REQUEST FOR ADDITIONAL INFORMATION NO. 105-1624 REVISION 0

11/24/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 15.00.03 - Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors
Application Section: FSAR Chapter 15, 15.0.3, 15.6.5, 15A

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

15.00.03-24

In the August 22, 2008 response to RAI No. 38, Question 15.00.03-2, you provided information on the calculation of the iodine appearance rate used in the calculation of the iodine spiking cases for the MSLB, SGTR and small line break accident doses. The staff has further questions based on your response.

a. It is unclear whether or not the coolant equilibrium iodine concentration used in the appearance rate calculation is the coolant concentration adjusted to DEI-131, as would be expected according to the guidance in RG 1.183, Appendix E, position 2.2. Confirm the basis of the equilibrium iodine concentration values used.

b. RG 1.183, Appendix E, position 2.2 guidance on the iodine spiking assumption stated that the increase in iodine appearance rate is based on the release rate corresponding to the iodine concentration at the equilibrium value. The calculation provided in the response is not based on the equilibrium state, but accounts for the transient, which is not required by the guidance, but would give conservative results. The model the staff and most current licensees use does not account for the transient leakage, but does account for iodine loss through radioactive decay, leakage and cleanup in the CVCS. This model is reflected in Equation 2 in a paper "The Iodine Spike Release Rate During a Steam Generator Tube Rupture," Adams and Atwood, Nuclear Technology, Vol. 94, June 1991. In comparison, your model does not account for radioactive decay and effectively assumes that the CVCS removes the iodine at an effective 100% efficiency. Justify the difference in modeling.

15.00.03-25

RAI No. 38, Question 15.00.03-17 requested details regarding the TSC dose consequence model sufficient for the NRC staff to determine independently that the MCR dose consequence model is bounding for the TSC. The response to Question 15.00.03-17 included a comparison of TSC atmospheric dispersion factors (χ/Q values) with the MCR χ/Q values for all the design-basis accidents. The MCR χ/Q values do not bound the TSC χ/Q values for the plant vent release pathway which is a release pathway for the LOCA and REA. Nor do the MCR χ/Q values bound the TSC χ/Q values for the small

line break analysis. Because the dose consequences in the MCR and TSC are directly proportional to their χ/Q values, the fact that the MCR χ/Q values do not bound the TSC χ/Q values implies that the doses in the MCR do not bound the doses in the TSC. The staff has performed some scoping calculations and finds that the MCR dose for the small line break accident may not be bounding for the TSC dose due to the small line break.

The response to Question 15.00.03-17 also stated that no changes to the DCD are proposed. The staff thinks that the additional information provided in response should be added to the DCD to accommodate applicant preparation and NRC staff review of TSC dose analyses for COL applications that do not have site-specific TSC χ/Q values that are bounded by the DCD values, or that take a departure from the DCD with respect to the TSC location. Therefore, provide additional discussion in the DCD text in Chapter 15 on the TSC dose analysis and results.