

REQUEST FOR ADDITIONAL INFORMATION 336-2375 REVISION 1

4/13/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 18 - Human Factors Engineering

Application Section: 18.3 Functional Requirements Analysis and Function Allocation

QUESTIONS for Operating Licensing and Human Performance Branch (AP1000/EPR Projects) (COLP)

18-28

In DCD section 18.3.2.1, MHI states that the functional requirements analysis and the allocation analysis were performed using a structured, documented methodology. This is a direct quote from NUREG-0711 rather than a description of how the criterion is implemented. Two references (IEC 964 and NUREG 3331) were cited as sources for guidance. As guidance documents it is not clear what was used or not used to establish a "Structured, documented methodology." Topical Report MUAP 7007 subsection 5.3.2 is referenced but it does not provide any additional information on the "Structured, documented methodology." RAI 18-30 on the topical report documented the same conclusion and requested details on the methodology used. In the RAI response, MHI stated their position that, "The functions and allocations are based primarily on historical practices ... Therefore the focus of this HFE effort is to identify any changes from historical practices." Subsequent to this response MHI provided the following documents describing historical practices:

PWR Plant Critical Function Hierarchy Analysis, January, 2009 (UAP-HF-09020 – Enclosure 1)
Operating Task Functional Analysis, January, 2009 (UAP-HF-09020– Enclosure 2)
Functional Assignment to Operator, January, 2009 (UAP-HF-09020– Enclosure 3)
Plant automation System Function, Summary January, 2009 (UAP-HF-09020– Enclosure 4)

The cover letter for these enclosures stated they were intended to present the HFE bases used for the design of the US-APWR.

The enclosures to MHI document UAP-HF-09020 provided information that would lead one to believe a methodology was used but they did not sufficiently demonstrate how that methodology incorporated guidance from NUREG-0711. Nor was the case made that the predecessor plant design could stand on its own as the starting point for the development of the US-APWR design. From the information the staff has received, there does not appear to be a good basis for making such a case.

The enclosures of MHI document UAP-HF-09020 were particularly difficult to evaluate for the following reasons:

1. No overall structure was provided. It was difficult to understand how the 4 enclosures related to each other even though they referred to each other.

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2. There were missing words in sentences.
3. There was a significant amount of atypical word usage. The staff had to make assumptions about intended meaning in many places.
4. Criteria and methods used to reach results were not sufficiently described.
5. The pedigree of these enclosures is uncertain. They do not appear to documents that would be included by reference within the DCD.

This collection of material does not demonstrate a "structured, documented methodology" .

Please provide a description of the methodology used to complete the functional requirements analysis and the functional allocation. Ensure the level of detail is sufficient to demonstrate the structure of the approach.

Please address the quality issues associated with the enclosures from MHI document USP-HF-9020 if these are intended to support the DCD.

18-29

In DCD Tier 2, Section 18.3.2.1, MHI restates the 0711 criterion 4.4(2) but does not explain how the criterion will be accomplished.

Please explain how the criterion will be addressed.

18-30

In DCD section 18.3.3, MHI restates 0711 criterion 4.4(4) but does not explain how the criterion will be implemented or provide the descriptions the criterion specifies.

Please explain how this criterion will be addressed.

18-31

In DCD section 18.3.3, MHI restates 0711 criterion 4.4(5) but does not explain how the criterion will be implemented or provide the all information the criterion specifies. The text indicates the information will be provided in a future HSI Design Technical report. Two Functional allocation changes for the US-APWR as compared to the standard Japanese PWR are listed. MHI indicates functional details are described in the FRA/FA report. This report was neither provided nor referenced.

Please submit the reports described in the DCD to support evaluation of this criterion.

18-32

In DCD section 18.3.3, MHI restates 0711 criterion 4.4(6) but does not explain how the criterion will be implemented or provide the information the criterion specifies. The DCD references Topical Report MUAP-07007 rev2, section 5.3.2 which describes the rules and considerations for functional allocation. This information provides a good basis for

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function allocation decision making. However, because there is no “structured, documented. methodology” (see RAI 2375 question 9869), it is not clear how each allocation decision is being documented.

Please explain how the criterion will be addressed.

18-33

In DCD section 18.3.2.1 MHI restates the 0711 criterion 4.4(7) but does not explain how the criterion will be accomplished.

Please explain how the criterion will be addressed.

18-34

In DCD section 18.3.2.2, MHI restates NUREG-0711 criterion 4.4(8) but does not explain how the criterion will be accomplished.

Please explain how the criterion will be addressed.

18-35

In DCD tier 2, section 18.3.2.2., MHI restates 0711 criterion 4.4(10) but does not explain how it will be accomplished.

Please explain how this criterion is accomplished.