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June 7, 2011

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-11175

Subject: **Revised Responses for US-APWR DCD RAI Nos. 132, 156, 195, 242, 255, 318, 372, 424, 582 and 616**

References:
1) **MHI's Responses to US-APWR DCD RAI No. 132-1538 Revision 1, UAP-HF-09028, dated January 29, 2009**
2) **MHI's Response to US-APWR DCD RAI No. 156-1877, UAP-HF-09039, dated February 5, 2009**
3) **MHI's Responses to US-APWR DCD RAI No. 195-2068 Revision 0, UAP-HF-09076, dated March 5, 2009**
4) **MHI's Responses to US-APWR DCD RAI No. 242-2153 Revision 0, UAP-HF-09215, dated April 27, 2009**
5) **MHI's Responses to US-APWR DCD RAI No. 255-2110 Revision 1, UAP-HF-09216, dated April 28, 2009**
6) **MHI's Response to US-APWR DCD RAI No. 318, UAP-HF-09292, dated June, 2009**
7) **MHI's Responses to US-APWR DCD RAI No. 372-2787 Revision 1, UAP-HF-09309, dated June 11, 2009**
8) **MHI's Responses to US-APWR DCD RAI No. 424-3281 Revision 0, UAP-HF-09441, dated September 8, 2009**
9) **MHI's Response to US-APWR DCD RAI No. 582-4456 Revision 2, UAP-HF-10206, dated July 16, 2010**
10) **MHI's Responses to US-APWR DCD RAI No. 616-4865 Revision 0, UAP-HF-10255, dated September 22, 2010**

This letter transmits Mitsubishi Heavy Industries, Ltd. (MHI) "Revised Responses for US-APWR DCD RAI Nos. 132, 156, 195, 242, 255, 318, 372, 424, 582 and 616."

US-APWR DCD Revision 3 incorporated Tier 1 changes made by the MHI RIS 2008-05 Tier 1 improvement project, conducted with NRC oversight. Changes made by this project materially affected several Tier 1 RAI responses (References 1 through 10). This document revises those Tier 1 RAI responses that were materially affected.

D081
NRO

Revised responses are provided for the following RAI questions:

RAI 132	09.01.02-11
RAI 132	09.01.02-14
RAI 156	14.3-1
RAI 195	14.03.10-1
RAI 242	14.03.03-15
RAI 242	14.03.03-16
RAI 255	14.03.05-11
RAI 318	09.05.04-37
RAI 372	14.03.09-3
RAI 372	14.03.09-4
RAI 372	14.03.09-5
RAI 424	14.03.06-17
RAI 582	09.04.01-20
RAI 616	09.01.05-18

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.

Enclosure:

1. Revised Responses for US-APWR DCD RAI Nos. 132, 156, 195, 242, 255, 318, 372, 424, 582 and 616

CC: J. A. Ciocco
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Docket No. 52-021
MHI Ref: UAP-HF-11175

Enclosure 1

UAP-HF-11175
Docket No. 52-021

Revised Responses for US-APWR DCD RAI Nos. 132, 156, 195, 242, 255, 318, 372, 424, 582 and 616

June 2011

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 132-1538 REVISION 1**
SRP SECTION:	**9.1.2 – New and Spent Fuel Storage**
APPLICATION SECTION:	**9.1.2**
DATE OF RAI ISSUE:	**12/18/2008**

QUESTION NO.: 09.01.02-11

[9.1.2-11] SRP Section 9.1.2 Section III.3.B states that, if the spent fuel pool liner plate is not designed and constructed to seismic Category I requirements, the spent fuel pool liner plate is reviewed for whether a failure of the liner plate as a result of an SSE will not cause any of the following:

Significant releases of radioactivity due to mechanical damage to the fuel.
Significant loss of water from the pool which could uncover the fuel and lead to release of radioactivity due to heat-up.
Loss of ability to cool the fuel due to flow blockage caused by a complete section or portion of the liner plate falling on the fuel racks.
Damage to safety-related equipment as a result of pool leakage.
Uncontrolled release of significant quantities or radioactive fluids to the environs.

The staff has not been able to determine if the SFP liner was designed as a seismic Category I structure. The staff also noted that the applicant has not proposed an ITAAC to verify the proper construction of the SFP liner. The staff requests the applicant to clarify in the DCD that the SFP liner was designed as a seismic Category I structure or to include in the DCD a justification (that addresses all the elements mention above) that justifies why the SFP liner is not designed as a seismic Category I structure. The staff also requests the applicant to justify why there is no ITAAC to verify the proper construction of the SFP liner (leak tight).

ANSWER:

The SFP liner is an integral part of the SFP structure and is classified as seismic Category I. DCD Revision 3 Tier 2 Section 3.8.4 describes Reactor Building fuel handling area structural design, including the SFP. DCD Section 3.8.4 discusses reactor building concrete design in accordance with ACI 349, RG 1.142, and SRP 3.8.4, using loads and load combinations shown in DCD Section 3.8.4.3 and Table 3.8.4-3. Liner anchorage design conforms to RG 1.199 and ACI 349 Appendix B.

The SFP and its liner will maintain their structural integrity and remain leak tight under all design basis loads and load combinations. SFP design calculations consider all design basis loads, including dead, live, hydrostatic, hydrodynamic, seismic, normal operating, accident thermal, and spent fuel assembly drop. DCD Tier 2 Section 3.8.4.3 provides definitions.

Conservatively, SFP design calculations do not credit the SFP liner as a structural element. However, design calculations account for liner strain compatibility with the SFP structure and for loads that the liner imposes on the structure, such as thermal expansion loads.

DCD Tier 2 Section 9.1.2.2.2 has been revised to state that the liner is classified Seismic Category I and will withstand all design basis loads.

COL applicants who reference the US-APWR certified design will establish an in-service inspection and testing program for Seismic Category I structures in accordance with NUMARC 93-01 guidance as described in DCD Sections 3.8.3.7 and 3.8.4.7. This program will maintain SFP liner integrity.

Discussion of the Seismic Category I SFP liner is intentionally omitted from DCD Tier 1 because the liner is an integral component of the overall Seismic Category I SFP structure and its separate discussion represents a level of detail that is inconsistent with SRP 14.3 guidance.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 132-1538 REVISION 1**
SRP SECTION:	**9.1.2 – New and Spent Fuel Storage**
APPLICATION SECTION:	**9.1.2**
DATE OF RAI ISSUE:	**12/18/2008**

QUESTION NO.: 09.01.02-14

[9.1.2-14] SRP Section 9.1.2, Section III.2.O states that "For spent fuel storage, monitoring systems should detect pool water levels, pool temperatures, and pool building radiation levels. Alarms should be both local and in a continuously manned location." In the DCD Section 9.1.2.2.2 the applicant states that SFP water level and temperature gauges, and an area radiation monitor in the fuel handling area are provided with alarms to the main control room (MCR). Additionally, the applicant stated in Tier 1 Section 2.7.6.2, "Spent Fuel Storage," that the SFP liner leakage collection system is provided with a leak detection capability. There are no other alarms, displays, or controls associated with the spent fuel storage facilities.
The staff finds these two statements to be contradictory and neither of these two statements is in accordance with the recommendations given by SRP Section 9.1.2. The staff requests the applicant to clarify in the DCD what are the monitoring requirements for the SFP and to justify in the DCD why the USAPWR design is not in accordance with the recommendations of SRP Section 9.1.2.

ANSWER:

US-APWR DCD Revision 3 Tier 2, Section 9.1.2.2.2, states "Spent fuel pit water level and temperature gauges, and an area radiation monitor in the fuel handling area are provided with alarms to the main control room (MCR) and locally." This statement is revised to clarify that these alarms are also displayed locally.

US-APWR DCD Revision 3 Tier 2, Figure 9.1.3-1, "Schematic of Spent Fuel Pit Purification and Cooling System (Cooling Portion)," has been revised to show both local and main control room monitoring systems (indications and alarms) for the SFP water level and temperature. DCD Tier 2 Section 12.3.4.1.2 Criteria for Location of Area Monitors states, "The ARMS provides a continuous, direct indication or recording of radiation levels in the control room and raises alarms locally and in the control room when radiation levels exceed the set values".

Discussion of SFP level and temperature, including the contradictory statement referenced by this RAI question, is intentionally omitted from US-APWR DCD Revision 3 Tier 1 as these parameters are not safety related and represent a level of detail that is inconsistent with SRP 14.3 guidance. DCD Tier 2 Section 14.2.1 describes verification of these functions by the Initial Test Program (ITP) performed during pre-operational testing of the Spent Fuel Pit Cooling and Purification System, which is described by DCD Section 14.2.12.1.85.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 156-1877 REVISION 0**
SRP SECTION:	**14.03.02 – Structural Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria**
APPLICATION SECTION:	**14.3**
DATE OF RAI ISSUE:	**01/14/09**

QUESTION NO. RAI 14.3-1: Define ITAAC to verify by inspection the special modular construction techniques for steel concrete (SC) modules.

The NRC staff has reviewed the frame work for steel concrete modules as it relates to Subsections 3.8.3.6.1, "Special Modular Construction Techniques," 3.8.3.1.7, "Refueling Cavity," and 3.8.3.1.5, "Primary Shield Wall" of the DCD. Particularly, in Subsection 3.8.3.6.1, the applicant states those special modular construction techniques, in addition to the methodology will be provided in a later supplement to the DCD. In accordance with Appendix A, GDC 2, to 10 CFR Part 50, the NRC staff request that the applicant develop ITAAC to verify by inspection that the special modular construction techniques adequately address the fabrication, shipping, handling, and installation of the steel concrete modules and reconcile the as-built configuration of the plant with the structural design basis of the licensed facility.

In addition, the applicant should provide a summary of the information in the supplement to the DCD that describes these special module construction techniques. This summary should include descriptions of special requirements placed on the fabrication, shipping, handling, and installation of the SC modules, which are necessary to avoid overstressing, excessive distortion, and/or any other degradation mechanism of the steel faceplates during these operations.

These explanations should be detailed enough to allow staff evaluation of the SC modules. As an example, in describing transportation issues, the discussion should address things such as maximum size and weight of the modules, how the modules are packaged and secured to the rail car (or truck bed). This information should address how the modules are supported to minimize vibrations and impact loading; how they are protected from the elements during transportation and storage; and how loading and unloading is to be accomplished to avoid overstressing the steel plate assemblies. Similar types of information should be provided for the other steps in the construction process.

Include in these explanations the acceptance criteria for the SC modules for loads related to fabrication, shipping and handling, erection and any other steps in the construction process.

The discussion should include a description of quality control measures needed, if any, that supplement those contained in applicable codes and standards (e.g., ACI 349; AISC 690).

ANSWER:

US-APWR DCD Revision 3 Tier 1 Table 2.2-4, ITAAC Nos. 1, 5, 6 and 24 verify SC module configuration and conformance to design bases. Fabrication, shipping, handling, storage, and installation of SC modules are controlled by 10 CFR 50 Appendix B NQA-1 qualified programs, procedures, purchase orders, and receipt inspections. These details of SC module construction are inappropriate for Tier 1, but are described in DCD Tier 2, as indicated below.

US-APWR DCD Revision 3 Tier 2, Section 3.8.3.6.1, commits to supplement this DCD discussion at a later date when special module construction techniques are described. The future supplement will include:

- Special requirements for fabrication, shipping, handling, and installation of SC modules in order to avoid overstressing or excessive distortion of steel faceplates, or other degradation that could occur during these operations.
- Maximum size, weight, and other parameters that affect the way SC modules are packaged and secured to a rail car or truck bed.
- Methods for supporting SC modules to minimize vibration and impact loads, protect against elements during transportation and storage, and load and unload without overstressing the assemblies.
- SC module acceptance criteria for loads related to fabrication, shipping, handling, erection, and other steps in the construction process.
- Description of quality control measures needed, if any, that supplement those contained in applicable codes and standards (e.g., ACI 349; AISC 690).

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 195-2068 REVISION 0**
SRP SECTION:	**14.03.10 – EMERGENCY PLANNING - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**2.10**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.10-01

ITAAC Item 2 in Table 2.10-1

The design commitment states that 'the SC is located close to the MCR'. The acceptance criterion states that 'walking between the as-built 2 areas takes no more than 2 minutes'. The acceptance criterion is unclear about what two areas. What determines whether 2 minutes walking distance meets the accepted criteria? The criteria that must be met should be established, and the acceptance criteria should be in distance not in walking time. The time to walk a given distance is relative to what type of person is doing the walking.

ANSWER:

NUREG 0696 (1981) guidance provides that the TSC must be located within two-minutes walking time of the MCR. This guidance was based on 1980 era communication technology, which technology has experienced revolutionary advances. These advances minimize or obviate the need for the two-minute walk-time criterion. Standard review plan Table 14.3.10 Acceptance Criteria 8.1.2 recognizes this fact, stating "Advanced communication capabilities may be used to satisfy the two minute travel time."

During a meeting with NRC staff to discuss ITAAC improvement in accordance with RIS 2008-05, the staff recognized that objectively verifying the two-minute walk-time ITAAC acceptance criteria would be extremely difficult and indicated that they would accept advanced communications as justification for deleting it. Consequently, the ITAAC improvement project deleted US-APWR DCD Revision 2 Tier 1 Table 2.10-1 ITAAC #2 and MNES implemented this deletion in US-APWR DCD Revision 3.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

The changes affect to the EP-ITAAC in COLA Part 10.

Impact on S-COLA

The changes affect to the EP-ITAAC in COLA Part 10.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 242-2153 REVISION 0**
SRP SECTION:	**14.03.03 – PIPING SYSTEMS AND COMPONENTS – Inspections, Tests, Analyses, and Acceptance Criteria**
APPLICATION SECTION:	**DCD SECTION 3.9**
DATE OF RAI ISSUE:	**03/09/2009**

QUESTION NO.: 14.03.03-15

In Tier 1 Table 2.7.4.2-1 Item 3, the applicant stated that the as-built ASME Code components of the Gaseous Waste Management System will conform to the requirements in the applicable ASME Code. It is not clear to the staff what the applicable ASME Code is. As an example, in Table 2.7.4.1-1, the applicant identifies it being ASME Code B31.3 as described by RG 1.143. The staff requests the applicant to identify the ASME Code in ITAAC Item 3 of Table 2.7.4.2-1.

Answer

US-APWR DCD Revision 3 Tier 2 Table 11.2-1 describes design, fabrication, and construction of gaseous waste management system (GWMS) valves and piping in accordance with ASME Code B31.3. GWMS valves and piping are not subject to ASME Code Section III.

Discussion of this subject has been intentionally omitted from DCD Tier 1 because it does not meet SRP 14.3 selection criteria.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 242-2153 REVISION 0**
SRP SECTION:	**14.03.03 – PIPING SYSTEMS AND COMPONENTS – Inspections, Tests, Analyses, and Acceptance Criteria**
APPLICATION SECTION:	**DCD SECTION 2.7.6.8**
DATE OF RAI ISSUE:	**03/09/2009**

QUESTION NO.: 14.03.03-16

In Tier 1 Section 2.7.6.8.1, subsection Seismic and ASME Code Classifications, the applicant stated that the seismic category and ASME code Section III requirements are applied to those isolation valves installed in the drainage piping from the engineered safety features (ESF) equipment room. The staff recognized that the isolation valves installed to provide isolation for the containment are addressed in Tier 1 Section 2.11.2. However, there is no ITAAC associated to these isolation valves installed in the drainage piping from ESF equipment room.

The applicant is requested to:

i) Provide appropriate ITAAC to address the design of this seismic category equipment or justification for not including an ITAAC.

ii) Provide appropriate ITAAC to address the as-built reconciliation of ASME Code Section III components or justification for not including an ITAAC.

iii) Identify any ASME Code Section III piping in the drainage piping from the ESF equipment room. If there is ASME Code Section III piping, appropriate ITAAC should also be included.

Answer

US-APWR equipment and floor drainage system drain-isolation valves prevent backflow from the drains into ESF equipment rooms. ESF drain-isolation valves are designed to ASME Code Section III and are classified seismic Category I. Prevention of backflow is the sole safety function of the equipment and floor drainage system drain-isolation valves. There are no other ASME Code Section III components or piping in the US-APWR equipment and floor drainage system.

US-APWR DCD Revision 3 Tier 1 Table 2.7.6.8-1, Equipment and Floor Drainage System ITAAC, is revised to clarify drain-isolation valve verification, as follows:

- ITAAC #4 verifies drain isolation valve seismic Category I design.

- ITAAC #6 verifies drain isolation valve fabrication and installation in accordance with ASME Code Section III requirements, including a design report and an as-built reconciliation.

US-APWR DCD Revision 3 deleted Tier 1, Table 2.7.6.8-1 ITAAC # 5.a because the ESF equipment room drain-isolation valves identified in Figure 2.7.6.8-1 are locally operated manual valves, not remotely operated valves.

US-APWR DCD Revision 3 deleted Tier 1, Table 2.7.6.8-1 ITAAC # 5.b because this ITAAC is redundant to Table 2.7.6.8-1 ITAAC #2 to verify alarms and because drain-isolation valves are manually operated and have no remote indication on the safety visual display unit (VDU).

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 255-2110 REVISION 1**
SRP SECTION:	**14.03.05 - Instrumentation and Controls- Inspections, Tests, Analyses, and Acceptance Criteria**
APPLICATION SECTION:	**SECTION 14.3.5**
DATE OF RAI ISSUE:	**03/03/2009**

QUESTION NO.: 14.03.05-11

Provide a discussion on the technically relevant Unresolved Safety Issues (USIs)/Generic Safety Issues (GSIs), Three Mile Island (TMI) items and operating experience related to the RT system and ESF systems in the ITAAC for the applicable Sections of 2.5.

To ensure that the ITAAC reflect the resolutions of technically relevant USIs/GSIs, TMI items, and operating experience requires that these be evaluated in Tier 1. SRP Section 14.3, states "Ensure that the ITAAC reflect the resolutions of technically relevant USIs/GSIs, TMI items, and operating experience." The staff did not find reference to USI/GSIs, TMI items and operating experience related to the RT system and ESF systems in the ITAAC. Revise the information in Tier 1 and Tier 2 of the DCD to include any reference to USI/GSIs, TMI items and operating experience, and modify the ITAAC.

ANSWER:

MHI has reviewed Unresolved Safety Issues (USI), Generic Safety Issues (GSI), Three Mile Island (TMI) items, and operating experience to assess their respective relevance to the US-APWR design. DCD Tier 2 Section 1.9 presents results of this review. Section 1.9.3 discusses and Table 1.9.3-1 summarizes relevant GSI and USI subjects and provides reference to DCD locations where each is addressed. Table 1.9.3-2 provides similar references for TMI Action Plan subjects. Section 1.9.4.2 and associated Tables 1.9.4.2-2, 1.9.4.2-3, and 1.9.5-1 through 1.9.5-4 are related to US-APWR design considerations that address operating experience.

No GSI or USI were identified that affect either the Reactor Trip System or Engineered Safety Features for US-AWPR design, thus there are no associated ITAAC for these systems in DCD Tier 1.

Tier 2 Table 1.9.3-2 identifies one TMI item, III.D.3.3, and location in DCD Section 7.3.1.5 that describes US-APWR design considerations pertaining to ESF related radiation monitoring for accident conditions. These ESF signal actuations are verified by Tier 1 Table 2.5.1-4 ITAAC #14 and are provided for diversity rather than as a direct result of the TMI Action Plan. Discussion of this item is included in the general discussion of USI, GSI, TMI items, and operating experience, instead of as a separate discussion.

Reliability and safety improvements made as a result of operating experience are incorporated as fundamental design elements, such as the four train reactor protection system. There are no specific operating experience related design attributes that require ITAAC verification.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 318-2227 REVISION 1**
SRP SECTION:	**09.05.04 – Emergency Diesel Engine Fuel Oil Storage and Transfer System**
APPLICATION SECTION:	**9.5.4**
DATE OF RAI ISSUE:	**4/6/2009**

QUESTION NO. : 09.05.04-37

RAI 9.5.4-32:

ITAAC Item 20 requires an inspection of the as-built GTGFSS to ensure that it is designed and constructed to ASME Section III and seismic Category I requirements. However, an inspection of the as-built system may not be sufficient to verify compliance with ASME Section III and seismic Category I requirements. Documentation, including analyses and tests, should also be examined to verify that the acceptance criteria are met. The applicant should expand the inspection requirements as required to ensure compliance and revise the table to clearly identify the additional inspections. This RAI also requests the applicant to verify that components that are not available as ASME Section III are verified to be of equivalent quality through application of this ITAAC.

Answer

US-APWR Revision 3 incorporated the following changes that were made to GTG fuel oil storage and transfer system ITAAC as part of the MHI ITAAC improvement project under RIS 2008-05.

In US-APWR DCD Revision 3 Table 2.6.4-1:

- ITAAC #20 was deleted because it was redundant to ITAAC #8, #7, #26, and #27.
- ITAAC #7, #8, #26, and #27 were revised to improve clarity, remove redundancy, and make acceptance criteria unambiguous to aid closure.

ASME and seismic ITAAC changes include the following:

- New Table 2.6.4-2 was added to list GTG support system components and piping subject to ASME Code Section III requirements. Revised ITAAC #7 requires these components and piping to be hydrostatically tested. Revised ITAAC #7 and #26 require them to be inspected.
- Seismic ITAAC #8 added a requirement to perform analyses.
- ITAAC #26 added requirements for ASME Code Section III data reports and as-built reconciliation of ASME Code Section III piping and components in EPS support systems.

US-APWR DCD Revision 3 Tier 2, Section 9.5.4.3, includes the following FOS provision:

> "... when an ASME Class 3 design component is not available, the component is proven to be of equivalent quality (through seismic design, testing, qualification and documentation)."

In accordance with SRP 14.3.3 guidance, ITAAC are not provided for mechanical features (e.g., hydrostatic and welding) of components that are not subject to ASME Code. The construction inspection program verifies these components by appropriate testing and inspection performed under a 10 CFR 50 Appendix B qualified program. Functional arrangement is verified by ITAAC.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA

Impact on S-COLA

There is no impact on the S-COLA

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 372-2787 REVISION 1**
SRP SECTION:	**14.03.09 – HUMAN FACTOR ENGINEERING - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.3.9**
DATE OF RAI ISSUE:	**5/20/2009**

QUESTION NO. 14.03.09-3

V&V
After reviewing ITAAC 8, the staff is unclear how this ITAAC will fulfill the implementation plans for verification and validation activities. The design commitment is not clear, in that, it does not provide a statement that would lead back to the implementation procedures so that they could be implemented or verified. Please clarify for the staff whether the statement given for the design commitment column for ITAAC 8 means the V&V activities for the HFE process will be implemented in accordance with V&V implementation plan.
Also, in the Acceptance Criteria column, the wording appears to be the same as each of their respective design commitments. This approach to ITAAC does not seem to be consistent with the NUREG-0800 Section 14.3 description for acceptance criteria. Where it states that:
...In some cases, the acceptance criteria may be more general because the detailed supporting information in Tier 2 does not lend itself to concise verification...
NUREG-0800 Section 14.3 goes on to give an example of how, in these types of situations, the applicant will specify a method (usually a report of some sort) to verify that the commitments are met. It also states that Tier 2 is where the detailed supporting information would be provided to validate the report. The acceptance criteria wording does not provide information that a report will be available. Please clarify if a report that documents the results of conducting the V&V implementation plan, and the results of the analyses and inspections for ITAAC 8, will be provided.

ANSWER:

DCD Tier 2 Section 18.8 describes US-APWR HFE procedure development to support the overall HFE Program and V&V activities. Regulatory Guide 1.33 and ANSI/ANS 3.2 describe NRC approved means for satisfying 10 CFR 50 Appendix B Criterion V procedure development requirements. DCD Tier 2 Section 13.5 describes the program for developing administrative and operating procedures. It also provides COL information items to require COL applicants who reference the US-APWR design certification to create procedure development programs and develop plant administrative, operating, and emergency procedures.

During an ITAAC improvement review meeting held February 10, 2011, MHI and NRC staff agreed to delete HFE procedure development ITAAC #8 (NUREG-0711 HFE Program Element #8) in DCD Revision 3 Tier 1 Section 2.9 Table 2.9-1 after determination that the NRC regulations, guidance, and industry approaches accepted by the NRC significantly diminish or eliminate the need for this ITAAC. During an SMR workshop held July 28, 2010, the NRC stated similar opinions in discussing potential revisions to NUREG-0711 that would significantly decrease the scope of procedure and training sections in order to remove overlap with operational programs. US-APWR DCD Revision 3 deleted Tier 1 Table 2.9-1 ITAAC #8.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 372-2787 REVISION 1**
SRP SECTION:	**14.03.09 – HUMAN FACTOR ENGINEERING - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.3.9**
DATE OF RAI ISSUE:	**5/20/2009**

QUESTION NO. 14.03.09-4

DESIGN IMPLEMENTATION
Please clarify how the design implementation ITAAC will be conducted in accordance with its associated implementation plan. The current wording in ITAAC #9 design commitment column does not clearly connect the two.
NUREG-0800, Section 14.3 guidance gives this example for acceptance criteria:
In general, the acceptance criteria should be objective and unambiguous. In some cases, the acceptance criteria may be more general because the detailed supporting information in Tier 2 does not lend itself to concise verification. For example, the acceptance criteria for the design integrity of piping and structures may be that a report "exists" that concludes the design commitments are met. In these cases, Tier 2 provides the detailed supporting information on multiple interdependent parameters that should be provided in order to demonstrate that a satisfactory report exists.
The ITAAC 9 acceptance criteria wording is unclear in 1) ensuring that the design implementation process is conducted by the implementation plan and 2) describing that the output of conducting the design implementation procedure will yield results that are consistent with the implementation plan.
In the acceptance criteria column of ITAAC 9, the staff notes that two of the three criteria from section 12.4.6 are included, but the third criteria (#2, in section 12.4.6) has not been included. Please clarify why this acceptance criterion has omitted the need to verify that the final HSIs, procedures and training match the design that is a result of the HFE process and V&V activities. Also, please clarify the reason for including the second bullet point in the design implementation ITAAC acceptance criteria column that deals with assigning a risk significance level to HAs.

Answer

The NRC and MHI have agreed that development of an operator license training program (NUREG-0711 HFE Program Element #10) and a procedure development program (NUREG-0711 HFE Program Element #9) do not require verification by ITAAC, thus these ITAAC are deleted.

At an SMR workshop held July 28, 2010, NRC staff made similar comments during discussion of potential revisions to NUREG-0711 that would significantly decrease the scope of procedures and training sections to remove overlap with operational programs, observing that current regulations, guidance, and industry approaches accepted by the NRC are adequate to assure proper implementation.

US-APWR training programs for reactor operators, senior reactor operators, fuel handlers, fire protection personnel, and positions specified in 10 CFR 50.120, are developed, established, implemented and maintained using a systems (or systematic) approach to training (SAT) as defined by 10 CFR 55.4, ANSI/ANS-3.1-1993, and Regulatory Guide 1.8. The NRC accepts this approach to training, as described by NEI 06-13A.

USAPWR DCD Tier 2 Section 13.2.1 discusses training program development in conformance with NEI 06-13A and includes COL Information items to require COL Applicants who reference the US-APWR certified design to develop training programs in accordance with NUREG-0800.

DCD Tier 2 Section 18.8 describes US-APWR HFE Program development and associated HFE Program V&V procedure development under 10 CFR 50 Appendix B Criterion V and in accordance with Regulatory Guide 1.33 and ANSI/ANS 3.2 guidance. DCD Tier 2 Section 13.5 describes administrative and operating procedure development requirements and includes COL information items to require that COL Applicants who reference the US-APWR certified design must create procedure programs and develop plant administrative, operating, and emergency procedures.

Thus, in US-APWR DCD Revision 3, MHI has deleted ITAAC related to HFE training program development and procedure development.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 372-2787 REVISION 1**
SRP SECTION:	**14.03.09 – HUMAN FACTOR ENGINEERING - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.3.9**
DATE OF RAI ISSUE:	**5/20/2009**

QUESTION NO. 14.03.09-5

HSI/PROCEDURES/TRAINING
The starting assumptions for the review of Section 2.9 and the ITAACs listed in Table 2.9-1 of Tier 1, were that the implementation plans contained sufficient detail to ensure the COL applicant can complete the respective HFE element, and that each ITAAC would explicitly address the completion of each HFE program element within Section 18.

Please provide clarification for the following:

1. The design commitment for ITAAC #7 in Table 2.9-1 states:

The scope of HSI design, procedures and training, which are developed and/or evaluated by the HFE program, includes operations, accident management, maintenance, tests, inspections and surveillances that are important to safety.

After reviewing ITAAC #7, in conjunction with section 2.9.1.3 of the US-APWR DCD, the staff is unclear how this ITAAC will fulfill the implementation plans for HSI design, procedure development and training development. The design commitment does not relate to how the HSI design (or procedures and training) has been developed in accordance with approved implementation plans; the commitment is merely limited to describing the "scope" of the HSI design, etc., which is only part of an overall HSI design methodology.

Please clarify for the staff whether the statement given for the design commitment column for ITAAC #7 means the HSI design, procedures development, and training development for the HFE process will be implemented in accordance with their respective implementation plans.

As well, it is suggested that, for clarity and conformity, the current single ITAAC commitment should be separated into three statements, HSI design, procedures, and training, as these are three distinct HFE elements.

2. The acceptance criteria for 7a states:

The design documentation exists to verify that panels and associated instrumentation, within the scope of the HFE program, comply with General Design Criteria 1 in Appendix A to 10 CFR 70 for

quality standards and records.

Please clarify why 10 CFR 70 was referenced and not 10 CFR 50.

3. ITAAC #7 provides fourteen design commitments, or parts (a through n), that include HSI design, procedures, and training. In the Acceptance Criteria column, the wording appears to be the same as each of their respective design commitments. This approach to ITAAC does not seem to be consistent with the NUREG-0800 Section 14.3 description for acceptance criteria. Where it states that:

...In some cases, the acceptance criteria may be more general because the detailed supporting information in Tier 2 does not lend itself to concise verification...

NUREG-0800 Section 14.3 goes on to give an example of how, in these types of situations, the applicant will specify a method (usually a report of some sort) to verify that the commitments are met. It also states that Tier 2 is where the detailed supporting information would be provided to validate the report. The acceptance criteria wording does not indicate that a report will be available. Please clarify if a report will be provided that documents the results of conducting the HSI implementation plan (and for procedures and training), and the results of the analyses and inspections for ITAAC 7.

ANSWER:

US-APWR DCD Revision 3 Tier 1 Table 2.9-1 ITAAC #7 has been changed as follows to be consistent with recent NRC review and comments:

- DC – Revised to state that the HFE design process is conducted in accordance with the HSI Design Implementation Plan. Information that would be contained in an implementation plan is removed because it is not appropriate for an ITAAC.
- ITA – Revised to state that the DC will be verified by inspection of the HSI design results summary report.
- AC – Revised to state that the inspection concludes that the HSI design process is conducted in accordance with the HSI Design Implementation Plan.
- ITAAC 7.a, 7.b, 7.d, 7.f, 7.g, 7.h and 7.j are deleted because these ITAAC were redundant to ITAAC #7.
- ITAAC 7.c is deleted because it was too ambiguous to allow closure and was redundant to other ITAAC that verify attributes of as-built SSCs in the as-built MCR.
- ITAAC 7.e is deleted because it was too ambiguous to allow closure and was redundant to Table 2.5.1-6 ITAAC #4 and Table 2.5.3-4 ITAAC #1a.
- ITAAC 7.i is deleted because it was redundant to Table 2.9-1 ITAAC #7 and to Table 2.5.2-3 ITAAC.
- ITAAC 7.k and 7.l are deleted because they were too ambiguous to allow closure and were redundant to Table 2.7.6.10-1 ITAAC #2.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 424-3281 REVISION 0**
SRP SECTION:	**14.03.06 – ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.03.06**
DATE OF RAI ISSUE:	**07/27/2009**

QUESTION NO. 14.03.06-17

In RAI 32-738, Question 14.03-4 the staff requested MHI to provide a description of the applicable tests and acceptance criteria for the tests that will be conducted for the onsite electric power system to assess its continuity, availability and condition of system components as listed under item 9 in Table 2.6.1-3.

During the teleconference held on March 23, 2009, MHI agreed that it will describe the tests required for assessing condition of system components and acceptance criteria in Table 2.6.1-3 for the onsite electric power system in upcoming Revision 2 of the DCD.

The staff requests that MHI docket its response confirming the above actions to resolve this RAI question.

ANSWER:

US-APWR DCD Revision 3 incorporated changes to Tier 1 made by the US-APWR ITAAC improvement project conducted to implement RIS 2008-05. As part of this project, DCD Tier 1 Table 2.6.1-3 ITAAC #9 was deleted because it did not meet SRP 14.3 selection criteria for electrical system ITAAC and because the ability to periodically test and inspect Class 1E AC power for system continuity, availability and condition of system components is adequately verified by existing ITAAC, including Table 2.6.1-3 ITAAC #6.b, #6.c, #7, #8, #2 and #21.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO.582-4456 REVISION 2**
SRP SECTION:	**09.04.01 –CONTROL ROOM AREA VENTILATION SYSTEM**
APPLICATION SECTION:	**DCD SECTION 9.4.1**
DATE OF RAI ISSUE:	**05/10/2010**

QUESTION NO. : 09.04.01-20

This is a follow-up RAI to RAI No. 63(-849), Question No. 09.04.01-18; RAI No. 327-2401, Question No. 09.04.01-6; & RAI 475-3780, Question No. 09.04.01-14.

The staff does not agree with the applicant's conclusion that RG 1.155 and NSAC-108 allows site specific EDG reliability, or in this case a site specific GTG reliability, to be based on industry operating experience. NSAC-108 is a survey documenting EDG reliabilities from the early 1980s and identifies what criteria (i.e. testing methodologies) were used to form the bases of the documented historical liabilities.

Regulatory Guide 1.155 Section 3.3.5, #5 reads in its entirety:
"The AAC power system should be inspected, maintained, and tested periodically to demonstrate operability and reliability. The reliability of the AAC power system should meet or exceed 95 percent as determined in accordance with NSAC-108 (Ref. 11) or equivalent methodology."

This clearly indicates that site specific AAC reliability is to be based on site specific testing and analysis. More specifically, the AAC reliability can not be based on analysis alone of historical industry data.

Based on the above, the staff repeats its request of RAI 475-3780, Question No. 09.04.01-14 that the applicant change the ITA for line item 12 of ITAAC Table 2.6.5-1, from "An analysis of the reliability of the as-built AAC power sources will be performed" to read "Demonstrate through testing and analysis the reliability of the as-built AAC power source".

References:
MHI's Responses to US-APWR DCD RAI No. 63(-849); MHI Ref: UAP-HF-08215; dated October 3, 2008; ML082810407.
MHI's Responses to US-APWR DCD RAI No. 327-2401; MHI Ref: UAP-HF-09323; dated June 19, 2009; ML091751095.
MHI's Responses to US-APWR DCD RAI No. 475-3780; MHI Ref: UAP-HF-09531; dated November 20, 2009; ML093290031.

ANSWER:

SRP 14.3.6 specifies verification of AAC power source capacity but does not indicate the need for an ITAAC to verify reliability. DCD Tier 2 Section 14.3 does not list AAC GTG reliability as a key design factor for discussion in Tier 1.

US-APWR DCD Revision 2 Tier 1 Table 2.6.5-1 ITAAC #12 was deleted during RIS 2008-95 ITAAC improvement because it did not meet SRP 14.3 selection criteria. US-APWR DCD Revision 3 implemented this deletion and added DCD Tier 2 Table 2.6.5-1 ITAAC #13 to verify capacity in accordance with IEEE 387 Section 7.2.

Although one AAC power source meets RG 1.155 guidance, US-APWR design provides two AAC GTG power sources and, as stated in DCD Tier 2 Section 8.4, either AAC GTG alone meets or exceeds RG 1.155 guidance for 95% reliability as determined in accordance with NSAC-108 methodology per RG 1.155 Section C.3.3.5, Criterion 5.

US-APWR AAC GTG reliability is verified by preoperational testing. US-APWR DCD Revision 3 Tier 2 Section 14.2.12.1.46, "Alternate ac Power Sources for Station Black Out Preoperational Test," states in subsection B., "Prerequisites,":

> "A report exists that demonstrates the reliability of the alternate ac power sources meets or exceeds 95% as determined in accordance with NSAC-108 (Reference 8.4-2) or equivalent methodology to meet the Criterion 5 of Section C.3.3.5, RG 1.155, based on historical data of the similar type of the ac alternate power sources."

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/7/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 616-4865 REVISION 0**
SRP SECTION:	**09.01.05 – OVERHEAD HEAVY LOAD HANDLING SYSTEM**
APPLICATION SECTION:	**09.01.05**
DATE OF RAI ISSUE:	**08/13/2010**

QUESTION NO.: 09.01.05- 18

GDC 2 and GDC 4 require Overhead Heavy Load Handling Systems (OHLHS) to be designed with the ability to withstand the effects of an earthquake and effects of a dropped load. NUREG-0612 and SRP Section 9.1.5.III.4 provide guidance for ensuring the OHLHS is designed to be a highly reliable load handling system or demonstrate by analysis that the potential consequence of a dropped load is acceptably low.

In RAI 9.1.5-01, the NRC staff requested the applicant to provide details (i.e. single failure-proof, loads, location, seismic category, etc.) for the OHLHS cranes located in areas throughout the plant where any load drop could result in damage to SSCs important to safety. In the response to RAI 9.1.5-01, the applicant clarified that, except for the polar crane and spent fuel cask handling crane, the cranes and hoists listed in Table 9.1.5-3 are not designed as single failure-proof.

Based on the staff's review of the applicant's RAI response, the applicant provided sufficient justification for the use of non-single failure-proof cranes, with the exception of the use of Hatch Hoist. In response to RAI 9.1.5-01, Table 9.1.5-3 was revised to include the Equipment Hatch Hoist as equipment that is located over Safe Shutdown Equipment (SSE). However, the RAI-response did not specify which SSE would be located beneath the Hatch Hoist. Furthermore, the RAI-response indicated that the use of the Hatch Hoist would be controlled by heavy load handling procedures. If use of procedures is the applicant's only credited method to justify not handling loads when a postulated load drop could result in unacceptable consequences (since the Hatch Hoist is purported to handle critical loads over SSEs), this does not sufficiently meet the guidance of SRP 9.1.5.III.4.

Therefore, the applicant is requested to provide the following information:

- Identification of the SSEs located beneath the Hatch Hoist that could be impacted by a potential load drop from the Equipment Hatch Hoist.

- Justification for how the SRP 9.1.5.III.4 guidance would be met for Equipment Hatch Hoist.

Reference: MHI's Responses to US-APWR DCD RAI No. 292-2232; MHI Ref: UAP-HF- 09260; dated May 25, 2009; ML091490219.

ANSWER:

The equipment hatch hoist is a winch-type drum hoist that is base mounted to supports attached to the inner surface of the PCCV wall at a location approximately thirty feet above the equipment hatch. It has no arm, boom, bridge, trolley, or other mechanism by which it might move its load in a horizontal direction.

The sole function of the equipment hatch hoist is to raise and lower the equipment hatch between its operating position at the equipment hatch opening and its storage position above the equipment hatch opening. During lifting, the equipment hatch moves vertically and its lateral motion is constrained by guides. Upon reaching its storage location, the equipment hatch is locked into position and the equipment hatch hoist is deenergized. When equipment hatch closure is required, the equipment hatch hoist lowers the equipment hatch to its operating position where it is bolted into place. At no time during raising or lowering of the equipment hatch is there fuel or safety related SSC located or moved beneath the equipment hatch hoist. MHI will not classify the equipment hatch hoist as single failure-proof. The equipment hatch hoist and its associated mounting and guides are classified Seismic Category II.

The equipment hatch hoist performs no safety related function and does not handle loads where inadvertent operation or equipment malfunction, separately or in combination, could cause a significant release of radioactivity, cause a loss of margin to criticality, uncover irradiated fuel in the reactor vessel or spent fuel pool, or damage equipment essential to achieving or maintaining safe shutdown. Thus, the equipment hatch hoist does not meet criteria for inclusion in DCD Section 9.1.5, Overhead Heavy Load Handling System.

US-APWR DCD Revision 3 Tier 2 will be revised to remove reference to the equipment hatch hoist. Since the equipment hatch hoist is a commercially purchased item chosen by the COL licensee, its functional testing prior to operation will be performed by the COL applicant in accordance with accepted good engineering practice.

US-APWR DCD Revision 3 Tier 2 Chapters 3, 9, and 14 will be revised to remove equipment hatch hoist design discussions, figures, tables, table entries, and other design characterizations regarding the equipment hatch hoist.

Impact on DCD

US-APWR DCD Revision 3 Tier 2 will be revised as described in the above answer and shown on the attached markups.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Table 3.2-2 Classification of Mechanical and Fluid Systems, Components, and Equipment (Sheet 40 of 56)

System and Components	Equipment Class	Location	Quality Group	10 CFR 50 Appendix B (Reference 3.2-8)	Codes and Standards[3]	Seismic Category[4]	Notes
Equipment hatch	2	PCCV	B	YES	2	I	
Personnel hatch	2	PCCV	B	YES	2	I	
30. Miscellaneous Plant Equipment							
PCCV polar crane	5	PCCV	N/A	N/A	5	II	The main and auxiliary hoist of the polar crane, the main hoist of the spent fuel cask handling crane ~~and the equipment hatch hoist~~ are designed in accordance with ASME NOG-1 and NUREG-0554 as Type I single-failure-proof cranes.
Spent fuel cask handling crane	5	R/B	N/A	N/A	5	II	
Equipment hatch hoist	5	PCCV	N/A	N/A	5	II	
Miscellaneous cranes and hoists in reactor building	5 or 10	R/B	N/A	N/A	5	II or NS	
Miscellaneous hoists in power source buildings	5	PS/B	N/A	N/A	5	II	
Crane for SWDS in auxiliary building	5	A/B	N/A	N/A	5	NS	
31. Containment Purge System							
Containment high volume purge air handling unit	10	R/B	N/A	N/A	5	NS	
Containment high volume purge air handling unit fan	10	R/B	N/A	N/A	5	NS	
Containment high volume purge air handling unit cooling coil	10	R/B	N/A	N/A	5	NS	
Containment high volume purge air handling unit electric heating coil	10	R/B	N/A	N/A	5	NS	
Containment high volume purge exhaust filtration unit	4	A/B	D	N/A	5	NS	

The Note of Equipment Hatch hoist is blank.

of and continue to hold their maximum loads during a SSE. The OHLHS is seismic category II and Equipment Class 5, as described in Section 3.2.

Other than the single-failure-proof OHLHS, miscellaneous hoists and cranes with heavy load capacities are installed in safety-related areas of the US-APWR plant. Descriptions and data for all cranes and hoists that have heavy load capacities which are installed over safe shutdown equipment are given in ~~Table 9.1.5-3~~. The safety evaluations for those cranes and hoists are discussed in Subsection 9.1.5.3.

Table 9.1.5-4

The OHLHS also includes equipment accessories (e.g., slings, and hooks, etc.) instrumentation, physical stops and/or electrical interlocks, and associated administrative controls.

The applicable Codes and Standards are identified in Section 9.1.5.1.

9.1.5.2.1 Physical Arrangement

The areas of the plant in which the spent fuel cask handling crane and polar crane operate are shown in Figures 9.1.5-1 through 9.1.5-4. The specifications for the spent fuel cask handling crane and the polar crane are given in Table 9.1.5-1 and 9.1.5-2. As shown, the spent fuel handling crane has three load handling hooks, the main, the auxiliary, and the suspension crane. The suspension crane is only used for new fuel assembly handling between a new fuel container to the new fuel storage area or between the new fuel storage rack and the basket on the new fuel elevator. Because of this limitation, the suspension crane is considered part of the light load handling system. Its operation and control is detailed in Section 9.1.4.

9.1.5.2.2 Spent Fuel Cask Handling Crane

A spent fuel cask filled with spent fuel assemblies is lifted and transferred using the main hoist of the spent fuel cask handling crane and the spent fuel cask lift rig. The cask's path is from the cask loading pit to the truck access area on the ground floor as shown on Figure 9.1.5-1.

Neutron source containers and Irradiation sample containers are transferred using the auxiliary hoist through the path shown on Figure 9.1.5-2.

A reactor coolant pump (RCP) motor is transferred from the PCCV into the fuel handling area. In the fuel handling area, once the RCP motor is in position, it is lifted by the main hoist of the spent fuel handling crane and transferred to the truck access area using the path shown on Figure 9.1.5-3.

Miscellaneous equipment is transferred from the PCCV using the same path as the RCP motors. The spent fuel cask handling crane movement and storage is handled as follows:

- The spent fuel handling cask crane range of movement is limited; in general, to the fuel handling area defined by the hoist coverage ranges shown in Figure 9.1.5-1. The limitation is controlled by the electrical interlock of the spent fuel handling cask crane.

developed in accordance with ANSI/ASME B30.2 (Ref. 9.1.7-22). Administrative control procedures are also required to be used to assure that the auxiliary hoists of the spent fuel cask handling crane does not handle heavy loads that could have adverse consequences for nuclear safety.

Except for the OHLHS polar crane main and auxiliary hoist, ~~equipment hatch hoist~~ and spent fuel cask handling crane main hoist, miscellaneous cranes and hoists with heavy load capacities as listed in Table 9.1.5-1, 2~~, 3~~ and 4 are not designed as single-failure-proof. However, they are designed as seismic category II equipment to prevent unacceptable structural interaction and failure during an SSE event. The non-single-failure proof cranes and hoists in ~~Table 9.1.5-3~~ satisfy safety criteria for critical load handling evolutions ~~in the following~~ manner:

Table 9.1.5-4

Table 9.1.5-4

- The non-single-failure-proof cranes and hoists ~~in Table 9.1.5-3~~ are not located over or adjacent to fuel assemblies. Therefore, a load handling incident involving the non-single-failure-proof cranes and hoists would not impact fuel assemblies.

- The non-single-failure proof cranes and hoists are located over safe shutdown equipment, but the plant configuration provides redundancy by separation of the components to assure that the effects of a single load drop from these cranes and hoists would not jeopardize the ability to achieve or maintain safe shutdown conditions. The hoists associated with the safety injection pumps, CS/RHR pumps, EFW pumps, CCW pumps, and CCW Heat Exchangers are all located on the basement slab of the R/B at floor elevation -26'-4", and each equipment train has its own room. Similarly, separation for other safe shutdown equipment serviced by non-single-failure proof cranes and hoists is achieved by walls, slabs, and/or adequate physical distance between adjacent equipment trains to assure that redundancy of safe shutdown functions is maintained in the case of a single load drop.

- The non-single-failure proof cranes and hoists are dedicated to servicing particular pieces of safe shutdown equipment (such as pumps, valves, heat exchangers, and chillers) or systems that will be out-of-service when the cranes and hoists are used for handling heavy loads over them. The use of these cranes and hoists is administratively controlled by load handling procedures to prevent overhead load handling that could cause unacceptable damage to the dedicated equipment or systems when in service.

Table 9.1.5-4

Therefore, load handling incidents involving non-single-failure-proof cranes and hoists listed in ~~Table 9.1.5-3~~ will not jeopardize safe shutdown functions or cause a significant release of radioactivity, a criticality accident, or inability to cool fuel.

To assure proper handling of heavy loads during the plant life, the COL Applicant is to establish a heavy load handling program, including associated procedural and administrative controls, that satisfies commitments made in Subsection 9.1.5 of the DCD, and that meets the guidance of ANSI/ASME B30.2, ANSI/ASME B30.9, ANSI N14.6, ASME NOG-1, CMAA Specification 70-2000, NUREG-0554, NUREG-0612, and NUREG-0800, Section 9.1.5. During the operating life of the plant, it is anticipated that temporarily installed hoists and mobile cranes will also be used for plant maintenance. The heavy

Deleted.

Table 9.1.5-3 ~~Specification of the Equipment Hatch Hoist~~

~~1. Type~~		~~Base mounted Drum Hoist~~	
~~2. Operating device~~		~~control box~~	
~~3. Component supplied electric power~~		~~Hoist~~	
~~4. Electric power supply~~		~~Power~~	~~: 460V ac, 60 Hz, 3 Phase~~
		~~Main Hoist~~	
~~5. Capacity~~	~~Metric ton~~	~~40~~	
~~6. Lift~~	~~ft-in (m)~~	~~29'-6" (8.99 m)~~	
~~7. Hoisting Speed~~	~~m/min~~	~~2.1 or less~~	
~~8. Wire Material~~		~~Carbon steel~~	