

**REQUEST FOR ADDITIONAL INFORMATION TOPICAL REPORT
THERMAL DESIGN METHODOLOGY
MUAP-07009**

09/01/2010

US-APWR Topical Report

Mitsubishi Heavy Industries Ltd.

Docket No. 52-021

1. ROUND 4 - REQUESTS FOR ADDITIONAL INFORMATION

- 4.1 Provide documentation which details the changes made to VIPRE between VIPRE-01 MOD 2.2.1 (the version of VIPRE obtained by MHI from CSA) and VIPRE-01M MOD 2.2.1 MHI 1.2.0 (MHI's version of VIPRE submitted to the NRC).
- 4.2 Provide documentation which demonstrates that the user manual provides guidance for selecting or calculating all input parameters and code options.¹
- 4.3 Provide documentation which demonstrates that the guidance in the VIPRE-01M manual specifies the required and acceptable code options for the specific licensing calculations.¹
- 4.4 Provide documentation which demonstrates that required input settings are hardwired into the input processor so that the code stops with an error message if the required input is not provided or if the input is not within an acceptable range of values or that administrative controls (an independent reviewer QA check) are in place that accomplish the same purpose.¹
- 4.5 Provide documentation which demonstrates that computer codes that are used for multiple accidents and transients include guidelines that are specific to each transient or accident.¹
- 4.6 Provide the documentation which demonstrates that all code options that are to be used in the accident simulation are appropriate and are not used merely for code tuning.¹
- 4.7 In response to RAI 3.2, MHI provided a table with operating conditions for Cases 1 and 2. There is a discrepancy between the table provided by MHI and the table in the VIPRE Manual which describes the input to the same case. Confirm that the correct operating conditions were used in the VIPRE-01M assessment.
- 4.8 In response to RAI 1.20, the Baker-Just equation is manipulated such that it can be used in VIPRE to calculate the thickness of the Zircaloy reacted. The derivation from Equation 1 to Equation 2 assumes that the Temperature is not a function of time. However, Equation 3 and following assumes that the temperature is a function of time. Shouldn't the derivative of Equation 1 be taken assuming that Temperature is a function of time? Also, MHI is using the planar

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form of the Baker-Just equation. Would it be more appropriate to use the cylindrical form?

¹ SRP 15.0.2 "Review of Transient and Accident Analysis Methods", NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," June 1987. (Certain updated sections are available from the NRC.)