BWROG RHV Template

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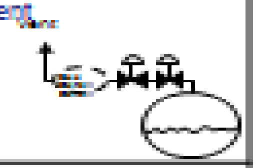
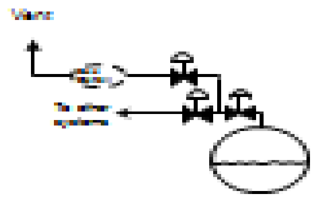
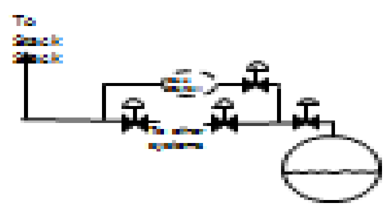
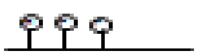
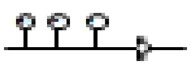
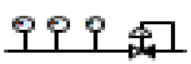
System Description - Overview

- The Hardened Containment Vent System (HCVS) *[is / will be]* designed to mitigate loss-of-decay-heat removal by providing sufficient containment venting capability to limit containment pressurization and maintain core cooling capability. The vent is designed with sufficient capacity to accommodate decay heat input equivalent to *[1% of current licensed thermal power (CLTP) / {if a power uprate is planned, state instead} 1% of XXXX MWt which accounts for a ZZ% planned power uprate above the current licensed thermal power (CLTP).]* Thus, the hardened vent capacity *[is / will be]* adequate to relieve decay heat for a prolonged station blackout (SBO) event. The HCVS is intended for use as one element of core damage prevention strategies
- The HCVS flow path from the containment to an elevated release point is shown in the simplified diagram below. No ductwork *[is / will be]* used in the flow path.

Simplified Diagrams

System Connection Options
Option 1 – Dedicated wetwell vent 
Option 2 – Wetwell vent interfacing with another wetwell-connected system, dedicated release point 
Option 3 – Wetwell vent interfacing with another wetwell-connected system and with an existing release point 

Detail Options
Option A – No control valve or rupture disk 
Option B – Rupture disk 
Option C – Control valve 

System Description - Equipment and Components

HCVS Mechanical Components

a) Containment isolation piping, valves and controls - The HCVS vent piping and supports up to and including the second containment isolation are designed in accordance with existing design basis. Containment isolation valves are provided consistent with the plants containment isolation valve design basis. The valves are [*air-operated valves (AOV) with be operated by a DC powered solenoid valve (SOV)*,] and can be operated from switches in the *[Main Control Room / specify alternate control location].*

b) Other system valves and piping - The HCVS piping and supports downstream of the second containment isolation valve, including valve actuator pneumatic supply components, *[has been / will be]* designed/analyzed to conform to the requirements consistent with the applicable design codes for the plant and to ensure functionality following a design basis earthquake.

c) *<u>{IF there are interconnected systems}</u> [Interface valves provide positive isolation to the interconnected systems] [The HCVS shares part of its flow path with the Standby Gas Treatment System (SGTS). Prior to initiating the HCVS, the valve to the SGTS must be isolated. However, since SGTS isolation valve[(s) are AOV(s)], with [air-to-open and spring to shut,] the containment isolation signal will automatically isolate the valve(s) upon any abnormal containment pressure.]*

d) *<u>{List any site specific mechanical components, i.e., rupture disks}</u>[Rupture disk(s) of [#] psig capability are provided in the vent line downstream of the CIVs. Rupture disks can be intentionally breached from the [Main Control Room / alternate control location] as directed by applicable procedures.]*

System Description - Equipment and Components - cont.

Instrumentation to monitor the status of the HCVS

a) Instrumentation indications *[will be / are]* available in the *[Main Control Room / alternate control location].* *{also describe if you have local readout capability}*

b) Effluent radiation monitor is located *[inside/outside]* the vent line.

c) HCVS vent flow path valves position indication, temperature and pressure instrumentation will monitor the status of the HCVS to aid the operator to ensure verification of proper venting operation. A failure of the position indication instrumentation would not prevent opening and closing the valve. *{add description of power and/or pneumatic pressure status if including MCR or local control station}*

System Description - Equipment and Components - cont.

Support systems

a) Normal power for the HCVS valve solenoids is provided from the *[essential DC batteries source / specify site specific].*

b) Back-up power is provided from *[a permanently installed DC power source / portable generator / specify site specific]* for at least *[24 / X]* hours.

c) Motive air/gas supply for HCVS operation *[will be / is]* adequate for at least the first *[24 / X]* hours during operation under prolonged SBO conditions provided from the *[system]*.

d) FLEX equipment will have the capability to provide back-up support equipment for reliable HCVS operation. Power is supplied from *[describe FLEX arrangements for supplying power for HCVS]*. Motive air/gas for HCVS operation is supplied from *[describe FLEX arrangements for supplying motive air for HCVS]*. Power for instrumentation is supplied form *[describe FLEX arrangements for supplying AC power]*.

System Description– System Control

- Active: *[Control valves and/or CIVs]* are operated in accordance with EOPs to control containment pressure. The HCVS *[will be / is]* designed for *[#]* open/close cycles under prolonged SBO conditions. Controlled venting at *[#]* psig will be permitted in the revised EPGs.*{add specific site details if available} [e.g., Separate control circuits are provided for the valves that are shared between the Containment Purge System and HCVS for each function. The Containment Purge System control circuit will be used during all design basis operating modes and maintains the ability of the valves to operate (open) for normal operation or automatically close when a containment isolation signal is received. A second, independent, circuit without any automatic controls will allow the containment isolation valves to be opened regardless of existing containment isolation signals.]*
- Passive: Inadvertent actuation protection is provided by *{describe the feature credited for protection of inadvertent actuation}*
  - *[Rupture disk(s) are provided in the vent line downstream of the CIVs. Rupture disks can be intentionally breached from the [Main Control Room / alternate control location] as directed by applicable procedures. The CIVs must be open to permit vent flow.*
    - » *OR –*
  - *Key lock switches located in the [Main Control Room / alternate control location] as directed by applicable procedures.*
    - » *OR –*
  - *Other]*

EA-050 1.1.1 Requirement

- The operation of the HCVS *[has been / will be]* designed to minimize the reliance on operator actions in response to hazards identified in NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*. Immediate operator actions can be completed by Reactor Operators and include remote-manual initiation from the HCVS control station. The operator actions required to open a vent path are – see next page:

EA-050 1.1.1 Requirement – cont.

Operator Actions Necessary to Vent the Containment during an SBO	
*Vent containment with containment pressure **above** the rupture disc rupture pressure*	*Vent containment with containment pressure **below** the rupture disc rupture pressure*
1. Open 1st containment Isolation Valves from MCR	*1. Open valve to pressurize area between rupture disc and closed valve from MCR*
2. Open 2nd containment Isolation Valves from MCR	*2. Shut valve to pressurize area between rupture disc and closed valve from MCR*
3. Open HCVS control valve from MCR	*3. Open 1st containment Isolation Valves from MCR*
	4. Open 2nd containment Isolation Valves from MCR
	5. Open HCVS control valve from MCR

EA-050 1.1.1 Requirement – cont.

- Remote-manual is defined in this report as a non-automatic power operation of a component and does not require the operator to be at or in close proximity to the component. No other operator actions are required to initiate venting under primary procedural protocol.

- The HCVS *[has been / will be]* designed to allow initiation, control, and monitoring of venting from *[the Main Control Room (MRC) / or specify the alternate location]*. This location minimizes plant operators' exposure to adverse temperature and radiological conditions and is protected from hazards assumed in NEI 12-06.

EA-050 1.1.1 Requirement – cont.

- Permanently installed power and motive air/gas capable will be available to support operation and monitoring of the HCVS for *[24 / x] {if less than 24 hours then use NEI 12-06 justification basis}* hours. *{State if you are crediting FLEX to sustain power. If so, state that the response to NRC EA-12-049 will demonstrate the capability for FLEX efforts to maintain the power source. If taking exception to 24 hour requirement, state how actions can be completed in a timely manner. For example:} "Permanently installed equipment will supply air and power to HCVS for 8 hours. As described in NEI 12-06, allowance is provided for operator actions to restore power. Staffing studies when completed in response to NRC EA-12-049 will demonstrate that sufficient manpower is available to ensure that supplemental DC control power can be established and portable air compressors aligned to supply air to the control valves via the quick-connect within that eight hour period when supplemental ERO staff is available."]*
- After *[24 / x]* hours, available personnel will be able to connect supplemental motive air/gas to the HCVS. Connections for supplementing electrical power and motive air/gas required for HCVS *[will be / are]* located in accessible areas with reasonable protection per NEI 12-06 that minimize personnel exposure to adverse conditions following a prolonged SBO and venting. Connections *[will be / are]* pre-engineered quick disconnects to minimize manpower resources.

EA-050 1.1.2 Requirement

- The HCVS design allows initiating and then operating and monitoring the HCVS from *[the Main Control Room (MRC) / or specify the alternate location]*, which minimizes plant operators' exposure to adverse temperature and radiological conditions and *[the Main Control Room (MRC) / or specify the alternate location]*is protected from hazards assumed in NEI 12-06.
- In order to minimize operator exposure to temperature excursions due to the impact of the prolonged SBO (i.e., loss of normal and emergency building ventilation systems and/or containment temperature changes) procedures will not require access to suppression pool (wetwell) area and exposure to extreme occupational hazards for normal and backup operation of electrical and pneumatic systems.
- Connections for supplemental equipment needed for sustained operation *[are / will be]* located in accessible areas protected from severe natural phenomena and minimize exposure to occupational hazards. Tools required for sustained operation, such as [portable headlamps / or specify lighting alternatives like flashlights or portable lights] and connection specific tooling will be pre-staged in the NEI 12-06 storage locations. *{if you are locating connections or tooling in radiological areas then address the potential need for shielding}*
- Neither temporary ladders nor scaffold are required to access these connections or storage locations.

EA-050 1.1.3 Requirement

- The HCVS *[is / will be]* designed for reliable remote-manual operation. Operators will not be required to access the suppression pool area. The HCVS is designed to minimize system cross flow, prevent steam flow into unintended areas, provide containment isolation, and provide reliable and rugged performance as discussed below for Order requirements 1.2.6.
- Dose rates are evaluated consistent with the assumption that the HCVS is to be used for the prevention of core damage. Shielding or other alternatives to facilitate manual actions are not required for operation of the vent under these conditions since no core damage has occurred.

EA-050 1.2.1 Requirement

- The HCVS [*wetwell and/or drywell*] path is designed for venting steam/energy at a nominal capacity of 1% of [*3950*] MWt thermal power at pressure of *[YY]* psig. {*Insert any clarification statements of this power level if it is not the current licensed power level.*} This pressure is the lower of the containment design pressure and the PCPL value]. *[The thermal power of 3900 MWt assumes a power uprate of 15% above the currently licensed thermal power of 3400 MWt.]*
- The 1% value assumes that the suppression pool pressure suppression capacity is sufficient to absorb the decay heat generated during the first 3 hours. The vent would then be able to prevent containment pressure from increasing above the containment design pressure. As part of the detailed design, the duration of suppression pool decay heat absorption [*has been / will be*] confirmed.

EA-050 1.2.2 Requirement

- The HCVS design allows initiating and then operating and monitoring the HCVS from [*the Main Control Room (MCR) / specify the alternate location*]. This location is also protected from adverse natural phenomena. {*It is felt that the industry needs to address all items even if you select the MCR as control point, because the 5 items are not just for alternate control locations*}
  - The HCVS flow path valves are [*air-operated valves (AOV) with air-to-open and spring-to-shut. Opening the valves requires energizing a DC powered solenoid operated valve (SOV) and providing motive air/gas. The detailed design will provide a permanently installed DC power source and motive air/gas supply]* adequate for the first 24 hours {*state if you are crediting FLEX to sustain DC power (If that option is selected during the detailed design, state that the response to NRC EA-12-049 will demonstrate the capability under the FLEX effort to maintain the DC source)*}. The initial stored motive air/gas will allow for a minimum of five valve operating cycles; however, the detailed design will determine the number of required valve cycles for the first 24-hours [*and, the initial stored motive air/gas will support the required number of valve cycles. Each of the valves that must be opened will be provided with two SOVs arranged such that energizing either SOV from the dedicated DC power supply can open the valve. The SOVs are the only electrical component required for valve functionality that is located inside the area considered not-accessible following a prolonged SBO. The AOVs do not require torque switches or limit switches.]*

EA-050 1.2.2 Requirement – cont.

- An assessment of temperature and radiological conditions that operating personnel may encounter both in transit and locally at the controls {*controls not in the MCR*} *[has been / will be]* performed.
- All permanently installed HCVS equipment, including any connections required to supplement the HCVS operation during a prolonged SBO (electric power, N2/air) [*are / will be]* located in areas reasonably protected from defined hazards from NEI 12-06.
- All valves required to open the flow path are designed for remote manual operation following a prolonged SBO, i.e., no valve operation via handwheel, reach–rod or similar means that requires close proximity to the valve. *{If you have exception include here and mention any use of shielding}* Any supplemental connections will be pre-engineered to minimize man-power resources and any needed portable equipment will be reasonably protected from defined hazards from NEI 12-06.
- Access to the locations described above will not require temporary ladders or scaffolding.

• *If the design provides any additional design features, add the information.* To address a failure of a HCVS valve to open due to a failure of a DC circuit (SOV, etc.), the design will provide a contingency for remotely operating the HCVS valve by [energizing a back-up SOV from an accessible location / supplying an independent air supply / or site specific description]. (Response to Public Comment Answer 3 for section 1.2.2.)

EA-050 1.2.3 Requirement

- The features that prevent inadvertent actuation are [*site specific list, example two CIV's in series powered from different division, a rupture disk, or key lock switches*].
- {Response if dedicated containment isolation valves are used} [*The HCVS containment isolation valves are normally closed AOVs that are air-to-open and spring-to-shut. The DC SOV must be energized to allow the motive air to open the valve. The MCR switch for each of the two in-series valves will have a key-locked switch. Although the same DC and motive air source will be used, separate control circuits including switches will be used for the two redundant valves to address single point vulnerabilities that may cause the flow path to inadvertently open.*]
- {*Response if "shared" containment isolation valves are used*} [*The HCVS uses the Containment Purge System containment isolation valves for containment isolation. These containment isolation valves are AOVs and they are air-to-open and spring-to-shut. A DC SOV must be energized to allow the motive air to open the valve. Although these valves are shared between the Containment Purge System and the HCVS, separate control circuits are provided to each valve for each function. This can be done by providing a second SOV which is electrically independent of the first SOV and arranging the SOVs so that energizing either SOV will open the valve. Specifically:*
  - *The Containment Purge System control circuit will be used during all "design basis" operating modes including all design basis transients and accidents. The containment isolation signal will automatically de-energize the SOV on this circuit causing the AOVs to shut.*
  - *A second, independent circuit will be used to operate these valves but only following an event that requires operating the HCVS. This circuit will not have any automatic controls including high containment pressure isolation signal, but the HCVS control circuit will have a key-locked switch for each of the two in-series valves to address inadvertent operation. Turning the switch to "open" will energize the second SOV opening the valve. Both valves will use the same DC for opening in the HCVS function, separate control circuits including switches will be used for the two redundant valves to address single point vulnerabilities that may cause the flow path to inadvertently open.]*
- 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/will be*] designed to provide features to prevent inadvertent actuation due to a design error, equipment malfunction, or operator error such that any credited containment accident pressure (CAP) that would provide net positive suction head to the emergency core cooling system (ECCS) pumps will be available (inclusive of a design basis loss-of-coolant accident (DBLOCA)). *{If the unit does credit CAP, state specific CAP requirement that is maintained.}*

EA-050 1.2.4 Requirement

- The design of the HCVS will have temperature and pressure monitoring downstream of the [*last isolation valve / rupture disc*]. All flow path valves will have open and closed position indication. These HCVS indications will be at or near the same location as the valve control switches, which is [*the MCR / alternate location*]. Motive air/gas pressure and power source voltage [*will be / is*] monitored. {*describe any use of alternate monitoring*}
- Power for the instrumentation will be from the same source used for the [*SOVs*] used to position the [AOVs]. Refer to the response to 1.2.2 for discussion on the power.
- The approximate range for the temperature indication will be [*50 F to 600 F {needs to match 2 times design temperature}*]. The approximate range for the pressure indication will be [0 psig to 120 *{needs to match 2 times design pressure from 1.2.1}]* psig. The upper limits are approximately twice the required design containment temperature and pressure. The ranges will be finalized when the detailed design and equipment specifications are prepared.
- The detailed design [*will / does*] address the radiological, temperature, pressure, flow induced vibration (if applicable) and internal piping dynamic forces, humidity/condensation and seismic qualification requirements. Assumed radiological conditions are those expected after a prolonged SBO (without fuel failure), which will bound normal plant conditions. {*use of your plants Harsh Environment standards could be easily justified*}

EA-050 1.2.5 Requirement

- The HCVS RMS will be dedicated to the HCVS. The approximate range of the radiation monitoring system (RMS) is *[0.1 mrem/hr to 1000 mrem/hr].* This range is considered adequate to determine core integrity per the NRC Responses to Public Comments document.

- The detector will be physically mounted [*on the* outside of the piping, accounting for the pipe wall thickness shielding in order *to provide a measurement of the radiation level on the inside of the HCVS piping / inside of the HCVS piping*]. The radiation level will be indicated at the [*MCR / alternate location*]. The RMS will be powered from the same source as all other powered HCVS components. Refer to the response to 1.2.2 for discussion on sustainability of the power.

EA-050 1.2.6 Requirement

- *{For Multi unit site responses} [The HCVS for all units are [fully independent of each other / {If the units vent to a common chimney, clarify that the chimney does not affect the HCVS capacity "independence" between units} .] Therefore, the capacity at each unit is independent of the status of the other unit.]*
- *{Response if a dedicated HCVS flow path is used}* The HCVS [*at each unit]* has no interfacing systems. This eliminates any potential for inter-system leakage through valves and dampers, and it eliminates the need to isolate interfacing system valves.

  -OR-

- *{Response if "shared" containment isolation valves are used}* The HCVS shares part of its flowpath with the Standby Gas Treatment System (SGTS). Prior to initiating the HCVS, the valve to the SGTS must be isolated. However, since SGTS isolation valve*[(*s) *are AOV(s)]*, with [*air-to-open and spring to shut*,] the containment isolation signal will automatically isolate the valve*(s)* upon any abnormal containment pressure. The detailed design phase will review the valve*(s)* to determine if the inter-system valves can meet the required leakage criteria under the limiting HCVS design conditions. If required, the valve*(s)* will be replaced or upgraded.

EA-050 1.2.7 Requirement

- The detailed design for the HCVS *[will address / addresses]* condensation accumulation resulting from intermittent venting. In situations where total elimination of condensation is not feasible, the HCVS *[will be / is]* designed to accommodate condensation, including allowance for applicable water hammer loads.
- The HCVS Containment Isolation Valves will be tested in accordance with the licensing and design basis for the plant. The HCVS past the outboard Containment Isolation Valve will be tested in conformance to one of the ISG methods. The test pressure shall be based on the HCVS design pressure, *[60{needs to match design pressure from 1.2.8}]* psig. Permissible leakage rates for the interfacing valves will be within the requirements of American Society of Mechanical Engineers Operation and Maintenance of Nuclear Power Plants Code (ASME OM) – 2009, Subsection ISTC – 3630 (e) (2), or later edition of the ASME OM Code. When testing the HCVS volume, the allowed leakage will not exceed the sum of the interfacing valve leakages as determined from the ASME OM Code unless a higher leakage acceptance value is justified to the NRC.
- The test types and frequencies will conform to the ISG 1.2.7 Table “Testing and inspection Requirements” with the clarification that “Leak test the HCVS” applies to the HCVS boundary valves. *[Rupture disks will be replaced at manufactures recommendations not to exceed 10 years, per the NRC Responses to Public Comments document.]*

EA-050 1.2.8 Requirement

- The HCVS design pressure is [60] psig and design temperature is *[310 F]*. The HCVS design pressure is the higher of the containment design pressure and the PCPL value. The HCVS design temperature is the saturation temperature corresponding to the design pressure.
- The piping, valves, and valve actuators will be designed to withstand the dynamic loading resulting from the actuation of the HCVS, including piping reaction loads from valve opening, concurrent hydrodynamic loads from SRV discharges to the suppression pool, and potential for water hammer from accumulation of condensation during multiple venting cycles.

EA-050 1.2.9 Requirement

- The HCVS discharge path uses the plant stack.
    - Or –
- The HCVS discharge path *[will be / is]* routed to a point above any adjacent structure *[state any exceptions, for example: The cooling towers have a higher elevation but they are not adjacent to the Reactor Building. The Station's chimney is an adjacent structure, but it is impractical to raise the HCVS above the chimney.]* This discharge point is *[just above that unit's Reactor Building] such that* the release point will vent away from ventilation system intake and exhaust openings, main control room location, location of FLEX, access routes required following a prolonged SBO, and emergency response facilities; however, these must be considered in conjunction with other design criteria (e.g., flow capacity) and pipe routing limitations, to the degree practical. *{If the vent line is mounted to the side of the reactor building plenum, a demonstration should evaluate the possibility of any cross flow back into the plant via the exhaust plenum. Refer to the NRC Responses to Public Comments document}{Describe basis for routing that does not avoid these areas, i.e., current routing, best position considering all items}*
- The detailed design *[will / addresses]* missile protection from external events as defined by NEI 12-06 for the outside portions of the selected release stack or structure. *{this should be a design element using reasonable protection features for the screened in hazards from NEI 12-06, engineering should use design basis missile hazards methods in the calculations. Examples could be specific details from the sites FSAR.}*

EA-050 2.1 Requirement

- The HCVS vent path up to and including the second containment isolation piping and supports are designed in accordance with existing design basis. The HCVS system design will not preclude the containment isolation valves, including the vent valve from performing their intended containment isolation function consistent with the design basis for the plant. Associated actuators, position indication, and power supplies are designed consistent with the design basis of the plant as required to maintain their design basis function of maintaining the valves closed. The control circuit will allow operation of the HCVS from its control panel regardless of containment isolation signals.

EA-050 2.2 Requirement

- The HCVS components downstream of the second containment isolation valve *[and components that interface with the HCVS]* are routed in seismically qualified structures *[except for components x, y, z. For those components, the structure [has been / will be] analyzed for seismic ruggedness to ensure that any potential failure would not adversely impact the function of the HCVS or other safety related structures or components {i.e. seismic category II over category I criteria}]*.
- 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 / will be]* designed/analyzed to conform to the requirements consistent with the applicable design codes (e.g., Non-safety, Cat 1, SS and 300# ASME or B31.1, NEMA 4, etc.) for the plant and to ensure functionality following a design basis earthquake.
- The HCVS instruments, including valve position indication, 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.

EA-050 3.1 Requirement

- Procedures will be established for system operations when normal and backup power is available, and during prolonged SBO 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 and backup power supplies,
  - directions for sustained operation(reference NEI 12-06), including the storage location of portable equipment,
  - training on operating the portable equipment, and
  - testing of portable equipment
- *[{<u>If the plant utilizes CAP for ECCS pump NPSH</u>} The procedures will state the impact on and ECCS pumps NPSH (loss of CAP) during a DBLOCA due to an inadvertent opening of the vent.]*
- Licensees will establish provisions for out-of-service requirements of the HCVS and compensatory measures. The following provisions will be documented in the *[Technical Requirements Manual (TRM) / similar document]*:
  - The allowed unavailability time for the HCVS shall not exceed 30 days during modes 1, 2, and 3.
  - If the unavailability time exceeds 30 days
    - The condition will entered into the corrective action system,
    - The HCVS availability will be restored in a manner consistent with plant procedures,
    - A cause assessment will be performed to prevent future unavailability for similar causes.

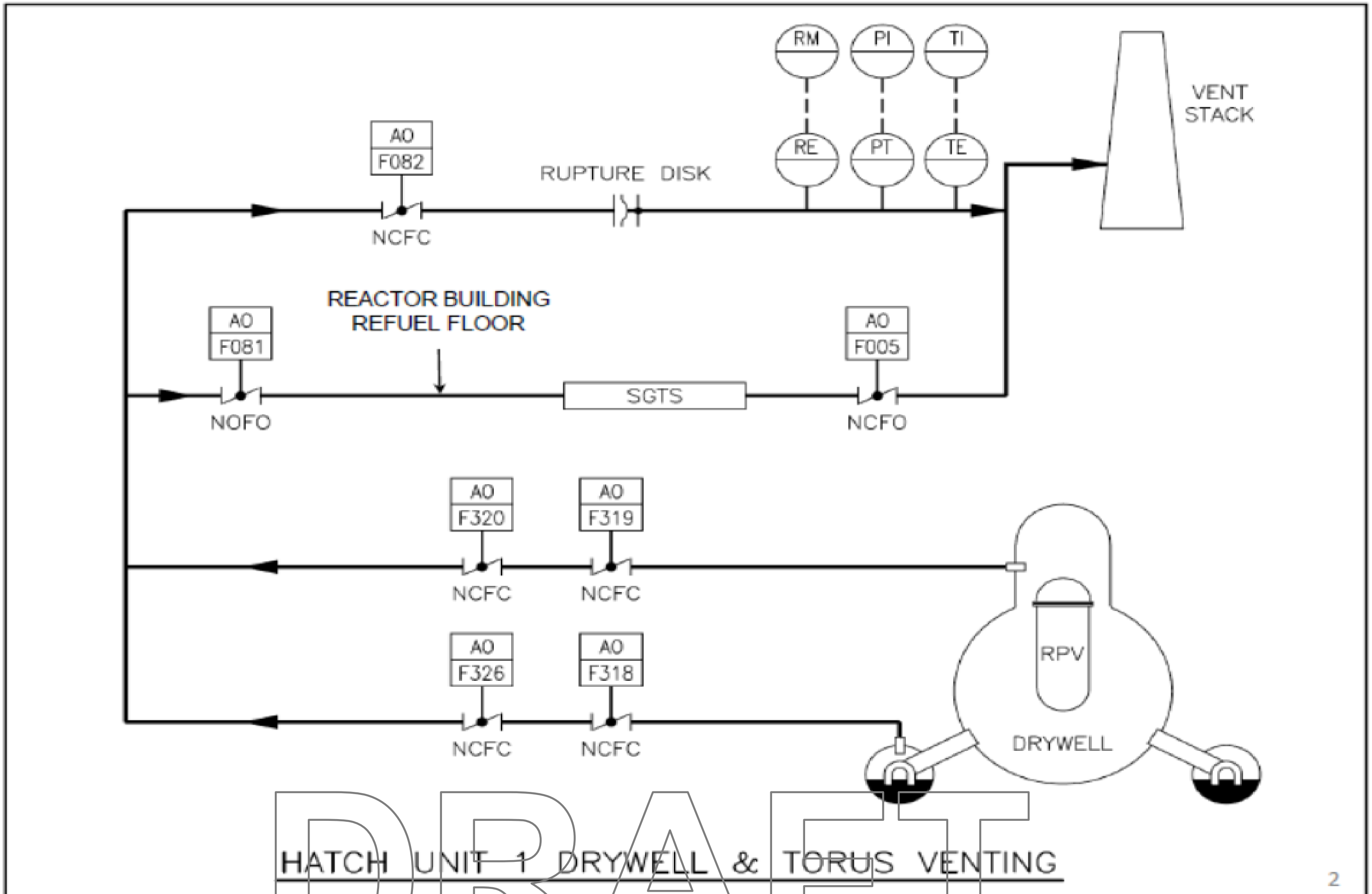
EA-050 3.2 Requirement

- 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 prolonged SBO conditions. The training will be refreshed on a periodic basis and as any changes occur to the HCVS. The training will utilize the systematic approach to training.
- In addition, per NEI 12-06, all personnel on-site will be available to supplement trained personnel.

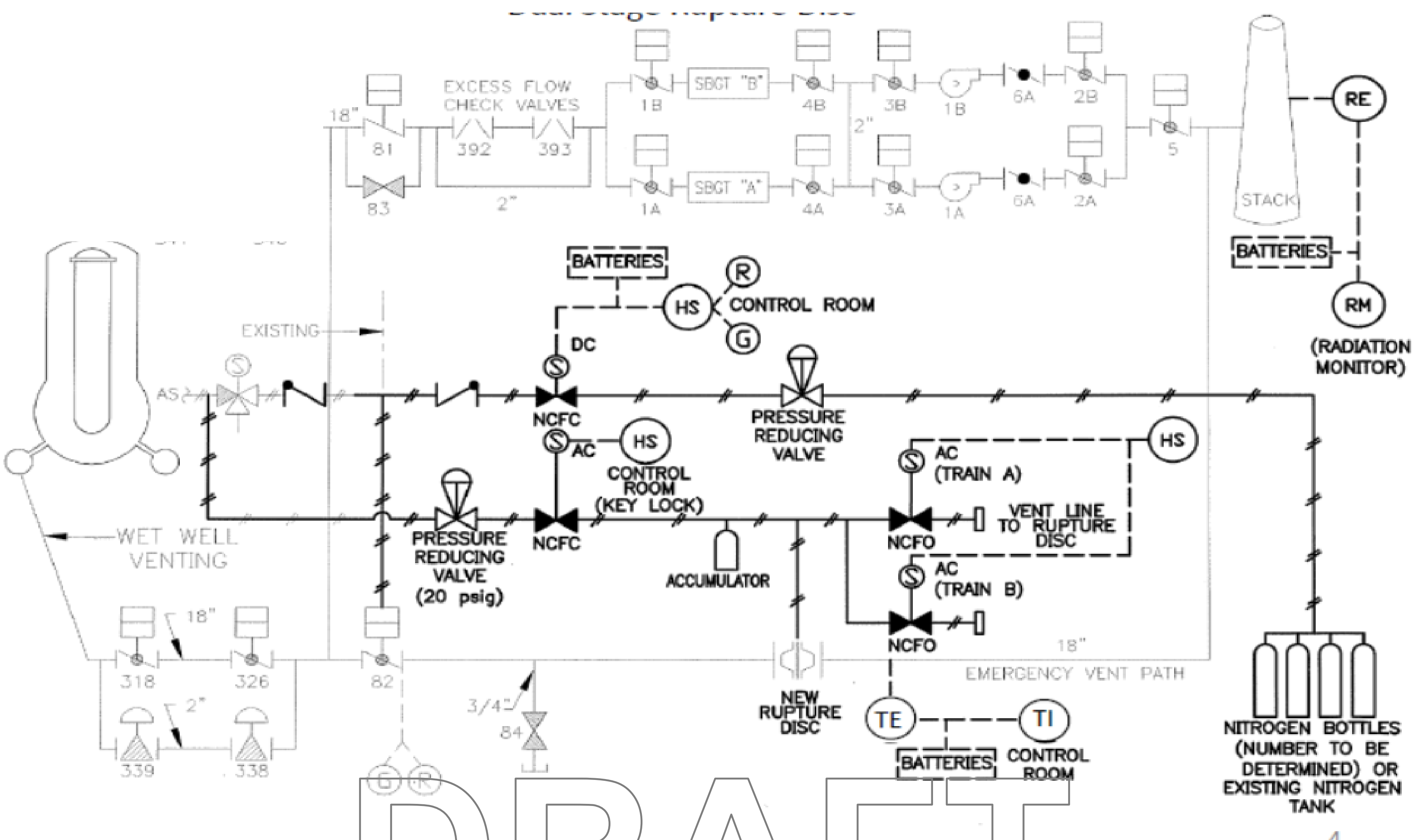
Example Schedule

Original Target Date	Activity	Status
Oct. 2012	Hold preliminary/conceptual design meeting	Complete
Oct. 2012	Submit 60 Day Status Report	Complete
Feb. 2013	Submit Overall Integrated Implementation Plan	Complete
Aug 2013	Submit 6 Month Status Report	
Aug. 2013	*U2 Design Major Material On-site*[1]	*{Include date changes in this column}*
Feb. 2014	Submit 6 Month Status Report	
Jun. 2014	*U2 Design Change Package Issued from Design*	
Aug. 2014	Submit 6 Month Status Report	
Sept. 2014	*Procedure Changes Training Material Complete*	
Feb. 2015	*Procedure Changes Active*	
Feb. 2015	*U2 Design Change Implemented*	
Feb. 2015	*U2 Demonstration/Functional Test*	
Feb. 2015	Submit 6 Month Status Report	
Jun. 2015	*U1 Design Change Package Issued from Design*	
Aug. 2015	*U1 Design Major Material On-site*	
Aug. 2015	Submit 6 Month Status Report	
Feb 2016	*U1 Design Change Implemented*	
Feb. 2016	*U1* Demonstration/Functional Test	
Feb. 2016	Submit Completion Report	

Example Figures



Example Figures



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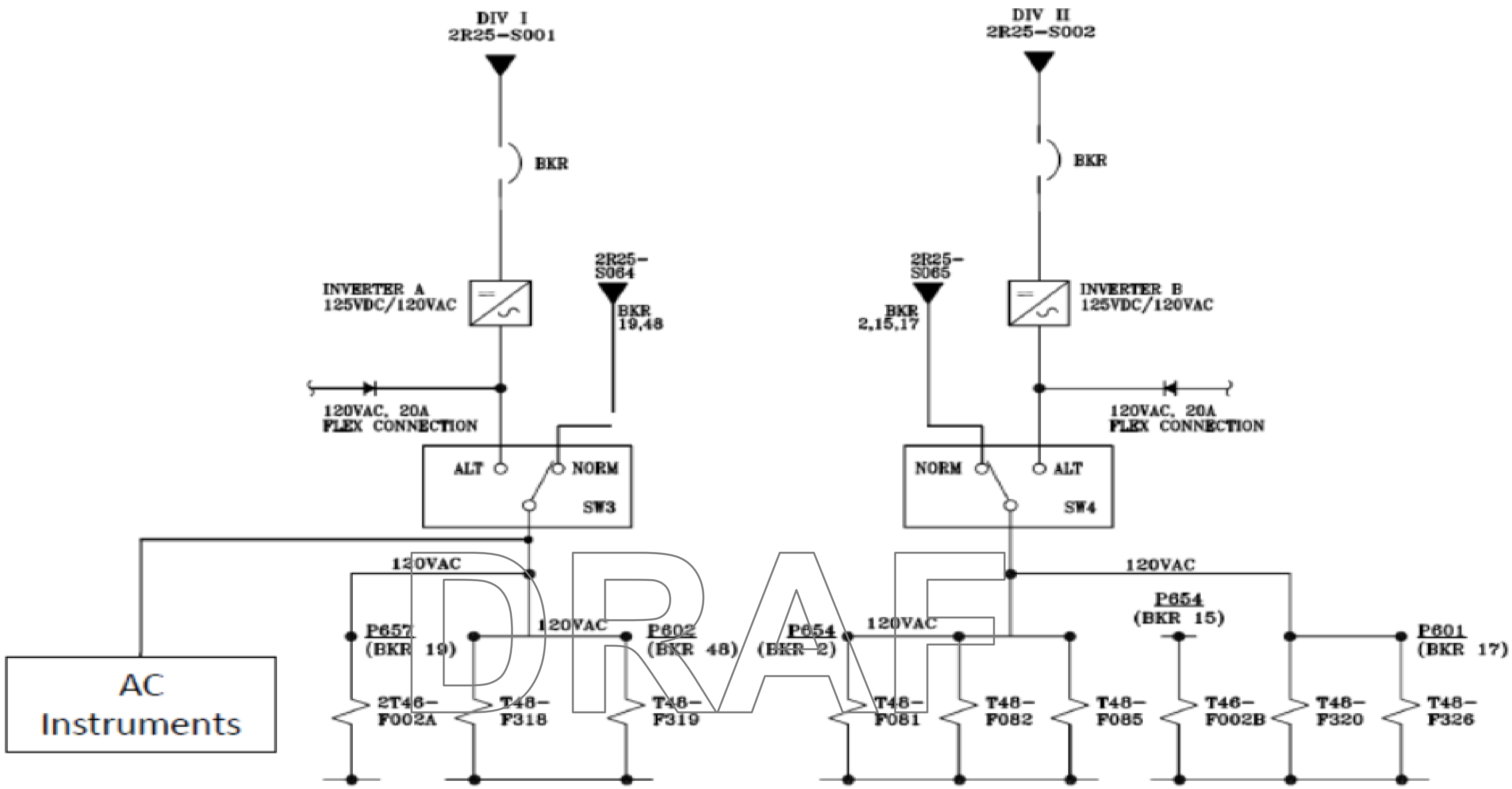
Example Figures

DC Power with Inverter for AC Solenoids and Instruments



Response to NRC Comments

HCVS Flow Path Actions			
Desired Result	**Primary Action**	**Possible Failure**	**Alternate Action**
Open system Air operated valves (AOVs) with air control by solenoid valves	Open system valves with MCR hand switch with essential DC Power to the solenoid and a permanent compressed gas supply independent of AC power to the valve. DC Power will be maintained for 24 hours with FLEX generators	Loss of DC Power.	{use one of the following or alternative plan} Use bypass gas line around the solenoid {manual valve not located near the valve}. {or} Portable battery to be connected remotely from the valve
		Loss air compressed gas.	Use portable bottles to supply compressed gas.
		Solenoid valve failure.	{use one of the following or alternative plan} Use alternate solenoid {or} Use bypass gas line around the solenoid {manual valve not located near the valve}. {or} Use reach rod to open AOV.
Close valve to other systems	Valves closes as instrument air is lost	NA - Valves Fail Close Valve	NA
HCVS system monitoring instrumentation	Powered by essential DC Power. DC Power will be maintained for 24 hours with FLEX generators	Loss of DC Power.	{use one of the following or alternative plan} NA – instrumentation not critical to establishing a flow path {or} Portable battery to be connected remotely from the instruments.

Response to NRC Comments

HCVS Use/Reference to NEI 12-06 as endorsed by JLD-ISG-12-01

NEI 12-06 as endorsed by JLD-ISG-12-01 is referenced in the EA-12-050 HCVS Template in 3 primary ways for consistency of approach in responding to the Fukushima Near-Term Task Force Tier 1 Orders:

- Evaluation of acceptable phase 2 actions to provide alternate motive force to the HCVS (1.3 FLEX Objectives & Guiding Principles, 2.1 Establish Baseline Coping Capability, 3.2.2 Minimum Baseline Capabilities)
- Scoping of the hazards to consider in engineering evaluations of system design features (Section 2.2 Determine Applicable Extreme External Hazards)
- Evaluations for "reasonable protection" (11.3 Equipment Storage) and "rugged" (11.2 Equipment Design) features