

June 18, 2015

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

Duane Arnold Energy Center  
Docket No. 50-331  
Renewed Facility Operating License No. DPR-49

NextEra Energy Duane Arnold, LLC's Six-Month Status Report 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. Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013 (ML13130A067)
  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," dated November 14, 2013 (ML13304B836)
  3. NRC Endorsement of Industry "Hardened Containment Venting (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0," (ML14128A219)
  4. NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109, Revision 0," dated November 2013
  5. NextEra Energy Duane Arnold LLC'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 December 10, 2014 (ML14349A324)

On June 6, 2013, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to NextEra Energy Duane Arnold, LLC. Reference 1 was immediately effective and directs NextEra Energy Duane Arnold, LLC (hereafter NextEra Energy Duane Arnold) to install 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. Specific requirements are outlined in Attachment 2 of Reference 1.

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Reference 1 required submission of a phase 1 overall integrated plan pursuant to Section IV, Condition D. Reference 2 endorses industry guidance document NEI 13-02, Revision 0 (Reference 4) with clarifications and exceptions identified in Reference 2. Reference 5 provided the NextEra Energy Duane Arnold LLC overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 2 (and 4) provides direction regarding the content of the status reports. The purpose of this letter is to provide the six-month status report pursuant to Section IV, Condition D, 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.

This letter contains no new regulatory commitments, however, there are several updates to design detail since the submittal of Reference 5.

If you have any questions regarding this report, please contact Ken Putnam at 319-851-7238.

I declare under penalty of perjury that the foregoing is true and correct.  
Executed on June 18, 2015.



T. A. Vehec  
Vice President, Duane Arnold Energy Center  
NextEra Energy Duane Arnold, LLC

Enclosure

cc: Director, Office of Nuclear Reactor Regulation  
USNRC Regional Administrator Region III  
USNRC Project Manager, Duane Arnold Energy Center  
USNRC Resident Inspector, Duane Arnold Energy Center

Enclosure to NG-15-0169

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Containment Vents Capable of Operation Under Severe Accident Conditions  
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7 pages follow

**Introduction**

NextEra Duane Arnold Energy Center, LLC developed an Overall Integrated Plan (Reference 1 on page 3), documenting the planned 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 attachment 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.

**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 1, 2015:

- Initial Outage for Phase 1 Planning
- Submit Six Month Status Reports

**Milestone Schedule Status**

The following provides an update to Part 5 of the 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. There are no changes to the current target dates in the Overall Integrated Plan at this time.

Milestone	Target Completion Date	Activity Status	Comments/ Date Changes
<b>Phase 1 HCVS Milestone Table</b>			
Issue preliminary/conceptual design report	Jun 2014	Complete	
Submit Overall Integrated Implementation Plan	Jun 2014	Complete	
Initial Outage for Phase 1 Planning	Nov 2014	Complete	
Submit 6 Month Status Report	Dec 2014	Complete	
Submit 6 Month Status Report	Jun 2015	Complete	
Submit 6 Month Status Report	Dec 2015	Not Started	
Design Complete Phase 1	Mar 2016	Started	
Submit 6 Month Status Report	Jun 2016	Not Started	
Operations Procedure Changes Developed Phase 1	Oct 2016	Not Started	

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Milestone	Target Completion Date	Activity Status	Comments/ Date Changes
<b>Phase 1 HCVS Milestone Table</b>			
Site Specific Maintenance and Testing Procedures Developed Phase 1	Oct 2016	Not Started	
Training Complete Phase 1	Oct 2016	Not Started	
Implementation Outage Phase 1	End of RFO25	Not Started	
Procedure Changes Active Phase 1	End of RFO25	Not Started	
Walk Through Demonstration/Functional Test Phase 1	End of RFO25	Not Started	
Submit Completion Report	60 days after RFO25	Not Started	

**Changes to Compliance Method**

There are several updates to the design detail since the previous submittal in December 2014 resulting in the following changes to the compliance method:

- 1) The location of the Remote Operating Station (ROS) has moved from the 1A4 Essential Switchgear Room in the Control Building to outside the 1A3 Essential Switchgear Room in the Turbine Building.
- 2) The routing of the new containment hardened vent system (HCVS) piping has changed from utilizing an existing containment penetration that supports normal venting to the Standby Gas Treatment System to using an existing spare penetration off the suppression pool. The vent piping will be routed into the south reactor building stairwell, up to the refuel floor and out the reactor building roof, reference Attachment A.
- 3) The HCVS piping will contain two new primary containment isolation valves and a new rupture disk as shown in Attachment A.
- 4) Attachment B is an updated listing of the HCVS instrumentation. It should be noted that the Interim Staff Evaluation (ISE) inadvertently listed a vent pipe process pressure indicator which will not be part of the Duane Arnold design.

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

NextEra Duane Arnold Energy Center, LLC expects to comply with the order implementation date and no relief/relaxation is required at this time.

**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.

<b>Overall Integrated Plan Phase 1 Open Item</b>	<b>Status</b>
Confirm secondary containment bypass leakage is acceptable without an installed rupture disk or retain an appropriated disk	Started
Perform severe accident evaluation for FLEX DG and replacement gas to confirm accessibility for use for post 24 hour actions	Started
Evaluate tornado/missile effects on HCVS components above the protected area of the Reactor Building	Started
Evaluate the system design for H <sub>2</sub> /CO measures to be taken	Started

<b>Interim Staff Evaluation Open Item</b>	<b>Status</b>
Make available for NRC staff audit documentation of licensee confirmation that secondary containment leakage is acceptable without an installed rupture disk or that an appropriate rupture disk, including procedures for rupture during HCVS operation, is included in the HCVS design.	Started
Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one (1) 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
Make available for NRC staff audit evaluations of tornado missile effects on HCVS components above the protected area of the reactor building.	Started
Make available for NRC staff audit additional detail on the design features that minimize unintended cross flow of vented fluids within a unit, including a one line diagram containing sufficient detail to confirm the description in the OIP.	Started

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<b>Interim Staff Evaluation Open Item</b>	<b>Status</b>
Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Started
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
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
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
Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Started
Make available for NRC staff audit the final sizing evaluation for pneumatic N2 supply.	Started
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.	Eliminated (See Note 1)
Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Started
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, and etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	Started
Provide a justification for deviating from the instrumentation seismic qualification guidance specified in NEI13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.	Eliminated (See Note 2)

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- Note 1: Due to design changes in vent location and routing, existing containment isolation valves will no longer be used for venting. New vent design will utilize a spare torus penetration with two new primary containment isolation valves and a rupture disk.
- Note 2: The qualification method used for each HCVS instrument will be to the IEEE 344-2004 standard or a substantially similar industrial standard and therefore will not be deviating from NEI 13-02 or JLD-ISG-2013-02.

### **Interim Staff Evaluation Impacts**

There are two potential impacts to the Interim Staff Evaluation identified at this time:

- 1) One ISE Open Item will be eliminated because the Hardened Pipe Vent will no longer use existing containment isolation valves. The revised vent pipe routing will instead use an existing spare torus penetration and install two new containment isolation valves and a rupture disk. An evaluation will be done to ensure the two new containment isolation valves will open under the maximum expected differential pressure during BDBEE and severe accident wetwell venting.
- 2) It should be noted that the Interim Staff Evaluation (ISE) inadvertently listed a vent pipe process pressure indicator which will not be part of the Duane Arnold design.

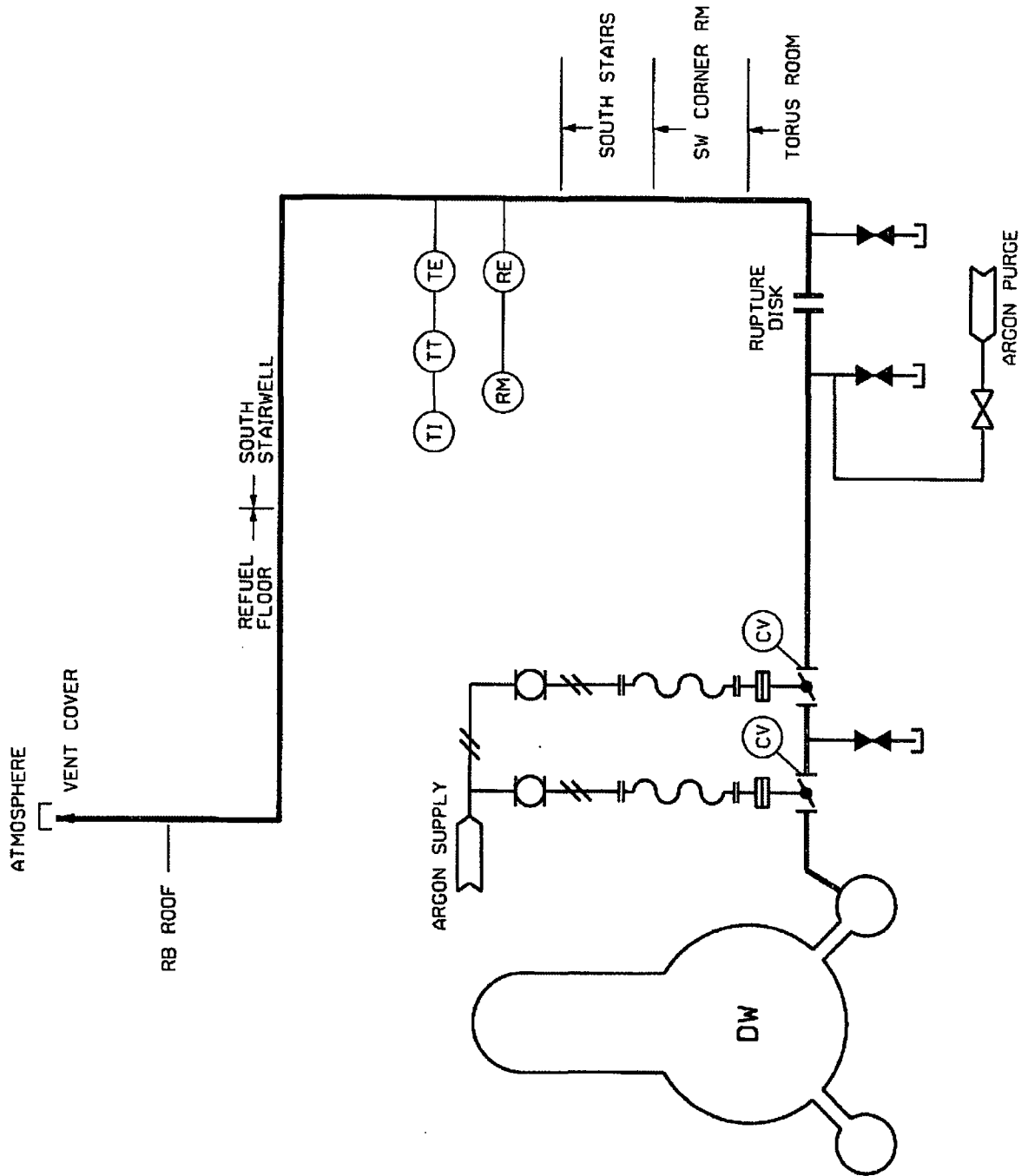
### **References**

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

1. NextEra Duane Arnold Energy Center, LLC'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 25, 2014 (ML14182A423).
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 (ML13130A067).
3. NEI 13-02, "Industry Guidance for Compliance with NRC Order EA-13-109, Revision 0," dated November 2013.
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 14, 2013 (ML13304B836).
5. NRC Endorsement of industry "Hardened Containment Venting System (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0" (ML14128A219).



Attachment A – Updated Layout of Proposed HCVS



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Attachment B - HCVS Indication Instruments

Instrument Parameter	New/ Existing	Indication Location	Function
HCVS System Effluent Temperature	New	MCR	Provides indication of open vent path. Installed in MCR to comply with EA-13-109.
HCVS Pneumatic Supply Pressure	New	ROS	Provides an indication of compressed gas to determine when bottle(s) need to be replaced to ensure pressure is adequate to operate two PCIVs (multiple cycles), blow the rupture disk for vent use and for purging the vent line to prevent hydrogen detonation. Installed locally at the ROS to comply with EA-13-109.
HCVS System Valve Position Indication	New	MCR	Provides operators a position indication for each PCIV using lights to comply with EA-13-109.
HCVS System Radiation Monitor	New	MCR	Provides indication of order of magnitude of radiation and indication of open vent path.
HCVS UPS Status Indication	New	ROS	Provides indication of UPS voltage status.
Compressed Gas Flow Totalizer	New	MCR & ROS	Provides compressed gas volume indication.
Torus Air Pressure - PI4395A/B (0-100 psig)	Existing	MCR 1C03	Provides indication of Torus Pressure.