RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 1

The defense-in-depth and diversity (D3) topical report, MUAP-07006, is not consistent with the current DAS design. The DCD is to identify differences in DAS design as compared to the design described in MUAP-07006.

ANSWER:

MHI will add descriptions in DCD Section 7.8 to identify the scope, applicability and design differences between the D3 topical report, MUAP-07006, and DCD Chapter 7.

Impact on DCD
The first paragraph of DCD Section 7.8 and Table 7.8-7 will be revised and Table 7.8-10 will be added as shown in Attachment 1-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 2

The safe state logic of the US-APWR is unclear, especially for components whose safe state depends on operating mode. The DCD is to provide clarity regarding the selection of a component's safe state.

ANSWER:

The determination of the safe state of the state-based priority logic applied between the SLS and DAS is based on the component position required to accomplish the critical safety function. In cases where a single component has two required positions, depending upon the scenario, the safe state of the component is the position opposite to the most frequent position of operation.

For example, the EFW control valve has two required positions (i.e., open for EFW actuation and closed for EFW isolation). The safe state in the state-based priority of this valve is "closed" which is the position opposite from the most frequent operating position of "open."

When assuming a spurious open signal from either the DAS or SLS, this spurious open signal would not be detected until the valve is subjected to testing, because open is the normal position of the valve. This spurious open signal does not affect the scenarios which require EFW actuation. For the scenarios which require EFW isolation, the EFW control valve can be closed from the DAS or SLS because the closed position is the safe state in the state-based priority.

On the other hand, a spurious close signal can be detected by the BISI alarm since the valve closure causes EFW line-up not to be in the normal alignment. Operators can correct this software design defect before it is triggered in multiple EFW divisions and prior to an AOO or PA. MHI will add Table 7.8-11 to the DCD to specify the safe state of each component actuated by DAS.

Impact on DCD

The second paragraph of DCD Section 7.8 will be revised and Table 7.8-11 will be added as shown in Attachment 2-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 3

Hardwired interface design for non-safety automatic control signals from the PCMS to the PSMS are to be represented in the DCD and supporting documentation.

ANSWER:

The non-safety to safety automatic hardwired signals are already described in Figure 7.3-2 and 7.3-3, but not shown in Figure 7.3-1 and 7.5-4 of the DCD. Figure 4.1-5 of the safety I&C technical report, MUAP-07004 does not show these signals. The signals will be added in the DCD and technical report figures.

Impact on DCD
Figures 7.3-1 and 7.5-4 of the DCD will be revised to add the hardwired interfaces from the PCMS to the ESFAS as shown in Attachment 3-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
Figure 4.1-5 of the safety I&C technical report, MUAP-07004, will be revised to add the hardwired interfaces from the PCMS to the ESFAS as shown in Attachment 3-2.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 4

The DAS manual actions after 30 minutes are not consistent with SRP BTP 7-19, Rev 6.

ANSWER:

BTP 7-19, Rev.6 states:

If manual operator actions are used as the diverse means or as part of the diverse means to accomplish a safety function, a suitable HFE analysis should be performed by the applicant to demonstrate that plant conditions can be maintained within recommended acceptance criteria.

The D3 Topical Report originally committed to perform detailed HFE analyses on DAS manual actions performed prior to 30 minutes from the prompting alarm for the event. MHI does, however understand that a detailed HFE evaluation, including the HFE Verification and Validation of DAS manual actions performed is required to for all manual operator actions to comply with SRP BTP 7-19, Rev.6, regardless of the expected performance time.

MHI will add commitments to perform a detailed HFE analysis on all DAS manual actions more than 30 minutes after the prompting alarm of the event identified in the D3 Coping Analysis Technical Report.

Impact on DCD
DCD Subsections 7.8.3.2 and 7.8.5 will be revised as shown in Attachment 4-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 5

Does the design of the DAS power sources (Class 1E UPS) comply with ATWS rule i.e., is there separation from the normal safety Class 1E power sources?

ANSWER:

The SRP for Section 7.8 states:

> Existing RTS sensor and instrument channel power supplies may be used, provided the possibility of common-cause failure is prevented.

The DAS and PSMS share diverse Class 1E power sources within each separate train. Although these power sources are shared, the diversity between these power sources prevents the possibility of common-cause failure. As shown in DCD Figure 7.1-4, the diverse Class 1E power sources are the UPS and the Transformer.

The UPS is powered diversely by the Class 1E GTG, the Class 1E Battery and the Offsite Power. Therefore, the Class 1E power system itself has sufficient diversity and availability to assure power to the PSMS and DAS. In addition, the PSMS and the DAS can be powered from the alternate non-safety GTG.

Because the DAS is powered by diverse power sources as explained above, additional power from Class 1E power sources is not required for the DAS power.

The DAS power supply circuits are isolated from the Class 1E power sources by qualified isolation devices (i.e., circuit breakers).

MHI will add diversity and availability assessments of the Class 1E power sources in DCD Section 7.8.

Impact on DCD
The fourth paragraph of DCD Section 7.8 will be added as shown in Attachment 5-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 6

Clarify the safety impacts of components' protective features that interface with the safety systems. Also provide reasons for these interfaces.

ANSWER:

There are two types of equipment protective features in the PSMS, one is a hardwired based, and another is a software based.

The hardwired based equipment features designed to protect against electrical and mechanical faults are installed in the wiring circuits downstream of the digital I&C system software as well as within the digital I&C systems themselves, and have priority over the actuation demands from the PSMS such as operator commands or ESF actuation signals. Equipment protective features installed downstream of the PIF modules have the highest priority and are designed to override component actuation by PSMS or DAS.

The software based equipment protective features designed into the digital I&C system software are inherently bypassed by DAS, because DAS bypasses all digital software. In most cases equipment protective features designed into the digital I&C system software will block manual and automatic commands generated within the software of the digital systems. There are, however, some exceptions, such as thermal overload protection for motor operated valves, where an equipment protective feature is bypassed by ESF actuation signals.

MHI will add a summary description of the equipment protective features which interface with the PSMS in DCD Section 7.3, and will correct the description on thermal overload protection for the safety-related motor operated valves in DCD Section 8.3.

Impact on DCD
DCD Subsection 7.3.1.2.5 will be added and Subsections 7.3.5 and 8.3.1.1.2.5 will be revised as shown in Attachment 6-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 7

MHI should describe the segregation between the corporate electronic archive system (CEAS) and the corporate network in MUAP-07005, state the CEAS is only used for nuclear projects, and describe which individuals have access to US-APWR files.

ANSWER:

MHI will add a summary description of the corporate electronic archive system (CEAS) for the US-APWR software and its compliance with the Appendix B QA program in the Technical Report "Safety System Digital Platform –MELTAC-", MUAP-07005. This description will clearly state that access to information will be limited to personnel authorized for the particular development project.

Impact on DCD
There is no impact on the DCD.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
Subsection 6.1.6.1 and Table 6.1-4 of the Technical Report "Safety System Digital Platform – MELTAC-", MUAP-07005 will be revised as shown in Attachment 7-1.

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 8

Clearly describe the location of the DAS defeat and permissive switches.

ANSWER:

The DAS defeat switch which bypasses the automatic actuation functions of the DAAC is located on the Operator Console in the MCR. The DAS defeat switch is included in Table 7.1-1 of DCD Section 7.1. The DAS permissive switch in the power breaker for DHP, which enables the manual actuation functions of the DHP, is also located in the MCR adjacent to the DHP, but physically separated from the DHP manual actuation switches to minimize the effect of fire propagation.

The DAS defeat switch and the DAS permissive switch circuits, including related cables, are isolated from other circuits in the MCR in accordance with IEEE 384 (i.e., in accordance with isolation between Class 1E and non-Class 1E circuits).

MHI will add descriptions on the design basis and how the switch location supports the basis in DCD Section 7.8.

Impact on DCD
DCD Subsections 7.8.1.1.1, 7.8.2.9 and 7.8.5 will be revised as shown in Attachment 8-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 9

Provide a Figure in the DCD on design and workings of the watchdog timers.

ANSWER:

MHI will add a figure and design descriptions on the watchdog timers in DCD Section 7.1 and the Technical Report "Safety System Digital Platform –MELTAC-." MUAP-07005.

The following acronym will be added in the acronyms and abbreviations of DCD Chapter 7.

WDT watchdog timer

Impact on DCD
ACRONYMS AND ABBREVIATIONS of DCD Chapter 7 and DCD Subsection 7.1.3.10 will be revised and Figure 7.1-8 will be added as shown in Attachment 9-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
Technical Report "Safety System Digital Platform –MELTAC-", MUAP-07005, Subsections 4.1.3 and 4.1.5 will be revised as shown in Attachment 9-2.

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 10

Add a summary description on the 100% load rejection and availability of turbine/generator in island mode in DCD Chapter 7 and refer to the related description in DCD Subsection 10.2.2.3.1.5.

ANSWER:

MHI will add a summary description of the 100% load rejection and availability of the turbine/generator which supply power only for the house loads of the US-APWR plant in DCD Chapter 7 and refer to the related description of DCD Subsection 10.2.2.3.1.5.

The following abbreviations will be added in the acronyms and abbreviations of DCD Chapter 7.

IV	**intercept valve**
MTCV	**main turbine control valve**
OPC	**overspeed protection controller**

Impact on DCD
ACRONYMS AND ABBREVIATIONS of DCD Chapter 7 and DCD Subsection 7.7.1.1.11.3 will be revised as shown in Attachment 10-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 11

The description in DCD Chapter 7 must be revised to incorporate the change in design of the CCW supply line isolation interlocks.

ANSWER:

In MHI letter UAP-HF-11352 dated October 12, 2011, MHI submitted a markup of Subsection 7.6.3 of the DCD Revision 3 to incorporate staff comments on the MHI response to RAI 571-4365 Q 09.02.02-48 regarding design change of interlocks important to safety for the CCW system.

DCD Subsection 7.6.3 will be revised in response to staff request regarding the RAI 919-6392 Q 09.02.02-86, which is a follow-up question for RAI 571-4365 Q 09.02.02-48. MHI believes that the response to the RAI 919-6392 submitted with MHI letter UAP-HF-13136 meets the staff request for this item. Consequently, the description provided in the response will be added in DCD Subsection 7.6.3.

Impact on DCD
DCD Subsection 7.6.3 will be revised as shown in Attachment 11-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 12

Correct the reactor vessel level indication discrepancy in table vs. text in Section 7.5 (parameter associated with top of the fuel plate vs. bottom of hot leg).

ANSWER:

MHI will revise the description to provide consistency between the text in Section 7.5 and table 7.5-3. Reference to the bottom of hot leg will be maintained.

Impact on DCD
DCD Subsection 7.5.1.1.3.2 will be revised as shown in Attachment 12-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
There is no impact on the Topical Report and Technical Report.

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 13

The data flow from the PSMS and PCMS to the external networks must be unidirectional, and all data must be transmitted via a hardware device to ensure the unidirectional data flow.

ANSWER:

MHI will modify DCD Tier 1 Subsection 2.5.6, DCD Tier 2 Subsections 7.9.1.6, 7.9.1.7, 7.9.2.3.5, 7.9.2.5, 9.5.2.2.5.1, and Section 13.3 and add descriptions and a figure to the Safety I&C Technical Report, MUAP-07004 to describe a clear commitment to use a hardware device (e.g., data diode) to ensure unidirectional data flow from the PCMS to the station bus and external networks. This revision will also clarify that there is no communication interface between the PSMS and the station bus, and no communication interface between the PSMS with other external networks.

Impact on DCD
DCD Tier 1 Subsection 2.5.6, Table 2.5.6-1, DCD Tier 2 Subsections 7.9.1.6, 7.9.1.7, 7.9.2.3.5, 7.9.2.5, 9.5.2.2.5.1, and Section 13.3 will be revised as shown in Attachment 13-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
The Safety I&C Technical Report, MUAP-07004 Subsection 4.2.7 will be revised and Figure 4.2-7 will be added as shown in Attachment 13-2.

RESPONSE TO ACRS SUBCOMMITTEE QUESTIONS ON APRIL 25-26, 2013

09/20/2013

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 7

CHAPTER TITLE: INSTRUMENTATION AND CONTROL

DATE OF MEETING: 04/25/13 – 04/26/13

QUESTION: Item 14

Address the following PRA issues
a) Basis for I&C Technical Specification references to PRA.
b) The reference to Chapter 19 or the PRA Technical Report should be substantiated or removed.
c) MGL method is not being used correctly; PRA is not modeling a complete/accurate design.

ANSWER:

a) <u>Basis for I&C Technical Specification References to PRA</u>

In Revision 3 of DCD Chapter 16, several sections of the Technical Specifications BASES referred to the US-APWR Probabilistic Risk Assessment (PRA) Technical Report, MUAP-07030, as a primary means of justification for Completion Times (CTs), Bypass Times (BTs), and Surveillance Frequencies (SFs). A meeting was held between MHI and the NRC on January 17, 2012 to discuss the I&C Technical Specifications (ML120400198). Following that meeting, MHI revised the I&C Technical Specifications BASES (Sections 3.3.1 through 3.3.5) to provide deterministic bases. The probabilistic bases, with the associated references to DCD Chapter 19, were retained only as a supplement to the deterministic bases. In addition, a new appendix was added to DCD Chapter 19 to summarize the PRA information related to the I&C Technical Specifications. MHI notes the inclusion of this reference is not intended to provide a generic basis for Risk Informed Technical Specifications.

All of the DCD changes which have been provided as a result of the 1/17/2012 meeting will be incorporated into DCD Revision 4 which is to be submitted in August 2013. In addition, as a results of the discussion in the public meeting held on 7/25/2013, MHI proposes the changes in the probabilistic bases of the I&C Tech Spec as given in the following examples that are typical of the Technical Specification Bases format in all I&C Technical Specification sections:

<u>Completion Time Example - Section B 3.3.1 Condition A</u>

<u>Deterministic Basis</u>
The Completion Time of 72 hours is justified because while two trains are adequate to perform the safety function, there are three automatic actuation trains and two other Manual

Reactor Trip trains OPERABLE. In addition, the Completion Time considers that a Manual Reactor Trip Function can be actuated from the Safety VDU for the train with the inoperable Manual Reactor Trip Function. Therefore, the ability to initiate a manual Reactor Trip through safety related equipment remains functional in all three trains.

Current Probabilistic Basis (Incorporated in DCD Rev.4)
The Completion Time of 72 hours is also justified in the US-APWR reliability and risk analyses, the summary and result of which are documented in FSAR Chapter 19 (Ref. 10).

Proposed Probabilistic Basis (Incorporated after DCD Rev. 4)
The Completion Time of 72 hours is also ~~justified in~~supported by the US-APWR reliability and risk ~~analyses~~insights, ~~the summary and result of~~ which are documented in FSAR Chapter 19 Appendix B (Ref. 10).

Bypass Time Example - Section B 3.3.1 Condition E

Deterministic Basis
The Bypass Time of 12 hours is justified because the remaining OPERABLE channels are adequate to perform the safety function. In addition, the Bypass Time considers that the remaining OPERABLE channels have continuous automatic self-testing and continuous automatic CHANNEL CHECKS.

Current Probabilistic Basis (Incorporated in DCD Rev.4)
The Bypass Time of 12 hours is also justified in the US-APWR reliability and risk analyses, the summary and result of which are documented in FSAR Chapter 19 (Ref. 10).

Proposed Probabilistic Basis (Incorporated after DCD Rev. 4)
The Bypass Time of 12 hours is also ~~justified in~~supported by the US-APWR reliability and risk ~~analyses~~insights, ~~the summary and result of~~ which are documented in FSAR Chapter 19 Appendix B (Ref. 10).

Surveillance Frequency Example – Section B 3.3.1 SR 3.3.1.4

Deterministic Basis
The Surveillance Frequency of every 62 days on a STAGGERED TEST BASIS applies to all four RTB trains. This Surveillance Frequency is justified based on industry experience. The Surveillance Frequency also considers the added reliability of the US-APWR RTB configuration, which includes redundant RTBs within each train and the overall two-out-of-four train configuration. Since each test actuates each RTB to its required trip state, the STAGGERED TEST BASIS results in each RTB being tested every 248 days, and each tripping method being tested every 744 days.

Current Probabilistic Basis (Incorporated in DCD Rev. 4)
The TADOT STAGGERED TEST BASIS Surveillance Frequency of 62 days, with each RTB tested every 248 days, and each trip method ultimately tested every 744 days, is also justified in the US-APWR reliability and risk analyses, the summary and result of which are documented in FSAR Chapter 19 (Ref. 10).

Proposed Probabilistic Basis (Incorporated after DCD Rev. 4)
The TADOT STAGGERED TEST BASIS Surveillance Frequency of 62 days, with each RTB tested every 248 days, and each trip method ultimately tested every 744 days, is

also ~~justified in~~supported by the US-APWR reliability and risk ~~analyses~~insights, ~~the summary and result of~~ which are documented in FSAR Chapter 19 Appendix B (Ref. 10).

Including a probabilistic basis in addition to the deterministic basis, was intended to match the Westinghouse Owners Group (WOG) Standard Technical Specification (STS) Bases, which include references to the following documents:

WCAP-14333-P-A, Rev. 1, October 1998
Supporting reference for Completion Time bases

WCAP-10271-P-A, Supplement 1, May 1986
Supporting reference for Bypass Time and Surveillance Frequency bases

[Plant specific evaluation reference]
Supporting reference for Completion Time bases

WCAP-10271-P-A, Supplement 2, June 1990
Supporting reference for Bypass Time bases

WCAP-15376, Rev. 0, October 2000
Supporting reference for Completion Time bases

The NRC reviewers for the I&C Technical Specifications requested similar probabilistic bases for the US-APWR. The NRC reviewers also requested probabilistic bases for the extensions of CTs, BTs, and the extended SFs for the US-APWR I&C Technical Specifications as compared to the corresponding CTs, BTs, and SFs in WOG STS.

To support these requests for probabilistic bases, DCD Chapter 19 Revision 4 will be supplemented with Appendix 19B "Summary of PSMS Reliability Analysis in PRA." This appendix explains how the PRA supports the CTs, BTs, and SFs defined in the I&C Technical Specifications. This appendix also provides a sensitivity analysis, which compares the US-APWR Core Damage Frequency (CDF) resulting from an analysis which uses the CTs, BTs, and SFs of the US-APWR I&C Technical Specifications to the CDF resulting from the same analysis using the corresponding times in the WOG STS.

b) Reference to Chapter 19 and PRA Technical Report

The Chapter 19 or PRA Technical Report (MUAP-07030) is referenced throughout the DCD. Such references are necessary to provide clarity and support statements made in the DCD. If PRA insights are used to substantiate a statement, a clear reference to the applicable section of Chapter 19 or PRA Technical Report is given. The corresponding section of the Chapter 19 or PRA Technical Report should contain a specific discussion regarding how insights were determined. If the sufficient deterministic bases are provided, the reference to Chapter 19 or PRA Technical Report is deleted. MHI checked DCD Chapter 7 and related technical reports for references to Chapter 19 and PRA Technical Report and proposes the changes as attached.

Please note that general references to Chapter 19 or PRA with no specific discussion, will remain in the DCD.

c) MGL Method

The MGL (Multiple Greek Letter) analysis method is used in the PRA. For the digital I&C related Common Cause Factor terms, it was conservatively assumed that all failures following the second failure were completely correlated. The amended response to RAI 750-5675 revision 2, Q 19-515 will address the ACRS concern by describing the analysis method that has been applied.

Impact on DCD
DCD Ch7 and Ch16 will be revised as shown in Attachment 14-1.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on PRA
There is no impact on the PRA.

Impact on Topical Report / Technical Report
MUAP-07004 will be revised as shown in Attachment 14-2.