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DTE Energy



10 CFR 2.202

June 30, 2014
NRC-14-0043

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

- References:
- 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43
 - 2) NRC Letter EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," dated June 6, 2013 (ML13143A334)
 - 3) NRC Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions", Revision 0, dated November 14, 2013
 - 4) NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109, BWR Mark I & II Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions", Revision 0, dated November 2013

Subject: DTE Electric Company's Phase 1 Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses With Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions (Order Number EA-13-109)

On June 6, 2013, the Nuclear Regulatory Commission (NRC) issued Order No. EA-13-109 (Reference 2) to all licensees that operate boiling-water reactors (BWRs) with Mark I and Mark II containment designs, including DTE Electric Company (DTE), to take certain actions to ensure the operability of reliable hardened containment vent systems (HCVS) to remove decay heat and maintain control of containment pressure following events that result in a loss of active containment heat

removal capability or extended loss of AC power, and ensure that containment venting functions are also available during severe accident conditions. Specific requirements are outlined in Attachment 2 of Reference 2.

Reference 2 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 2 will be achieved. The interim staff guidance (Reference 3) 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 Overall Integrated Plan for Phase 1 requirements pursuant to Section IV, Condition D.1, of Reference 2.

Reference 4, Section 7.0 contains the specific reporting requirements for the Overall Integrated Plan. Reference 3 provides the NRC endorsement of Reference 4. The enclosed Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, 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 2.

For the purposes of compliance with Phase 1 of Order EA-13-109, DTE plans to install a severe accident capable wetwell vent.

This submittal contains no new regulatory commitments.

Should you have any questions or require additional information, please contact Mr. Kirk R. Snyder, Manager, Industry Interface at (734) 586-5020.

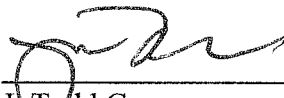
Sincerely,



Enclosure

cc: Director, Office of Nuclear Reactor Regulation
NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission,
Regulated Energy Division (kindschl@michigan.gov)

I, J. Todd Conner, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.



J. Todd Conner
Site Vice President, Nuclear Generation

On this 30th day of June, 2014 before me personally appeared J. Todd Conner, being first duly sworn and says that he executed the foregoing as his free act and deed.



Notary Public

ANGELA R. CRONE
NOTARY PUBLIC, STATE OF MI
COUNTY OF LENAWE
MY COMMISSION EXPIRES Apr 4, 2020
ACTING IN COUNTY OF *Monroe*

USNRC
NRC-14-0043
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**Enclosure to
NRC-14-0043**

**Fermi 2 NRC Docket No. 50-341
Operating License No. NPF-43**

**DTE Electric Company's Phase 1 Integrated Plan in
Response to June 6, 2013 Commission Order
Modifying Licenses With Regard to
Reliable Hardened Containment Vents
Capable of Operation under Severe Accident Conditions
(Order Number EA-13-109)**

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Introduction

In 1989, the NRC issued Generic Letter 89-16, "Installation of a Hardened Wetwell Vent," to all licensees of 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 (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

Fermi 2 June 2014 HCVS Phase 1 Overall Integrated Plan

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.

Fermi 2 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 HCVS Control Panel or Main Control Room (MCR) 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 HCVS Control Panel or MCR instrumentation to monitor effectiveness of the venting actions
- The vent operation will be monitored by HCVS valve position, temperature, and effluent radiation levels.
- The HCVS 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 Fermi 2 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 RF-18 planned for second quarter 2017.
- Phase 2: by the startup no later than startup from RF-19. Currently scheduled for Fourth 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 Fermi 2

- Seismic, External Flooding, Extreme Cold, High Wind, Extreme High Temperature

The following extreme external hazards screen out for Fermi 2

- Hurricane

Key Site assumptions to implement NEI 13-02 HCVS Actions.

Provide key assumptions associated with implementation of HCVS Phase 1 Actions

Ref: NEI 13-02 Section 1

Mark I/II Generic HCVS Related Assumptions:

Applicable EA-12-049 (FLEX) 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 except for failure of RCIC or HPCI. (Reference NEI 12-06, section 3.2.1.3 item 9)
- 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. (NEI 12-06, section 3.2.1.3 item 9 and 3.2.1.4 item 1-4)
- 049-6. At 45 minutes (time sensitive at a time greater than 75 minutes) an ELAP is declared and actions begin as defined in EA-12-049 compliance
- 049-7. DC power and distribution can be credited for the duration determined per the EA-12-049

Part 1: General Integrated Plan Elements and Assumptions

- methodology for battery usage, (greater than 12 hours with a calculation limiting value of 14.5 hrs.) (NEI 12-06, section 3.2.1.3 item 8). An additional dedicated HCVS battery will be installed at the HCVS primary control panel to provide the DC loading for the remainder of the first 24 hours.
- 049-8. All activities associated with plant specific EA-12-049 FLEX strategies that are not specific to implementation of the HCVS, including such items as debris removal, communication, notifications, SFP level and makeup, security response, opening doors for cooling, and initiating conditions for the event, can be credited as previously evaluated for FLEX.

Applicable EA-13-109 generic assumptions:

- 109-1. Site response activities associated with EA-13-109 actions are considered to have no access limitations associated with radiological impacts 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 FLEX portable air supply equipment that is credited to recharge air lines for HCVS components after 24 hours. The FLEX portable air supply used must be demonstrated to meet the “SA Capable” criteria that are defined in NEI 13-02 Section 4.2.4.2 and Appendix D Section D.1.3.
- 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 NEI HCVS-FAQ-07)
- 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 NEI HCVS-FAQ-05 and NEI 13-02 section 6.2.2).
- 109-5. Classical design basis evaluations and assumptions are not required when assessing the operation of the HCVS. The reason 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 which classical design basis evaluations are intended to prevent. (Reference NEI 13-02 section 2.3.1).
- 109-6. HCVS manual actions that require minimal operator steps and can be performed in the postulated thermal and 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 NEI HCVS-FAQ-01)
- 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 NEI HCVS-FAQ-02 and White Paper HCVS-WP-01)
- 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 BDBEE and SA HCVS operation. (reference FLEX MAAP Endorsement ML13190A201) Additional analysis using RELAP5/MOD 3, GOTHIC, PCFLUD, LOCADOSE and SHIELD are acceptable methods for evaluating environmental conditions in areas of the plant provided the specific version utilized is documented in the analysis.
- 109-9. Utilization of NRC Published Accident evaluations (e.g. SOARCA, SECY-12-0157, and NUREG 1465) as related to Order EA-13-109 conditions is acceptable as references. (reference NEI 13-02 section 8)
- 109-10. Permanent modifications installed per EA-12-049 are assumed implemented and may be credited for use in EA-13-109 Order response.
- 109-11. This Overall Integrated Plan is based on Emergency Operating Procedure changes consistent with EPG/SAGs Revision 3 as incorporated per the sites EOP/SAMG procedure change process.
- 109-12. Under the postulated scenarios of order EA-13-109 the Control Room is adequately protected from excessive radiation dose per General Design Criterion (GDC) 19 in 10CFR50 Appendix A and no

Part 1: General Integrated Plan Elements and Assumptions

further evaluation of its use as the preferred HCVS control location is required. (Reference NEI HCVS-FAQ-01) In addition, adequate protective clothing and respiratory protection is available if required to address contamination issues.

Plant Specific HCVS Related Assumptions/Characteristics:

- F2-1 The current Torus Hardened Vent stack on the Auxiliary Building (AB) roof can handle the HCVS flow.
- F2-2 All load stripping is accomplished within one hour and fifteen minutes of event initiation and will occur at locations not impacted by a radiological event.

Part 2: Boundary Conditions for Wet Well 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 4.2.5, 4.2.6. 6.1.1

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 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 (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. Energize the HCVS Control Panel at 2PB2-15 Circuit #6. Required to be done prior to operation of HCVS system (expected time is 8 hours based on severe accident timelines). If depletion of station battery occurs within 24 hours, operator action is required to transfer to the dedicated HCVS battery bank.	2PB2-15 is located in Division 2 Switchgear room at Grid H-10.5 on AB3 South.	Conducted as part of 45-75 minute Extended SBO actions.
2. Brief and station Nuclear Operator at HCVS Control Panel. Required to be done prior to operation of the HCVS system.	HCVS Control Panel is located in Division 2 Switchgear Room at Grid G-9 on AB3 South.	Conducted either on indication of core damage (SAG entry) OR when Torus Temperature reaches 200 F during FLEX response.
3. Align Containment Isolation signal override key-lock bypass switches for HCVS Operation (keylock switches in Relay room).	Relay Room Panels (H11P617 and H11P618) located in AB2 North	Conducted as part of 45-75 minute Extended SBO actions.

Part 2: Boundary Conditions for Wet Well Vent

<p>4. Align Electrical supplies for alternate HCVS Operation (MPU #1 and MPU #2 startup for operation of AC solenoids from CR).</p>	<p>Division 1 and Division 2 Switchgear rooms for MPU #1 and MPU #2 respectively. Switchgear rooms located AB2 South and AB3 South respectively.</p>	<p>Conducted as part of Supplemental AC power using FLEX Generators prior to 4 hours.</p>
<p>5. Align pneumatic supplies for alternate HCVS Operation (NIAS supplied from FLEX Compressor).</p>	<p>FLEX Compressor is in FLEX Building 1 in Yard North of AB1. Connection points to NIAS are in AB1 North and TB1.</p>	<p>Conducted as part of FLEX actions prior to 6 hours.</p>
<p>6. Align supplemental DC to HCVS Control Panel (if required) based on Voltage readings in Division 2 Battery area.</p>	<p>HCVS Control Panel located in Division 2 Switchgear Room at Grid G-9 on AB3 South.</p>	<p>Prior to depletion of station batteries.</p>
<p>7. Operate the HCVS System as directed from the HCVS Control Panel when required based on EOP/SAGs.</p>	<p>HCVS Control Panel located in Division 2 Switchgear Room at Grid G-9 on AB3 South.</p>	<p>Required as contingency action for BDBEE response when Torus Temperature exceeds 220 F. Required for SAGs when DW Pressure exceeds Pressure Suppression Pressure (PSP) and prior to exceeding Primary Containment Pressure Limit (PCPL) values.</p>

A timeline was developed to identify required operator response times and potential environmental constraints. This timeline is based upon the following three Cases:

1. Case 1 is based upon the action response times developed for FLEX when utilizing anticipatory venting in a BDBEE without core damage. **Case 1 is not applicable to Fermi 2 as the primary method (credited) for FLEX response is Feed and Bleed of the Torus with expected Torus Temperature of < 200F. Operation of the HCVS system is a “Contingency Action” that takes place at 220F.**
2. Case 2 is based on a SECY-12-0157 long term station blackout (LTSBO) (or ELAP) with failure of RCIC after a black start where failure occurs because of subjectively assuming over injection.
3. Case 3 is based on NUREG-1935 (SOARCA) results for a prolonged SBO (or ELAP) with the loss of RCIC case without black start.

Discussion of time constraints identified in Attachment 2 for the three timeline Cases identified above

- Contingency Actions, Initiate use of Hardened Containment Vent System (HCVS) for BDBEE per site procedures is required at 220 F (indicating Failure of FLEX Feed and Bleed strategy) to maintain

Part 2: Boundary Conditions for Wet Well Vent

containment parameters below design limits and within the limits that allow continued use of RCIC. This is not expected to occur prior to 11.7 hours post event per the FLEX MAAP cases.

- HCVS Power for Primary HCVS operation: The reliable operation of HCVS will be met because HCVS meets the seismic requirements identified in NEI 13-02 and will be powered by DC buses and dedicated batteries with motive force supplied to HCVS valves from installed nitrogen storage bottles. Critical HCVS controls and instruments associated with containment will be DC powered. The HCVS controls and instruments are operated from the HCVS Control Panel (primary location for the first 24 hours) or from the Main Control Room after AC power is available (within 24 hours). The DC power for HCVS will be available as long as the HCVS is required. Station batteries will provide power for greater than 14.5 hours, HCVS battery capacity will be available to extend past 24 hours via a new battery bank with a throw-over switch located at the HCVS Control Panel. This throw-over switch would be operated if required based on Division 2 Battery Voltage (available in the Division 2 battery area). In addition, Phase 2 FLEX Diesel Generator (DG) can provide power before the HCVS battery life is exhausted. Also, the FLEX supplemental Diesel Generator will supply 480 VAC to the Division 2 Battery chargers prior to 2 hours after the event per the FLEX response. Thus initiation of the HCVS from the HCVS Control Panel as required is acceptable because the actions can be performed any time after declaration of an ELAP until the venting is needed. This action can also be performed for SA HCVS operation which occur at a time further removed from an ELAP declaration as shown in Attachment 2.
- Required motive air for the primary method of HCVS operation: The local (Primary) nitrogen tank supplies will ensure sufficient nitrogen for 12 HCVS valve operations without makeup over the first 24 hours.
- Required 120 VAC power for alternate method of HCVS Operation is available prior to 24 hours. The FLEX supplemental Diesel Generator will supply 480 VAC to the Division 2 Battery chargers prior to 2 hours after the event per the FLEX response. Credit for this power is not allowed under the Order but the method of restoring 120 VAC is planned for < 6 hours after the event and can be credited at the 24 hour point.
- Required Motive Air for alternate method of HCVS Operation is available prior to 24 hours: NIAS will be supplied by FLEX Compressor to supplement the local (Primary) nitrogen tank supplies. The FLEX Compressor is expected to be started and NIAS supplied by the 6 hour actions for FLEX response.
- Site Specific actions that are time sensitive for HCVS initiation: Based on required actions and timing of FLEX actions, there are NO time sensitive actions for HCVS initiation.

Discussion of radiological and temperature constraints identified in Attachment 2

- Heat Impact: Review of the actions required and location of the actions shows that all Remote Manual Actions (actions outside the Control Room) occur in the Auxiliary Building (AB), in a space outside the influence of the HCVS Piping heat impact, or in the Yard. The loss of Reactor Building (RB) and Auxiliary Building HVAC will result in an increase in temperatures in the affected areas (Switchgear Rooms, AB1, and Relay Room) but will also result in a significant loss of heat load (ELAP). These impacts can easily be countered via the FLEX Toolbox concept for areas impacted by loss of ventilation (yet not impacted by HCVS Piping heat impact).

[Open Item-1: Confirm thermal environment]

Part 2: Boundary Conditions for Wet Well Vent

- Radiological Impact: Review of the actions required and location of the actions shows that all Remote Manual Actions (actions outside the Control Room) occur in the AB in area that has significant shielding between the RB and AB. The Control Room/Relay Room areas meet GDC 19 requirements for Radiological conditions and the wall thickness in the area of the HCVS Control Panel and Division 1 Switchgear rooms provide similar shielding. Specific application of severe accident doses from the hardened vent will be analyzed as part of the designed modifications. The AB1 location also has significant shielding and the Yard location is accessed significantly before any potential Severe Accident dose consequences.

[Open Item-2: Confirm radiological environment]

Specific action locations:

Division 2 Switchgear Room: Actions 1, 2, 4, 6, 7.

Relay Room: Action 3

Control Room: Action 4

Yard: Action 5

Auxiliary Building First Floor: Action 5

Turbine Building First Floor: Action 5

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, Primary Containment Pressure Limit (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

Indicate the areas where portable equipment will be staged after the 24 hour period, the dose fields in the area,

Part 2: Boundary Conditions for Wet Well Vent

and any shielding that would be necessary in that area. Any shielding that would be provided in those areas

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, 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, 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 ISG-JLD-2012-01 and ISG-JLD-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 344-1975, "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

Part 2: Boundary Conditions for Wet Well Vent

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 to vent steam/energy at a nominal capacity of greater than 1% of the current licensed power of 3486 MWt at a pressure of 53.9 psig. The pressure of 53.9 psig is lower than the containment design pressure (56 psig) and the PCPL value (58.8 psig). The size of the wetwell portion of the HCVS is 20 and 24 inches in diameter until it reduces to a HCVS dedicated 10 inch pipe on RB5, which provides adequate capacity to meet or exceed the Order criteria.

Vent Capacity

The 1% of 3486 MWt value at Fermi 2 assumes that the suppression pool pressure suppression capacity is sufficient to absorb the decay heat generated during the first 3 hours. HCVS venting would then be able to prevent containment pressure from increasing above the containment design pressure. As part of the detailed design, the duration of suppression pool decay heat absorption capability will be confirmed.

[Open Item-3: Confirm suppression pool heat capacity]

Vent Path and Discharge

The existing HCVS vent path at Fermi 2 consists of a wetwell and drywell vent. The wetwell vent rises using Standby Gas Treatment System piping from the torus, joins the drywell vent on RB 3rd floor, connects to the SGTS system inlet piping on RB 5th floor then exhausts through a dedicated 10 inch vent stack.

HCVS has its own discharge path. The HCVS discharge path is routed to a point above the Reactor Building roof. The cooling towers have a higher elevation than HCVS discharge point but they are not adjacent to the Reactor Building. The Reactor Building ventilation system vent stack is at a higher elevation and is 67 feet south of HCVS stack. The vent stack will be extended to discharge 3 feet above the RB roof parapet. The HCVS discharge will vent away from emergency ventilation system intake and exhaust openings, main control room location, location of HCVS portable equipment, access routes required following an ELAP and BDBEE, and emergency response facilities.

The detailed design will provide appropriate missile protection on RB 5th floor in accordance with NEI guidance.

[Open Item-4: Define tornado missile protection for RB 5th floor components.]

Power and Pneumatic Supply Sources

For the first 24 hours following the ELAP event, power for the HCVS is provided from either the station battery or a dedicated HCVS battery for operation from HCVS Control Panel H21P101 (primary controls location). After 24 hours, power is available from FLEX sources through existing MPU #1, MPU #2, and the station battery chargers for HCVS operation from the Control Room and Relay Room (alternate controls location). Battery power will be provided from the station batteries during the coping period and from the dedicated HCVS battery for the remaining period until the use of FLEX power sources. After 24 hours, power is available and credited from a FLEX Phase 2 480V generator for both the station batteries and 120VAC distribution equipment, to allow HCVS operation from either the HCVS Control Panel or Control Room.

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Pneumatic power is provided by the local Nitrogen bottles for the first 24 hours. Alternate method of operation used the non-interruptible air system with backup air provided from the FLEX Compressor. Following an ELAP event, station air system is lost. The Primary pneumatic power is supplied by the local Nitrogen bottles until NIAS is restored via FLEX. The alternate method is expected to be in service based on FLEX actions conducted prior to 6 hours post event but is not credited until > 24 hours post event.

1. The existing HCVS flow path valves are either air-operated valves (AOV) with air-to-open and spring-to-shut (i.e., the wet well containment isolation valves and the torus hardened vent isolation valves) or AOV air-to-shut and spring-to-open (RBHVAC isolation from RB 3rd and RB 5th floor). Operating the valves to their required positions for HCVS requires energizing an AC or DC powered solenoid operated valve (SOV) and providing motive air/gas. The initial stored motive air/gas will allow for a minimum of 12 valve operating cycles for the HCVS control valve for the first 24-hours. After the first 24 hours, FLEX generators and compressor will be available to maintain electric power and pneumatic supply for HCVS components.
2. An assessment of temperature and radiological conditions will be confirmed acceptable to ensure that operating personnel can safely access and operate controls at the HCVS Control Panel 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 (i.e., electric power, N2/air) will be located in areas reasonably protected from defined 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 hand wheel, reach-rod or similar means that requires close proximity to the valve (reference FAQ HCVS-03). The operating mechanisms are routed to the HCVS Control Panel located in the Division 2 Switchgear room (AB 3rd Floor). This location is outside the heat influence zone for the HCVS discharge pipe (located in the Reactor Building) and ventilation is supplemented by the FLEX Battery Exhaust fans. This location is also east of the concrete shield wall between the Reactor Building and the Auxiliary Building for adequate shielding from the expected HCVS pipe source term. DC power supplemental system is located at the HCVS Control Panel and will be designed to minimize man-power resources. Required portable equipment for the alternate HCVS operation is all required FLEX mitigating strategies support equipment and is protected to the standards in NEI-12-06 (Attachment 1). Based on this, 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.
6. Following the initial 24 hour period, alternate motive force will be supplied from the FLEX Compressor to the NIAS header for operation of the HCVS valves via their normally designed operators from the Control Room. The FLEX compressor can be started prior to 6 hours following the event but will not be credited for < 24 hours following the event. Vital 120 VAC power for HCVS Valve and Radiation Monitor operation from the Control Room (alternate operation) will be supplied via the FLEX Generators 2 hours after event initiation. This alternate AC power will not be credited 24 hours following the event.

Location of Control Panels

The HCVS design allows initiating and then operating and monitoring the HCVS from the HCVS Control Panel located in the Division 2 Switchgear Room (Primary controls location) and the Main Control Room (MCR) (alternate controls location). Both the HCVS Control Panel and the MCR location are protected from

Part 2: Boundary Conditions for Wet Well Vent

adverse natural phenomena and will be evaluated as a normal control point for Plant Emergency Response actions. The HCVS Control Panel location is outside the heat influence zone for the HCVS discharge pipe (located in the Reactor Building). This location is also east of the concrete shield wall between the Reactor Building and the Auxiliary Building for adequate shielding from the expected HCVS pipe source term.

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. Fermi 2 is considering a discharge check valve in combination with a purge system as required installed after the last HCVS Isolation Valve. The evaluation of the purge system and operation of the purge valve connecting to the HCVS piping will be described in the detailed design.

Unintended Cross Flow of Vented Fluids

The HCVS uses the Containment Purge System containment isolation valves for containment isolation. These containment isolation valves are AOVs and they are air-to-open and spring-to-shut. An SOV must be energized to allow the motive air to open the valve. Although these valves are shared between the Containment Purge System and the HCVS, separate control circuits are provided to each valve for each function. Specifically:

- The Containment Purge System control circuit will be used during all “design basis” operating modes including all design basis transients and accidents.
- Cross flow potential exists between the HCVS and the Standby Gas Treatment System (SGTS). Resolution involves evaluation of SGTS boundary valve leakage. Testing and maintenance will be performed to ensure that the valves remain leak tight with established leakage criteria.

Prevention of Inadvertent Actuation

EOP/EPG operating procedures will 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 will be designed to provide features to prevent inadvertent actuation due to a design error, equipment malfunction, or operator error.

The features that prevent inadvertent actuation are:

- Key lock switches will be provided to prevent inadvertent operation of the HCVS control valves.
- The HCVS Control Panel override capability of Containment isolation function is not powered to allow this override without operator action.
- Energizing the HCVS Control Panel will be annunciated in the MCR per the IEEE-279 standards.
- Procedures will also provide clear guidance to not circumvent containment integrity by simultaneously opening torus and drywell vent valves during any design basis transient or accident.

Component Qualifications

The HCVS components downstream of the second containment isolation valve and components that interface with the HCVS are routed in seismically qualified structures. HCVS components that directly interface with the pressure boundary will be designed in accordance with existing safety system boundaries. The containment system limits the leakage or release of radioactive materials to the environment to prevent offsite exposures from exceeding the guidelines of 10CFR100. During normal or design basis operations, this means serving as a pressure boundary to prevent release of radioactive material. Newly installed components will be seismically

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qualified back to their isolation boundaries.

Any electrical or controls component that interfaces with Class 1E power sources will be considered safety related up to and including appropriate isolation devices such as fuses or breakers, as their failure could adversely impact containment isolation and/or a safety-related power source. The remaining installed components will be considered Augmented Quality. Electrical and controls components will be seismically qualified and will include the ability to handle harsh environmental conditions (although they 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. Additionally, radiation monitoring instrumentation accuracy and range 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 344-1975
3. Demonstration that instrumentation is substantially similar to the design of instrumentation previously qualified.

<u>Instrument</u>	<u>Qualification Method*</u>
HCVS Process Temperature	ISO9001 / IEEE 344-1975 / Demonstration
HCVS Process Radiation Monitor	ISO9001 / IEEE 344-1975 / Demonstration
HCVS Process Valve Position	ISO9001 / IEEE 344-1975 / Demonstration
HCVS Electrical Power Supply Availability	ISO9001 / IEEE 344-1975 / Demonstration

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

Monitoring of HCVS

The Fermi 2 wetwell HCVS will be capable of being manually operated during sustained operations from an HCVS Control panel located in the Division 2 Switchgear Room. The Division 2 Switchgear Room location is in the Auxiliary Building and is in a separate ventilation zone from the Reactor Building area and is not directly impacted by the HCVS piping heat load. On loss of power, the Division 2 Switchgear Room ventilation is isolated from the Reactor Building ventilation. A 4.3' thick concrete shield wall separates the HCVS piping from the HCVS Control Panel, providing protection equivalent to GDC 19/Alternate Source Term (AST). This operating location meets the requirements of Order element 1.2.4. The controls and indications at the HCVS 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 Fermi 2 wetwell HCVS will also be capable of being manually operated during sustained operations from a control panel located in the MCR (alternate controls location). The MCR is a readily accessible location with no further evaluation required. Control Room dose associated with HCVS operation conforms to GDC 19/Alternate Source Term (AST). This location meets the intent for an alternate control location of section 1.2.5 of the Order as described in NEI 13-02 section

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4.2.2.1.2.1. The controls and indications at the MCR 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. An evaluation will be performed to confirm accessibility to the location, habitability, staffing sufficiency, and communication capability with Vent-use decision makers.

The wetwell HCVS will include means to monitor the status of the vent system at both the HCVS Control panel and the MCR. The HCVS Control panel includes valve position indications for the seven (7) operating valves and the two SGTS Isolation valves. HCVS pneumatic capability is provided by bottle sizing for 7 days in addition to pneumatic capability from the NIAS system after first 24 hours.

The wetwell HCVS operation will be indicated by valve position and gas flow (indicated by temperature). HCVS effluent radiation level will be indicated by the radiation monitor. Indication of HCVS electrical capability will be provided by Division II station battery voltage and HCVS battery voltage. These indicators will provide compliance with Requirement 1.2.4 and will be designed for sustained operation during an ELAP event.

Component reliable and rugged performance

The HCVS downstream of the second containment isolation valve, including piping and supports, electrical power supply, valve actuator pneumatic supply, and instrumentation (local and remote) components, will be designed/analyzed to conform to the requirements consistent with the applicable design codes (e.g., Non-safety, Cat 1, SS and 300# ASME or B31.1, NEMA 4, etc.) for the plant and to ensure functionality following a design basis earthquake.

Additional modifications required to meet the Order will be reliably functional at the temperature, pressure, and radiation levels consistent with the vent pipe conditions for sustained operations. The instrumentation/power supplies/cables/connections (components) will be qualified for temperature, pressure, radiation level, and total integrated dose for the vent pipe effluent.

Torus vent design temperature and pressure will be increased from 300°F and 62 psig to 340°F and 80 psig. Containment and isolation valves T4600F400, T4600F401 and T4600F412 are currently qualified for 340°F. NEI 13-02 guidance section 2.4.3 and 5.1.1 recommends 350°F and 80 psig. The Fermi 2 hardened vent will be opened to protect the PCPL of 58.8 psig and containment design pressure of 56 psig, which equates to a saturation temperature of 303°F. 340°F provides adequate margin to ensure the torus vent containment isolation valves will perform their hardened vent and isolation functions.

Conduit will be installed to Seismic Class 1 criteria. Both existing and new barriers will be used to provide a level of protection from missiles when equipment is located outside of seismically qualified structures. Augmented quality requirements will be applied to the components installed in response to this Order.

If the instruments are purchased as commercial-grade equipment, they will be qualified to operate under severe accident environment as required by NRC Order EA-13-109 and the guidance of NEI 13-02. The equipment will be qualified seismically (IEEE 344), environmentally (IEEE 323), and for electro-magnetic compatibility (per RG 1.180). These qualifications will be bounding conditions for Fermi 2.

For the instruments required after a potential seismic event, the following methods will be used to verify that the design and installation is reliable / rugged and thus capable of ensuring HCVS functionality following a seismic event. Applicable instruments are rated by the manufacturer (or otherwise tested) for seismic impact at

Part 2: Boundary Conditions for Wet Well Vent

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 will be 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 IEEE Standard 344-1975, *IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations*, (Reference 27) 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); or
- Seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

Part 2 Boundary Conditions for WW Vent: **BDBEE Venting**

Determine venting capability for Beyond Design Bases External Event (BDBEE) Venting, such as may be used in an ELAP scenario to mitigate core damage.

BDBEE Venting is NOT being used at Fermi 2 as the primary success path for ELAP induced by the BDBEEs. This section describes contingency use of the BDBEE Venting.

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 in the FLEX Contingency mode will be designed to minimize the reliance on operator actions for response to a ELAP and BDBEE hazards identified in part 1 of this OIP. Immediate operator actions can be completed by Operators from the HCVS control station and include remote-manual initiation. 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 under the guiding procedural protocol.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the HCVS Control Panel. This location minimizes plant operators' exposure to adverse temperature and radiological conditions and is protected from hazards assumed in Part 1 of this report.

Permanently installed power and motive air/gas capability will be available to support operation and monitoring of the HCVS for 24 hours. Permanently installed equipment will supply air and power to HCVS for 24 hours.

System control:

- i. Active: Control valves and/or PCIVs are operated in accordance with EOPs/SOPs to control containment pressure. The HCVS is designed for 12 open/close cycles under ELAP conditions over the first 24 hours following an ELAP. Controlled venting as a contingency action under FLEX will be permitted in the revised EPGs and associated implementing EOPs.
- ii. Passive: Inadvertent actuation protection is provided by a normally de-energized HCVS Control Panel with energization annunciated in the MCR. A key-lock is provided to prevent inadvertent operation at the HCVS Control Panel.

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

After 24 hours, available personnel will be able to power 120 VAC and NIAS air supplies to allow operation of the HCVS Valves from the Control Room. FLEX Generators are credited for re-energizing MPU #1 and MPU #2 electrical supplies to restore normal HCVS valve operations. FLEX actions will bypass the required Containment Isolation logic to allow HCVS Valve positioning. As stated previously, operation of the HCVS system after 24 hours is only a contingency if the credited FLEX method of Feed and Bleed of the Torus fails to

Part 2 Boundary Conditions for WW Vent: **BDBEE Venting**

maintain Torus Temperature below 220 F.

These actions provide long term support for HCVS operation for the period beyond 24 hours to 7 days (sustained operation time period) because on-site and off-site personnel and resources will have access to the unit to provide needed action and supplies.

Details:

Provide a brief description of Procedures / Guidelines:

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

Primary Containment Control Flowchart exists to direct operations in protection and control of containment integrity, including use of the existing Hardened Vent System. Other site procedures for venting containment using the HCVS include: 29.ESP.ExtendedSBO (pending), Technical Support Guidelines, 29.100.01 Sheet 2, 29.ESP.07, 29.ESP.22, 29.200.01 Sheet 1

Identify modifications:

List modifications and describe how they support the HCVS Actions.

EA-12-049 Modifications

- EDP 37037(completed in RF16): Installed containment isolation trip signal bypass switches to permit operation of the containment vent valves through the existing valve control circuits (alternate controls). Installed divisional cabling between the Auxiliary Building and Reactor Building to provide electrical control of vent valves and instrumentation valves from the new HCVS Control Panel (primary controls).
- EDP 37122(Cycle 17): FLEX DC and AC Support Modifications. Supplies 480 VAC to DC Chargers, 480 VAC loads and 120 VAC for alternate HCVS controls (alternate controls).
- EDP 37114 (Cycle 17 and RF17): Opens T5000F420B and T4600F421B with DC operated SOVs to restore DW/WW instrumentation following loss of NIAS for Containment indications. This modification supports FLEX instrumentation for Decision Maker on use of HCVS.
- EDP 37084 (Cycle 17 and RF17): FLEX RHR cross-tie modification which supplies water from alternate source.

EA-13-109 Modifications

- EDP 37037: (complete in RF16): Installed containment isolation trip signal bypass switches to permit operation of the containment vent valves through the existing valve control circuits. Installed divisional cabling between the Auxiliary Building and Reactor Building to provide electrical control of vent valves and instrumentation valves from the new HCVS Control Panel (primary controls).
- EDP 37114 (Cycle 17 and RF17): Opens T5000F420B and T4600F421B with DC operated SOVs to restore DW/WW instrumentation following loss of NIAS for Containment indications. This modification supports Decision Maker on use of HCVS. Abandoned Panel H21P101 will be designed to mount the controls necessary for primary control of HCVS during ELAP.

Part 2 Boundary Conditions for WW Vent: **BDBEE Venting**

- EDP 37115/37116 (Cycle 18 and RF18): Installs portable bottles and DC solenoids for HCVS Primary controls. Installs the valve position indications and controls on HCVS Control Panel. Revise power feed to T46F420/F421 and to the hardened vent Rad Monitor. Adds a dedicated battery to ensure power to H21P101 for a minimum of 24 hours.
- EDP 37295 (Cycle 17 and RF17): Installs leak rate test capability of HCVS and NIAS connection for a portable compressor. Supplies FLEX Compressor for NIAS supplies for alternate HCVS controls.

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:

<u>Key Parameter</u>	<u>Component Identifier</u>	<u>Indication Location</u>
HCVS Effluent temperature	TBD	HCVS Control Panel
HCVS valve position indication	TBD	HCVS Control Panel/MCR
HCVS Effluent Radiation	RE-D11-N551	HCVS Control Panel/MCR

Initiation, operation and monitoring of the HCVS system will rely on several existing Main Control Room key parameters and indicators which are qualified or evaluated to Regulatory Guide 1.97 per the existing plant design:

<u>Key Parameter</u>	<u>Component Identifier</u>	<u>Indication Location</u>
Drywell pressure	T50N401A/B (NR), T50N415A/B (WR) T50R802A/B Recorders	MCR
Torus pressure	T50N499A/B (NR) T50N414A/B (WR) T50R802A/B Recorders	MCR
Torus water temperature	T50N404A/B T50N405A/B T50R800A/B Recorders	MCR
Torus level	T50N406A/B T50R804A/B Recorders	MCR
Reactor pressure	B21N051A/B B21R623A/B Recorders	MCR
Drywell radiation	D11N443A/B D11R810 Recorder	MCR

Indications for HCVS valve position, HCVS effluent temperature, HCVS effluent radiation will be installed in HCVS primary control panel to comply with EA-13-109. Final configuration of the HCVS control panel is still under consideration.

Notes:

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 the reliance on operator actions for response to an ELAP and severe accident events. Severe accident event assumes that specific core cooling actions from the FLEX strategies identified in the response to Order EA-12-049 were not successfully initiated. Access to the Reactor Building will be restricted as determined by the RPV water level and core damage conditions. Actions will be completed by Operators at the HCVS Control Panel and will include remote-manual actions to operate HCVS valves using the locally installed operating bottles and DC solenoids. The operator actions required to open a vent path were previously listed in the BDBEE Venting Part 2 section of this report (Table 2-1). Operator actions required are limited to DC load shedding (Relay Room), energizing the HCVS Control Panel, and operation of the HCVS Control Panel.

Permanently installed power and motive air/gas capable will be available to support operation and monitoring of the HCVS for 24 hours. Specifics are the same as for BDBEE Venting Part 2.

System control:

- I. Active: Primary method: Control valves and/or PCIVs are operated in accordance with EOPs/SOPs to control containment pressure. The HCVS will be designed for 12 open/close cycles under ELAP conditions over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EPGs and associated implementing EOPs.
- II. Passive: Same as for BDBEE Venting Part 2.

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

Specifics are the same as for BDBEE Venting Part 2.

These actions provide long term support for HCVS operation for the period beyond 24 hours to 7 days (sustained operation time period) because on-site and off-site personnel and resources will have access to the unit to provide needed action and supplies.

Part 2 Boundary Conditions for WW Vent: Severe Accident Venting
Details:
<p>Provide a brief description of Procedures / Guidelines: <i>Confirm that procedure/guidance exists or will be developed to support implementation.</i></p>
<p>The operation of the HCVS is governed by SAMGs for severe accident operation. EPG/SAG Rev. 3 directs (29.200.01 Sheet 1 & 2), that containment pressure be controlled less than PSP pressure (17-25 psig) prior to RPV breach by degraded core to protect containment integrity from a high pressure melt ejection. Wetwell venting will be used to accomplish this. Following, RPV breach by the degraded core, containment pressure will be maintained within PCPL limits (< 58.8 psig) and containment design pressure (56 psig) to protect containment integrity.</p>
<p>Identify modifications: <i>List modifications and describe how they support the HCVS Actions.</i></p>
<p>The same as for BDBEE Venting Part 2</p>
<p>Key Venting Parameters: <i>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)</i></p>
<p>The same as for BDBEE Venting Part 2</p>
<p>Notes:</p>

<p>Part 2 Boundary Conditions for WW Vent: HCVS Support Equipment Functions</p>
<p>Determine venting capability support functions needed</p>
<p>Ref: EA-13-109 Section 1.2.8, 1.2.9 / NEI 13-02 Section 2.5, 4.2.4, 6.1.2</p>
<p>BDBEE Venting</p>
<p><i>Provide a general description of the BDBEE Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.</i></p>
<p>Ref: EA-13-109 Section 1.2.9 / NEI 13-02 Section 2.5, 4.2.2, 4.2.4, 6.1.2</p>
<p>Containment integrity is initially maintained by permanently installed equipment. All containment venting functions will be performed from the HCVS Control Panel or MCR.</p> <p>Venting will require support from DC power and pneumatic supplies from permanently installed local bottles (Primary operating mechanism for the first 24 hours). Existing safety related station batteries will provide sufficient electrical power for HCVS operation for greater than 14 hours. Before station batteries are depleted, installed HCVS dedicated batteries will be placed in service using a throw over switch located at the HCVS Control panel to attain > 24 hours capacity for HCVS Operation with DC Load Shedding accomplished via the FLEX actions.</p>
<p>Severe Accident Venting</p>
<p><i>Provide a general description of the Severe Accident Venting actions support functions. Identify methods and strategy(ies) utilized to achieve venting results.</i></p>
<p>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</p>
<p>The same support functions that are used in the BDBEE scenario would be used for severe accident venting. To ensure power for the 12 to 24 hours, dedicated HCVS batteries will be available to feed HCVS loads via a manual transfer switch to attain > 24 hours capacity for HCVS Operation with DC Load Shedding accomplished via the FLEX actions.</p> <p>At 24 hours, power will be available at the station service batteries which, at that point, will be backed up by FLEX generators evaluated for SA capability. FLEX generators supplying the DC Battery chargers are located outside the Reactor Building in a FLEX rated structure so issues of thermal or radiological impacts are minimized. This allows them to be used under Severe Accident conditions based on available distance and shielding provide by the Reactor Building exterior walls.</p> <p>Multiple sources of compressed air will be available (FLEX compressor, FLEX generator supplied NIAS compressors) to tie-in supplemental pneumatic sources to the NIAS system for HCVS valve operation.</p>
<p>Details:</p>
<p>Provide a brief description of Procedures / Guidelines:</p> <p><i>Confirm that procedure/guidance exists or will be developed to support implementation.</i></p>
<p>Most of the equipment used in the HCVS is permanently installed. Portable equipment is only used to support the alternate operating method of HCVS (FLEX generators to supply 120 VAC, FLEX compressors) to run pneumatic supplies for HCVS valve operation.</p>
<p>Identify modifications:</p> <p><i>List modifications and describe how they support the HCVS Actions.</i></p>

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

See Section “Part 2 Boundary Conditions for WW Vent: DBDEE Venting, Identify Modifications”

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. HCVS connections are located inside the AB 1st floor flood protected area in a Seismic Class 1/Tornado qualified structure and on the west wall of the Turbine Building 1st floor. Connection is not required until after the flood recedes; therefore, the Turbine Building and Auxiliary Building are accessible and connection points 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)

Controls and instruments associated with the FLEX DG electrical load and fuel supply (to be stored on-site).
Controls and instruments associated with the FLEX compressor (to be stored on-site).
Pressure gauges on permanently installed local Nitrogen bottles to verify proper standby conditions (to be installed on local bottles). Bottles installed in inaccessible locations will be sized for sufficient capacity beyond 24 hours such that no makeup is needed.
Operation of the portable equipment is the same as for compliance with Order EA-12-049.

Notes:

Part 2 Boundary Conditions for WW Vent: HCVS Venting Portable Equipment Deployment		
<i>Provide a general description of the venting actions using portable equipment including modifications that are proposed to maintain and/or support safety functions.</i>		
Ref: EA-13-109 Section 3.1 / NEI 13-02 Section 6.1.2, D.1.3.1		
Deployment pathways for compliance with Order EA-12-049 are acceptable without further evaluation needed except in areas around the Reactor Building or in the vicinity of the HCVS piping. At Fermi 2, no deployment is required in the areas around the Reactor Building or in the vicinity of the HCVS piping for access, operation and replenishment of consumables related to HCVS operation.		
Details:		
Provide a brief description of Procedures / Guidelines:		
<i>Confirm that procedure/guidance exists or will be developed to support implementation.</i>		
Operation of the portable equipment is the same as for compliance with Order EA-12-049 thus they are acceptable without further evaluation		
HCVS Actions	Modifications	Protection of connections
Per compliance with Order EA-12-049 (FLEX)	N/A	Per compliance with Order EA-12-049 (FLEX)
Notes:		

Part 3: Boundary Conditions for Dry Well 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 walk-through 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 an 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 Dry Well 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:

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, 6.2

Program Controls:

The HCVS venting actions will include:

- Site procedures and programs are being developed in accordance with NEI 13-02 to address: operation of HCVS System in both standby and operating conditions, maintenance of HCVS permanent equipment, interface with NRC Order EA-12-049 equipment, connection points and timing for alternate HCVS control equipment being used, protection of HCVS 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.

Procedures:

Procedures will be established for system operations when normal and backup power is available, and during ELAP conditions. The HCVS procedures will be developed and implemented following the plant process for initiating or revising procedures 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, including the storage location of portable equipment,
- training on operating the portable equipment,
- testing of portable equipment,
- performance or surveillance testing

Provisions for out-of-service requirements of the HCVS and compensatory measures will be documented in the Beyond-Design-Bases Event Coping Strategies Program Document (pending MOP25):

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

Part 4: Programmatic Controls, Training, Drills and Maintenance

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

Personnel expected to perform direct execution of the HCVS will receive necessary training in the use of plant procedures for system operations when normal and backup power is available and during ELAP conditions. The training will be refreshed on a periodic basis and as any changes occur to the HCVS. Training content and frequency will be established using the Systematic Approach to Training (SAT) process.

In addition, personnel on-site will be available to supplement trained personnel (reference NEI 12-06).

Identify how the drills and exercise parameters will be met.

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

Use of the HCVS system in drills, tabletops, or exercises will be aligned with the pending rulemaking 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 using backup power, from the primary or alternate location, during conditions of ELAP/loss of UHS with no core damage based on Torus temperature. System use is for containment heat removal and containment pressure control.
- HCVS operation on backup power and from the 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 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 NTF 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, expected use and manufacturer's recommendations (further details are provided in Section 5 of NEI 13-02).
 - 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.

Part 4: Programmatic Controls, Training, Drills and Maintenance

- 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 established in accordance with guidance in Fermi 2 Conduct Manual MES51, “Preventative Maintenance” will include maintenance guidance, testing procedures and frequencies established based on type of equipment and considerations made within the EPRI guidelines.

Fermi 2 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 (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

Part 4: Programmatic Controls, Training, Drills and Maintenance

Notes:

Part 5: Implementation Schedule Milestones

Provide a milestone schedule. This schedule should include:

- **Modifications timeline**
- **Procedure guidance development complete**
 - **HCVS Actions**
 - **Maintenance**
- **Storage plan (reasonable protection)**
- **Staffing analysis completion**
- **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 <i>{Include date changes in this column}</i>
Hold preliminary/conceptual design meeting	June 2014	Complete	
Submit Overall Integrated Implementation Plan	June 2014	Complete	
Design Change Package issued for Cycle 17/RF17	Sept. 2014	In progress	
Submit 6 Month Status Report	Dec. 2014		
Submit 6 Month Status Report	June 2015		
Design Change implementation Cycle 17	Aug. 2015		
Design Change implementation RF17	Nov. 2015		
Submit 6 Month Status Report	Dec. 2015		Simultaneous with Phase 2 OIP
Design Change Package issued for RF18	Mar. 2016		
Submit 6 Month Status Report	June 2016		
<i>Operations Procedure Changes Developed</i>	Dec. 2016		
<i>Site Specific Maintenance Procedure Developed</i>	Dec. 2016		
Submit 6 Month Status Report	Dec. 2016		
<i>Training Complete</i>	Feb. 2017		
Submit 6 Month Status Report	June 2017		
Design Change implementation RF18	Apr. 2017		

Part 5: Implementation Schedule Milestones

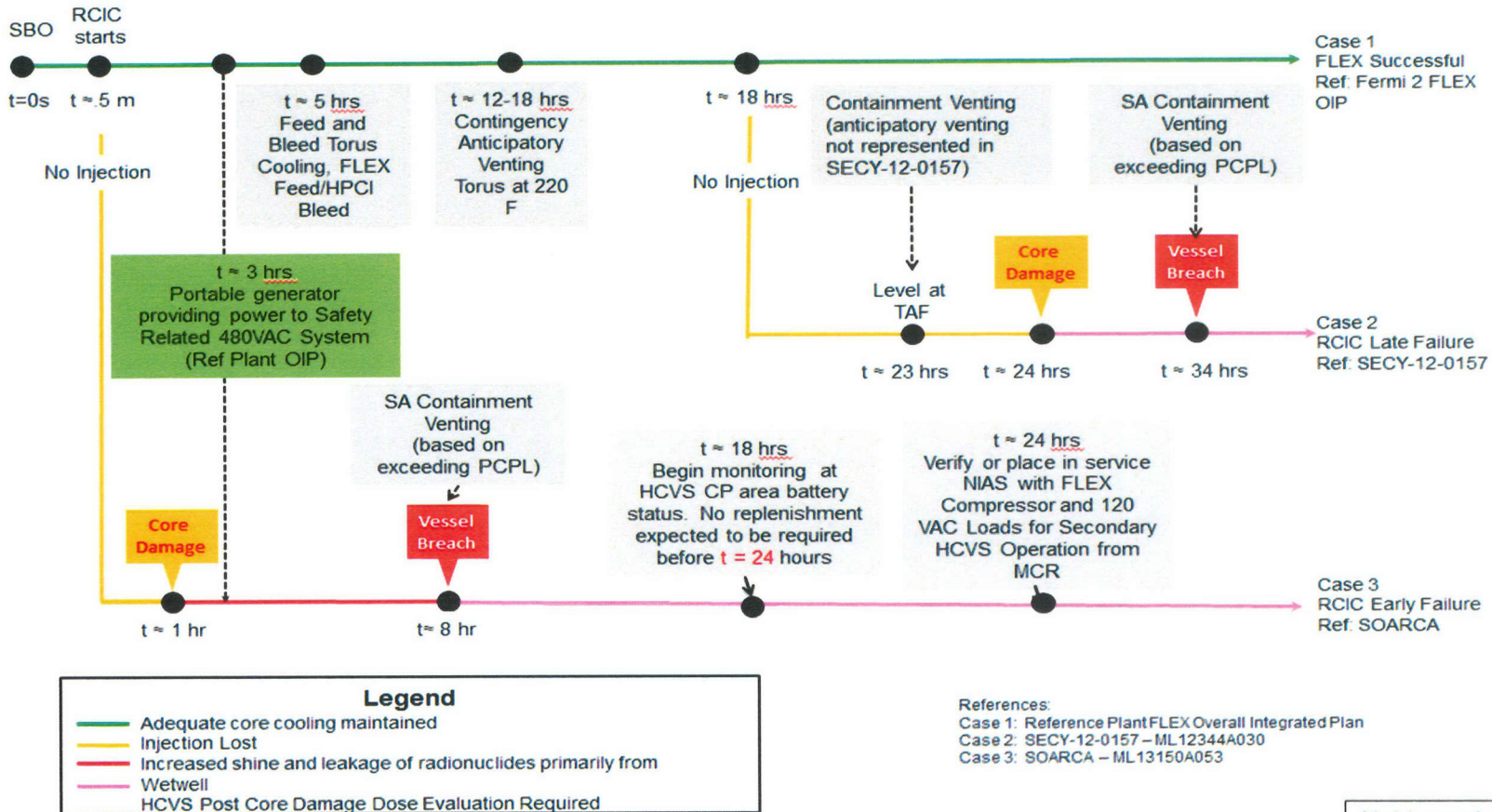
<i>Procedure Changes Active</i>	May 2017		
Walk Through Demonstration/Functional Test	June 2017		
Submit Completion Report	June 2017		

Attachment 1: HCVS Portable Equipment				
<i>List portable equipment</i>	<i>BDBEE Venting</i>	<i>Severe Accident Venting</i>	<i>Performance Criteria</i>	<i>Maintenance / PM requirements</i>
FLEX Compressor	X	X	TBD	Periodically run for functional testing per response to EA-12-049
FLEX Generator	X	X	TBD	Periodically run for functional testing per response to EA-12-049

Attachment 2: Sequence of Events Timeline

Table 2A: Wet Well HCVS Timeline

Fermi 2 Venting Timelines



Attachment 3: Conceptual Sketches

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

- 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 currently existing and new ones.

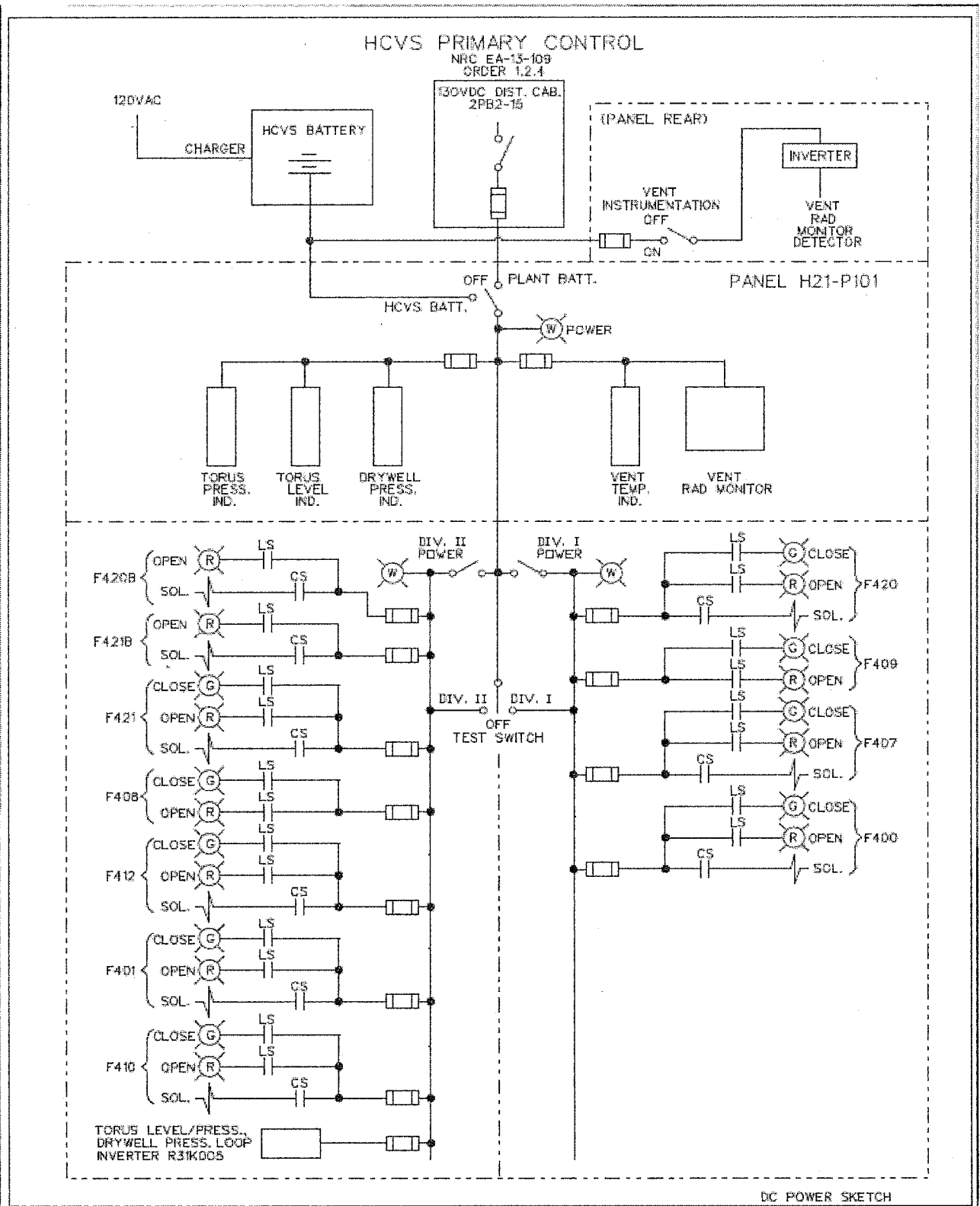
Sketch 1: HCVS Control Panel (DC) Electrical Layout of System (preliminary)

Sketch 2: MCR (AC) Electrical Layout of System (preliminary)

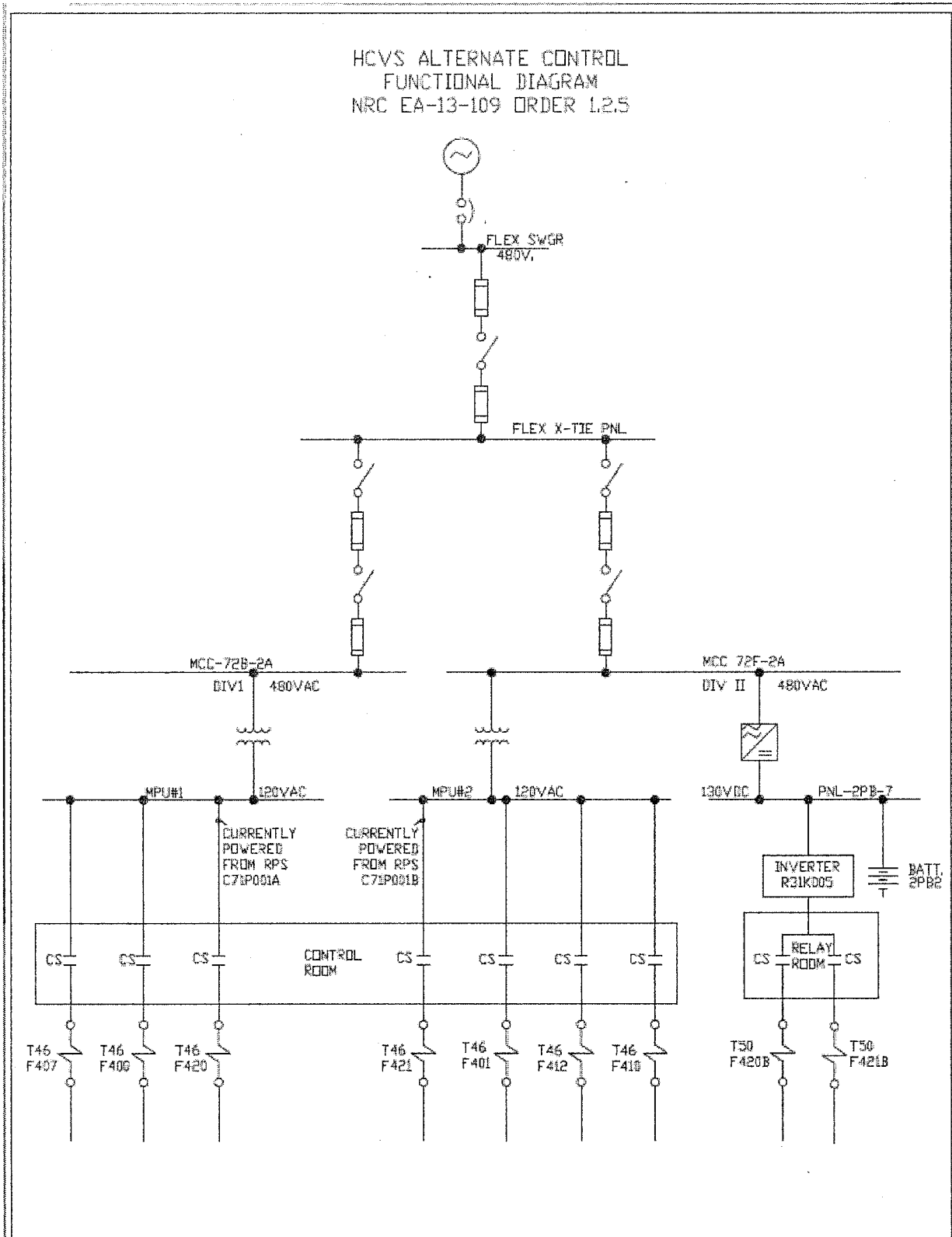
Sketch 3: Layout of HCVS (preliminary)

- **Piping routing for vent path**
- **Demarcate the valves (in the vent piping) between the currently existing and new ones**
- **HCVS Instrumentation Process Flow Diagram**

Fermi 2 June 2014 HCVS Phase 1 Overall Integrated Plan

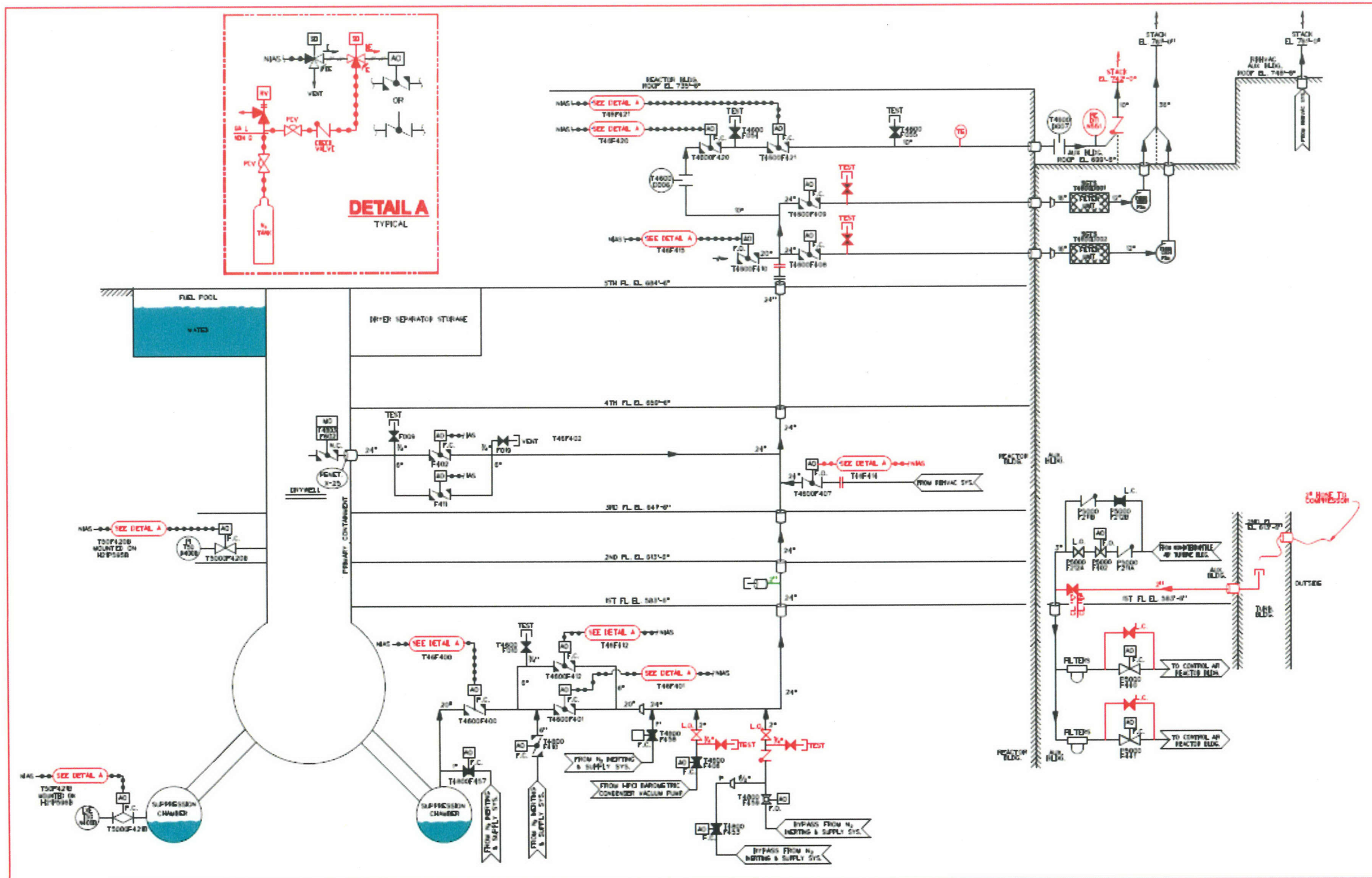


Sketch 1: HCVS Control Panel (DC) Electrical Layout of System



Sketch 2: MCR (AC) Electrical Layout of System

HARDENED CONTAINMENT VENT SYSTEM CONCEPTUAL DESIGN



Sketch 3: Layout of HCVS – red indicates changes

[Attachment 5: References](#)

1. Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989
2. Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
3. Order EA-12-050, Reliable Hardened Containment Vents, dated March 12, 2012
4. Order EA-12-051, Reliable SFP Level Instrumentation, dated March 12, 2012
5. Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated June 6, 2013
6. JLD-ISG-2012-01, Compliance with Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated August 29, 2012
7. JLD-ISG-2012-02, Compliance with Order EA-12-050, Reliable Hardened Containment Vents, dated August 29, 2012
8. JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013
9. 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
10. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 1, dated August 2012
11. NEI 13-02, Industry Guidance for Compliance with Order EA-13-109, Revision 0, Dated November 2013
12. NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, Revision 0, dated March 2014
13. NEI 14-01, Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Revision 0, dated March 2014
14. NEI HCVS-FAQ-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations
15. NEI HCVS-FAQ-02, HCVS Dedicated Equipment
16. NEI HCVS-FAQ-03, HCVS Alternate Control Operating Mechanisms
17. NEI HCVS-FAQ-04, HCVS Release Point
18. NEI HCVS-FAQ-05, HCVS Control and 'Boundary Valves'

Fermi 2 June 2014 HCVS Phase 1 Overall Integrated Plan

19. NEI HCVS-FAQ-06, FLEX Assumptions/HCVS Generic Assumptions
20. NEI HCVS-FAQ-07, Consideration of Release from Spent Fuel Pool Anomalies
21. NEI HCVS-FAQ-08, HCVS Instrument Qualifications
22. NEI HCVS-FAQ-09, Use of Toolbox Actions for Personnel
23. NEI White Paper HCVS-WP-01, HCVS Dedicated Power and Motive Force
24. NEI White Paper HCVS-WP-02, HCVS Cyclic Operations Approach
25. NEI White Paper HCVS-WP-03, Hydrogen/CO Control Measures
26. NEI White Paper HCVS-WP-04, FLEX/HCVS Interactions
27. IEEE Standard 344-1975, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,
28. Fermi 2 Correspondence NRC-13-0009, EA-12-049 (FLEX) Overall Integrated Plan, Rev 0, February 2013
29. Fermi 2 Correspondence NRC-13-0008, EA-12-050 (HCVS) Overall Integrated Plan, Rev 0, February 2013
30. Fermi 2 Correspondence NRC-13-0006, EA-12-051 (SFP LI) Overall Integrated Plan, Rev 0, February 2013

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	Confirm thermal environment for actions using Gothic.	
2	Confirm radiological environment	
3	Confirm suppression pool heat capacity.	
4	Define tornado missile protection for RB 5 th floor components.	