

NRC INSPECTION MANUAL

PBMB

TEMPORARY INSTRUCTION 2515/193

INSPECTION OF THE IMPLEMENTATION OF EA-13-109: ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS

CORNERSTONES: Initiating Events, Mitigating Systems, Barrier Integrity

APPLICABILITY: This temporary instruction (TI) applies to General Electric Boiling-Water Reactors with Mark I and II Containments upon NRC issuance of the plant-specific Safety Evaluation (SE) associated with Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML13143A321](#)).

2515/193-01 OBJECTIVE

To confirm through inspection the implementation of:

- NRC Order EA-13-109, which added requirements for reliable hardened containment venting system.

2515/193-02 BACKGROUND

Following the earthquake and tsunami at the Fukushima Dai-ichi nuclear power plant in March 2011, the NRC established a senior-level task force referred to as the Near-Term Task Force (NTTF). The NTTF conducted a systematic and methodical review of the NRC regulations and processes to determine if the agency should make safety improvements in light of the events in Japan. As a result of this review, the NRC staff issued SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan" (ADAMS Accession No. [ML11186A950](#)). Additionally, the NRC staff issued SECY-11-0124, "Recommended Actions To Be Taken without Delay from the Near-Term Task Force Report" (ADAMS Accession No. [ML112911571](#)), and SECY-11-0137, "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned" (ADAMS Accession No. [ML11272A111](#)), which established prioritization of the recommendations. NTTF Recommendation 5.1, concerning reliable hardened vents for Mark I and Mark II containments, was determined to be high-priority.

The Commission ordered licensees of boiling-water reactors (BWRs) with Mark I and Mark II containment designs to install a hardened containment vent system (HCVS). At Fukushima, limitations in time and unpredictable conditions associated with the accident significantly challenged attempts by the responders to preclude core damage and containment failure. In particular, the operators were unable to successfully operate the containment venting system. Order EA-13-109 requirements ensure that BWR Mark I and Mark II containments have reliable hardened venting capability.

Order EA-13-109 requires installation of reliable hardened wetwell vents that not only will assist in preventing core damage when normal containment heat-removal capability is lost, but also will function in severe accident conditions (i.e., after core damage has occurred). Severe accident conditions include the elevated temperatures, pressures, radiation levels, and concentrations of combustible gases, such as hydrogen and carbon monoxide that could result from accidents involving extensive core damage, including accidents involving a breach of the reactor vessel by molten core debris. The order includes provisions for the control of combustible gasses and for equipment operation in post-core-damage radiation environments. The order was structured as having two phases with different implementation schedules. Phase 1 requires installation of a severe-accident-capable hardened wetwell venting system. Phase 2 requires licensees to either install a severe-accident-capable drywell venting system or 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.

Guidance for meeting the order requirements was developed by the Nuclear Energy Institute (NEI) and the BWR Owners Group, and approved with conditions and limitations by the NRC staff. The staff issued interim staff guidance (ISG) documents that describe acceptable methods of complying with the order. Specifically,

- On November 14, 2013, the NRC issued JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," Revision 0 ([ML13304B836](#)), for Phase 1 of Order EA-13-109 on November 14, 2013. JLD-ISG-2013-02, Revision 0, endorsed, with exceptions and clarifications, the methodologies described in NEI 13-02, Revision 0, "Industry Guidance for Compliance with Order EA-13-109" ([ML13316A853](#)).
- On April 29, 2015, the staff issued JLD-ISG-2015-01, "Compliance with Phase 2 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" ([ML15104A118](#)) Revision 0, which endorsed the methodologies for meeting the requirements of Phase 2 described in NEI 13-02, Revision 1 ([ML15113B318](#)).

In addition to addressing Phase 2 of Order EA-13-109, NEI 13-02, Revision 1, includes some clarifications and additions to the guidance related to implementation of Phase 1 of the order. These changes reflect ongoing interactions with the NRC staff and lessons learned during implementation of Phase 1 the order. Revision 1 to NEI 13-02 provides acceptable guidance for both phases of Order EA-13-109, with the exceptions and clarifications noted in JLD-ISG-2013-02, Revision 0, and JLD-ISG-2015-01, Revision 0.

2515/193-03 INSPECTION REQUIREMENTS

Inspectors will verify that programs and systems for complying with NRC Order EA-13-109 are in place and were implemented by the licensee as described by the licensee and as reviewed by NRR staff.

The licensee's described the HCVS hardware and programmatic elements in the site specific submittal(s). The NRC staff's understanding and acceptance of the HCVS are documented in the NRC's plant-specific safety evaluations (SEs). See section 2515/193-11 for additional information.

See Appendix A for inspection requirements associated with Phase 1 of Order EA-13-109.

See Appendix B for inspection requirements associated with Phase 2 of Order EA-13-109.

2515/193-04 DOCUMENTATION AND REPORTING REQUIREMENTS

Document the completion of the TI as a stand-alone inspection report. Specific reporting requirements are discussed in the appendices to this TI.

The inspection report(s) containing the results should be forwarded to NRR/DLP/PBMB. Inspectors should contact NRR/DLP/PBMB with any questions related to the scope of this TI or with questions related to other inspector concerns identified while implementing this TI.

2515/193-05 COMPLETION SCHEDULE

Appendices A and B of this TI are to be initiated after the NRC has issued the plant-specific SE, which will most likely follow the licensee site-wide compliance with NRC Order EA-13-109. Appendices A and B should be completed as soon as practical after issuance of the safety evaluations and no later than 12/31/2020. NRR/DIRS has approved this TI to be in effect for greater than 24 months, based on the time necessary for the NRC headquarters staff to issue safety evaluations and for the regions to plan and perform inspections associated with this TI for all licensees in their region.

2515/193-06 EXPIRATION

The TI will expire on December 31, 2021.

2515/193-07 CONTACT(S)

Any request for technical support, or any administrative, documentation, or reporting questions should be addressed to NRR/DLP/PBMB.

2515/193-08 STATISTICAL DATA REPORTING

All direct inspection effort expended on this TI is to be charged to 2515/193 with an IPE code of TI. All indirect inspection effort expended on this TI for preparation and documentation should be charged to TPD (TI Preparation/Documentation).

2515/193-09 RESOURCE ESTIMATE

The estimated average time to complete the TI inspection requirements described is 60 hours per site (Appendix A – 35 hours, and Appendix B – 25 hours). Inspectors can take credit within the baseline inspection program for samples completed during this TI, as appropriate (e.g., complete or partial walkdown sample associated with IP 71111.04, “Equipment Alignment;” or IP 71111.18, “Plant Modifications).

2515/193-10 TRAINING

Training will be conducted by DLP staff via webinar or in person for the first few TI inspections by request from the regions, and the training sessions will be recorded. For subsequent TI inspections, the regions will use the recorded webinars as a refresher or to train any new inspectors participating in the TI inspections. DLP will provide onsite and/or remote support for all of the TI inspections. Although not required, it might be more efficient if inspectors familiar with the station's FLEX strategies (i.e., he/she was a member of the TI-191 inspection team for the station) are used to complete this TI.

2515/193-11 REFERENCES

Order EA-13-109, “Order Modifying Licenses with regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions, (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML13143A321](#)).

NEI 13-02, “Industry Guidance for Compliance with Order EA-13-109” Revision 0, dated November 2013 (ADAMS Accession Number [ML13316A853](#)).

NEI 13-02, “Industry Guidance for Compliance with Order EA-13-109” Revision 1, dated April 25, 2015 ([ML15113B318](#)).

Final Interim Staff Guidance: JLD-ISG-2013-02, “Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions,” Revision 0, dated November 14, 2013 ([ML13304B836](#)).

Final Interim Staff Guidance: JLD-ISG-2015-01, “Compliance with Phase 2 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions” Revision 0, dated April 29, 2015 ([ML15104A118](#)).

Licensee site-specific Final Integrated Plan and NRC Safety Evaluation covering EA-13-109

END

Appendices:

Appendix A: Phase 1 Reliable Severe Accident Capable Wetwell Venting System

Appendix B: Phase 2 Reliable Wetwell Venting Strategy

Attachments:

Attachment 1: Revision History Table

APPENDIX A – PHASE 1, RELIABLE SEVERE ACCIDENT CAPABLE WETWELL VENTING SYSTEM

2515/193-03 INSPECTION REQUIREMENTS:

03.01 General.

Order EA-13-109 was issued on June 6, 2013. Phase 1 of this order requires installation of reliable hardened wetwell vents that will not only assist in preventing core damage when containment heat-removal capability is lost, but will also function in severe accident conditions (i.e., when core damage has occurred). Severe accident conditions include the elevated temperatures, pressures, radiation levels, and concentrations of combustible gases 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. The safety improvements to Mark I and Mark II containment venting systems required by this order are intended to increase confidence in the plant's ability to remove heat from containment and control containment pressure following core-damage events. A hardened vent system would provide a path to the outside environment that would minimize release of containment atmosphere into the reactor building and avoid the associated potential loss of operator access or other hindrance of efforts to bring the core debris to a controlled and cooled condition in a timely fashion.

The purpose of Appendix A to this Temporary Instruction (TI) is to verify that the licensee has installed a HCVS in compliance with Phase 1 of NRC Order EA-13-109 (reliable hardened containment wetwell vents capable of operation under severe accident conditions). The licensee described the HCVS in the Final Integrated Plan (FIP), and the NRR staff reviewed the design and issued a plant-specific safety evaluation (SE). NRR based its review on statements the licensee made in its FIP, as supplemented by an audit of selected licensee documentation (via e-portal), and relied on licensee commitments to follow industry programmatic guidance. The intent of this TI is not to have inspectors re-perform a review of whether the HCVS, as described in the FIP, complies with Order EA-13-109, but rather to confirm that the HCVS hardware and programmatic controls are implemented as described by the licensee.

Appendix A will verify that the licensee has implemented the following general requirements of Phase 1 of Order EA-13-109:

- The performance objectives outlined in Section A.1.1 of Attachment 2 to Order EA-13-109;
- The design features specified in Section A.1.2 of Attachment 2 to the Order EA-13-109;
- The quality standards described in Section A.2 of Attachment 2 to the Order EA-13-109;
- The maintenance and testing program of HCVS equipment to ensure their availability and capability described in Section A.1.2.13 of Attachment 2 to Order EA-13-109;
- The procedures to safely operate the HCVS during an extended loss of AC power (ELAP) and during postulated severe accident scenarios have been integrated into the existing plant procedures such that entry into and exit from the procedures are clear, as described in Section A.3.1 of Order EA-13-109;
- Licensee staff have been adequately trained to ensure personnel can proficiently operate the HCVS during an ELAP and severe accident scenario as described in Section A.3.2 of Order EA-13-109.

03.02 Specific Inspection Requirements.

Note: These inspection requirements below are described consistent with the requirements outlined in EA-13-109. Some of the order requirements will be adequately verified by the NRR staff during the safety evaluation review; these order requirements do not need to be inspected and are not referenced below to avoid redundant staff effort. References to the applicable Order requirements and NEI 13-02 sections are included as an inspector aid and do not preclude inspectors from reviewing other applicable documentation.

a. HCVS Functional Requirements

Inspectors will verify the following to ensure the HCVS system is installed as described in the plant specific submittal(s) and associated safety evaluation (SE):

1. The HCVS is designed to minimize the reliance on operator actions (EA-13-109 Attachment 2, Requirement A.1.1.1 and NEI 13-02, Section 4.2.6.1).
 - (a) Verify operation of the HCVS is readily accessible to operators under all operational conditions without the need of ladders, scaffolding, etc.
 - (b) Verify the following:
 1. Operation does not require use of jumpers or lifted leads.
 2. No system or component assembly or disassembly is required.
2. The HCVS shall minimize operator exposure to occupational non-radiological hazards. (EA-13-109 Attachment 2, Requirement A.1.1.2).
 - (a) Confirm operating locations for local operation are as described in the plant specific submittal(s) and the associated SE.
3. The HCVS shall account for radiological conditions that would impede personnel action needed for event response (EA-13-109 Attachment 2, Requirement A.1.1.3).
 - (a) Confirm the transit and operating locations (both manual and remote) are as described in the plant specific submittal(s) and the associated SE.
 1. If shielding is used, confirm equipment and procedures are available such that they support the licensee's timeline.
4. The HCVS controls and indications are accessible and functional under the range of plant conditions, including severe accident conditions, ELAP, which results in a loss of normal heating and cooling and inadequate containment cooling (EA-13-109 Attachment 2, Requirement A.1.1.4).
 - (a) Verify the controls and indications are as described in the SE

b. HCVS Design Features

The bulk of the design and functional review will be done by the NRR staff during development of the safety evaluation. Inspectors will verify the following concerning HCVS system is installed as described in the plant specific submittal(s) and associated safety evaluation (SE):

1. The system is installed with acceptable features, such as check valves, to minimize unintended cross flow of vented fluids within a unit and between units on the site as described by the SE and licensee submittals (Order EA-13-109 Attachment 2, Requirement A.1.2.3).

- (a) The licensee should describe what constitutes “leak tight,” in submittal documentation that will be reviewed as part of the SE review. Inspectors should verify that the license has implemented the leak testing program as described.
- 2. The HCVS control panel is located in the main control room or a remote location that is readily accessible during sustained operation. (Order EA-13-109 Attachment 2, Requirement A.1.2.4). Sustained operation is defined in Appendix A of NEI 13-02.
- 3. Manual operation (e.g., reach-rod with hand wheel or manual operation of pneumatic supply valves from a shielded location) is accessible to plant operators (Order EA-13-109 Attachment 2, Requirement A.1.2.5).
- 4. Communication equipment (installed or portable) exists such that the operators can communicate between the control, remote, and various manual operating stations given the adverse radiological and environmental conditions of a severe accident scenario.
- 5. Dedicated and permanently installed equipment that is capable of operation 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 (Order EA-13-109 Attachment 2, Requirement A.1.2.6).
 - (a) Verify the equipment is installed as described in the SE and licensee submittal documents.
- 6. Installed equipment includes a means that will prevent inadvertent actuation of the HCVS, as described in the SE and licensee submittals (Order EA-13-109 Attachment 2, Requirement A.1.2.7).
- 7. The HCVS includes indication of the status of the vent system (e.g., valve position indication) from the control panel that is capable of sustained operation during an extended loss of AC power (Order EA-13-109 Attachment 2, Requirement A.1.2.8).
 - (a) Verify the indications are installed as described in the SE and licensee submittal documents.
- 8. Includes 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 and shall be designed for sustained operation during an extended loss of AC power (Order EA-13-109 Attachment 2, Requirement A.1.2.9).
 - (a) Verify the effluent discharge monitoring equipment is installed as described in the SE and licensee submittal documents.

c. Maintenance and Testing

- 1. Licensee has initially tested, or verified by some other means, HCVS equipment can perform its required function (NEI 13-02, Section 5.4.1). This includes support equipment such as communication equipment.
- 2. The HCVS portable and installed equipment is maintained to ensure reliability. Standard industry templates (e.g., EPRI) and associated bases have been developed to define specific maintenance and testing (NEI 13-02, Section 5.4.3).

3. Licensee has programmatic controls in place to ensure that if equipment and applicable connections are unavailable (e.g., due to maintenance), the licensee implements compensatory measures in accordance with guidance (NEI 13-02, Section 6.3).
4. Non-installed HCVS support equipment are stored in a manner consistent with EA-12-049/NEI 12-06 (FLEX equipment) (NEI 13-02, Section 5.4.6).
5. The licensee has a means to periodically test HCVS e.g., cycling vent valves ((NEI 13-02, Section 6.2.1)
6. The HCVS outboard of the containment boundary is tested to ensure vent flow is released outside plant structures and with minimal leakage, if any, through the interfacing boundaries with other systems or units (NEI 13-02, Section 6.2.3).
7. The licensee has implemented the testing and inspection guidance outlined in Section 6.2.4 of NEI 13-02.
8. Review condition reports related to HCVS equipment (for example, testing and validation, maintenance, failures, etc.) to ensure that deficiencies are being appropriately addressed/resolved.

d. HCVS Quality Standards

Inspectors will verify the following to ensure the HCVS system is installed as described in the plant specific submittal(s) and associated safety evaluation (SE):

1. Installed primary containment isolation valves (PCIVs) are locked closed, automatically isolated, or a normally-closed valve with a fail-closed mode (i.e., AOVs) (NEI 13-02, Section 4.1.2.1.3.4).
2. PCIV remote operation control switches have a key lock and key control is in accordance with plant procedures (NEI 13-02, Section 4.1.2.1.3.5).
3. If HCVS components including instrumentation are installed outside a seismic category 1 (or equivalent) building or enclosure then ensure the equipment is protected from the external hazards that screen in for the plant as defined in guidance NEI 12-06, Rev 0 as endorsed by JLD-ISG-12-01 for Order EA-12-049.

e. HCVS Programmatic Requirements

1. Procedures

Sample selected licensee's procedure(s) to verify that they address or contain the following attributes (sample size 2-4):

- (a) Plant procedures/guidance to operate, test and maintain the HCVS (NEI 13-02, Section 6.1.2.1).
- (b) Plant procedures/guidance are validated for operator usability/accessibility with normal power sources (no ELAP), an ELAP

with a loss of the normal access to the ultimate heat sink (UHS) and an ELAP/loss of UHS with core damage with or without vessel breach (NEI 13-02, Section 6.1.2.3).

- (c) Plant procedures/guidance coordinate with other procedures, for example, Abnormal Operating Procedures (AOPs), Emergency Operating Procedures (EOPs), FLEX Support Guidelines (FSGs), and Severe Accident Guides (SAGs) (NEI 13-02, Section 6.1.2.4)
- (d) Plant procedures/guidance use have been demonstrated (or planned to be demonstrated) in drills, tabletops during the following scenarios:
 - 1. Exercises with normal power sources (no ELAP),
 - 2. An ELAP with a loss of the ultimate heat sink (UHS), and
 - 3. An ELAP/loss of UHS with core damage with or without vessel breach (NEI 13-02, Section 6.1.2.5).

2. Training

Inspectors will verify the following:

- (a) Licensee has developed a training program to ensure all personnel expected to operate the HCVS receive initial and continuing training in the use of plant procedures developed for HCVS operation during all applicable scenarios (NEI 13-02, Section 6.1.3.1).
 - 1. Personnel assigned to direct the execution of HCVS operation are equipped through training to be familiar with the associated tasks considering available job aids, instructions, and time constraints.
- (b) Licensee has scheduled the training to be refreshed on a periodic basis consistent with the procedure control process at the plant, or following procedure changes (NEI 13-02, Section 6.1.3.2).
- (c) Licensee has ensured that specific guidance and procedures (e.g., EOPs, FSGs, and SAGs) that direct HCVS use are used when training is formulated (NEI 13-02, Section 6.1.3.3).

2515/193-04 REPORTING REQUIREMENTS

Inspectors will notify NRR/DLP/PBMB of any issues of concern and such issues will be screened through a cross-regional panel. Following consultation with NRR/DLP/PBMB, and outcome of a cross-regional panel, inspectors will document any issues in accordance with IMC 0612, "Power Reactor Inspection Reports" in a standalone inspection report.

If no more-than-minor issues of concern are identified, the following statements shall be included in the standalone inspection report:

Based on samples selected for review, the inspector(s) verified that the licensee satisfactorily implemented appropriate elements of the reliable hardened containment wetwell vent as described in the plant specific submittal(s) and the associated safety evaluation [provide ADAMS number] and determined that the licensee is in compliance with NRC Order EA-13-109 Phase 1, Reliable, Severe Accident Capable Wetwell Venting System (ADAMS Accession No. [ML13143A321](#))."

The inspectors verified that the licensee satisfactorily:

- Installed the HCVS to meet the performance objectives outlined in Section A.1.1 of Attachment 2 to the Order EA-13-109;
- Installed the HCVS system with the design features specified in Section A.1.2 of Attachment 2 to the Order EA-13-109;
- Designed the HCVS to meet the quality standards described in Section A.2 of Attachment 2 to the Order EA-13-109;
- Developed and implemented adequate maintenance and testing of HCVS equipment to ensure their availability and capability;
- Developed and issued procedures to safely operate the HCVS using normal power supplies, during an ELAP, and during a postulated severe accident scenario, and integrated the procedures into existing plant procedures and,
- Trained their staff to assure personnel can proficiently operate the HCVS.

The inspectors verified that any noncompliance with requirements, and standards identified during the inspection were entered into the licensee's corrective action program (list the correction action program document(s) number)."

END

APPENDIX B – PHASE 2, RELIABLE WETWELL VENTING STRATEGY

2515/193-03 INSPECTION REQUIREMENTS

03.01 General.

Phase 2 of the vent order requires that licensees either install a drywell vent system or develop a reliable containment wetwell vent strategy such that a drywell vent would not be necessary. Although licensees have the option to install a drywell vent, as of issuance of this TI, no licensee is installing a drywell vent. All licensees have developed reliable containment wetwell vent strategies, so this TI is written to reflect that option. The reliable venting strategy consists of two parts. The first is what NEI 13-02 defines as severe accident water addition (SAWA), which is the ability to provide water to the reactor pressure vessel or drywell under severe accident conditions (involves extensive core damage and fission product release into the reactor vessel and/or containment with potential for release to the environment). SAWA is needed in the near term (approximately 8 hours) to limit drywell temperature and prevent liner melt-through. The second strategy is severe accident water management (SAWM), which is defined as the strategy to manage SAWA in a way such that the use of the HCVS wetwell vent will be preserved, as defined in NEI 13-02. SAWM involves reducing SAWA flow rate when decay heat decreases, and controlling SAWA flow or suppression pool water level to prevent covering the vent.

Appendix B will verify that the licensee has implemented the following general requirements of Phase 2 of Order EA-13-109:

- The licensee developed a strategy making it unlikely that the licensee would need to vent from the containment drywell, that includes the following:
 - Implemented the SAWA systems as defined and fulfilled functional requirements for installed and portable equipment;
 - Installed and/or identified the previously-installed instrumentation to support SAWA/SAWM function
 - Developed and implemented adequate maintenance and testing of equipment for SAWA/SAWM to ensure their availability and capability;
 - Developed and issued procedures for SAWA/SAWM during the postulated severe accident scenario, and integrated their procedures into their existing plant procedures such that entry into and exiting from the procedures is clear;
 - Trained their staff to assure personnel can proficiently implement SAWA/SAWM during the postulated accident scenario.

03.02 Specific Inspection Requirements.

Note: References to the applicable Order requirements and NEI 13-02 sections are included as an inspector aid and do not preclude inspectors from reviewing other applicable documentation.

- a. Defined and fulfilled the functional requirements for installed and portable equipment.

Inspectors will verify the following to ensure the SAWA/SAWM equipment is installed/procured as described in the plant specific submittal(s) and associated safety evaluation (SE):

1. The licensee's onsite SAWA/SAWM pump can provide the flow rate as described in the SE and the licensee submittal documents (NEI 13-02, Appendix I, Section 1.4.1).
2. The SAWA/SAWM system shall be designed to minimize operator exposure to occupational non-radiological and radiological hazards (NEI 13-02, Section 4.2.5 and 4.2.2.4).
 - (a) Confirm operating locations for local operation that have been analyzed for lack of ventilation and radiological conditions, are as described in the SE and licensee submittal documentation.
 1. If shielding is used, confirm equipment and procedures are available such that they support the licensee's timeline.
 - (b) The described SAWA/SAWM route accounts for environmental and radiological conditions that would impede personnel action needed to deploy and operate SAWA/SAWM equipment.
 - (c) The portable equipment connections utilize engineered connection points as described in the SE and licensee submittal documentation such that SAWA functionality can be readily accomplished under the expected accident conditions present at that location at the time of connection, such as elevated humidity, temperature and radiation.
 - (d) Required motive force is provided for any (pneumatically or electrically) operated valve.
 - (e) Components can be accessed without using ladders or scaffolding.
3. Operators have a means to monitor SAWA/SAWM pump performance (NEI 13-02, Appendix I, Section 1.6.2.2).
4. Operators can verify the SAWA/SAWM flowpath is functioning from local or remote indications such as valve position, pump flow indication, system response and reduced SAWM flow rate as described (NEI 13-02, Appendix I, Section 1.6 Appendix C, Section 8).
5. Communication equipment (installed or portable) exists such that the operators can communicate between the control, remote and various manual operating stations given the adverse radiological and environmental conditions of a severe accident scenario.
6. The SAWA/SAWM flow path considered other possible flow paths and diversions (NEI 13-02, Section 4.1.4.3).
 - (a) Diversions and other flow paths are isolable.
 - (b) Isolation valve operation as described is reasonable and can be accomplished by operators given severe accident conditions during an ELAP.
 - (c) The licensee installed backflow prevention as described (NEI 13-02, Section 4.1.4.2).
 - (d) The SAWA/SAWM flow path is independent of the HCVS (NEI 13-02, Section 4.1.8.4).
7. If applicable, the portable and installed equipment are protected from inadvertent actuation by using manual valves or some other means as described (NEI 13-02, Section 4.2.1.4).

8. The portable SAWA/SAWM equipment is reasonably protected, in accordance with NEI 12-06, from the applicable external events as described in the plant-specific submittal(s) and safety evaluation (NEI 13-02, Section 5.4.6).
9. The SAWA/SAWM flow path can be deployed and provide flow within the time limits specified (NEI 13-02, Appendix I, Section 1.4.2).
10. The SAWA/SAWM system including water sources is capable of operating for the first 7 days as described, or the licensee has described the alternate reliable containment heat removal and pressure control strategy as described in their plant specific submittal (NEI 13-02, Appendix C, Section 7.1).
 - (a) The SAWA/SAWM system is capable of controlling the SAWM flow rate as described

b. Installed instrumentation

Inspectors will verify the following to ensure the SAWA/SAWM equipment is installed/procured as described in the plant specific submittal(s) and associated safety evaluation (SE):

1. Seismically rugged (as defined in Appendix A of NEI 13-02) instrumentation described is installed as described in the licensee submittal documentation and SE, and it is protected if located outside a seismic category I building (NEI 13-2, Section 5.2).
2. Wetwell level indication is available at the primary control location or a remote, readily accessible, location until battery-backed power is depleted and can be repowered in time to support the wetwell vent preservation as part of SAWM.
3. The SAWA/SAWM systems have indications to support flow determination, pump operation, and reduced SAWM flow rate as described (NEI 13-02, Appendix I, Section 1.6 Appendix C, Section 8).
4. The availability of instrumentation listed in the licensee specific submittal has the range and qualification necessary to support SAWA/SAWM (NEI 13-02, Appendix I, Section 1.6 Appendix C, Section 8).

c. Maintenance and Testing

1. Licensee has verified that the equipment was tested or the licensee has other means available to verify that it can perform its required function. (NEI 13-02, Section 5.4.1). This includes support equipment such as communication equipment as well.
2. The SAWA/SAWM portable and installed equipment is maintained to ensure reliability standard industry templates (e.g., EPRI) and associated bases have been developed to define specific maintenance and testing (NEI 13-02, Section 5.4.3 and Section 6.2.4).
3. Licensee has programmatic controls in place to ensure that if equipment and applicable connections are unavailable (e.g., due to maintenance), the licensee implements compensatory measures in accordance with guidance (NEI 13-02, Section 6.3).

4. The licensee has a means to periodically test SAWA/SAWM e.g., periodic pump runs (NEI 13-02, Section 6.2.1)
5. Review condition reports related to SAWA/SAWM equipment (i.e. testing and validation, maintenance, failures, etc) to ensure that deficiencies are being appropriately addressed/resolved.

d. SAWA/SAWM Programmatic Requirements

1. Procedures

Sample selected licensee's procedure(s) to verify that they address or contain the following attributes (sample size 2-4):

- (a) Plant procedures/guidance operate, test and maintain the severe accident capable SAWA/SAWM system (NEI 13-02, Section 6.1.2.1).
- (b) Plant procedures direct operator time sensitive actions needed to accomplish SAWA and SAWM during a severe accident scenario.
- (c) Plant procedures/guidance are validated for operator usability/accessibility with normal power sources (no ELAP), an ELAP with a loss of the ultimate heat sink (UHS) and an ELAP/loss of UHS with core damage with or without vessel breach (NEI 13-02, Section 6.1.2.3).
- (d) Plant procedures/guidance coordinate with other procedures, for example, Abnormal Operating Procedures (AOPs), Emergency Operating Procedures (EOPs), FLEX Support Guidelines (FSGs), and Severe Accident Guides (SAGs) (NEI 13-02, Section 6.1.2.4)
- (e) Plant procedures/guidance use have been demonstrated (or planned to be demonstrated) in drills, tabletops during the following scenarios:
 1. Exercises with normal power sources (no ELAP),
 2. An ELAP with a loss of the ultimate heat sink (UHS), and
 3. An ELAP/loss of UHS with core damage with or without vessel breach (NEI 13-02, Section 6.1.2.5).

2. Training

Inspectors will verify the following:

- (a) Licensee has developed a training program to ensure all personnel expected to operate the SAWA/SAWM equipment receive initial and continuing training in the use of plant procedures developed for SAWA/SAWM operation during normal operations, an ELAP with a loss of the UHS and an ELAP/loss of UHS with core damage with or without vessel breach (NEI 13-02, Section 6.1.3.1).
 1. Personnel assigned to direct the execution of SAWA/SAWM operation are equipped through training to be familiar with the associated tasks considering available job aids, instructions, and time constraints.
- (b) Licensee has scheduled the training to be refreshed on a periodic basis consistent with the procedure control process at the plant, or following procedure changes (NEI 13-02, Section 6.1.3.2).

- (c) Licensee has ensured that specific guidance and procedures (e.g., EOPs, FSGs, and SAGs) that direct SAWA/SAWM equipment use are used when training is formulated (NEI 13-02, Section 6.1.3.3).

2515/193-04 REPORTING REQUIREMENTS

Inspectors will notify NRR/DLP/PBMB of any issues of concern and such issues will be screened through a cross-regional panel. Following consultation with NRR/DLP/PBMB, and outcome of a cross-regional panel, inspectors will document any issues in accordance with IMC 0612, "Power Reactor Inspection Reports" in a standalone inspection report.

If no more-than-minor issues of concern are identified, the following statements shall be included in the standalone inspection report:

Based on samples selected for review, the inspector(s) verified that the licensee satisfactorily implemented appropriate elements of the reliable wetwell venting strategy as described in the plant specific submittal(s) and the associated safety evaluation [provide ADAMS number] and determined that the licensee is in compliance with NRC Order EA-13-109 Phase 2, Reliable, Severe Accident Capable Drywell (or alternative strategy) Venting System (ADAMS Accession No. [ML13143A321](#))."

The inspectors verified that the licensee satisfactorily:

- The licensee developed a strategy making it unlikely that the licensee would need to vent from the containment drywell, that includes the following:
 - Implemented the SAWA/SAWM systems as defined and fulfilled functional requirements for installed and portable equipment.
 - Installed and/or identified the previously-installed instrumentation necessary to implement SAWM;
 - Developed and implemented adequate maintenance and testing of SAWA/SAWM equipment to ensure availability and capability;
 - Developed and issued procedures to safely operate the SAWA/SAWM during an ELAP and during postulated severe accident scenario, and integrated their procedures into their existing plant procedures such that entry into and exiting from the procedures are clear when using existing plant procedures and,
 - Trained their staff to assure personnel can proficiently operate the HCVS during an ELAP and accident scenario.

The inspectors verified that noncompliances with requirements, and standards identified during the inspection were entered into the licensee's corrective action program (list the correction action program document(s) number)."

END

Attachment 1 – Revision History
TI 2515/193

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public)
	ML17102A560 DRAFT CN17-XXX	This is the initial issuance of a Temporary Instruction which will be used to verify licensee's satisfactory implementation of NRC Order EA-13-109, which added requirements for BWRs with Mark I and Mark II containments to add a hardened, reliable containment ventilation system and develop a reliable containment venting strategy that ensures the wetwell vent will remain functional during a severe accident scenario.	Presentations to be provided by NRR staff prior to initial inspection activities.	ML17107A110