

US-APWRRRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, May 13, 2013 9:11 AM
To: us-apwr-rai@mhi.co.jp; US-APWRRRAIsPEm Resource
Cc: Pohida, Marie; Mrowca, Lynn; Reyes, Ruth; Lee, Samuel
Subject: US-APWR Design Certification Application RAI 1033-7090 (19)
Attachments: US-APWR DC RAI 1033 SPRA 7090.pdf

MHI,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, MHI requests and we grant 45 days to respond to the RAI. We will adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 1033-7090

Issue Date: 5/13/2013

Application Title: US-APWR Design Certification - Docket Number 52-021

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: 19

QUESTIONS

19-592

The staff has reviewed the applicant's response to RAI questions 19-565 and 19-548. The staff does not have sufficient information to conclude that draindown events when the refueling cavity is flooded, particularly when fuel is stored in the temporary racks, are not a significant contributor to US-APWR shutdown risk. The staff notes that refueling cavity level indicators and alarms are not required to be operable, even with fuel being stored in the temporary racks. When the temporary fuel racks are being used, should RCS level drop to the vessel flange, water level would be near the top of active fuel. Therefore, the time to uncover these temporary fuel racks should be evaluated. Please address the following items associated with draindown events:

1. Please provide a quantified evaluation of draindown events from the refueling cavity with and without the temporary fuel racks being used, evaluating all possible drain paths and address the following items in the evaluation:

(a) The maximum flow rate from the RHR pumps (3650 gpm) and the spent fuel pumps (3685 gpm) needs to be included in the evaluation.

(b) The time to core boiling with the racks being used needs to be included in the evaluation.

(c) The time to uncover of the fuel stored in the racks needs to be included in the evaluation.

(d) Identify the level indications and associated alarms available to the operator and credited in the evaluation when fuel is stored in these racks, especially when there is no fuel movement.

(e) Identify the refueling cavity level at which the fuel racks are installed in the evaluation.

(f) Identify the refueling cavity level at which the temporary fuel racks become hydraulically disconnected from the reactor vessel and the RHR system such that RHR cooling cannot adequately cool the fuel stored in these temporary racks in the evaluation.

(g) Evaluate draindown events when the weir gate or the transfer tube/valve/gate are closed while fuel is in the temporary storage racks. Since there does not appear to be a requirement for having the weir gate or transfer tube valve/gate open while fuel is in the refueling cavity temporary storage racks. The statement "During a fuel handling event, the refueling cavity water level would be maintained at least 11'1" above the top of moving fuel to keep the water

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shielding thickness (See DCD Subsection 12.3.2.2.4)," is only valid for a gravity motivated drain down event with refueling cavity hydraulically connected to the spent fuel pool.

2. Item 21 of Table 19.1-119 says the level instrument will be available when the refueling cavity is flooded, but DCD section 9.1.4.2.1.13 only discusses availability prior to fuel movement to/from the R/V. What about when fuel is stored in the temporary storage racks, but no fuel movement to/from the R/V is in progress? Please resolve this discrepancy between Chapter 19 and Chapter 9 of the DCD.

3. The staff requests MHI to update Chapter 19 of the DCD and the risk insights table in Chapter 19 to include indications and alarms that will be available during Modes 5 and 6 for inadvertent drain down paths leading outside of containment such as the CCW surge tank and the RWSAT.

4. For those instruments/alarms (e.g., sump tank level) that are routed through the waste disposal panel, or otherwise share a common alarm, does the presence of another alarm condition have the potential to block the specified alarms to the MCR relied upon to detect this leakage? See footnote 2 to DCD Rev 3 Table 11.2-8 "Summary of Tank Indication, Level Annunciations, and Overflows," which states "High level alarms in the radwaste control room are annunciated in the MCR as a common alarm." How was this information factored into the human reliability assessment for draindown events? Please identify any significant operator actions in DCD Chapter 19.

