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September 5, 2008

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-08172

Subject: MHI's Response to US-APWR DCD RAI No.37

References: 1) "Request for Additional Information No. 37 Revision 0, SRP Section: 06.05.03, Application Section: 6.5.3," dated July 24, 2008.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No.37 Revision 0."

Enclosed is the response to one RAI contained within Reference 1.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittals. His contact information is below.

Sincerely,

Y. Ogata

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

Enclosures:

1. Responses to Request for Additional Information No.37 Revision 0

CC: J. A. Ciocco
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Docket No. 52-021
MHI Ref: UAP-HF-08172

Enclosure 1

UAP-HF-08172
Docket Number 52-021

Response to Request for Additional Information No.37 Revision 0

September, 2008

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

09/05/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO.37 REVISION 0

SRP SECTION: 06.05.03 – FISSION PRODUCT CONTROL SYSTEMS AND STRUCTURES

APPLICATION SECTION: 06.05.03 FISSION PROCUDT CONTROL SYSTEMS

DATE OF RAI ISSUE: 07/24/2008

QUESTION NO. : 06.05.03-1

DCD 6.5.3.2 states that the US-APWR design does not use a secondary containment. However, in the design basis accident LOCA and REA analyses in DCD Chapter 15, credit is taken for collection and filtration in the penetration areas of 50% of the containment leakage. Although a secondary containment in the manner of a structure that completely surrounds the primary containment is not part of the US-APWR design, the NRC staff considers the LOCA and REA analyses are treating the penetration areas as a partial dual containment, given that the analyses credit fission product removal by filtration systems in those areas. Standard Review Plan (SRP) section 6.5.3, "Fission Product Control Systems and Structures," in addition to the primary and secondary containments also discusses other fission product control structures for collection and control of post-accident releases. The SRP acceptance criteria for secondary containments on page 6.5.3-5 states that partial dual containments should meet the same basic criteria as secondary containments in order for credit for fission product removal to be found acceptable by the NRC staff. Therefore, in DCD, Tier 2, section 6.5.3 discuss the penetration areas with reference to the discussion in SRP 6.5.3 on secondary containments, including the justification for 50% of the primary containment leakage to the penetration areas, post-accident isolation, ventilation systems design and operation and any technical specifications.

ANSWER:

US-APWR containment penetration areas should be treated as a partial dual containment, since the LOCA and REA analyses credit fission product removal by the annulus emergency exhaust system in the penetration areas. Subsection 6.5.3 will be revised, as described below, to discuss the penetration areas with reference to the discussion in SRP 6.5.3 on secondary containments.

Furthermore, subsection 6.2.3 will also be revised, since subsection 6.2.3 should also include similar discussion in terms of a secondary containment.

Impact on DCD

DCD subsection 6.2.3 will be revised to discuss the prevention of uncontrolled radioactive releases from the containment penetration areas during an accident. DCD subsection 6.5.3.2 will also be revised to reflect the partial dual containment function in the containment penetration

areas, and operation of the annulus emergency exhaust system during accident conditions, including HEPA filter filtration and maintenance of negative pressure.

6.2.3 Secondary Containment Functional Design

The US-APWR design does not utilize a secondary containment. Rather than a secondary containment, portions of the primary containment are enclosed by containment penetration areas, which function to prevent the direct release of containment atmosphere to the environment through the containment penetrations. Containment penetration areas are served by the auxiliary building HVAC system during normal operation and by the annulus emergency exhaust system following a design basis accident. The annulus emergency exhaust system maintains the containment penetration areas at a negative pressure during accident conditions. Refer to Section 6.5.3.2 Secondary Containments for additional discussion on the function of the containment penetration areas.

6.5.3.2 Secondary Containments

The US-APWR primary containment is not completely surrounded by a secondary containment structure. However, all mechanical and electrical containment penetrations, including the equipment hatch and airlock, are surrounded by containment penetration areas to prevent direct release of containment atmosphere to the environment through the containment penetrations.

Each penetration area is served by auxiliary building HVAC system during normal operation. Following a design basis accident, the penetration area is isolated by auxiliary building HVAC system isolation dampers that change position to the accident or closed position, and kept at a slightly negative pressure to control the release of radioactive materials to environment by the annulus emergency exhaust system. The annulus emergency exhaust system initiates on an ECCS actuation signal and exhausts penetration area air through HEPA filters, as described in Subsection 6.5.1, Figure 6.5-1 and Chapter 9, Subsection 9.4.5. The auxiliary building HVAC system is described in Chapter 9, Subsection 9.4.3.

The leakage fraction of the primary containment leakage to the environment is presented in Table 6.5-5. This leakage fraction is based on the total potential containment bypass leakage rate. The potential containment bypass leakage rate is assumed to be due to leakage from containment isolation valves installed in piping, which penetrate both the primary containment and penetration areas and is determined based on valve design limitations. As a result, the potential containment bypass leakage is considered to be much less than 10%. However, the leakage fraction to the penetration areas in dose evaluations that are discussed in Chapter 15 is credited as 50%, that is, including a conservative margin assumed for the evaluation.

These systems limit the maximum radiation dose to less than the criteria of RG 1.183 (Ref. 6.5-3). The radiological consequences following a design basis accident are presented in Chapter 15, Subsection 15.4.8 and 15.6.5.

Impact on COLA

There is no impact on the COLA

Impact on PRA

There is no impact on the PRA