UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 25, 2015

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
P.O. Box 1295 / BIN B038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT UNITS, 1 AND 2 - INTERIM STAFF EVALUATION RELATING TO OVERALL INTEGRATED PLAN IN RESPONSE TO PHASE 1 OF ORDER EA-13-109 (SEVERE ACCIDENT CAPABLE HARDENED VENTS) (TAC NOS. MF4479 AND MF4480)

Dear Mr. Pierce:

By letter dated June 6, 2013, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-13-109, "Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Sever Accident Conditions" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13143A334). By letter dated June 27, 2014 (ADAMS Accession No. ML14178B464), Southern Nuclear Operating Company, Inc. (SNC), submitted its Overall Integrated (OIP) Plan for Edwin I. Hatch Nuclear Plant (Hatch), Units 1 and 2 in response to Phase 1 of Order EA-13-109. By letter dated December 31, 2014 (ADAMS Accession No. ML15049A513), SNC submitted its first six-month status report for Hatch in response to Order EA-13-109. Any changes to the compliance method will be reviewed as part of the ongoing audit process.

SNC's OIP for Hatch appears consistent with the guidance found in Nuclear Energy Institute (NEI) 13-02, Revision 0, endorsed, in part, by the NRC's Japan Lessons-Learned Project Directorate (JLD) Interim Staff Guidance (ISG) JLD-ISG-2013-02, as an acceptable means for implementing the requirements of Phase 1 of Order EA-13-109. This conclusion is based on satisfactory resolution of the open items detailed in the enclosed Interim Staff Evaluation. This evaluation only addressed consistency with the guidance. Any plant modifications will need to be conducted in accordance with plant engineering change processes and consistent with the licensing basis.

If you have any questions, please contact Charles Norton, Project Manager, at 301-415-7818 or at Charles.Norton@nrc.gov.

Sincerely,

Mandy K Halter

Mandy K. Halter, Acting Chief
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Interim Staff Evaluation

cc w/encl: Distribution via Listserv

UNITED STATES
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INTERIM STAFF EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO ORDER EA-13-109 PHASE 1, MODIFYING LICENSES

WITH REGARD TO RELIABLE HARDENED

CONTAINMENT VENTS CAPABLE OF OPERATION UNDER

SEVERE ACCIDENT CONDITIONS

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

EDWIN I. HATCH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-321 AND 50-366

1.0 INTRODUCTION

By letter dated June 6, 2013, the U.S. Nuclear Regulatory Commission (NRC or Commission) issued Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" [Reference 1]. The order requires licensees to implement its requirements in two phases. In Phase 1, licensees of boiling-water reactors (BWRs) with Mark I and Mark II containments shall design and install a venting system that provides venting capability from the wetwell (WW) during severe accident (SA) conditions. In Phase 2, licensees of BWRs with Mark I and Mark II containments shall design and install a venting system that provides venting capability from the drywell under severe accident conditions, or, alternatively, those licensees shall develop and implement a reliable containment venting strategy that makes it unlikely that a licensee would need to vent from the containment drywell during severe accident conditions.[1]

The purpose of the staff's review, as documented in this interim staff evaluation (ISE) is to provide an interim evaluation of the Overall Integrated Plan (OIP) for Phase 1 of Order EA-13-109. Phase 1 of Order EA-13-109 requires that BWRs with Mark I and Mark II containments shall design and install a severe accident capable hardened containment vent system (HCVS)

[1] This ISE only addresses the licensee's plans for implementing Phase 1 of Order EA-13-109. While the licensee's OIP makes reference to Phase 2 issues, those issues are not being considered in this evaluation. Issues related to Phase 2 of Order EA-13-109 will be considered in a separate ISE at a later date.

Enclosure

that provides venting capability from the wetwell during severe accident conditions, using a vent path from the containment wetwell to remove decay heat, vent the containment atmosphere (including steam, hydrogen, carbon monoxide, non-condensable gases, aerosols, and fission products), and control containment pressure within acceptable limits. The HCVS shall be designed for those accident conditions (before and after core damage) for which containment venting is relied upon to reduce the probability of containment failure, including accident sequences that result in the loss of active containment heat removal capability or extended loss of alternating current (ac) power (ELAP).

By letter dated June 27, 2014 [Reference 2], Southern Nuclear Operating Company, Inc. (SNC, the licensee) provided the OIP for Edwin I. Hatch Nuclear Plant, Units 1 and 2 (Hatch) for compliance with Phase 1 of Order EA-13-109. The OIP describes the licensee's currently proposed modifications to systems, structures, and components, new and revised guidance, and strategies that it intends to implement in order to comply with the requirements of Phase 1 of Order EA-13-109.

2.0 REGULATORY EVALUATION

Following the events at the Fukushima Dai-ichi nuclear power plant on March 11, 2011, the NRC established a senior-level agency task force referred to as the Near-Term Task Force (NTTF). The NTTF was tasked with conducting a systematic and methodical review of the NRC regulations and processes and determining if the agency should make improvements to these programs in light of the events at Fukushima Dai-ichi. As a result of this review, the NTTF developed a set of recommendations, documented in SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011 [Reference 3]. These recommendations were enhanced by the NRC staff following interactions with stakeholders. Documentation of the NRC staff's efforts is contained in the Commission's Staff Requirements Memorandum (SRM) for SECY-11-0124, "Recommended Actions to be Taken without Delay from the Near-Term Task Force Report," dated September 9, 2011 [Reference 4], and SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 [Reference 5].

As directed by the Commission's SRM for SECY-11-0093 [Reference 6], the NRC staff reviewed the NTTF recommendations within the context of the NRC's existing regulatory framework and considered the various regulatory vehicles available to the NRC to implement the recommendations. SECY-11-0124 and SECY-11-0137 established the NRC staff's prioritization of the recommendations based upon the potential safety enhancements.

On February 17, 2012, the NRC staff provided SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami" [Reference 7], to the Commission, including the proposed order to implement the installation of a reliable HCVS for Mark I and Mark II containments. As directed by SRM-SECY-12-0025 [Reference 8], the NRC staff issued Order EA-12-050, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents" [Reference 9], which required licensees to install a reliable HCVS for Mark I and Mark II containments.

While developing the requirements for Order EA-12-050, the NRC acknowledged that questions remained about maintaining containment integrity and limiting the release of radioactive materials if the venting systems were used during severe accident conditions. The NRC staff presented options to address these issues for Commission consideration in SECY-12-0157, "Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments" [Reference 10]. In the SRM for SECY-12-0157 [Reference 11], the Commission directed the staff to issue a modification to Order EA-12-050, requiring 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." The NRC staff held a series of public meetings following issuance of SRM SECY-12-0157 to engage stakeholders on revising the order. Accordingly, by letter dated June 6, 2013, the NRC issued Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Performing under Severe Accident Conditions."

Order EA-13-109, Attachment 2, requires that BWRs with Mark I and Mark II containments have a reliable, severe-accident capable HCVS. This requirement shall be implemented in two phases. In Phase 1, licensees of BWRs with Mark I and Mark II containments shall design and install a venting system that provides venting capability from the wetwell during severe accident conditions. Severe accident conditions include the elevated temperatures, pressures, radiation levels, and combustible gas concentrations, such as hydrogen and carbon monoxide, associated with accidents involving extensive core damage, including accidents involving a breach of the reactor vessel by molten core debris. In Phase 2, licensees of BWRs with Mark I and Mark II containments shall design and install a venting system that provides venting capability from the drywell under severe accident conditions, or, alternatively, those licensees shall develop and implement a reliable containment venting strategy that makes it unlikely that a licensee would need to vent from the containment drywell during severe accident conditions.

On November 12, 2013, the Nuclear Energy Institute (NEI) issued NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 0 [Reference 12] to provide guidance to assist nuclear power reactor licensees with the identification of measures needed to comply with the requirements of Phase 1 of the HCVS order. On November 14, 2013, the NRC staff issued Japan Lessons-Learned Project Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2013-02, "Compliance with Order EA-13-109, 'Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Performing under Severe Accident Conditions'" [Reference 13], endorsing, in part, NEI 13-02, Revision 0, as an acceptable means of meeting the requirements of Phase 1 of Order EA-13-109, and published a notice of its availability in the *Federal Register* (FR) [78 FR 70356]. Licensees are free to propose alternate methods for complying with the requirements of Phase 1 of Order EA-13-109.

By letter dated May, 27, 2014 [Reference 14], the NRC notified all BWR Mark I and Mark II Licensees that the staff will be conducting audits of the implementation of Order EA-13-109. This letter described the audit process to be used by the staff in its review of the information contained in licensee's submittals in response to Phase 1 of Order EA-13-109.

3.0 <u>TECHNICAL EVALUATION</u>

Hatch is a dual unit General Electric BWR, each unit having an independent reactor building and a Mark I primary containment system. Hatch is upgrading the existing torus hardened vent (THV) on each unit to a HCVS to meet the requirements of Phase 1 of Order EA-13-109. Each unit's existing THV consists of a drywell and wetwell vent that combine in a common header. The THV on each unit is routed to the main plant stack. The OIP describes THV upgrades to meet the requirements of Order EA-13-109 that include: the addition of remote operating stations (ROS), electrical power supply upgrades, pneumatic valve motive force upgrades, and instrumentation upgrades. The OIP also describes evaluations of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment. In addition, the OIP describes programmatic changes that include procedures, training, drills and maintenance.

3.1 GENERAL INTEGRATED PLAN ELEMENTS AND ASSUMPTIONS

3.1.1 Evaluation of Extreme External Hazards

Extreme external hazards for Hatch were evaluated in the Hatch OIP in response to Order EA-12-049 (Mitigation Strategies) [Reference 15]. In the Hatch ISE relating to Mitigation Strategies [Reference 16], NRC staff documented an analysis of SNC's extreme external hazards evaluation. The following extreme external hazards screened in: Seismic, Extreme Cold- Ice Only, High Wind, and Extreme High Temperature. The following extreme external hazards screened out: External Flooding and Extreme Cold except for Ice. Based on Hatch not excluding any external hazard from consideration, the NRC Staff determined that SNC appears to have identified the appropriate external hazards for consideration in the design of HVCS.

3.1.2 Assumptions

On page 4 of the Hatch OIP, SNC adopted a set of generic assumptions associated with Order EA-13-109 Phase 1 actions. The staff determined that the set of generic assumptions appear to establish a baseline for HCVS evaluation consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable method to implement the requirements of Order EA-13-109.

The staff reviewed the Hatch plant-specific HCVS related assumptions:

HNP-1. The main stack at Plant Hatch can handle the HCVS flow from both units simultaneously. Once outside the reactor building, effluent lines slope downward toward main stack such that effluent is unlikely to accumulate and create a hot spot.

HNP-2. All load stripping is accomplished within one hour and fifteen minutes of event initiation and will occur below the core area at locations not impacted by a radiological event.

HNP-3. The rupture disc will be manually breached within 7.3 hours of event initiation if required for anticipatory venting during an ELAP.

HNP-4. All load stripping activities performed are located in the control building either at lower elevations (EL 130) or in the MCR.

HNP-5. The Plant layout of buildings and structures are depicted in the following figures 1-1, 1-2 and 1-3 [of the OIP]. Note the Main Control Room is located on the turbine deck elevation. The Control Building has substantial structural walls and features independent of the Reactor Building. The vent routing is indicated on figure 1-1 [of the OIP].

The staff determined that the plant specific assumptions for Hatch do not appear to create deviations from the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable method to implement the requirements of Order EA-13-109.

3.1.3 Compliance Timeline and Deviations

Page 4 of the OIP states the following:

> Compliance will be attained for E.I. Hatch Units 1&2 (Plant Hatch) with no known deviations to the guidelines in JLD-ISG-2013-02 and NEI 13-02 for each phase as follows:
>
> - Phase I (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 1st Quarter 2017 (Unit 2), 1st Quarter 2018 (Unit 1)
> - Phase 2: Later
>
> If deviations are identified at a later date, then the deviations will be communicated in a future 6 month update following identification.

Hatch's implementation schedule complies with the requirements of the order and at this time, neither SNC nor the staff has identified any deviations. Therefore, the staff concludes that it appears Hatch will attain compliance with Phase 1 of Order EA-13-109 with no known deviations to the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable method to implement the requirements of Order EA-13-109.

<u>Summary, Section 3.1:</u>

The licensee's described approach to General Integrated Plan Elements and Assumptions, if implemented as described in Section 3.1, and assuming acceptable resolution of any open items identified here or as a result of licensee alterations to their proposed plans, appears to be consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

3.2 BOUNDARY CONDITIONS FOR WETWELL VENT

3.2.1 Sequence of Events (SOE)

Order EA-13-109, Sections 1.1.1, 1.1.2, and 1.1.3 state that:

1.1.1 The HCVS shall be designed to minimize the reliance on operator actions.

1.1.2 The HCVS shall be designed to minimize plant operators' exposure to occupational hazards, such as extreme heat stress, while operating the HCVS system.

1.1.3 The HCVS shall also be designed to account for radiological conditions that would impede personnel actions needed for event response.

Page 9 of the OIP states the following:

> The operation of the HCVS will be designed to minimize the reliance on operator actions in response to hazards listed in Part 1 [of the OIP]. 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[of the OIP]). The reliable operation of HCVS will be met because HCVS meets the seismic requirements identified in NEI 13-02 and will be powered by DC buses with motive force supplied to HCVS valves from installed accumulators and portable nitrogen storage bottles. A HCVS Extended Loss of AC Power (ELAP) Failure Evaluation table, which shows alternate actions that can be performed, is included in Attachment 4 [of the OIP].

The NRC staff reviewed the Remote Manual Actions (Table 2-1 of the OIP) and concluded that these actions appear to consider minimizing the reliance on operator actions. The actions appear consistent with the types of actions described in the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. NRC Staff reviewed the Wetwell HCVS Failure Evaluation Table (Attachment 4 of the OIP) and determined the actions described appear to adequately address all the failure modes listed in the guidance provided by NEI 13-02, which include: loss of normal ac power, long term loss of batteries, loss of normal pneumatic supply, loss of alternate pneumatic supply, and solenoid operated valve (SOV) failure.

The staff reviewed the three cases contained in the SOE timeline [Attachment 2 of the OIP] and determined that the three cases appropriately bound the conditions for which the HCVS is required. These cases include: successful FLEX implementation with no failure of reactor core isolation cooling (RCIC); late failure of RCIC leading to core damage; and failure of RCIC to inject at the start of the event. The timelines accurately reflect the progression of events as described in the Hatch Mitigation Strategies OIP [Reference 17], SECY-12-0157 [Reference 10], and State-of-the-Art Reactor Consequence Analyses (SOARCA) [Reference 18].

The NRC staff reviewed the licensee discussion of time constraints on page 10 of the OIP and confirmed that the time constraints identified appear to be appropriately derived from the time lines developed in Attachment 2 of the OIP, consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02. The time constraints establish when the HCVS must be initiated and when supplemental compressed gas for motive power and supplemental electrical power (FLEX) must be supplied. Specific details not available at this time for NRC staff review include: the location of the ROSs (licensee identified), the location of the dedicated HCVS battery transfer switch, the location of the back-up nitrogen bottles (licensee identified), and the deployment location of the portable diesel generators (DGs) (licensee identified); therefore, the NRC staff has not completed its review.

The NRC staff reviewed the discussion of radiological and temperature constraints on page 12 of the OIP. The licensee identified that accessibility evaluations are required for specific HCVS locations outside the main control room. Until these locations are finalized, the licensee cannot complete evaluations of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment; therefore, the NRC staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit the deployment location of the portable diesel generators.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.2 Vent Characteristics

3.2.2.1 Vent Size and Basis

Order EA-13-109, Section 1.2.1 states that:

> 1.2.1 The HCVS shall have the capacity to vent the steam/energy equivalent of one (1) percent of licensed/rated thermal power (unless a lower value is justified by analyses), and be able to restore and then maintain containment pressure below the primary containment design pressure and the primary containment pressure limit.

Page 15 of the OIP states the following:

> The HCVS wetwell path is designed for venting steam/energy at a nominal capacity of 1% of 2804 MWt thermal power at pressure of 56 psig. This pressure is the lower of the containment design pressure (56 psig) and the PCPL value (62 psig). The size of the wetwell portion of the HCVS is greater than or equal to 18 inches in diameter which provides adequate capacity to meet or exceed the Order criteria.

The Hatch OIP describes a vent sized to meet or exceed 1 percent or greater current licensed thermal power. An analysis that demonstrates that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power, containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit is not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.

3.2.2.2 Vent Capacity

Order EA-13-109, Section 1.2.1 states that:

> 1.2.1 The HCVS shall have the capacity to vent the steam/energy equivalent of one (1) percent of licensed/rated thermal power (unless a lower value is justified by analyses), and be able to restore and then maintain containment pressure below the primary containment design pressure and the primary containment pressure limit.

Page15 of the OIP states the following:

> The greater than 1% decay heat removal capacity at Plant Hatch 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 capability will be confirmed.

The Hatch OIP assumes that until decay heat is less than the one percent, the suppression pool must absorb the decay heat generated until the HCVS is able to restore and maintain primary containment pressure below the primary containment design pressure and the PCPL. Analyses confirming that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.

3.2.2.3 Vent Path and Discharge

Order EA-13-109, Sections 1.1.4 and 1.2.2 state that:

1.1.4 The HCVS controls and indications shall be accessible and functional under a range of plant conditions, including severe accident conditions, extended loss of AC power, and inadequate containment cooling.

1.2.2 The HCVS shall discharge the effluent to a release point above main plant structures.

Page 15 of the OIP states the following:

> The existing HCVS vent path at Hatch consists of a wetwell and drywell vent on each unit. The drywell vent exits the Primary Containment into the Reactor Building and proceeds down to the torus bay. Wetwell and drywell vent piping merges into a common header in the torus bay. Vent path for both wetwell and drywell exits the reactor building through an underground pipe. This pipe travels approximately 500 feet from both units and combines in a mixing chamber at the base of the main stack. All effluents exit out the main stack.
>
> The HCVS discharge path uses the main stack.

The Hatch OIP describes the routing and discharge point of the HCVS that, pending resolution of open items, appear consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions are not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.

3.2.2.4 Power and Pneumatic Supply Sources

Order EA-13-109, Sections 1.2.5 and 1.2.6 state that:

1.2.5 The HCVS shall, in addition to meeting the requirements of 1.2.4, be capable of manual operation (e.g., reach-rod with hand wheel or manual operation of pneumatic supply valves from a shielded location), which is accessible to plant operators during sustained operations.

1.2.6 The HCVS shall be capable of operating with dedicated and permanently installed equipment for at least 24 hours following the loss of normal power or loss of normal pneumatic supplies to air operated components during an extended loss of AC power.

Page 15 of the OIP States the following:

> All electrical power required for operation of HCVS components will be routed through two Inverters, one for each electrical division. These inverters will be sized at 7.5 kW each and will convert DC power from installed batteries into AC power for the end users (instruments, solenoid valves, etc.). Battery power will be provided by the existing station service batteries for the first 12 hours following the ELAP event. At about 12 hours, power can be transferred to the HCVS dedicated batteries that will supply power for an additional time of > 12 hours. At 24 hours, power will transfer back to the normal configuration, at which time it is expected that FLEX generators will be in service to power the DC bus.
>
> Pneumatic power for the HCVS air-operated valves (AOVs) is normally provided by the non-interruptible air system. Following an ELAP event, the non-interruptible air system is lost, and normal backup from installed nitrogen supply tanks is isolated. Therefore, for the first 24 hours, pneumatic force will be supplied from newly installed air accumulator tanks. These tanks will supply the required motive force to those HCVS valves needed to maintain flow through the HCVS effluent piping. After the first 24 hours, backup nitrogen provided by nitrogen supply bottles will be manually valved-in and replenished as needed.
>
> 1. The HCVS flow path valves are air-operated valves (AOV) with air-to-open and spring-to-shut (i.e., the wetwell containment isolation valves and the HCVS inlet isolation valve). Opening the valves requires energizing an AC powered solenoid operated valve (SOV) and providing motive air/gas. The detailed design will provide a permanently installed power source and motive air/gas supply adequate for the first 24 hours. Beyond the first 24 hours, FLEX generators will be used to maintain battery power to the HCVS components. The initial stored motive air/gas will allow for a minimum of twelve valve operating cycles for the HCVS valve for the first 24 hours.
>
> 2. Following the initial 24 hour period, additional motive force will be supplied from nitrogen bottles that will be staged at a gas cylinder rack located (near

the ROS in the control building or outside) such that radiological impacts are not an issue. Additional bottles can be brought in as needed.

3. An assessment of temperature and radiological conditions will be performed to ensure that operating personnel can safely access and operate controls at the ROS based on time constraints listed in Attachment 2 of the OIP. ...

4. All permanently installed HCVS equipment, including any connections required to supplement the HCVS operation during an ELAP (i.e., electric power, N2/air) will be located in areas reasonably protected from defined hazards listed in Part 1 of this report.

5. All valves required to open the flow path or valves that require manual operation to be closed to prevent diversion or cross-flow into other systems/units will be designed for remote manual operation following an ELAP, such that the primary means of valve manipulation does not rely on use of a hand wheel, reach-rod or similar means that requires close proximity to the valve (reference HCVS-FAQ-03). 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.

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

The Hatch OIP describes system features such as a dedicated battery and pneumatic supply that, pending resolution of open items, appear to make the system reliable. Specific design details not available at this time include: the location of the ROSs (licensee identified), the final sizing evaluations for HCVS pneumatic supply (licensee identified), the final sizing for HCVS battery/battery charger including documentation of incorporating HCVS into the FLEX DG loading calculations, and documentation of an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.2.5 Location of Control Panels

Order EA-13-109, Sections 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.4 and 1.2.5 state that:

> 1.1.1 The HCVS shall be designed to minimize the reliance on operator actions.
>
> 1.1.2 The HCVS shall be designed to minimize plant operators' exposure to occupational hazards, such as extreme heat stress, while operating the HCVS system.
>
> 1.1.3 The HCVS shall also be designed to account for radiological conditions that would impede personnel actions needed for event response.
>
> 1.1.4 The HCVS controls and indications shall be accessible and functional under a range of plant conditions, including severe accident conditions, extended loss of AC power, and inadequate containment cooling.
>
> 1.2.4 The HCVS shall be designed to be manually operated during sustained operations from a control panel located in the main control room or a remote but readily accessible location.
>
> 1.2.5 The HCVS shall, in addition to meeting the requirements of 1.2.4, be capable of manual operation (e.g., reach-rod with hand wheel or manual operation of pneumatic supply valves from a shielded location), which is accessible to plant operators during sustained operations.

Page 16 of the OIP stated the following:

> The HCVS design allows initiating and then operating and monitoring the HCVS from the Main Control Room (MCR) or the Remote Operating Station (ROS). The MCR location is protected from adverse natural phenomena and is the normal control point for HCVS operation and Plant Emergency Response actions.
>
> The final location of the ROS is still under evaluation at this time.

The Hatch OIP describes 2 HCVS control locations for each unit, the ROS and the main control room. SNC states that the control room is protected from normal adverse phenomena. However, some design details are not available at this time, including: the location of the ROSs (licensee identified), an assessment of communication between remote operation locations and HCVS operational decision makers, an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee identified), and descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions. Therefore, the NRC staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit documentation that demonstrates adequate communication between the remote HCVS operation locations and HCVS decision makers during ELAP and severe accident conditions.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

Open Item: Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.

3.2.2.6 Hydrogen

Order EA-13-109, Sections 1.2.10, 1.2.11, and 1.2.12 state that:

> 1.2.10 The HCVS shall be designed to withstand and remain functional during severe accident conditions, including containment pressure, temperature, and radiation while venting steam, hydrogen, and other non-condensable gases and aerosols. The design is not required to exceed the current capability of the limiting containment components.
>
> 1.2.11 The HCVS shall be designed and operated to ensure the flammability limits of gases passing through the system are reached; otherwise, the system shall be designed to withstand dynamic loading resulting from hydrogen deflagration and detonation.
>
> 1.2.12 The HCVS shall be designed to minimize the potential for hydrogen gas migration and ingress into the reactor building or other buildings.

Page 17 of the OIP States the following:

> 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. Several configurations are available which will support the former (e.g., purge, mechanical isolation from outside air, etc.) or the latter (design of potentially affected portions of the system to withstand a detonation relative to pipe stress and support structures).

A description of the final design for hydrogen control is not available at this time, including a description of the final design of the HCVS to address hydrogen detonation and deflagration (licensee identified) and a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings; therefore, the staff has not completed its review.

Open Item: Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.

Open Item: Provide a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings.

3.2.2.7 Unintended Cross Flow of Vented Fluids

Order EA-13-109, Sections 1.2.3 and 1.2.12 state that:

> 1.2.3 The HCVS shall include design features to minimize unintended cross flow of vented fluids within a unit and between units on the site.
>
> 1.2.12 The HCVS shall be designed to minimize the potential for hydrogen gas migration and ingress into the reactor building or other buildings.

Page 17 of the OIP states the following:

> The HCVS uses the Primary Containment Isolation System (PCIS) containment isolation valves 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. Specifically:
>
> - The PCIS control circuit will be used during all "design basis" operating modes including all design basis transients and accidents.
> - Cross flow potential exists between the HCVS and the Standby Gas Treatment System (SGTS). Resolution involves evaluation of SGTS isolation valve leakage for both inlet and outlet valves (referred to as boundary valves), as both interface with the HCVS. This evaluation will follow the testing criteria presented in NEI HCVS-FAQ-05. If necessary, these valves will be replaced with leak-tight valves. Testing and maintenance will be performed to ensure that the valves remain leak-tight. ...
> - An additional cross-flow avenue exists between the HCVS of the two units and other connected systems at the mixing chamber in the shared Main Stack. With the Main Stack being open to the atmosphere, there is no motive force to push effluent from the mixing chamber back to the plant, thus it is assumed this avenue of cross flow is not a reasonable assumption, since the buoyancy of the vent process fluid will not have sufficient motive force to create backflow in the mixing chamber

The Hatch OIP describes methods to minimize unintended cross flow within a unit and between units on the site that include: AOVs that are air-to-open spring-to-close. Design details not available at this time include: the final method to isolate HCVS from SGTS, all interfacing discharges to the plant stack, and control of all penetrations to the HCVS envelope; therefore, the staff has not completed its review.

Open Item: Make available descriptions of design details that minimize unintended cross flow of vented fluids within a unit and between units.

3.2.2.8 Prevention of Inadvertent Actuation

Order EA-13-109, Section 1.2.7 states that:

> 1.2.7 The HCVS shall include means to prevent inadvertent actuation.

Page 17 of the OIP states the following:

> EOP/ERG [emergency operating procedure/emergency response guideline] 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 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)). However the ECCS pumps will not have normal power available because of the starting boundary conditions of an ELAP.
>
> - The features that prevent inadvertent actuation are two PCIV's in series powered from different divisions, a rupture disk, or key lock switches. 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. In addition, the HCVS will be designed to provide features to prevent inadvertent actuation due to a design error, equipment malfunction, or operator error.

The Hatch OIP provides a description of methods to prevent inadvertent initiation that include: procedure controls, two PCIVs in series powered from different divisions, a rupture disk, and keylock switches. This appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

3.2.2.9 Component Qualifications

Order EA-13-109, Section 2.1 states that:

> 2.1 The HCVS vent path up to and including the second containment isolation barrier shall be designed consistent with the design basis of the plant.

> Items in this path include piping, piping supports, containment isolation valves, containment isolation valve actuators and containment isolation valve position indication components.

Page 18 of the OIP states the following:

> The HCVS components downstream of the second containment isolation valve and components that interface with the HCVS are routed in seismically qualified structures. For these components, the structures that are credited in Order EA-13-109 were 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. HCVS components that directly interface with the pressure boundary will be considered safety related, as the existing system is safety related. The primary 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 controls component which interfaces with Class 1E power sources will be considered safety related up to and including appropriate isolation devices such as fuses or breakers, as their failure could adversely impact containment isolation and/or a safety-related power source.
> The remaining components will be considered Augmented Quality. Newly installed piping and valves will be seismically qualified to handle the forces associated with the safe shutdown earthquake (SSE) back to their isolation boundaries. Electrical and controls components will be seismically qualified and will include the ability to handle harsh environmental conditions (although they will not be considered part of the site Environmental Qualification (EQ) program).
>
> HCVS instrumentation performance (e.g., accuracy and precision) need not exceed that of similar plant installed equipment. Additionally, radiation monitoring instrumentation accuracy and range will be sufficient to confirm flow of radionuclides through the HCVS. The HCVS instruments, including valve position indication, process instrumentation, radiation monitoring, and support system monitoring, will be qualified by using one or more of the three methods described in the ISG, which includes:
>
> 1. Purchase of instruments and supporting components with known operating principles from manufacturers with commercial quality assurance programs (e.g., ISO9001) where the procurement specifications include the applicable seismic requirements, design requirements, and applicable testing.
>
> 2. Demonstration of seismic reliability via methods that predict performance described in IEEE [institute of electrical and Electronics Engineers] 344-2004
>
> 3. Demonstration that instrumentation is substantially similar to the design of instrumentation previously qualified.

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

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

The Hatch OIP describes component qualification methods that, pending resolution of open items, appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Specific details not available at this time include: information regarding the pre-qualification methods of existing instrumentation, which will be used by operators to make containment venting decisions, descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions, and design details that confirm existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during beyond-design-basis external event (BDBEE) and severe accident wetwell venting; therefore, the NRC staff has not completed its review.

Open Item: Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.

Open Item: Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.

Open Item: Make available for NRC staff audit documentation of an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during BDBEE and severe accident wetwell venting.

3.2.2.10 Monitoring of HCVS

Order EA-13-109, Sections 1.1.4, 1.2.8, and 1.2.9 state that:

> 1.1.4 The HCVS controls and indications shall be accessible and functional under a range of plant conditions, including severe accident conditions, extended loss of AC power, and inadequate containment cooling.
>
> 1.2.8 The HCVS shall include means to monitor the status of the vent system (e.g., valve position indication) from the control panel required by 1.2.4. The monitoring system shall be designed for sustained operation during an extended loss of AC power.
>
> 1.2.9 The HCVS shall include a means to monitor the effluent discharge for radioactivity that may be released from operation of the HCVS. The monitoring system shall provide indication from the control panel required by 1.2.4 and shall be designed for sustained operation during an extended loss of AC power.

Page 19 of the OIP states the following:

> The Plant Hatch wetwell HCVS will be capable of being manually operated during sustained operations from a control panel located in the MCR and will meet the requirements of Order element 1.2.4. The MCR is a readily accessible location with no further evaluation required. 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 section 1.2.5 of the Order, a readily accessible Remote Operating Station (ROS) will also be incorporated into the HCVS design as described in NEI 13-02 section 4.2.2.1.2.1. The controls and indications at the ROS location will be accessible and functional under a range of plant conditions, including severe accident conditions with due consideration to source term and dose impact on operator exposure, extended loss of AC power (ELAP), and inadequate containment cooling. An evaluation will be performed to determine accessibility to the location, habitability, staffing sufficiency, and communication capability with Vent-use decision makers (EOP/SOP/SAMG). ...
>
> The wetwell HCVS will include means to monitor the status of the vent system in both the MCR and the ROS. Included in the existing design of the torus hardened vent (THV) are control switches in the MCR with valve position indication. These THV controls currently meet the environmental and seismic requirements of the Order for the plant severe accident and will be upgraded to address ELAP. Control and indication of the wetwell HCVS valves will be duplicated at the ROS. The ability to open/close these valves multiple times during the event's first 24 hours will be provided by two air accumulator tanks and station service batteries, supplemented by installed backup battery power sources. Beyond the first 24 hours, the ability to maintain these valves open or

> closed will be accomplished through the use of replaceable nitrogen bottles and FLEX generators.
>
> The wetwell HCVS will include indications for vent temperature and effluent radiation levels at both the MCR and ROS. Other important information on the status of supporting systems, such as power source status and pneumatic supply pressure, will also be included in the design and located to support HCVS operation. The wetwell HCVS includes existing containment pressure and wetwell level indication in the MCR to monitor vent operation. This monitoring instrumentation provides the indication from the MCR as per Requirement 1.2.4 and will be designed for sustained operation during an ELAP event.

The Hatch OIP provides a description of HCVS monitoring and control that, pending resolution of open items, appears to be consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Descriptions of the environmental and radiological effects on HCVS controls and indications, and an evaluation of environmental and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment are not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.2.11 Component Reliable and Rugged Performance

Order EA-13-109, Section 2.2 states that:

> 2.2 All other HCVS components shall be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. These items include electrical power supply, valve actuator pneumatic supply and instrumentation (local and remote) components.

Page 20 of the OIP states the following:

> The HCVS downstream of the second containment isolation valve, including piping and supports, electrical power supply, valve actuator pneumatic supply, and instrumentation (local and remote) components, will be designed/analyzed to conform to the requirements consistent with the applicable design codes (e.g.,

Non-safety, Cat 1, SS and 300# ASME or B31.1, NEMA 4, etc.) for the plant and to ensure functionality following a design basis earthquake.

The torus hardened vent (THV) system was originally installed to satisfy the requirements of Generic Letter 89-16. The modifications associated with the THV vent were performed under the provisions of 10CFR50.59 and thus the Plant Hatch THV was designed, analyzed, and implemented consistent with the design basis of the plant. The current design will be evaluated to confirm that the existing system, coupled with current and planned modifications to upgrade the THV to a hardened containment vent system (HCVS), will meet the requirements of Order EA-13-109 and remain functional following a severe accident.

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 procured for use under the temperature, pressure, radiation level, total integrated dose radiation for the effluent vent pipe and HCVS ROS location.

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

In addition to these design requirements, providing sufficient channel separation (by distance and/or protective barriers) will minimize the likelihood of a common cause event which adversely affects both divisions of the containment isolation valves when the control for these valves is provided at the ROS. Separation will be in accordance with Plant Hatch electrical design criteria (ref. RG 1.75 and IEEE 384).

If the instruments are purchased as commercial-grade equipment, they will be procured suitable to operate under severe accident environment as required by NRC Order EA-13-109 and the guidance of NEI 13-02. The equipment procurement will utilize the following guidance for seismic per IEEE 344, environment per IEEE 323, and Electromagnetic Compatibility (EMC) per RG 1.180. These qualifications will be bounding conditions for Plant Hatch. The qualification for the equipment by the supplier will be validated by SNC for the specific location at Plant Hatch to ensure that the bounding conditions envelope the specific plant conditions.

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

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

The Hatch OIP provides descriptions for component reliable and rugged performance that appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

3.2.3 Beyond Design Basis External Event Venting

3.2.3.1 First 24-Hour Coping

Order EA-13-109, Section 1.2.6 states that:

> 1.2.6 The HCVS shall be capable of operating with dedicated and permanently installed equipment for at least 24 hours following the loss of normal power or loss of normal pneumatic supplies to air operated components during an extended loss of AC power.

Page 22 of the OIP states the following:

> The operation of the HCVS will be designed to minimize the reliance on operator actions for response to a ELAP and BDBEE hazards identified in part 1 of this OIP. Immediate operator actions can be completed by Operators from the HCVS control station(s) and include remote-manual initiation. The operator actions required to open a vent path are as described in table 2-1 [of the OIP].

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

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

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

System control:

i. Active: PCIVs are operated in accordance with EOPs/SOPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles under ELAP conditions over the first 24 hours following an ELAP, based on normal operating pressures. Controlled venting will be permitted in the revised EPGs and associated implementing EOPs, e.g., jumpers will be used to override the containment isolation circuit on the PCIVs needed to vent containment.

   Passive: Inadvertent actuation protection is provided by the current containment isolation circuitry associated with the PCIVs used to operate the HCVS. In addition, the HCVS isolation valve is normally key-locked closed and has a rupture disc located downstream. This rupture disc has a burst set pressure above the header pressure expected during a design basis event. Breach of the rupture disc will occur outside of the MCR and will require manual operation.

The Hatch OIP describes a first 24 hour BDBEE coping strategy that, pending resolution of open items, appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. The final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation and the final nitrogen pneumatic system design including sizing and location are not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

3.2.3.2 Greater Than 24-Hour Coping

Order EA-13-109, Section 1.2.4 states that:

> 1.2.4 The HCVS shall be designed to be manually operated during sustained operations from a control panel located in the main control room or a remote but readily accessible location.

Page 23 of the OIP states the following:

> After approximately 24 hours, available personnel will be able to connect supplemental nitrogen to the HCVS, but based on the staged quantity of bottles this action is not expected to occur until after 72 hours. Connections for supplementing electrical power and motive force required for HCVS will be located in accessible areas with reasonable protection from the hazards described in Part 1 of the OIP per NEI 12-06 that minimize personnel exposure to adverse conditions for HCVS initiation and operation. Connections will be pre-engineered quick disconnects or similar in order to minimize manpower resources. Sufficient nitrogen bottles will be staged to support operations for up to 72 hours following the ELAP event (less than 3 planned actuations for FLEX), additional bottles can be connected to support sustained operation. After 24 hours, power can be switched back to the normal configuration which is expected to be powered by FLEX generators.
>
> 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.

The Hatch OIP describes a greater than 24 hour BDBEE coping strategy that, pending resolution of open items, appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. The final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation and the final nitrogen pneumatic system design including sizing and location are not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

3.2.4 Severe Accident Event Venting

3.2.4.1 First 24 Hour Coping

Order EA-13-109, Section 1.2.6 states that:

> 1.2.6 The HCVS shall be capable of operating with dedicated and permanently installed equipment for at least 24 hours following the loss of normal power or loss of normal pneumatic supplies to air operated components during an extended loss of AC power.

Page 25 of the OIP states the following:

> The operation of the HCVS will be designed to minimize the reliance on operator actions for response to an ELAP and severe accident events. Severe accident event assumes that specific core cooling actions from the FLEX strategies identified in the response to Order EA-12-049 were unsuccessful and that core damage has occurred, up to and including a breach of the reactor vessel by molten core debris. Venting will occur without the need for manually breaching the rupture disc, since conditions in containment would be sufficient to burst the rupture disc without assistance from operators. Access to the reactor building will be restricted as determined by the RPV [reactor pressure vessel] water level and core damage conditions. Immediate actions will be completed by Operators in the Main Control Room (MCR) or at the HCVS Remote Operating Station (ROS) and will include remote-manual actions from a local gas cylinder station. The operator actions required to open a vent path were previously listed in the BDBEE Venting Part 2 section of this report [the OIP].
>
> As stated in the section on BDBEE Venting, the HCVS will be designed to allow initiation, control, and monitoring of venting from the MCR and will be capable of operation from an ROS to be installed as part of the response to this Order. Both locations minimize plant operators' exposure to adverse temperature and radiological conditions and are protected from hazards assumed in Part (Table 2-1 of this document [the OIP]). Travel pathways will be reviewed for dose and temperature, and alternate routes may need to be considered to minimize operator exposure to harsh environmental conditions).
>
> Permanently installed power and motive air/gas capable will be available to support operation and monitoring of the HCVS for 24 hours.
>
> System control:
>
> i. Active: PCIVs are operated in accordance with EOPs to control containment pressure. The HCVS is designed for a minimum of 12 open/close cycles of the isolation valve under ELAP conditions over the first 24 hours following an ELAP. Controlled venting will be permitted in the revised EPGs. Jumpers will be used to override the containment isolation circuit on the PCIVs needed to vent containment.
>
> ii. Passive: Inadvertent actuation protection is provided by the current containment isolation circuitry associated with the PCIVs used to operate the

HCVS. In addition, the HCVS isolation valve is normally key-locked closed and has a rupture disc located downstream. This rupture disc has a burst set pressure above the header pressure expected during a design basis event.

The Hatch OIP describes a first 24 hour severe accident coping strategy that, pending resolution of open items, appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Specific details not available at this time include: the location of the ROSs (licensee identified), the location of the dedicated HCVS battery transfer switch (licensee identified), the deployment location of the portable diesel generators (licensee identified), the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation, the final nitrogen pneumatic system design including sizing and location (licensee Identified), and an evaluation of environmental and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee Identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.

Open Item: Make available for NRC staff audit the deployment location of the portable diesel generators.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.4.2 Greater Than 24 Hour Coping

Order EA-13-109, Sections 1.2.4 and 1.2.8 state that:

1.2.4 The HCVS shall be designed to be manually operated during sustained operations from a control panel located in the main control room or a remote but readily accessible location.

1.2.8 The HCVS shall include means to monitor the status of the vent system (e.g., valve position indication) from the control panel required by 1.2.4. The monitoring system shall be designed for sustained operation during an extended loss of AC power.

Page 26 of the OIP states the following:

> Connections for supplementing electrical power and motive force required for HCVS will be located in accessible areas with reasonable protection per Part 1 of this report [of the OIP]. Connections will be pre-engineered quick disconnects or similar arrangement to minimize manpower resources.
>
> After 24 hours, power will be switched back to the normal configuration which is expected to be powered by SA Capable FLEX generators at that time (refer to Open Item 3 [in the OIP]).
>
> After approximately 24 hours, available personnel will be able to connect supplemental nitrogen to the HCVS if greater than 12 HCVS cycles have occurred or the pneumatic pressure is low. Sufficient nitrogen bottles will be staged to support operations for up to 72 hours following the ELAP event. Specifics are the same as for BDBEE Venting Part 2 except {the location and refueling actions for the FLEX DG and replacement Nitrogen Bottles} will be evaluated for SA environmental conditions resulting from the proposed damaged Reactor Core and resultant HCVS vent pathway.
>
> 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.

The Hatch OIP describes a greater than 24 hour severe accident coping strategy that, pending resolution of open items, appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Specific details not available at this time include: the location of the ROSs (licensee identified), the location of the dedicated HCVS battery transfer switch (licensee identified), the deployment location of the portable diesel generators (licensee identified), the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation, the final nitrogen pneumatic system design including sizing and location (licensee Identified), and an evaluation of environmental and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee Identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.

Open Item: Make available for NRC staff audit the deployment location of the portable diesel generators.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.5 Support Equipment Functions

3.2.5.1 BDBEE

Order EA-13-109, Sections 1.2.8 and 1.2.9 state that:

> 1.2.8 The HCVS shall include means to monitor the status of the vent system (e.g., valve position indication) from control panel required by 1.2.4. The monitoring system shall be designed for sustained operation during an extended loss of AC power.
>
> 1.2.9 The HCVS shall include a means to monitor the effluent discharge for radioactivity that may be released from operation of the HCVS. The monitoring system shall provide indication from the control panel required by 1.2.4 and shall be designed for sustained operation during an extended loss of AC power.

Page 28 of the OIP states the following:

> Containment integrity is initially maintained by permanently installed equipment. All containment venting functions will be performed from the MCR or ROS except for breaching of the rupture disc for anticipatory venting, which is not required for BDBEE venting.
>
> Venting will require support from DC power as well as instrument air systems as detailed in the response to Order EA-12-049. Existing safety related station service batteries will provide sufficient electrical power for HCVS operation for greater than 12 hours. Before station service batteries are depleted, portable FLEX diesel generators, as detailed in the response to Order EA-12-049, will be credited to charge the station service batteries and maintain DC bus voltage after 12 hours. Newly installed accumulator tanks with back-up portable N2 bottles will provide sufficient motive force for all HCVS valve operation and will provide for multiple operations of the 1/2T48-F082 vent valve.

The Hatch OIP describes BDBEE supporting equipment functions that, pending resolution of open items, appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of

Order EA-13-109. The final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation and the final nitrogen pneumatic system design including sizing and location are not available at this time; therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC Staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

3.2.5.2 Severe Accident Venting

Order EA-13-109, Sections 1.2.8 and 1.2.9 state that:

> 1.2.8 The HCVS shall include means to monitor the status of the vent system (e.g., valve position indication) from control panel required by 1.2.4. The monitoring system shall be designed for sustained operation during an extended loss of AC power.
>
> 1.2.9 The HCVS shall include a means to monitor the effluent discharge for radioactivity that may be released from operation of the HCVS. The monitoring system shall provide indication from the control panel required by 1.2.4 and shall be designed for sustained operation during an extended loss of AC power.

Page 28 of the OIP states the following:

> The same support functions that are used in the BDBEE scenario would be used for severe accident venting. To ensure power for the 12 to 24 hours, a set of dedicated HCVS batteries will be available to feed HCVS loads via a manual transfer switch. At 24 hours, power will be switched back to the normal configuration powered by FLEX generators evaluated for SA capability.
>
> Nitrogen bottles located outside of the reactor building and in the immediate area of the ROS will be available to tie-in supplemental pneumatic sources before the air accumulator tanks are depleted.

The Hatch OIP describes support equipment functions for severe accident venting that, pending resolution of open items, appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Specific details not available at this time include: the location of the ROSs (licensee identified), the location of the dedicated HCVS battery transfer switch (licensee identified), the deployment location of the portable diesel generators (licensee identified), the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation, the final nitrogen pneumatic system design including sizing and location (licensee Identified), and an evaluation of environmental and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee Identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.

Open Item: Make available for NRC staff audit the deployment location of the portable diesel generators.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

3.2.6 Venting Portable Equipment Deployment

Order EA-13-109, Section 3.1 states that:

> 3.1 The licensee shall develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures shall be established for system operations when normal and backup power is available, and during an extended loss of AC power.

Page 30 of the OIP states the following:

> Deployment pathways for compliance with Order EA-12-049 are acceptable without further evaluation 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.

The Hatch OIP describes venting portable equipment deployment functions that, pending resolution of open items, appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. Procedure development, implementation and maintenance are described in Section 3.4.1 of this ISE. Specific design details not available at this time include: the location of the ROSs (licensee identified), the location of the dedicated HCVS battery transfer switch (licensee identified), the deployment location of the portable diesel generators (licensee identified), the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation, the final nitrogen pneumatic system design including sizing and location (licensee Identified), and an evaluation of environmental and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment (licensee Identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the location of the ROSs.

Open Item: Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.

Open Item: Make available for NRC staff audit the deployment location of the portable diesel generators.

Open Item: Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.

Open Item: Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.

Open Item: Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.

Summary, Section 3.2:

The licensee's approach to Boundary Conditions for Wetwell Vent, if implemented as described in Section 3.2, and assuming acceptable resolution of any open items identified here or as a result of licensee alterations to their proposed plans, appears to be consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

3.3 BOUNDARY CONDITIONS FOR DRY WELL VENT

Summary, Section 3.3:

Dry Well Vent will be evaluated during Phase 2 of Order EA-13-109. The ISG for Phase 2 will be provided by April 30, 2015. Licensees will submit an updated OIP to address Phase 2 of Order EA-13-109 by December 31, 2015.

3.4 PROGRAMMATIC CONTROLS, TRAINING, DRILLS AND MAINTENANCE

3.4.1 Programmatic Controls

Order EA-13-109, Sections 3.1 and 3.2 state that:

3.1 The licensee shall develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures shall be established for system operations when normal and backup power is available, and during an extended loss of AC power.

3.2 The licensee shall train appropriate personnel in the use of the HCVS. The training curricula shall include system operations when normal and backup power is available, and during an extended loss of AC power.

Page 33 of the OIP states the following:

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 and backup power is available, and during ELAP conditions.

The HCVS procedures will be developed and implemented following the plants process for initiating or revising procedures and/or guidelines will support existing symptom based command and control strategies in the current EOPs and will contain the following details:

- Appropriate conditions and criteria for use of the HCVS
- When and how to place the HCVS in operation,
- The location of system components,
- Instrumentation available,
- Normal and backup power supplies,
- Directions for sustained operation, 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 a controlled document:

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

- If for up to 90 consecutive days, the primary or alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If for up to 30 days, the primary and alternate means of HCVS operation are non-functional, no compensatory actions are necessary.
- If the out of service times exceed 30 or 90 days as described above, the following actions will be performed:
    - The condition will 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

The Hatch OIP describes programmatic controls that, pending resolution of open items, appear to be consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. NRC staff determined that procedure development appears to be in accordance with existing industry protocols. The provisions for out-of-service requirements appear to reflect consideration of the probability of an ELAP requiring severe accident venting and the consequences of a failure to vent under such conditions. The control document for HCVS out of service time criteria is not available at this time (licensee identified); therefore, the staff has not completed its review.

Open Item: Make available for NRC staff audit the control document for HCVS out of service time criteria.

3.4.2 Training

Order EA-13-109, Section 3.2 states that:

> 3.2 The licensee shall train appropriate personnel in the use of the HCVS. The training curricula shall include system operations when normal and backup power is available, and during an extended loss of AC power.

Page 34 of the OIP states the following:

> Personnel expected to perform direct execution of the HCVS will receive necessary training in the use of plant procedures for system operations when

> normal and backup power is available and during ELAP conditions. The training will be refreshed on a periodic basis and as any changes occur to the HCVS. Training content and frequency will be established using the Systematic Approach to Training (SAT) process.
>
> In addition, (reference NEI 12-06) all personnel on-site will be available to supplement trained personnel.

The Hatch OIP describes HCVS training requirements that appear to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109. The systematic approach to training process has been accepted by the NRC as appropriate for developing training for nuclear plant personnel.

3.4.3 Drills

Order EA-13-109, Section 3.1, states that:

> 3.1 The licensee shall develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures shall be established for system operations when normal and backup power is available, and during an extended loss of AC power.

Page 35 of the OIP states the following:

> 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.

The Hatch OIP describes an approach to drills that appear to be in accordance with NEI 13-06, "Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events" and NEI 14-01, "Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents." This approach appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

3.4.4 Maintenance

Order EA-13-109, Section 1.2.13 states that:

> 1.2.13 The HCVS shall include features and provisions for the operation, testing, inspection and maintenance adequate to ensure that reliable function and capability are maintained.

Page 35 of the OIP states the following:

The site will utilize the standard EPRI [Electric Power Research Institute] 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.

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

Table 4-1: Testing and Inspection Requirements

Description	Frequency
Cycle the HCVS valves and the interfacing system valves not used to maintain containment integrity during operations.	Once per operating cycle
Perform visual inspections and a walk down of HCVS components	Once per operating cycle
Test and calibrate the HCVS radiation monitors.	Once per operating cycle
Leak test the HCVS.	(1) Prior to first declaring the system functional; (2) Once every three operating cycles thereafter; and (3) Post-maintenance test 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:
Leak test the HCVS applies to the non-PCIV HCVS valves per section 6.2.3 of NEI13-02 and clarified by HCVS-FAQ-05.

The Hatch OIP describes an approach to maintenance that appears to be in accordance with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

Summary, Section 3.4:

The licensee's approach to Programmatic Controls Training, Drills and Maintenance, if implemented as described in Section 3.4, and assuming acceptable resolution of any open items identified here or as a result of licensee alterations to their proposed plans, appears to be consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.

4.0 OPEN ITEMS

This section contains a summary of the open items identified to date as part of the technical evaluation. Open items, whether NRC or licensee identified, are topics for which there is insufficient information to fully resolve the issue, for which the NRC staff requires clarification to ensure the issue is on a path to resolution, or for which the actions to resolve the issue are not yet complete. The intent behind designating an issue as an open item is to highlight items that the staff intends to review further. The NRC staff has reviewed the licensee OIP for consistency with NRC policy and technical accuracy. NRC and licensee identified open items have been identified in Section 3.0 and are listed in the table below.

List of Open items

Open Item	Action	Comment
1.	Make available for NRC staff audit the location of the ROSs.	Section 3.2.1 Section 3.2.2.4 Section 3.2.2.5 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.2 Section 3.2.6
2.	Make available for NRC staff audit the location of the dedicated HCVS battery transfer switch.	Section 3.2.1 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.2 Section 3.2.6
3.	Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Section 3.2.1 Section 3.2.2.4 Section 3.2.3.1 Section 3.2.3.2 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.1 Section 3.2.5.2 Section 3.2.6
4.	Make available for NRC staff audit the deployment location of the portable diesel generators.	Section 3.2.1 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.2 Section 3.2.6

5.	Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.	Section 3.2.1 Section 3.2.2.4 Section 3.2.2.5 Section 3.2.2.10 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.2 Section 3.2.6
6.	Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.	Section 3.2.2.1 Section 3.2.2.2
7.	Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	Section 3.2.2.3 Section 3.2.2.5 Section 3.2.2.9 Section 3.2.2.10
8.	Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX DG loading calculation.	Section 3.2.2.4 Section 3.2.3.1 Section 3.2.3.2 Section 3.2.4.1 Section 3.2.4.2 Section 3.2.5.1 Section 3.2.5.2 Section 3.2.6
9.	Make available for NRC staff audit documentation that demonstrates adequate communication between the remote HCVS operation locations and HCVS decision makers during ELAP and severe accident conditions.	Section 3.2.2.5
10.	Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Section 3.2.2.6
11.	Provide a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings.	Section 3.2.2.6
12.	Make available descriptions of design details that minimize unintended cross flow of vented fluids within a unit and between units.	Section 3.2.2.7

13.	Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Section 3.2.2.9
14.	Make available for NRC staff audit documentation of an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during BDBEE and severe accident wetwell venting.	Section 3.2.2.9
15.	Make available for NRC staff audit the control document for HCVS out of service time criteria.	Section 3.4.1

5.0 SUMMARY

As required by Order EA-13-109, the licensee has provided an OIP for designing and installing Phase 1 of a severe accident capable HCVS that provides venting capability from the wetwell during severe accident conditions, using a vent path from the containment wetwell to remove decay heat, vent the containment atmosphere (including steam, hydrogen, carbon monoxide, non-condensable gases, aerosols, and fission products), and control containment pressure within acceptable limits. The OIP describes a HCVS wetwell vent designed for those accident conditions (before and after core damage) for which containment venting is relied upon to reduce the probability of containment failure, including accident sequences that result in the loss of active containment heat removal capability or ELAP.

The NRC staff finds that the licensee's OIP for Phase 1 of Order EA-13-109 describes: plan elements and assumptions; boundary conditions; provisions for programmatic controls, training, drills and maintenance; and an implementation schedule that appear consistent with the guidance found in NEI 13-02, endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing Phase 1 requirements of Order EA-13-109, subject to acceptable closure of the above open items.

6.0 REFERENCES

1. Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," June 6, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13143A321).

2. Letter from SNC to NRC, "Edwin I. Hatch Nuclear Plant – Units 1 and 2 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 Phase 1 (Order EA-13-109)," dated June 27, 2014 (ADAMS Accession No. ML14178B464).

3. SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan", (ADAMS Accession No. ML111861807).

4. SRM-SECY-11-0124, "Recommended Actions to be taken Without Delay from the Near-Term Task Force Report", (ADAMS Accession No. ML112911571).

5. SRM-SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned", (ADAMS Accession No. ML113490055).

6. SRM-SECY-11-0093, "Staff Requirements – SECY-11-0093 – Near-Term Report and Recommendations for Agency Actions following the Events in Japan," August 19, 2011 (ADAMS Accession No. ML112310021).

7. SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," February 17, 2012 (ADAMS Accession No. ML12039A103).

8. SRM-SECY-12-0025, "Staff Requirements – SECY-12-0025 - Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," March 9, 2012 (ADAMS Accession No. ML120690347).

9. Order EA-12-050, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents," March 9, 2012 (ADAMS Accession No. ML12054A694).

10. SECY-12-0157, "Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments", November 26, 2012 (ADAMS Accession No. ML12325A704).

11. SRM-SECY-12-0157, "Staff Requirements - SECY-12-0157, "Consideration Of Additional Requirements For Containment Venting Systems For Boiling Water Reactors With Mark I And Mark II Containments", March 19, 2013 (ADAMS Accession No. ML13078A017).

12. NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 0, November 12, 2013 (ADAMS Accession No. ML13316A853).

13. Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Severe Accident Reliable Hardened Containment Vents," November 14, 2013 (ADAMS Accession No. ML13304B836).

14. Nuclear Regulatory Commission Audits Of Licensee Responses To Phase 1 of Order EA-13-109 to Modify Licenses With Regard To Reliable Hardened Containment Vents Capable Of Operation Under Severe Accident Conditions (ADAMS Accession No. ML14126A545).

15. Order EA-12-049, "Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events", March 12, 2012 (ADAMS Accession No. ML12054A735).

16. Edwin I. Hatch Nuclear Plant, Units 1 and 2 - Interim Staff Evaluation related to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (ADAMS Accession No. ML13364A202).

17. Letter from SNC to NRC, Edwin I. Hatch, Units 1 & 2, Southern Nuclear Operating Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 27, 2013 (ADAMS Accession No. ML13059A385).

18. NUREG-1935, State-of-the-Art Reactor Consequence Analyses (SOARCA) Report (ADAMS Accession No. ML12332A058).

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Date: March 25, 2015

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Sincerely,

/RA/

Mandy K. Halter, Acting Chief
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Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

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