

REQUEST FOR ADDITIONAL INFORMATION 267-2016 REVISION 1, plus proposed future revision

3/9/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.02.06 - Containment Leakage Testing
Application Section: 6.2.6 Containment Leakage testing

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

06.02.06-14

RAI 6.2.6-14:

Justify type C test that are not planned

Supplemental RAI to RAI 6.02.06-6. The staff requested, in RAI 6.2.6-6, that the applicant provide justification for those lines with CIVs indicated on DCD Table 6.2.4-3 which are not planned to be Type C tested. The MHI response to Question 06.02.06-6 provides an acceptable explanation for most of the valves that are listed in DCD Table 6.2.4-3 as having no Type C test. These explanations use the allowable exception in ANS 58.6, Section 3.3.1 (1), namely "Boundaries that do not constitute potential primary containment atmospheric pathways during and following a DBA." The information provided in this RAI response is an important part of the US-APWR design basis and should be included in the DCD.

1. Include this information from the RAI response in a future DCD revision.

The staff has reviewed the response and has also identified three aspects of the response that need to be addressed by the applicant:

- 1) Penetrations 209, 226, 257 & 273 are shown on Figure 6.2.4-1 Sheet 12. These are the four penetrations for the four CS/RHR pump suction lines. For each penetration there are three valves: SIS-VLV-225, RHS-MOV-002, and RHS-VLV-003. The MHI response groups this penetration with several other ECCS penetrations and states that "these valves are either normally open at the time of a LOCA or are opened at some time after the accident to effect immediate and long term core cooling." This is true for RHS-MOV-002, but is not true for SIS-VLV-225 and RHS-VLV-003. These valves are normally closed and don't open post-LOCA (see Table 6.2.4-3 sheet 2 of 8). Please provide an updated justification for these two valves in the DCD.
- 2) The response states in part, "The justification for the component cooling water (CCW) lines to and from the containment fan coolers..." However, it appears from Table 6.2.4-3, Figure 6.2.4-1, and DCD Chapter 9 that CCW does not cool the containment fan coolers. Further, Table 6.2.4-3 does not indicate penetrations for any such lines. Please correct.

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- 3) The RAI response states in part, “The justification for ... the non-essential chilled water (CW) lines to and from CRDM cooling unit and containment fan cooler is that these systems are closed systems inside containment designed and constructed to ASME III, Class 2 and Seismic Category I requirements and as such they do not constitute a potential containment atmosphere leak path... Furthermore, inservice testing and inspection of these isolation valves and the associated piping system inside the containment is performed periodically under the inservice inspection requirements of ASME XI as described in subsection 3.9.6 and section 6.6.” The CW lines are shown on Figure 6.2.4-1, Sheet 43, and use Penetrations 408 and 409. There is only one containment isolation valve (CIV) per penetration and it is outside containment. DCD Section 9.2.7.3.2, Safety Evaluation for the Non-Essential Chilled Water System, states, “With the exception of piping and valves between and including the containment isolation valves, the system does not perform any safety function.” Please update Section 9.2.7.3.2 to include the information in the RAI response related to the CW system.

06.02.06-15

RAI 6.2.6-15:

Clarify the Type A test acceptance criteria for preoperational and operational tests

The staff requested in RAI 6.2.6-10, that the applicant provide details of pre-operational leak rate testing methods or provide an appropriate reference. The staff also requested that the applicant provide the acceptance criteria associated with pre-operational leakage rate test or provide an appropriate reference.

In a letter dated September 17,2008 Mitsubishi provided the following response to RAI 6.2.6-10:

“Preoperational test abstract 14.2.12.1.62, Containment Local Leak Rate Preoperational Test specifies acceptance criteria in item D.1 by reference to Technical Specifications SR 3.6.1.1 and B 3.6.1. Technical Specifications section B 3.6.1, Containment Bases, in the discussion of bases for SR 3.6.1.1, identifies acceptance leak rates of <0.6 La for combined Type B and C leakage and <0.75 La for overall Type A leakage, consistent with ANSI/ANS 56.8. The Applicable Safety Analyses section of B 3.6.1 specifies the values of La and Pa. The Background section of B 3.6.1 identifies the use of Option B of 10CFR50 Appendix J. Compliance with 10CFR50 Appendix J, RG 1.163 and NEI 94-01 is specified in subsections 6.2.6 and 6.2.6.4 of the DCD. NEI-94-01, revision 0, endorses ANSI/ANS-56.8-1994.

MHI will revise the subsections 14.2.12.1.62 and 14.2.12.1.63 to clearly specify the use of RG 1.163 and NEI 94-01 for test methods and acceptance criteria, and correct an error in Chapter 16 Subsection 5.5.16 to remain consistent with ANSI/ANS-56.8”.

The staff has reviewed the response and has identified that the following needs to be addressed by the applicant:

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The MHI response states that preoperational test methods and acceptance criteria will meet RG 1.163, NEI 94-01 and ANSI/ANS-56.8-1994. This is acceptable for the test methods. However, for acceptance criteria the preoperational test revision provided is not so clear.

Supplemental RAI to RAI 6.02.06-10. The NRC – endorsed guidance for Type A test acceptance criteria from RG 1.163, NEI 94-01 and ANSI/ANS-56.8-1994 is somewhat detailed in that it involves statistical confidence levels and corrections for isolated or improperly vented/drained penetrations.

For the preoperational Type A test the MHI response to Question 06.02.06-10 states that preoperational test methods and acceptance criteria will meet RG 1.163, NEI 94-01 and ANSI/ANS-56.8-1994. This is acceptable. However, the proposed changes to DCD Chapter 14 test abstracts state that the testing will be done using the Containment Leak Rate Testing (CLRT) Program defined in TS Chapter 16 subsection 5.5.16. Please clarify in DCD 14.2.12.1.63 that acceptance criteria will meet the guidance in RG 1.163, NEI 94-01 and ANSI/ANS-56.8-1994.

For Type A tests during plant operation, DCD Section 6.2.6 refers only to TS Section 5.5.16 for acceptance criteria and gives a value of $0.75 L_a$. TS Section 5.5.16 also gives an acceptance value of $0.75 L_a$ however does not reference the guidance documents or provide more detail. Please clarify in DCD Section 6.2.6 that the operational Type A test acceptance criteria will meet the guidance in RG 1.163, NEI 94-01 and ANSI/ANS-56.8-1994.

06.02.06-16

RAI 6.2.6-16:

Confirm and document accommodation for Inspection of Containment Penetrations

10 CFR 50 App. A, GDC 53, states in part that “The reactor containment shall be designed to permit (1) appropriate periodic inspection of all important areas such as penetrations. DCD Section 6.2.1.6, Testing and Inspections, states that Section 6.2.4.4 provides a description of the testing and inspection of the containment isolation system DCD Section 6.2.4.4 discusses Type A, B & C leakage testing but does not mention inspection. Please confirm that the US-APWR containment will be designed to permit appropriate periodic inspection of all important areas such as penetrations.

06.02.06-17

RAI 6.2.6-17:

Clarify the exception to venting and draining for type A tests.

The draft revision to DCD Section 6.2.6 dated Nov. 7, 2008, provides for vent and drain conditions to be established prior to the Type A test. One exception taken in the draft DCD is that “Pathways which are Type B or C tested within the previous 24 calendar

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months need not be vented or drained.” This is contained in NEI 94-01 but has a number of added provisos, not included in the DCD. As stated in the DCD, this would permit the Type A test with no venting or draining of any penetration during the preoperational test. For operational Type A tests, make this exception consistent with the NEI 94-01 wording, and clarify that it does not apply to the preoperational Type A test.

06.02.06-18

RAI 6.2.6-18:

Clarify Local Leak Rate Testing acceptance criteria in DCD 6.2.6

In an enclosure to a letter, dated November 7, 2008 you provided additional information on the test method for Type A, B & C Tests as Supplemental information related to COL item 6.2(8). This information is to be included in section 6.2.6 of Revision 2 of the DCD. The staff has reviewed this information and the following additional information is required:

The last paragraph of the Nov. 7, 09 draft of DCD Section 6.2.6.2, “Containment Penetration Leakage Rate Testing”, discusses acceptance criteria for Type B or Type C testing. Please clarify that these criteria apply to both the preoperational and the periodic operational leak rate tests.

06.02.06-19

RAI-6.2.6-19:

Provide additional details regarding test connections, vents and drains for containment isolation valves.

In an enclosure to a letter, dated November 7, 2008 you provided additional information on the test method for Type A Tests as Supplemental information related to COL item 6.2(8). This information is to be included in section 6.2.6 of Revision 2 of the DCD. The staff has reviewed this information and the following additional information is required:

Include a discussion regarding administrative controls for test connections, vents and drains for containment isolation valves to ensure that containment integrity is restored after testing and maintained. Please state that all test, vent, and drain connections that are used to facilitate local leakage rate testing and the performance of the CILRT are under administrative control and are subject to periodic surveillance, to ensure their integrity and to verify the effectiveness of administrative controls.

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06.02.06-20

To be discussed during conference call.

06.02.06-21

RAI-6.2.6-21:

Clarify where the Containment Leakage Testing Program will reside.

TS 5.5.16 and TS 3.6.1 both refer to a Containment Leakage Testing Program. Rev. 1 of the DCD specified that this Program was to be developed by the COL holder. The draft revision to the DCD dated Nov. 7, 2008 removes that requirement from the COL item, but it has not revised the TS. Is this program to be the new DCD section 6.2.6 or is it a licensee program that is still to be developed? Clarify the Containment Leakage Testing Program referred to by the TS and when it will be developed.

06.02.06-22

RAI 6.2.6-22:

Provide additional details regarding test prerequisites and testing of instrumentation lines that are not locally leakage rate tested.

In an enclosure to a letter, dated November 7, 2008 you provided additional information on the test method for Type A Tests as Supplemental information related to COL item 6.2(8). This information is to be included in section 6.2.6 of Revision 2 of the DCD. The staff has reviewed this information and the following information is required:

Include a discussion regarding Type A testing methods for instrumentation lines. Please confirm that instrumentation lines that are not locally leakage rate tested are not isolated from the containment atmosphere during the performance of the CILRT. Confirm that measured leakage rates from instrumentation lines that are locally leakage rate tested and isolated during the CILRT are added to the CILRT results. Confirm that provisions are made to ensure that instrumentation lines isolated to the CILRT are restored to their operable status following the test.