

## REQUEST FOR ADDITIONAL INFORMATION 729-5667 REVISION 2

4/13/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.02.04 - Containment Isolation System

Application Section: 6.2.4

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

06.02.04-55

Question 06.02.04-55

1. The response to RAI 271-1899 Question 06.02.04-38 indicated the word “not” would be removed from the following sentence in Note 7 of Tier 2 Table 6.2.4-3: “The valve does ~~not~~ provide a barrier outside containment to prevent loss of sump water should a leak develop in a recirculation loop” The staff did not note this change in Revision 2 of the DCD or any tracking report. Please clarify the sentence in the DCD as per your previous response.
2. The US-APWR, is a pressurized water reactor with a refueling water storage pit located inside containment. The staff understands that it is the intent of MHI to justify compliance with GDC 56 using the Other Defined Basis for a single valve and a closed system both located outside containment. This guidance for justification of this basis is provided in ANSI N271-1976 paragraph 3.6.4. The staff has noted that justification statements in note 7 are similar to that used in ANSI N271-1976, Appendix A Note 56-1. This note provides justification for an acceptable alternative to GDC 56 requirements for typical lines which connect to a suppression pool in Boiling Water Reactor (BWR) plants. This note provides justification for the valve arrangement based, in part, on the following design features:
  - a. The single valve is remote manual or automatic
  - b. The valve is attached to lines which are an extension to containment
  - c. The valve is enclosed in a room adjacent to containment which as provisions for environmental control of any fluid leakage
  - d. The lines in the suppression pool are always submerged so no containment atmosphere can impinge upon the valve.

## REQUEST FOR ADDITIONAL INFORMATION 729-5667 REVISION 2

- e. The systems which the lines from the suppression pool connect to outside containment are closed systems meeting the appropriate requirements of closed systems in ANSI N271-1976, including 3.6.4 and 3.6.7.
- f. The valves provide a barrier outside containment to prevent loss of suppression pool water should a leak develop in the lines from the suppression pool.
- g. Should leakage develop, fluid will be contained by the controlled leakage pump room.
- h. The configuration of the connection of the lines to the suppression pool assures that the connections are always submerged and prevents the escape of containment atmosphere.

The staff has reviewed justification for the lines by comparing the justification in note 7 to ANSI N271-1976, Appendix A Note 56-1 and the guidance in ANSI N271-1976 paragraph 3.6.4 for this arrangement. In addition to item 1 above, the following information is needed

2. a. Please clarify the note that the connecting systems are considered closed systems as these are defined by ANSI N271-1976 An explicit statement that the connecting systems are closed systems outside containment and these systems are designed to meet the guidance for closed systems in ANSI N271-1976, including paragraphs 3.6.4 and 3.6.7 would suffice, or provide alternative wording to the note.

2.b. Please clarify the note #7 to state that the lines from the RWSP that contain a single containment isolation valve outside containment are always submerged (during normal operation and postulated accidents) and therefore no containment atmosphere can impinge on the valve.

2. c. SRP 6.2.4 Rev. 3 ,Acceptance Criterion 5 also states that the design of the valve or the piping compartment should provide the capability to terminate leakage from the valve shaft or bonnet seals. ANSI N271-1976 paragraph 3.6.4 states that the single valve and piping between the containment and the valve shall be enclosed in a protective leak tight or controlled leakage housing to prevent leakage to the atmosphere. Note# 7 does not include a discussion on how leakage will be terminated or contained should a leak develop in the piping, valve body, valve bonnet or shaft seals or piping. Based on review of appendix A and B of this standard, the staff notes that this could be satisfied by either A)

## REQUEST FOR ADDITIONAL INFORMATION 729-5667 REVISION 2

Locating the piping and valve in a compartment (a small space capable of terminating the leakage), such as the pump room adjacent to the containment as discussed in Appendix A note 56-1 or, B) Locating the piping and valve in a compartment that is leak tight at containment design pressure, as discussed in Appendix B note 56-1. Therefore please clarify how the US-APWR design complies with this aspect of SRP 6.2.4 Rev. 3 SRP Acceptance Criteria 5 in note 7, indicate such confinement in DCD Tier 2 Figure 6.2.4-1 sheets 11 and 18 to show the barrier that terminates leakage from the valve shaft or bonnet seals.

2.d. Please provide additional information to justify the following sentences in the note "These lines and valves are designed to preclude a breach of pipe integrity. Therefore guard pipe are not provided in these lines (Reference SRP 6.2.4 Rev. 3 SRP Acceptance Criteria 5)"

The staff is unclear what this means. Do you mean that the design of the lines and valves complies with SRP 6.2.4 Rev. 3 SRP Acceptance Criteria 5? If so, please indicate where the following information for this finding is located in the DCD or revise the DCD and the Note as required to provide the following information:

The SRP acceptance criterion prescribes the use of guard pipes for the piping. However, it also states that it would be acceptable that, in lieu of housing, the piping and valve could be designed conservatively to preclude a breach of piping integrity. This is provided through compliance with SRP 3.6.2 requirements.

Therefore provide a discussion specific to the piping from the RWSP to the CIV and for the CIV, how these components meet SRP 3.6.2 requirements, and are of a conservative design in your RAI response. Note that the staff considers the discussion on the compliance with SRP 6.2.4 acceptance criterion 5 related to GDC 4 and is a separate issue than the question described in item 2.c. above (existence of leak tight or controlled leakage housing around piping and valve), which is related to provisions to terminate leakage such that redundant barriers exist to prevent loss of RWSP inventory, and uncontrolled leakage to the auxiliary building.