Entergy

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John A. Dent Jr.
Site Vice President

June 30, 2014

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

SUBJECT: Entergy's Phase 1 Overall Integrated Plan in Response to June 6, 2013, Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)

Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

REFERENCES:

1. NRC Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989 (ML031140220)
2. NRC Order Number EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents (Effective Immediately), dated March 12, 2012 (ML12056A043)
3. 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)
4. NRC Interim Staff Guidance JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013 (ML13304B836)
5. NRC Acknowledgement of NEI 13-02 Phase 1 OIP Template, dated May 23, 2014
6. NEI 13-02, Industry Guidance for Compliance with Order EA–13–109, Revision 0, Dated November 2013 (ML13316A853)

LETTER NUMBER 2.14.045

Dear Sir or Madam:

A153
NRR

On June 6, 2013, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 3) to Entergy Nuclear Operations, Inc. (Entergy). Reference 3 was immediately effective and directs Entergy to require their BWRs with a Mark I containment (Pilgrim Nuclear Power Station) to take certain actions to ensure that its facility 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 3.

Reference 3 requires submission of an Overall Integrated Plan (OIP) by June 30, 2014, for Phase 1 of the order. The interim staff guidance (Reference 4) was issued November 14, 2013 which provides direction regarding the content of this OIP. The purpose of this letter is to provide the OIP for Phase 1 of the Order pursuant to Section IV, Condition D.1, of Reference 3. This letter confirms Entergy has received Reference 4 and has a Phase 1 OIP 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 3.

Reference 6, Section 7.0 contains the specific reporting requirements for the OIP. The information in the attachment provides Entergy's Phase 1 OIP pursuant to Section 7.0 of Reference 6 by use of the Phase 1 OIP Template per reference 5.

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, Entergy plans to install a severe accident capable wetwell vent.

Compliance with the requirements of reference 3 will supersede any and all actions or commitments associated with references 1 and 2. Any actions or commitments made relative to reference 1 or 2 are rescinded and not binding by submittal of the reference 3 Phase 1 OIP via this letter.

Entergy and PNPS have reviewed the in-depth severe accident studies and evaluations performed by the NRC as described in the SECY-12-0157 series of documents and its references. The previously submitted "PNPS FLEX Strategy" for NRC Order EA-12-049 seeks to mitigate all Beyond-Design-Basis-External-Events successfully without core damage under the most extreme conditions, but we understand the obligation to consider the full spectrum of severe accident conditions as part of the NRC efforts to address all the Fukushima lessons-learned and to enhance and solidify the defense-in-depth for all plants. A bounding envelope for such extreme events has been defined in the Attachment to this letter and it is shown that the actions to be taken will preclude or substantially mitigate the release of core damage materials from containment for the accident timelines that are postulated for the purpose of encompassing the defined set of severe accident events.

The Hardened Containment Vent System Severe Accident Capable Wetwell Vent continues to be used for the purpose of preserving and maintaining containment integrity, providing heat removal, and controlling combustible gases under all conditions. The overall strategy remains based on the timely and continued deployment of equipment and capabilities that are simple, robust, and independent, to the extent practicable, from permanent plant systems that may be affected by Beyond-Design-Basis-External-Events. These capabilities are focused on the principal and highest priority goal of maintaining core cooling and submergence under all conditions using the most reliable methods available that can be implemented under potentially severe environmental conditions with only on-site assets, and subsequently maintaining that capability indefinitely with additional off-site resources. It is our belief that the proposed FLEX Severe Accident Strategy will preclude the occurrence of core damage, but also includes the capability for restoring and maintaining containment integrity and to cool core debris and thereby allow recovery without the serious complications that were encountered at Fukushima Dai-ichi.

This letter contains no new regulatory commitments.

Should you have any questions concerning the content of this letter, please contact Mr. Joseph R. Lynch, Manager, Regulatory Assurance at (508) 830-8403.

I declare under penalty of perjury that the foregoing is true and correct; executed on June 30, 2014.

Sincerely,

DE Noyes FOR J. DENT

JAD/rmb

Attachment: Pilgrim's Overall Integrated Plan in Response to June 6, 2013, Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents (Order Number EA-13-109)

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Attachment to

PNPS Letter 2.14.045

Pilgrims
Overall Integrated Plan
In Response to June 6, 2013, Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents
(Order Number EA-13-109)

Table of Contents:

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." Subsequently, 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, *Industry Guidance for Compliance with Order EA-13-109, BWR Mark I & II Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions*, 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 Plant 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 HCVS Local Panel at the appropriate time based on procedural guidance in response to the Plant observed or derived symptoms.
- The MCR will utilize Containment Parameters of Temperature, Pressure, and Wetwell Water Level from the existing MCR instrumentation to monitor Containment conditions.
- The HCVS vent operation will be monitored by HCVS Instrumentation for Temperature, Pressure, Mass Flow, Valve Position, and HCVS Radiation levels in the MCR and at the HCVS Local Panel.
- 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 electrical and pneumatic capacities are exhausted.
- Venting actions will be capable of being maintained for a sustained period of up to 7 days or longer with replenishment of consumable materials as-needed.

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 Pilgrim Nuclear Power Station (PNPS) 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 Spring 2017.
- Phase 2 (Drywell): by the startup from the first refueling outage that begins after June 30, 2017, or June 30, 2019, whichever comes first. Currently scheduled for Spring 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 PNPS:

- Seismic, Snow, Ice and Extreme Cold, High Wind, Extreme High Temperature

The following extreme external hazards screen out for PNPS:

- External Flooding

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 Assumptions (Ref. 1S)

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. (Ref. 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

Part 1: General Integrated Plan Elements and Assumptions

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 approximately 1 hour 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 (FLEX) methodology for battery usage, 8 hours (NEI 12-06, section 3.2.1.3 item 8)

049-8. Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours

049-9. All activities associated with plant specific EA-12-049 FLEX strategies that are not specific to implementation of the HCVS (i.e., HCVS valves, instruments and motive force) can be credited as having been accomplished.

Applicable EA-13-109 Generic Assumptions (Ref. 1S)

109-1. Site response activities associated with EA-13-109 actions are considered to have no access limitations associated with radiological impacts while 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.

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 (Ref. FAQ HCVS-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 (Ref. FAQ HCVS-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. (Ref. 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. (Ref. FAQ HCVS-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. (Ref. FAQ HCVS-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. (Ref. 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., NUREG/CR-7110 SOARCA, SECY-12-0157, NUREG 1465) as related to Order EA-13-109 conditions are acceptable as references. The MELCOR Analytical Models used for Severe Accident evaluations in the

Part 1: General Integrated Plan Elements and Assumptions

SOARCA effort and SECY-12-0157 are applicable and considered bounding for PNPS. (Ref. 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 further evaluation of its use as the preferred HCVS control location is required. (Ref. FAQ HCVS-01). In addition, adequate protective clothing and respiratory protection is available if required to address contamination issues.

Plant Specific HCVS Related Assumptions/Characteristics:

None.

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 Operator Manual Actions

Primary Action	Primary Location / Component	Notes
1. Isolate outlet of Standby Gas Treatment System (SGTS)	Manual actuator overrides in the Reactor Building, Elevation 51'.	
2. Disable PCIV interlock by closing a keylock switch for PCIV AO-5042B	Panel C7 in the MCR.	
3. Deploy pre-staged flexible drain hose from Auxiliary Bay connection downstream of Manual Valve 44-HO-114 to the Torus Room Water Seal. Open Valve 44-HO-114.	Flexible drain hose stored in JOBOX in Auxiliary Bay, Elevation 3'-0".	
4. Open 1st Containment Isolation Valve AO-5042B, confirm Torus Pressure upstream of AO-5025.	Keylocked switch located in the MCR panel. Parameter displays available on MCR Panel C7 and at HCVS Local Panel.	Manipulate manual valves to align pneumatic supplies at the HCVS Local Panel if DC power is unavailable.

Part 2: Boundary Conditions for Wet Well Vent

5. Open 2nd Containment Isolation Valve AO-5025, Monitor Vent Mass Flow and Temperature downstream of AO-5025.	Keylocked switch located in the MCR panel if DC power is available. Parameter displays available on MCR Panel D7 and at HCVS Local Panel.	Manipulate manual valves to align pneumatic supplies at the HCVS Local Panel if DC power is unavailable.
6. Monitor available battery capacity and pneumatic pressure.	Battery capacity available on MCR Panel C7. Pneumatic pressure available at HCVS Local Panel.	
7. Align power supplies for all HCVS instrumentation and indication to the dedicated HCVS power supply.	Switch located in the MCR panel.	For use between 0 and 24 hours.
8. Replenish pneumatics with replaceable nitrogen bottles.	Readily accessible location in the Reactor Building.	Prior to depletion of the pneumatic sources actions will be required to connect back-up sources at a time greater than 24 hours.
9. Connect back-up power to station battery chargers	Turbine Building – Battery Charger and Switchgear Rooms	Prior to depletion of the installed power sources actions will be required to connect back-up sources at 24 hours.
10. Re-align power supplies for all instruments and indication from the HCVS dedicated power supply to the Station Batteries.	Control switch located in the MCR or at the HCVS Local Panel.	At a time greater than 24 hours.
11. Discharge the accumulated condensate in the Main Stack to the Frac Tank using a submersible pump	Main Stack Basement	Condensation accumulation in the Main Stack will fill up to the vent outlet piping at a time greater than 24 hours.

Part 2: Boundary Conditions for Wet Well Vent

PNPS Venting Strategy (Ref. 4A)

To evaluate the PNPS Strategy for response to Severe Accident conditions, it is necessary to develop a set of bounding cases that demonstrate the actions required and results that can be obtained for this defined set of parameters that envelop the postulated conditions. Since there are an unlimited number of potential scenarios that can result in Severe Accident conditions of core melt, a minimum set of scenarios is defined that bounds the potential variations to the extent possible. These cases define an operating envelope for mitigating the "Extended Loss of AC Power (ELAP)", and the loss of motive force, and the "Loss of normal access to the Ultimate Heat Sink (LUHS)"events and the potential for Severe Accident conditions that includes core damage and RPV breach by molten core debris. These extreme cases may be used to evaluate or bound the many multiple scenarios that may have more complex timelines with intermittent injections to the RPV and temporary or partial repressurizing of the RPV.

Containment Venting is used when required to provide an alternate and effective means for Containment Heat Removal at or before exceeding the Containment Design Temperature of 281°F and to prevent exceeding the Primary Containment Pressure Limit (PCPL) in combination with water injection to the Reactor Pressure Vessel (RPV) for Core Cooling and to remain within the Pressure Suppression Pressure Limits (PSPL) if the RPV cannot be depressurized.

Case 1 – FLEX Strategy (Ref. 3A, 4A)

FLEX Strategy Case 1 is the Base Case in which successful FLEX implementation prevents core damage by maintaining core submergence at all times. The FLEX Strategy is a three-phase approach for mitigating Beyond-Design-Basis External Events (BDBEEs). The Initial Phase 1 requires the use of installed equipment and resources to maintain or restore Core Cooling, which is the RCIC System with HPCI as an alternate steam-driven system. The Transition to Phase 2 includes depressurizing the RPV and using a source of low pressure injection via FLEX portable equipment. The Final Phase 3 allows the use of sufficient offsite resources to sustain these functions indefinitely.

Case 2A – Long Term Station Blackout (LTSBO) – SECY-12-0157 (Ref. 1BB, 4A)

Long-Term Station Blackout (LTSBO) Severe Accident scenario in which the steam-driven RCIC or HPCI Systems are employed for up to 12 Hours after Shutdown, after which it is assumed that there is a loss of core cooling. Core damage and RPV breach is assumed to occur at 14 Hours after Shutdown or later, while venting is initiated at the PCPL with the Wetwell at or above 250°F due to the combination of steam and Hydrogen (H2) gas pressure from the core overheating. The FLEX Low Pressure Injection Source is deployed and begins RPV injection at 300 GPM for RPV and core debris cooling. The H2 gas generation causes Containment Pressure to exceed the PCPL but does not exceed the 80 PSIG Drywell Head Leakage Pressure when the FLEX Injection is commenced. The 300 GPM injection is continued until the Wetwell is cooled below 250°F, at which time the FLEX injection rate is reduced from 300 GPM to the Minimum Debris Retention Injection Rate (MDRIR) which maintains the core debris cooled while preserving the ability to continue Wetwell Venting for Containment Heat Removal and purging of the steam-diluted Hydrogen gas for up to 30 days, when alternate methods of heat removal are expected to be deployed.

FLEX Strategy Case 2A is the bounding Long-Term LTSBO scenario that defines the maximum time period for which FLEX Phase 1 may be used before Low Pressure Injection must be initiated to avoid exceeding Containment Temperature & Pressure Limits. It is assumed that the RCIC core cooling has failed completely by 12 Hours after Shutdown, with the Wetwell exceeding 250°F and rising, and

Part 2: Boundary Conditions for Wet Well Vent

Wetwell Venting is initiated to prevent exceeding the PCPL due to the combination of steam and H2 gas pressure. The RPV Breach occurs at or beyond 14 Hours after Shutdown, at which time the Wetwell temperature exceeds 280°F and it is necessary that the FLEX injection of external water be initiated at this time to prevent the potential failure of the Drywell Liner. The Containment pressure peaks at up to 80 PSIG but drops below the PCPL by 30 Hours after Shutdown.

Case 2B – Short Term Station Blackout (STSBO) – NUREG/CR-7110 SOARCA (Ref. 1AA, 4A)

Short-Term Station-Black-Out (STSBO) Severe Accident scenario in which the immediate or early failure of the steam-driven RCIC & HPCI Systems results in the most rapid core overheating, damage, and RPV breach, which occurs at 8.2 Hours after Shutdown. This allows sufficient time for the FLEX Low Pressure Injection Source to be deployed and begin RPV injection at 300 GPM for RPV and core debris cooling while venting is initiated at the PCPL with the Wetwell at or above 250°F due to the combination of steam and Hydrogen (H2) gas pressure from the core overheating. The 300 GPM injection is continued until the Wetwell is cooled below 250°F, at which time the FLEX injection rate is reduced from 300 GPM to the Minimum Debris Retention Injection Rate (MDRIR) which maintains the core debris cooled while preserving the ability to continue Wetwell Venting for Containment Heat Removal and purging of the steam-diluted Hydrogen gas for up to 30 days, when alternate methods of heat removal are expected to be deployed. No Containment Design Parameters are exceeded for Case 2B.

FLEX Strategy Case 2B is the bounding Short-Term STSBO scenario that defines the minimum time before core damage and RPV breach, when there has been no active mitigation effort to restore core cooling. It is shown that the minimum possible time to RPV Breach is 8.2 Hours after Shutdown. At this time, it is then necessary that the FLEX injection of external water be initiated to prevent the failure of the Drywell Liner and to begin cooling and solidifying the core debris to stop the adverse event progression. This coolant injection into the RPV, and then out the RPV breach location, also rapidly cools the core and debris, creating steam and flushing the core decay heat to the Suppression Pool such that the Wetwell temperature and pressure quickly rise to the PCPL due to the combination of steam and H2 gas pressure. Wetwell Venting is initiated by 10 Hours and provides the heat removal that mitigates continued Wetwell temperature rise.

A timeline was developed to identify required operator response times and potential environmental constraints relative to Case 1, 2, and 3 discussed above.

Discussion of time constraints identified in Attachment 2 for the timeline cases identified above:

- Install HCVS condensate drain hose using the quick-connect fitting to ensure proper venting capability.

  16 hours – Case 1

  12 hours – Case 2A

  10 hours – Case 2B

  To support draining condensation within the HCVS pipeline, a flexible hose is to be installed between the quick-connect fitting in the Auxiliary Bay to the Torus room via an available downcomer.

- Initiate use of Hardened Containment Vent System (HCVS) per EOPs:

  16 hours – Case 1

Part 2: Boundary Conditions for Wet Well Vent

12 hours – Case 2A

10 hours – Case 2B

The reliable operation of HCVS will be met because the HCVS meets the seismic requirements identified in NEI 13-02 and will be powered by DC buses with motive force supplied to HCVS valves from portable nitrogen storage bottles. HCVS instrumentation, indication, and operation can be powered using HCVS Dedicated Batteries with a capacity to extend past 24 hours. Phase 2 FLEX Diesel Generators (DGs) can provide power before HCVS Dedicated Batteries are depleted.

- Replace nitrogen supply bottles to replenish the permanently installed secondary nitrogen bottle supply.

  > 24 hours – Cases 1, 2A & 2B

  Additional nitrogen bottles will be stored at a readily accessible location in the Reactor Building.

- Install FLEX DGs using portable cable connections and AC transfer switches to the 125 VDC Station Battery Chargers to supply power to HCVS sensitive components and instruments (Ref. 3A).

  24 hours – Cases 1, 2A & 2B (Time sensitive after 24 hours)

  Two DGs will be maintained in on-site FLEX storage buildings and a third DG will be pre-staged in the Turbine Building Truck Lock area, which is a protected area in close proximity to the Battery Charger and Switchgear Rooms (Ref. 3A). DGs will be transferred and staged via haul routes and staging areas evaluated for impact from external hazards (Ref. 3A). HCVS Dedicated Batteries will be sized to support the required HCVS functions for 24 hours. Modifications will be implemented to facilitate the connections and operational actions required to supply power (place FLEX DGs in-service) within 8 hours which is acceptable because the actions can be performed any time after declaration of an ELAP until repowering is needed at 24 hours (Ref. 3A).

- Switch power supply for HCVS instrumentation and indication back to the 125 VDC Station Batteries, which have been repowered with the installation of FLEX DGs (Ref. 3A; Att. 3, Sketch 1A).

  24 hours – Case 1, 2A & 2B (Time sensitive after 24 hours)

  Access to the power transfer switch will be in the MCR or at the HCVS Local Panel (Att. 3, Sketch 1A).

- Install submersible pump and hose to discharge the accumulated condensate in the basement of the Main Stack to the Frac Tank for reuse as makeup water via the Water Treatment Skid from the RRC (Ref. 3A; Att. 3, Sketch 1A).

  24 hours – Cases 1, 2A & 2B (Time sensitive after 24 hours)

  The pump and hose will be available in on-site FLEX storage buildings for use. The Main Stack basement is anticipated to fill up to the vent discharge piping by approximately 27 hours after initiation of the event.

Part 2: Boundary Conditions for Wet Well Vent

Discussion of radiological and temperature constraints identified in Attachment 2

The travel pathways to and the actions required at the FLEX DGs, HCVS Local Panel, nitrogen bottle storage, condensate drain hose location, SGTS isolation, Main Stack will be evaluated during detailed design to identify actions that are performed in a high thermal stress or high dose environment.

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, 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, 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

Part 2: Boundary Conditions for Wet Well Vent

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)

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. (Ref. 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 344-2004, "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.

Part 2: Boundary Conditions for Wet Well Vent

Vent Size and Basis

The HCVS Wetwell path is designed for venting steam/energy at a nominal capacity of 1% or greater of 2,028 MWt thermal power at pressure of 56 psig (Ref. 4D). This pressure is the lower of the containment design pressure and the PCPL value (Ref. 9A). The size of the Wetwell portion of the HCVS is a minimum of 8 inches in diameter which provides adequate capacity to meet or exceed the Order criteria.

Vent Capacity

The 1% value at PNPS assumes that the suppression pool pressure suppression capacity is sufficient to absorb the decay heat generated during the first 3 hours (Ref. 4A). The vent would then be able to prevent containment pressure from increasing above the containment design pressure. The duration of suppression pool decay heat absorption capability has been confirmed to meet this requirement (Ref. 4A).

Vent Path and Discharge

The existing GL 89-16 Hardened Containment Vent System (HCVS) Torus Vent at PNPS includes an 8" Air-Operated Butterfly Valve AO-5025 capable of venting the Wetwell (Torus) airspace through an 8" branch line between the two Primary Containment Isolation Valves (PCIVs) AO-5042A & B from 20" Torus Penetration X-227. The HCVS Torus Vent flow path via AO-5042B & AO-5025 connects to the 20" discharge line downstream of the Standby Gas Treatment System (SGTS) filter trains, which then discharges to the plant's Main Stack (30") via a buried piping run. The HCVS will continue to use the existing HCVS discharge path to the Main Stack. The SGTS filter trains will be isolated prior to initiating the venting operation (Ref.'s 8A, 8B, 8C).

Power and Pneumatic Supply Sources

The electrical power required for operation of HCVS components will normally be provided by the existing plant 125 VDC System routed through two converters, one for each electrical division. The converters will supply 24 VDC power to the HCVS instrumentation and controls until 125 VDC Station Battery depletion (approximately 8 hours into the event). The HCVS Dedicated Batteries will then supply 24 VDC power with a minimum capacity capable of providing power for 24 hours without recharging. After 24 hours, power will be available from the 125 VDC Station Batteries, which are charged by FLEX DGs using portable cable connections and AC transfer switches (Ref. 3A; Att. 3, Sketch 1A). The battery sizing and impact to the station battery and Fukushima loading calculations will be completed during detailed design.

Pneumatic power is normally provided to vent valves AO-5042B and AO-5025 by the Essential Air System with backup nitrogen provided from installed Backup Nitrogen System supply tanks. A HCVS Backup Nitrogen Station (at the HCVS Local Panel) will be installed with two redundant sets of N2 tanks each capable of providing the pneumatic force to support a minimum of 5 valve operating cycles for the first 24 hours following the event including allowances for system minimum initial conditions and leakage (Ref. 4B). Provisions for supplying additional nitrogen bottles will be readily available to support sustained operation for an unlimited period.

1. The HCVS flow path valves are air-operated valves (AOV) that are air-to-open and spring-to-shut. To open each AOV from the Main Control Room (MCR) requires energizing one DC

Part 2: Boundary Conditions for Wet Well Vent

powered solenoid operated valve (SOV) via a control switch to supply motive nitrogen gas. SV-5025 is keylocked and SV-5042B requires a jumper to defeat a containment isolation signal (Ref's. 5A, 5B). Initially, the 125 VDC Station Batteries will be relied upon to operate the vent valves until depletion, at which time the HCVS Dedicated Batteries will be relied upon for continued operation. If necessary, to open each vent valve from the HCVS Local Panel requires manipulation of manual valves to supply motive nitrogen gas through the vent port of the solenoid valve (energizing or repositioning of solenoid valves is not required).

2. An assessment of temperature and radiological conditions will be performed to ensure that operating personnel can safely access and operate controls at the HCVS Local Panel 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 screened in 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 (Ref. 1P). 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.
6. Following the initial 24 hour period, additional nitrogen bottles will be staged at a gas cylinder rack located in a readily accessible Reactor Building location such that radiological impacts are not an issue.

Location of Control Panels

The HCVS design allows initiating and then operating and monitoring the HCVS from the MCR and the HCVS Local Panel, which minimizes plant operators' exposure to adverse temperature and radiological conditions. The MCR location is protected from adverse natural phenomena and is the normal control point for Plant Emergency Response actions.

The HCVS Local Panel will be located on Reactor Building elevation 23' outside of the TIP Room (Att. 3, Sketch 3A & 3B), which contains vent valves AO-5042B and AO-5025. The HCVS Local Panel location will be evaluated during detailed design to determine the anticipated environmental conditions during a Severe Accident and identify the need for additional shielding.

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.

PNPS has determined that the most viable and sensible approach to accommodate Hydrogen (H2) gas generation due to core overheating events is to ensure that the H2 is vented from Primary Containment as a steam-diluted mixture via the HCVS vent path. Once initiated, Containment

Part 2: Boundary Conditions for Wet Well Vent

Venting provides a continuous vent flow path until an alternate method of Containment Heat Removal has been established and is functioning at a sufficient rate to provide all further Heat Removal. The HCVS Wetwell Vent pipeline from the Torus to the Main Stack will remain steam inerted; thus preventing accumulation of detonable gases or the infiltration of oxygen into the HCVS vent pipeline at all times that it is in use.

Considering the overall objective of maintaining continuous core cooling and precluding or preventing additional core damage and the resulting release of radioactive products, there are no instances where an established Containment Venting Strategy is intermittently stopped until alternative Heat Removal is established, with due consideration that full cycling (Open-Closed-Open) of an operating Containment Vent may result in Condensation Water Hammer and/or Deflagration of Combustible Gases in the Vent System, resulting in a more deteriorated overall condition and negative consequences for the principal objectives of protecting Containment, maintaining Core Cooling, and minimizing the release of radioactive material. If needed, the vent flow rate may be reduced by controlled throttling of the HCVS System valves, using Containment Temperature & Pressure and Vent Mass Flow indications for guidance. This would not be needed until at least several days into a successful FLEX injection and venting strategy.

Unintended Cross Flow of Vented Fluids

The HCVS vent valves are PCIVs for containment isolation. These containment isolation valves are AOVs that are air-to-open and spring-to-shut. An SOV must be energized to allow the motive air to open the valve. AO-5042B receives a containment isolation signal automatically de-energizing the SOV causing the AOV to shut. AO-5025 is only used for emergency venting and not during normal plant operation; therefore, it does not receive a containment isolation signal. In a beyond design basis event, steps to manually override the containment isolation function have been incorporated into operating procedures to allow for operation of the HCVS.

The cross flow potential experienced upstream of AO-5025 is with normally closed, fail closed PCIVs that are subjected to Appendix J testing; therefore, these are considered acceptable for minimizing cross flow between the HCVS and buildings/other systems (Ref's. 1E, 1R).

Cross flow potential exists downstream of AO-5025 at the outlet of the Standby Gas Treatment System (SGTS). The cross flow potential at this location is minimized by isolating the discharge of the SGTS. There are two options being reviewed for isolation of SGTS discharge including (a) replace existing outlet valves AO-N-108 and AO-N-112 with new butterfly valves or (b) install a new valve in the common piping downstream of AO-N-108 and AO-N-112. Regardless of the chosen option, the isolation valve will meet the required HCVS design conditions/leakage requirements and will be manually operated local to the valve.

This is accomplished using manual actuator overrides local to the valves in the Reactor Building, Elevation 51' (Ref. 4C, 6A).

There is no cross flow potential for the other systems that also discharge to the Main Stack. The potential for unintended cross flow and hydrogen migration is precluded for systems that have open-ended vertical exhaust piping in the vertical base section of the Main Stack (Ref. 4C, 6A).

Prevention of Inadvertent Actuation

EOP/ERG operating procedures 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

Part 2: Boundary Conditions for Wet Well Vent

designed to provide features to prevent inadvertent actuation due to a design error, equipment malfunction, or operator error. PNPS does credit CAP to provide adequate Net Positive Suction Head (NPSH) to the Emergency Core Cooling System (ECCS) Pumps for the Design Basis Loss of Coolant Accident (Ref. 1CC, Section 14.5.3).

- The primary feature that prevents inadvertent actuation from the MCR are two PCIVs in series powered from different divisions with the downstream vent valve AO-5025 equipped with a keylock switch (Ref. 5A). The upstream vent valve AO-5042B requires installation of a jumper to defeat the containment isolation signal (Ref. 5B). Procedures also provide clear guidance to not circumvent containment integrity by simultaneously opening Torus and Drywell Vent Valves during any design basis transient or accident.
- The primary feature that prevents inadvertent actuation at the HCVS Local Panel is locked open solenoid vent valves which prevent pressurization of the valve actuators should the nitrogen supply valves be inadvertently opened (Ref's. 7B, 7C).

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 safety related, as the existing system is safety related. 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.

Likewise, any electrical or control components which interface with Class 1E power sources will be considered safety related, as their failure could adversely impact containment isolation and/or a safety-related power source. The remaining 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 process instrumentation, radiation monitoring, and support system monitoring, will be qualified by using one 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
3. Demonstration that instrumentation is substantially similar to the design of instrumentation previously qualified.

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Instrument	Qualification Method*
HCVS Effluent Temperature	ISO9001 / IEEE 344-2004 / Demonstration
HCVS System Pressure	ISO9001 / IEEE 344-2004 / Demonstration
HCVS System Flow	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Process Radiation Monitor	ISO9001 / IEEE 344-2004 / Demonstration
Available HCVS Battery Capacity	ISO9001 / IEEE 344-2004 / Demonstration
HCVS Pneumatic Supply Pressure	ISO9001 / IEEE 344-2004 / Demonstration
Drywell pressure	Existing instruments / pre-qualified
Wetwell pressure	Existing instruments / pre-qualified
Wetwell level	Existing instruments / pre-qualified
Wetwell temperature	Existing instruments / pre-qualified
Reactor Pressure	Existing instruments / pre-qualified
HCVS Valve Position Limit Switches	Existing instruments / pre-qualified

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

Monitoring of HCVS

The PNPS 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 (Ref. 1E). 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). Additionally, to meet the intent for a secondary control location of Order Element 1.2.5 (Ref. 1E), a readily accessible HCVS Local Panel will also be incorporated into the HCVS design as described in NEI 13-02 Section

Part 2: Boundary Conditions for Wet Well Vent

4.2.2.1.2.1 (Ref. 1K). The controls and indications at the HCVS Local Panel 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 determine accessibility to the location, habitability, staffing sufficiency, and communication capability with vent-use decision makers.

The HCVS will have vent temperature, pressure, mass flow, radiation, pneumatic pressure, and battery capacity monitoring. The temperature monitoring will be downstream of the second vent valve (AO-5025). Both AOVs have open and closed limit switch indication. These HCVS indications will be at the same location as the valve control switches, which is on the MCR Panel C7. The temperature, pressure, mass flow, and radiation indicators and valve position switch lights will be provided on MCR Panel C7 and at the HCVS Local Panel in the Reactor Building (Att. 3, Sketch 2B). The position switches, temperature sensor, pressure, and mass flow sensor will be used to determine with certainty whether or not containment pressure/energy is being vented through the HCVS at the conditions required to meet the venting strategy.

Local pressure gages at the HCVS Local Panel will monitor the high pressure nitrogen cylinder supplies and gages downstream of the pressure regulators will show the reduced pressure provided to the AOV actuators (Att. 3, Sketch 2B).

Since the instrumentation dedicated for Containment pressure monitoring is AC powered, the Containment Pressure will be monitored using the RCIC or HPCI suction pressure instrumentation which are powered by the 125/250 VDC System. An alternate method for monitoring the Torus Pressure is using the pressure monitoring between the upstream (AO-5042B) and the downstream vent valve (AO-5025), so that Torus Pressure can be verified by opening the first isolation valve before the Torus Vent flow path is opened. The Containment Monitoring instrumentation will be available upon the installation of the FLEX DGs supplying power to the 125/250 VDC Station Battery Chargers, which are repowering the supply panels (Ref. 3A).

Torus Water Level monitoring instrumentation (AC powered) is not available until installation of the FLEX DGs supplying power to the 125/250 VDC Station Battery Chargers, which are repowering the supply panels (Ref. 3A). This is acceptable because the Torus Water Level is not required until after the 8 hours.

The new HCVS instrumentation will normally be supplied by the Station 125 VDC Power System, via 125 VDC to 24 VDC converters in MCR Panel C7. The new HCVS instrumentation and existing controls will also include a 24 VDC Dedicated Battery Panel included at the HCVS Local Panel and MCR, with spare terminals to connect additional 24 VDC external batteries at either the HCVS Local Panel or in MCR Panel C7. The available battery capacity will be displayed in the MCR Panel C7 (Att. 3, Sketch 1A).

This monitoring instrumentation provides the indication in the MCR as per Requirement 1.2.4. The HCVS and related controls and instrumentation will be specified and evaluated or tested, as required, with the expectation that the components remain functional under thermal, environmental, and radiation conditions that are consistent with station specific conditions and the actual recorded events at the Fukushima Dai-ichi Nuclear Power Plants in March 2011.

Part 2: Boundary Conditions for Wet Well Vent

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, has been designed/analyzed to conform to the requirements consistent with the applicable design codes (e.g., Non-safety, Cat 1, 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 radiation for the Effluent Vent Pipe and HCVS HCVS Local Panel location.

Conduit design will be seismically rugged. 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. These qualifications will be bounding conditions for PNPS.

For the instruments required after a potential seismic event, the appropriate method 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 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 equivalent of 2x Safe Shutdown Earthquake (SSE) loads based on the plant bounding response spectra;
- 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, (Ref.2A) 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 bounding the existing design basis loading at the installation location.

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 the reliance on operator actions for response to an ELAP and BDBEE hazards identified in part 1 of this OIP. Immediate operator actions can be completed by Operators from the HCVS control station(s) and include remote-manual initiation. Remote-manual is defined in this report as a manually initiated power operation of a component and does not require the operator to be at or in close proximity to the component. The operator actions required to open a vent path are as described in Table 2-1.

The HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR or the HCVS Local Panel. 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 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 the HCVS for 24 hours.

A condensate drain trap, manual isolation valve, and flex hose quick-connect fitting will be installed downstream of torus drain valve 44-HO-114 as part of the FLEX modifications. Prior to venting, a flexible hose must be connected to this fitting and routed to the Torus Room to drain condensate from the vent pipeline (Att. 3, Sketch 3C).

Isolating the outlet of the Standby Gas Treatment System will be completed by manually closing the valves that interface with the vent path, AO-N-108 and AO-N-112. This will be accomplished using manual actuator overrides local to the valves in the Reactor Building, Elevation 51' (Att. 3, Sketch 3D). Ladders or platforms will not be required to access the manual actuator control(s) for isolation of the SGTS discharge piping (see this OIP Part 2, "Unintended Cross Flow of Vented Fluids" for more information).

System control:

i. Active: The HCVS vent valves are operated in accordance with EOPs to control containment pressure. The HCVS is designed for 5 open/close cycles over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EPGs. There is no intention to cycle the HCVS vent valve AO-5025 once it is opened for purposes of heat removal. The strategy will be to minimize Containment pressure from that point until Wetwell venting is no longer required.

   As noted in Table 2-1, a keylock switch will need to be closed to defeat the containment isolation circuit on the PCIV AO-5042B needed to vent containment. Inadvertent actuation protection is provided by the use of a key lock switch located on MCR Panel C7 for the downstream vent valve AO-5025. In addition, locked open solenoid vent valves prevent

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

inadvertent pressurization of the vent valve actuators AO-5042B and AO-5025 from the HCVS Local Panel.

ii. Passive: No passive component (e.g. rupture disk) will be installed.

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 required to connect supplemental motive air/gas to the HCVS. Connections for supplementing electrical power and motive air/gas required for HCVS will be located in accessible areas with reasonable protection per NEI 12-06 that minimize personnel exposure to adverse conditions for HCVS initiation and operation. Connections will be pre-engineered quick disconnects to minimize manpower resources. The response to NRC EA-12-049 (Ref. 3A) will demonstrate the capability for FLEX efforts to maintain the power source.

After 24 hours, available personnel will be required to discharge the accumulated condensate in the basement of the Main Stack to the Frac Tank using a submersible for reuse as makeup water via the Water Treatment Skid from the RRC.

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

- EC-42259/EC-45555 will provide the FLEX alternate power to the 125 and 250 VDC Station Battery Chargers including the portable cable connections and AC transfer switches.
- EC-42259/EC-45556 will provide the FLEX alternate power to 120 VAC panels required for powering the Wetwell Level and Containment Pressure instrumentation.
- EC-42259/EC-46812 will provide a 24 hour HCVS Local Panel for AO-5025 and AO-5042B

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

(Child EC-46820), a portable condensate drain hose with drain trap (Child EC-46823), and remove the rupture disk PSD-8180 from the vent path (Child EC-46822).

EA-13-109 Modifications (Ref.'s 4D, 6A, 8D, 8E)

- A modification will be required to install the HCVS Dedicated Batteries, chargers, and disconnect switches needed to supply power to HCVS for 24 hours following the ELAP event.
- A modification will be required for installation of required HCVS instrumentation and indication in the MCR and at the HCVS Local Panel.
- A modification will be required to install a nitrogen bottle storage rack with additional bottles to support sustained operation.
- A modification will be required to replace valves AO-N-108 and AO-N-112 or install a new downstream valve to provide adequate isolation between the vent path and the Standby Gas Treatment System.
- A modification will be required to replace the existing SV-5042B and SV-5025 and position indicating lights compliant with a 24 VDC battery supply
- A modification will be required to stage a pump and hose to discharge condensation accumulation from the Main Stack.

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 (Ref. 3A, 7A):

Key Parameter	Component Identifier	Indication Location
HCVS Effluent Temperature* (40 to 400°F) 24 VDC	TBD	MCR Panel C7 HCVS Local Panel
HCVS System Pressure* (0 to 250 psig) 24 VDC	TBD	MCR Panel C7 HCVS Local Panel
HCVS System Flow* (5,000 to 80,000 lbm/hr Steam) 24 VDC	TBD	MCR Panel C7 HCVS Local Panel
HCVS Process Radiation Monitor* (0.010 to 10,000 Rad/hr) 24 VDC	TBD	MCR Panel C7 HCVS Local Panel

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

HCVS Valve Position	ZS-5025 ZS-5042B TBD (HCVS Local Panel) Red/Green Indicators	MCR Panel C7/C904 HCVS Local Panel
HCVS Pneumatic Supply Pressure** (Bottles: 0 to 3000 psig; Supply: 0 to 160 psig) Mechanical gauges	Bottles: PI-4001A/B Supply: PI-4002A/B	HCVS Local Panel
RCIC Suction Pressure (30 inch HG VAC to 85 psig) 120 VAC/250 VDC Pnl Y2	PI-1340-2	MCR Panel C904
HPCI Suction Pressure (30 inch HG VAC to 85 psig) 125 VDC Pnl D5	PI-2340-7	MCR Panel C903
Drywell Pressure – Low Range (0 to 5 psig) 120 VAC/125 VDC Pnl Y3/Y4/D36/D37	PIS-1001-89/A/B/C/D	CS Room Instr Racks C2233A & B
Wide Range Primary Containment Pressure (0 to 225 psig) 120 VAC Pnl Y3/Y4	PI-1001-600A/B	MCR Panels C170/C171
Containment Pressure - Low Range (-5 to +5 psig) 120 VAC Pnl Y3/Y4	PI-1001-601A/B	MCR Panels C170/C171
Torus Water Level (0 to 300 inches) 120 VAC Y3/Y4	LI-1001-604A/B	MCR Panels C170/C171
Torus Water Local Temperature (30 to 230°F) 120 VAC Pnl Y31/C179	TI-5021-01A/B	MCR Panel C903
Torus Water Bulk Temperature (30 to 230°F) 120 VAC Pnl Y31/C179	TI-5021-02A/B	MCR Panel C903
Reactor Pressure (0 to 1200 psig) 120 VAC/250 VDC Pnl Y2	PI-640-25A/B	MCR Panel C905

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

Reactor Pressure (0 to 1500 psig) 120 VAC/125 VDC Pnl Y3/Y4/D36/D37	PI-263-49A/B	MCR Panels C170/C171
Reactor Pressure (0 to 1500 psig) 120 VAC/125 VDC Pnl Y3/Y4/D36/D37	PIS-263-49A/B	CS Room Instr Racks C2233A & B
Reactor Pressure (0 to 1200 psig) 120 VAC/125 VDC Pnl Y3/Y4/D36/D37	PIS-263-50A/B	CS Room Instr Racks C2233A & B
Reactor Pressure (0 to 1200 psig) 120 VAC/125 VDC Pnl Y3/Y4/D36/D37	PIS-263-52A/B	CS Room Instr Racks C2233A & B
Reactor Pressure (0 to 1500 psig)	PI-263-60A/B	Local Rack C2205A/B & C2206A/B

*Newly installed to comply with EA-13-109 (HCVS)
**Installed as part of response to EA-12-049 (FLEX)

Initiation and operation of the HCVS system will rely on several existing Main Control Room key parameters and indicators which are qualified or evaluated to the existing plant design (reference NEI 13-02 Section 4.2.2.1.9). The HCVS Effluent Temperature, Valve Position Indication, System Flow, System Pressure, Radiation Detector, and Available HCVS Battery Capacity will be powered by the HCVS Dedicated Batteries. The Pneumatic Supply Pressure will be indicated at the HCVS Local Panel using mechanical gauges. The Wetwell Level and Containment Pressure instrumentation will be repowered and unavailable until the FLEX DGs are installed, along with all other Containment Parameters. There are, however, other mechanisms for monitoring Containment Pressure until the FLEX DGs are available (See this OIP Part 2, “Monitoring of HCVS” for further discussion).

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

Specifics are the same as for BDBEE Venting Part 2 except the following locations and travel pathways are evaluated for SA environmental conditions resulting from the proposed damaged Reactor Core and resultant HCVS vent pathway:

- HCVS Local Panel (Reactor Building, Elevation 23').
- Installation of a condensate drain hose from Auxiliary Bay, Elevation 3' to the Torus Room.
- Isolating the outlet of the Standby Gas Treatment System using valves AO-N-108 and AO-N-112 (Reactor Building, Elevation 51') or a newly installed downstream valve.

An evaluation of travel pathways for dose and temperature concerns will be completed as part of detailed design for confirmation.

System control:

i. Active: Same as for BDBEE Venting Part 2.

ii. Passive: Same as for BDBEE Venting Part 2.

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

Specifics are the same as for BDBEE Venting Part 2 except the following are evaluated for SA environmental conditions resulting from the proposed damaged Reactor Core and resultant HCVS vent pathway.

- The location and refueling/replenishment actions for the FLEX DGs (Battery Charger and Switchgear Rooms) and the HCVS Local Panel (Reactor Building, Elevation 23').
- The location and installation actions for draining the Main Stack

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

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)

The same as for BDBEE Venting Part 2.

Notes:

Part 2 Boundary Conditions for WW Vent: **HCVS 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

Containment integrity is initially maintained by permanently installed equipment. All containment vent operating functions will be performed from the MCR or HCVS Local Panel. Venting will require support from DC power and instrument air systems as detailed in the response to Order EA-12-049 (Ref. 3A) but not until after 24 hours for HCVS instrumentation.

Existing safety related station batteries will provide sufficient electrical power for operation of the HCVS vent valves from the MCR for at least 8 hours. HCVS Dedicated Batteries will supply sufficient electrical power for HCVS operation and monitoring for 24 hours. At 24 hours, power will be switched back to the station batteries, which at that point will be backed up by FLEX DGs.

The HCVS Local Panel will be installed in the Reactor Building outside of the TIP Room (Elevation 23'), which contains vent valves AO-5042B and AO-5025 (Ref.'s 7B, 7C; Att. 3, Sketch 3A & 3B). Additional nitrogen bottles will be stored in a readily accessible location.

A condensate drain trap, manual isolation valve, and flex hose quick-connect fitting will be installed downstream of torus drain valve 44-HO-114 as part of the FLEX modifications. Prior to venting, a flexible hose must be connected to this fitting and routed to the Torus Room to drain condensate from the vent pipeline (Att. 3, Sketch 3C).

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

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

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

FLEX modifications applicable to HCVS operation (Ref. 3.A):

- EC-42259/EC-45555 will provide the FLEX alternate power to the 125 VDC and 250 VDC Station Battery Chargers including the portable cable connections and AC transfer switches.
- EC-42259/EC-45556 will provide the FLEX alternate power to 120V AC panels required for powering the Wetwell Level and Containment Pressure instrumentation.
- EC-42259/EC-46812 will provide a portable condensate drain hose with drain trap (Child EC-46823).

HCVS modifications:

- HCVS modification to install a nitrogen bottle rack to provide pneumatic force for sustained operations (beyond 24 hours).
- A modification will be required to stage a pump and hose to discharge condensation accumulation from the Main Stack to avoid impeding the vent flow.
- 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.
Pressure gauge on supplemental nitrogen bottles.

Notes:

Part 2 Boundary Conditions for WW Vent: **HCVS 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**		
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. Deployment in the areas around the Reactor Building or in the vicinity of the HCVS piping will allow access, operation and replenishment of consumables with the consideration that there is potential Reactor Core Damage and HCVS operation.		
Details:		
Provide a brief description of Procedures / Guidelines: *Confirm that procedure/guidance exists or will be developed to support implementation.*		
Implementation procedures will be 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.		
HCVS Actions	**Modifications**	**Protection of connections**
Identify Actions including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
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 2.

See attached sequence of events timeline (Attachment 2).

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.

Part 3: Boundary Conditions for Dry Well Vent

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

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 will be 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 (Ref. 1E) 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 during all modes of operation and during Severe Accidents.

Procedures:

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

The HCVS procedures will be developed and implemented following the plant's process for initiating or revising procedures and 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, and
- testing of portable equipment

Licensees will establish provisions for out-of-service requirements of the HCVS and compensatory measures. The following provisions will be documented in site control documents:

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,

Part 4: Programmatic Controls, Training, Drills and Maintenance

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 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.
  - Initiate action 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

Personnel expected to perform direct execution of the HVCS 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, (Ref. 1J) all personnel on-site will be available to supplement trained personnel.

Identify how the drills and exercise parameters will be met.

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

The Licensee should demonstrate use of the HCVS system in drills, tabletops, or exercises 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 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.

Part 4: Programmatic Controls, Training, Drills and Maintenance

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 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 permanently 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.

PNPS will implement the following operation, testing and inspection requirements for the HCVS to ensure reliable operation of the system (Ref. 1K). The minimum frequency for testing and inspection of the HCVS has been listed in Table 4-1.

Part 4: Programmatic Controls, Training, Drills and Maintenance

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

Notes:

Part 5: Milestone Schedule

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
Complete HCVS Gap Analysis	Jun, 2014	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 On-site/Complete	Dec, 2015		
Submit 6 Month Status Report	Jun. 2016		
Operations Procedure Changes Developed	Dec, 2016		
Site Specific Maintenance Procedure Developed	Dec, 2016		
Submit 6 Month Status Report	Dec. 2016		
Training Complete	Dec, 2016		
Implementation Outage	Mar, 2017		
Procedure Changes Active	Mar, 2017		

Part 5: Milestone Schedule

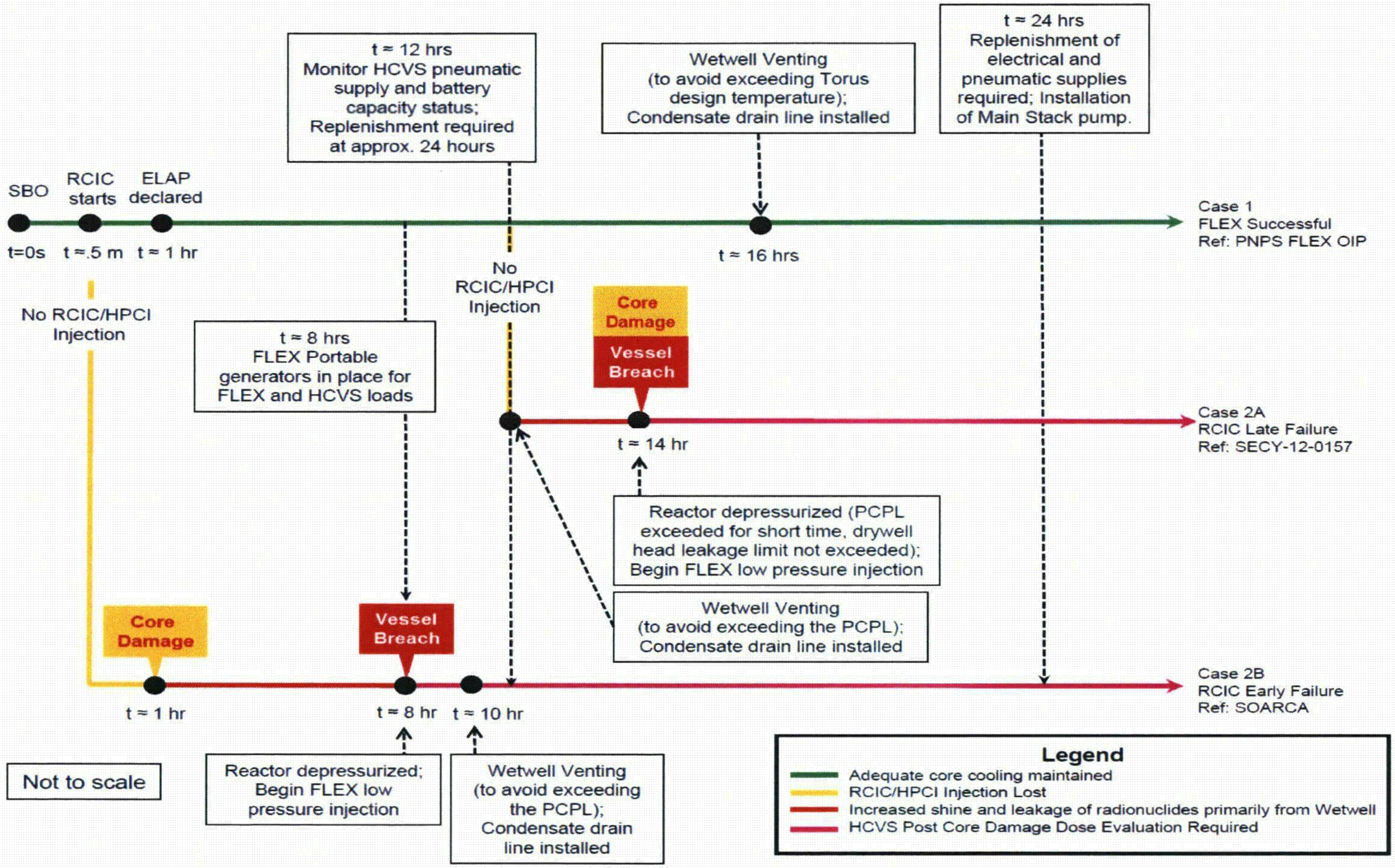
Walk Through Demonstration/Functional Test	Mar, 2017		
Submit Completion Report	Jun. 2017		

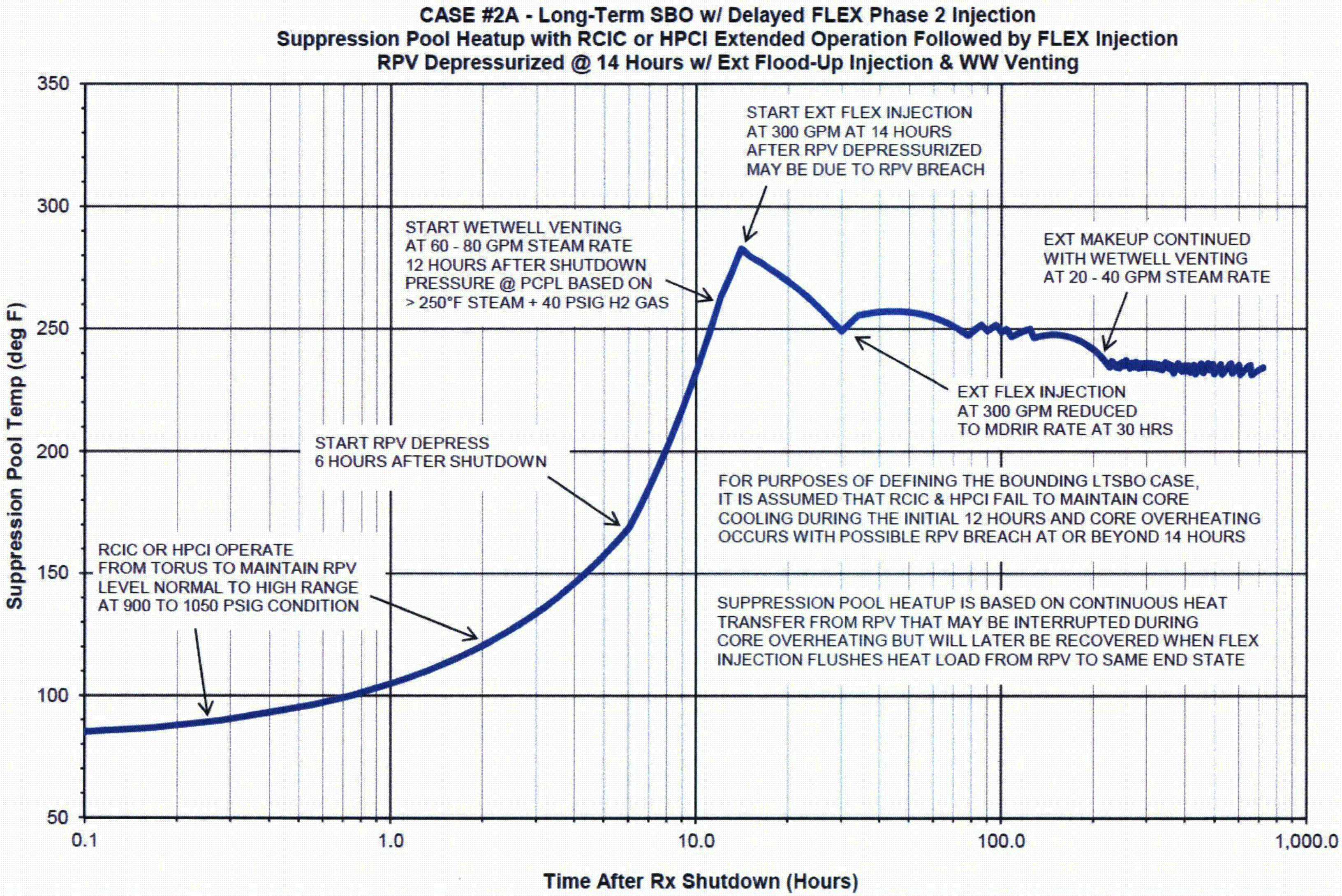
Attachment 1: HCVS Portable Equipment

List portable equipment	*BDBEE Venting*	*Severe Accident Venting*	*Performance Criteria*	*Maintenance / PM requirements*
Nitrogen Cylinders	**X**	**X**	**500 psig min.**	**Check periodically for pressure, replace or replenish as needed**
FLEX DG	**X**	**X**	**100 kVA**	**Per Response to EA-12-049**
Condensate Drain Hose	**X**	**X**	**N/A**	**No maintenance requirements**
Main Stack Pump	**X**	**X**	**10 GPM min.**	**Check in accordance with other FLEX equipment**

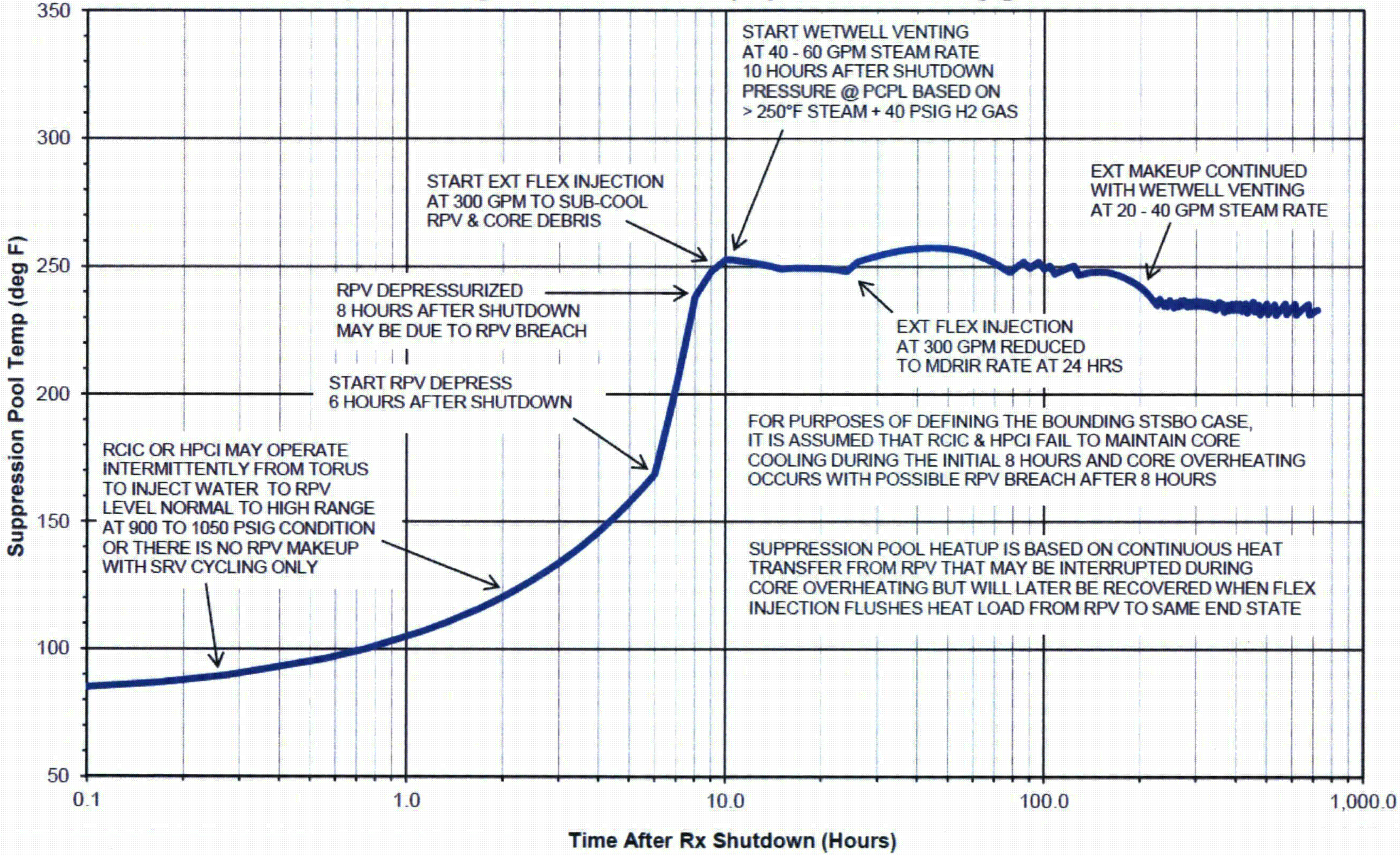
Attachment 2: Sequence of Events Timeline

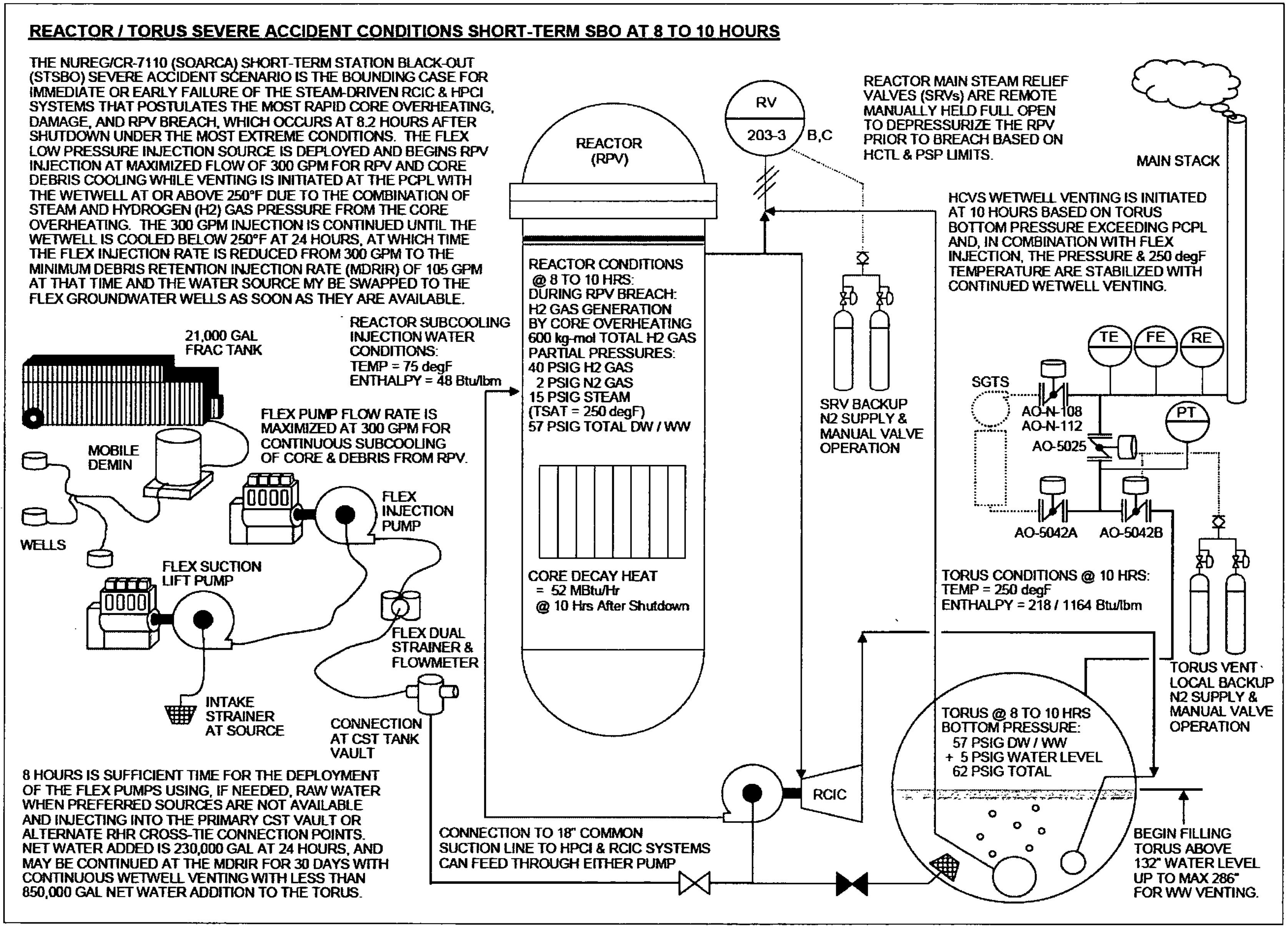
See Reference 4A for figures and design input for this attachment




CASE #2A - Long-Term SBO w/ Delayed FLEX Phase 2 Injection
Suppression Pool Heatup with RCIC or HPCI Extended Operation Followed by FLEX Injection
RPV Depressurized @ 14 Hours w/ Ext Flood-Up Injection & WW Venting
Suppression Pool Temp (deg F)
350
300
250
200
150
100
50
0.1
1.0
10.0
100.0
1,000.0
Time After Rx Shutdown (Hours)
START EXT FLEX INJECTION AT 300 GPM AT 14 HOURS AFTER RPV DEPRESSURIZED MAY BE DUE TO RPV BREACH
START WETWELL VENTING AT 60 - 80 GPM STEAM RATE 12 HOURS AFTER SHUTDOWN PRESSURE @ PCPL BASED ON > 250°F STEAM + 40 PSIG H2 GAS
EXT MAKEUP CONTINUED WITH WETWELL VENTING AT 20 - 40 GPM STEAM RATE
EXT FLEX INJECTION AT 300 GPM REDUCED TO MDRIR RATE AT 30 HRS
START RPV DEPRESS 6 HOURS AFTER SHUTDOWN
FOR PURPOSES OF DEFINING THE BOUNDING LTSBO CASE, IT IS ASSUMED THAT RCIC & HPCI FAIL TO MAINTAIN CORE COOLING DURING THE INITIAL 12 HOURS AND CORE OVERHEATING OCCURS WITH POSSIBLE RPV BREACH AT OR BEYOND 14 HOURS
RCIC OR HPCI OPERATE FROM TORUS TO MAINTAIN RPV LEVEL NORMAL TO HIGH RANGE AT 900 TO 1050 PSIG CONDITION
SUPPRESSION POOL HEATUP IS BASED ON CONTINUOUS HEAT TRANSFER FROM RPV THAT MAY BE INTERRUPTED DURING CORE OVERHEATING BUT WILL LATER BE RECOVERED WHEN FLEX INJECTION FLUSHES HEAT LOAD FROM RPV TO SAME END STATE

CASE #2B - Short-Term SBO w/ Loss of Phase 1 RCIC & HPCI Systems
Suppression Pool Heatup w/ RCIC & HPCI RPV Makeup Lost or Intermittent
RPV Depressurized @ 8 Hours w/ Ext Flood-Up Injection & WW Venting @ 10 Hours




REACTOR / TORUS SEVERE ACCIDENT CONDITIONS SHORT-TERM SBO AT 8 TO 10 HOURS
THE NUREG/CR-7110 (SOARCA) SHORT-TERM STATION BLACK-OUT (STSBO) SEVERE ACCIDENT SCENARIO IS THE BOUNDING CASE FOR IMMEDIATE OR EARLY FAILURE OF THE STEAM-DRIVEN RCIC & HPCI SYSTEMS THAT POSTULATES THE MOST RAPID CORE OVERHEATING, DAMAGE, AND RPV BREACH, WHICH OCCURS AT 8.2 HOURS AFTER SHUTDOWN UNDER THE MOST EXTREME CONDITIONS. THE FLEX LOW PRESSURE INJECTION SOURCE IS DEPLOYED AND BEGINS RPV INJECTION AT MAXIMIZED FLOW OF 300 GPM FOR RPV AND CORE DEBRIS COOLING WHILE VENTING IS INITIATED AT THE PCPL WITH THE WETWELL AT OR ABOVE 250°F DUE TO THE COMBINATION OF STEAM AND HYDROGEN (H2) GAS PRESSURE FROM THE CORE OVERHEATING. THE 300 GPM INJECTION IS CONTINUED UNTIL THE WETWELL IS COOLED BELOW 250°F AT 24 HOURS, AT WHICH TIME THE FLEX INJECTION RATE IS REDUCED FROM 300 GPM TO THE MINIMUM DEBRIS RETENTION INJECTION RATE (MDRIR) OF 105 GPM AT THAT TIME AND THE WATER SOURCE MY BE SWAPPED TO THE FLEX GROUNDWATER WELLS AS SOON AS THEY ARE AVAILABLE.
21,000 GAL FRAC TANK
MOBILE DEMIN
WELLS
REACTOR SUBCOOLING INJECTION WATER CONDITIONS:
TEMP = 75 degF
ENTHALPY = 48 Btu/lbm
FLEX PUMP FLOW RATE IS MAXIMIZED AT 300 GPM FOR CONTINUOUS SUBCOOLING OF CORE & DEBRIS FROM RPV.
FLEX INJECTION PUMP
FLEX SUCTION LIFT PUMP
FLEX DUAL STRAINER & FLOWMETER
INTAKE STRAINER AT SOURCE
CONNECTION AT CST TANK VAULT
8 HOURS IS SUFFICIENT TIME FOR THE DEPLOYMENT OF THE FLEX PUMPS USING, IF NEEDED, RAW WATER WHEN PREFERRED SOURCES ARE NOT AVAILABLE AND INJECTING INTO THE PRIMARY CST VAULT OR ALTERNATE RHR CROSS-TIE CONNECTION POINTS. NET WATER ADDED IS 230,000 GAL AT 24 HOURS, AND MAY BE CONTINUED AT THE MDRIR FOR 30 DAYS WITH CONTINUOUS WETWELL VENTING WITH LESS THAN 850,000 GAL NET WATER ADDITION TO THE TORUS.
REACTOR (RPV)
REACTOR CONDITIONS
@ 8 TO 10 HRS:
DURING RPV BREACH:
H2 GAS GENERATION
BY CORE OVERHEATING
600 kg-mol TOTAL H2 GAS
PARTIAL PRESSURES:
40 PSIG H2 GAS
2 PSIG N2 GAS
15 PSIG STEAM
(TSAT = 250 degF)
57 PSIG TOTAL DW / WW
CORE DECAY HEAT
= 52 MBtu/Hr
@ 10 Hrs After Shutdown
CONNECTION TO 18" COMMON SUCTION LINE TO HPCI & RCIC SYSTEMS CAN FEED THROUGH EITHER PUMP
RV
203-3
B,C
RCIC
SRV BACKUP N2 SUPPLY & MANUAL VALVE OPERATION
REACTOR MAIN STEAM RELIEF VALVES (SRVs) ARE REMOTE MANUALLY HELD FULL OPEN TO DEPRESSURIZE THE RPV PRIOR TO BREACH BASED ON HCTL & PSP LIMITS.
MAIN STACK
HCVS WETWELL VENTING IS INITIATED AT 10 HOURS BASED ON TORUS BOTTOM PRESSURE EXCEEDING PCPL AND, IN COMBINATION WITH FLEX INJECTION, THE PRESSURE & 250 degF TEMPERATURE ARE STABILIZED WITH CONTINUED WETWELL VENTING.
TE
FE
RE
PT
SGTS
AO-N-108
AO-N-112
AO-5025
AO-5042A
AO-5042B
TORUS CONDITIONS @ 10 HRS:
TEMP = 250 degF
ENTHALPY = 218 / 1164 Btu/lbm
TORUS VENT LOCAL BACKUP N2 SUPPLY & MANUAL VALVE OPERATION
TORUS @ 8 TO 10 HRS
BOTTOM PRESSURE:
57 PSIG DW / WW
+ 5 PSIG WATER LEVEL
62 PSIG TOTAL
BEGIN FILLING TORUS ABOVE 132" WATER LEVEL UP TO MAX 286" FOR WW VENTING.

Attachment 3: Conceptual Sketches

Electrical

Sketch 1A: HCVS Electrical Layout Drawing

Flow and Control Diagrams

Sketch 2A: P&ID Layout of HCVS

Plant Layout

Sketch 3A: HCVS Local Panel

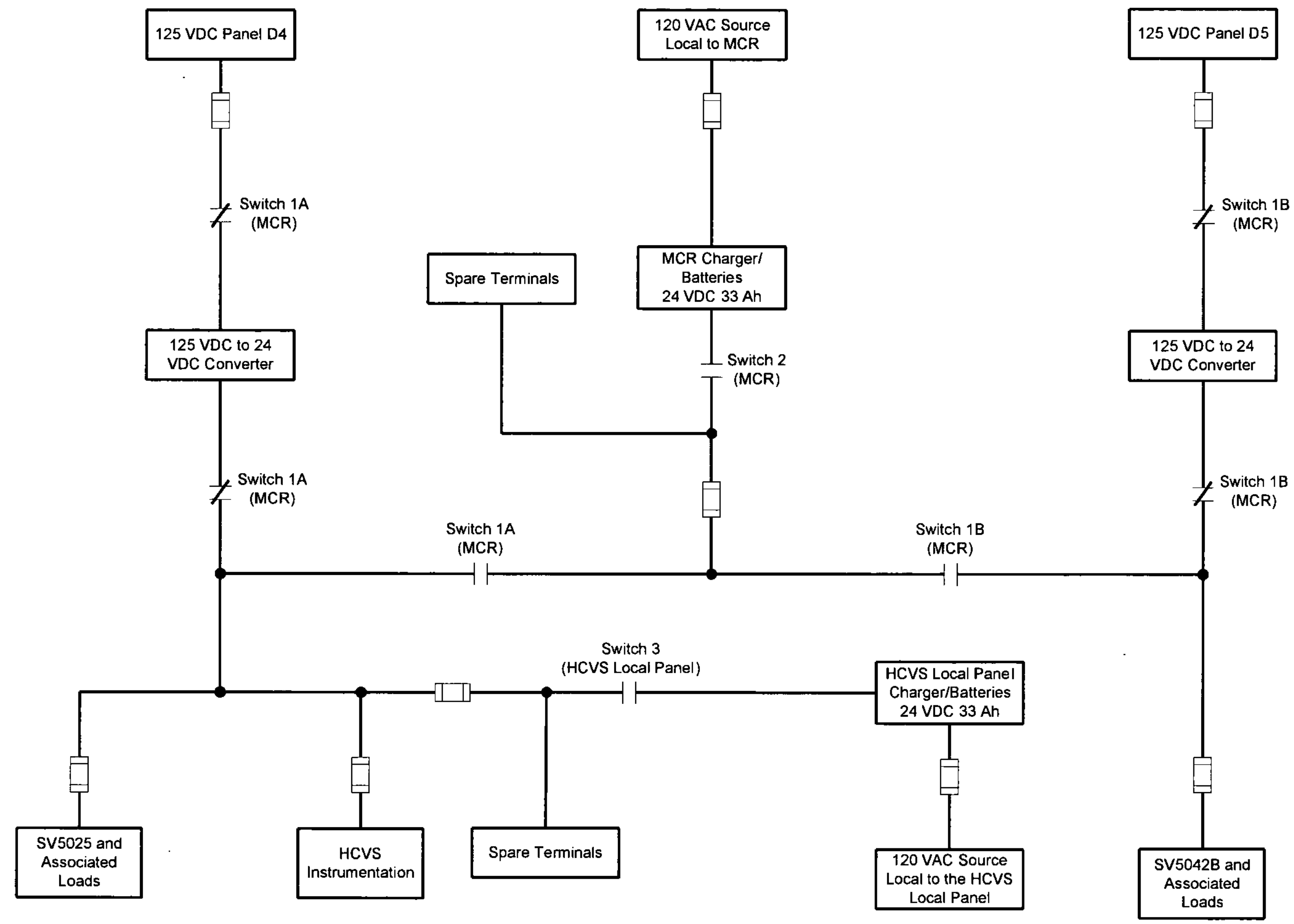
Sketch 3B: HCVS Local Panel (Detail A)

Sketch 3C: Condensate Drain Hose Connection

Sketch 3D: Standby Gas Treatment System Isolation

See the PNPS EA-12-049 FLEX OIP for the onsite FLEX DG deployment plan. Travel pathways will be addressed during detailed design. Figures to identify them will be provided in a later revision to this OIP.

Sketch 1A: HCVS Electrical Layout Drawing

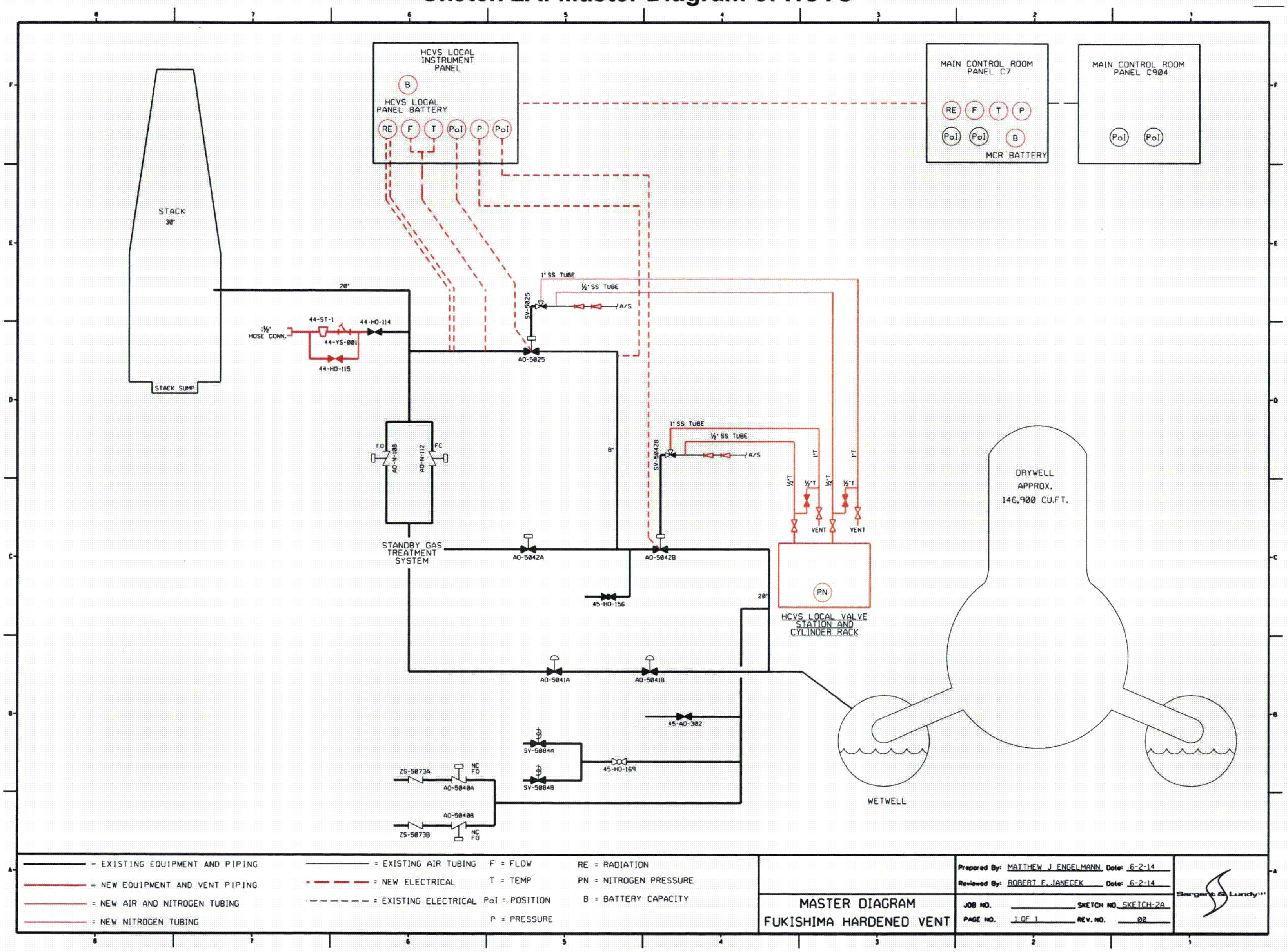


Notes:
1. Switch 1A/1B ("Normal" / "Alternate") shown in "Normal".
2. Switch 2/3 ("HCVS Battery" / "Off") shown in "Off".
3. The HCVS instrumentation is primarily powered by Station Batteries with MCR and Local Panel Batteries available as backup. Opening Switch 3 will power the loads from the HCVS Local Panel Batteries. Prior to the transfer, Switch 1A/1B need to be in the "Alternate" and Switch 2 in the "Off" position.
4. In the event that all batteries are depleted, new batteries may be connected to the spare terminals.

PNPS Electrical Layout Drawing

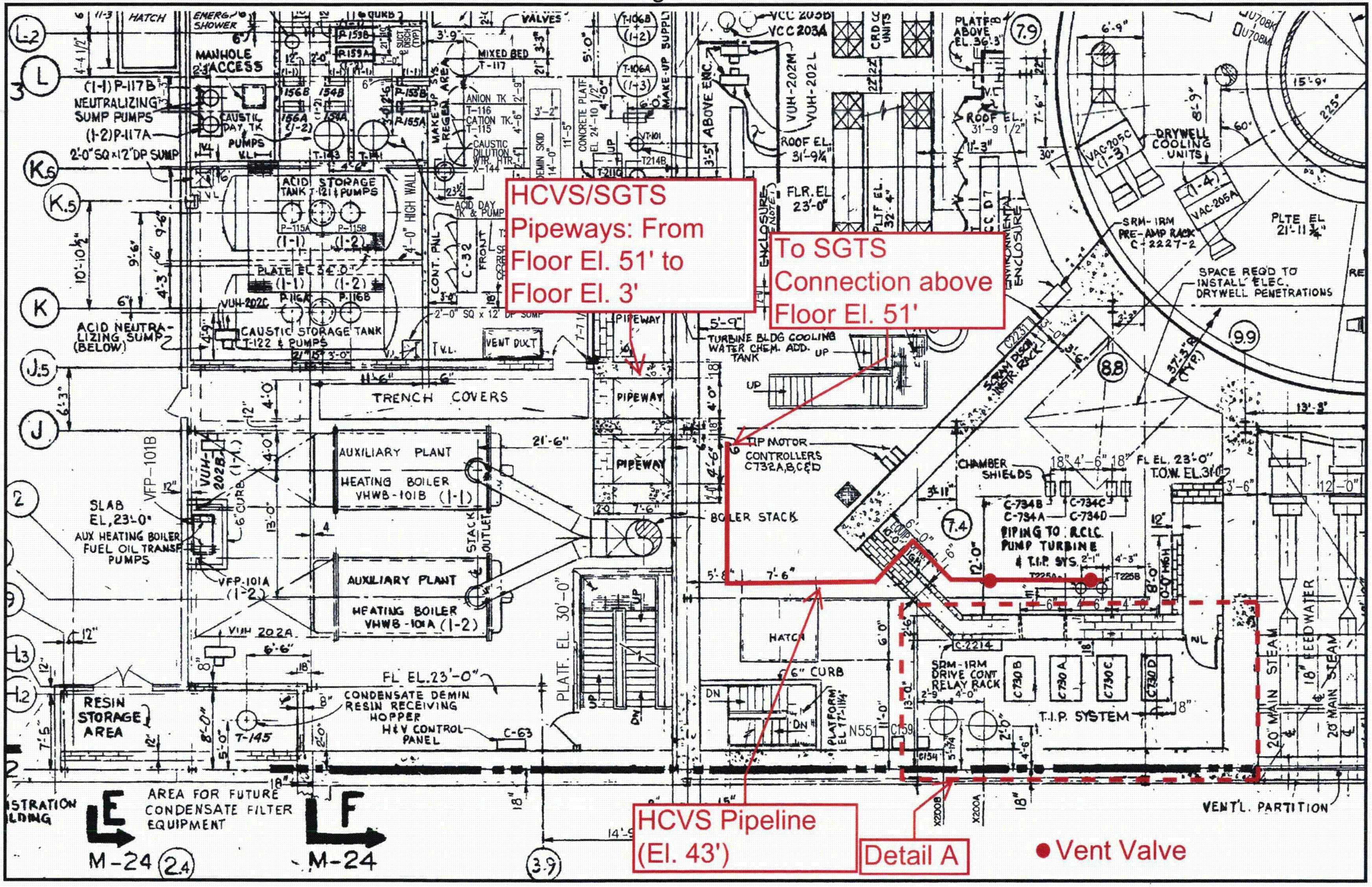
Prepared: John McCague (S&L) Date: 5/30/2014
Reviewed: Bob Davis (S&L) Date: 5/30/2014

Sketch 2A: Master Diagram of HCVS

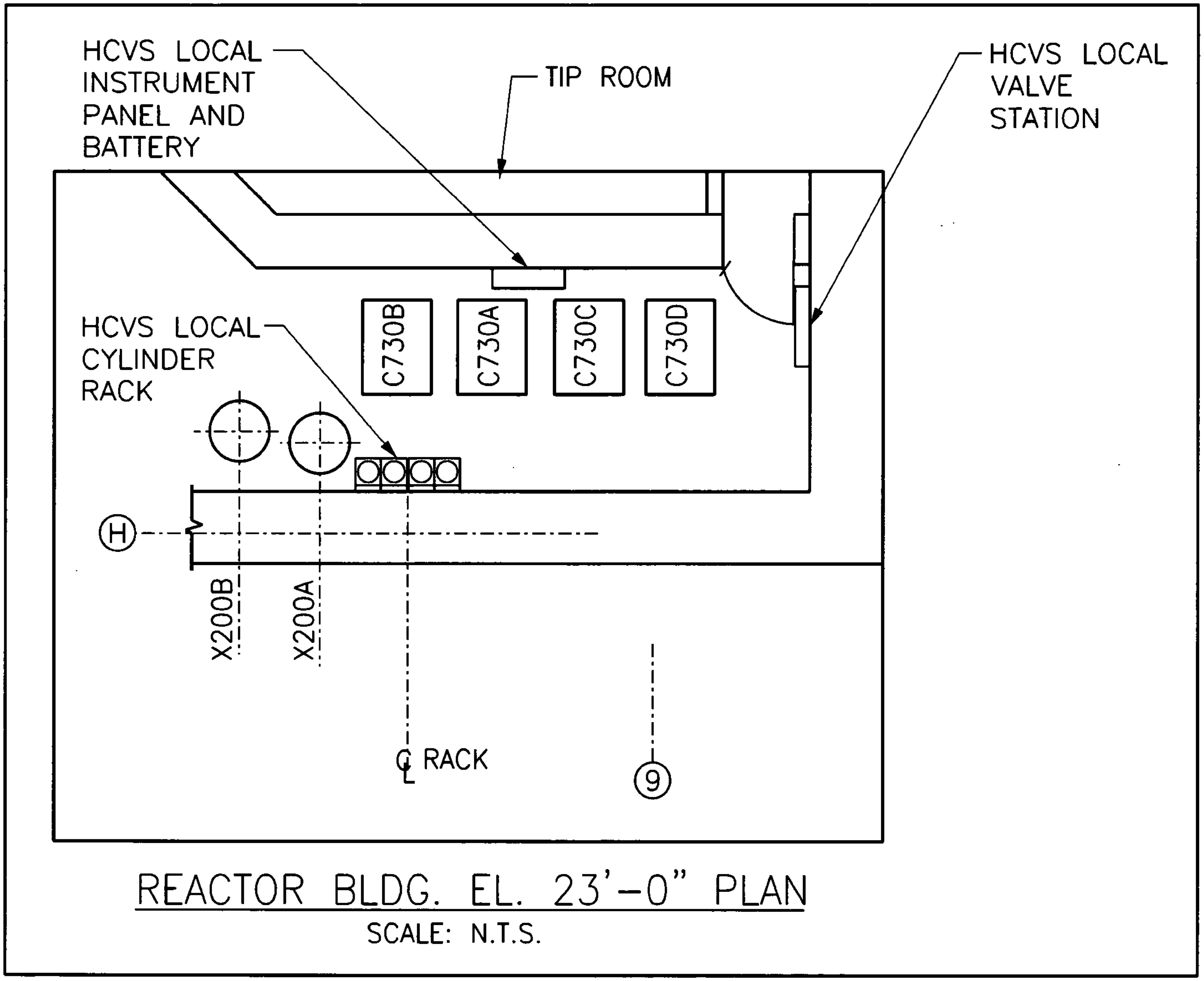


Sketch 3A: HCVS Local Panel Location

Reactor Building Plan - Elevation 23'

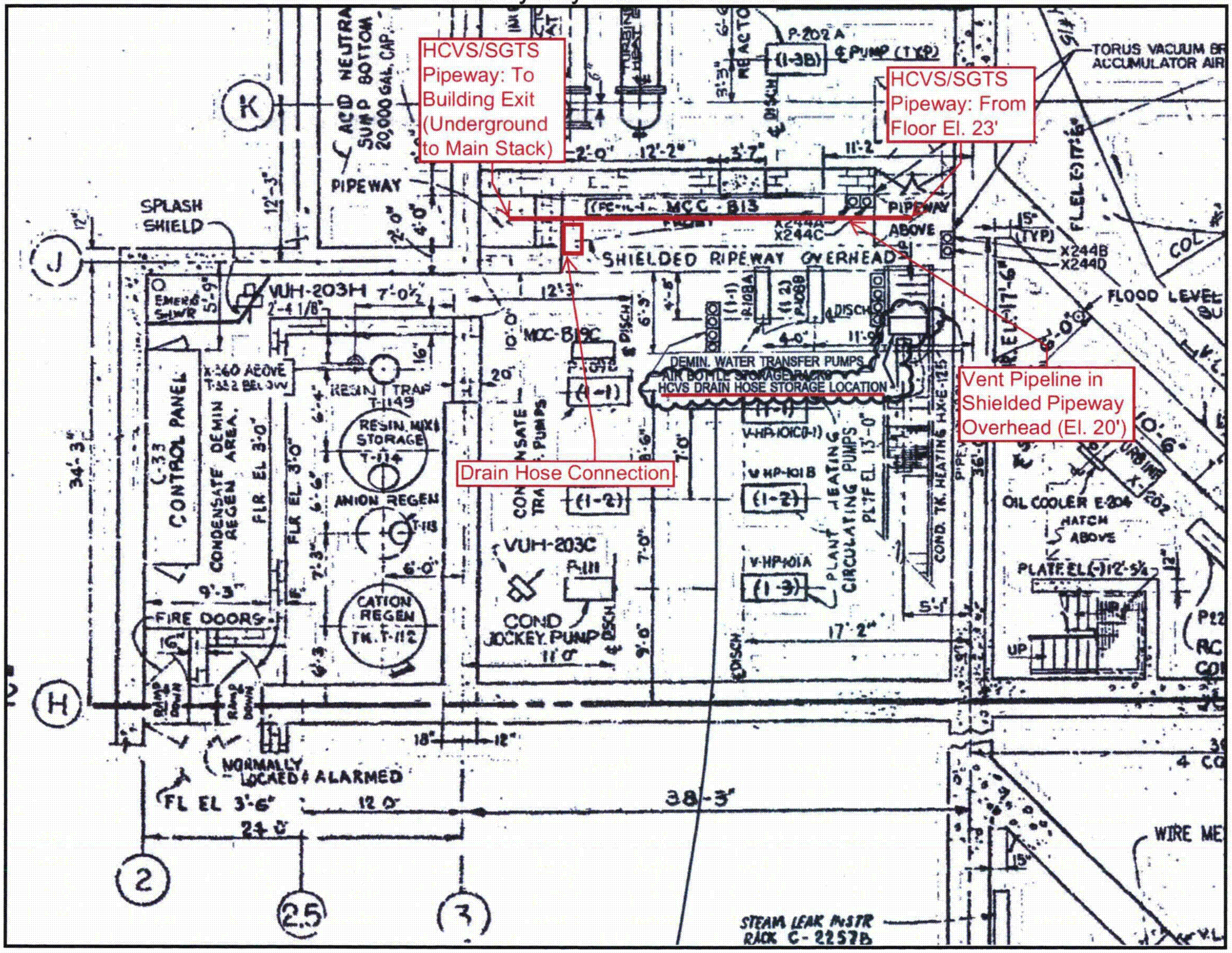


Sketch 3B: HCVS Local Panel Location (Detail A)
Reactor Building Plan - Elevation 23'



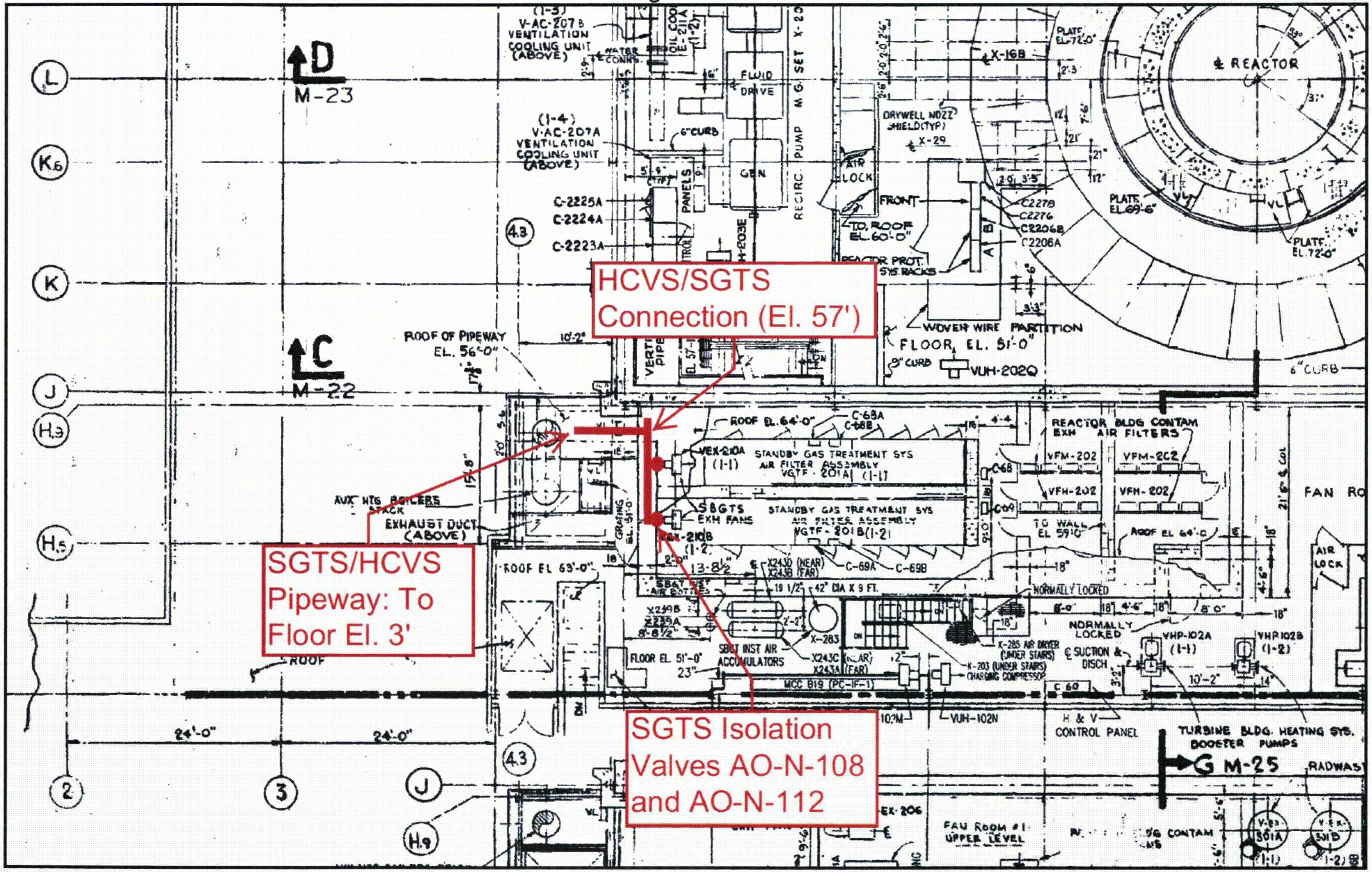
Sketch 3C: Condensate Drain Hose Connection

Auxiliary Bay Plan - Elevation 3'



Sketch 3D: Standby Gas Treatment System Isolation

Reactor Building Plan - Elevation 51'



Attachment 4: Failure Evaluation Table

Table 4A: Wet Well HCVS Failure Evaluation Table

Failures specific to the vent valve internals are not described in this table. NRC Order EA-13-109 does require the HCVS design to be single failure proof and it is recognized that the failure of the vent valve internals will ultimately result in the inability to vent. This table, however, represents that the rest of the PNPS HCVS design to be reliable with adequate alternate actions to compensate for failures in the rest of the HCVS supporting subsystems.

Functional Failure Mode	Failure Cause	Alternate Action	Failure with Alternate Action Impact on Containment Venting?
Failure of Vent to Open on Demand	Vent valves fail to open due to loss of permanent station electrical power (125 VDC). (A) ELAP	All failures: No action needed, alternate power sources provided by station batteries and HCVS dedicated batteries for a minimum of 24 hours.	No
Failure of Vent to Open on Demand	Vent valves fail to open due to loss of primary alternate electrical DC power source (MCR): (A) Battery depletion or Switch 2 (MCR) fails to make contact (B) Switch 1A/B fails to make contact	(A) Secondary alternate power source provided by second set of HCVS dedicated batteries located at the ROS. (B) All failures: Operate vent valves using pneumatic backup at HCVS Local Panel. No DC power is required for this operation.	No

Functional Failure Mode	Failure Cause	Alternate Action	Failure with Alternate Action Impact on Containment Venting?
Failure of Vent to Open on Demand	Vent valves fail to open due to loss of secondary alternate electrical DC power source (HCVS Local Panel): (A) Battery depletion or Switch 3 (HCVS Local Panel) to make contact (B) Switch 1A/B fails to make contact	(A) Spare terminal battery connections will be available in the MCR and at the HCVS Local Panel. (B) All failures: Operate vent valves using pneumatic backup at HCVS Local Panel. No DC power is required for this operation.	No
Failure of Vent to Open on Demand	Vent valve fails to open due to failure of solenoid valve to operate.	Operate vent valves using pneumatic backup at HCVS Local Panel. No DC power is required for this operation.	No
Failure of Vent to Open on Demand	Valves fail to open due to failure of permanent plant pneumatic air supply: (A) ELAP	No action needed, air can be supplied by dedicated pneumatic nitrogen tanks, which are sufficient for at least 5 cycles of AO-5042B and AO-5025 valves over first 24 hours.	No
Failure of Vent to Open on Demand	Valves fail to open due to failure of alternate pneumatic air supply: (A) Bottle depletion (B) Supply regulator fails to open	(A) Replace nitrogen bottles at HCVS Local Panel. (B) Second bottle/regulator supply automatically supplies required air.	No

Functional Failure Mode	Failure Cause	Alternate Action	Failure with Alternate Action Impact on Containment Venting?
Failure of Vent to Close on Demand	Valves fail to close using alternate pneumatic air supply due to: (A) Regulator fails open (B) Solenoid valve fails to operate	(A) Relief valve prevents failure of supply tubing or actuator. Isolate air supply and vent actuator using manual valves at the HCVS Local Panel. (B) Isolate air supply and vent actuator using manual valves at the HCVS Local Panel.	No

Attachment 5: References

1. *Regulatory Documents*
   A. Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989
   B. Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
   C. Order EA-12-050, Reliable Hardened Containment Vents, dated March 12, 2012
   D. Order EA-12-051, Reliable SFP Level Instrumentation, dated March 12, 2012
   E. Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated June 6, 2013
   F. JLD-ISG-2012-01, Compliance with Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated August 29, 2012
   G. JLD-ISG-2012-02, Compliance with Order EA-12-050, Reliable Hardened Containment Vents, dated August 29, 2012
   H. JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013
   I. 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
   J. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 1, dated August 2012
   K. NEI 13-02, Industry Guidance for Compliance with Order EA–13–109, Revision 0, Dated November 2013
   L. NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, Revision 0, dated March 2014
   M. NEI 14-01, Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Revision 0, dated March 2014
   N. NEI FAQ HCVS-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations
   O. NEI FAQ HCVS-02, HCVS Dedicated Equipment
   P. NEI FAQ HCVS-03, HCVS Alternate Control Operating Mechanisms
   Q. NEI FAQ HCVS-04, HCVS Release Point
   R. NEI FAQ HCVS-05, HCVS Control and 'Boundary Valves'
   S. NEI FAQ HCVS-06, FLEX Assumptions/HCVS Generic Assumptions
   T. NEI FAQ HCVS-07, Consideration of Release from Spent Fuel Pool Anomalies
   U. NEI FAQ HCVS-08, HCVS Instrument Qualifications
   V. NEI FAQ HCVS-09, Use of Toolbox Actions for Personnel
   W. NEI White Paper HCVS-WP-01, HCVS Dedicated Power and Motive Force
   X. NEI White Paper HCVS-WP-02, HCVS Cyclic Operations Approach
   Y. NEI White Paper HCVS-WP-03, Hydrogen/CO Control Measures
   Z. NEI White Paper HCVS-WP-04, FLEX/HCVS Interactions

AA. NURGEG/CR-7110, Rev. 1, State-of-the-Art Reactor Consequence Analysis Project, Volume 1: Peach Bottom Integrated Analysis
BB. 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
CC. PNPS FSAR, Rev. 28, Final Safety Analysis Report

2. *Standards*
   A. IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,

3. *Overall Integrated Plans*
   A. PNPS EA-12-049 (FLEX) Overall Integrated Implementation Plan, Rev 0, February 2013
   B. PNPS EA-12-050 (HCVS) Overall Integrated Implementation Plan, Rev 0, February 2013
   C. PNPS EA-12-051 (SFP LI) Overall Integrated Implementation Plan, Rev 0, February 2013

4. *Calculations*
   A. Calculation M1380, Rev. 0, PNPS FLEX Strategy Thermal-Hydraulic Analysis
   B. Calculation M1386, Rev. 0, HCVS Vent Valves AO-5025 and AO-5042B Backup N2 System
   C. Calculation M1388, Rev. 0, HCVS Unintended Cross Flow Evaluation
   D. Calculation M1387, Rev. 0, Hardened Containment Vent Capacity

5. *Procedures*
   A. Procedure 5.4.6, Rev. 45, Primary Containment Venting and Purging Under Emergency Conditions
   B. Procedure 5.3.21, Rev. 29, Bypassing Selected Interlocks

6. *Reports*
   A. SL-012329, Rev. 0, Hardened Containment Vent Order EA-12-050 to EA-13-109 Gap Analysis

7. *Engineering Change Packages*
   A. EC-42259, Rev. 0, PNPS FLEX Strategy Master EC For Beyond-Design-Basis External Events (BDBEEs) Diverse & Flexible Coping Strategy (Flex) Implementation
   B. EC-46812, Rev. 0, HCVS Modification To Support Flex Implementation (Base EC)
   C. EC-48820, Rev. 0, FLEX - HCVS N2 Supply Modification (Child EC)
   D. EC-48822, Rev. 0, FLEX - Rupture Disc PSD-8180 Removal (Child EC)
   E. EC-48823, Rev. 0, FLEX - Steam Trap in HCVS Drain Line Modification (Child EC)
   F. EC-45555, Rev. 0, FLEX Alternate Power To 125VDC and 250VDC Battery Chargers (Base EC)

G. EC-45556, Rev. 0, FLEX Alternative Power To 120VAC Panels (Base EC)

8. *Drawings*
   A. M227SH1, Rev. 60, P&ID Containment Atmospheric Control System
   B. M294, Rev. 27, Heating Ventilation & Air Conditioning Standby Gas Treatment System Control Diagram
   C. M210, Rev. 71, P&ID Air Ejection and Off-Gas System
   D. E401SH2, Rev. 0, Schematic Diagram Containment Atmospheric Control System
   E. E401SH3, Rev. 1, Schematic Diagram Containment Atmospheric Control System

9. *System Design Basis Documents*
   A. SDBD-09A, Rev. 1, Primary Containment Atmospheric Control System

Attachment 6: Changes/Updates to this Overall Integrated 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
	No OIP Open Items	