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BWR OWNERS' GROUP

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BWROG-12020
May 18, 2012

Project No. 691

To: Mr. Robert J. Fretz
Nuclear Regulatory Commission
Mail Code O-9D02
11555 Rockville Pike
Rockville, MD 20852

SUBJECT: Transmittal of BWROG Information

Attachment: Proposed BWROG Interim Staff Guidance

Dear Mr. Fretz:

As a follow-up to our meeting with the NRC on May 2, 2012, the BWR Owners' Group (BWROG) is providing proposed Interim Staff Guidance (ISG) elements for your consideration in developing ISG for NRC Order EA-12-050 (Reliable Hardened Containment Vents). We understand that you intend to issue the ISG for this Order in August 2012, and we appreciate the opportunity to provide this input.. The attached input provides, in tabular form, the recommended ISG elements for each provision of the Order.

Additionally, I am concerned that a February 2013 submittal date for a detailed implementation plan (Section IV.C.1 of Order EA-12-050) is not realistic if the NRC desires to have FSAR detail and P&ID's included in this plan as described by NRC staff in the May 2, 2012 meeting. Provision of FSAR detail and P&IDs would require information from walkdowns that may not be feasible before that date. I recommend that the NRC discuss its expectations for this submittal further with industry so that agreement on the content of this submittal can be achieved.

If you have questions about this input, we will be happy to discuss them with you during our meeting with you on May 23, 2012. Please contact me or Mr. Rob Whelan, BWROG Project Manager, at 910-200-1006 with any other questions.

Regards,

Frederick P. "Ted" Schiffley, II
Chairman
BWR Owners' Group

cc: C.J. Nichols, BWROG Program Manager
BWROG Primary Representatives

Enclosure

Attachment

BWR INTERIM STAFF GUIDANCE ELEMENTS FOR RHV ORDER

MAY 2, 2012

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1. Functional Requirements	
Boiling Water Reactor (BWR) Mark I and Mark II containments shall have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following events that result in the loss of active containment heat removal capability or prolonged Station Blackout (SBO). The hardened vent system shall be accessible and operable under a range of plant conditions, including a prolonged SBO and inadequate containment cooling.	
1.1 HVCS Performance Objectives	
1.1.1 The HCVS shall be designed to minimize the reliance on operator actions.	1.1.1 The HCVS should be designed to minimize the reliance on operator actions. • Operators may be involved in the initiation of system operation and shall be involved in the cessation of venting. Opening of HCVS flow path may rely on an operator to initiate valve alignment. Appropriate emergency procedures will drive vent initiating actions. • Operator actions to initially align the HCVS flow path and to isolate inter-connected systems by manual positioning of valves is allowed provided isolation of the HCVS flow path is maintained.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
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.	1.1.2 If normal motive power is available, operators should be able to vent containment from environmentally accessible equipment operating locations (i.e., not compromised by the effects of occupational hazards during ingress, egress, or system manipulation). The licensee can use qualitative or quantitative evaluations to determine the occupational hazards at the proposed locations. This is the preferred method of operation. Equipment may be operated and controlled by portable equipment (aligns with NEI's FLEX philosophy) from an accessible operating location. Note that this criterion refers to both valve opening and valve closure (as required for venting operation). For example, provisions must be in place such that the equipment can be operated from a safe location (consider strategically placed insulation, reach rods, quick disconnect located in a low temperature and dose area, etc.). Such accident occupational and radiological hazards must be considered relative to valves, valve actuation devices, portable equipment hookup locations, etc. (e.g. – no operation of valves located adjacent to torus should be considered for post-accident venting evolutions). Note that the associated equipment must be accessible through the accident coping period (e.g. – equipment operation access locations should be in seismically rugged areas and equipment operation access locations should anticipate occupational hazards at later times during the coping period). See NEI 12-06 FLEX Guidance Document for further information on potential post-accident hazards.
1.1.3 The HCVS shall also be designed to minimize radiological consequences that would impede personnel actions needed for event response.	1.1.3 Radiological considerations to be addressed are those associated with a BWR to allow operation of a reliable hardened vent under a range of plant conditions including a prolonged SBO and inadequate containment cooling. The HCVS design should minimize both radiological and temperature considerations that could impede overall event response in addition to HCVS operation. These overall event response actions could include ingress, egress, and connection of FLEX equipment.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1.2 HCVS Design Features:	
1.2.1 The HCVS shall have the capacity to vent the steam/energy equivalent of 1 percent of licensed/ rated thermal power (unless a lower value is justified by analyses), and be able to maintain containment pressure below the primary containment design pressure.	1.2.1 Option 1: The HCVS should have the capacity to vent the steam/energy equivalent of 1 percent of licensed/ rated thermal power (unless a lower value is justified by site-specific analyses), and be able to maintain containment pressure below the primary containment design pressure or PCPL (whichever is lower). The preferred venting source should be the wetwell. This sizing will be dependent on containment conditions associated with the following scenarios: • Events similar to those at the Fukushima plants • Prolonged Station Blackout • Loss of decay heat removal The overall purpose of the system is for the prevention of core damage and containment protection. Option 2: Analyses should be used to justify a lower power level than 1%. Plants performing this analysis should consider that 1% decay heat (post-shutdown) is arrived at only a few hours after shutdown. As it is relatively conservative to assume that PCPL and/or design pressures will be reached by that point in time, 1% is considered to be a conservative value containing reasonable margin for such vent design. With respect to margin, it is expected that the HCVS will have approximately 10% margin above these operational design values at which it may be operated effectively. Such margin is expected to be inherent in the system design (based on work done relative to GL 89-10 for MOVs, work done by the AOV Users Group, and the codes and standards used in designing and constructing these systems). This margin should be verified by the individual plant sites.
1.2.2 The HCVS shall be accessible to plant operators and be capable of remote operation and control, or manual operation, during sustained operations.	1.2.2 HCVS should be able to be operated and controlled by portable equipment from an accessible operating location that limit the occupational hazards as defined in 1.1.2 and 1.1.3. NOTE: This criterion applies for operator actions that require substantial stay times to manipulate valves or connect portable equipment, etc. Feasibility of operator actions should be determined by a process similar to the one used for validating other manual actions in the plant.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1.2.3 The HCVS shall include a means to prevent inadvertent actuation.	1.2.3 The HCVS should include a means to prevent inadvertent actuation. • No single active failure can cause inadvertent actuation • Methods (to prevent inadvertent actuation) may include rupture discs, pulled fuses to key valves, keylocked switches, etc. Stipulations set forth in Section 1.1.2 are applicable here • Consideration should be given to other general plant design guidelines such as single point vulnerability, spurious operations, etc. for normal operation of any plant installed equipment associated with HCVS
1.2.4 The HCVS shall include a means to monitor the status of the vent system (e.g., valve position indication) from the control room or other location(s). The monitoring system shall be designed for sustained operation during a prolonged SBO.	1.2.4 The HCVS should include a means to monitor the status of the vent system with process instrumentation from the control room or other location(s). The monitoring methods used should be designed for sustained operation during a prolonged SBO. "Sustained operation" may include the use of FLEX equipment as necessary. Indicators to be used may be (but are not limited to) of valve position (both remote and local), pressure indication, radiation levels, containment pressure, temperature indication, flow, etc. Multiple indications should be used in conjunction with one another such that a reasonable indication of flow (to the preferred release point) is achieved.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1.2.5 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 in the control room or other location(s), and shall be designed for sustained operation during a prolonged SBO.	1.2.5 The HCVS should include a means to monitor for radioactivity that may be released from operation of the HCVS. This is intended as a gross monitoring system for the overall activity in the release providing indication of vent operation. The monitoring system shall provide indication in the control room or other location(s), and should be designed for sustained operation during a prolonged SBO. "Sustained operation" may include FLEX equipment as necessary. The radiation monitor should indicate that effluent from the reactor are passing by the monitor. The monitor does not need to meet the requirement of NUREG 0737 for monitored release points nor does it need to be able to monitor releases quantitatively to ensure 10 CFR 100 (or 10 CFR 50.67, whichever is applicable) limits are met. The monitor should be able to provide a rough estimate of releases based on the containment volume, the pressure change and typical reactor coolant radioactivity. An acceptable "wide" range for the monitor may be 0.1 to 1,000 mr/hr. A recorder or some other means to trend the monitor reading would be desirable. The monitoring device should be located such that there is no interference from other potential radiation sources. And it should be located close to the vent path such that effective monitoring is assured. If venting is performed, gross radiation monitors will indicate a spike in gamma release once venting is initiated. Specific isotopic indication is not required for positive indication of venting.
1.2.6 The HCVS shall include design features to minimize unintended cross flow of vented fluids within a unit and between units on the site.	1.2.6 The HCVS should minimize the use of common systems between multiple units. If a site must vent multiple units through a common stack or elevated vent pipe, common vent pipes must be capable of accommodating simultaneous vent flow (based on Criterion 1) from all connected units. The discharge flow should not interfere with the operation of HCVS equipment. This criterion also includes vent flow between systems in the same unit. Interfacing valves (e.g. valves which isolate the vent path from SGTS) must be able to withstand conditions associated with the initiation of venting and design vent flow. This includes assurance that released gases cannot migrate into low pressure systems (e.g. assurance that butterfly valve seats and seals, and boot seals can be assured to maintain their integrity). Consideration should be given to minimizing the environmental hazard for the operation of other equipment. Provide testing, procedural guidance, etc. that assures that interfaces with adjacent low pressure systems are able to accommodate effective venting at 100% capacity.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1.2.7 The HCVS shall include features and provision for the operation, testing, inspection and maintenance adequate to ensure that reliable function and capability are maintained.	1.2.7 The HCVS should include features and provisions for the operation, testing, inspection and maintenance adequate to ensure that reliable function and capability are maintained. Items that should be considered relative to this criterion: • All isolation valves tied to other systems should be leak tested no less frequently than every three cycles. Frequency may be adjusted based on plant-specific performance. • A visual inspection/walkdown of the accessible HCVS equipment and support equipment should be performed every cycle. • Vent valve cycling should be performed every 2 refueling cycles. • On a 10 year frequency validate the site procedure for HCVS. • Existing work control processes may be used to control maintenance and testing.
1.2.8 The HCVS shall be designed for pressures that are consistent with maximum containment design pressures as well as dynamic loading resulting from system actuation.	1.2.8 The HCVS should be designed for pressures that are consistent with maximum containment design pressures as well as dynamic loading resulting from system actuation. Design considerations are: • The effect of piping reaction loads that may result from potential water hammer events as a result of use of quick opening isolation barriers (rupture disks, valves). The HCVS should be designed to minimize the potential for water hammer. • For dynamic loading, water hammer should also be considered during subsequent venting cycles if condensed steam is not adequately drained from the HCVS piping. • Stack/release pipe along with dynamic response associated with multiple ventings shall also be considered. • The HCVS should be capable of venting over a range of containment pressures up to the design pressure or PCPL. • The hardened vent should ensure that no ignition sources are present in the pipe flow path. • The HCVS should be designed to accommodate multiple venting cycles. This may include FLEX options for motive force for component operation.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
1.2.9 The HCVS shall discharge the effluent to a release point above main plant structures.	1.2.9 The HCVS should discharge the effluent to a release point above main plant structures. Main plant structures include power block and ancillary buildings such as DG building and SW building. It does not include Plant Stack or Cooling Towers. Release point should be situated away from HVAC intake to Main Control Room and Emergency Response facilities.
2. HCVS Quality Standards for reliable HCVS	
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. These items include piping, piping supports, containment isolation valves, containment isolation valve actuators and containment isolation valve position indication components.	2.1 The HCVS vent path up to and including the second containment isolation barrier should be designed consistent with the design basis of the plant. These items include piping, piping supports, containment isolation valves, containment isolation valve actuators and containment isolation valve position indication components.
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.	2.2 All other HCVS components should be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. These items include piping (up to and including release point), piping supports, electrical power supply, valve actuator pneumatic supply and instrumentation (local and remote) components. Options might include: • Use Category I design criteria • Evaluate according to industry established standards such as SQUG • Other engineering basis as supported by plant engineering analysis
3. Hardened Containment Venting System Programmatic Requirements	
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 SBO conditions.	3.1 The Licensee should develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures should be established for system operations when normal and backup power is available, and during SBO conditions. In the TRM or equivalent document, establish an out-of-service time and compensatory measures. For planned maintenance/testing, the system may be out of service for up to 7 days during Modes 1, 2, and 3. For an unplanned, nonfunctional condition during Modes 1, 2, and 3, initiate actions within 24 hours to restore capability, and either restore functionality or implement compensatory measures within 7 days.

NRC ORDER PROVISIONS	POTENTIAL ISG ELEMENTS
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 SBO conditions.	3.2 The Licensee should train appropriate personnel in the use of the HCVS. The training curricula should include system operations when normal and backup power is available, and during SBO conditions. • Use of installed equipment should follow the established Systematic Approach to Training process to determine the training requirements • Backup equipment should have programs and controls established to assure the personnel proficiency needed to mitigate beyond design-basis events remain effective in accordance with an accepted training process in a manner similar to the methods used for SAMG Training • Operator training for Beyond Design Basis Event accident mitigation should not be given undue weight in comparison with other training requirements, and that responsibility for demonstrating knowledge in this area be similarly limited • Personnel assigned to direct the execution of mitigation strategies for beyond design-basis events will receive necessary training to be familiar with the associated tasks, considering available job aids, instructions, and mitigating strategy time constraints.