

Jeff Ciocco

From: Jeff Ciocco
Sent: Tuesday, July 22, 2008 12:55 PM
To: us-apwr-rai@mhi.co.jp
Cc: Tinh Dinh; Robert Radlinski; William Ward; Harrison Botwin; Larry Burkhart
Subject: US-APWR Design Certification Application RAI No.30
Attachments: US-APWR DC RAI 30 SFPT 540542544546605601604606614615635639661.pdf

MHI,

Attached please find the subject request for additional information (RAI). This RAI was sent to you in draft form. The schedule we are establishing for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. However, as you have requested, you are granted 45 days to respond to RAI 30. Please submit your RAI response to the NRC Document Control Desk.

Thanks,

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REQUEST FOR ADDITIONAL INFORMATION NO. 30 REVISION 0

7/22/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 09.05.01 - Fire Protection Program

Application Section: 9.5.1

SFPT Branch

QUESTIONS

09.05.01-1

Section 9.5.1 of the DCD indicated the use of probabilistic risk assessment (PRA) to identify fire risks and vulnerability. Will the applicant be crediting the fire PRA and fire modeling results to demonstrate acceptable fire hazards or post-fire safe shutdown capabilities for specific fire scenarios? If so, the applicant should provide the NRC staff with details of the specific application of fire PRA and fire models to these fire scenarios. Information should include at the minimum the program name, program revision, input file, key assumptions, and results for staff review.

09.05.01-2

Section 9.5.1.1 of the DCD states that possible fire-induced failures, including multiple spurious actuations, are addressed in the post-fire safe shutdown circuit analysis in accordance with RG 1.189 and NFPA 804. However, since the potential for fire-induced multiple spurious actuations to occur in rapid succession has been demonstrated by industry and NRC cable fire test programs, RG 1.189, Rev 1, noted that the one-at-a-time assumption for multiple spurious actuations as stated in NFPA 804 (2006 Edition) may not adequately address the potential risk attributed to fire. The US-APWR design should not be based on a one-at-a-time assumption for multiple spurious actuations unless MHI can satisfactorily demonstrate that this assumption is valid for the specific fire scenarios to which it is applied. MHI should provide the technical and safety basis for the application of this assumption. MHI should also describe the impact on post-fire safe shutdown capability if multiple spurious actuations were to occur in any area where the one-at-a-time assumption is applied? One approach to addressing multiple spurious actuations is being developed by NEI as guidance document NEI 00-01.

09.05.01-3

Section 9.5.1.1 of the DCD states that the potential for fire-induced multiple spurious actuations is minimized by the use of digital instrumentation and control circuits. Tests performed on some types of digital equipment have shown that smoke can cause spurious actuations of digital instrumentation and control devices. How will the applicant assess/demonstrate the effects of heat and smoke due to fire on digital equipment,

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particularly with respect to the potential to cause spurious actuations that could prevent safe shutdown?

09.05.01-4

Section 9.5.1.2.5 of the DCD specified Novec 1230 fluid in a 5.6% concentration is used for cable raised-floor areas, or equal. What is the concentration used for other areas, especially "energy augmented" areas where energy sources can augment combustion or cause re-ignition? Also, will room integrity testing be included in the initial performance test to ensure the specified concentration can be maintained long enough for fire extinguishment? The DCD should also specify the standard to which the automatic gaseous suppression system is installed or included the appropriate standard in the reference section.

09.05.01-5

In Table 9.5-1, MHI indicated conformance with Regulatory Position 5.3.4. Clarify that the conformance is based on the assumption that multiple spurious actuations can occur in rapid succession or simultaneously per RG 1.189, and NOT based on the "one-at-a-time" multiple spurious actuation assumption per NFPA 804, which is not endorsed by the NRC. This RAI is related to RAI 542, Question 1822.

09.05.01-6

In Table 9.5-1, for compliance with Regulatory Position 1.2, MHI indicated that the COL applicant will update and maintain the Fire Hazards and Safe Shutdown Analysis as required per COL Item 9.5(2). This COL information item should direct the COL applicant to perform a Final Fire Hazards and Safe Shutdown Analyses based on the final plant cable routing, fire barrier ratings, fuel loading, ignition sources, purchased equipment, equipment arrangement, and includes a review against the assumptions and requirements stated in the Initial Fire Hazards and Safe Shutdown Analysis provided in the DCD. The final FHA and Safe Shutdown Analysis should also include a detailed post-fire safe-shutdown circuit analysis performed and documented using a methodology similar to that described in NEI guidance document, NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis," using as-built data. This COL information item should also direct the applicant to describe how these analyses will be performed and documented, and how will the NRC be made aware of deviations and subsequent changes to the approved design.

09.05.01-7

In Table 9.5-1, MHI indicated conformance with Regulatory Position 5.3.1 and referenced the Fire Hazard Analysis (Appendix 9A). Since NEI 00-01 methodology is based on as-built data with final purchased equipment, equipment arrangement, plant cable routing, and detailed control circuitry, it is doubtful that the analysis as presented in Appendix 9A at this early stage of design conforms to Regulatory Position 5.3.1. A detailed safe shutdown analysis using the above prescribed as-built data and a methodology similar to NEI 00-01 must be completed prior to fuel load either by MHI or the COL applicant. This RAI is related to RAI 601, Question 1953.

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09.05.01-8

Tier 1 Table 2.2-4, Item 16 - the acceptance criteria should be revised to clarify that all as-built penetrations and openings are protected with rated components (i.e. fire doors in door openings, fire dampers in ventilation duct openings, and penetration seals) consistent with the fire resistance rating of the associated barrier.

09.05.01-9

Tier 1 Table 2.6.6-1, Item 6, the acceptance criteria should include the verification or testing of self-contained battery packs to provide at least 8 hours of service upon lost of normal power.

09.05.01-10

Tier 1 Table 2.9-1, Item 7i, the acceptance criteria for the remote shutdown console (RSC) should include the verification of electrical isolation from the Main Control Room (MCR) upon transfer of control.

09.05.01-11

Tier 1, Tables 2.7.5.1-3, 2.7.5.2-3 and 2.7.5.4-2, the acceptance criteria should clarify that fire damper testing is to be performed at design air flow conditions in accordance with RG 1.189, Regulatory Guide 4.2.1.3.

09.05.01-12

MHI should include an ITAAC to verify the operability of all automatic and manually actuated fixed fire suppression systems in accordance with RG 1.189, Regulatory Position 1.7.5.a.

09.05.01-13

MHI should include an ITAAC to verify conformance with RG 1.189, Position Number 4.1.7, as indicated in Table 9.5-1 for the fire brigade radio system. If the fire brigade radio system is a site-specific item as indicated in Section 9.5.2.2.5.2, the COL applicant should address the fire brigade radio system requirements in an appropriate COL item. The acceptance criteria should ensure preclusion of interferences with the plant security communication system, fixed repeaters are installed and protected from exposure fire damage to preclude dead zones, and selected radio frequencies will not affect the actuation of protective relays.