GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

January 13, 1994

Docket No. 52-001

Chet Poslusny, Senior Project Manager
Standardization Project Directorate
Associate Directorate for Advanced Reactors
and License Renewal
Office of the Nuclear Reactor Regulation

Subject: Submittal Supporting Accelerated ABWR Schedule - **Containment Emergency Procedure Guidelines Issues**

Reference: R. W. Borchardt Letter to J. F. Quirk, "GE ABWR Containment Systems and Severe Accident Review Issues", December 29, 1993

Dear Chet:

This letter responds to the Low-Pressure Venting Items 1, 3, 4, and 5 of the subject issues transmitted by the above reference. The issues are repeated below followed by responses:

1. Revise EPGs (PC/P) to show the venting is restricted to the 2-inch line in the drywell.

   Response:

   EPG Step PC/P has been revised in Amendment 33 of the SSAR to state that venting of the containment is restricted to the 2-inch (50A) Atmosphere Control System (ACS) drywell bleed line.

3. Address containment isolation configuration of interconnection in the ACS between the wetwell and drywell. GE should justify automatic control of the ACS over normally closed penetration ensuring containment integrity.

   Response:

   See attached markup of Subsection 6.2.4.3.2.2.2.3, Page 6.2-27.

4. Address suppression pool level issue in EPGs relating to the wetwell to drywell interconnection level. The EPGs appear to be inconsistent with the design.

   Response:

   The purpose of the EPG steps that specify spraying the drywell only if suppression pool water level is below 11.7 meters is to preserve the functionality of the wetwell-to-drywell vacuum breakers. There is no requirement to limit the suppression pool water level below 8.6 meters which is elevation of the water return paths (either from lower drywell to suppression pool or from suppression pool to lower drywell). The attached markup of Appendix 18B, Table 18B-1, Page 18B-11 provides this clarification.

5. Address suppression pool level and pressure control EPGs for injection from sources outside of containment. The EPGs appear to require conflicting actions in the SP/L-3.3 directs operators to stop injection from sources outside containment when the suppression pool level reaches 27.2 meters. Whereas, PC/P-6 directs operators to spray the containment when the water level reaches 27.2 meters (using sources external to the containment).

   Response:

   EPG Step PC/P-6 has been revised in Amendment 33 to allow containment spray only if containment water level is below 27.2 meters.

Item 2 is under preparation and scheduled for completion by January 28, 1994.

Please provide a copy of this transmittal to Mark Reinhart.

Sincerely,

Jack Fox

Jack Fox
Advanced Reactor Programs

cc:	Joe Quirk	(GE)
	Alan Beard	(GE)
	Norman Fletcher	(DOE)
	Cal Tang	(GE)

Table 18B-1 Differences Between BWROG EPG Revision 4 and ABWR EPG (Continued)

ABWR EPG Step	BWROG EPG Rev. 4 Step	Differences from BWROG Rev. 4 EPG	Basis for Differences
DW/T-2 (continued)		• Replaced phrase, "elevation of bottom of internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water", with the phrase, "elevation of the bottom of suppression pool-to- lower-drywell vent".	• In the ABWR containment, vents are provided connecting the upper drywell to the lower drywell. When the wetwell-to-drywell vacuum breakers open, flow is from the wetwell to the lower drywell and then from the lower drywell to the upper drywell through these vents. The vacuum breakers are located above the vents. ~~Water can also spill to the lower drywell~~ from the suppression pool if pool level reaches the vents. Water can also flow from the lower drywell to the suppression pool if lower drywell is flooded to the elevation of these vents. ~~For these reasons,~~ it is appropriate to spray the drywell only when suppression pool water level is below the bottom of the ~~upper drywell-to-lower-drywell~~ vents to preclude drywell differential pressure capability to be exceeded.
		• Deleted phrase "recirculation pumps" from instruction to shutoff recirculation pumps and drywell cooling fans prior to containment spray initiation.	• The ABWR has internal recirculation pumps, driven by motors located below the RPV in the lower portion of the drywell. Drywell spray only sprays the upper portion of the drywell. An explicit instruction to shut down the recirculation pumps is not required.
		• Specify RHR pumps used for containment spray as "RHR subsystems B and C".	• RHR subsystems B and C provide simultaneous drywell and suppression pool spray capability. Initiation of containment sprays is by manual control action. It is possible to initiate spray when RHR B or C is operating in other modes by opening spray valves.

Suppression pool

Preserve the operability of the vacuum breaker function and

piping from the suppression pool must be available for long-term usage following a design basis LOCA, and, as such, is designed to the quality standards commensurate with its importance to safety. The RHR discharge line fill system suction lines have manual valves for operational purposes. These systems are isolated from the containment by the respective RHR pump suction valves from the suppression pool.

6.2.4.3.2.2.2.2 SPCU Suction Line

The SPCU System suction line has two isolation valves. However, because the penetration is under water, both isolation valves are located outside the containment. The first valve is located as close as possible to the containment, and the second is located to provide adequate separation from the first.

6.2.4.3.2.2.2.3 ACS Lines to Containment

550A

The Atmospheric Control System (ACS) has both influent and effluent lines which penetrate the containment. Both isolation valves on these lines are outside of the containment vessel to provide accessibility to the valves. The valves are located as close as practical to the containment vessel. The piping from the containment to and including both valves is an extension of the primary containment boundary and is designed in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2 requirements. The arrangement of the isolation valves and connecting piping is such that a single active failure of an inboard valve, or a single active or passive failure in the connecting piping or an outboard valve, cannot prevent isolation of the ACS containment penetrations. The ACS containment isolation valve closure time is ≤ 20 seconds. These valves close on the following signals: high drywell pressure, RPV low water level 3, and high radioactivity in the purge and vent exhaust line. The SRP 6.2.4 states that the 5-second closure speed is necessary to assure that the purge and vent valves would have closed before the onset of fuel failures following a LOCA. The ACS purge and vent valves are normally closed during plant operation and are allowed to open only during the inerting (startup) and de-inerting (shutdown) process where the reactor is at less than 15% power. The likelihood of LOCA during inerting/de-inerting is very low. If a LOCA does occur, these valves will have closed before the onset of fuel failure. Note that the onset of fuel failure is when the core is uncovered and that reactor water level 3 (when ACS valves isolates) is 3.8m above the core. In the event of a radioactivity leak during inerting/ de-inerting, the radiation detectors at the purge and vent exhaust line will detect the condition and isolate the ACS containment isolation valves. Note that the exhaust radiation detectors are very sensitive and are set at a lower setpoint compared to the ones inside containment to have an effective early detection. For the ACS, a more reliable isolation valve is necessary to ensure containment integrity. A fast closing valve is less reliable than valves with moderate speed. The difference between 5 and 20 seconds is considered to be insignificant. Thus, the risk is judged to be sufficiently small and that the 20-second closure time, is deemed sufficient and reliable.

INSERT → "A"

INSERT A

The ACS also has two 50A makeup line isolation valves which are normally open during normal reactor operation to provide nitrogen makeup into the containment. If these isolation valves are placed in the normally closed position, nitrogen makeup will not be possible without opening. In either position, these valves need to open to provide nitrogen makeup. The normally open position provides automatic nitrogen makeup without frequent cycling that could cause damage to the valves. In the event of a LOCA or an event requiring primary containment isolation, these valves automatically close upon receipt of the following signals: high drywell pressure, low water level, high radioactivity in the purge and vent exhaust line. These valves are redundant and meet ESF requirements as described above for the 550A influent and effluent lines.