HCVS Guidance Inquiry Form

A. TOPIC: HCVS Instrument Qualification — Inq. No.: HCVS-FAQ-08

Source document: NEI 13-02 — Sections: Order EA-13-109, Element 1.1.1, 1.1.2, 1.1.3, 1.2.4, 1.2.5, 1.2.6, NEI 13-02 Section 4.2.2, 4.2.3 4.2.4

B. DESCRIPTION:

Note: This FAQ addresses the environmental and radiological impacts on the ability of HCVS instrumentation to remain functional during the sustained operational period. Environmental and radiological impacts on accessibility and habitability for system operation are addressed in FAQ HCVS-01, HCVS Primary Controls and Alternate Controls and Monitoring Locations.

What conditions have to be considered in the design and siting of HCVS Controls and monitoring equipment?

Order Element 1.2.4 states, "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."

Order Element 1.2.5 states, "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."

Order Element 1.2.6 states, "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."

C. PROPOSED ANSWER (Include additional pages if necessary. Total pages: 3)

Environmental Conditions:
The Primary/Alternate controls and monitoring equipment design must consider the following:

Thermal Considerations: (See Order Elements 1.1.2 and 1.1.4):

- Main Control Room (MCR) temperature and heat load that exist for operation of the HCVS system.
  - Temperature and heat load that exist due to proximity to the undercooled containment.
    - MCR Temperatures considered for Order EA-12-049 (FLEX) are reasonable to use since any changes as the result of a severe accident are not expected to impact the MCR due to Control Room location in a separate air space and FLEX ventilation methods applied to the MCR
  - Temperature and heat load that exists due to the ELAP condition (loss of ventilation).
    - Utilize toolbox actions (e.g., portable fans, opening of doors, etc.) and EA-12-049 (FLEX) mitigation strategies.
    - HCVS controls and instrumentation will be similar to other instrumentation and controls found in most MCRs. Unless the licensee uses controls and instrumentation in the HCVS system that are known to be susceptible to failure from elevated temperatures but within habitability limits, no evaluation of temperature effects needs to be performed for HCVS components located in the MCR.
- Primary or Alternate Control location (if other than MCR) temperature and heat load that exist for operation of the HCVS system.
  - Temperature and heat load that exist due to proximity to the undercooled containment
  - Temperature and heat load that exists due to the ELAP condition (loss of ventilation).
    - If this location is NOT in the Reactor Building or other buildings where HCVS piping is located then the heat load impact is similar to the MCR when the location is in a separate air space.
    - HCVS controls and instrumentation located outside the MCR will be similar to other instrumentation and controls found in plant locations outside the MCR. Unless the licensee uses controls and instrumentation in

the HCVS system that are known to be susceptible to failure from elevated temperatures but within habitability limits, no evaluation of temperature effects needs to be performed for HCVS components located outside of the Reactor Building or other buildings where HCVS piping is located.

Radiological Considerations: (See Order Elements 1.1.3)

- Main Control room radiological conditions that exist from operation of the HCVS system.
  - This analysis is bounded by the required dose considerations for MCR design in General Design Criteria (GDC) 19 or the Alternate Source Term (AST) analysis
- Primary or Alternate Control location (if other than Control Room) radiological conditions that exist for operation of the HCVS system.
  - This analysis may be bounded by the required dose considerations for Control Room design in General Design Criteria (GDC) 19 or the Alternate Source Term (AST) analysis if this location is outside the Reactor Building due to Reactor Building to Auxiliary Building Shielding design.
  - If the location is inside the Reactor Building, then it will need to be evaluated for radiological impact due to HCVS system operation under severe accident conditions.
- The specific event progression that leads to the Severe Accident is NOT specified and does not have to include multiple path source terms from loss of Spent Fuel Pool Cooling as this would presume that the event progression that leads to the Severe Accident also prevents or causes the mitigating measures for loss of Spent Fuel Pool Cooling to fail. Order element 1.1.3 does discuss the requirement to consider the dose and radiological conditions caused by operation of the HCVS system but not failure of Mitigating Strategies related to Spent Fuel Pool Cooling.

Time frame:

The instrumentation should be capable of operating in the thermal and radiological environment for at least 24 hours without significant operator action (see FAQ HCVS-02, HCVS Dedicated Equipment, for a discussion of significant operator action considerations for the first 24 hours of the sustained operational period). Other provisions of NEI-13-02 such as the definition of "Sustained Operations" extend this time but do NOT preclude mitigating measures from FLEX or offsite support for reduction in thermal or radiological impacts (e.g. portable fans, AC power for ventilation, possible cooling water supplies to the area coolers if part of the FLEX mitigating measures. The restriction on permanently installed equipment and operator actions only exists for the 24 hour period to ensure HCVS viability for at least a 24 hour mission time. See FAQ HCVS-02 on Order Element 1.2.6 use of "dedicated equipment" and HCVS-WP-01, HCVS Dedicated Power and Motive Force.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 3)

Revision: 0 Date: _____

E. NRC Review:

Not Necessary _____ Interpretation X Agency Position _____

Explanation: _____

F. Industry Approval:

Documentation Method: FAQ Date: _____