Part 3: Boundary Conditions for Dry Well Vent

NOTE: This is a Phase 2 Action - Information will be included in a future update.

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

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

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

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

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

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

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.

Part 3: Boundary Conditions for Dry Well Vent

NOTE: This is a Phase 2 Action - Information will be included in a future update.

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

Details:

Provide a brief description of Procedures / Guidelines:

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

Identify modifications:

List modifications and describe how they support the HCVS Actions.

Key Venting Parameters:

List instrumentation credited for the venting HCVS Actions.

Notes:

Part 4: Programmatic Controls, Training, Drills and Maintenance

Identify how the programmatic controls will be met.

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

Ref: EA-13-109 Section 3.1, 3.2 / NEI 13-02 Section 6.1.2, 6.1.3, 6.2

Program Controls:

The HCVS venting actions will include:

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

Procedures:

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

The HCVS procedures will be developed and implemented following the plants 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 electrical supplies,
- directions for sustained operation, including the storage location of portable equipment,
- training on operating the portable equipment, and
- testing of portable equipment

Susquehanna will establish and document provisions for out-of-service requirements of the HCVS and compensatory measures.

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

Part 4: Programmatic Controls, Training, Drills and Maintenance

- If for up to 90 consecutive days, the primary or alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If for up to 30 days, the primary and alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If the out of service times exceed 30 or 90 days as described above, the following actions will be performed:
  - The condition will 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 HCVS will receive necessary training in the use of plant procedures for system operations. 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, (reference NEI 12-06) 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 14-01 as codified in NTTF Recommendation 8 and 9 rulemaking

The Licensee should demonstrate use of the HCVS system in drills, tabletops, or exercises as follows:

Part 4: Programmatic Controls, Training, Drills and Maintenance

- Hardened containment vent operation on normal power sources (no ELAP).
- During FLEX demonstrations (as required by EA-12-049: Hardened containment vent operation 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 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.

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 permanent installed equipment should be maintained in a manner that is consistent with assuring that it performs its function when required.
    - HCVS permanently installed equipment should be subject to maintenance and testing guidance provided to verify proper function.

Part 4: Programmatic Controls, Training, Drills and Maintenance

- 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.

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

Table 4-1: Testing and Inspection Requirements

Description	Frequency
Cycle the HCVS valves and the interfacing system valves not used to maintain containment integrity.	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

Part 4: Programmatic Controls, Training, Drills and Maintenance			
	Validate the HCVS operating procedures by conducting an open/close test of the HCVS control logic from its control panel and ensuring that all interfacing system valves move to their proper (intended) positions.	Once 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**
- **Long term use equipment acquisition timeline**
- **Training completion for the HCVS Actions**

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

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

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

Milestone	Target Completion Date	Activity Status	Comments *{Include date changes in this column}*
Hold preliminary/conceptual design meeting	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
U2 Design Engineering Complete	Mar. 2016		

Part 5: Milestone Schedule

Submit 6 Month Status Report	Jun. 2016		
U2 Operations Procedure Changes Developed	Dec. 2016		
U2 Maintenance Procedures Developed	Dec. 2016		
Submit 6 Month Status Report	Dec. 2016		
U2 Training Complete	Dec. 2016		
U2 Implementation Outage	Feb. 2017		
U2 Procedure Changes Active	Mar. 2017		
U2 Walk Through Demonstration/Functional Test	Mar. 2017		
U1 Design Engineering Complete	Mar. 2017		
Submit 6 Month Status Report	Jun. 2017		
Submit 6 Month Status Report	Dec. 2017		
U1 Operations Procedure Changes Developed	Dec. 2017		
U1 Maintenance Procedures Developed	Dec. 2017		
U1 Training Complete	Dec, 2017		
U1 Implementation Outage	Feb. 2018		
U1 Procedure Changes Active	Mar. 2018		
U1 Walk Through Demonstration/Functional Test	Mar. 2018		
Submit Completion Report	May 2018		

Attachment 1: HCVS Portable Equipment				
List portable equipment	*BDBEE Venting*	*Severe Accident Venting*	*Performance Criteria*	*Maintenance / PM requirements*
Nitrogen Cylinders	X	X	TBD	Check periodically for pressure, replace or replenish as needed
FLEX Electrical Generator	X	X	TBD	Per Response to EA-12-049

Attachment 2: Sequence of Events Timeline

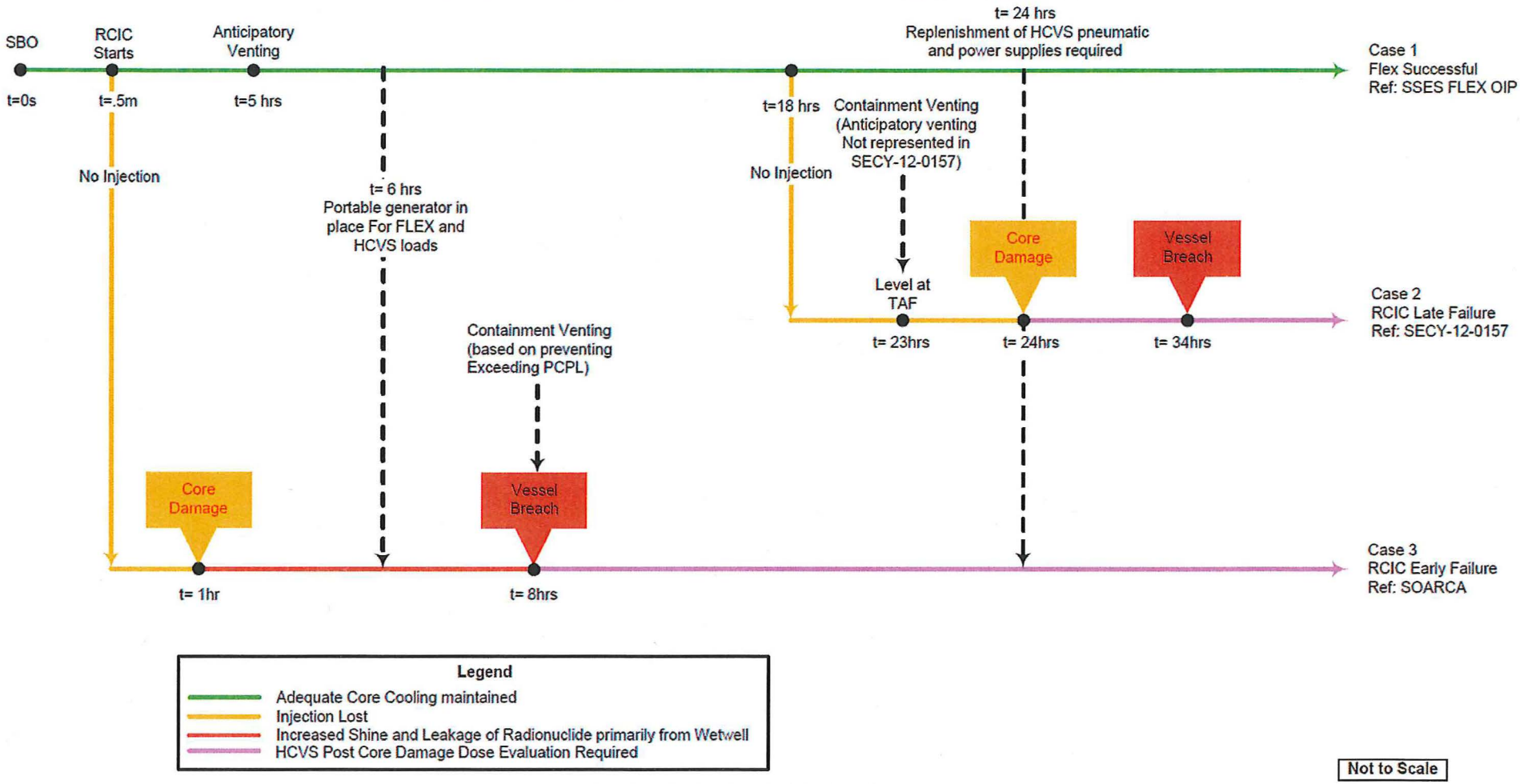


Table 2: Wet Well HCVS Timeline

Attachment 3: Conceptual Sketches

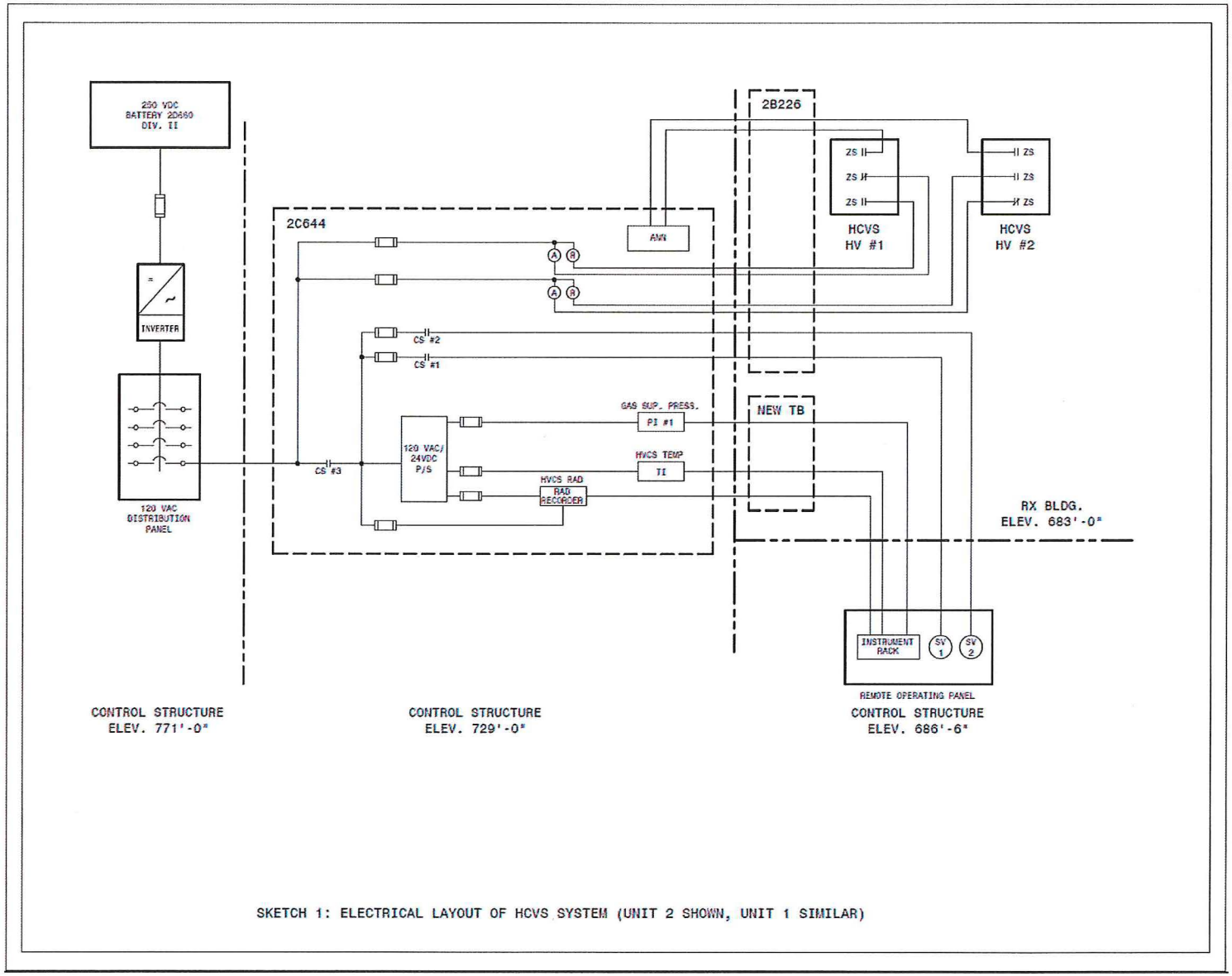
Sketch 1: Electrical Layout of System

Sketch 2: P&ID Layout of HCVS

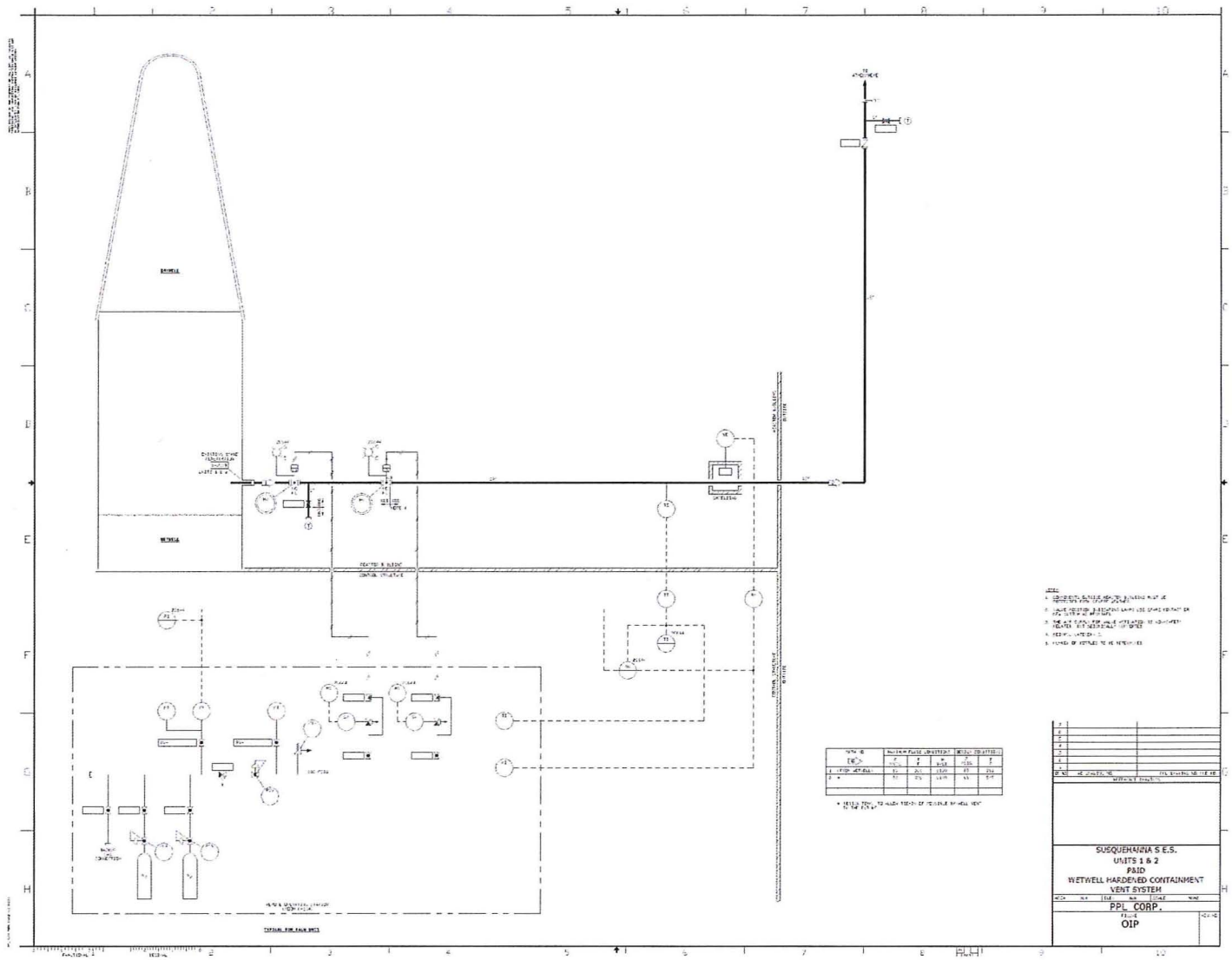
Sketch 3: Piping routing for vent path Unit 2

Sketch 4: Remote Operating Station Layout

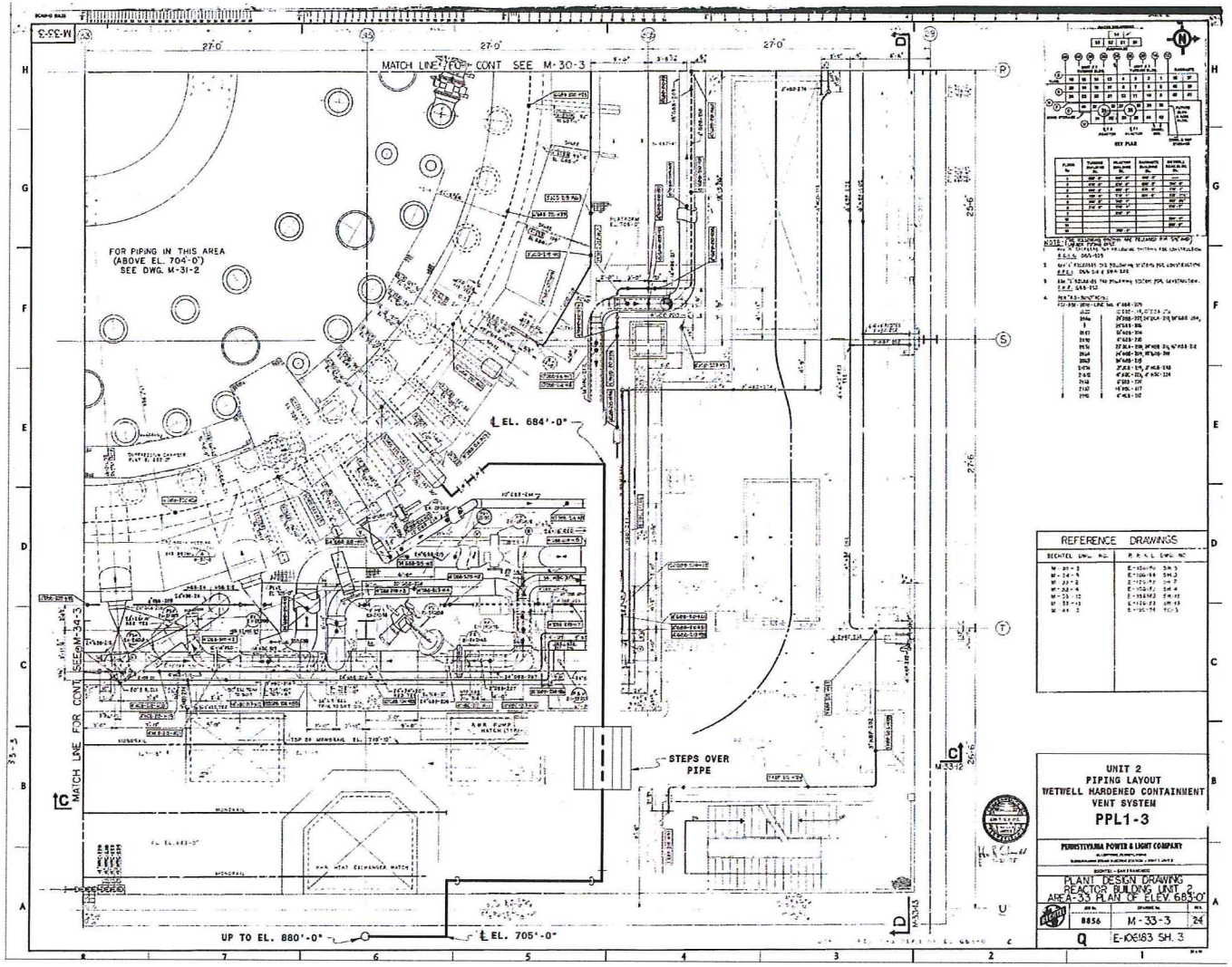
Sketch 5: Plant Layout



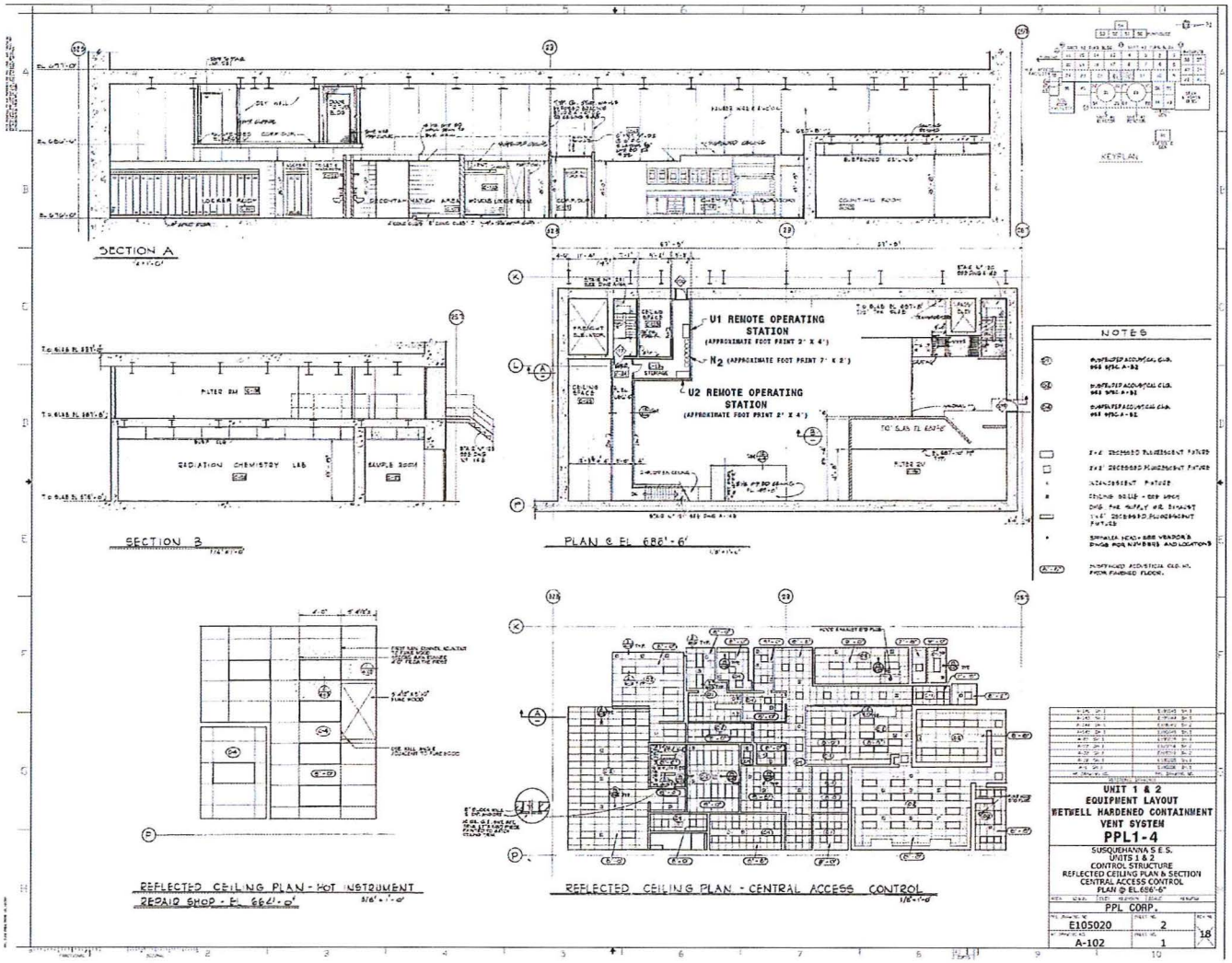
SKETCH 1: ELECTRICAL LAYOUT OF HCVS SYSTEM (UNIT 2 SHOWN, UNIT 1 SIMILAR)



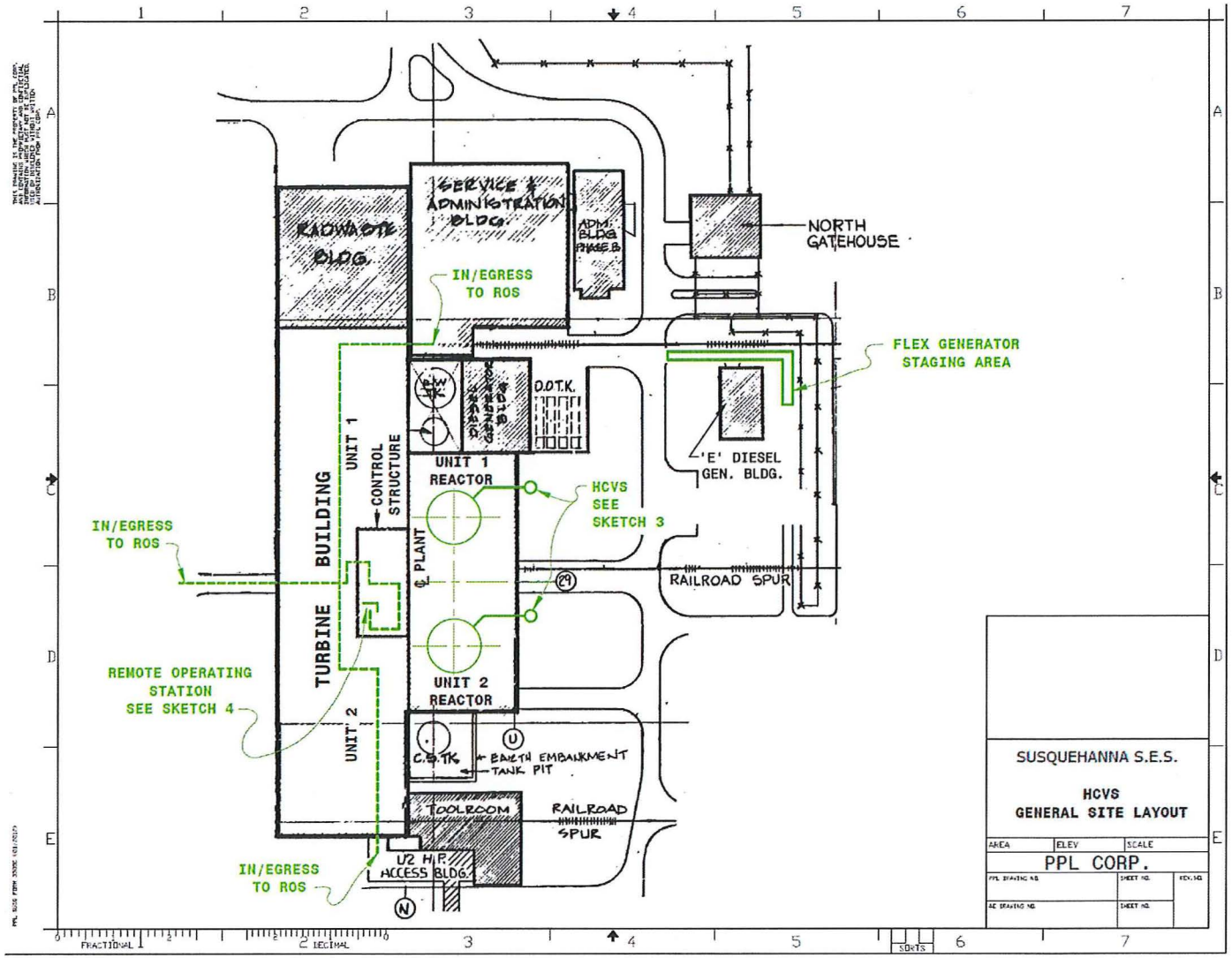
Sketch 2: Layout of Wetwell HCVS, Unit 2 (Unit 1 similar)



Sketch 3: Pipe Routing of Wetwell HCVS, Unit 2 (Unit 1 similar)



Sketch 4: HCVS Remote Operating Station Location



Sketch 5: Plant Layout

Attachment 4: Failure Evaluation Table

Table 4A: Wet Well HCVS Failure Evaluation Table

Functional Failure Mode	**Failure Cause**	**Alternate Action**	**Failure with Alternate Action Impact on Containment Venting?**
Failure of Vent to Open on Demand	Valves fail to open due to loss of AC power to solenoid valves or complete loss of HCVS power supply	Open three way valve provided at ROS to bypass solenoid valves. This action directs gas supply to the valves to open valves on demand	No
Failure of Vent to Open on Demand	Valve fails to open due to failure of solenoid valve	Open three way valve provided at ROS to bypass failed solenoid valve.	No
Failure of Vent to Open on Demand	Valves fail to open due to loss of HCVS power supply (long term)	Recharge station service batteries with 4 kV FLEX generators, considering severe accident conditions	No
Failure of Vent to Open on Demand	Valves fail to open due to loss of alternate pneumatic air supply (long term)	Tie-in portable gas supply to pneumatic system supporting HCVS valves, replace portable supply, as needed.	No
Failure of Vent to Open/close on Demand	Valve fails to open/close due to valve or valve actuator failure	No alternate action credited since valves may not be accessible.	Yes

Attachment 5: References

1. Generic Letter 89-16, Installation of a Hardened Wetwell Vent, dated September 1, 1989
2. Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
3. Order EA-12-050, Reliable Hardened Containment Vents, dated March 12, 2012
4. Order EA-12-051, Reliable SFP Level Instrumentation, dated March 12, 2012
5. Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated June 6, 2013
6. JLD-ISG-2012-01, Compliance with Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events, dated August 29, 2012
7. JLD-ISG-2012-02, Compliance with Order EA-12-050, Reliable Hardened Containment Vents, dated August 29, 2012
8. JLD-ISG-2013-02, Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents, dated November 14, 2013
9. NRC Responses to Public Comments, Japan Lessons-Learned Project Directorate Interim Staff Guidance JLD-ISG-2012-02: Compliance with Order EA-12-050, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents, ADAMS Accession No. ML12229A477, dated August 29, 2012
10. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 1, dated August 2012
11. NEI 13-02, Industry Guidance for Compliance with Order EA–13–109, Revision 0, dated November 2013
12. NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, Revision 0, dated March 2014
13. NEI 14-01, Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Revision 0, dated March 2014
14. NEI FAQ HCVS-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations
15. NEI FAQ HCVS-02, HCVS Dedicated Equipment
16. NEI FAQ HCVS-03, HCVS Alternate Control Operating Mechanisms
17. NEI FAQ HCVS-04, HCVS Release Point
18. NEI FAQ HCVS-05, HCVS Control and 'Boundary Valves'
19. NEI FAQ HCVS-06, FLEX Assumptions/HCVS Generic Assumptions
20. NEI FAQ HCVS-07, Consideration of Release from Spent Fuel Pool Anomalies

21. NEI FAQ HCVS-08, HCVS Instrument Qualifications
22. NEI FAQ HCVS-09, Use of Toolbox Actions for Personnel
23. NEI White Paper HCVS-WP-01, HCVS Dedicated Power and Motive Force
24. NEI White Paper HCVS-WP-02, HCVS Cyclic Operations Approach
25. NEI White Paper HCVS-WP-03, Hydrogen/CO Control Measures
26. NEI White Paper HCVS-WP-04, FLEX/HCVS Interactions
27. IEEE Standard 344-1975, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,
28. SSES EA-12-049 (FLEX) Overall Integrated Implementation Plan, Rev 0, February 2013
29. SSES EA-12-050 (HCVS) Overall Integrated Implementation Plan, Rev 0, February 2013
30. SSES EA-12-051 (SFP LI) Overall Integrated Implementation Plan, Rev 0, February 2013
31. EO-000-103 – Primary Containment Control
32. EP-PS-004 – Primary Containment and RPV Venting

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

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

Attachment 7: List of Overall Integrated Plan Open Items

Open Item	Action	Comment
1	Confirm suppression pool heat capacity	Confirmatory Action
2	Deployment under severe accident conditions will be confirmed for the deployment of the FLEX generators credited to re-energize battery chargers.	Confirmatory Action
3	Deployment under severe accident conditions will be confirmed for the deployment of the supplemental nitrogen bottles.	Confirmatory Action
4	The gas supply will be sized to support HCVS operation for a minimum of 24 hours (a minimum of 12 valve cycles of valve operation is assumed, consistent with recommendations in HCVS-WP-02). This design assumption will require future validation in the design phase of this project.	Confirmatory Action
5	An assessment of temperature and radiological conditions will be performed to ensure that operating personnel can safely access and operate controls at the remote operating station, based on time constraints listed in Attachment 2.	Confirmatory Action
6	Evaluate viable options to address Hydrogen detonation concerns in HCVS piping to meet the requirements of EA-13-109, Section 1.2.11 and incorporate in HCVS design. SSES will determine the method to be deployed once NRC review of HCVS-WP-03 is complete.	Confirmatory Action
7	An evaluation will be performed to confirm the HCVS power supply can support HCVS operation for a minimum of 24 hours.	Confirmatory Action