U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Mark I and Mark II BWRs Containment Venting Systems

Implementation of Order EA-13-109

July 26, 2017

Japan Lessons Learned

Agenda

- Introductions
- Opening remarks
- Industry presentation – Final integrated plan (FIP) template development
- NRC staff generic comments on Phase 1 audit calls
- Other related issues
- NRC staff presentation–Temporary Instructions 2515-193
- Public questions and comments
- Toll free number: **888-560-9084** and pass code: **76545**

FIP Template Schedule

Public meetings to discuss proposed draft FIP template – June 1, and July 26, 2017. August/September meeting, if needed

- FIP template completion (target) – September 2017
- NRC staff proposed draft FIP checklist (ADAMS Acc. No. ML17200D081)
- NRC staff comments on the industry draft FIP template (ADAMS Acc. No. ML17200D038)

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FIP Development
Industry presentation

Japan Lessons Learned

Generic Comments on Phase 1 Audit calls

- Audit calls to date have been highly successful
- All calls have run less than 45 minutes
- Most items have been simple clarifications
- Typical there are 12-15 open items
- Most calls end with just a few action items
- Typical action items include:
  - identify specific location of information on e-portal documents
  - Post a document to the e-portal
  - Verify or clarify a specific piece of information usually through an email response

Generic Comments on Phase 1 Audit calls

- HCVS-WP-04: Discussion on how the 4 assumptions cited in the WP are applicable should be included
- Plant engineering change (EC) document is very large. Difficult to download and find the needed information
- Information on ePortal. Suggest timely uploading of technical information related to ISE open items closure
- A Table with listing of all I&C components including their locations will be useful

SE Open Item Status

ISE Open Item Number Requested Action	Licensee Response – Information provided in six-month updates and on the ePortal	NRC staff Close-out notes	SE status Closed; Pending; Open (need info from licensee)
Phase 1 ISE OI 1 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.	CED 6036742,Tab 6, Section 6.5.5 (E2 - Environmental Features), discusses the temperature and radiological conditions, as well as CED 6036742,Tab 6, Section 6.5.7 (E4 - Emergency Preparedness, Planning and Response). NEDC 15-002, "Review of Tetra Tech Portable Equipment Calculations in support of CNS FLEX Strategy," calculates the 24 hour room heat-up temperature profile in the Reactor Building and Control Building during an ELAP. The site-specific radiological conditions for the HCVS are evaluated in NEDC 15-024, "Radiological Conditions Resulting from the Operation of the HCVS," based on the bounding [Plant] - specific in-containment source term during the first seven days following an ELAP (NEDC 15-047, "HCVS Radiological Source Term").	Reviewed the information provided in the six-month updates and on the ePortal. Temperatures do not exceed 110° F, which is acceptable for long-term personnel habitability. Radiological conditions result in low operator dose. No follow-up questions.	Closed [Staff evaluation to be included in SE Sections 3.1.1.2 and 3.1.1.3]

SE Open Item Status (cont.)

Phase 1 ISE OI 2 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, and etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	CED 6036742, Tab 6, Section 6.5.5 (E2 - Environmental Features), provides a description of the local conditions (temperature, radiation, and humidity) for the HCVS components. NEDC 15-002, “Review of Tetra Tech Portable Equipment Calculations in support of CNS FLEX Strategy," calculates the24 hour room heat-up temperature profile in the Reactor Building and Control Building during an ELAP. The site-specific radiological conditions for the HCVS are evaluated in NEDC l5-024,"Radiological Conditions Resulting from the Operation of the HCVS," based on the bounding CNS-specific in containment source term during the first seven days following an ELAP (NEDC 15-047, “HCVS Radiological Source Term"). NEDC 15-023, "Calculation of the Pressure Gradient Across the HCVS Line and HCVS Maximum Operational Temperature," determines the HCVS pressure and temperature conditions for the HCVS pipe.	Reviewed the information provided in the six-month updates and on the ePortal. The reports NEDC 15-002, NEDC 15-024, NEDC 15-047, and NEDC 15-023 were not available on the ePortal for staff’s confirmation of the assumptions used in the analysis.	Pending. Licensee to upload the report on EPortal. [Staff evaluation to be included in Section 3.1.2.10]

SE Audit Table

SE Section	Audit Summary
3.1.1.2 Personnel Habitability – Environmental Order EA-13-109, Attachment 2, Section 1.1.2 requires that the HCVS be designed to minimize plant operators' exposure to occupational hazards, such as extreme heat stress, while operating the HCVS system. Relevant guidance is found in NEI 13-02 Sections 4.2.5 and 6.1.1, NEI 13-02 Appendix I, and HCVS-FAQ-01.	Accessing HCVS equipment, following an external event that results in an ELAP, will subject the operator to prevailing area temperatures. The majority of the operator travel path from the MCR to the ROS is outdoors. Therefore, the travel path does not pose any habitability concerns, with respect to temperature. The MCR and ROS are expected to remain habitable, with respect to temperature, during the event. During the ELAP, as with the station blackout, normal ventilation systems are inoperable and non-vital equipment is not contributing to the area heat load. Therefore, area temperatures in the MCR will be higher than that for normal operation and likely more in line with that for station blackout. The licensee performed calculation ES-198, "Control Building Station Blackout Analysis," Revision 1, which predicts the control room heat-up following a station blackout. The licensee's MCR heat-up analysis determined that the peak area temperature for the MCR is 100 °F. The area temperature for the ROS in the Track Bay is not expected to undergo any appreciable change as a result of the event. There is no vital equipment in the area that would be operating, adding to the heat load, and the space has a 20' vertical height, which will moderate the area temperature. Additionally, the Track Bay door to the outside can be opened to moderate the temperature, if needed. Based on the expected temperature response in the MCR and ROS remaining below the limit of 110 °F (the temperature limit, as identified in NUMARC-87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," Rev. 1, for control room habitability), the staff finds it reasonable that operators can safely access and occupy the MCR and ROS during an ELAP event.

SE Audit Table (cont.)

SE Section	Audit Summary
3.1.1.3 Personnel Habitability – Radiological Order EA-13-109, Attachment 2, Section 1.1.3 requires that the HCVS be designed to account for radiological conditions that would impede personnel actions needed for event response. Relevant guidance is found in NEI 13-02 Sections 4.2.5 and 6.1.1, NEI 13-02 Appendices D, F, G and I, HCVS-FAQ-01, -07, -09 and -12, and HCVS-WP [White Paper]-02.	The licensee performed calculation H21C-114, "Hardened Containment Vent System Dose Assessment," Revision 0, which performs a dose assessment for designated areas inside the reactor building (outside of containment) and outside the reactor building caused by the sustained operation of the HCVS under a beyond design basis severe accident condition of an ELAP. Calculation H21C-114 was performed using NRC-endorsed HCVS-WP-02 [Reference X] and HCVS-FAQ-12 [Reference X] methodologies. Consistent with the definition of sustained operations in NEI 13-02, Revision 1, the integrated radiation dose due to HCVS operation was determined over a 7-day period. The 7-day dose determined in the calculation is a conservative maximum that assumes ELAP and fuel failure starting at reactor shutdown. For the sources considered and the methodology used in the calculation, the timing of HCVS vent operation or cycling of the vent will not create higher doses at locations important to personnel habitability and equipment functionality (i.e., maximum doses determined in the calculation bound operational considerations for HCVS vent operation). The operator travel path is designed to minimize the dose to the operator from shine off of the HCVS vent pipe on the west side of the Reactor Building. The areas along the majority of the path are heavily shielded from the HCVS vent pipe and expected dose rates would not be significant (< 1 mR/hr). The dose rate along the path between the Control Building and the Maintenance Building could be significant (several R/hr). However, the exposure to this dose rate would be for a few seconds and the accumulated dose would not be significant. In the licensee's dose calculation, the peak maximum dose rates and 7-day total integrated dose have been calculated for the MCR and the ROS. The radiation dose to personnel occupying defined habitability locations, resulting from HCVS operation, are less than 5 rem as shown below: MCR: 7-day Total Integrated Dose = 4.1 rem ROS: 7-day Total Integrated Dose < 1 rem Based on the expected total integrated radiological dose in the MCR and ROS during the sustained operating period, the NRC staff concludes, with reasonable assurance, that the mission doses associated with actions taken to protect the public under severe accident conditions will not subject plant personnel to an undue risk from radiation exposure.

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Temporary Instructions 2515-193
Inspection of Implementation of EA-13-109

(ADAMS Accession No. ML17102A560)

Japan Lessons Learned

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TI-193 – Hardened Vent Inspection

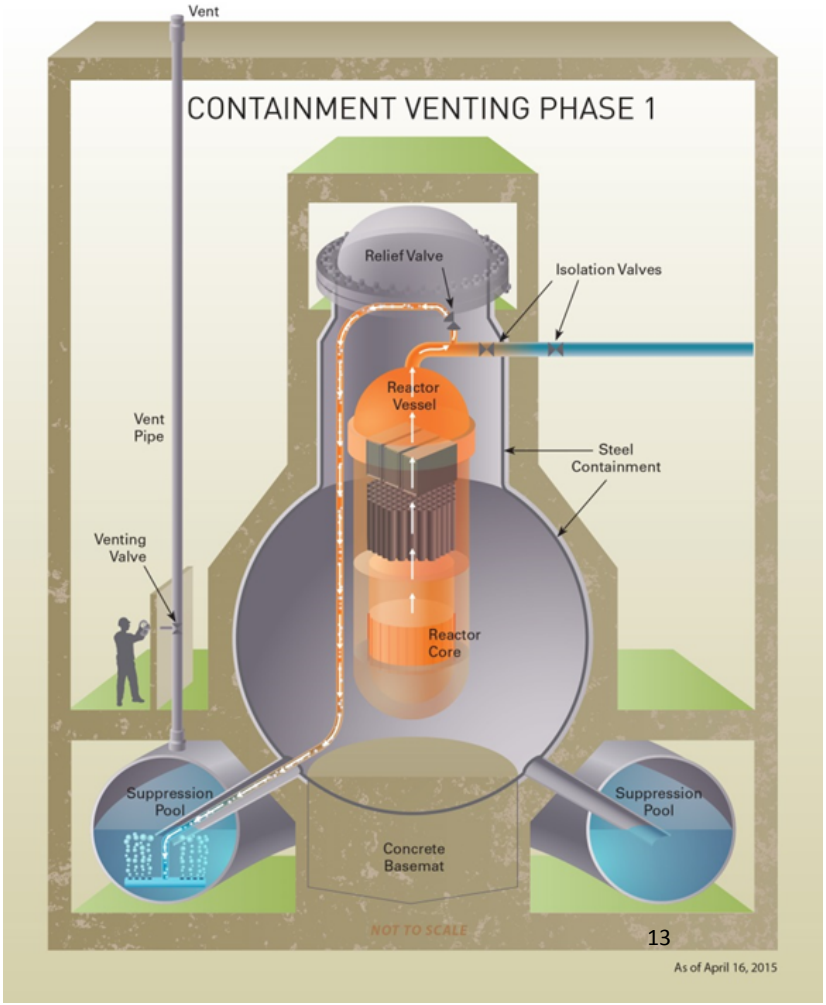
July 26, 2017

Kevin Roche

Reactor Systems Engineer, JLD

Topics

- DRAFT TI-193 Overview
- Remaining Work
- Compliance Dates



TI-193 Overview

- Background
- Inspection Requirements
  - Appendix A – Phase 1 requirements
  - Appendix B – Phase 2 requirements
- Stand-alone inspection report
- Follows site compliance and issuance of NRC Safety Evaluation
- Estimate 60 hours, 2 inspectors onsite for ~4 days

TI-193 Overview Continued

- Design review will be conducted during NRR Audit (currently ongoing)
- Inspectors verify implementation is consistent with documentation
- Avoids redundant review
- TI includes references to applicable Order and NEI 13-02 sections
- Two appendices allow for inspector flexibility

Remaining Work

- Issue inspection procedure – September 2017
- Conduct inspector briefings as necessary – Spring 2018
- Conduct pilot inspection – Summer/Fall 2018
- Cross regional panel to disposition issues
- Significance determination

Compliance Dates

- Potential pilot inspection sites
  - Hope Creek
  - Nine Mile Point, Unit 2

- Site Compliance dates with Phase 2 of EA-13-109
  - Region 1 – 6 sites (10 units)
    - Hope Creek – Spring 2018
    - Peach Bottom – Fall 2018
    - Fitzpatrick – Fall 2018
    - Limerick – Spring 2019
    - Nine Mile Point – Spring 2019
    - Susquehanna – Spring 2019
  - Region 2 – 3 (7)
    - Browns Ferry – Spring 2019
    - Brunswick – Spring 2019
    - Hatch – Spring 2019
  - Region 3 – 6 (9)
    - Dresden – Fall 2018
    - Duane Arnold – Fall 2018
    - Fermi – Fall 2018
    - LaSalle – Spring 2019
    - Monticello – Spring 2019
    - Quad Cities – Spring 2019
  - Region 4 – 2 (2)
    - Cooper – Fall 2018
    - Columbia – Spring 2019

Reference Documents (Order EA-13-109)

- Order EA-13-109 issued – June 6, 2013 (ADAMS Accession No. ML13143A321)
- JLD-ISG-2013-02 issued - November 14, 2013 (ADAMS Accession No. ML13304B836)
- JLD-ISG-2015-01 issued – April 29, 2015 (ADAMS Accession No. ML15104A118)
- NEI 13-02, Revision 1 issued – April 2015 (ADAMS Accession No. ML15113B318)
- HCVS Phase 1 and 2 OIP Template – September 28, 2015 (ADAMS Accession No. ML15273A141)

Contact Information

- Rajender Auluck, Sr. Project Manager
  - Office of Nuclear Reactor Regulation
    Division of Japan Lessons-Learned
    Containment and Balance of Plant Branch
    301-415-1025
    Rajender.Auluck@NRC.gov

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Questions & Discussion

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