

REQUEST FOR ADDITIONAL INFORMATION NO.111-932 REVISION 0

12/3/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.02.01.02 - Subcompartment Analysis
Application Section: MUAP-07031 Report

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

06.02.01.02-2

MUAP-07031 report: Although sensitivity of the results to time step variation in the cases presented was small, many variables impact correct time step selection. Please, include in the DCD additional justification and/or discussion regarding the selection of the time steps for the specific limiting cases presented in the DCD.

06.02.01.02-3

MUAP-07031 report: Based on codes comparison presented in section 5.3, the conclusion presented in section 5.3.3 is that "GOTHIC code is suitable for the containment subcompartment pressure analyses." This conclusion is very broad, and can not be supported by examining only one transient. Please, provide:

- A. Additional information regarding the options used in the code, the specific models exercised by this transient, etc. in order to extend these conclusions to other subcompartment analyses,
- B. Discuss and/or provide additional justification in support of the above conclusion

06.02.01.02-4

MUAP-07031 report: The regenerative heat exchanger room, the letdown heat exchanger room, and the pressurizer spray valve room were not considered in the subcompartment analysis because vent paths were large compared to line sizes. Supporting documentation needs to be provided showing the volumes for these rooms, vent paths and areas, and size and energy content of the piping to confirm this conclusion.

06.02.01.02-5

Revise Table 3-1 in MUAP-07031 report by including quantitative rationale for each line that was eliminated from consideration. Lines in the compartment that were eliminated because of LBB considerations also need to be included in the table.

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06.02.01.02-6

MUAP-07031 report Section 3.1.2 says the subcompartment analysis for the SG compartment is performed assuming a 150 mm (6-inch) diameter break of the pressurizer spray line or a 400 mm (16-inch) diameter feedwater pipe break. Results of the pressurizer spray line are not discussed in this report or represented in Table 3-1. Please provide results for the pressurizer spray line, or provide appropriate the reference if it is addressed in DCD Section 6.3.2.

06.02.01.02-7

MUAP-07031 report: Clarify the word “basically” in the statement “Mass and energy releases used for postulated primary piping breaks are basically calculated by the computer code M-RELAP5” used in section 4.2 of the report. If it refers to the discussion for the feedwater line break in the SG subcompartment, additional clarification is needed. Also, Section 6.2.1.2 of the DCD does not seem to be consistent with this statement, noting that there are two methodologies used for calculating mass and energy release.

A statement is also made in this section: “Also, the approach to assume a constant blowdown profile using initial mass and energy release conditions calculated by the computer code M-RELAP5 ...” is used for postulated secondary piping breaks. The only secondary side break analyzed was the feedwater break for the SG subcompartment. The description in that section does not seem to be consistent with this statement. These descriptions need to be clarified, describing exactly what was assumed for the blowdown in these breaks.

06.02.01.02-8

MUAP-07031 report: Section 6.1.1 states that nodalization sensitivities have been performed using two nodalizations, and that results of the sensitivity studies for the steam generator compartment and pressurizer compartment have been described in section 7. However section 7 contains “Conclusions.” Additionally, there were no nodalization studies presented for the SG compartment, just the pressurizer compartment. Please,

- A. correct the location of the nodalization study accordingly, and
- B. provide a nodalization study for the most limiting break for the SG compartment.

06.02.01.02-9

MUAP-07031 report: Vent path geometries are not provided in sufficient detail to allow checks to be made on loss coefficient assumptions and calculations. Additional information is requested on these geometries to allow these checks, and so that models can be developed for confirmatory calculations. Since the SG compartment break is the most limiting, vent path geometries used in this analysis are requested.

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06.02.01.02-10

MUAP-07031 report: In section 6.3.1 (b), it states: "To obtain conservative results, all vent paths were connected to the containment atmosphere node which is maintained at constant pressure." It is not clear that this assumption is indeed conservative. Please, clarify and/or justify the conservatism of this assumption.

06.02.01.02-11

MUAP-07031 report: Please provide clarification of the description of how the feedwater line break release rates were determined. The description should include:

- A. more detailed description than that given in 6.3.2 (c),
- B. determination of the time from break initiation until the feed water reaches saturation,
- C. whether the assumed "tank" volume is depleted before the transient ends,
- D. clarify the assumption regarding operating pumps, i.e., the pumps are supplying no head or normal operating head?

06.02.01.02-12

MUAP-07031 report: Details for vent path geometries are not sufficient to perform confirmatory calculation. Please provide details of vent path geometries used in the pressurizer subcompartment analysis.

06.02.01.02-13

MUAP-07031 report: Section 6.4.1 include conclusion that nodalization is sufficient to calculate peak pressure differences. However, the figures 6.4-14 and 6.4-15 only show one curve that is not labeled. Please, provide a comparison plots of pressures for each nodalization scheme and selected volume to clarify potential misunderstanding.

06.02.01.02-14

MUAP-07031 report: Sufficient information needs to be provided by Mitsubishi allowing staff to perform independent evaluation of both the subcompartment analysis itself as well as the mass and energy release calculations used in the subcompartment analysis. Specifically, staff selected SG compartment and reactor cavity cases to perform confirmatory calculation. Please, provide the mass and energy release and nodalization details used in Mitsubishi analyses of the two cases.