submittal.

From the combined Phases 1 and 2 OIP Figure 2.1.C, Dresden parameters are compared to the reference plant parameters as shown below:

<table><tr><th>Reference Plant[1]</th><th>Dresden</th></tr><tr><td>Torus freeboard volume is 525,000[1] gallons</td><td>Torus freeboard volume is 1,021,500 gallons</td></tr><tr><td>SAWA flow is 500 GPM at 8 hours followed by 100 GPM from 12 hours to 168 hours</td><td>SAWA flow is 421 GPM at 8 hours followed by 85 GPM from 12 hours to 168 hours</td></tr><tr><td colspan="2">The above parameters for Dresden compared to the reference plant that determine success of the SAWM strategy demonstrate that the reference plant values are bounding. Therefore, the SAWM strategy implemented at Dresden makes it unlikely that a DW vent is needed to prevent containment overpressure related failure.</td></tr></table></td></tr>
<tr><td>ISE-5</td><td>Make available for NRC staff documentation that demonstrates adequate communication between the MCR and the operator at the FLEX pump during severe accident conditions.</td><td>Complete with this submittal.

Dresden utilizes FSG-39, “FLEX Communication Options” to communicate between the MCR and remote locations such as the intake structure (Cribhouse Intake), FLEX pump in the RB basement level and SAWA flow control manifold.

This communication method is the same as accepted in Order EA-12-049. These items</td></tr>
</table>

[1] Peach Bottom available freeboard volume in gallons is estimated from nominal water level of 14.7 feet to 21 feet. 21 feet is the upper range of the wide range torus level instrument and the assumed loss of wetwell vent function. The Peach Bottom torus is 31 feet in diameter.

<table>
<tr><td></td><td></td><td>will be powered and remain powered using the same methods as evaluated under EA-12-049 for the period of sustained operation, which may be longer than identified for EA-12-049.

FSG-39 is provided on ePortal for NRC Staff review.</td></tr>
<tr><td>ISE-6</td><td>Make available for the NRC staff the SAWM flow instrumentation qualification for the expected environmental conditions.</td><td>Complete with this submittal.

The Design Consideration Summary of EC 617659, section 4.1.36 provides the following details of the SAWA/SAWM flow meter.

For locations outside the Reactor Building between 7 hours and 7 days when SAWA is being utilized, Dresden performed a quantitative evaluation of expected dose rates per HCVS-WP-02 and found the dose rates at deployment locations including ingress/egress paths are acceptable. The selected instrument is designed for the expected flow rate, temperature and pressure for SAWA over the period of sustained operation.

<table><tr><th>SAWA Flow Instrument Qualification</th><th>Expected SAWA Parameter Range</th></tr><tr><td>80-2300 GPM</td><td>85 – 421 GPM*</td></tr><tr><td>0 – 125 °F Operating
0 – 185 °F Storage</td><td>-6 – 94 °F</td></tr><tr><td>0 -300 PSI</td><td>0 -200 PSI</td></tr></table>* For 4” piping, this corresponds to flow velocities between approximately 2 ft/s and 11 ft/s

The new flow meter is an FRC model FTA500. The unit is powered by an internal lead acid battery which will power the flow meter for 6 hours under normal expected operating conditions. Operating and storage temperatures of the flow meter are limited by the battery used. Colder ambient temperatures reduce the life expectancy and capacity of the internal battery. In order to conserve battery power, the flow meter will only be turned on when determining the flow</td></tr>
</table>

		required during a SAWA event. As a backup, the flow meter may be powered by a 120/240 VAC source, which can be provided from the FLEX diesel generator or other small portable generator available as part of the existing FLEX equipment inventory. The flow meter uses a paddle wheel to determine flow and is, therefore, not sensitive to the conductivity of the water. The flow meter is only used when changing the flow through the manifold and can be disconnected and brought to a warmer location such as a FLEX equipment deployment/refueling vehicle as a means to extend battery capacity when not required or powered from an external power source. The flow meter electronics including battery can be disconnected from and reconnected to the flow meter body without disruption of SAWA flow or removal of the flow meter body from the SAWA flow path. The body of the SAWA flow meter will remain at or near the process flow temperature at or above 32°F due to the continuous SAWA flow. The SAWA flow meter is qualified for the expected environmental conditions that may exist over the period of Sustained Operation. The instrument requires at least 10 ft. of 4" diameter hose upstream of the instrument for an accurate flow indication. Therefore, the 10 ft. of 4" diameter hose will be installed between the SAWA manifold and the flow meter. EC 617659, DCS is provided on ePortal for NRC Staff review.

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. Dresden's 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, "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, "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. Dresden's Combined Phase 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 December 16, 2015.
7. 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).
8. NRC Order Number EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents, dated March 12, 2012.
9. Regulatory Correspondence RS-16-106, Dresden's 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.

10. Regulatory Correspondence RS-16-232, Dresden's 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), dated December 14, 2016.