REQUEST FOR ADDITIONAL INFORMATION
US-APWR TOPICAL REPORT: SMALL BREAK LOCA METHODOLOGY, MUAP-07013-P (R0)

02/16/2010
Mitsubishi Heavy Industries
Docket No. 52-021
SRSB Branch

The following is the fifth set of NRC requests for additional information (RAIs) based on the review of the Small Break LOCA Methodology Topical Report. These are follow-up RAIs to MHI RAI responses from UAP-HF-09492 (October 2009) and UAP-HF-09512 (November 2009). The original RAI question is referenced in the "Original Question Number" column.

New Question Number	Original Question Number	Question
8.1.2-14-1	8.1.2-14	[(Proprietary information withheld under 10 CFR 2.390)]
8.1.3-9-1	8.1.3-9	[(Proprietary information withheld under 10 CFR 2.390)

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8.2.1-12-1	8.2.1-12	MHI mentioned that errors may arise by not specifying some important parameters as boundary conditions. However, if that is the case then one might expect that similar errors can arise in the US-APWR SBLOCA simulations. That is why M-RELAP5 needs to be assessed against IETs' data and the errors need to be identified and considered in establishing the capability of M-RELAP5 to predict the plant response for SBLOCA events.

The approach that MHI used in this case makes this a SET and not an IET. MHI has performed other tests in an IET manner. The documentation should reflect the limitations of the conclusions that can be drawn from this assessment. Either modify the discussion to accurately portray what can be concluded from this assessment or explain how the assessment of ROSA-IV/LSTF Small Break (5%) LOCA test in Section 8.2.1 establishes the ability of M-RELAP5 to predict the US-APWR response for SBLOCA events in light of specifying important parameters as boundary conditions. |
| 8.2.1-14-1 | 8.2.1-14 | Please confirm that the figures provided in the RAI response 8.2.1-14 will be incorporated into MUAP-07013-P. |
| 8.2.1-23-1 | 8.2.1-23 | In the response to RAI 8.2.1-23, MHI committed to modifying the conclusions in the subject report section to such that the reviewer is able to recognize the remaining uncertainty. In revising the conclusion, please address the following concern.

MHI states that M-RELAP5 predicts the total vessel mass inventory lower than the measurement, in spite of the uncertainty resulting from the upper head mass inventory. The reviewer understands the MHI's believes that there is a distortion of the initial total vessel mass inventory. However, Figures 8.2.1-15 and -16 show good agreements of the break flowrate and the pressurizer pressure between the prediction and the measurement. This means that if the geometry of the facility was modeled accurately, the mass inventory in the primary system is similar in the analysis and the test during the transient period.

As shown in Figure RAI 8.2.1-23-2, the mass was accumulated in the upper plenum in the experiment from around 150 s to 320 s and then started decreasing and the water level reached the upper elevation of the core region at around 400 s while M-RELAP5 does not predict the mass accumulation in the upper plenum during that time period. Figure 8.2.1-17 shows that the |

		water started decreasing from around 400 s in the core region of the test facility. Therefore, the difference in the core water level dropping time appears to be caused by the accumulation of water in the upper plenum in the test, while it is not accumulated in the analysis. The source of the water being accumulated in the upper plenum in the test seems to be the upper head water.

New Question Number	Original Question Number	Question

8.1.4-11-1	8.1.4-11	[
		
		  (Proprietary information withheld under 10 CFR 2.390)
		
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8.2.1-8	8.2.1-8-1	[(Proprietary information withheld under 10 CFR 2.390)

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8.2.1-12-2	8.2.1-10, **8.2.1-11, 8.2.1-12**	[(Proprietary information withheld under 10 CFR 2.390)]
CA-5-1	CA-5	[(Proprietary information withheld under 10 CFR 2.390)]