MITSUBISHI HEAVY INDUSTRIES, LTD.

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TOKYO, JAPAN

September 22, 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-11319

Subject: Updated Completion Plan for US-APWR Seismic and Structural Analyses (Update to MHI Ref. UAP-HF-11290)

References:
(1) Letter (ML11136A235) from Y. Ogata (MHI) to U.S. NRC, "Revised Completion Plan for US-APWR Seismic and Structural Analyses" dated May 12, 2011
(2) Letter (ML110240150) from D. Matthews (NRC) to Y. Ogata (MHI), "Schedule Change for the United States – Advanced Pressurized Water Reactor Design Certification" dated February 24, 2011
(3) File (ML111080683), Summary of the March 31, 2011, Public Meeting with Mitsubishi Heavy Industries, Ltd., Discuss Its Proposal to the Seismic Analysis and Containment Design, Design Control Document, Section 3.7 and Section 3.8 as Part of the United States – Advanced Pressurized Water Reactor Nuclear Power Plant Combined License Application
(4) Letter (MHI Ref: UAP-HF-11290) from Y. Ogata (MHI) to U.S. NRC, "Updated Completion Plan for US-APWR Seismic and Structural Analyses" dated September 1, 2011

With this letter Mitsubishi Heavy Industries, Ltd. (MHI) is providing an update to the current plan for completing the resolution of seismic issues related to the US-APWR.

In Reference 1, MHI provided a revised completion plan for the US-APWR seismic and structural analyses to address the critical issues identified by the NRC in Reference 2. The plan is also based on the public meeting held on March 31, 2011 (Reference 3) and includes the schedule of the documents for submittal, those available for audit, and a list of impacts on the DCD.

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In March, MHI implemented a number of significant changes in seismic analysis, including change from a Lumped-Mass-Stick Model (LMSM) to the more refined Finite Element (FE) model for the Reactor Building (R/B) complex Soil-Structure Interaction (SSI) analysis and bounding analyses with respect to cracked and uncracked concrete conditions. Reanalysis with the new methodology has disclosed that some of the original design inputs used with the LMSM (soil profiles and the time history input) require adjustment to facilitate implementation of the methodology presented in March. Consequently, MHI has had to reassess the use of those original design inputs. This has resulted in the identification of changes and enhancements that are needed to make the design inputs more compatible with the improved methodology and maintain required safety margins of the US-APWR Standard Plant. Furthermore, changes in plant layout have been identified to increase the original gap between Standard Plant structures, along with foundation modifications including the introduction of shear keys.

This Letter provides updates to previously submitted information in Attachments 1, 2 and 3. The updates resulted from soil profile changes, an adjustment to the time history seeds, and adjustments to site layout as outlined in Reference 4.

MHI plans on submitting all technical reports affecting DCD Sections 3.7 and 3.8 by October 31, as originally planned. After the submittal, MHI would like to have a meeting with the NRC in early November to present the details of the technical reports. MHI plans on submitting the associated DCD markups by November 28. In addition, RAI responses which need to be updated to incorporate the revisions to the technical reports will be submitted to NRC by November 28, 2011.

The changes in seismic loading and the adjustment in the layout of the standard plant structures may require revision to the technical reports for other DCD Sections including: MUAP-08012, "Sump Strainer Stress Report"; MUAP-07033, "Mechanical Analysis for US-APWR New and Spent Fuel Racks," and: MUAP-08007, "Evaluation Results of US-APWR Fuel System Structural Response to Seismic and LOCA Loads". MHI will examine this need and will meet the submittal dates identified in Attachment 1.

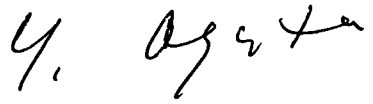
The calculations which support the technical reports, excluding MUAP-08012, MUAP-07033, and MUAP-08007, will be available for audit as described in Attachment 2. The basic design reports for the standard plant structures and their supporting calculations will be available in January, 2012.

Potential changes required in the DCD Sections other than Sections 3.7 and 3.8 are also identified in Attachment 3. These changes are mainly due to the adjustment to the layout of standard plant structures. However, no change is required for the existing DCD design methodology and any impacts to the DCD supporting analyses are expected to be insignificant. Consequently, no changes to the technical conclusions presented in the DCD are expected.

MHI, together with the support of the Design Centered Working Group members Dominion and Luminant, will continue to work closely with the NRC in order to maintain our schedule while ensuring the quality of the submittals.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this letter. His contact information is provided below.

Sincerely,



Yoshiki Ogata,
General Manager – APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

CC: J. A. Ciocco
C. K. Paulson

Contact Information

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Attachment 1

Submittal Dates of Technical Reports

Attachment 1 - Submittal Dates of Technical Reports

Doc. #	Title	Current Contents	Updates and Future Contents	Date to NRC
Technical Reports for DCD Sections 3.7 and 3.8				R2
MUAP-10001	Seismic Design Bases of the US-APWR Standard Plant	Rev. 2: - Description of Model for R/B (LMSM) and PS/B (FE model) - Validation of Model for R/B (LMSM) and PS/B (FE model) - Methodology of Concrete Cracking Effects	Rev. 3: - Description of Model for R/B (updated to FE model) and PS/B (update for design changes and stiffness) - Validation of Model for R/B (updated to FE model) and PS/B (update to reflect minor design changes) - Update Methodology of Concrete Cracking Effects (including stiffness reduction, damping values) - Update reference to SASSI to clarify that version 2.3.0 includes module updates through Nov 2009	June 2011 Completed (UAP-HF-11179)
			Rev. 4 - Update development of soil profiles and strain compatible properties - Update time history methodology - Update description of structures and layout	October 2011
MUAP-10006	Soil-Structure Interaction Analyses and Results for the US-APWR Standard Plant	Rev. 1: - Results of SSI Analysis for R/B (LMSM) and PS/B (FE model)	Rev. 2: - Results of SSI Analysis for R/B (updated to FE model) and PS/B (updated design and stiffness) based on the updated MUAP-10001 - Update reference to SASSI to clarify that version 2.3.0 includes module updates through Nov 2009 - Update to reflect gap assessment - Update to reflect results of SSSI analysis report MUAP-11011 if required - Update to include appendix containing parametric study of soil profile for compliance with SRP 3.7.2 - Update to include missing soil properties observed by NRC staff - Update discussion on gaps between buildings	October 2011 R2

Doc. #	Title	Current Contents	Updates and Future Contents	Date to NRC	
MUAP-11001	A/B Model Properties, SSI Analyses, and Structural Integrity Evaluation	Rev. 0: - Description of Model for A/B (FE model) - Results of SSI for A/B	Rev. 1: - Description of Model for A/B (unchanged) - Methodology of Stability and relative displacement for A/B (previously excluded)	June 2011 Completed (UAP-HF-11182)	
			Rev. 2: - Revise due to updated time history and soil profile inputs - Results of SSI for A/B relative displacement (change for reduced stiffness) - Results of Stability of A/B (previously excluded) - Update to reflect gap assessment - Re-evaluate/reconcile structural evaluation for new basemat ISRS	October 2011	R2 R2
MUAP-11002	T/B Model Properties, SSI Analyses, and Structural Integrity Evaluation	Rev. 0: - Description of Model for T/B (FE model) - Results of SSI for T/B	Rev. 1 - Update the methodology for T/B to be compatible with the methodology used in A/B - Results of SSI for T/B with the T/B to be consistent with DCD Rev. 3 and based on the updated MUAP-10001 - Update to reflect gap assessment - Update to reflect RAIs 766-5819 (03.07.02) and 767-5821 (03.08.04)	October 2011	
MUAP-11006	Validation of LMSM for R/B Complex	N/A	Rev. 0: - Description of Model for R/B (LMSM) – used only for sensitivity studies - Validation of Model for R/B (LMSM)	June 2011 Completed (UAP-HF-11196)	R2
MUAP-11007	Results of Evaluation using LMSM for R/B Complex	N/A	Rev. 0: - Methodology of Sliding Stability - Methodology of Sensitivity Study on Water Table Effect - Methodology on Sensitivity Study on Embedment Effect	June 2011 Completed (UAP-HF-11196)	

Doc. #	Title	Current Contents	Updates and Future Contents	Date to NRC	
			Rev. 1: - Revise due to updated time history and soil profile inputs - Results of Sensitivity Study on Water Table Effect - Results of Sensitivity Study on Embedment Effect - Results of Sliding Stability	October 2011	R2
MUAP-11011	Effects of Structure-Soil-Structure Interaction (SSSI) on Standard Seismic Design of US-APWR Plant	N/A	Rev. 0: - Methodology of SSSI Analysis	June 2011 Completed (UAP-HF-11196)	R2
			Rev. 1: - Results of SSSI Analysis based on the updated MUAP-10001	October 2011	
MUAP-11013	Design Criteria for SC Modules		Rev. 0: - Design Criteria for SC modules - Methodology for SC modules	June 2011 Completed (UAP-HF-11196)	
			Rev. 1: - Further clarify design approach for the CIS (ACI 349 methodology)	August, 2011 Completed (UAP-HF-11265)	
MUAP-08002	PS/B Enhanced Information for PS/B Design	Rev. 0: - Provide results of the lumped mass stick model analysis of east and west PS/Bs	Rev. 1: - Superseded by MUAP-10001 and MUAP-10006	N/A	

Doc. #	Title	Current Contents	Updates and Future Contents	Date to NRC	
MUAP-08005	Dynamic Analysis of the Coupled RCL-R/B-PCCV-CIS Lumped Mass Stick Model	Rev. 0: - Provide dynamic seismic analysis of the coupled system including the RCL, R/B, PCCV, and CIS. - Frequencies and mode shapes of dominant modes - Acceleration and displacement responses of structures - Forces and moments in selected building structures - ISRS	Rev. 1: - Superseded by MUAP-10001 and MUAP-10006	N/A	
MUAP-11018	CIS: Stiffness and Damping for Analysis	N/A	Rev. 0: [Task 1-A] - Applied stiffness and damping for each part of CIS	Mid- August 2011 Completed (UAP-HF-11256)	R2
MUAP-11019	CIS: SC Wall Design Criteria (For In-Plane and Out-of-Plane Behavior)	N/A	Rev. 0: [Task 2-A] - Design criteria for in-plane behavior - Design criteria for out-of-plane behavior - Design criteria for interaction equation - Scope and description of additional testing, if needed	First half of September 2011 Completed (UAP-HF-11316)	R2
MUAP-11020	CIS: Anchorage, Connection, and Section Design and Detailing	N/A	Rev. 0: [Task 2-C, 2-D (excluding design adequacy check)] - Design criteria for anchorage - Design criteria for connections - Design criteria for section design and detailing - Scope and description of additional testing, if needed	End of September 2011	
Technical Reports for Other DCD Sections					R2
MUAP-08012*	Sump Strainer Stress Report	Rev. 1: - Stress Results based on SSI Analysis for R/B (LMSM)	Rev. 2: - Stress Results based on SSI Analysis for R/B (FEM)	March 2012	

Doc. #	Title	Current Contents	Updates and Future Contents	Date to NRC	
MUAP-07033*	Mechanical Analysis for US-APWR New and Spent Fuel Racks	Rev. 0: - Stress Results based on SSI Analysis for R/B (LMSM)	Rev. 1: - Stress Results based on SSI Analysis for R/B (FEM)	March 2012	R2
MUAP-08007*	Evaluation Results of US-APWR Fuel System Structural Response to Seismic and LOCA Loads	Rev. 2: - Stress Results based on SSI Analysis for R/B (LMSM)	Rev. 3: - Stress Results based on SSI Analysis for R/B (FEM)	April 2012	
MUAP-10023*	Initial Type Test Result of Class 1E Gas Turbine Generator System	Rev. 3: - GTG seismic test results based on the bounding seismic input.	Rev. 4 - Re-evaluation of the test results based on SSI Analysis for PS/B. - Stress Results of the other components (e.g., the Generator and Air Receiver Assembly) based on SSI Analysis for PS/B.	April 2012	R2
UAP-SGI-08001*	Design Certification Physical Security Element Review	Rev 3: - Layout based on DCD Rev. 2	Rev 4: - Revision/reconciliation based on the adjusted layout	Dec 2011	
UAP-SGI-08002*	High Assurance Evaluation Assessment	Rev 2: - Layout and Security Assessment based on DCD Rev. 2	Rev 3: - Revision/reconciliation based on the adjusted layout	Dec 2011	R2

Notes)

R2: Revisions to Letter (MHI Ref: UAP-HF-11290) from Y. Ogata (MHI) to U.S. NRC, " Updated Completion Plan for US-APWR Seismic and Structural Analyses" dated September 1, 2011.

*: MHI will examine the seismic design changes and layout adjustment to determine if revisions are required. If a revision is required, the report will be submitted to NRC.

Attachment 2

Dates of Calculation Reports (Available for Audit)

Attachment 2 - Dates of Calculation Reports (Available for Audit)

Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
REB-13-05-113-004 (MUAP-10006)	R/B Complex Standard Plant SSI Analysis	N/A	Rev. 0: - Calculation documenting the runs of the R/B, PCCV analyses with reduced stiffness (lower bound) SSE damping and full stiffness (upper bound) OBE damping and CIS analysis with reduced stiffness and associated damping	October 2011
PSB-13-05-113-002 (MUAP-10006)	PS/B Standard Design SSI Analysis	Rev. 0 PS/B Standard Design SSI Analysis	Rev. 1: - Calculation documenting the runs of the PS/B analyses with reduced stiffness (lower bound) SSE damping and full stiffness (upper bound) OBE damping	November 2011
	New Calculation Report – Documenting Reduced Stiffness of CIS		Void – Refer to REB-13-05-113-004	
REB-13-05-205-003 (Short term & long term settlement); (MUAP-11001, 11002, and 10006)	Subgrade Modeling in Finite Element Analysis – Settlement Calculation	N/A	Rev. 0: - Long term deformation moduli for sand sites and clay sites - Long term displacements for Soil Profile 270-500 considering two types of subgrade –sand and clay - Settlements of all structures including dishing effects and effects of primary consolidation (clay) - Tilt of all structures from long term loads for gap - Differential settlements from long term loads (between adjacent structures and for each structure) - Update to include changes to the building layout - Update to include changes resulting from new time history seed - Update to reflect changes in soil profiles	October 2011
REB-13-05-	Subgrade Modeling in	N/A	Rev. 0:	November 2011

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Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
205-004 (Seismic & static bearing pressure) (MUAP-11001, 11002, and 10006)	Finite Element Analysis – Bearing Pressure Demand Calculation		- Demand and allowable bearing pressures	
SPS-13-05-113-002 (MUAP-10006)	Standard Plant Required Gap Analysis	N/A	Rev. 0: - Dynamic Differential Displacements methodology and results - Standard plant required gap analysis	November 2011
PCV-13-05-230-013 (Supports DCD)	Submodeling for Strain Near PCCV Penetrations	N/A	Rev. 0: - Detailed calculation of strain results near all penetrations	June 2011 (Completed)
PCV-13-05-230-003 (MUAP-10006)	Basic Analysis of the US-APWR PCCV	Rev. 0: - Basic analysis results provides design forces obtained by FEM	Rev. 1: - Basic analysis results provides design forces obtained by FEM	January 2012
PCV-13-05-230-004 (Supports PCV-13-05-230-003)	Basic Design Verification of PCCV	N/A	Rev. 0: - Basic Design Verification of PCCV	January 2012
PCV-13-05-230-005 (Supports PCV-13-05-230-003)	PCCV Thermal Analysis	N/A	Rev. 0: - PCCV Thermal Analysis	January 2012
PCV-13-05-230-006 (Supports PCV-13-05-230-003)	PCCV Creep Evaluation	N/A	Rev. 0: - PCCV Creep Evaluation	January 2012
PCV-13-05-	PCCV Tendon Prestress	Rev. 0:	Rev. 1:	January 2012

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Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
230-007 (Supports PCV-13-05-230-003)	Evaluation	- PCCV Tendon Prestress Evaluation	- PCCV Tendon Prestress Evaluation	
PCV-13-05-230-008	Basic Design of PCCV Liner System	Rev. 0: - PCCV Liner Anchor Design	Rev. 1: - PCCV Liner Anchor Design	January 2012
PCV-13-05-230-009	Postprocessor Theory – Supports PCCV Calcs PCV-13-09-230-004, 010, 012	N/A	Rev. 0: - Design Postprocessor	January 2012
PCV-13-05-230-010	PCCV Buttress Design	N/A	Rev. 0: - PCCV Buttress Design	January 2012
PCV-13-05-230-011	PCCV Equipment Hatch and Airlock Analysis	N/A	Rev. 0: - PCCV Equipment Hatch and Airlock Analysis	January 2012
PCV-13-05-230-012	PCCV Equipment Hatch and Airlock Design	N/A	Rev. 0: - PCCV Equipment Hatch and Airlock Design	January 2012
PCV-13-05-271-001	US-APWR – Concrete Calculation for Evaluation of Local Stresses and Rebar Requirements at Sleeve Penetrations	N/A	Rev. 0: - Concrete Calculation for Evaluation of Local Stresses and Rebar Requirements at Sleeve Penetrations	January 2012
PCV-13-05-272-001	Design of PCCV Mechanical Penetrations	N/A	Rev. 0: - Large Bore Mechanical Pipe Penetrations	January 2012
PCV-13-05-272-002	Design of PCCV Electrical and Ventilation Penetrations	N/A	Rev. 0: - Type I through Type V General Penetration for Small Bore Piping and Electrical Penetrations	January 2012
PCV-13-05-272-003	Design of PCCV Fuel Transfer Tube Penetration	Rev. 0: - Fuel Transfer Tube Penetration	Rev. 1: - Fuel Transfer Tube Penetration	January 2012
PCV-13-05-272-004	PCCV Penetration Design Basis Calculation	N/A	Rev. 0: - Main Steam, Main Feedwater and Blowdown Pipe Penetrations	January 2012
PCV-13-05-641-001			Void - Refer to PCV-13-05-230-008	
PCV-13-05-			Void – Refer to PCV-12-05-230-013	

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Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
270-001				
PCV-13-05-277-001	US-APWR – Preliminary Calculation for Polar Crane Runway Girder Calculation	Rev. 0: - Preliminary Calculation for Polar Crane Runway Girders	Rev. 1: - Preliminary Calculation for Polar Crane Runway Girders	January 2012
PCV-13-05-277-002	US-APWR – Preliminary Design of PCCV Polar Crane Bracket Structural Steel and Anchorage to Concrete	Rev. 0: - Preliminary Calculation for Polar Crane Support Brackets	Rev. 1: - Preliminary Calculation for Polar Crane Support Brackets	January 2012
PCV-13-05-277-003			Void – Refer to PCV-13-05-277-002	
PCV-13-05-262-001	US-APWR – Calculation for Attachment Loading to the Liner Plate (Loading Calculation)	N/A	Rev. 0: - Calculation for Attachment Loading to the Liner Plate (Loading Calculation)	January 2012
PCV-13-05-262-002	US-APWR – Calculation for 4 Typical Attachments to Containment Wall Liner Plate	N/A	Rev. 0: - Calculation for 4 Typical Attachments to Containment Wall Liner Plate	January 2012
PCV-13-05-640-001 (Supports CIS-13-05-230-004)	US-APWR – Calculation for SC Module Anchors	N/A	Rev. 0: - Calculation for SC Module Anchors	January 2012
PCV-13-05-640-002 (Supports CIS-13-05-230-004)	US-APWR – Calculation for Rebar Coupler for CIS	N/A	Rev. 0: - Calculation for Rebar Coupler for CIS	January 2012
CIS-13-05-230-004 (MUAP-10006)	Basic Analysis and Design of CIS	Rev. 0: - Basic Design Results based on the seismic design forces obtained by LMSM	Rev. 1: - Basic Design Results based on the seismic design forces obtained by FEM - Check of the design adequacy against the enhanced detailed design criteria reports, including design check of critical sections - Tasks 1-B, 2-B, 2-C and 2-D	January 2012

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Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
REB-13-05-230-001 (MUAP-10006)	Design Report for the Basic Design of the US-APWR R/B	Rev. 0: - Basic Design Results based on the seismic design forces obtained by LMSM	Rev. 1: - Basic Design Results based on the seismic design forces obtained by FEM - CIS	January 2012
RB-13-05-113-002			Void – Refer to REB-13-05-113-004	
REB-13-05-113-003 (MUAP-10001)	Dynamic FE Model Development of R/B	N/A	Rev. 0: - Dynamic FE Model Development of R/B	November 2011
REB-13-05-205-001			Void - Duplication of RBF-13-05-205-001	
REB-13-05-205-002			Void - Duplication of RBF-13-05-205-002	
RB-13-05-113-001 (MUAP-11006)	Lumped Mass Stick Model Development of R/B	N/A	Rev. 0: - Lumped Mass Stick Model Development of R/B	November 2011
SPS-13-05-113-003 (MUAP-11007)	Effect of Embedment on Seismic Soil-Structure Interaction Response of the US-APWR Standard Plant Reactor Building Complex	N/A	Rev. 0: - Effect of Embedment on Seismic Soil-Structure Interaction Response of the US-APWR Standard Plant Reactor Building Complex	November 2011
RBF-13-05-205-001 (MUAP-10006)	Basic Analysis of the US-APWR R/B Foundation (including stability evaluation)	Rev. 0: - Basic Design Results based on the seismic design forces obtained by LMSM	Rev. 1: - Basic Design Results based on the seismic design forces obtained by FEM	January 2012
RBF-13-05-205-002 (MUAP-10006)	Basic Design of R/B Foundation (ASME)	N/A	Rev. 0: - Basic Design of R/B Foundation (ASME)	January 2012
RBF-13-05-205-003			Void - Refer to RBF-13-05-205-002	
PSB-13-05-	Design Report for the	Rev. 0:	Rev. 1:	January 2012

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Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
230-002 (MUAP-10006)	Basic Design of the US-APWR PS/B	- Basic Design Results based on the seismic design forces obtained by FEM	- Basic Design Results incorporated in the revision of MUAP-10006	
PSB-13-05-113-001 (MUAP-10001)	Dynamic Model Development and Validation of PS/B	N/A	Rev. 0: - Dynamic Model Development and Validation of PS/B	November 2011
PSB-13-05-205-001 (MUAP-11007)	Stability Evaluation of PS/B	N/A	Rev. 0: - Stability Evaluation of PS/B	November 2011
AUB-13-05-113-001 (MUAP-11001)	Static and Dynamic Model Development of A/B	N/A	Rev. 0: - Static and Dynamic Model Development of A/B	November 2011
AUB-13-05-113-002 (MUAP-11001)	A/B Standard Design SSI Analysis	N/A	Rev. 0: - A/B Standard Design SSI Analysis	November 2011
AUB-13-05-113-003 (MUAP-11001)	Structural Integrity Evaluation of A/B	N/A	Rev. 0: - Structural Integrity Evaluation of A/B	November 2011
AUB-13-05-205-001 (MUAP-11001)	Stability Evaluation of A/B	N/A	Rev. 0: - Stability Evaluation of A/B	November 2011
SPS-13-05-113-001 (MUAP-11011)	Standard Plant SSSI Analysis	N/A	Rev. 0: - Standard Plant SSSI Analysis	November 2011
CIS-13-15-150-004 (MUAP-11013)	Benchmarked NIFE Models for SC Components	N/A	Rev. 0: - Benchmarking of NIFE models to SC components and primary shield - In Plane Behavior - Out-of-Plane Behavior - Thermal Mechanical Behavior	November 2011

R1

Doc. # (support to)	Title	Current Contents	Updates and Future Contents	Available Following Last Date in Month
CIS-13-15-150-007 (MUAP-11013)	Benchmarked NIFE Model for 1/10th Scale CIS Test up to SSE	N/A	Rev. 0: - Benchmarking of NIFE models to 1/10th scale CIS test up to SSE	December 2011
CIS-13-15-150-008 (MUAP-11013)	Benchmarked NIFE Model for 1/10th Scale CIS Test Beyond SSE	N/A	Rev. 0: - Benchmarking of NIFE models to 1/10th scale CIS test up to SSE	January 2012
CIS-13-15-150-010 (MUAP-11013)	US-APWR CIS Pushover Analysis up to SSE	N/A	Rev. 0: - Results of CIS pushover analysis up to SSE	December 2011
CIS-13-15-150-011 (MUAP-11013)	US-APWR CIS Pushover Analysis Beyond SSE	N/A	Rev. 0: - Results of CIS pushover analysis beyond SSE	February 2012
CIS-13-15-150-002 (MUAP-11013)	Benchmarked NIFE Models for 1/6th Scale CIS Test up to SSE	N/A	Rev. 0: - Results of CIS pushover analysis up to SSE	November 2011
CIS-13-15-150-003 (MUAP-11013)	Benchmarked NIFE Models for 1/6th Scale CIS Test Beyond SSI	N/A	Rev. 0: - Results of CIS pushover analysis up to SSE	December 2011
UAP-SGI-09001	US-APWR Design Certification Aircraft Impact Assessment	Rev 0: - Layout based on DCD Rev. 2	Rev 1: - Revision/reconciliation based on the adjusted layout	January 2012
TBD (MUAP-11002)	Steel Member Stress of T/B	N/A	Rev 0: - Check of the adequacy of steel member by checking member stress	February 2012

R1

Notes:

R1: Revisions to Letter (ML11136A235) from Y. Ogata (MHI) to U.S. NRC, "Revised Completion Plan for US-APWR Seismic and Structural Analyses" dated May 12, 2011

- Since the above listed documents are internal documents, the above information is subject to change.

Attachment 3

Impacts on DCD

Attachment 3 – Impacts on DCD

R1

DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
Tier 1	Tier 1 Layout drawings	X	X	November 2011
Tier 1	Tier 1 Table 2.2-2 Update Wall Thicknesses Update table notes	X		June 2011 Completed (UAP-HF-11195) November 2011
Tier 2 1	1.2 Plot Plan and Layout drawings	X	X	November 2011
2	Table 2.0-1 Revise the soil profiles description and data Revise bearing capacity demands Revise allowable settlements	X		November 2011
2	Table 2.3.4-1 to Table 2.3.4-7 Revise the horizontal distance source to receptor, straight distance and direction receptor to source (degree)		X	November 2011
3	3.5, 3.7, 3.8, 3.9, 3.12 (General) Update for latest ACI 349 revision including any criteria updates	X		November 2011
3	3.7.1.2 Update this discussion to tie to the bounding conditions discussion in 3.7.2.4 with respect to how proper damping values are selected	X		June 2011 Completed (UAP-HF-11195)
3	3.7.1.3 Update generic profiles	X		November 2011
3	3.7.2 Revise methodology for seismic response analyses of R/B Complex and PS/B dynamic FE models	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2 Update generic profiles	X		November 2011
3	3.7.2.1 Revise discussion of seismic analysis methods to reflect latest methods, especially Table 3.7.2-1	X		November 2011

DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
3	3.7.2.2 Revise/delete as necessary to explain switch from lumped mass stick models	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.2 Update natural frequencies and responses discussion based on the latest results and import some basic results information from MUAP-10001 and/or MUAP-10006 Update with any needed references to A/B and T/B reports and/or results (general note and may apply to other sections)	X		November 2011
3	3.7.2.3 Revise/delete as necessary to explain switch from lumped mass stick models	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.3.1 Update analytical models discussion particularly regarding bounding conditions analyses and how damping values are assigned in conjunction with the various bounding/stiffness conditions (cracked, uncracked)	X		November 2011
3	3.7.2.3.2 Revise discussion due to changing from lumped mass stick model design basis to dynamic FE model design basis	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.3.2 Update generic profiles	X		November 2011
3	3.7.2.3.10 Rewrite to address how the dynamic FE models for R/B Complex are validated	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.4 Revise to address how the standard design envelopes embedment effects Revise to address change from lumped mass stick model to FE model	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.4 Update generic profiles Category I structures are separated from Seismic Category II structures by gaps of at least 16 inches	X	X	November 2011
3	3.7.2.5 Revise/delete as necessary to explain switch from lumped mass stick models	X		June 2011 Completed (UAP-HF-11195)

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DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
3	3.7.2.8 Updated SSSI discussion to remove statements that conclude the effects are negligible	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.8.2 T/B clearance to adjacent seismic category I structures is 16 inches		X	November 2011
3	3.7.2.8.3 Update based on lumped mass stick model to FE update	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.8.4 Update stability methodology for the A/B	X		June 2011 Completed (UAP-HF-11195)
3	3.7.2.11 Revise/delete as necessary to explain switch from lumped mass stick models	X		June 2011 Completed (UAP-HF-11195)
3	3.7.3 (General) Update for any changes to high-frequency subsystem analyses	X		November 2011
3	3.7.6 Update references based on reports issued in 6/2011	X		June 2011 Completed (UAP-HF-11195)
3	3.7 Figures and Tables (General) Revise tables and drawings as applicable to reflect design changes	X		June 2011 Completed (UAP-HF-11195)
3	Table 3.7.1-4 Comparison of 5% Damping ARS of Synthesized Time History CSDRS	X		November 2011
3	Table 3.7.1-5 Duration of Motion of US-APWR Time Histories with Respect to Arias Intensity	X		November 2011
3	Table 3.7.1-6 Generic Soil Profile Categories	X		November 2011
3	Table 3.7.1-7 Spectra Matching Requirements for Converted Time Histories	X		November 2011
3	Figure 3.7.1-3 Acceleration, Velocity, and Displacement Time History for Component H1	X		November 2011
3	Figure 3.7.1-4 Acceleration, Velocity, and Displacement Time History for Component H2	X		November 2011
3	Figure 3.7.1-5 Acceleration, Velocity, and Displacement Time History for Component V	X		November 2011
3	Figure 3.7.1-6 5% Damped Time History Response Spectra (H1)	X		November 2011

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DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
3	Figure 3.7.1-7 5% Damped Time History Response Spectra (H2)	X		November 2011
3	Figure 3.7.1-8 5% Damped Time History Response Spectra (V)	X		November 2011
3	3.8.1 (General) Update figures/discussion to add transient pressure conditions to the same level of detail as the figures for transient temperature	X		November 2011
3	3.8.1.4.1.2 Update to address latest methodology for PCCV thermal analyses	X		November 2011
3	3.8.1.4.2 Update to address latest PCCV concrete considerations methodology	X		November 2011
3	3.8.1.4.3 Update discussion of ultimate pressure capacity of PCCV based on latest analyses of liner stress and strain at penetrations	X		November 2011
3	3.8.1.4.4 Update PCCV liner system design and analysis discussion with regard to post-processing discussion, investigation of local strains and stresses at penetrations, tolerances considered in the design evaluation, etc. Update or add associated tables and figures	X		November 2011
3	3.8.3 (General) Revise the design criteria and methodology of SC	X		November 2011
3	3.8.3.4, 3.8.3.4.1 Update discussion of design and analysis procedures for SC modules and associated tables and figures	X		June 2011 Completed (UAP-HF-11195)
3	3.8.3.4.3 Update SC module thermal analyses discussions and explanations	X		June 2011 Completed (UAP-HF-11195)
3	3.8.3.4.4 Update design procedures particularly with regard to statements about the ACI 349 strength method	X		June 2011 Completed (UAP-HF-11195)
3	3.8.3.4.5 Provide updated SC design criteria and analysis excluding ACI 349 discussion	X		June 2011 Completed (UAP-HF-11195)
3	3.8.3.5.2 Update for critical SC wall sections along with associated figures and tables	X		November 2011

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DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
3	3.8.4.1 Revise the gap to 16 inches		X	November 2011
3	3.8.4.1.3 Revise descriptions of shear keys for Seismic Category I Structures as applicable to reflect design changes	X		November 2011
3	3.8.4.1.3 Provide description of methodology used for stability evaluations	X		November 2011
3	3.8.4.4.1.1 Update for critical sections along with any figures and tables	X		November 2011
3	3.8.4.4.2.1 Update for critical sections along with any figures	X		November 2011
3	3.8.5.1 Revise the gap to 16 inches		X	November 2011
3	3.8.5.4.1 Update embedment effects discussion.	X		June 2011 Completed (UAP-HF-11195)
3	3.8.5.4.1 Update generic profiles	X		November 2011
3	3.8.5.4.4 Revise analyses of settlement and bearing capacity discussion as required to reflect latest methodology	X		November 2011
3	3.8.5.5 Update stability discussion based on methodology change	X		June 2011 Completed (UAP-HF-11195)
3	3.8.6 Update COL 3.8(22) to include tilt and related conditions Update COL 3.8(26) due to updated settlement criteria and to tie better to updated criteria in Table 2.0-1	X		November 2011
3	3.8.7 Update references based on reports issued in 6/2011	X		June 2011 Completed (UAP-HF-11195)
3	3.8 Tables and Figures (General) Revise tables and drawings as applicable to reflect design and methodology changes	X		June 2011 Completed (UAP-HF-11195)

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DCD Affected Chapter	Summary of Potential Changes	Cause of Change		DCD Markup Date to NRC
		Seismic Related Change	Layout Change	
3	3.8 Figures Layout drawings		X	November 2011
3	Appendix 3H Update description and properties of RCL lumped mass stick model	X		June 2011 Completed (UAP-HF-11195)
Appendix 3I	Appendix 3I Revise R/B Complex In-Structure Response Spectra (ISRS) and provide ISRS for PS/B	X		November 2011
Appendix 3J	Appendix 3J Structural drawings		X	November 2011
Appendix 3K	Appendix 3K Layout drawing of waterproof doors		X	November 2011
8	8.3 Class 1E Equipment Layout		X	November 2011
9	9.1 Fuel Rack Configuration	X		November 2011
9	9.5 Appendix 9A/ figure 9A-1 Fire area drawing		X	November 2011
9	9.5 Appendix 9A/ table 9A-2 Fire Hazard analysis Summary		X	November 2011
9	9.5 Appendix 9A/ table 9A-3 Fire Zone/ Fire Area Inter face		X	November 2011
11	Figure 11.5-2 Monitor Layout drawings		X	November 2011
12	Figure 12.3-1/Figure 12.3-2 thr Figure 12.3-6/Figure 12.3-9/Figure 12.3-11 Rad Zone Maps		X	November 2011
19	19.1.5.1.1 Revise methodology with FEM analysis in Seismic Risk Evaluation	X		June 2011 Completed (UAP-HF-11195)

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Notes:

R1: Revisions to Letter (ML11136A235) from Y. Ogata (MHI) to U.S. NRC, "Revised Completion Plan for US-APWR Seismic and Structural Analyses" dated May 12, 2011