

**REQUEST FOR ADDITIONAL INFORMATION NO. 184-1912 REVISION 0**

2/9/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria  
Application Section: Section 2.7 and 2.8 of DCD

QUESTIONS for Construction Inspection and Allegations Branch (CCIB)

14.03.07-16

ITAAC Item 3.a in Table 2.7.5.1-3

Include the provision for simulated test signals in each Class 1E division to test that Class 1E components are powered from their respective Class 1E division in the ITA column for Item 11 in US-APWR DCD Tier 1 Table 2.4.1-2. The AC column should indicate that only the equipment for each division, when it is tested, receives power from a power supply in the same division. This completely describes the extent of the necessary tests and corresponds to Example 6.b in Tier 2 Table 14.3-2.

Establish that simulated test signals exist only at the Class 1E equipment, identified in Tier I Table 2.4.1-1, under test. An important aspect of the design commitment for item 11 is that the power supplies to common components are independent.

Also applicable to the following ITAAC:

ITAAC Item 3.a in Table 2.7.5.2-3  
ITAAC Item 3.a in Table 2.7.5.4-2  
ITAAC Item 7.a in Table 2.7.6.3-5  
ITAAC Item 3.a in Table 2.7.6.6-2  
ITAAC Item 6.b in Table 2.7.6.7-3  
ITAAC Item 4.a in Table 2.7.6.13-3

14.03.07-17

ITAAC Item 3.b in Table 2.7.1.5-3

The design commitment refers to non-Class 1E divisions, why does the AC not indicate that non-class 1E cables are routed in their own raceways?

Will inspections be able to verify only cables from a certain division are routed in crowded raceways?

This is also applicable to the following ITAAC:

ITAAC Item 3.b in Table 2.7.5.2-3  
ITAAC Item 7.b in Table 2.7.6.3-5

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ITAAC Item 3.b in Table 2.7.6.6-2  
ITAAC Item 4.b in Table 2.7.6.13-3

14.03.07-18

ITAAC Item 7 in Table 2.7.1.5-3

Table 2.7.1.5-2 lists alarms, displays, and control functions for the MCR. It seems that this panel should be represented in Item 7. It would seem that the MCR panel would have all of these alarms, displays, and control functions. If that is the case, then item 7 needs to be revised.

Several components are listed in US-APWR DCD Tier 1 Table 2.7.1.5-2 with MCR alarms. No ITAAC entry was noted to verify the retrieval of the listed alarms in the MCR.

Also applicable for ITAAC Item 7 in Table 2.7.5.2-3

14.03.07-19

Explain how the acceptance criteria for item 1.b identified in US-APWR DCD Tier 1 Table 2.7.5.1-3 meets the design commitment for item 1.b. The design commitment calls for each MCR HVAC mechanical division to be physically separated. The acceptance criteria states that the physical separation can be structural or by a fire barrier.

A fire barrier does not necessarily infer physical separation between components of different ECCS divisions as required by the design commitment. The design commitment statement only appears in US-APWR DCD Tier 1 Table 2.4.4-5 and is not expanded or amplified in Tier 1 Section 2.4.4 in a text discussion or a tabular form.

Also applicable to ITAAC:

ITAAC Item 1.b in Table 2.7.5.2-3  
ITAAC Item 4 in Table 2.7.6.6-2  
ITAAC Item 5 in Table 2.7.6.13-3

14.03.07-20

Define the term "adequate" such that an inspector can evaluate SFP pump cooling capacity in the Acceptance Column for item 8 in US-APWR DCD Tier 1 Table 2.7.6.3-5

Without a definition for the word "adequate," an inspector will be unable to provide an acceptable

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verification of the design commitment. The range of tests in the Inspections, Tests, Analyses column should also be provided for clarity.

Also applicable to following ITAAC:

14.03.07-21

ITAAC Item 2 in Table 2.7.4.2-1

The design commitment is more definitive than the AC. The AC should be at least as definitive as the design commitment.

Also applicable to following ITAAC:

ITAAC Item 1 in Table 2.7.6.6-2 - In addition, what are the NRC regs referred to in this ITAAC. They are not listed in Tier 1 in Table 2.7.6.6-1.

ITAAC Item 5 in Table 2.7.6.6-2 .

ITAAC Item 8 in Table 2.7.6.7-3

ITAAC Item 1 in Table 2.7.6.13-3 - In addition, what are the NRC regs referred to in this ITAAC. They are not listed in Tier 1 in Table 2.7.6.13-1.

ITAAC Item 6 in Table 2.7.6.13-3

14.03.07-22

Identify the source of the start signal in all columns for item 5.a in US-APWR DCD Tier 1 Table 2.7.5.1-3.

. The specific start signal should be identified for clarity to fully evaluate the start function.

Also applicable to following ITAAC:

ITAAC Item 6.b in Table 2.7.5.1-3.

ITAAC Item 5.a in Table 2.7.5.2-3.

ITAAC Item 6.b in Table 2.7.5.2-3.

14.03.07-23

RAI 14.3.4.7.4-01

The following typographical or editorial errors were noted in US-APWR Tier 2, Chapter 14, Section 14.3.4.7 and Tier 1, Chapter 2, Section 2.7.4:

1. Page 2.7-120, Item 2, Design Commitment: The word "closes" should be "close."
2. Page 2.7-123, Item 2, Design Commitment: The word "closes" should be "close."

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14.03.07-24

Verify that no LWMS components need be qualified for harsh environments.

The Equipment to be Qualified for Harsh Environments section in Tier 1 Section 2.7.4.1.1 on page 2.7-119 is marked "Not applicable." Table 2.11.2-1 identifies valves LMS-AOV-052 on the Reactor Coolant Drain Tank gas analysis line, LMS-AOV-055 on the Reactor Coolant Drain Tank vent line, LMS-LCV-1000A on the Reactor Coolant Drain Tank pump discharge line and LMS-AOV-104 on the sump pump discharge line as qualified for a harsh environment. It appears that Table 2.11.2-1 should be referenced in the Equipment to be Qualified for Harsh Environments section in Tier 1 Section 2.7.4.1.1 on page 2.7-119.

Also applicable to following ITAAC:

### **ITAAC in Table 2.7.6.3-5**

Verify that no SFP Cooling and Purification System equipment is qualified to operate in a harsh environment as identified in US-APWR DCD Tier 1 Table 2.7.6.3-1.

The subsection "Equipment to be Qualified for Harsh Environments" in Tier 1 Section 2.7.6.3 on page 2.7-191 indicates that some SFP Cooling and Purification System equipment is qualified to operate in a harsh environment. Information provided in US-APWR DCD Tier 1 Table 2.7.6.3-1 and the design commitment information provided in Tier 1 Section 2.7.6.3 should match.

### **ITAAC in Table 2.7.6.7-3**

Verify that no SFP Cooling and Purification System equipment is qualified to operate in a harsh environment as identified in US-APWR DCD Tier 1 Table 2.7.6.3-1.

The subsection "Equipment to be Qualified for Harsh Environments" in Tier 1 Section 2.7.6.3 on page 2.7-191 indicates that some SFP Cooling and Purification System equipment is qualified to operate in a harsh environment. Information provided in US-APWR DCD Tier 1 Table 2.7.6.3-1 and the design commitment information provided in Tier 1 Section 2.7.6.3 should match.

### **ITAAC Item 3 in Table 2.7.6.13-3**

Discuss why inspections are not required by US-APWR DCD Tier 1 Table 2.7.6.13-3, item 3 to verify that equipment and associated wiring, cables, and terminations located in a harsh environment are bounded by the type tests and/or analyses.

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An important aspect of the harsh environment design commitment for item 3 is that the as-built area radiation monitors are bound by type tests and analyses. An inspection of the as-built area radiation monitors is necessary. Example 6.a.ii in Tier 2 Table 14.3-2 provides an acceptable verification of the commitment.

14.03.07-25

The following typographical or editorial errors were noted in US-APWR Tier 2, Chapter 14, Section 14.3.4.7 and Tier 1, Chapter 2, Section 2.7.5:

1. Page 2.7-180, Design Commitment, Item 4.a: The phrase “perform an safety-related...” should be “perform a safety-related...”
2. Page 2.7-181, Key Design Features: The first bullet should actually be the lead in sentence for the section and not appear in bullet form.

14.03.07-26

Identify the proper environmental condition to be maintained in the control room envelope in the Acceptance Criteria for item 4.a identified in US-APWR DCD Tier 1 Table 2.7.5.1-3.

No definition of the proper environmental condition to be maintained in the control room envelope is provided in Tier 1 Section 2.7.5.1 in a text discussion or a tabular form. Without a definition of the proper environmental condition, an inspector will be unable to provide an acceptable verification of the design commitment.

Also applicable to following ITAAC:

ITAAC item 4.a in Table 2.7.5.2-3.

14.03.07-27

ITAAC Item 7.a in Table 2.4.4-5

The reference for this ITAAC directs the reader to Section 2.11.2. However, there is no direction as to the attributes that are applicable to the ITAAC. This ITAAC is open-ended in that the licensee would find it difficult as to what acceptance criteria had to be satisfied to conclude that the ITAAC was met. In addition, that section contain key design information some of which is contained in ITAAC, but the remainder is not.

Applicable to following ITAAC:

ITAAC Item 7 in Table 2.4.6-5

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ITAAC Item 7 in Table 2.7.1.2-5  
ITAAC Item 7 in Table 2.7.1.9-5  
ITAAC Item 7 in Table 2.7.1.11-5  
ITAAC Item 2 in Table 2.7.2-3  
ITAAC Item 2 in Table 2.7.3.6-1  
ITAAC Item 2 in Table 2.7.5.3-1  
ITAAC Item 7 in Table 2.7.6.7-3  
ITAAC Item 7 in Table 2.7.6.9-2

14.03.07-28

ITAAC Item 1 in Table 2.7.1.12-1

This is applicable to this and all other ITAAC which state that the functional arrangement of a system conforms to description of operation in a section of Tier1. A functional arrangement is typically based on a figure and a description of how system operates not just the latter. It would be difficult to inspect the as-built system based on solely a description of its operation.

The following listing is not inclusive of all ITAAC affected:

ITAAC Item 1 in Table 2.7.1.13-1  
ITAAC Item 1 in Table 2.7.2-3  
ITAAC Item 1 in Table 2.7.3.2-1

14.03.07-29

The following typographical or editorial errors were noted in US-APWR Tier 2, Chapter 14, Section 14.3.4.7 and Tier 1, Chapter 2, Section 2.7.6:

1. Page 2.7-197, Design Commitment, Item 7.a: The word "is" should be "are."
2. Page 2.7-203, Key Design Features, 3<sup>rd</sup> Bullet: The phrase "suspension crane" is used to describe the third load handling hook on the spent fuel handling crane. In Section 2.7.6.4 on page 2.7-199, this equipment is consistently identified as the "suspension hoist." The terminology should be consistent between the two sections.
3. Page 2.7-226, Design Commitment and Acceptance Criteria, Item 3: The word "provide" should be "provided."
4. Page 2.7-227, Design Commitment and Acceptance Criteria, Item 8: The phrase "Table 2.6.9-1" should be "Table 2.7.6.9-1."
5. Page 2.7-229, Key Design Features, 2<sup>nd</sup> Paragraph: The phrase "and as well as" should be "as well as."

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14.03.07-30

ITAAC Item 6 in Table 2.7.6.3-5

The piping identified here should be included with Item 5 in Table 2.7.6.3-5 or another separate ITAAC similar to Item 5 should be developed for the piping in this ITAAC.

Also applicable to the following ITAAC:

14.03.07-31

Identify the LLHS seismic criteria to be met by US-APWR DCD Tier 1 Table 2.7.6.4-2, item 2.

The US-APWR DCD Tier 1 Table 2.7.6.4-2, item 2 Acceptance Criteria specifies that the LLHS equipment meet the seismic criteria identified in US-APWR DCD Tier 1 Table 2.7.6.4-1. No seismic criteria are identified in US-APWR DCD Tier 1 Table 2.7.6.4-1. A verifiable acceptance criterion would indicate that the result of type tests and/or analyses indicates that the seismic category I LLHS equipment can withstand seismic design basis loads.

Applicable to following ITAAC:

ITAAC Item 2 in Table 2.7.6.5-1 - The OHLHS can be Seismic Category II in regard to damage to itself, but what about the mounting of the OHLHS in regard to II over I criteria? What about seismic restraint system for polar crane?

14.03.07-32

ITAAC Item 3 in Table 2.7.6.4-2

The design commitment does not agree with what is tested in the ITA, and the AC sure does not agree with the ITA either. This ITAAC is very confusing in that the design commitments seem to have no connection to what is tested in the ITA. In addition, the ITA is numbered differently than the design commitments or AC. There should be some correlation with the design commitments.

The first design commitment states that the interlocks, limits switches, and mechanical stops prevent damage to a fuel assembly. This seems to be all inclusive, but that is not the case because what is tested in the ITA is determining if the gripper can be open when an assembly is suspended to it. This test only prevents damage to an assembly by dropping it. What about ramming it into another fuel assembly?

For design commitment two, what is the upper limit to which a fuel assembly may be raised?

For design commitment three, what is the upper limit for the most weight that the refueling machine can lift?

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The steps in the ITA and AC should be three different ITAAC because they are all unique. This can be accomplished by separating them out and using suffixes like what is presently done in the ITA.

14.03.07-33

### **ITAAC Item 4 in Table 2.7.6.4-2**

What is the rated capacity of the suspension hoist? That should be stated in the AC.

Also applicable to following ITAAC:

**ITAAC Item 3 in Table 2.7.6.5-1** - The travel limits of the OHLHS should somehow be listed in the directions the load hook is so limited. In addition, the design commitment is confusing because damage to safety-related components is more critical than the OHLHS. Damage to the OHLHS should be a limiting factor only when damage to it can cause damage to safety related components.

14.03.07-34

Identify the conditions where the new fuel elevator winch load sensing interlock operates to prevent a fuel assembly from being raised in the Design Commitment and Acceptance Criteria for item 5 identified in US-APWR DCD Tier 1 Table 2.7.6.4-2.

The new fuel elevator winch load sensing device is noted to prevent a fuel assembly from being raised under the Interlocks section in Tier 1 Section 2.7.6.4 on page 2.7-200. No specifics concerning the conditions under which this interlock is enforced are detailed in the Tier 1 Section 2.7.6.4 text or in the US-APWR DCD Tier 1 Table 2.7.6.4-2 for item 5. As written, the new fuel elevator should never operate to raise a fuel assembly.

Applicable also to following ITAAC:

**ITAAC Item 4 in Table 2.7.6.5-1** - For what type of system fault are the safety devices actuated?