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Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-12154

Subject: **MHI's Response to US-APWR DCD RAI No. 918-6361 Revision 0 (SRP 06.02.06)**

Reference: 1) "Request for Additional Information No. 918-6361 Revision 0, SRP Section 06.02.06 – Containment Leakage Testing Application Section: 6.2.6", dated April 10, 2012.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 918-6361 Revision 0 (SRP 06.02.06)."

Enclosed is the response to Question 06.02.06-35 contained within Reference 1.

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
Director- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

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NRO

Enclosure:

1. Response to Request for Additional Information No. 918-6361 Revision 0 (SRP 06.02.06)

CC: J. A. Ciocco
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Enclosure 1

UAP-HF- 12154
Docket No. 52-021

Response to Request for Additional Information No. 918-6361 Revision 0 (SRP 06.02.06)

June 2012

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

06/07/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: **NO. 918-6361 REVISION 0**

SRP SECTION: **06.02.06 – CONTAINMENT LEAKAGE TESTING**

APPLICATION SECTION: 6.2.6

DATE OF RAI ISSUE: **4/10/2012**

QUESTION NO.: 06.02.06-35:

RAI 866-6149, Question No.: 6.2.6-34

In response, dated January 6, 2012, to RAI 6149, MHI states the following in the markup to US-APWR DCD Revision 3 Tier 2 Section 6.2.6.5 in regards to special testing requirements for containment leakage testing:

"Leakage paths that may bypass the penetration areas and the annulus emergency exhaust system are identified in Table 6.2.4-3 and will be Type C tested as part of the containment leakage rate test program with additional acceptance criteria to ensure that the assumptions of the safety analysis are met."

Please revise DCD Section 6.2.6.5 and others as necessary to clearly state what is the additional acceptance criteria that will be used as part of the containment leakage test program to ensure that the assumptions of the safety analysis are met.

ANSWER:

As shown in DCD Tables 6.5-5 and 15.6.5-4, the DCD safety analysis assumes that only 50% of the total containment leakage (L_a) is to the penetration areas served by the Annulus Emergency Exhaust System and 50% of leakage bypasses these areas to the environment. As discussed in the response to RAI 866-6149, all bypass leakage paths are Type C tested. Type C tests measure combined leakage from valve disc, stem, and bonnets, while only disc leakage results in potential bypass leakage to the environment. Therefore, the Type C test results for each penetration conservatively bound the bypass leakage to the environment. Therefore, applying the additional acceptance criterion that the total combined leakage from all Type C tests must remain below $0.50L_a$ is sufficient to ensure that the assumptions of the safety analysis are met.

DCD Subsection 6.2.6.5 is revised to clarify that the total combined leakage from all Type C tests shall be limited to the bypass leakage assumption in DCD Tables 6.5-5 and 15.6.5-4. In addition, this acceptance criterion is added to the Containment Leakage Rate Testing Program description in DCD Chapter 16 (Technical Specification 5.5.16).

Impact on DCD

DCD Subsection 6.2.6.5, will be revised as shown in Attachment 1 to be consistent with the proposed changes identified above.

DCD Chapter 16 (Technical Specification 5.5.16) will be revised as shown in Attachment 2 to be consistent with the proposed changes identified above.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on Topical Report / Technical Report

There is no impact on the Topical Report / Technical Report.

Attachment 1 to RAI 918-6361

10 CFR 50 Appendix J Option B Type C testing is initially performed during preoperational testing following completion of the Reactor Building construction. The first periodic Type C tests are performed at a frequency of at least once per 30 months until acceptable performance is established in accordance with NEI 94-01 (Ref. 6.2-31), with subsequent testing frequencies determined in accordance with NEI 94-01 (Ref. 6.2-31) as specified in the containment leakage rate testing program, not to exceed 60 months, consistent with RG 1.163 (Ref. 6.2-30).

Type C test methods and techniques are consistent with ANSI/ANS 56.8-1994 (Ref. 6.2-35).

Type C testing leakage rate results are used to determine the combined leakage rate for all Type B and C penetrations as discussed above.

6.2.6.4 Scheduling and Reporting of Periodic Tests

The proposed schedule and test report content requirements associated with performing pre-operational and periodic leakage rate testing are in accordance with the guidance provided in NEI 94-01 (Ref. 6.2-31), as modified and endorsed by the NRC in RG 1.163(Ref. 6.2-30). The results of preoperational and periodic Type A, Band C tests must be documented to show that the performance criteria for leakage have been met. The comparison to previous results of the performance of the overall containment system and of individual components within it must be documented to show that the test intervals established for the containment system and components within it are adequate.

6.2.6.5 Special Testing Requirements

~~The US-APWR does not have a secondary containment or a sub-atmospheric primary containment, therefore there are no special testing requirements in addition to the requirements of Subsections 6.2.6.1 through 6.2.6.4 above.~~Leakage paths that may bypass the penetration areas and the annulus emergency exhaust system are identified in Table 6.2.4-3 and will be Type C tested as part of the containment leakage rate test program with additional acceptance criteria to ensure that the assumptions of the safety analysis are met. The total combined leakage from all Type C tests shall be below the amount assumed for bypass leakage to the environment in DCD Tables 6.5-5 and 15.6.5-4.

DCD_06.02.06-34

DCD_06.02.06-35

6.2.7 Fracture Prevention of Containment Pressure Vessel

Ferritic containment pressure boundary materials include the ferritic portions of the containment vessel and all penetration assemblies or appurtenances attached to the containment vessel; all piping, pumps and valves attached to the containment vessel, or to penetration assemblies out to and including the pressure boundary materials of any valve required to isolate the system and provide a pressure boundary for the containment function.

Ferritic containment pressure boundary materials meet the fracture toughness criteria and requirements for testing identified in Article NE-2000 of Section III, Division 1 (Ref. 6.2-32) or Article CC-2000 of Section III, Division 2 of the ASME Code (Ref. 6.2-33).

Attachment 2 to
RAI 918-6361

5.5.16 Containment Leakage Rate Testing Program

a. A program shall establish the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September, 1995:

1. The visual examination of containment concrete surfaces intended to fulfill the requirements of 10 CFR 50, Appendix J, Option B testing, will be performed in accordance with the requirements of and frequency specified by the ASME Section XI Code, Subsection IWL, except where relief has been authorized by the NRC.

2. The visual examination of the steel liner plate inside containment intended to fulfill the requirements of 10 CFR 50, Appendix J, Option B, will be performed in accordance with the requirements of and frequency specified by the ASME Section XI Code, Subsection IWE, except where relief has been authorized by the NRC.

b. The calculated peak containment internal pressure for the design basis loss of coolant accident, P_a, is 59.5 psig. The containment design pressure is 68 psig.

c. The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.10% of containment air weight per day.

d. Leakage rate acceptance criteria are:

1. Containment leakage rate acceptance criterion is 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are < 0.60 L_a for the Type B and C tests combined, < 0.50 L_a for Type C tests, and < 0.75 L_a for Type A tests. DCD_06.02.06-35

2. Air lock testing acceptance criteria are:

a) Overall air lock leakage rate is ≤ 0.05 L_a when tested at ≥ P_a.

b) For each door, leakage rate is ≤ 0.01 L_a when pressurized to ≥ 10 psig.

e. The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

f. Nothing in these Technical Specifications shall be construed to modify the testing Frequencies required by 10 CFR 50, Appendix J.