REQUEST FOR ADDITIONAL INFORMATION 251-2146 REVISION 1

3/2/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 10.04.08 - Steam Generator Blowdown System
Application Section: 10.4.8

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

10.04.08-1

Please provide more specific detailed information about the location of the blowdown nozzle and include it in the DCD. Discuss the basis (e.g., operating experience) for selecting the specified location. The staff did not find the location indicated on a drawing, and the DCD (Tier 2, page 10.4-63) describes it only in general terms ("a location above the tube sheet of each steam generator where impurities are expected to accumulate").

10.04.08-2

Please clarify the meaning of the statement, "Demineralizers include two – 100 percent trains." (DCD page 10.4-64) What quantity is defined as "100 percent?" It is the staff's understanding that this statement means each demineralizer train is capable of processing 100 percent of the maximum blowdown rate. Since the maximum blowdown rate is defined in terms of the maximum steam flow rate, but the demineralizer design information is provided in terms of gallons per minute (Table 10.4.8-1), please use both units in your response.

10.04.08-3

Please identify the differences between your requirements and the EPRI secondary water chemistry guidelines for the steam generator blowdown system. Discuss how you determined these differences are appropriate. Table 1.9.2-5 of the DCD states the US APWR specifications for secondary-side water chemistry are, "almost consistent with EPRI Guideline." The staff notes, for example, the apparent lack of continuous pH monitoring of SG blowdown (DCD Table 9.3.2-5) appears to be inconsistent with the EPRI guidelines for blowdown sampling at power operation.

10.04.08-4

Please clarify the meaning of the second sentence of the paragraph about coolant chemistry at the end of 10.4.8.3 ("Preserving these specifications is accordingly able to ensures [*sic*] the integrity of the SG tube materials."). The staff notes it would be incorrect to state that meeting the chemistry specification ensures the integrity of the SG

materials, since some degradation mechanisms (e.g., wear, loose parts) may be unrelated to water chemistry.

10.04.08-5

DCD Section 10.4.8.2.2.5 says the blowdown demineralizers can remove contaminants from condenser tube leaks and radioactivity from primary-to-secondary SG tube leakage. Describe how you determined the US-APWR cleanup capability is adequate to maintain the specified secondary-water chemistry under these conditions.

10.04.08-6

Please identify in the DCD the temperature limitation for the demineralizer inlet. According to Table 10.4.8-1, the expected operating outlet temperature of the non-regenerative coolers is 113°F, and the measured outlet temperature determines if the water is too hot for the demineralizers. However, the staff was not able to identify the outlet temperature value that activates the demineralizer bypass circuit.

10.04.08-7

Please provide additional information on how the SGBDS is designed to resist flow-accelerated corrosion (FAC). What materials are specified for the parts of the SGBDS with conditions that would be expected to cause FAC of carbon steel? If there are FAC-susceptible components, please discuss the reason for not designing to prevent FAC and the controls in place to ensure these components are included in COL applicants' FAC programs.

10.04.08-8

SRP 10.4.8 states that RG 1.143, Position C.1.1, is to be used to specify quality group standards, and US APWR DCD Table 1.9.1-1 states conformance with RG 1.143. RG 1.143 lists the ASME B31.3 code for the design and construction of piping and valves. However, DCD Tier 2, Table 3.2-2 indicates piping and valves in this portion of the US-APWR steam generator blowdown system (SGBDS) will be designed to the ASME B31.1 code.

For the design and construction of SGBDS piping and valves outside the containment isolation valves, the staff notes there is an inconsistency in the design codes specified in Table 3.2-2 of DCD (ASME B31.1) and Table 11.2-1 of the DCD (ASME B31.3). The design code recommended in RG 1.143 is ASME B31.3. Please verify which design code is used for the SGBDS piping, and revise the incorrect DCD reference accordingly. If you intend to use B31.1, please discuss the basis for this decision including any specific requirements to address potential degradation of the piping from chemical and liquid radwaste fluids and make the corresponding changes to DCD Sections 11.2 (liquid radioactive waste) and 1.9 (Regulatory Guide conformance).