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October 8, 2009

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-09485

Subject: MHI's Response to US-APWR DCD RAI No. 452-3297 Revision 1 (Question 14.03.02-13)

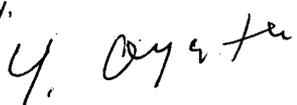
Reference: 1) "Request for Additional Information No. 452-3297 Revision 1, SRP Section: 14.03.02 Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria" dated September 1st, 2009.
2) "MHI's Partial Responses to US-APWR DCD RAI No. 452-3297 Revision 1, UAP-HF-09467" dated October 1st, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 452-3297 Revision 1."

Enclosed is the response to Question 14.03.02-13 that is contained within Reference 1. The responses to the other questions in Reference 1 were submitted on October 1st, 2009 (Reference 2).

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,


Yoshiaki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No. 452-3297 Revision 1 (Question 14.03.02-13)

CC: J. A. Ciocco
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Docket No. 52-021
MHI Ref: UAP-HF-09485

Enclosure 1

UAP-HF-09485
Docket No. 52-021

Responses to Request for Additional Information
No. 452-3297 Revision 1 (Question 14.03.02-13)

October 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

10/08/2009

**US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021**

RAI NO.: NO. 452-3297 REVISION 1
SRP SECTION: 14.03.02 – STRUCTURAL AND SYSTEMS ENGINEERING –
INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE
CRITERIA
APPLICATION SECTION: DCD TIER 1 – SECTIONS 2.2, 2.4.2, 2.4.6, AND 2.5.1
DATE OF RAI ISSUE: 09/01/09

QUESTION NO. RAI 14.03.02-13:

ITAAC Items 14 and 15 in Table 2.4.2-5

The original RAI question 14.03.04-30 (RAI 1842, Q 7142) stated the following:

Table 2.4.2-4 lists alarms, displays, and control functions for both MCR and RSC. It seems that both these panels should be represented in Items 14 and 15. It would seem that both the MCR and RSC panels would have all of these alarms, displays, and control functions. If that is the case, then items 14 and 15 need to be revised along with Table 2.4.2-4. Several components are listed in US-APWR Tier 1 Table 2.4.2-4 with MCR alarms. No ITAAC entry was noted to verify the retrieval along with Table 2.4.2-4. Also applicable to following ITAAC:

*ITAAC Items 11 and 12 in Table 2.4.4-5
ITAAC Items 12 and 13 in Table 2.4.5-5
ITAAC Items 12 and 13 in Table 2.4.6-5
ITAAC Items 10 and 11 in Table 2.7.1.2-5
ITAAC Items 10 and 11 in Table 2.7.1.9-5
ITAAC Items 10 and 11 in Table 2.7.1.11-5*

The applicant in its response stated the following: Table 2.4.2-5 will be revised to indicate that the alarms and displays are located at MCR, and the alarms, displays, and controls are located at RSC. Since controls from MCR are identified in ITAAC Items 8, 10.a, and 10.b, they are not included in ITAAC Item 14. Other similar tables that indicate alarms, displays, and controls, associated with ITAAC cited in the question, will be revised in the same manner as Table 2.4.2-5. The ITAAC cited above will be revised, as applicable, to include the capability of retrieving or verifying the existence of alarms, displays, and controls in the MCR and the RSC. If existing ITAAC items, e.g., for MCR controls of pumps and valves, do not provide complete coverage of the MCR control functions identified on the equipment tables, then the ITAAC are revised as necessary to ensure the control functions are verified. Alarms are included in the RSC ITAAC where necessary to provide complete coverage of RSC alarms, displays, and controls.

The reference in applicant's response of the MCR controls, for example, in Table 2.4.2-5 for the valves and pumps being verified in ITAAC 8, 10.a, and 10.b is incorrect, because those controls are found in ITAAC Items 11 and 13.a. However, Table 2.4.2-4 indicates controls for pressurizer heaters, reactor coolant flow and pressure (flow and pressure transmitters), reactor coolant pump speed (speed sensor), and pressurizer pressure and water level (pressurizer and level transmitters). Some of these identified as controls do not require manual switches to activate them, but the pressurizer heaters do have switches to activate the various banks of heaters. Since these controls in the MCR are not covered by ITAAC Items 11 and 13.a, should not ITAAC Item 14 be more comprehensive so as to include the remainder of MCR controls not included in those two ITAAC? In addition, the control functions for Items 11 and 13.a are determined by a test not an inspection, should not the additional MCR controls and the RSC controls not covered by ITAAC 11 and 13.a be verified by a test also? This RAI question is also applicable to all the ITAAC identified in the original RAI question above and to ITAAC Item 7 in both tables 2.7.5.1-3 and 2.7.5.2-3 (RAI question -14.03.07-18).

The regulatory basis for these comments is 10 CFR 50.70 and 10 CFR 50, Appendix B, Criterion III, Design Control.

ANSWER:

MHI has completed a review of each of the cited DCD Tier 1 subsections to ensure that the MCR and RSC alarm, display and control functions identified have applicable ITAAC for the verification of the functions to be performed. This review was based on changes that were previously submitted to the NRC (MHI ref.: UAP-HF-09413) in US-APWR DCD RAI Tracking Report Revision 3 (MUAP-09003 (R3)). A verification test is included in the appropriate ITAAC for all MCR and RSC control functions. The following is a summary of this review, including DCD revisions where required.

ITAAC Table 2.4.2-5, Reactor Coolant System ITAAC

DCD Tier 1 Table 2.4.2-4 identifies a MCR/RSC control function for the start and stop of the pressurizer heaters. An ITAAC for the MCR control function has not been included in DCD Table 2.4.2-5. Therefore, Table 2.4.2-5 will be revised to add a new ITAAC Item 17 for MCR control of the pressurizer heaters.

The remaining Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 11, 13, 14, and 15 in Table 2.4.2-5.

ITAAC Table 2.4.4-5, Emergency Core Cooling System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8, 10.a, 11, and 12 in Table 2.4.4-5. No additional changes to the ITAAC are required.

ITAAC Table 2.4.5-5, Residual Heat Removal System ITAAC

DCD Tier 1 Table 2.4.5-4 identifies a MCR/RSC control function for CS/RHR Pump Discharge Flow transmitters (RHS-FT-601, 611, 621, 631) and CS/RHR Pump Minimum Flow transmitters (RHS-FT-604, 614, 624, 634), but these flow transmitters have no control function from MCR/RSC. Table 2.4.5-4 will be revised to correct these inconsistencies.

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 9, 11, 12, and 13. No additional changes to the ITAAC are required.

ITAAC Table 2.4.6-5, Chemical and Volume Control System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 9, 11, 12, and 13 in Table 2.4.5-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.1.2-5, Main Steam Supply System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8.a, 10, and 11 in Table 2.7.1.2-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.1.9-5, Condensate and Feedwater System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8.a, 10, and 11 in Table 2.7.1.9-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.1.11-5, Emergency Feedwater System ITAAC

DCD Tier 1 Table 2.7.1.11-5 will be revised to add a new ITAAC Item 18 for starting and stopping the EFW pumps from the main control room. This ITAAC revision is consistent with ITAAC previously submitted in response to RAI 193-1842, Question 14.03.04-29.

The remaining Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8.a, 10, 11, and 17 in Table 2.7.1.11-5.

ITAAC Table 2.7.5.1-3, Main Control Room HVAC System ITAAC

DCD Tier 1 Table 2.7.5.1-2 identifies several dampers that have MCR control functions identified for the MCR HVAC System. An ITAAC for the MCR control functions for these dampers has not been included in DCD Table 2.7.5.1-3. A new ITAAC Item 5.e will be added to Table 2.7.5.1-3.

The remaining Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 5, 6, and 8 in Table 2.7.5.1-3.

ITAAC Table 2.7.5.2-3, Engineered Safety Features Ventilation System ITAAC

DCD Tier 1 Table 2.7.5.2-2 identifies several dampers that have MCR control functions identified for the ESFVS. An ITAAC for the MCR control functions for these dampers has not been included in DCD Table 2.7.5.2-3. A new ITAAC Item 5.d will be added to Table 2.7.5.2-3.

The remaining Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 5, 6, and 8 in Table 2.7.5.2-3.

In addition, MHI has completed a review of the following DCD Tier 1 subsections that were not cited in the RAI to ensure that the MCR and RSC alarm, display and control functions identified have applicable ITAAC for the verification of the functions to be performed. A verification test is included in the appropriate ITAAC for all MCR and RSC control functions. The following is a summary of this review

ITAAC Table 2.7.1.10-4, Steam Generator Blowdown System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 10, 11, and 13.a in Table 2.7.1.10-4. No additional changes to the ITAAC are required.

ITAAC Table 2.7.2-3, Compressed Air and Gas System ITAAC

There are no MCR and RSC control functions identified in DCD Tier 1 Table 2.7.2-2. The Alarm and Display functions for the MCR and RSC are adequately addressed by ITAAC Items 3 and 4 in Table 2.7.2-3. No additional changes to the ITAAC are required.

ITAAC Table 2.7.3.1-5, Essential Service Water System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8, 10.a, 11 and 12 in Table 2.7.3.1-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.3.3-5, Component Cooling Water System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8.a, 10.a, 11 and 12 in Table 2.7.3.3-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.3.5-5, Essential Chilled Water System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 10.a, 11, and 12 in Table 2.7.3.5-5. No additional changes to the ITAAC are required.

ITAAC Table 2.7.5.4-3, Auxiliary Building Ventilation System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 5, 6, and 7 in Table 2.7.5.4-3. No additional changes to the ITAAC are required.

ITAAC Table 2.7.6.7-5, Process and Post-accident Sampling System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 10.a, 12, and 13 in Table 2.7.6.7-5. No additional changes to the ITAAC are required.

ITAAC Table 2.11.2-2, Containment Isolation System ITAAC

Table 2.11.2-2 Item 11 is being revised in DCD Revision 2 to address RSC alarms, displays and controls consistent with MHI's response to RAI 222, question 14.3.4.11-24. The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 10, 11.a, and 11.b in Table 2.11.2-2, No additional changes to the ITAAC are required.

ITAAC Table 2.11.3-5, Containment Spray System ITAAC

The Alarm, Display, and Control functions for the MCR and RSC are adequately addressed by ITAAC Items 8, 11, and 12 in Table 2.11.3-5. No additional changes to the ITAAC are required.

Standard Review Plan (SRP) Section 14.3, Appendix D provides examples to be used for ITAAC entries. Example 6 for the Control Room Configuration and Example 7 for the Remote Shutdown System provides that inspections will be performed on the Control Room and RSS alarms, displays, and/or controls for these systems. The system "Alarms, Displays and Control Functions" tables identify the MCR control functions through the safety visual display units (VDUs), which are verified by ITAAC testing. MHI considers the combination of testing and

inspection ITAAC for the alarms, displays, and controls for the MCR and the RSC to be consistent with the SRP guidance.

Impact on DCD

The changes to DCD Tier 1 include the changes that were previously submitted to the NRC in US-APWR DCD RAI Tracking Report Revision 3 (MUAP-09003 (R3)).

DCD Tier 1 Table 2.4.2-5 will be revised to add new ITAAC Item 17 as follows:

Table 2.4.2-5 Reactor Coolant System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<u>17. Controls exist in the MCR to start and stop the pressurizer heaters identified in Table 2.4.2-4.</u>	<u>17. Tests will be performed on the as-built pressurizer heaters listed in Table 2.4.2-4 using controls in the as-built MCR.</u>	<u>17. Controls exist in the as-built MCR to start and stop the as-built pressurizer heaters identified in Table 2.4.2-4.</u>

DCD Tier 1 Table 2.4.5-4 will be revised as follows:

Table 2.4.5-4 Residual Heat Removal System Alarms, Displays, and Control Functions

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
CS/RHR Pump Discharge Flow RHS-FT-601, 611, 621, 631	No	Yes	Yes <u>No</u>	Yes
CS/RHR Pump Minimum Flow RHS-FT-604, 614, 624, 634	No	Yes	Yes <u>No</u>	Yes

DCD Tier 1 Table 2.7.1.11-5 will be revised to add new ITAAC Item 18 as follows:

Table 2.7.1.11-5 Emergency Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<u>18. Controls exist in the MCR to start and stop the pumps identified in Table 2.7.1.11-4.</u>	<u>18. Tests will be performed on the as-built pumps in Table 2.7.1.11-4 using controls in the as-built MCR.</u>	<u>18. Controls exist in the as-built MCR to start and stop the as-built pumps listed in Table 2.7.1.11-4.</u>

DCD Tier 1 Table 2.7.5.1-3, ITAAC Item 5.e will be added as follows to specify the MCR control functions for the dampers listed in Table 2.7.5.1-2:

Table 2.7.5.1-3 Main Control Room HVAC System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<u>5.e Controls exist in the MCR to open and close the remotely operated dampers identified in Table 2.7.5.1-2.</u>	<u>5.e Tests will be performed on the as-built remotely operated dampers listed in Table 2.7.5.1-2 using controls in the MCR.</u>	<u>5.e Controls exist in the as-built MCR to open and close the as-built remotely operated dampers listed in Table 2.7.5.1-2.</u>

DCD Tier 1 Table 2.7.5.2-3, ITAAC Item 5.d will be added as follows to specify the MCR control function for the dampers listed in Table 2.7.5.2-2:

Table 2.7.5.2-3 Engineered Safety Features Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<u>5.d Controls exist in the MCR to open and close the remotely operated dampers identified in Table 2.7.5.2-2.</u>	<u>5.d Tests will be performed on the as-built remotely operated dampers listed in Table 2.7.5.2-2 using controls in the MCR.</u>	<u>5.d Controls exist in the as-built MCR to open and close the as-built remotely operated dampers listed in Table 2.7.5.2-2.</u>

It is noted that the changes to ITAAC provided above are based on changes that were previously submitted to the NRC (MHI ref.: UAP-HF-09413) in US-APWR DCD RAI Tracking Report Revision 3 (MUAP-09003(R3)).

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

This completes MHI's response to the NRC's question.