Exelon Generation.
Constellation Energy Nuclear Group, LLC

Maria Korsnick
Senior Vice President, Northeast Operations
Chief Nuclear Officer, CENG

100 Constellation Way
Suite 500P
Baltimore, MD 21202

410-470-5133 Office
443-213-6739 Fax
www.exeloncorp.com
maria.korsnick@exeloncorp.com

June 27, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Nine Mile Point Nuclear Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-63 and NPF-69
Docket Nos. 50-220 and 50-410

Subject: Overall Integrated Plan per Order EA-13-109 Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions

References:

(1) 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 (ML13143A321)

(2) Interim Staff Guidance (JLD–ISG), 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 (ML13130A067).

(3) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Nine Mile Point Nuclear Station, Units 1 and 2, Answer Order EA-13-109 Modifying Licenses with regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, dated June 21, 2013 (ML13175A360)

(4) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Nine Mile Point Nuclear Station, Unit 2, Response per Order EA-13-109 Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, dated December 12, 2013

(5) 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 0, dated November 2013 (ML13316A853)

(6) Letter from D. Skeen (NRC) to J. E. Pollock (NEI), NRC Acknowledgement of NEI 13-02 Phase 1 Overall Integrated Plan Template, dated May 14, 2014 (ML14128A219)

A153
NRR

(7) Letter from J. G. Partlow (NRC) to All Holders of Operating Licenses for Nuclear Power Reactors with Mark I Containments, Installation of a Hardened Wetwell Vent (Generic Letter 89-16), dated September 1, 1989 (ML031140220)

(8) NRC Order Number EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents, dated March 12, 2012 (ML12054A694)

On June 6, 2013, the Nuclear Regulatory Commission (NRC) issued Order EA-13-109 (Reference 1) to all licensees that operate boiling-water reactors (BWRs) with Mark I and Mark II containments 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 the 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).

In Reference (3), Nine Mile Point Nuclear Station, LLC (NMPNS) Unit 1 (NMP1) and Unit 2 (NMP2) consented to Order EA-13-109. In addition, NMP2 provided a twenty (20) day response to Paragraph IV.C.1 of Order EA-13-109 in Reference (4). It defined that implementation of the Phase 1 requirements described in Attachment 2 of Order EA-13-109 will cause NMP2 to be in violation of the provisions of 10 CFR 50, Appendix A, General Design Criterion (GDC) 56, Primary Containment Isolation. As defined in Reference (4), NMP2 will be seeking an exemption from the requirement of 10 CFR 50, Appendix A, GDC 56.

Reference (1) requires submission of an Overall Integrated Plan by June 30, 2014, including a description of how compliance with the Phase 1 requirements described in Attachment 2 of Reference (1) will be achieved. The interim staff guidance (Reference 2) was issued November 14, 2013, which provides direction regarding the content of this Overall Integrated Plan. The purpose of this letter is to provide the NMP1 and NMP2 Overall Integrated Plans for Phase 1 requirements pursuant to Section IV, Condition D.1, of Reference (1).

This letter confirms NMP1 and NMP2 have received Reference (2) and have Phase 1 Overall Integrated Plans complying with the guidance for the purpose of ensuring the functionality of a HCVS to remove decay heat from the containment, and maintain control of containment pressure within acceptable limits following events that result in the loss of active containment heat removal capability while maintaining the capability to operate under SA conditions resulting from an ELAP as described in Attachment 2 of Reference (1).

Reference (5), Section 7.0 contains the specific reporting requirements for the Overall Integrated Plan. The information in Attachments 1 and 2 provide the NMP1 and NMP2 Overall Integrated Plans, respectively, pursuant to Section 7.0 of Reference (4) by use of the Phase I Overall Integrated Plan Template per Reference (6). The attached NMP1 and NMP2 Overall Integrated Plans are based on conceptual design information. Final design details as well as any revisions to the information contained in the Enclosure, will be provided in the 6-month Integrated Plan updates required by Section IV, Condition D.3, of Reference (1).

For the purposes of compliance with Phase 1 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, NMP1 and NMP2 plan to install a severe accident capable Wetwell vent.

Compliance with the requirements of Reference (1) will supersede any and all actions or commitments associated with References (7) and (8). Any actions or commitments made relative to Reference (7) or (8) are rescinded and not binding by submittal of the NMP1 and NMP2 Phase 1 Overall Integrated Plans via this letter.

This letter contains no new regulatory commitments.

If there are any questions regarding this submittal, please contact Bruce Montgomery, Acting Manager - Licensing, at 443-532-6533.

I declare under penalty of perjury that the foregoing is true and correct. This statement executed on the 27th day of June, 2014.

Sincerely,

Mary G Korsnick

MGK/STD

Attachments: (1) Nine Mile Point Unit 1 Overall Integrated Plan for Reliable Hardened Vents
(2) Nine Mile Point Unit 2 Overall Integrated Plan for Reliable Hardened Vents

cc: Director, Office of Nuclear Reactor Regulation
Regional Administrator, Region I, USNRC
Project Manager, USNRC
Resident Inspector, USNRC
Mr. William D. Reckley, NRR/JLD/PSB, NRC
Mr. Rajender Auluck, NRR/JLD/PSB, NRC
S. Gray, DNR

bcc: M. G. Korsnick
B. S. Montgomery
B. J. Dough
C. L. Behrend
V. K. Aggarwal
D. J. Distel
H. N. Trenka
C. R. Costanzo
J. J. Stanley
E. P. Perkins
T. H. Darling
C. R. Dedrickson
P. M. Amway
C. R. Merritt
K. A. Picciott
G. J. Wrobel
S. R. Tenace
S. T. Day, Jr.

Fleet Licensing Letter 14-025
NMP1L2940

COMMITMENTS IDENTIFIED IN THIS CORRESPONDENCE:	
None	
Responsible Person/Organization:	**NA**
Due Date:	**NA**
SAR/TSB Revision Required? No	**NA**
NL No.:	**NA**

Posting Requirements for Responses -- NOV/Order No

ATTACHMENT (1)

NINE MILE POINT UNIT 1 OVERALL INTEGRATED PLAN FOR RELIABLE HARDENED VENTS

Nine Mile Point Nuclear Station, LLC
June 27, 2014

Table of Contents:

Introduction

Part 1: General Integrated Plan Elements and Assumptions

Part 2: Boundary Conditions for Wetwell Vent

Part 3: Boundary Conditions for Drywell Vent

Part 4: Programmatic Controls, Training, Drills and Maintenance

Part 5: Milestone Schedule

Attachment 1: HCVS Portable Equipment

Attachment 2: Sequence of Events Timeline

Attachment 3: Conceptual Sketches

Attachment 4: Failure Evaluation Table

Attachment 5: References

Attachment 6: Changes/Updates to this Overall Integrated Implementation Plan

Attachment 7: List of Overall Integrated Plan Open Items

Introduction

In 1989, the NRC issued Generic Letter 89-16, "Installation of a Hardened Wetwell Vent," (Reference 2) to all licensees of Boiling Water Reactors (BWRs) with Mark I containments to encourage licensees to voluntarily install a hardened wetwell vent. In response, licensees installed a hardened vent pipe from the wetwell to some point outside the secondary containment envelope (usually outside the reactor building). Some licensees also installed a hardened vent branch line from the drywell.

On March 19, 2013, the Nuclear Regulatory Commission (NRC) Commissioners directed the staff per Staff Requirements Memorandum (SRM) for SECY-12-0157 to require licensees with Mark I and Mark II containments to "upgrade or replace the reliable hardened vents required by Order EA-12-050 with a containment venting system designed and installed to remain functional during severe accident conditions." In response, the NRC issued Order EA-13-109, *Issuance of Order to Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accidents*, June 6, 2013. The Order (EA-13-109) requires that licensees of BWR facilities with Mark I and Mark II containment designs ensure that these facilities have a reliable hardened vent to remove decay heat from the containment, and maintain control of containment pressure within acceptable limits following events that result in the 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).

The Order requirements are applied in a phased approach where:

- "Phase 1 involves upgrading the venting capabilities from the containment wetwell to provide reliable, severe accident capable hardened vents to assist in preventing core damage and, if necessary, to provide venting capability during severe accident conditions." (Completed "no later than startup from the second refueling outage that begins after June 30, 2014, or June 30, 2018, whichever comes first.")
- "Phase 2 involves providing additional protections for severe accident conditions through installation of a reliable, severe accident capable drywell vent system or the development of a reliable containment venting strategy that makes it unlikely that a licensee would need to vent from the containment drywell during severe accident conditions." (Completed "no later than startup from the first refueling outage that begins after June 30, 2017, or June 30, 2019, whichever comes first.")

The NRC provided an acceptable approach for complying with Order EA-13-109 through Interim Staff Guidance (ISG) (JLD-ISG-2013-02) issued in November 2013. The ISG endorses the compliance approach presented in NEI 13-02 Revision 0, *Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents*, with clarifications. Except in those cases in which a licensee proposes an acceptable alternative method for complying with Order EA-13-109, the NRC staff will use the methods described in this ISG (NEI 13-02) to evaluate licensee compliance as presented in submittals required in Order EA-13-109.

The Order also requires submittal of an overall integrated plan which will provide a description of how the requirements of the Order will be achieved. This document provides the Overall Integrated Plan (OIP) for complying with Order EA-13-109 using the methods described in NEI 13-02 and endorsed by NRC JLD-ISG-2013-02. Six month progress reports will be provided consistent with the requirements of Order EA-13-109.

The Nine Mile Point Unit 1 (NMP1) Hardened Containment Vent System (HCVS) venting actions for the EA-13-109 severe accident capable venting scenario can be summarized by the following:

- The HCVS will be initiated via manual action from the Main Control Room (MCR) or Remote Operating Station (ROS) at the appropriate time based upon procedural guidance in response to plant conditions from observed or derived symptoms.
- The HCVS will utilize Containment Parameters of Pressure and Level from the MCR instrumentation to monitor effectiveness of the venting actions.
- The vent operation will be monitored by HCVS valve position, temperature, pressure and effluent radiation levels.
- The motive force will be monitored and have the capacity to operate for 24 hours with installed equipment. Replenishment of the motive force will be by use of portable equipment once the installed motive force is exhausted.
- Venting actions will be capable of being maintained for a sustained period of up to 7 days.

Part 1: General Integrated Plan Elements and Assumptions

Extent to which the guidance, JLD-ISG-2013-02 and NEI 13-02, are being followed. Identify any deviations.

Include a description of any alternatives to the guidance. A technical justification and basis for the alternative needs to be provided. This will likely require a pre-meeting with the NRC to review the alternative.

Ref: JLD-ISG-2013-02

Compliance will be attained for Nine Mile Point Unit 1 (NMP1) with no known deviations to the guidelines in JLD-ISG-2013-02 and NEI 13-02 for each phase as follows:

- Phase 1 (wetwell): by the startup from the second refueling outage that begins after June 30, 2014, or June 30, 2018, whichever comes first. Currently scheduled for 2nd quarter 2017.
- Phase 2: by the startup from first refueling outage that begins after June 30, 2017, or June 30, 2019, whichever comes first. Currently scheduled for 2nd quarter 2019.

If deviations are identified at a later date, then the deviations will be communicated in a future 6 month update following identification.

State Applicable Extreme External Hazard from NEI 12-06, Section 4.0-9.0

List resultant determination of screened in hazards from the EA-12-049 Compliance.

Ref: NEI 13-02 Section 5.2.3 and D.1.2

The following extreme external hazards screen in for NMP1:

- Seismic, tornado, external flooding, extreme cold temperature, extreme high temperature, and ice/snow

The following extreme external hazards screen out for NMP1:

- Straight wind

Key Site assumptions to implement NEI 13-02 strategies.

Provide key assumptions associated with implementation of HCVS Phase 1 Strategies

Ref: NEI 13-02 Section 1

Mark I/II Generic HCVS Related Assumptions:

Applicable EA-12-049 (Reference 3) assumptions:

049-1. Assumed initial plant conditions are as identified in NEI 12-06, Section 3.2.1.2, items 1 and 2.

049-2. Assumed initial conditions are as identified in NEI 12-06, Section 3.2.1.3, items 1, 2, 4, 5, 6 and 8

049-3. Assumed reactor transient boundary conditions are as identified in NEI 12-06, Section 3.2.1.4, items 1, 2, 3 and 4

049-4. No additional events or failures are assumed to occur immediately prior to or during the event, including security events (Reference NEI 12-06, Section 3.2.1.3, item 9 [8])

049-5. At time=0 the event is initiated and all rods insert and no other event beyond a common site ELAP is occurring at any or all of the units.

049-6. At time=1 hour, actions begin as defined in EA-12-049 compliance.

Part 1: General Integrated Plan Elements and Assumptions

049-7. Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours

049-8. All activities associated with EA-12-049 (FLEX) that are not specific to implementation of the HCVS, including such items as debris removal, communication, notifications, Spent Fuel Pool (SFP) level and makeup, security response, opening doors for cooling, and initiating conditions for the events, can be credited as previously evaluated for FLEX.

Applicable EA-13-109 (Reference 4) generic assumptions:

109-1. Site response activities associated with EA-13-109 actions are considered to have no access limitations associated with radiological conditions while Reactor Pressure Vessel (RPV) level is above 2/3 core height (core damage is not expected).

109-2. Portable equipment can supplement the installed equipment after 24 hours provided the portable equipment credited meets the criteria applicable to the HCVS. An example is use of portable air compressors to recharge pneumatic lines. The use of this portable equipment must be evaluated to demonstrate that they can meet "SA capable" criteria that are defined in NEI 13-02, Section 4.2.4.2 and Appendix D, Section D.1.

109-3. SFP Level is maintained with either on-site or off-site resources such that the SFP does not contribute to the analyzed source term (Reference FAQ HCVS-07[18]).

109-4. Existing containment components design and testing values are governed by existing plant containment criteria (e.g., Appendix J) and are not subject to the testing criteria from NEI 13-02 (Reference FAQ HCVS-05[16] and NEI 13-02, Section 6.2.2[9]).

109-5. Classical design basis evaluations and assumptions are not required when assessing the operation of the HCVS. The reason that this is not required is that the order postulates an unsuccessful mitigation of an event such that an ELAP progresses to a severe accident with ex-vessel core debris that classical design basis evaluations are intended to prevent (Reference NEI 13-02, Section 2.3.1[9]).

109-6. HCVS manual actions require minimal operator steps and can be performed in the postulated thermal radiological environment at the location of the step (s) (e.g., load stripping, control switch manipulation, valving-in nitrogen bottles) are acceptable to obtain HCVS venting dedicated functionality (Reference FAQ HCVS-01[12]).

109-7. HCVS dedicated equipment is defined as vent process elements that are required for the HCVS to function in an ELAP event that progresses to core melt ex-vessel (Reference FAQ HCVS-02[13] and White Paper HCVS-WP-01[21]).

109-8. Use of MAAP Version 4 or higher provides adequate assurance of the plant conditions (e.g., RPV water level, temperatures, etc.) assumed for Order EA-13-109 Beyond Design Basis External Event (BDBEE) and SA HCVS operation (Reference FLEX MAAP Endorsement ML13190A201[29]). Additional analysis using RELAP5/MOD 3, GOTHIC, and MICROSHIELD, etc., are acceptable methods for evaluating environmental conditions in other portions of the plant, provided that the specific version utilized is documented in the analysis. Upper drywell temperatures will be determined as part of the Phase 2 evaluation and guidance development.

109-9. Utilization of NRC Published Accident evaluations (e.g. SOARCA, SECY-12-0157, NUREG 1465) as related to Order EA-13-109 conditions are acceptable as references (Reference NEI 13-02, Section 8[9]).

109-10. Permanent modifications installed or planned per EA-12-049 are assumed implemented and may be credited for use in Order EA-13-109 response.

109-11. This Overall Integrated Plan is based on Emergency Operating Procedure (EOP) changes consistent with Emergency Procedures Guidelines/Severe Accident Guidelines (EPG/SAGs) Revision 3 as

Part 1: General Integrated Plan Elements and Assumptions

incorporated per the sites EOP/Severe Accident Procedure (SAP) procedure change process.

109-12. Under the postulated scenarios of Order EA-13-109, the Main Control Room is adequately protected from excessive radiation dose as per General Design Criterion (GDC) 19 in 10CFR50 Appendix A and no further evaluation of its use as the preferred HCVS control location is required (Reference FAQ HCVS-01[12]). In addition, adequate protective clothing and respiratory protection is available if required to address contamination issues.

Plant Specific HCVS Related Assumptions/Characteristics:

NMP1-1 EA-12-049 (FLEX) actions to restore power are sufficient to ensure continuous operation of non-dedicated containment instrumentation identified on page 15 of the OIP.

NMP1-2 Modifications that allow a FLEX generator to be connected to a 600 volt safety related bus are assumed to have been installed such that a FLEX generator can be credited for HCVS operation beyond the initial 24 hour sustained operational period.

Part 2: Boundary Conditions for Wetwell Vent

Provide a sequence of events and identify any time or environmental constraint required for success including the basis for the constraint.

HCVS Actions that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, action to open vent valves).

HCVS Actions that have an environmental constraint (e.g. actions in areas of High Thermal stress or High Dose areas) should be evaluated per guidance.

Describe in detail in this section the technical basis for the constraints identified on the sequence of events timeline attachment.

See attached sequence of events timeline (Attachment 2)

Ref: EA-13-109 Section 1.1.1, 1.1.2, 1.1.3 / NEI 13-02 Section 4.2.1/6.1

The operation of the HCVS will be designed to minimize the reliance on operator actions in response to hazards listed in Part 1. Immediate operator actions will be completed by trained plant personnel and will include the capability for remote-manual initiation from the HCVS control station. A list of the remote manual actions performed by plant personnel to open the HCVS vent path can be found in the following table (Table 2-1). A HCVS Extended Loss of AC Power (ELAP) Failure Evaluation table, which shows alternate actions that can be performed, is included in Attachment 4.

Table 2-1 HCVS Remote Manual Actions

Primary Action	Primary Location/ Component	Notes
1. Power HCVS Control Panel	Key-locked switch at HCVS Control Panel in Main Control Room (MCR)	This action not required for alternate control
2. Open Torus inboard Containment Isolation Valve (NEW)	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
3. Open Torus outboard Containment Isolation Valve (NEW)	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
4. Open HCVS Control Valve (NEW)	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
5. Monitor electrical power status, pneumatic pressure, and HCVS vent conditions	HCVS Control Panel in MCR	This action not required for alternate control.

Part 2: Boundary Conditions for Wetwell Vent

6. Connect back-up power to HCVS battery charger	Reactor Building Track Bay	Prior to depletion of the dedicated HCVS power supply batteries (no less than 24 hours from initiation of ELAP)
7. Replenish pneumatic supply	Reactor Building Track Bay	Prior to depletion of the pneumatic nitrogen supply (no less than 24 hours from initiation of ELAP)

Attachment 2, Sequence of Events Timeline, was developed to identify required operator response times and potential environmental constraints. This timeline is based upon the following three sequences:

1. Sequence 1 is a based upon the action response times developed for NMP1 FLEX in a BDBEE without core damage. Containment venting is not required for NMP1 FLEX response since the Emergency Condensers (ECs) remove all the decay heat from the reactor and the containment does not become pressurized enough to require venting. NMP1 does not have a RCIC system or similar reactor steam driven injection system.
2. Sequence 2 is based on NUREG/CR-7110, Rev. 1 (Reference 25) (SOARCA) results for a ELAP with early loss of RCIC. For NMP1, it is assumed that the ECs fail to operate.
3. Sequence 3 is based on a SECY-12-0157 (Reference 26) ELAP with failure of RCIC because of subjectively assuming over injection. For NMP1, it is assumed that the ECs fail at 18 hours due to lack of makeup water for cooling. This time could be as soon as 8 hours, should FLEX fail to provide makeup water for the EC condensers. This event path is shown to demonstrate the timing for fuel failure and vessel breach.

Discussion of time constraints identified in Attachment 2

- Approximately 8 Hours, Initiate use of the HCVS per site procedures to maintain containment pressure below the lower of the primary containment pressure limit (PCPL) or containment design pressure. Initiation of the HCVS can be completed with manipulation of only 4 switches located within the MCR. The reliable operation of HCVS will be met because HCVS meets the seismic requirements identified in NEI 13-02 and will be powered by dedicated HCVS batteries with motive force supplied to HCVS valves from installed nitrogen storage bottles. HCVS controls and HCVS instrumentation will be provided from a panel installed in the MCR. Other containment parameter instrumentation associated with operation of the HCVS is available in the MCR. Operation of the system will be available from either the MCR or a ROS. Dedicated HCVS batteries will provide power for greater than 24 hours. Therefore, initiation of the HCVS from the MCR or the ROS within 8 hours is acceptable because of the simplicity and limited number of operator actions. Placing the HCVS in operation to maintain containment parameters within design limits for either BDBEE or SA venting would occur at a time further removed from ELAP declaration as shown in Attachment 2.
- 24 Hours, Replace/install additional nitrogen bottles or install portable air compressor. The nitrogen

Part 2: Boundary Conditions for Wetwell Vent

station will have extra connections so that new bottles can be added or an air compressor can be connected while existing bottles supply the HCVS. This can be performed at any time prior to 24 hours to ensure adequate capacity is maintained so this time constraint is not limiting.

- 24 Hours, Connect back-up power to HCVS battery charger. The HCVS batteries are calculated to last a minimum of 24 hours (Open Item #1). The HCVS battery charger will be able to be re-powered either from the 600VAC bus that will be re-powered from a portable diesel generator (DG) put in place for FLEX or locally (Reactor Building Track Bay) from a small portable generator. The DG will be staged and placed in service within 8 hours (Reference 1) and therefore will be available prior to being required. In the event that the DG is not available, a local connection will allow a small portable generator to be connected to the battery charger to provide power.

  [OPEN ITEM-1: Perform final sizing evaluation for HCVS batteries/battery charger and incorporate into FLEX DG loading calculation]

Discussion of radiological, temperature, other environmental constraints identified in Attachment 2

- Actions to initiate HCVS operation are taken from the MCR or from the ROS in the Turbine Building. Both locations have significant shielding and physical separation from radiological sources. Non-radiological habitability for the MCR is being addressed as part of the NMP1 FLEX response (Reference 1). The location in the Turbine Building has no heat sources and will have open doors to provide ventilation.
- Actions to replenish the pneumatic supply will be completed from the Turbine Building. The Turbine Building HCVS pneumatic supply, HCVS batteries and ROS are located on the north wall near the west roll up door. This wall makes up part of the south wall of the Reactor Building. The HCVS piping will exit the Reactor Building on the Northeast corner of the Reactor Building approximately 140' from ground elevation. Therefore, the location for pneumatic supply replenishment is shielded from the HCVS piping by the Reactor Building itself and is greater than approximately160' away from the piping.
- Actions to install the FLEX Portable DG will occur on the south side of the NMP1 Turbine Building and within the south end of the Turbine Building itself. The locations for installation (and control) of the DG are therefore shielded from HCVS piping by the Reactor Building and the Turbine Building and is greater than 500' away from the HCVS piping. In the event that this DG cannot be operated, the backup portable generator would be connected to the battery charger in the Turbine Building, similar to replacement of the pneumatic supply.

Provide Details on the Vent characteristics

Vent Size and Basis (EA-13-109 Section 1.2.1 / NEI 13-02 Section 4.1.1)

What is the plants licensed power? Discuss any plans for possible increases in licensed power (e.g. MUR, EPU).

What is the nominal diameter of the vent pipe in inches? Is the basis determined by venting at containment design pressure, PCPL, or some other criteria (e.g. anticipatory venting)?

Vent Capacity (EA-13-109 Section 1.2.1 / NEI 13-02 Section 4.1.1)

Indicate any exceptions to the 1% decay heat removal criteria, including reasons for the exception. Provide the heat capacity of the suppression pool in terms of time versus pressurization capacity, assuming suppression pool is the injection source.

Part 2: Boundary Conditions for Wetwell Vent

Vent Path and Discharge (EA-13-109 Section 1.1.4, 1.2.2 / NEI 13-02 Section 4.1.3, 4.1.5 and Appendix F/G)
Provides a description of Vent path, release path, and impact of vent path on other vent element items.

Power and Pneumatic Supply Sources (EA-13-109 Section 1.2.5 & 1.2.6 / NEI 13-02 Section 4.2.3, 2.5, 4.2.2, 4.2.6, 6.1)
Provide a discussion of electrical power requirements, including a description of dedicated 24 hour power supply from permanently installed sources. Include a similar discussion as above for the valve motive force requirements. Indicate the area in the plant from where the installed/dedicated power and pneumatic supply sources are coming

Indicate the areas where portable equipment will be staged after the 24 hour period, the dose fields in the area, and any shielding that would be necessary in that area.

Location of Control Panels (EA-13-109 Section 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.4, 1.2.5 / NEI 13-02 Section 4.1.3, 4.2.2, 4.2.3, 4.2.5, 4.2.6, 6.1.1. and Appendix F/G)
Indicate the location of the panels, and the dose fields in the area during severe accidents and any shielding that would be required in the area. This can be a qualitative assessment based on criteria in NEI 13-02.

Hydrogen (EA-13-109 Section 1.2.10, &1.2.11, and 1.2.12 / NEI 13-02 Section 2.3,2.4, 4.1.1, 4.1.6, 4.1.7, 5.1, & Appendix H)
State which approach or combination of approaches the plant will take to address the control of flammable gases, clearly demarcating the segments of vent system to which an approach applies

Unintended Cross Flow of Vented Fluids (EA-13-109 Section 1.2.3, 1.2.12 / NEI 13-02 Section 4.1.2, 4.1.4, 4.1.6 and Appendix H)
Provide a description to eliminate/minimize unintended cross flow of vented fluids with emphasis on interfacing ventilation systems (e.g. SGTS). What design features are being included to limit leakage through interfacing valves or Appendix J type testing features?

Prevention of Inadvertent Actuation (EA-13-109 Section 1.2.7/NEI 13-02 Section 4.2.1)
The HCVS shall include means to prevent inadvertent actuation

Component Qualifications (EA-13-109 Section 2.1 / NEI 13-02 Section 5.1)
State qualification criteria based on use of a combination of safety related and augmented quality dependent on the location, function and interconnected system requirements

Monitoring of HCVS (Order Elements 1.1.4, 1.2.8, 1.2.9/NEI 13-02 4.1.3, 4.2.2, 4.2.4, and Appendix F/G)
Provides a description of instruments used to monitor HCVS operation and effluent. Power for an instrument will require the intrinsically safe equipment installed as part of the power sourcing

Component reliable and rugged performance (EA-13-109 Section 2.2 / NEI 13-02 Section 5.2, 5.3)
HCVS components including instrumentation should be designed, as a minimum, to meet the seismic design requirements of the plant.

Components including instrumentation that are not required to be seismically designed by the design basis of

Part 2: Boundary Conditions for Wetwell Vent

the plant should be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. (Reference JLD-ISG-2012-01 and JLD-ISG-2012-03 for seismic details.)

The components including instrumentation external to a seismic category 1 (or equivalent building or enclosure should be designed to meet the external hazards that screen in for the plant as defined in guidance NEI 12-06 as endorsed by JLD-ISG-12-01 for Order EA-12-049.

Use of instruments and supporting components with known operating principles that are supplied by manufacturers with commercial quality assurance programs, such as ISO9001. The procurement specifications shall include the seismic requirements and/or instrument design requirements, and specify the need for commercial design standards and testing under seismic loadings consistent with design basis values at the instrument locations.

Demonstration of the seismic reliability of the instrumentation through methods that predict performance by analysis, qualification testing under simulated seismic conditions, a combination of testing and analysis, or the use of experience data. Guidance for these is based on sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," or a substantially similar industrial standard could be used.

Demonstration that the instrumentation is substantially similar in design to instrumentation that has been previously tested to seismic loading levels in accordance with the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges). Such testing and analysis should be similar to that performed for the plant licensing basis.

Vent Size and Basis

The HCVS wetwell path is designed for venting steam/energy at a minimum capacity of 1% of 1850 MW thermal power at pressure of 35 psig (Open Item #2). This pressure is the lower of the containment design pressure (62 psig) and the PCPL value (35 psig). The preliminary size of the wetwell vent piping for the HCVS is ≥ 10 inches in diameter which provides adequate capacity to meet or exceed the Order criteria.

[OPEN ITEM-2: Perform final vent capacity calculation for the Torus HCVS piping confirming 1% minimum capacity]

Vent Capacity

The 1% value at NMP1 assumes that the Torus has sufficient capacity to absorb the decay heat generated for a minimum of 3 hours without allowing containment pressure to exceed 43 psig (PCPL) after which point decay heat is less than or equal to 1%. The vent would then be able to prevent containment pressure from increasing above the PCPL. The duration of Torus decay heat absorption capability has been confirmed (Reference 30).

Vent Path and Discharge

The HCVS vent path at NMP1 utilizes the existing penetration piping for the Containment Vent and Purge System from the Torus up to the first Primary Containment Isolation Valve, VLV-201-16. The torus (wetwell) vent piping tees off from the existing penetration piping described above. The dedicated HCVS piping then continues up through the Reactor Building and exits the Reactor Building roof in the northeast corner to a discharge point approximately 3' above the highest point of the Reactor Building roof or any nearby structure.

Part 2: Boundary Conditions for Wetwell Vent

A new air-operated HCVS control valve will be provided in this piping, which will serve as both the primary method to control HCVS flow, therefore controlling containment pressure, and as a secondary containment isolation valve, as required by the design basis. The NMP1 vent path is completely separate from the Nine Mile Point Unit 2 (NMP2) vent path.

Power and Pneumatic Supply Sources
All electrical power required for operation of HCVS components will be provided by dedicated HCVS batteries with a minimum capacity capable of providing power for 24 hours without recharging. A preliminary sizing evaluation has been completed. A final confirmatory evaluation will be completed as part of the detailed design process when selection of electrical components is finalized (Ref Open Item #1). A battery charger is provided that requires a 240 VAC supply. This will be provided by a dedicated 600 VAC to 120/240 VAC transformer, which will be powered from a 600 VAC bus that will be re-powered by a diesel generator as part of the FLEX response. In addition, a connection point that utilizes standard electrical connections will be provided for a portable generator for sustained operation of the HCVS.

For the first 24 hours following the event, the motive supply for the AOVs will be dedicated nitrogen gas bottles that will be permanently installed and available. These bottles will be sized such that they can provide motive force for 12 cycles (open/close) of vent path operation (2 Primary Containment Isolation Valves (PCIVs) and 1 Pressure Control Valve (PCV)). A preliminary sizing evaluation has been completed. A final evaluation will be completed as part of the detailed design process when selection of the system AOVs is finalized (Open Item #3).

[OPEN ITEM-3: Perform final sizing evaluation for pneumatic Nitrogen (N2) supply]

Supplemental motive force (e.g., additional nitrogen gas bottles, air compressor), portable generators, and enough fuel for an additional 48 hours of operation will be stored on site in an area that is reasonably protected from assumed hazards consistent with the requirements of NEI 12-06. Pre-engineered quick disconnects will be provided to connect the supplemental motive force supply.

1. The HCVS flow path valves are air-operated valves (AOV) that are air-to-open and spring-to-shut. Opening the valves requires energizing a DC powered solenoid operated valve (SOV) and providing motive air/gas. A backup means of operation is also available that does not require energizing or repositioning the SOV.
2. An assessment of temperature and radiological conditions will be performed to ensure operating personnel can safely access and operate controls at the ROS based on time constraints listed in Attachment 2. (Open Item #4)

[OPEN ITEM-4: Perform confirmatory environmental condition evaluation for the Turbine Building in the vicinity of the ROS and HCVS dedicated pneumatic supply and batteries]

3. All permanently installed HCVS equipment, including any connections required to supplement the HCVS operation during an ELAP (electric power, N2/air) will be located in areas reasonably protected from the hazards listed in Part 1 of this report.
4. All valves required to open the flow path will be designed for remote manual operation following an ELAP, such that the primary means of valve manipulation does not rely on use of a handwheel, reach-rod, or similar means requiring close proximity to the valve (HCVS-FAQ-03, Reference 14). Any supplemental connections will be pre-engineered to minimize man-power resources and address

Part 2: Boundary Conditions for Wetwell Vent

environmental concerns. Required portable equipment will be reasonably protected from screened in hazards listed in Part 1 of this OIP.

5. Access to the locations described above will not require temporary ladders or scaffolding.

Location of Control Panels

The HCVS design allows for initiation, operation, and monitoring of the HCVS from either the MCR or the ROS. The MCR location is protected from adverse natural phenomena and is the normal control point for HCVS operation and Plant Emergency Response actions.

The ROS will be located on the north wall west in the Turbine Building. This location is protected from adverse natural phenomena, is readily accessible, well ventilated and is shielded from the HCVS piping by the Reactor Building. The NMP1 Turbine Building was designed to seismic loads in accordance with the building code and is considered seismically robust.

Hydrogen

As is required by EA-13-109, Section 1.2.11, the HCVS must be designed such that it is able to either provide assurance that a combustible mixture of gas is not credible or it must be able to accommodate the dynamic loading resulting from a combustible gas detonation. Piping upstream of the HCVS control valve will be protected by preventing the mix of oxygen with flammable gases. Several methods are available to protect piping downstream of the HCVS control valve. Methods being considered include installation of a purge system, installation of a flow-check valve near the end of the piping, designing the piping and HCVS control valve for gas detonation loading or utilize other design principles to preclude detonation. Final determination of the method to be used for the HCVS control valve and downstream piping is Open Item #5. NMP1 intends to follow the guidance in HCVS-WP-03, Hydrogen/CO Control Measures (Reference 23).

[OPEN ITEM-5: State which approach or combination of approaches the plant determines is necessary to address the control of combustible gases downstream of the HCVS control valve]

Unintended Cross Flow of Vented Fluids

The HCVS for NMP1 is fully independent of NMP2 with separate discharge points. Therefore, the capacity at each unit is independent of the status of the other unit's HCVS. The only interfacing system with the NMP1 HCVS is the short section of primary containment penetration piping upstream of the Containment Vent and Purge System inboard PCIV. This valve is normally closed, except during infrequent vent and purge operations, and fails closed upon loss of electrical power, instrument air and upon a containment isolation signal. This valve is leak tight and tested in accordance with the 10CFR50 Appendix J program. This valve is safety related and fully qualified in accordance with the Environmental Qualification (EQ) Program for NMP1. There are no additional interface systems for the proposed HCVS for the NMP1 wetwell vent.

Prevention of Inadvertent Actuation

EOPs/Emergency Response Guidelines provide clear guidance that the HCVS is not to be used to defeat containment integrity during any design basis transients and accidents. In addition, the HCVS is designed to provide features that prevent inadvertent HCVS flow path actuation due to a design error, equipment malfunction, or operator error. These design features include two normally closed/fail closed, in-series PCIVs that are air-to-open and spring-to-shut. A DC SOV must be energized to allow the motive air to open the valve. Although the same DC and motive air source will be used for each valve, separate control circuits including key-locked switches will be used for the two redundant valves to address single point vulnerabilities that may cause the flow path to inadvertently open. Power to the DC SOVs will be maintained de-energized and the

Part 2: Boundary Conditions for Wetwell Vent

key-lock switch will be required to be actuated to power the solenoids. Manual valves on the pneumatic supply from the nitrogen tanks will be locked in their normal position to maintain the valve closed.

Component Qualifications

The HCVS components downstream of the second containment isolation valve are located in seismically designed and constructed structures, including the ROS, pneumatic supply station, HCVS batteries, and HCVS battery charger.

HCVS components that directly interface with the primary containment pressure boundary and the HCVS control valve will be classified as safety-related in accordance with the design basis for NMP1. Likewise, any electrical or controls component which interfaces with Class 1E power sources will be classified as safety related up to applicable isolation devices (e.g., fuses, breakers), as their failure could adversely impact containment isolation and/or a safety-related power source. All safety-related components will be seismically and environmentally qualified in accordance with the design basis of the plant. Additional functionality evaluations for severe accident/boundary conditions specified in NEI 13-02 will be performed.

Interfacing HCVS components will be classified as augmented quality.

Qualification includes consideration of environmental conditions specified in NEI 13-02. HCVS components will be evaluated to ensure functionality following a design basis earthquake. Components that interface with the HCVS will be routed in seismically qualified structures or the structure will be analyzed for seismic ruggedness to ensure that any potential failure would not adversely impact the function of the HCVS or other safety related structures or components.

Instrumentation and controls components will also be evaluated for environmental conditions postulated for a severe accident, although these evaluations will not be considered part of the site Environmental Qualification (EQ) program.

HCVS instrumentation performance (e.g., accuracy and precision) need not exceed that of similar plant installed equipment. Radiation monitoring equipment accuracy will be sufficient to confirm flow of radionuclides through the HCVS.

The HCVS instruments, including valve position indication, process instrumentation, radiation monitoring, and support system monitoring, will be qualified by using one or more of the three methods described in the ISG, which includes:

1. Purchase of instruments and supporting components with known operating principles from manufacturers with commercial quality assurance programs (e.g., ISO9001) where the procurement specifications include the applicable seismic requirements, design requirements, and applicable testing.
2. Demonstration of seismic reliability via methods that predict performance described in IEEE 344-2004 (Reference 28).
3. Demonstration that instrumentation is substantially similar to the design of instrumentation previously qualified.

Part 2: Boundary Conditions for Wetwell Vent

Instrument	Qualification Method*
HCVS Process Temperature	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Pressure	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Radiation Monitor	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Valve Position	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Pneumatic Supply Pressure	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Electrical Power Supply Availability	ISO9001 / IEEE 344-2004 / Demonstration

* The specific qualification method(s) used for each required HCVS instrument will be reported in future 6 month status reports

[OPEN ITEM-6: Complete evaluation for environmental/seismic qualification of HCVS components]

Monitoring of HCVS

The NMP1 wetwell HCVS will be capable of being manually operated during sustained operations from a control panel located in the MCR and will meet the requirements of Order element 1.2.4. The MCR is a readily accessible location with no further evaluation required. MCR dose associated with HCVS operation conforms to GDC 19/Alternate Source Term (AST) for radiation shielding considerations (HCVS-FAQ-01, Reference 12). Additionally, to meet the intent for a secondary control location of section 1.2.5 of the Order, a readily accessible ROS will also be incorporated into the HCVS design as described in NEI 13-02 section 4.2.2.1.2.1. The controls at the ROS location will be accessible and functional under a range of plant conditions, including severe accident conditions with due consideration to source term and dose impact on operator exposure, extended loss of AC power (ELAP), and inadequate containment cooling.

The wetwell HCVS will include indications for HCVS valve position, vent pipe pressure, temperature, and effluent radiation levels to aid operator verification of HCVS function. Other important information on the status of supporting systems, such as power source status and pneumatic supply pressure, will also be included in the design and located to support HCVS operation. This instrumentation will be powered from the dedicated HCVS batteries, which provide a minimum of 24-hour supply.

Other instrumentation that supports HCVS function will be provided nearby in the MCR. This includes existing containment pressure and wetwell level indication. This instrumentation is not required to validate HCVS function and is therefore not powered from the dedicated HCVS batteries. However, these instruments are expected to be available since the FLEX DG that supports HCVS battery charger function after 24 hours also supplies the station battery charger for these instruments and will be installed prior to depletion of the station batteries (Reference 1).

The HCVS instruments, including valve position indication, process instrumentation, radiation monitoring, and support system monitoring, will be qualified as previously described.

Component reliable and rugged performance

Part 2: Boundary Conditions for Wetwell Vent

The HCVS vent path components that directly interface with the containment pressure boundary and the HCVS control valve and downstream piping will be classified as safety-related in accordance with the design basis for the plant. In addition, any electrical or controls component which interfaces with Class 1E power sources will be classified as safety related, as their failure could adversely impact containment isolation and/or a safety-related power source. All safety-related components will be seismically qualified in accordance with the NMP1 design basis. All other HCVS components, including piping and supports, electrical power supply, valve actuator pneumatic supply, and instrumentation (local and remote) will be designed for reliable and rugged operational performance that is capable of ensuring HCVS functionality following a design basis earthquake as required per Section 2.2 of EA-13-109.

For the HCVS instruments that are required after a potential seismic event, the following methods will be used to verify that the design and installation is reliable / rugged and therefore capable of ensuring HCVS functionality following a seismic event. Applicable instruments are rated by the manufacturer (or otherwise tested) for seismic impact at levels commensurate with those of postulated severe accident event conditions in the area of instrument component use using one or more of the following methods:

- demonstration of seismic motion consistent with that of existing design basis loads at the installed location.
- substantial history of operational reliability in environments with significant vibration with a design envelope inclusive of the effects of seismic motion imparted to the instruments proposed at the location.
- adequacy of seismic design and installation is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, *IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations* (Reference 28), or a substantially similar industrial standard.
- demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges)
- seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

HCVS components are located in the Reactor Building and Turbine Building. The Reactor Building and Control Building are safety-related, seismic class I structures. The Turbine Building is seismically designed in accordance with the plant design basis and will be evaluated for the external hazards, that screen in for the plant as defined in guidance NEI 12-06 as endorsed by JLD-ISG-12-01 for Order EA-12-049.

The instrumentation/power supplies/cables/connections (components) will be qualified for temperature, pressure, radiation level, and total integrated radiation dose up to 7 days for the Effluent Vent Pipe and HCVS ROS location. The qualification for the equipment by the supplier will be validated by NMP for the specific location at NMP1 to ensure that the bounding conditions envelope the specific plant conditions.

Conduit design will be in accordance with Seismic Class 1 criteria. Both existing and new barriers (if required) will be used to provide a level of protection from missiles when equipment is located outside of seismically qualified structures.

Part 2: Boundary Conditions for Wetwell Vent

Augmented quality requirements will be applied to the components installed in response to this Order unless higher quality requirements apply.

Part 2: Boundary Conditions for WW Vent - BDBEE Venting

Determine venting capability for BDBEE Venting, such as may be used in an ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section 1.1.4 / NEI 13-02 Section 2.2

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.6 / NEI 13-02 Section 2.5, 4.2.2

The operation of the HCVS will be designed to minimize reliance on operator actions for response to an ELAP and severe accident events. Immediate operator actions will be completed by qualified plant personnel from either the MCR or the HCVS ROS using remote-manual actions. The operator actions required to open a vent path are as described in Table 2-1. Remote-manual is defined in this report as a non-automatic power operation of a component and does not require the operator to be at or in close proximity to the component. No other operator actions are required to initiate venting.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR and will be able to be operated from an installed ROS as part of the response to this Order. Both locations minimize plant operators' exposure to adverse temperature and radiological conditions and are protected from hazards assumed in Part 1 of this report.

Permanently installed electrical power and motive air/gas capability will be available to support operation and monitoring of the HCVS for 24 hours. Power will be provided by installed batteries for up to 24 hours before generators will be required to be functional.

System control:

i. Active: The HCVS PCIVs and HCVS control valve are operated in accordance with EOPs/SAPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles of the vent path under ELAP conditions over the first 24 hours. Controlled venting will be permitted in the revised EOPs.

ii. Passive: Inadvertent actuation protection is provided by use of key-locked switches for both the HCVS power supply actuation and valve operation. The normal state of the system is de-energized and isolated.

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.4, 1.2.8 / NEI 13-02 Section 4.2.2

Actions required to extend venting beyond 24 hours include replenishment of pneumatic supplies and replenishment of electrical supply.

The pneumatic supply station will be installed in the Turbine Building and will include a nitrogen bottle station

Part 2: Boundary Conditions for WW Vent - BDBEE Venting

with additional connections for extra nitrogen bottles and/or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and refueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Turbine Building. This will include battery capacity sufficient for 24 hour operation. The normal power supply to the HCVS controls and instruments will be provided by the #12 Station Battery Bus, which in turn is re-powered by a 600 VAC diesel generator connected to the #12 Station Battery Charger as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the bus, a local 240 VAC connection to the UPS will allow the UPS to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment integrity. These flowcharts are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS implementation.

Identify modifications:
List modifications and describe how they support the HCVS Actions.

EA-12-049 Modifications

- A modification to install a connection point to allow a FLEX portable diesel generator to be connected to electrical DC power bus #12 is being installed. This will allow the DG to power the HCVS equipment and battery charger.

EA-13-109 Modifications

- A modification will be required to install the HCVS pneumatic supply station
- A modification will be required to install the dedicated HCVS batteries and battery charger
- A modification will be required to install required HCVS instrumentation and controls, including a radiation monitor. This also includes installation of control panels in the MCR and the ROS.
- A modification will be required to install dedicated HCVS piping, PCIVs and the HCVS control valve from the Vent and Purge System containment penetration piping to the HCVS discharge
- Additional modifications may be required to existing system isolation valves, piping, and piping supports.

Part 2: Boundary Conditions for WW Vent - BDBEE Venting

Key Venting Parameters:

List instrumentation credited for this venting actions. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)

Initiation, operation and monitoring of the HCVS venting will rely on the following key parameters and indicators. Indication for these parameters will be installed in the MCR to comply with EA-13-109:

Key Parameter	Component Identifier	Indication Location
HCVS Process Temperature	TBD	MCR/ROS
HCVS Process Pressure	TBD	MCR/ROS
HCVS Process Radiation Monitor	TBD	MCR/ROS
HCVS Process Valve Position	TBD	MCR/ROS
HCVS Pneumatic Supply Pressure	TBD	MCR/ROS
HCVS Electrical Power Supply Availability	TBD	MCR/ROS

Initiation and cycling of the HCVS will be controlled based on several existing MCR key parameters and indicators which are qualified to the existing plant design basis: (reference NEI 13-02 Section 4.2.2.1.9[9]):

Key Parameter	Component Identifier	Indication Location
Drywell pressure	PI 201.2-105A PI 201.2-106A PI 201.2-483A PI 201.2-484A	MCR
Torus pressure	PI 201.2-594A PI 201.2-595A	MCR
Torus level	LI 201.2-594C LI 201.2-595D LI 58-06A LI 58-05A	MCR

Notes: None

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting

Determine venting capability for Severe Accident Venting, such as may be used in an ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section 1.2.10 /NEI 13-02 Section 2.3

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.6 / NEI 13-02 Section 2.5, 4.2.2

The operation of the HCVS will be designed to minimize reliance on operator actions for response to an ELAP and severe accident events. Progression of the ELAP into a severe accident assumes that the FLEX strategies identified in the response to Order EA-12-049 have not been effective. Immediate operator actions will be completed by operators from either the MCR or the HCVS ROS using remote-manual actions. The operator actions required to open a vent path are as described in Table 2-1. Remote-manual is defined in this plan as a non-automatic power operation of a component and does not require the operator to be at or in close proximity to the component. No other operator actions are required to initiate venting under primary procedural protocol.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR and will be able to be operated from an installed ROS as part of the response to this Order. Both locations minimize plant operators' exposure to adverse temperature and radiological conditions and are protected from hazards assumed in Part 1 of this report. A preliminary evaluation of travel pathways for dose and temperature concerns has been completed and travel paths identified. A final evaluation of environmental conditions will be completed as part of detailed design for confirmation.

[OPEN ITEM-7: Complete evaluation for environmental conditions and confirm the travel path accessibility]

Permanently installed electrical power and motive air/gas capability will be available to support operation and monitoring of the HCVS for 24 hours. Power will be provided by installed batteries for up to 24 hours before generators will be required to be functional.

System control:

i. Active: The HCVS PCIVs and HCVS control valve are operated in accordance with EOPs/SOPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles of the vent path under ELAP conditions over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EOPs. The configuration of the new pneumatic supplies allows the HCVS system controls to override the containment isolation circuit on the PCIVs needed to vent containment.

ii. Passive: Inadvertent actuation protection is provided by use of key-locked switches for both the HCVS power supply actuation and valve operation. The normal state of the system is de-energized and closed.

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.4, 1.2.8 / NEI 13-02 Section 4.2.2

Actions required to extend venting beyond 24 hours include replenishment of pneumatic supplies and replenishment of electrical supply.

The pneumatic supply station will be installed in the Turbine Building and will include a nitrogen bottle station with additional connections for extra nitrogen bottles or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and refueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Turbine Building. The UPS will include battery capacity sufficient for 24 hour operation. The normal power supply to the HCVS controls and instruments will be provided by the #12 Station Battery Bus, which in turn is re-powered by a 600 VAC diesel generator connected to the #12 Station Battery Charger as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the bus, a local 240 VAC connection to the UPS will allow the UPS to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Both the pneumatic supply station and the HCVS batteries/battery charger are located in the Turbine Building north wall west. The Turbine Building is outside of the secondary containment boundary. The HCVS piping will exit the Reactor Building in the northeast corner of the Reactor Building. Therefore, the Reactor Building provides shielding for the Turbine Building. A preliminary evaluation of radiological and temperature concerns was completed. A final evaluation will be completed when the location of the ROS is finalized.

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment integrity. Similarly, severe accident procedures exist for when EOP actions do not halt the progression of the BDBEE to severe accident. These flowcharts/procedures are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS implementation.

Identify modifications:
List modifications and describe how they support the HCVS Actions.

Modifications are the same as for BDBEE Venting Part 2

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting
Key Venting Parameters: *List instrumentation credited for the HCVS Actions. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)*
Key venting parameters are the same as for BDBEE Venting Part 2
Notes: None

Part 2: Boundary Conditions for WW Vent – Support Equipment Functions

Determine venting capability support functions needed

Ref: EA-13-109 Section 1.2.8, 1.2.9 /NEI 13-02 Section 2.5, 4.2.4, 6.1.2

BDBEE Venting

Provide a general description of the BDBEE Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.

Ref: EA-13-109 Section 1.2.9 / NEI 13-02 Section 2.5, 4.2.2, 4.2.4, 6.1.2

Venting will require support from the HCVS batteries, battery charger, and pneumatic supply station being installed. These provide a minimum of 24 hour operation on installed supplies and provide connection points for additional pneumatic supplies (nitrogen bottles or compressor) and electrical supplies (portable generator)

Containment integrity is initially maintained by permanently installed equipment. All containment venting functions will be performed from the MCR or ROS.

The pneumatic supply station will be installed in the Turbine Building and will include a nitrogen bottle station with additional connections for extra nitrogen bottles or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and refueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Turbine Building. The UPS will include battery capacity sufficient for 24 hour operation. The normal power supply to the HCVS controls and instruments will be provided by the #12 Station Battery Bus, which in turn is re-powered by a 600 VAC diesel generator connected to the #12 Station Battery Charger as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the bus, a local 240 VAC connection will allow the battery charger to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Severe Accident Venting

Provide a general description of the Severe Accident Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.

Ref: EA-13-109 Section 1.2.8, 1.2.9 / NEI 13-02 Section 2.5, 4.2.2, 4.2.4, 6.1.2

The same support functions that are used in the BDBEE scenario would be used for severe accident venting.

Details:

Provide a brief description of Procedures / Guidelines:

Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment

Part 2: Boundary Conditions for WW Vent – Support Equipment Functions

integrity. Similarly, severe accident procedures exist for when EOP actions do not halt the progression of the BDBEE to severe accident. These flowcharts/procedures are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS.

Identify modifications:
List modifications and describe how they support the HCVS Actions.

- The FLEX modification to add connection points for the FLEX 600 VAC portable diesel generator to connect to the #12 Station Battery Charger and #12 Station Battery Bus supports re-powering the HCVS equipment.
- HCVS modification to add piping and connection points at a suitable location in the Turbine Building to connect portable N2 bottles or air compressor for motive force to HCVS components after 24 hours. Install HCVS batteries and battery charger with applicable connection to #12 station battery bus and connection for small portable generator.
- HCVS connections required for portable equipment will be protected from all applicable screened-in hazards and located such that operator exposure to radiation and occupational hazards will be minimized. Structures to provide protection of the HCVS connections will be constructed to meet the requirements identified in NEI-12-06 section 11 for screened in hazards.

Key Support Equipment Parameters:
List instrumentation credited for the support equipment utilized in the venting operation. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)

- Local control features of the FLEX DG electrical load and fuel supply.
- Local HCVS Battery supply voltage.
- Pressure gauge on supplemental Nitrogen bottles.

Notes: None

Part 2: Boundary Conditions for WW Vent – Venting Portable Equipment Deployment

Provide a general description of the venting actions using portable equipment including modifications that are proposed to maintain and/or support safety functions.

Ref: EA-13-109 Section 3.1 / NEI 13-02 Section 6.1.2, D.1.3.1

Venting actions using portable equipment include the following:

- Replacement and replenishment of pneumatic supply sources. This includes the option of replacing nitrogen bottles or connecting a portable air compressor. Equipment sufficient for an additional 48 hours of vent operation beyond the 24-hour installed supply would be pre-staged in the FLEX storage building. Installation of the HCVS includes installation of a pneumatic supply header that includes pneumatic regulators and utilizes standard pneumatic connections.
- Establishing temporary power to repower the battery charger. Option 1 is to connect the FLEX DG to Station Battery Charger #12, which provides power to Station Battery Bus #12 that in turn powers the HCVS equipment and battery charger. Option 1 would be completed as part of the FLEX response strategy and occurs to the south and inside the NMP1 Turbine Building. Option 2, to be taken if the FLEX DG cannot be connected to the Station Battery Charger #12, is to connect a small portable generator (approximately 2kW) to the HCVS battery charger. Option 2 would be taken locally at the battery charger. Either of these actions will also require the generators to be refueled. A one line diagram of the electrical system to be installed is included in Attachment 3.

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

Implementation procedures are being developed to address all HCVS operating strategies, including deployment of portable equipment. Direction to enter the procedure for HCVS operation will be given in the EOPs, the site ELAP procedure, and the SAPs. (refer to Part 4 for general information on procedures).

There is minimal impact to deployment actions since the HCVS discharge pipe will be located in the Northeast corner of the Reactor Building and deployment areas are the Northwest or on the South side of the Turbine Building. Therefore, the procedures/guidelines for HCVS actions are the same as for support equipment section.

Strategy	Modifications	Protection of connections
Per compliance with Order EA-12-049 (FLEX)	N/A	Per compliance with Order EA-12-049 (FLEX)

Notes: None

Part 3: Boundary Conditions for Drywell Vent

Provide a sequence of events and identify any time constraint required for success including the basis for the time constraint.

HCVS Actions that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walkthrough of deployment).

Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 2B

See attached sequence of events timeline (Attachment 2B).

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Severe Accident Venting

Determine venting capability for Severe Accident Venting, such as may be used in a ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Details:

Provide a brief description of Procedures / Guidelines:

Confirm that procedure/guidance exists or will be developed to support implementation.

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Identify modifications:

List modifications and describe how they support the HCVS Actions.

Part 3: <u>Boundary Conditions for Drywell Vent</u>
This section will be completed with the Phase 2 OIP submittal by December 31, 2015
Key Venting Parameters: *List instrumentation credited for the venting HCVS Actions.*
This section will be completed with the Phase 2 OIP submittal by December 31, 2015
Notes: None

Part 4: Programmatic Controls, Training, Drills and Maintenance

Identify how the programmatic controls will be met.
Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality addressing the impact of temperature and environment

Ref: EA-13-109 Section 3.1, 3.2 / NEI 13-02 Section 6.1.2, 6.1.3, 6.3

Program Controls:

The HCVS venting actions will include:

- Site procedures and programs are being developed in accordance with NEI 13-02 to address use and storage of portable equipment relative to the Severe Accident defined in NRC Order EA-13-109 and the hazards applicable to the site per Part 1 of this OIP.
- Routes for transporting portable equipment from storage location(s) to deployment areas will be developed as the response details are identified and finalized. The identified paths and deployment areas will be accessible when the HCVS system is required to be functional including during Severe Accidents.

Procedures:

Procedures will be established for system operations when normal and backup power is available, and during ELAP conditions.

NMP1 will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop/enhance site specific procedures or guidelines to address the criteria in NEI 13-02. These procedures and/or guidelines will support existing symptom based command and control strategies in the current EOPs and will contain the following details:

- appropriate conditions and criteria for use of the HCVS
- when and how to place the HCVS in operation
- the location of system components
- instrumentation available
- normal and backup power supplies
- directions for sustained operation (Reference 9), including the storage and location of portable equipment
- location of the remote control HCVS operating station (panel)
- training on operating the portable equipment
- testing of portable equipment

Nine Mile Point will establish provisions for out-of-service requirements of the HCVS and compensatory measures. The following provisions will be documented in the HCVS Program Document:

The provisions for out-of-service requirements for HCVS are applicable in Modes 1, 2 and 3

- If for up to 90 consecutive days, the primary or alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If for up to 30 days, the primary and alternate means of HCVS operation are non-functional, no compensatory actions are necessary.

Part 4: Programmatic Controls, Training, Drills and Maintenance

- If the out of service times exceed 30 or 90 days as described above, the following actions will be performed:
  - The condition will entered into the corrective action system,
  - The HCVS availability will be restored in a manner consistent with plant procedures,
  - A cause assessment will be performed to prevent future unavailability for similar causes.
  - Actions will be initiated to implement appropriate compensatory actions

Describe training plan

List training plans for affected organizations or describe the plan for training development

Ref: EA-13-109 Section 3.2 / NEI 13-02 Section 6.1.3

The Systematic Approach to Training (SAT) will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. As determined by the SAT process, the training will consider system operations when normal and backup power is available, and during ELAP conditions. Required training will be completed prior to placing the HCVS in service.

Identify how the drills and exercise parameters will be met.

Alignment with NEI 13-06 and 14-01 as codified in NTTF Recommendation 8 and 9 rulemaking

The Licensee should demonstrate use in drills, tabletops, or exercises for HCVS operation as follows:

- *Hardened containment vent operation on normal power sources (no ELAP).*
- *During FLEX demonstrations (as required by EA-12-049): Hardened containment vent operation on backup power and from primary or alternate location during conditions of ELAP/loss of UHS with no core damage. System use is for containment heat removal AND containment pressure control.*
- *HCVS operation on backup power and from primary or alternate location during conditions of ELAP/loss of UHS with core damage. System use is for containment heat removal AND containment pressure control with potential for combustible gases (Demonstration may be in conjunction with SAG change).*

Ref: EA-13-109 Section 3.1 / NEI 13-02 Section 6.1.3

The site will utilize the guidance provided in NEI 13-06 and NEI 14-01 (References 10 and 11) for guidance related to drills, tabletops, or exercises for HCVS operation. In addition, the site will integrate these requirements with compliance to any rulemaking resulting from the NTTF Recommendations 8 and 9.

Describe maintenance plan:

- *The HCVS maintenance program should ensure that the HCVS equipment reliability is being achieved in a manner similar to that required for FLEX equipment. Standard industry templates (e.g., EPRI) and associated bases may be developed to define specific maintenance and testing.*
  - *Periodic testing and frequency should be determined based on equipment type and expected use (further details are provided in Section 6 of this document).*

Part 4: Programmatic Controls, Training, Drills and Maintenance

- *Testing should be done to verify design requirements and/or basis. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.*
- *Preventive maintenance should be determined based on equipment type and expected use. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.*
- *Existing work control processes may be used to control maintenance and testing.*

- *HCVS permanent installed equipment should be maintained in a manner that is consistent with assuring that it performs its function when required.*
  - *HCVS permanently installed equipment should be subject to maintenance and testing guidance provided to verify proper function.*
- *HCVS non-installed equipment should be stored and maintained in a manner that is consistent with assuring that it does not degrade over long periods of storage and that it is accessible for periodic maintenance and testing.*

Ref: EA-13-109 Section 1.2.13 / NEI 13-02 Section 5.4, 6.2

The site will utilize the standard EPRI industry PM process (similar to the Preventive Maintenance Basis Database) for establishing the maintenance calibration and testing actions for HCVS components. The control program will include maintenance guidance, testing procedures and frequencies established based on type of equipment and considerations made within the EPRI guidelines.

Site procedures and programs are being developed in accordance with NEI 13-02 to address use and storage of portable equipment relative to the Severe Accident defined in NRC Order EA-13-109 and the hazards applicable to the site per Part 1 of this OIP. Attachment 1 defines the applicable maintenance and preventive maintenance requirements for HCVS portable equipment.

NMP1 will implement the following operation, testing and inspection requirements for the HCVS to ensure reliable operation of the system.

Table 4-1: Testing and Inspection Requirements

Description	Frequency
Cycle the HCVS valves and the interfacing system valves not used to maintain containment integrity during operations.	Once per operating cycle
Perform visual inspections and a walk down of HCVS components	Once per operating cycle
Test and calibrate the HCVS radiation monitor.	Once per operating cycle
Leak test the HCVS.	(1) Prior to first declaring the system functional; (2) Once every three operating cycles thereafter; and (3) After restoration of any breach of system boundary within the buildings

Part 4: Programmatic Controls, Training, Drills and Maintenance

	Validate the HCVS operating procedures by conducting an open/close test of the HCVS control logic from its control panel and ensuring that all interfacing system valves move to their proper (intended) positions.	Once per every other operating cycle	

Notes: None

Part 5: Milestone Schedule

Provide a milestone schedule. This schedule should include:

- **Modifications timeline**
- **Procedure guidance development complete**
  - **HCVS Actions**
  - **Maintenance**
- **Long term use equipment acquisition timeline**
- **Training completion for the HCVS Actions**

The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.

Ref: EA-13-109 Section D.1, D.3 / NEI 13-02 Section 7.2.1

The following milestone schedule is provided. The dates are planning dates subject to change as design and implementation details are developed. Any changes to the following target dates will be reflected in the subsequent 6 month status reports.

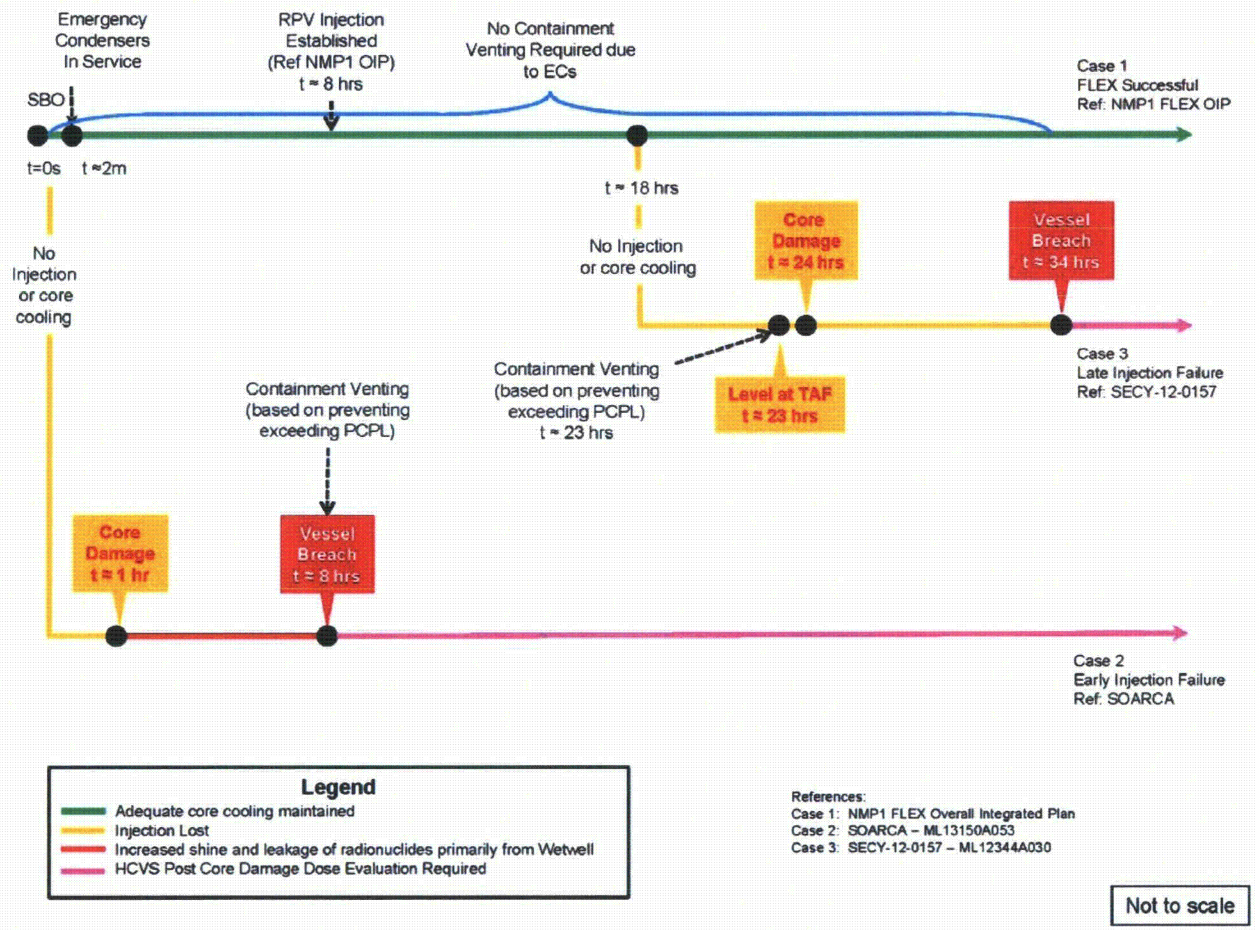
Milestone	Target Completion Date	Activity Status	Comments *{Include date changes in this column}*
Hold preliminary/conceptual design meeting	Nov 2013	Complete	
Submit Overall Integrated Implementation Plan	Jun 2014	Complete	
Submit 6 Month Status Report	Dec 2014		
Submit 6 Month Status Report	Jun 2015		
Submit 6 Month Status Report	Dec. 2015		Simultaneous with Phase 2 OIP
Design Engineering Complete	April 2016		
Operations Procedure Changes Developed	Dec 2016		
Site Specific Maintenance Procedure Developed	Dec 2016		
Training Complete	Feb 2017		
NMP1 Implementation Outage	Apr 2017		
Procedure Changes Active	Apr 2017		
Walk Through Demonstration/Functional Test	Apr 2017		
Submit Completion Report	June 2017		

Attachment 1: HCVS Portable Equipment

List portable equipment	*BDBEE Venting*	*Severe Accident Venting*	*Performance Criteria*	*Maintenance / PM requirements*
Nitrogen Cylinders	X	X	X	Check periodically for pressure, replace or replenish as needed
FLEX DG	X	X	TBD	Per response to EA-12-049
Portable Air Compressor (optional)	X	X	TBD	Per vendor manual
Small Portable Generator (optional)	X	X	TBD	Per vendor manual

Attachment 2: Sequence of Events Timeline

Table 2A: Wetwell HCVS Timeline



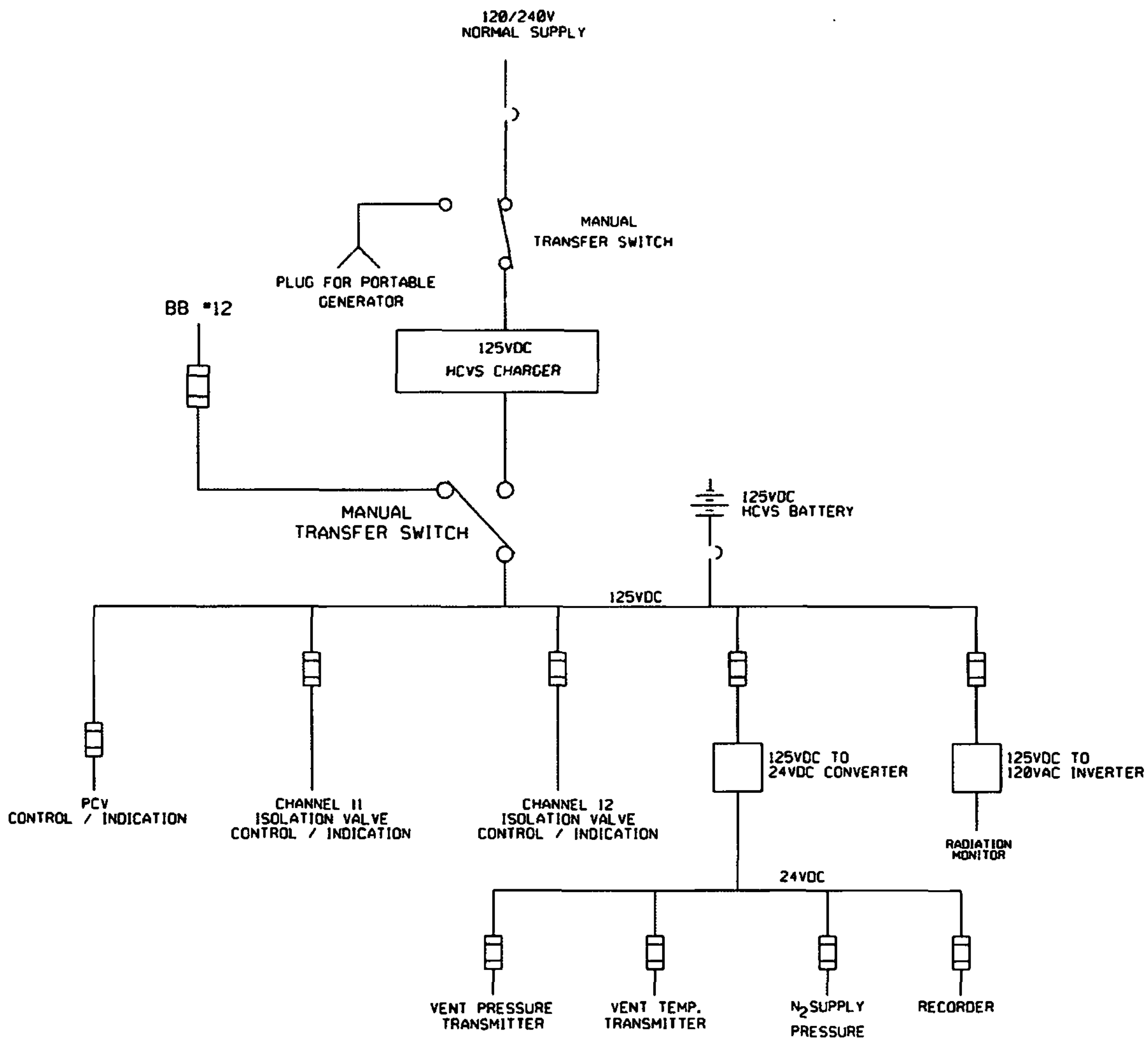
Attachment 3: Conceptual Sketches

(Conceptual sketches, as necessary to indicate equipment which is installed or equipment hookups necessary for the strategies)

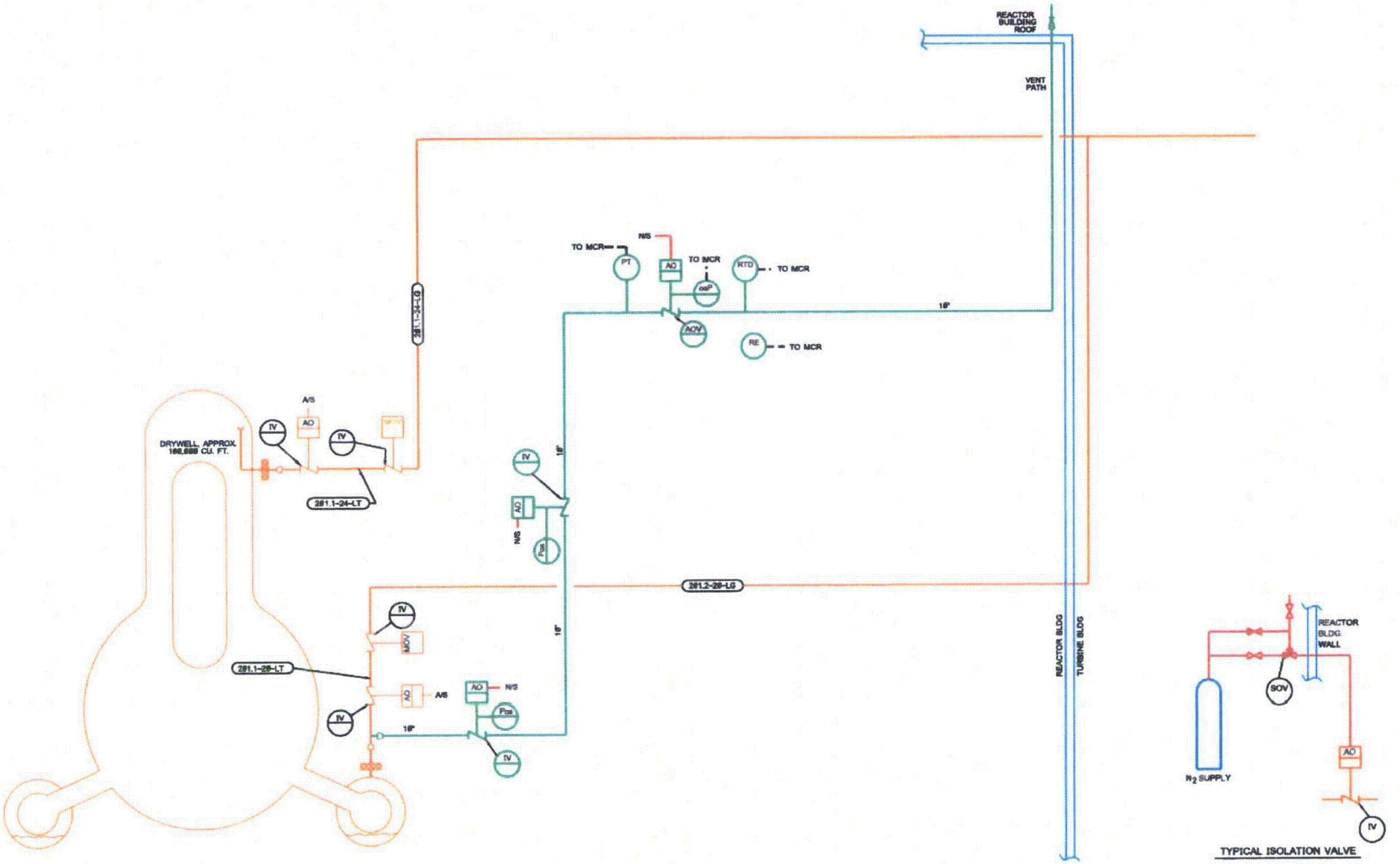
- Plant layout with egress and ingress pathways
- Piping routing for vent path
- Instrumentation Process Flow
- Electrical Connections
- Include a piping and instrumentation diagram of the vent system. Demarcate the valves (in the vent piping) between the existing and new.

Sketch 1: Electrical Layout of System
Sketch 2: Layout of HCVS, NMP1
Sketch 3: Remote Operating Station
Sketch 4: HCVS Plan Overview

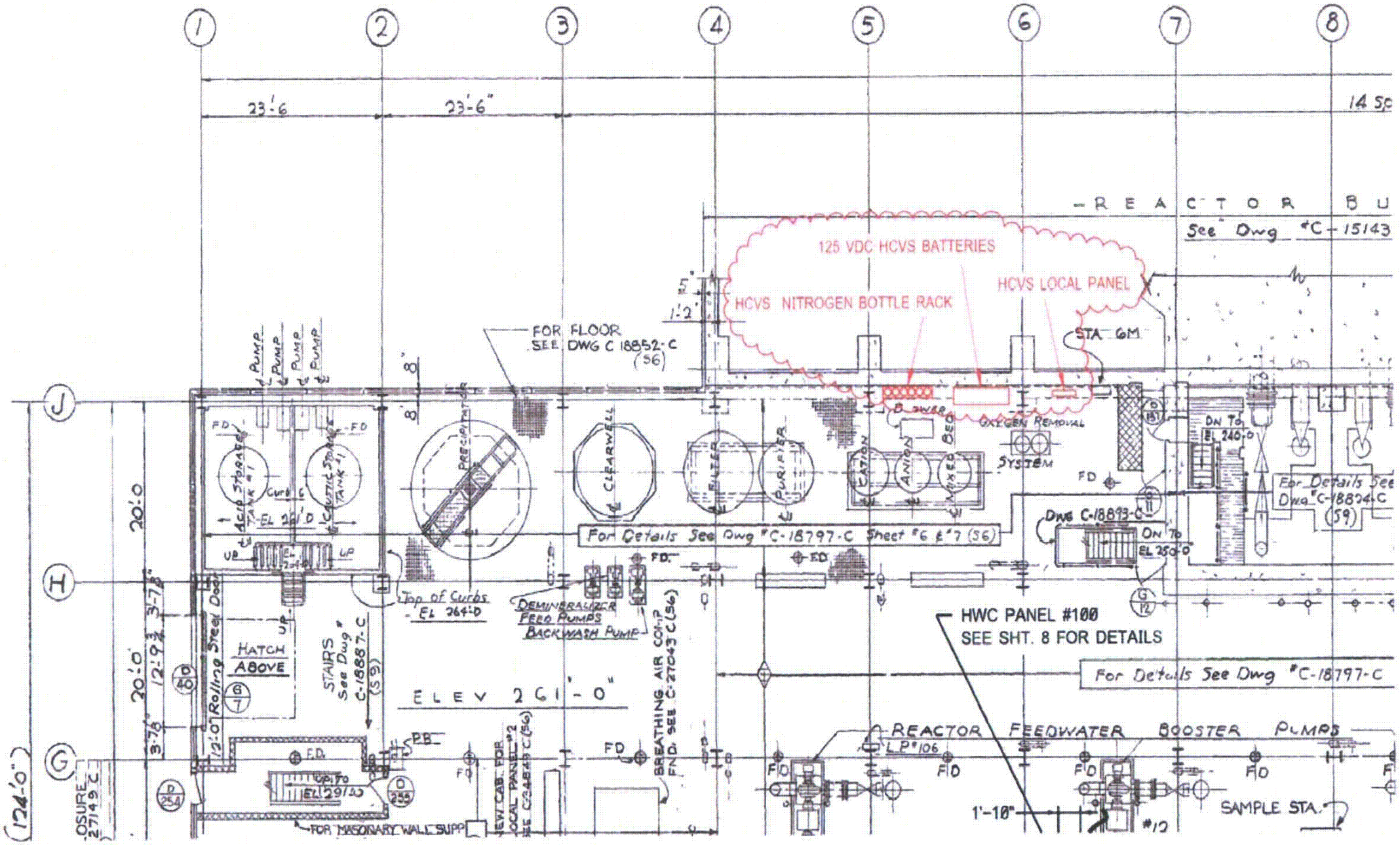
Sketch 1: Electrical Layout of System



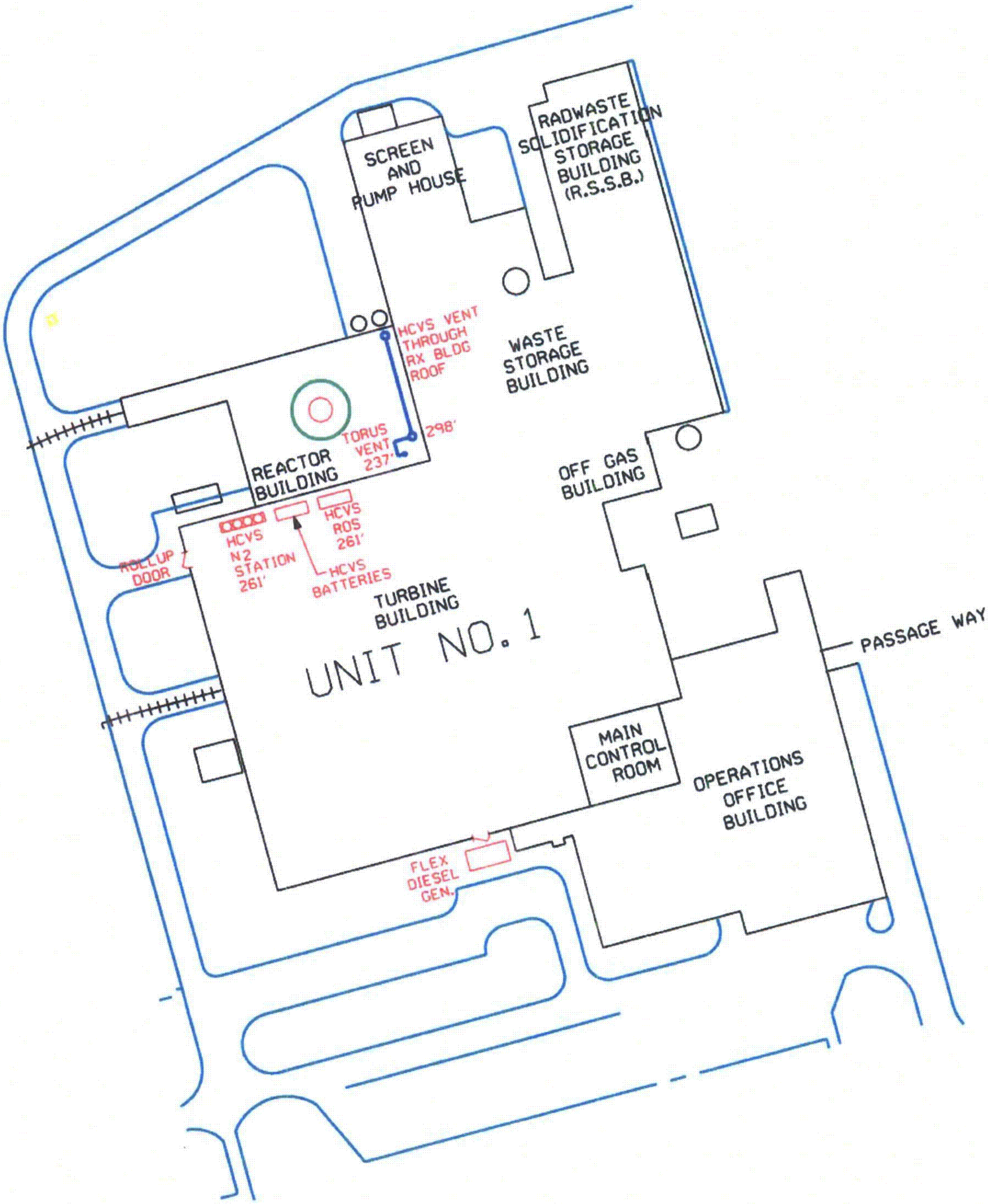
Sketch 2: Layout of HCVS, NMP1



Sketch 3: Remote Operating Station



Sketch 4: HCVS Plan Overview



Attachment 4: Failure Evaluation Table

Table 4A: Wetwell HCVS Failure Evaluation Table

Functional Failure Mode	Failure Cause	Alternate Action	Failure with Alternate Action Prevents Containment Venting?
Fail to Vent (Open) on Demand	Valves fail to open/close due to loss of normal AC power/DC batteries	None required – system SOVs utilize dedicated 24-hour power supply	No
	Valves fail to open/close due to depletion of dedicated power supply	Recharge system with FLEX provided portable generators	No
	Valves fail to open/close due to complete loss of power supplies	Manually operate backup pneumatic supply/vent lines at remote panel	No
	Valves fail to open/close due to loss of normal pneumatic supply	No action needed. Valves are provided with dedicated motive force capable of 24 hour operation	No
	Valves fail to open/close due to loss of alternate pneumatic supply (long term)	Replace bottles as needed and/or recharge with portable air compressors	No
	Valve fails to open/close due to SOV failure	Manually operate backup pneumatic supply/vent lines at remote panel	No
Fail to stop venting (Close) on demand	Not credible as there is not a common mode failure that would prevent the closure of at least 1 of the 3 valves needed for venting.	N/A	No
Spurious Opening	Not credible as key-locked switches prevent miss-positioning of the HCVS CIVs and PCV.	N/A	No
Spurious Closure	Valves fail to remain open due to depletion of dedicated power supply	Recharge system with FLEX provided portable generators	No
	Valves fail to remain open due to complete loss of power supplies	Manually operate backup pneumatic supply/vent lines at remote panel	No
	Valves fail to remain open due to loss of alternate pneumatic supply (long term)	Replace bottles as needed and/or recharge with portable air compressors	No

Attachment 5: References

1. Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events, dated February 28, 2013 (ML13066A171) for Nine Mile Point Unit #1
2. Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989
3. Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
4. Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated June 6, 2013
5. JLD-ISG-2012-01, Compliance with Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated August 29, 2012
6. JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013
7. NRC Responses to Public Comments, Japan Lessons-Learned Project Directorate Interim Staff Guidance JLD-ISG-2012-02: Compliance with Order EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents, ADAMS Accession No. ML12229A477, dated August 29, 2012
8. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 1, dated August 2012
9. NEI 13-02, Industry Guidance for Compliance with Order EA–13–109, Revision 0, Dated November 2013
10. NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, Revision 0, dated March 2014
11. NEI 14-01, Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Revision 0, dated March 2014
12. NEI FAQ HCVS-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations
13. NEI FAQ HCVS-02, HCVS Dedicated Equipment
14. NEI FAQ HCVS-03, HCVS Alternate Control Operating Mechanisms
15. NEI FAQ HCVS-04, HCVS Release Point
16. NEI FAQ HCVS-05, HCVS Control and 'Boundary Valves'
17. NEI FAQ HCVS-06, FLEX Assumptions/HCVS Generic Assumptions
18. NEI FAQ HCVS-07, Consideration of Release from Spent Fuel Pool Anomalies
19. NEI FAQ HCVS-08, HCVS Instrument Qualifications
20. NEI FAQ HCVS-09, Use of Toolbox Actions for Personnel
21. NEI White Paper HCVS-WP-01, HCVS Dedicated Power and Motive Force
22. NEI White Paper HCVS-WP-02, HCVS Cyclic Operations Approach
23. NEI White Paper HCVS-WP-03, Hydrogen/CO Control Measures
24. NEI White Paper HCVS-WP-04, FLEX/HCVS Interactions
25. NURGEG/CR-7110, Rev. 1, State-of-the-Art Reactor Consequence Analysis Project, Volume 1: Peach Bottom Integrated Analysis
26. SECY-12-0157, Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments, 11/26/12
27. NMP1 UFSAR, Rev. 23, Updated Final Safety Analysis Report
28. IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,
29. FLEX MAAP Endorsement ML13190A201
30. N1-2014-004, MAAP 4.0.6 Analysis of Nine Mile Point Unit 1 Loss of All AC Power Scenario

Attachment 6: Changes/Updates to this Overall Integrated Implementation Plan

Any significant changes to this plan will be communicated to the NRC staff in the 6 Month Status Reports

Attachment 7: List of Overall Integrated Plan Open Items

Open Item	Action	Comment
1	Perform final sizing evaluation for HCVS batteries and battery charger and include in FLEX DG loading calculation.	Confirmatory action
2	Perform final vent capacity calculation for the Torus HCVS piping confirming 1% minimum capacity.	Confirmatory action
3	Perform final sizing evaluation for pneumatic Nitrogen (N2) supply.	Confirmatory action
4	Perform confirmatory environmental condition evaluation for the Turbine Building in the vicinity of the ROS and HCVS dedicated pneumatic supply and batteries	Confirmatory action
5	State which approach or combination of approaches the plant determines is necessary to address the control of combustible gases downstream of the HCVS control valve	Confirmatory action
6	Complete evaluation for environmental/seismic qualification of HCVS components	Confirmatory action
7	Complete evaluation for environmental conditions and confirm the travel path accessibility	Confirmatory action

ATTACHMENT (2)

NINE MILE POINT UNIT 2 OVERALL INTEGRATED PLAN FOR RELIABLE HARDENED VENTS

Nine Mile Point Nuclear Station, LLC
June 27, 2014

Table of Contents:

Introduction

Part 1: General Integrated Plan Elements and Assumptions

Part 2: Boundary Conditions for Wetwell Vent

Part 3: Boundary Conditions for Drywell Vent

Part 4: Programmatic Controls, Training, Drills and Maintenance

Part 5: Milestone Schedule

Attachment 1: HCVS Portable Equipment

Attachment 2: Sequence of Events Timeline

Attachment 3: Conceptual Sketches

Attachment 4: Failure Evaluation Table

Attachment 5: References

Attachment 6: Changes/Updates to this Overall Integrated Implementation Plan

Attachment 7: List of Overall Integrated Plan Open Items

Introduction

In 1989, the NRC issued Generic Letter 89-16, "Installation of a Hardened Wetwell Vent," (Reference 2) to all licensees of Boiling Water Reactors (BWRs) with Mark I containments to encourage licensees to voluntarily install a hardened wetwell vent. In response, licensees installed a hardened vent pipe from the wetwell to some point outside the secondary containment envelope (usually outside the reactor building). Some licensees also installed a hardened vent branch line from the drywell.

On March 19, 2013, the Nuclear Regulatory Commission (NRC) Commissioners directed the staff per Staff Requirements Memorandum (SRM) for SECY-12-0157 (Reference 26) to require licensees with Mark I and Mark II containments to "upgrade or replace the reliable hardened vents required by Order EA-12-050 with a containment venting system designed and installed to remain functional during severe accident conditions." In response, the NRC issued Order EA-13-109, *Issuance of Order to Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accidents*, June 6, 2013 (Reference 4). The Order (EA-13-109) requires that licensees of BWR facilities with Mark I and Mark II containment designs ensure that these facilities have a reliable hardened vent to remove decay heat from the containment, and maintain control of containment pressure within acceptable limits following events that result in the 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).

The Order requirements are applied in a phased approach where:

- "Phase 1 involves upgrading the venting capabilities from the containment wetwell to provide reliable, severe accident capable hardened vents to assist in preventing core damage and, if necessary, to provide venting capability during severe accident conditions." (Completed "no later than startup from the second refueling outage that begins after June 30, 2014, or June 30, 2018, whichever comes first.")
- "Phase 2 involves providing additional protections for severe accident conditions through installation of a reliable, severe accident capable drywell vent system or the development of a reliable containment venting strategy that makes it unlikely that a licensee would need to vent from the containment drywell during severe accident conditions." (Completed "no later than startup from the first refueling outage that begins after June 30, 2017, or June 30, 2019, whichever comes first.")

The NRC provided an acceptable approach for complying with Order EA-13-109 through Interim Staff Guidance (ISG) (JLD-ISG-2013-02) issued in November 2013 (Reference 6). The ISG endorses the compliance approach presented in NEI 13-02 Revision 0, *Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents* (Reference 9), with clarifications. Except in those cases in which a licensee proposes an acceptable alternative method for complying with Order EA-13-109, the NRC staff will use the methods described in this ISG (NEI 13-02) to evaluate licensee compliance as presented in submittals required in Order EA-13-109.

The Order also requires submittal of an overall integrated plan which will provide a description of how the requirements of the Order will be achieved. This document provides the Overall Integrated Plan (OIP) for complying with Order EA-13-109 using the methods described in NEI 13-02 and endorsed by NRC JLD-ISG-2013-02. Six month progress reports will be provided consistent with the requirements of Order EA-13-109.

The Nine Mile Point Unit 2 (NMP2) venting actions for the EA-13-109 severe accident capable venting scenario can be summarized by the following:

- The Hardened Containment Vent System (HCVS) will be initiated via manual action from the Main Control Room (MCR) or Remote Operating Station (ROS) at the appropriate time based on procedural guidance in response to plant conditions from observed or derived symptoms.
- The vent will utilize Containment Parameters of Pressure, Level and Temperature from the MCR instrumentation to monitor effectiveness of the venting actions
- The vent operation will be monitored by HCVS valve position, temperature, pressure and effluent radiation levels.
- The motive force will be monitored and have the capacity to operate for 24 hours with installed equipment. Replenishment of the motive force will be by use of portable equipment once the installed motive force is exhausted.
- Venting actions will be capable of being maintained for a sustained period of up to 7 days.

Part 1: General Integrated Plan Elements and Assumptions

Extent to which the guidance, JLD-ISG-2013-02 and NEI 13-02, are being followed. Identify any deviations.

Include a description of any alternatives to the guidance. A technical justification and basis for the alternative needs to be provided. This will likely require a pre-meeting with the NRC to review the alternative.

Ref: JLD-ISG-2013-02

Compliance will be attained for Nine Mile Point Unit 2 (NMP2) with no known deviations to the guidelines in JLD-ISG-2013-02 and NEI 13-02 for each phase as follows:

- Phase 1 (wetwell): by the startup from the second refueling outage that begins after June 30, 2014, or June 30, 2018, whichever comes first. Currently scheduled for 2nd quarter 2016
- Phase 2: by the startup from first refueling outage that begins after June 30, 2017, or June 30, 2019, whichever comes first. Currently scheduled for 2nd quarter 2018

If deviations are identified at a later date, then the deviations will be communicated in a future 6 month update following identification.

State Applicable Extreme External Hazard from NEI 12-06, Section 4.0-9.0

List resultant determination of screened in hazards from the EA-12-049 Compliance.

Ref: NEI 13-02 Section 5.2.3 and D.1.2

The following extreme external hazards screen in for NMP2

- Seismic, external flooding, tornado, extreme cold, extreme high temperature, and ice/snow

The following extreme external hazards screen out for NMP2

- Straight wind

Key Site assumptions to implement NEI 13-02 strategies.

Provide key assumptions associated with implementation of HCVS Phase 1Strategies

Ref: NEI 13-02 Section 1

Mark I/II Generic HCVS Related Assumptions:

Applicable EA-12-049 (Reference 3) assumptions:

049-1. Assumed initial plant conditions are as identified in NEI 12-06, Section 3.2.1.2, items 1 and 2 (Reference 8).

049-2. Assumed initial conditions are as identified in NEI 12-06, Section 3.2.1.3, items 1, 2, 4, 5, 6 and 8 (Reference 8)

049-3. Assumed reactor transient boundary conditions are as identified in NEI 12-06, Section 3.2.1.4, items 1, 2, 3 and 4

049-4. No additional events or failures are assumed to occur immediately prior to or during the event, including security events, except for the failure of Reactor Core Isolation Cooling (RCIC) (Reference NEI 12-06, Section 3.2.1.3, item 9 [8])

049-5. At time=0 the event is initiated and all rods insert and no other event beyond a common site ELAP

Part 1: General Integrated Plan Elements and Assumptions

is occurring at any or all of the units.

049-6. At time=1 hour actions begin as defined in EA-12-049 compliance

049-7. Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours

049-8. All activities associated with EA-12-049 (FLEX) that are not specific to implementation of the HCVS, including such items as debris removal, communication, notifications, Spent Fuel Pool (SFP) level and makeup, security response, opening doors for cooling, and initiating conditions for the events, can be credited as previously evaluated for FLEX.

Applicable EA-13-109 (Reference 4) generic assumptions:

109-1. Site response activities associated with EA-13-109 actions are considered to have no access limitations associated with radiological conditions while Reactor Pressure Vessel (RPV) level is above 2/3 core height (core damage is not expected).

109-2. Portable equipment can supplement the installed equipment after 24 hours provided the portable equipment credited meets the criteria applicable to the HCVS. An example is use of portable air compressors to recharge pneumatic lines. The use of this portable equipment must be evaluated to demonstrate that they can meet "SA capable" criteria that are defined in NEI 13-02, Section 4.2.4.2 and Appendix D, Section D.1 (Reference 9).

109-3. SFP Level is maintained with either on-site or off-site resources such that the SFP does not contribute to the analyzed source term (Reference FAQ HCVS-07 [18]).

109-4. Existing containment components design and testing values are governed by existing plant containment criteria (e.g., Appendix J) and are not subject to the testing criteria from NEI 13-02 (Reference FAQ HCVS-05 [16] and NEI 13-02, Section 6.2.2 [9]).

109-5. Classical design basis evaluations and assumptions are not required when assessing the operation of the HCVS. The reason that this is not required is that the order postulates an unsuccessful mitigation of an event such that an ELAP progresses to a severe accident with ex-vessel core debris that classical design basis evaluations are intended to prevent (Reference NEI 13-02, Section 2.3.1 [9]).

109-6. HCVS manual actions require minimal operator steps and can be performed in the postulated thermal radiological environment at the location of the step(s) (e.g., load stripping, control switch manipulation, valving-in nitrogen bottles) are acceptable to obtain HCVS venting dedicated functionality (Reference FAQ HCVS-01[12]).

109-7. HCVS dedicated equipment is defined as vent process elements that are required for the HCVS to function in an ELAP event that progresses to core melt ex-vessel (Reference FAQ HCVS-02 [13] and White Paper HCVS-WP-01 [21]).

109-8. Use of MAAP Version 4 or higher provides adequate assurance of the plant conditions (e.g., RPV water level, temperatures, etc.) assumed for Order EA-13-109 Beyond Design Basis External Event (BDBEE) and SA HCVS operation (Reference FLEX MAAP Endorsement ML13190A201 [29]). Additional analysis using RELAP5/MOD 3, GOTHIC, and MICROSHIELD, etc., are acceptable methods for evaluating environmental conditions in other portions of the plant, provided that the specific version utilized is documented in the analysis. Upper drywall temperatures will be determined as part of the Phase 2 evaluation and guidance development.

109-9. Utilization of NRC Published Accident evaluations (e.g. SOARCA, SECY-12-0157, NUREG 1465) as related to Order EA-13-109 conditions are acceptable as references (Reference NEI 13-02, Section 8 [9]).

109-10. Permanent modifications installed or planned per EA-12-049 are assumed implemented and may be credited for use in Order EA-13-109 response.

Part 1: General Integrated Plan Elements and Assumptions

109-11. This Overall Integrated Plan is based on Emergency Operating Procedure (EOP) changes consistent with Emergency Procedures Guidelines/Severe Accident Guidelines (EPG/SAGs) Revision 3 as incorporated per the sites EOP/Severe Accident Procedure (SAP) procedure change process.

109-12. Under the postulated scenarios of Order EA-13-109, the Main Control Room is adequately protected from excessive radiation dose as per General Design Criterion (GDC) 19 in 10CFR50 Appendix A and no further evaluation of its use as the preferred HCVS control location is required (Reference FAQ HCVS-01 [12]). In addition, adequate protective clothing and respiratory protection is available if required to address contamination issues.

Plant Specific HCVS Related Assumptions/Characteristics:

NMP2-1 GDC-56 Exemption Request has been approved to allow relocation of the inboard containment isolation valve from the inside of containment to outside of containment.

NMP2-2 EA-12-049 (FLEX) actions to restore power are sufficient to ensure continuous operation of non-dedicated containment instrumentation identified on page 15 of the OIP.

NMP2-3 Modifications that allow a FLEX generator to be connected to a 600 volt safety related bus are assumed to have been installed such that a FLEX generator can be credited for HCVS operation beyond the initial 24 hour sustained operational period.

Part 2: Boundary Conditions for Wetwell Vent

Provide a sequence of events and identify any time or environmental constraint required for success including the basis for the constraint.

HCVS Actions that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, action to open vent valves).

HCVS Actions that have an environmental constraint (e.g. actions in areas of High Thermal stress or High Dose areas) should be evaluated per guidance.

Describe in detail in this section the technical basis for the constraints identified on the sequence of events timeline attachment.

See attached sequence of events timeline (Attachment 2)

Ref: EA-13-109 Section 1.1.1, 1.1.2, 1.1.3 / NEI 13-02 Section 4.2.1/6.1

The operation of the HCVS will be designed to minimize the reliance on operator actions in response to hazards listed in Part 1. Immediate operator actions will be completed by trained plant personnel and will include the capability for remote-manual initiation from the HCVS control station. A list of the remote manual actions performed by plant personnel to open the HCVS vent path can be found in the following table (Table 2-1). A HCVS ELAP Failure Evaluation table, which shows alternate actions that can be performed, is included in Attachment 4.

Table 2-1 HCVS Remote Manual Actions

Primary Action	Primary Location/ Component	Notes
1. Power HCVS Control Panel	Key-locked switch at HCVS Control Panel in Main Control Room (MCR)	This action not required for alternate control
2. Open Suppression Chamber inboard Containment Isolation Valve (CIV) 2CPS*AOV109	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
3. Open Suppression Chamber outboard Containment Isolation Valve (CIV) 2CPS*AOV111	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
4. Open Pressure Control Valve	Key-locked switch at HCVS Control Panel in MCR	Alternate control via manual valves at backup control panel
5. Monitor electrical power status, pneumatic pressure, and HCVS conditions	HCVS Control Panel in MCR	This action not required for alternate control

Part 2: Boundary Conditions for Wetwell Vent

6. Connect back-up power to HCVS battery charger	Reactor Building Track Bay	Prior to depletion of the dedicated HCVS power supply batteries (no less than 24 hours from initiation of ELAP)
7. Replenish pneumatic supply	Reactor Building Track Bay	Prior to depletion of the pneumatic supply (no less than 24 hours from initiation of ELAP)

Attachment 2, Sequence of Events Timeline, was developed to identify required operator response times and potential environmental constraints. This timeline is based upon the following three sequences:

1. Sequence 1 is a based upon the action response times developed for FLEX when utilizing anticipatory venting in a BDBEE without core damage.
2. Sequence 2 is based on NUREG-1935 (SOARCA) results for an ELAP with early loss of RCIC.
3. Sequence 3 is based on a SECY-12-0157 SBO (ELAP) with failure of RCIC because of subjectively assuming over injection.

Discussion of time constraints identified in Attachment 2

- 2 Hours, Initiate use of HCVS per site procedures to maintain containment parameters within the limits that allow continued use of RCIC. Initiation of the HCVS can be completed with manipulation of only 4 switches located within the MCR. The reliable operation of HCVS will be met because HCVS meets the seismic requirements identified in NEI 13-02 and will be powered by dedicated HCVS batteries with motive force supplied to HCVS valves from installed nitrogen storage bottles. HCVS controls and HCVS instrumentation will be provided from a panel installed in the MCR. Other containment parameter instrumentation associated with operation of the HCVS is available in the MCR. Operation of the system will be available from either the MCR or a ROS. Dedicated HCVS batteries will provide power for greater than 24 hours. Therefore, initiation of the HCVS from the MCR or the ROS within 2 hours is acceptable because of the simplicity and limited number of operator actions. Placing the HCVS in operation to maintain containment parameters within design limits for either BDBEE or SA venting would occur at a time further removed from ELAP declaration as shown in Attachment 2.
- 24 Hours, Replace/install additional nitrogen bottles or install compressor. The nitrogen station will have extra connections so that new bottles can be added or an air compressor can be connected while existing bottles supply the HCVS. This can be performed at any time prior to 24 hours to ensure adequate capacity is maintained so this time constraint is not limiting.
- 24 Hours, Connect back-up power to HCVS battery charger. The HCVS batteries are calculated to last a minimum of 24 hours (Open Item #1). The HCVS battery charger will be able to be re-powered either from a 600VAC bus that will be re-powered from a portable diesel generator (DG) put in place for FLEX or locally (Reactor Building Track Bay) from a small portable generator. The DG will be staged and placed in service within 8 hours (Reference 1) and therefore will be available prior to being required. In

Part 2: Boundary Conditions for Wetwell Vent

the event that the DG is not available, a local connection will allow a small portable generator to be connected to the battery charger to provide power.

[OPEN ITEM-1: Perform final sizing evaluation for HCVS batteries/battery charger and incorporate in FLEX DG loading calculation]

Discussion of radiological, temperature, other environmental constraints identified in Attachment 2

- Actions to initiate HCVS operation are taken from the MCR or from the ROS in the Reactor Building Track Bay. Both locations have significant shielding and physical separation from radiological sources. Non-radiological habitability for the MCR is being addressed as part of the FLEX response (Reference 1). The location in the Reactor Building Track Bay has no heat sources and will have open doors to provide ventilation.
- Actions to replenish the pneumatic supply will be completed from the Reactor Building Track Bay. The Reactor Building Track Bay is located on the East-Northeast side of the Reactor Building. The HCVS will exit the Reactor Building on the Northwest side of the Reactor Building approximately 60' from ground elevation. Therefore, the location for pneumatic supply replenishment is shielded from the HCVS piping by the Reactor Building itself and is greater than 100' away from the piping.
- Actions to install the DG will occur on the East side of the NMP2 Control Building and within the Control Building itself. The Control Building is located on the south side of the Reactor Building. The locations for installation (and control) of the DG are therefore shielded from HCVS piping by the Reactor Building and is greater than 100' away from the piping. In the event that this DG cannot be operated, the backup portable generator would be connected to the UPS in the Reactor Building Track Bay, which is also a shielded location.

Provide Details on the Vent characteristics

Vent Size and Basis (EA-13-109 Section 1.2.1 / NEI 13-02 Section 4.1.1)

What is the plants licensed power? Discuss any plans for possible increases in licensed power (e.g. MUR, EPU). What is the nominal diameter of the vent pipe in inches? Is the basis determined by venting at containment design pressure, PCPL, or some other criteria (e.g. anticipatory venting)?

Vent Capacity (EA-13-109 Section 1.2.1 / NEI 13-02 Section 4.1.1)

Indicate any exceptions to the 1% decay heat removal criteria, including reasons for the exception. Provide the heat capacity of the suppression pool in terms of time versus pressurization capacity, assuming suppression pool is the injection source.

Vent Path and Discharge (EA-13-109 Section 1.1.4, 1.2.2 / NEI 13-02 Section 4.1.3, 4.1.5 and Appendix F/G)

Provides a description of Vent path, release path, and impact of vent path on other vent element items.

Power and Pneumatic Supply Sources (EA-13-109 Section 1.2.5 & 1.2.6 / NEI 13-02 Section 4.2.3, 2.5, 4.2.2, 4.2.6, 6.1)

Provide a discussion of electrical power requirements, including a description of dedicated 24 hour power supply from permanently installed sources. Include a similar discussion as above for the valve motive force requirements. Indicate the area in the plant from where the installed/dedicated power and pneumatic supply sources are coming

Part 2: Boundary Conditions for Wetwell Vent

Indicate the areas where portable equipment will be staged after the 24 hour period, the dose fields in the area, and any shielding that would be necessary in that area.

Location of Control Panels (EA-13-109 Section 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.4, 1.2.5 / NEI 13-02 Section 4.1.3, 4.2.2, 4.2.3, 4.2.5, 4.2.6, 6.1.1. and Appendix F/G)
Indicate the location of the panels, and the dose fields in the area during severe accidents and any shielding that would be required in the area. This can be a qualitative assessment based on criteria in NEI 13-02.

Hydrogen (EA-13-109 Section 1.2.10, &1.2.11, and 1.2.12 / NEI 13-02 Section 2.3,2.4, 4.1.1, 4.1.6, 4.1.7, 5.1, & Appendix H)
State which approach or combination of approaches the plant will take to address the control of flammable gases, clearly demarcating the segments of vent system to which an approach applies

Unintended Cross Flow of Vented Fluids (EA-13-109 Section 1.2.3, 1.2.12 / NEI 13-02 Section 4.1.2, 4.1.4, 4.1.6 and Appendix H)
Provide a description to eliminate/minimize unintended cross flow of vented fluids with emphasis on interfacing ventilation systems (e.g. SGTS). What design features are being included to limit leakage through interfacing valves or Appendix J type testing features?

Prevention of Inadvertent Actuation (EA-13-109 Section 1.2.7/NEI 13-02 Section 4.2.1)
The HCVS shall include means to prevent inadvertent actuation

Component Qualifications (EA-13-109 Section 2.1 / NEI 13-02 Section 5.1)
State qualification criteria based on use of a combination of safety related and augmented quality dependent on the location, function and interconnected system requirements

Monitoring of HCVS (Order Elements 1.1.4, 1.2.8, 1.2.9/NEI 13-02 4.1.3, 4.2.2, 4.2.4, and Appendix F/G)
Provides a description of instruments used to monitor HCVS operation and effluent. Power for an instrument will require the intrinsically safe equipment installed as part of the power sourcing

Component reliable and rugged performance (EA-13-109 Section 2.2 / NEI 13-02 Section 5.2, 5.3)
HCVS components including instrumentation should be designed, as a minimum, to meet the seismic design requirements of the plant.

Components including instrumentation that are not required to be seismically designed by the design basis of the plant should be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. (Reference JLD-ISG-2012-01 and JLD-ISG-2012-03 for seismic details.)

The components including instrumentation external to a seismic category 1 (or equivalent building or enclosure should be designed to meet the external hazards that screen in for the plant as defined in guidance NEI 12-06 as endorsed by JLD-ISG-12-01 for Order EA-12-049.

Use of instruments and supporting components with known operating principles that are supplied by manufacturers with commercial quality assurance programs, such as ISO9001. The procurement specifications shall include the seismic requirements and/or instrument design requirements, and specify the need for

Part 2: Boundary Conditions for Wetwell Vent

commercial design standards and testing under seismic loadings consistent with design basis values at the instrument locations.

Demonstration of the seismic reliability of the instrumentation through methods that predict performance by analysis, qualification testing under simulated seismic conditions, a combination of testing and analysis, or the use of experience data. Guidance for these is based on sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," or a substantially similar industrial standard could be used.

Demonstration that the instrumentation is substantially similar in design to instrumentation that has been previously tested to seismic loading levels in accordance with the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges). Such testing and analysis should be similar to that performed for the plant licensing basis.

Vent Size and Basis
NMP2 is licensed to operate at a thermal power of 3988MW due to a recent extended power uprate project. There are no current plans to further increase the power level.

The HCVS wetwell path is designed for venting steam/energy at a minimum capacity of 1% of 3988 MW thermal power at pressure of 38 psig (Open Item #2). This pressure is the lower of the containment design pressure (45 psig) and the Primary Containment Pressure Limit (PCPL) value (38 psig). The size of the wetwell portion of the HCVS is ≥ 12 inches in diameter which provides adequate capacity to meet or exceed the Order criteria.

[OPEN ITEM-2: Perform final vent capacity calculation for the HCVS piping confirming 1% minimum capacity]

Vent Capacity
The 1% value at NMP2 assumes that the suppression pool has sufficient capacity to absorb the decay heat generated for a minimum of 3 hours without allowing containment pressure to exceed 38 psig (PCPL) after which point decay heat is less than or equal to 1%. The vent would then be able to prevent containment pressure from increasing above the PCPL. The duration of suppression pool decay heat absorption capability has been confirmed (Reference 30).

Vent Path and Discharge
The HCVS vent path at NMP2 utilizes existing Containment Purge System piping from the suppression chamber and drywell up to the Standby Gas Treatment System isolation valves (2GTS*AOV101 and 2GTS*SOV102). The inboard primary containment isolation valves (PCIVs) for both the suppression chamber and drywell lines will be relocated from inside the containment to outside the containment. The outboard PCIVs will be relocated to provide room for the inboard valves. The suppression chamber piping exits the containment into the Reactor Building and continues for approximately 140' until it ties into a combined Drywell/Wetwell 20" header. New 18" piping will tie into this header upstream of 2GTS*AOV101/SOV102. A new air-operated valve will be provided in this piping, which will serve as both the primary method to control HCVS flow, therefore controlling containment pressure, and as secondary containment isolation. The discharge piping will exit through the Reactor Building wall approximately 60' above ground elevation and will be routed up the Northwest side of the Reactor Building to a discharge point approximately 3' above the

Part 2: Boundary Conditions for Wetwell Vent

highest point of the Reactor Building roof. The NMP2 vent path is completely separate from the Nine Mile Point Unit 1(NMP1) vent path.

Power and Pneumatic Supply Sources

All electrical power required for operation of HCVS components will be provided by dedicated HCVS batteries with a minimum capacity capable of providing power for 24 hours without recharging. A preliminary sizing evaluation has been completed. A final evaluation will be completed as part of the detailed design process when selection of electrical components is finalized (Open Item #1). A battery charger is provided that requires a 240 VAC supply. This will be provided by a dedicated 600 VAC to 120/240 VAC transformer, which will be powered from a 600 VAC bus that will be re-powered by a diesel generator as part of the FLEX response. In addition, a connection point that utilizes standard electrical connections will be provided for a portable generator for sustained operation of the HCVS.

For the first 24 hours following the event, the motive supply for the air-operated valves (AOVs) will be nitrogen gas bottles that will be pre-installed and available. These bottles will be sized such that they can provide motive force for 12 cycles of a vent path (2 PCIVs and 1 Pressure Control Valve (PCV)). A preliminary sizing evaluation has been completed (Open Item #3). A final evaluation will be completed as part of the detailed design process when selection of the system AOVs is finalized.

[OPEN ITEM-3: Perform final sizing evaluation for pneumatic Nitrogen (N2) supply]

Supplemental motive force (e.g., additional nitrogen gas bottles, air compressor), portable generators, and enough fuel for an additional 48 hours of operation will be stored on site in an area that is reasonably protected from assumed hazards consistent with the requirements of NEI 12-06. Pre-engineered quick disconnects will be provided to connect the supplemental motive force supply.

1. The HCVS flow path valves are AOVs that are air-to-open and spring-to-shut. Opening the valves requires energizing a DC powered solenoid operated valve (SOV) and providing motive air/gas. A backup means of operation is also available that does not require energizing or repositioning the SOV.
2. An assessment of temperature and radiological conditions will be performed to ensure operating personnel can safely access and operate controls at the ROS based on time constraints listed in Attachment 2.
3. All permanently installed HCVS equipment, including any connections required to supplement the HCVS operation during an ELAP (electric power, N2/air) will be located in areas reasonably protected from the hazards listed in Part 1 of this report.
4. All valves required to open the flow path will be designed for remote manual operation following an ELAP, such that the primary means of valve manipulation does not rely on use of a handwheel, reach–rod, or similar means requiring close proximity to the valve (Reference FAQ HCVS-03, Reference 14). In addition, the PCV will have a handwheel as an optional means of operation. Any supplemental connections will be pre-engineered to minimize man-power resources and address environmental concerns. Required portable equipment will be reasonably protected from screened in hazards listed in Part 1 of this OIP.
5. Access to the locations described above will not require temporary ladders or scaffolding.

Part 2: Boundary Conditions for Wetwell Vent

Location of Control Panels

The HCVS design allows for initiation, operation, and monitoring of the HCVS from either the MCR or the ROS. The MCR location is protected from adverse natural phenomena and is the normal control point for HCVS operation and Plant Emergency Response actions.

The ROS will be located in the Reactor Building Track Bay. This location is protected from adverse natural phenomena and is shielded from the HCVS piping by the Reactor Building. While the Reactor Building Track Bay is not a seismic category 1 structure, the adjoining Reactor Building and Standby Gas Treatment Buildings are both seismic category 1 structures and the Reactor Building Track Bay structure was built to the same general specifications. Confirmation that the Reactor Building Track Bay is seismically rugged will be evaluated during the detailed engineering and design phase (Open Item #4).

[OPEN ITEM-4: Perform seismic evaluation of Reactor Building Track Bay]

Hydrogen

As is required by EA-13-109, Section 1.2.11, the HCVS must be designed such that it is able to either provide assurance that oxygen cannot enter and mix with flammable gas in the HCVS (so as to form a combustible gas mixture), or it must be able to accommodate the dynamic loading resulting from a combustible gas detonation. Piping upstream of the HCVS PCV will be protected by preventing the mix of oxygen with flammable gases. Several methods are available to protect piping downstream of the PCV. Methods being considered include installation of a purge system, installation of a flow-check valve at the end of the piping, or designing the piping and PCV for gas detonation. Final determination of the method to be used for the PCV and downstream piping is Open Item #5. NMP2 intends to follow the guidance in HCVS-WP-03, Hydrogen/CO Control Measures (Reference 23).

[OPEN ITEM-5: State which approach or combination of approaches the plant determines is necessary to address the control of combustible gases downstream of the HCVS control valve]

Unintended Cross Flow of Vented Fluids

The HCVS for NMP2 is fully independent of NMP1 with separate discharge points. Therefore, the capacity at each unit is independent of the status of the other unit's HCVS. The only interfacing system with the HCVS is the Standby Gas Treatment System (SGTS). There are two parallel interface isolation valves separating the SGTS and the HCVS discharge piping (one 20" air operated butterfly valve and one 2" AC solenoid operated globe valve).

The interface valves between the HCVS and the SGTS are normally-closed, fail-closed (spring operated) valves. Upon initiation of an ELAP and associated loss of instrument air, the valves would automatically shut due to spring pressure. Therefore, no additional power is necessary. Environmental conditions in which the valve will be expected to remain functional will be assessed during the detailed engineering and design phase and upgraded valve internals installed if required. Connection points will be added to the HCVS to facilitate Appendix J type testing of the interface valves. Testing and maintenance will be performed to ensure that the valves remain leak-tight within established leakage criteria. This reduces the potential for inter-system leakage through valves and dampers.

Prevention of Inadvertent Actuation

EOPs/Emergency Response Guidelines provide clear guidance that the HCVS is not to be used to defeat containment integrity during any design basis transients and accident. In addition, the HCVS is designed to provide features that prevent inadvertent HCVS flow path actuation due to a design error, equipment

Part 2: Boundary Conditions for Wetwell Vent

malfunction, or operator error. These design features include two normally closed/fail closed, in-series CIVs that are air-to-open and spring-to-shut. A DC SOV must be energized to allow the motive air to open the valve. Although the same DC and motive air source will be used, separate control circuits including key-locked switches will be used for the two redundant valves to address single point vulnerabilities that may cause the flow path to inadvertently open. Manual valves that can bypass the SOVs will be locked closed and a bypass jumper will be removed from the system.

Component Qualifications

The HCVS components downstream of the second containment isolation valve are located in seismically qualified structures except those components located in the Reactor Building Track Bay, including the ROS, pneumatic supply station, HCVS batteries, and HCVS battery charger. For those components, the structure will be analyzed for seismic ruggedness to ensure that any potential failure would not adversely impact the function of the HCVS (i.e., seismic category II over I criteria).

HCVS components that directly interface with the pressure boundary, up to and including the PCV and SGTS interface valve will be classified as safety-related since the existing system is safety-related. Likewise, any electrical or controls component which interfaces with Class 1E power sources will be classified as safety related up to applicable isolation devices (e.g., fuses, breakers), as their failure could adversely impact containment isolation and/or a safety-related power source. All safety-related components will be seismically and environmentally qualified in accordance with the design basis of the plant. Additional functionality evaluations for severe accident/boundary conditions specified in NEI 13-02 will be performed.

Interfacing HCVS components will be classified as augmented quality.

Qualification includes consideration of environmental conditions specified in NEI 13-02. HCVS components will be evaluated to ensure functionality following a design basis earthquake. Components that interface with the HCVS will be routed in seismically qualified structures or the structure will be analyzed for seismic ruggedness to ensure that any potential failure would not adversely impact the function of the HCVS or other safety related structures or components.

Instrumentation and controls components will also be evaluated for environmental qualification to conditions postulated for a severe accident, although these evaluations will not be considered part of the site Environmental Qualification (EQ) program.

HCVS instrumentation performance (e.g., accuracy and precision) need not exceed that of similar plant installed equipment. Radiation monitoring equipment accuracy will be sufficient to confirm flow of radionuclides through the HCVS.

The HCVS instruments, including valve position indication, process instrumentation, radiation monitoring, and support system monitoring, will be qualified by using one or more of the three methods described in the ISG, which includes:

1. Purchase of instruments and supporting components with known operating principles from manufacturers with commercial quality assurance programs (e.g., ISO9001) where the procurement specifications include the applicable seismic requirements, design requirements, and applicable testing.
2. Demonstration of seismic reliability via methods that predict performance described in IEEE 344-2004 (Reference 28)
3. Demonstration that instrumentation is substantially similar to the design of instrumentation previously qualified.

Part 2: Boundary Conditions for Wetwell Vent

Instrument	Qualification Method*
HCVS Process Temperature	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Pressure	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Radiation Monitor	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Valve Position	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Pneumatic Supply Pressure	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Electrical Power Supply Availability	ISO9001 / IEEE 344-2004 / Demonstration

* The specific qualification method(s) used for each required HCVS instrument will be reported in future 6 month status reports

[OPEN ITEM-6: Complete evaluation for environmental/seismic qualification of HCVS components]

Monitoring of HCVS

The NMP2 wetwell HCVS will be capable of being manually operated during sustained operations from a control panel located in the MCR and will meet the requirements of Order element 1.2.4. The MCR is a readily accessible location with no further evaluation required. MCR dose associated with HCVS operation conforms to GDC 19/Alternate Source Term (AST) for radiation shielding considerations (HCVS-FAQ-01, Reference 12). Additionally, to meet the intent for a secondary control location of section 1.2.5 of the Order, a readily accessible ROS will also be incorporated into the HCVS design as described in NEI 13-02 section 4.2.2.1.2.1 (Reference 9). The controls at the ROS location will be accessible and functional under a range of plant conditions, including severe accident conditions with due consideration to source term and dose impact on operator exposure, ELAP, and inadequate containment cooling.

The wetwell HCVS will include indications for HCVS valve position, vent pipe pressure, temperature, and effluent radiation levels to aid operator verification of HCVS function. Other important information on the status of supporting systems, such as power source status and pneumatic supply pressure, will also be included in the design and located to support HCVS operation. This instrumentation will be powered from the dedicated HCVS batteries, which provide a minimum of 24-hour supply.

Other instrumentation that supports HCVS function will be provided nearby in the MCR. This includes existing containment pressure and wetwell level indication. This instrumentation is not required to validate HCVS function and is therefore not powered from the dedicated HCVS batteries. However, these instruments are expected to be available since the DG that supports HCVS battery charger function after 24 hours also supplies the battery charger for these instruments and will be installed prior to depletion of the station batteries. (Reference [1)

The HCVS instruments, including valve position indication, process instrumentation, radiation monitoring, and support system monitoring, will be qualified as previously described.

Part 2: Boundary Conditions for Wetwell Vent

Component reliable and rugged performance

The HCVS vent path components that directly interface with the pressure boundary, up to and including the PCV and SGTS interface valves, will be classified as safety-related since the existing system is safety-related. In addition, any electrical or controls component which interfaces with Class 1E power sources will be classified as safety related, as their failure could adversely impact containment isolation and/or a safety-related power source. All safety-related components will be seismically qualified in accordance with the NMP2 design basis. All other HCVS components, including piping and supports, electrical power supply, valve actuator pneumatic supply, and instrumentation (local and remote) will be designed for reliable and rugged operation performance that is capable of ensuring HCVS functionality following a design basis earthquake as required per Section 2.2 of EA-13-109.

For the HCVS instruments that are required after a potential seismic event, the following methods will be used to verify that the design and installation is reliable / rugged and therefore capable of ensuring HCVS functionality following a seismic event. Applicable instruments are rated by the manufacturer (or otherwise tested) for seismic impact at levels commensurate with those of postulated severe accident event conditions in the area of instrument component use using one or more of the following methods:

- demonstration of seismic motion consistent with that of existing design basis loads at the installed location
- substantial history of operational reliability in environments with significant vibration with a design envelope inclusive of the effects of seismic motion imparted to the instruments proposed at the location
- adequacy of seismic design and installation is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, *IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations*, (Reference 28 or a substantially similar industrial standard)
- demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges)
- seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

HCVS components are located in the Reactor Building, Control Building, and Reactor Building Track Bay. The Reactor Building and Control Building are safety-related, seismic class I structures. The Reactor Building Track Bay will be evaluated for the external hazards, including seismic hazards, that screen in for the plant as defined in guidance NEI 12-06 as endorsed by JLD-ISG-12-01 for Order EA-12-049 (Reference 5).

The instrumentation/power supplies/cables/connections (components) will be qualified for temperature, pressure, radiation level, and total integrated radiation dose up to 7 days for the Effluent Vent Pipe and HCVS ROS location. The qualification for the equipment by the supplier will be validated by NMP for the specific location at NMP2 to ensure that the bounding conditions envelope the specific plant conditions.

Conduit design will be in accordance with Seismic Class 1 criteria. Both existing and new barriers (if required) will be used to provide a level of protection from missiles when equipment is located outside of seismically qualified structures.

Part 2: Boundary Conditions for Wetwell Vent
Augmented quality requirements will be applied to the components installed in response to this Order unless higher quality requirements apply.

Part 2: Boundary Conditions for WW Vent – BDBEE Venting

Determine venting capability for BDBEE Venting, such as may be used in an ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section 1.1.4 /NEI 13-02 Section 2.2

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.6 / NEI 13-02 Section 2.5, 4.2.2

The operation of the HCVS will be designed to minimize reliance on operator actions for response to an ELAP and severe accident events. Immediate operator actions will be completed by qualified plant personnel from either the MCR or the HCVS ROS using remote-manual actions. The operator actions required to open a vent path are as described in Table 2-1. Remote-manual is defined in this report as a non-automatic power operation of a component and does not require the operator to be at or in close proximity to the component. No other operator actions are required to initiate venting.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR and will be able to be operated from an installed ROS as part of the response to this Order. Both locations minimize plant operators' exposure to adverse temperature and radiological conditions and are protected from hazards assumed in Part 1 of this report.

Permanently installed electrical power and motive air/gas capability will be available to support operation and monitoring of the HCVS for 24 hours. Power will be provided by installed batteries for up to 24 hours before generators will be required to be functional.

System control:

i. Active: PCIVs are operated in accordance with EOPs/SAPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles of the vent path under ELAP conditions over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EOPs.

ii. Passive: Inadvertent actuation protection is provided by use of key-locked switches for both the HCVS power supply actuation and valve operation. The normal state of the system is de-energized and isolated.

Part 2: Boundary Conditions for WW Vent – BDBEE Venting

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.4 / NEI 13-02 Section 4.2.2

Actions required to extend venting beyond 24 hours include replenishment of pneumatic supplies and replenishment of electrical supply.

The pneumatic supply station will be installed in the Reactor Building Track Bay and will include a nitrogen bottle station with additional connections for extra nitrogen bottles or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and fueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Reactor Building Track Bay. The UPS will include battery capacity sufficient for 24 hour operation. The normal power supply to the UPS will be provided by a dedicated 600 VAC to 120/240 VAC transformer, which in turn is powered from a 600 VAC bus that will be re-powered by a diesel generator as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the bus, a local 240 VAC connection will allow the battery charger to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Details:

Provide a brief description of Procedures / Guidelines:

Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment integrity. These flowcharts are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS implementation.

Identify modifications:

List modifications and describe how they support the HCVS Actions.

EA-12-049 Modifications

- A modification to install a connection point to allow a diesel generator to be connected to electrical power bus 2EJS*US1 is being installed. This will allow the DG to power the HCVS battery charger.

EA-13-109 Modifications

- A modification will be required to install the HCVS pneumatic supply station
- A modification will be required to install the dedicated HCVS batteries and battery charger
- A modification will be required to install required HCVS instrumentation and controls, including

Part 2: Boundary Conditions for WW Vent – BDBEE Venting

radiation monitors. This also includes installation of control panels in the MCR and the ROS.

- A modification will be required to install dedicated HCVS piping and PCV from the combined wetwell/drywell piping upstream of 2GTS*AOV101/SOV102 to the HCVS discharge
- A modification will be required to relocate existing Containment Purge System inboard containment isolation valve 2CPS*AOV109 to outside of containment and to upgrade HCVS system boundary valves. This includes relocation of existing outboard containment isolation valve 2CPS*AOV111
- Additional modifications may be required to system isolation valves, HCVS piping, and piping supports.

Key Venting Parameters:

List instrumentation credited for this venting actions. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)

Initiation, operation and monitoring of the HCVS venting will rely on the following key parameters and indicators. Indication for these parameters will be installed in the MCR to comply with EA-13-109:

Key Parameter	Component Identifier	Indication Location
HCVS Process Temperature	TBD	MCR
HCVS Process Pressure	TBD	MCR
HCVS Process Radiation Monitor	TBD	MCR
HCVS Process Valve Position	TBD	MCR
HCVS Pneumatic Supply Pressure	TBD	MCR/ROS
HCVS Electrical Power Supply Availability	TBD	MCR/ROS

Initiation and cycling of the HCVS will be controlled based on several existing MCR key parameters and indicators which are qualified to the existing plant design: (Reference NEI 13-02 Section 4.2.2.1.9 [9]):

Key Parameter	Component Identifier	Indication Location
Drywell pressure	2CMS*PI2A 2CMS*PR2B	MCR
Suppression Chamber pressure	2CMS*PI7A 2CMS*PR7B	MCR
Suppression Pool level	2CMS*LI9A 2CMS*LR9B 2CMS*LI11A 2CMS*LI11B	MCR

Notes: None

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting

Determine venting capability for Severe Accident Venting, such as may be used in an ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section 1.2.10 /NEI 13-02 Section 2.3

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.6 / NEI 13-02 Section 2.5, 4.2.2

The operation of the HCVS will be designed to minimize reliance on operator actions for response to an ELAP and severe accident events. Progression of the ELAP into a severe accident assumes that the FLEX strategies identified in the response to Order EA-12-049 have not been effective. Immediate operator actions will be completed by operators from either the MCR or the HCVS ROS using remote-manual actions. The operator actions required to open a vent path are as described in Table 2-1. Remote-manual is defined in this plan as a non-automatic power operation of a component and does not require the operator to be at or in close proximity to the component. No other operator actions are required to initiate venting under primary procedural protocol.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR and will be able to be operated from an installed ROS as part of the response to this Order. Both locations minimize plant operators' exposure to adverse temperature and radiological conditions and are protected from hazards assumed in Part 1 of this report. A preliminary evaluation of travel pathways for dose and temperature concerns has been completed and travel paths identified (Open Item #7). A final evaluation of environmental conditions will be completed as part of detailed design for confirmation.

[OPEN ITEM-7: Confirm travel path accessibility]

Permanently installed electrical power and motive air/gas capability will be available to support operation and monitoring of the HCVS for 24 hours. Power will be provided by installed batteries for up to 24 hours before generators will be required to be functional.

System control:

i. Active: PCIVs are operated in accordance with EOPs/SOPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles of the vent path under ELAP conditions over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EOPs. The configuration of the new pneumatic supplies allows the HCVS system controls to override the containment isolation circuit on the PCIVs needed to vent containment.

ii. Passive: Inadvertent actuation protection is provided by use of key-locked switches for both the HCVS power supply actuation and valve operation. The normal state of the system is de-energized and closed.

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section 1.2.4, 1.2.8 / NEI 13-02 Section 4.2.2

Actions required to extend venting beyond 24 hours include replenishment of pneumatic supplies and replenishment of electrical supply.

The pneumatic supply station will be installed in the Reactor Building Track Bay and will include a nitrogen bottle station with additional connections for extra nitrogen bottles or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and fueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Reactor Building Track Bay. The UPS will include battery capacity sufficient for 24 hour operation. The normal power source for the UPS is a dedicated 600 VAC to 120/240 VAC transformer, which will be powered from a 600 VAC bus that will be re-powered by a diesel generator as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the 600 VAC bus, a local 240 VAC connection to the UPS will allow the UPS to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Both the pneumatic supply station and the HCVS batteries/battery charger are located in the Reactor Building Track Bay on the Northeast side of the Reactor Building. The track bay is outside of the secondary containment boundary. The HCVS piping will exit the Reactor Building on the west-northwest side of the Reactor Building. Therefore, the Reactor Building provides shielding for the Reactor Building Track Bay. A preliminary evaluation of radiological and temperature concerns was completed (Open Item #8). A final evaluation will be completed when the location of the ROS is finalized.

[OPEN ITEM-8: Perform final environmental evaluation of the ROS location]

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment integrity. Similarly, severe accident procedures exist for when EOP actions do not halt the progression of the BDBEE to severe accident. These flowcharts/procedures are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS implementation.

Part 2: Boundary Conditions for WW Vent – Severe Accident Venting
Identify modifications: *List modifications and describe how they support the HCVS Actions.*
Modifications are the same as for BDBEE Venting Part 2
Key Venting Parameters: *List instrumentation credited for the HCVS Actions. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)*
Key venting parameters are the same as for BDBEE Venting Part 2
Notes: None

Part 2: Boundary Conditions for WW Vent – Support Equipment Functions

Determine venting capability support functions needed

Ref: EA-13-109 Section 1.2.8, 1.2.9 /NEI 13-02 Section 2.5, 4.2.4, 6.1.2

BDBEE Venting

Provide a general description of the BDBEE Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.

Ref: EA-13-109 Section 1.2.9 / NEI 13-02 Section 2.5, 4.2.2, 4.2.4, 6.1.2

Venting will require support from the HCVS batteries, battery charger, and pneumatic supply station being installed. These provide a minimum of 24 hour operation on installed supplies and provide connection points for additional pneumatic supplies (nitrogen bottles or compressor) and electrical supplies (portable generator).

Containment integrity is initially maintained by permanently installed equipment. All containment venting functions will be performed from the MCR or ROS.

The pneumatic supply station will be installed in the Reactor Building Track Bay and will include a nitrogen bottle station with additional connections for extra nitrogen bottles or connection of a portable air compressor. Connections will utilize pre-engineered quick disconnect fittings. The location of the pneumatic supply station will be evaluated for reasonable protection per Part 1 of this OIP and modified as required for compliance. Actions to replenish the pneumatic supplies include replacement of nitrogen bottles or installation and fueling of a portable air compressor. Sufficient nitrogen bottles will be staged to support operations for an additional 48 hours beyond the initial 24 hour coping period following the ELAP event.

The HCVS batteries and battery charger will also be installed in the Reactor Building Track Bay. The UPS will include battery capacity sufficient for 24 hour operation. The normal power source for the UPS is a dedicated 600 VAC to 120/240 VAC transformer, which will be powered from a 600 VAC bus that will be re-powered by a diesel generator as part of the FLEX response. A design change to install portable generator connections to this bus is being completed in support of EA-12-049 (Reference 1). In the event that power is not restored to the 600 VAC bus, a local 240 VAC connection to the UPS will allow the UPS to receive power from a small portable generator. Actions to replenish the electrical supply include refueling the DG or connecting and refueling a small portable generator.

Severe Accident Venting

Provide a general description of the Severe Accident Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.

Ref: EA-13-109 Section 1.2.8, 1.2.9 / NEI 13-02 Section 2.5, 4.2.2, 4.2.4, 6.1.2

The same support functions that are used in the BDBEE scenario would be used for severe accident venting.

Details:

Provide a brief description of Procedures / Guidelines:

Confirm that procedure/guidance exists or will be developed to support implementation.

Primary Containment Control Flowcharts exist to direct operations in protection and control of containment integrity. Similarly, severe accident procedures exist for when EOP actions do not halt the progression of the

Part 2: Boundary Conditions for WW Vent – Support Equipment Functions

BDBEE to severe accident. These flowcharts/procedures are being revised as part of the EPG/SAGs revision 3 updates and associated EOP/SAP implementation. HCVS-specific procedure guidance will be developed and implemented to support HCVS.

Identify modifications:
List modifications and describe how they support the HCVS Actions.

- The FLEX modification to add connection points for the FLEX 600 VAC generator to connect to the 600 VAC bus supports re-powering the HCVS battery charger.
- HCVS modification to add piping and connection points at a suitable location in the Reactor Building Track Bay to connect portable N2 bottles or air compressor for motive force to HCVS components after 24 hours. Install HCVS batteries and battery charger with applicable connection to 600 VAC bus and connection for small portable generator.
- HCVS connections required for portable equipment will be protected from all applicable screened-in hazards and located such that operator exposure to radiation and occupational hazards will be minimized. Structures to provide protection of the HCVS connections will be constructed to meet the requirements identified in NEI-12-06 section 11 (Reference 8) for screened in hazards.

Key Support Equipment Parameters:
List instrumentation credited for the support equipment utilized in the venting operation. Clearly indicate which of those already exist in the plant and what others will be newly installed (to comply with the vent order)

- Local control features of the FLEX DG electrical load and fuel supply.
- Pressure gauge on supplemental Nitrogen bottles.

Notes: None

Part 2: Boundary Conditions for WW Vent – Venting Portable Equipment Deployment

Provide a general description of the venting actions using portable equipment including modifications that are proposed to maintain and/or support safety functions.

Ref: EA-13-109 Section 3.1 / NEI 13-02 Section 6.1.2, D.1.3.1

Venting actions using portable equipment include the following:

- Replacement and replenishment of pneumatic supply sources. This includes the option of replacing nitrogen bottles or connecting a portable air compressor. Equipment sufficient for an additional 48 hours of vent operation beyond the 24-hour installed supply would be pre-staged in the FLEX storage building. Installation of the HCVS includes installation of a pneumatic supply header that includes pneumatic regulators and utilizes standard pneumatic connections.
- Establishing temporary power to repower the battery charger. Option 1 is to connect the FLEX DG to 2EJS*US1, which provides power to EHS*MCC102 that in turn powers the HCVS transformer and battery charger. Option 1 would be completed as part of the FLEX response strategy and occurs to the east and inside the NMP2 Control Building. Option 2, to be taken if the FLEX DG cannot be connected to 2EJS*US1, is to connect a small portable generator (approximately 2kW) to the battery charger. Option 2 would be taken locally at the battery charger. Either of these actions will also require the generators to be refueled. A one line diagram of the electrical system to be installed is included in Attachment 3.

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

Implementation procedures are being developed to address all HCVS operating strategies, including deployment of portable equipment. Direction to enter the procedure for HCVS operation will be given in the EOPs, the site ELAP procedure, and the SAPs. (refer to Part 4 for general information on procedures).

There is minimal impact to deployment actions since the HCVS discharge pipe will be located on the Northwest side of the Reactor Building and deployment areas are either on the East/Northeast side of the Reactor Building or on the South of the Reactor Building. Therefore, the procedures/guidelines for HCVS actions are the same as for support equipment section.

Strategy	Modifications	Protection of connections
Per compliance with Order EA-12-049 (FLEX)	N/A	Per compliance with Order EA-12-049 (FLEX)

Notes: None

Part 3: Boundary Conditions for Drywell Vent

Provide a sequence of events and identify any time constraint required for success including the basis for the time constraint.
HCVS Actions that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walkthrough of deployment).

Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 2B

See attached sequence of events timeline (Attachment 2B).

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Severe Accident Venting

Determine venting capability for Severe Accident Venting, such as may be used in a ELAP scenario to mitigate core damage.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

First 24 Hour Coping Detail

Provide a general description of the venting actions for first 24 hours using installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Greater Than 24 Hour Coping Detail

Provide a general description of the venting actions for greater than 24 hours using portable and installed equipment including station modifications that are proposed.

Ref: EA-13-109 Section X.X.X / NEI 13-02 Section X.X.X

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Details:

Provide a brief description of Procedures / Guidelines:
Confirm that procedure/guidance exists or will be developed to support implementation.

This section will be completed with the Phase 2 OIP submittal by December 31, 2015

Identify modifications*:*
List modifications and describe how they support the HCVS Actions.

Part 3: Boundary Conditions for Drywell Vent
This section will be completed with the Phase 2 OIP submittal by December 31, 2015
Key Venting Parameters: *List instrumentation credited for the venting HCVS Actions.*
This section will be completed with the Phase 2 OIP submittal by December 31, 2015
Notes: None

Part 4: Programmatic Controls, Training, Drills and Maintenance

Identify how the programmatic controls will be met.

Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality addressing the impact of temperature and environment

Ref: EA-13-109 Section 3.1, 3.20 / NEI 13-02 Section 6.1.2, 6.1.3, 6.2

Program Controls:

The HCVS venting actions will include:

- Site procedures and programs are being developed in accordance with NEI 13-02 to address use and storage of portable equipment relative to the Severe Accident defined in NRC Order EA-13-109 and the hazards applicable to the site per Part 1 of this OIP.
- Routes for transporting portable equipment from storage location(s) to deployment areas will be developed as the response details are identified and finalized. The identified paths and deployment areas will be accessible when the HCVS is required to be functional including during Severe Accidents.

Procedures:

Procedures will be established for system operations when normal and backup power is available, and during ELAP conditions.

NMP2 will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop/enhance site specific procedures or guidelines to address the criteria in NEI 13-02. These procedures and/or guidelines will support existing symptom based command and control strategies in the current EOPs and will contain the following details:

- appropriate conditions and criteria for use of the HCVS
- when and how to place the HCVS in operation
- location of system components
- instrumentation available
- normal and backup power supplies
- directions for sustained operation (Reference 9), including the storage and location of portable equipment
- location of the remote control HCVS operating station (panel)
- training on operating the portable equipment
- testing of portable equipment

Provisions will be established for out-of-service requirements of the HCVS and compensatory measures that comply with the criteria from NEI 13-02 (Reference 9).

NMP2 will establish provisions for out-of-service requirements of the HCVS and compensatory measures. The following provisions will be documented in the HCVS Program Document:

The provisions for out-of-service requirements for HCVS are applicable in Modes 1, 2 and 3

- If for up to 90 consecutive days, the primary or alternate means of HCVS operation are non-functional, no compensatory actions are necessary.

Part 4: Programmatic Controls, Training, Drills and Maintenance

- If for up to 30 days, the primary and alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If the out of service times exceed 30 or 90 days as described above, the following actions will be performed:
  - The condition will entered into the corrective action system,
  - The HCVS availability will be restored in a manner consistent with plant procedures,
  - A cause assessment will be performed to prevent future unavailability for similar causes.
  - Actions will be initiated to implement appropriate compensatory actions

Describe training plan

List training plans for affected organizations or describe the plan for training development

Ref: EA-13-109 Section 3.2 / NEI 13-02 Section 6.1.3

The Systematic Approach to Training (SAT) will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. As determined by the SAT process, the training will consider system operations when normal and backup power is available, and during ELAP conditions. Required training will be completed prior to placing the HCVS in service.

Identify how the drills and exercise parameters will be met.

Alignment with NEI 13-06 and 14-01 as codified in NTTF Recommendation 8 and 9 rulemaking

The Licensee should demonstrate use in drills, tabletops, or exercises for HCVS operation as follows:

- *Hardened containment vent operation on normal power sources (no ELAP).*
- *During FLEX demonstrations (as required by EA-12-049): Hardened containment vent operation on backup power and from primary or alternate location during conditions of ELAP/loss of UHS with no core damage. System use is for containment heat removal AND containment pressure control.*
- *HCVS operation on backup power and from primary or alternate location during conditions of ELAP/loss of UHS with core damage. System use is for containment heat removal AND containment pressure control with potential for combustible gases (Demonstration may be in conjunction with SAG change).*

Ref: EA-13-109 Section 3.1 / NEI 13-02 Section 6.1.3

The site will utilize the guidance provided in NEI 13-06 and 14-01 (References 10 and 11) for guidance related to drills, tabletops, or exercises for HCVS operation. In addition, the site will integrate these requirements with compliance to any rulemaking resulting from the NTTF Recommendations 8 and 9.

Describe maintenance plan:

- *The HCVS maintenance program should ensure that the HCVS equipment reliability is being achieved in a manner similar to that required for FLEX equipment. Standard industry templates (e.g., EPRI) and associated bases may be developed to define specific maintenance and testing.*
  - *Periodic testing and frequency should be determined based on equipment type and expected*

Part 4: Programmatic Controls, Training, Drills and Maintenance

use (further details are provided in Section 6 of this document).
  - *Testing should be done to verify design requirements and/or basis. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.*
  - *Preventive maintenance should be determined based on equipment type and expected use. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.*
  - *Existing work control processes may be used to control maintenance and testing.*
- *HCVS permanent installed equipment should be maintained in a manner that is consistent with assuring that it performs its function when required.*
  - *HCVS permanently installed equipment should be subject to maintenance and testing guidance provided to verify proper function.*
- *HCVS non-installed equipment should be stored and maintained in a manner that is consistent with assuring that it does not degrade over long periods of storage and that it is accessible for periodic maintenance and testing.*

Ref: EA-13-109 Section 1.2.13 / NEI 13-02 Section 5.4, 6.2

The site will utilize the standard EPRI industry PM process (similar to the Preventive Maintenance Basis Database) for establishing the maintenance calibration and testing actions for HCVS components. The control program will include maintenance guidance, testing procedures and frequencies established based on type of equipment and considerations made within the EPRI guidelines.

Site procedures and programs are being developed in accordance with NEI 13-02 to address use and storage of portable equipment relative to the Severe Accident defined in NRC Order EA-13-109 and the hazards applicable to the site per Part 1 of this OIP. Attachment 1 defines the applicable maintenance and preventive maintenance requirements for HCVS portable equipment.

NMP2 will implement the following operation, testing and inspection requirements for the HCVS to ensure reliable operation of the system.

Table 4-1: Testing and Inspection Requirements

Description	Frequency
Cycle the HCVS valves and the interfacing system valves not used to maintain containment integrity during operations.	Once per operating cycle
Perform visual inspections and a walk down of HCVS components	Once per operating cycle
Test and calibrate the HCVS radiation monitors.	Once per operating cycle
Leak test the HCVS.	(1) Prior to first declaring the system functional; (2) Once every three operating cycles thereafter; and

Part 4: Programmatic Controls, Training, Drills and Maintenance

	(3) After restoration of any breach of system boundary within the buildings
Validate the HCVS operating procedures by conducting an open/close test of the HCVS control logic from its control panel and ensuring that all interfacing system valves move to their proper (intended) positions.	Once per every other operating cycle

Notes: None

Part 5: Milestone Schedule

Provide a milestone schedule. This schedule should include:

- **Modifications timeline**
- **Procedure guidance development complete**
  - o **HCVS Actions**
  - o **Maintenance**
- **Long term use equipment acquisition timeline**
- **Training completion for the HCVS Actions**

The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.

Ref: EA-13-109 Section D.1, D.3 / NEI 13-02 Section 7.2.1

The following milestone schedule is provided. The dates are planning dates subject to change as design and implementation details are developed. Any changes to the following target dates will be reflected in the subsequent 6 month status reports.

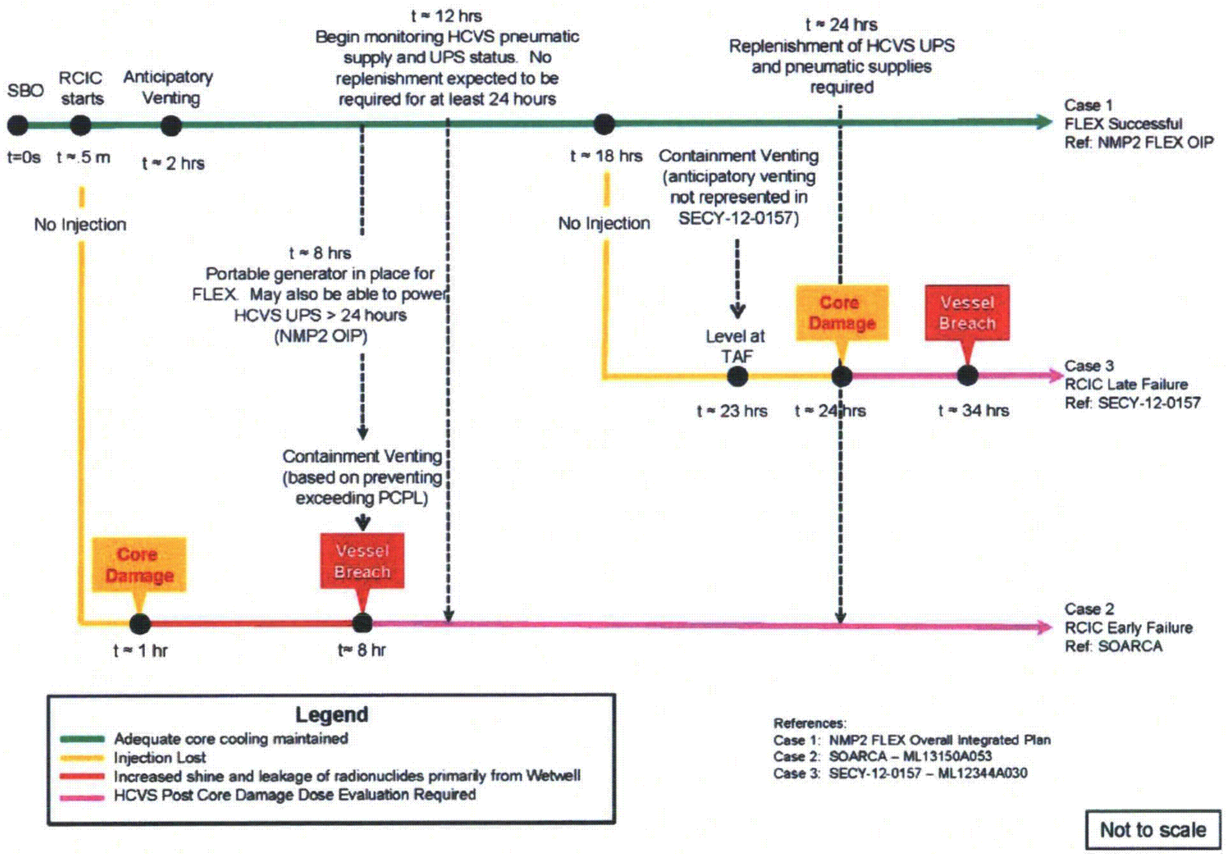
Milestone	Target Completion Date	Activity Status	Comments *{Include date changes in this column}*
Hold preliminary/conceptual design meeting	Nov 2013	Complete	
Submit Overall Integrated Implementation Plan	Jun 2014	Complete	
Submit 6 Month Status Report	Dec 2014		
Design Engineering Complete	Mar 2015		
Submit 6 Month Status Report	Jun 2015		
Operations Procedure Changes Developed	Dec 2015		
Site Specific Maintenance Procedure Developed	Dec 2015		
Submit 6 Month Status Report	Dec. 2015		Simultaneous with Phase 2 OIP
Training Complete	Feb 2016		
NMP2 Implementation Outage	Apr 2016		
Procedure Changes Active	Apr 2016		
Walk Through Demonstration/Functional Test	Apr 2016		
Submit Completion Report	June 2016		

Attachment 1: HCVS Portable Equipment

List portable equipment	*BDBEE Venting*	*Severe Accident Venting*	*Performance Criteria*	*Maintenance / PM requirements*
Nitrogen Cylinders	X	X	X	Check periodically for pressure, replace or replenish as needed
FLEX DG	X	X	TBD	Per response to EA-12-049
Portable Air Compressor (optional)	X	X	TBD	Per vendor manual
Small Portable Generator (optional)	X	X	TBD	Per vendor manual

Attachment 2: Sequence of Events Timeline

Table 2A: Wetwell HCVS Timeline



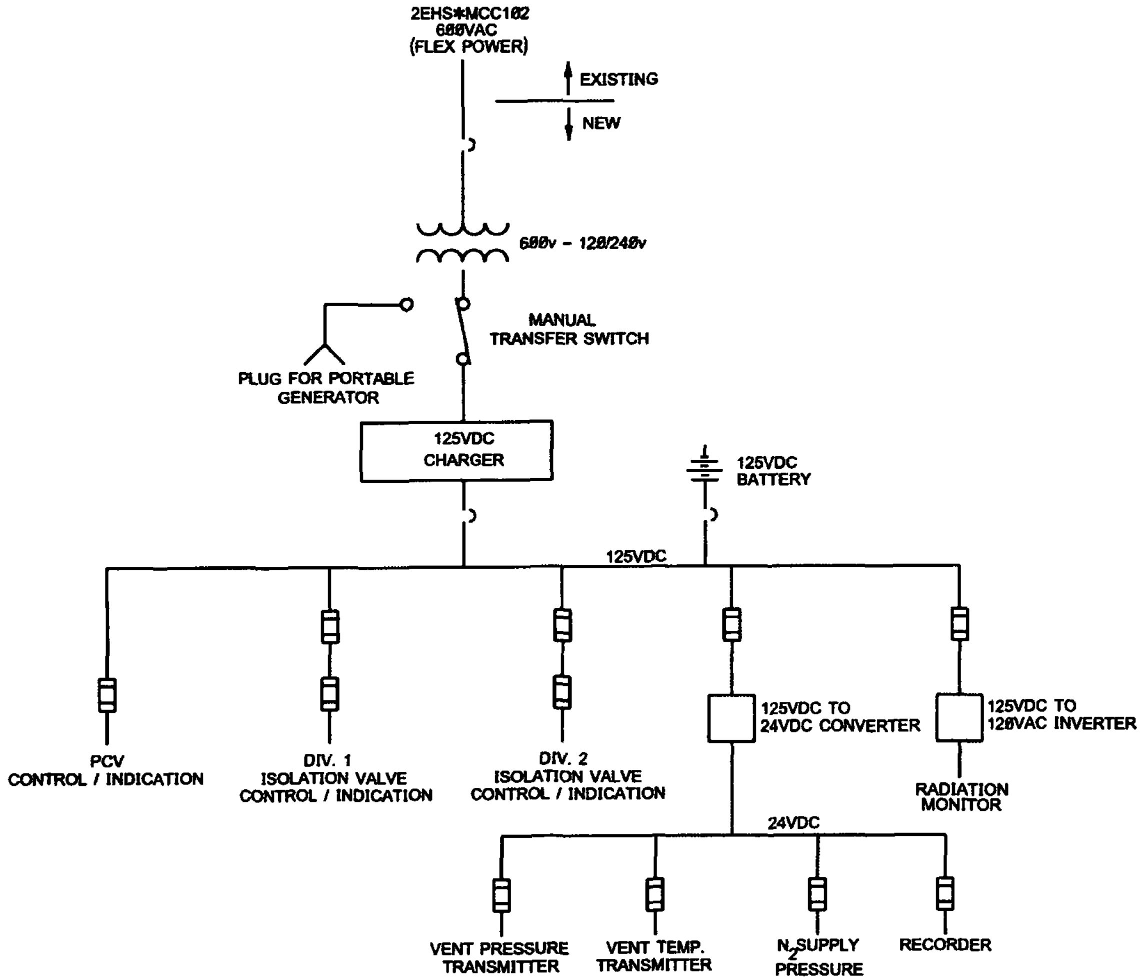
Attachment 3: Conceptual Sketches

(Conceptual sketches, as necessary to indicate equipment which is installed or equipment hookups necessary for the strategies)

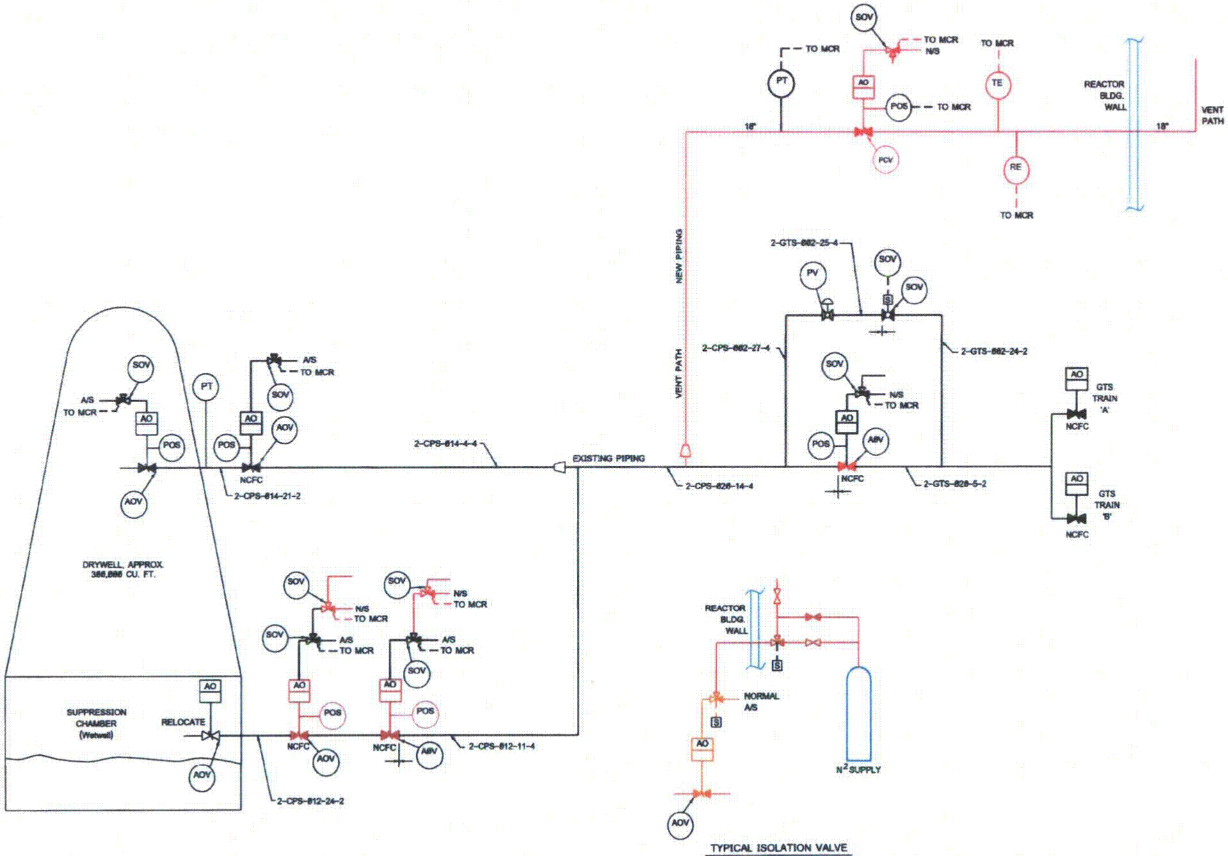
- Plant layout with egress and ingress pathways
- Piping routing for vent path
- Instrumentation Process Flow
- Electrical Connections
- Include a piping and instrumentation diagram of the vent system. Demarcate the valves (in the vent piping) between the existing and new.

Sketch 1: Electrical Layout of System
Sketch 2: Layout of HCVS, NMP2
Sketch 3: Remote Operating Station
Sketch 4: HCVS Plan Overview

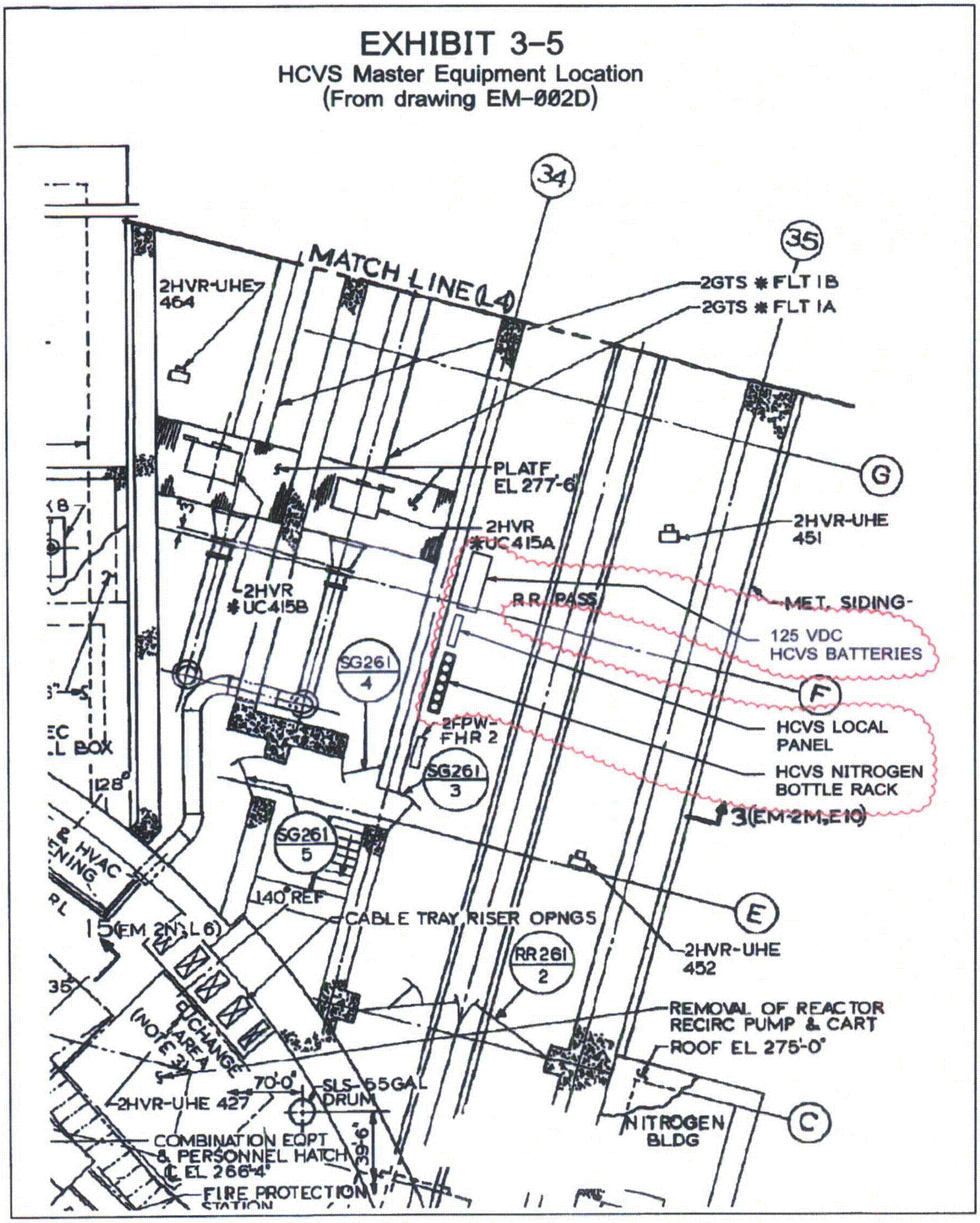
Sketch 1: Electrical Layout of System



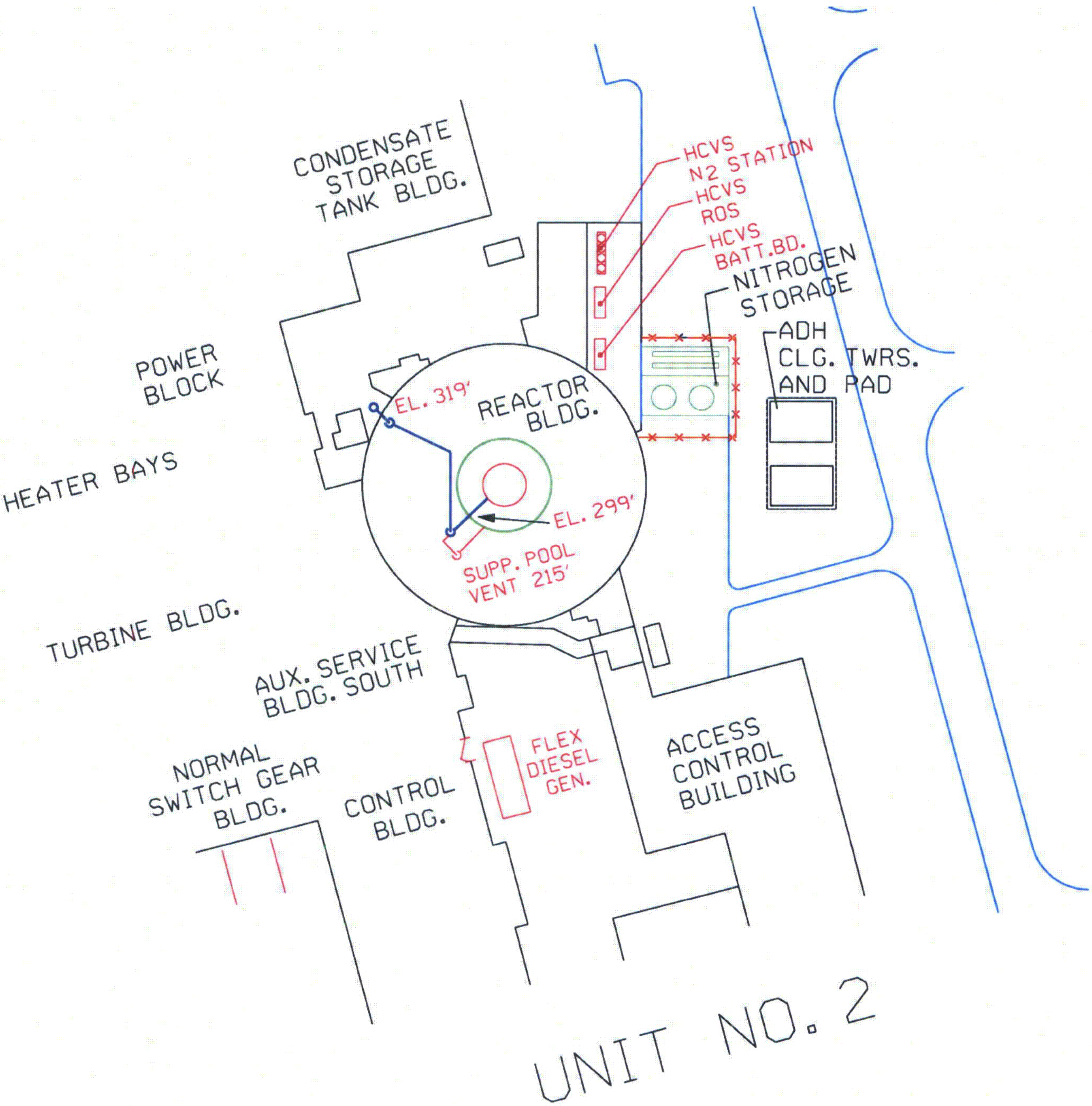
Sketch 2: Layout of HCVS, NMP2



Sketch 3: Remote Operating Station



Sketch 4: HCVS Plan Overview



Attachment 4: Failure Evaluation Table

Table 4A: Wetwell HCVS Failure Evaluation Table

Functional Failure Mode	Failure Cause	Alternate Action	Failure with Alternate Action Prevents Containment Venting?
Fail to Vent (Open) on Demand	Valves fail to open/close due to loss of normal AC power/DC batteries	None required – system SOVs utilize dedicated 24-hour power supply	No
	Valves fail to open/close due to depletion of dedicated power supply	Recharge system with FLEX provided portable generators	No
	Valves fail to open/close due to complete loss of power supplies	Manually operate backup pneumatic supply/vent lines at remote panel	No
	Valves fail to open/close due to loss of normal pneumatic supply	No action needed. Valves are provided with dedicated motive force capable of 24 hour operation	No
	Valves fail to open/close due to loss of alternate pneumatic supply (long term)	Replace bottles as needed and/or recharge with portable air compressors	No
	Valve fails to open/close due to SOV failure	Manually operate backup pneumatic supply/vent lines at remote panel	No
Fail to stop venting (Close) on demand	Not credible as there is not a common mode failure that would prevent the closure of at least 1 of the 3 valves needed for venting.	N/A	No
Spurious Opening	Not credible as key-locked switches prevent mispositioning of the HCVS CIVs and PCV.	N/A	No
Spurious Closure	Valves fail to remain open due to depletion of dedicated power supply	Recharge system with FLEX provided portable generators	No
	Valves fail to remain open due to complete loss of power supplies	Manually operate backup pneumatic supply/vent lines at remote panel	No
	Valves fail to remain open due to loss of alternate pneumatic supply (long term)	Replace bottles as needed and/or recharge with portable air compressors	No

Attachment 5: References

1. Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events, dated February 28, 2013 (ML13066A171) for Nine Mile Point Unit #2
2. Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989
3. Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
4. Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated June 6, 2013
5. JLD-ISG-2012-01, Compliance with Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated August 29, 2012
6. JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013
7. NRC Responses to Public Comments, Japan Lessons-Learned Project Directorate Interim Staff Guidance JLD-ISG-2012-02: Compliance with Order EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents, ADAMS Accession No. ML12229A477, dated August 29, 2012
8. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 1, dated August 2012
9. NEI 13-02, Industry Guidance for Compliance with Order EA–13–109, Revision 0, Dated November 2013
10. NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, Revision 0, dated March 2014
11. NEI 14-01, Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Revision 0, dated March 2014
12. NEI FAQ HCVS-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations
13. NEI FAQ HCVS-02, HCVS Dedicated Equipment
14. NEI FAQ HCVS-03, HCVS Alternate Control Operating Mechanisms
15. NEI FAQ HCVS-04, HCVS Release Point
16. NEI FAQ HCVS-05, HCVS Control and 'Boundary Valves'
17. NEI FAQ HCVS-06, FLEX Assumptions/HCVS Generic Assumptions
18. NEI FAQ HCVS-07, Consideration of Release from Spent Fuel Pool Anomalies
19. NEI FAQ HCVS-08, HCVS Instrument Qualifications
20. NEI FAQ HCVS-09, Use of Toolbox Actions for Personnel
21. NEI White Paper HCVS-WP-01, HCVS Dedicated Power and Motive Force
22. NEI White Paper HCVS-WP-02, HCVS Cyclic Operations Approach
23. NEI White Paper HCVS-WP-03, Hydrogen/CO Control Measures
24. NEI White Paper HCVS-WP-04, FLEX/HCVS Interactions
25. NUREG/CR-7110, Rev. 1, State-of-the-Art Reactor Consequence Analysis Project, Volume 1: Peach Bottom Integrated Analysis
26. SECY-12-0157, Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments, 11/26/12
27. NMP2 USAR, Rev. 20, Updated Safety Analysis Report
28. IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
29. FLEX MAAP Endorsement ML13190A201
30. N2-2014-003, MAAP 4.0.6 Analysis of Nine Mile Point Unit 2 Loss of All AC Power Scenario

Attachment 6: Changes/Updates to this Overall Integrated Implementation Plan

Any significant changes to this plan will be communicated to the NRC staff in the 6 Month Status Reports

Attachment 7: List of Overall Integrated Plan Open Items

Open Item	Action	Comment
1	Perform final sizing evaluation for HCVS batteries and battery charger and include in FLEX DG loading calculation.	Confirmatory action
2	Perform final vent capacity calculation for the HCVS piping confirming 1% minimum capacity	Confirmatory action
3	Perform final sizing evaluation for pneumatic Nitrogen (N2) supply.	Confirmatory action
4	Perform seismic evaluation of Reactor Building Track Bay.	Confirmatory action
5	State which approach or combination of approaches the plant determines is necessary to address the control of combustible gases downstream of the HCVS control valve.	Confirmatory action
6	Complete evaluation for environmental/seismic qualification of HCVS components.	Confirmatory action
7	Confirm travel path accessibility.	Confirmatory action
8	Perform final environmental evaluation of ROS location.	Confirmatory action