



# Future Technical Reports

**April 15, 2008**

**Mitsubishi Heavy Industries, LTD.**

# Contents



1. Introduction
2. Reports Submitted since DCD Submittal
3. Reports to be Submitted in the Future
4. Outline of Technical Reports
5. Summary

- **MHI's commitment letter for submitting technical reports was sent to the NRC with the DCD on Dec. 31, 2007.**
- **All of the committed technical reports have been sent as planned to the NRC for the review.**
- **Today, table of contents and summary outline of future submittal reports are presented to insure that the NRC has the information needed to develop its review schedule.**

# Reports Submitted since DCD Submittal



Title	Submittal date
US-APWR Fuel System Design Evaluation	February/2008
Sub-compartment Analysis for US-APWR Design Confirmation	February/2008
Criticality Analysis for US-APWR New and Spent Fuel Racks	February/2008
Enhanced Information for PS/B Design	February/2008
US-APWR Sump Strainer Performance	February/2008
Probabilistic Risk Assessment (Level 3)	March/2008
FINDS: Mitsubishi Fuel Assemblies Seismic Analysis Code	March/2008

# Reports to be Submitted in the Future



Title	Submittal date
Sump Strainer Related Technical Reports	Discussed separately
Stress Analysis Related Technical Reports	Discussed separately
Dynamic Analysis of the Coupled RCL-R/B-PCCV-CIS Lumped Mass Stick Model	April/2008
US-APWR Reactor Vessel Lower Plenum 1/7 Scale Model Flow Test Report	June/2008
Security Assessment Report	TBD (Originally July/2008)
Environmental Qualification Program	December/2008
US Operator Static V&V Results	December/2008
Mechanical Analyses for US-APWR New and Spent Fuel Racks	March/2009
HSI Design	June/2009

# Outline of Technical Reports (1/7)



## Dynamic Analysis of the Coupled RCL-R/B-PCCV-CIS Lumped Mass Stick Model (04/2008)

<b>Contents</b>	<b>Summary Outline</b>	<b>Related DCD Section/Sub- Section</b>
<b>Structural design verification</b>	<ul style="list-style-type: none"><li>• <b>Verification of the building-RCL coupled-model analysis results to be within the seismic design load assumed in the DCD.</b></li><li>• <b>In the DCD, the seismic design load is conservatively established based on the results of a non-coupled building model.</b></li></ul>	<b>3.7</b>

**RCL: Reactor Coolant Loop**

**R/B: Reactor Building**

**PCCV: Pre-stressed Concrete Containment Vessel**

**CIS: Core Internal Structure**

# Outline of Technical Reports (2/7)



## US-APWR Reactor Vessel Lower Plenum 1/7 Scale Model Flow Test Report (06/2008)

Contents	Summary Outline	Related DCD Section/Sub-Section
Objective	<ul style="list-style-type: none"><li>• Confirmation of hydraulic characteristics, flow induced vibration and the core inlet temperature distribution related to the lower plenum design configuration of the reactor vessel</li></ul>	1.5.2.1.2
Hydraulic characteristics	<ul style="list-style-type: none"><li>• Description of core inlet flow distribution test results</li></ul>	1.5.2.1.2
Flow-induced vibration	<ul style="list-style-type: none"><li>• Description of flow-induced vibration responses of the low plenum structures</li></ul>	1.5.2.1.2 3.9.2.3
Core inlet temperature distribution	<ul style="list-style-type: none"><li>• Core inlet temperature distribution in events with non-uniform coolant temperature condition between primary loops</li></ul>	

# Outline of Technical Reports (3/7)



Security Assessment Report (To be further discussed with NRC)  
(TBD, Originally planned on 07/2008)

<b>Contents</b>	<b>Summary Outline</b>	<b>Related DCD Section/Sub-Section</b>
<b>High Assurance Evaluation</b>	<ul style="list-style-type: none"><li>• Development and identification of target sets</li><li>• Development of DBT scenarios</li><li>• Assessments for each scenario and evaluation of interactions of the security design features with plant safety</li></ul>	<b>13.6</b>
<b>Mitigative Measures Evaluation</b>	<ul style="list-style-type: none"><li>• Consideration and development of mitigative strategies for the US-APWR</li><li>• Description of the cost-effectiveness and benefits of different mitigative strategies</li><li>• Strategies and measures to mitigate fuel damage and to minimize releases</li></ul>	<b>13.6</b>
<b>Cyber Assurance Evaluation</b>	<ul style="list-style-type: none"><li>• Description of the US-APWR network architecture and connectivity of the plant digital systems</li><li>• Description of a defensive model, methods and approach</li><li>• Description of the initial assessment of the cyber security program</li></ul>	<b>13.6</b>



# Outline of Technical Reports (4/7)



## Environmental Qualification Program (12/2008)

Contents	Summary Outline	Related DCD Section/Sub-Section
Codes Standards and Regulatory Guidance	<ul style="list-style-type: none"><li>• Identification of the applicable CFRs, NRC Regulatory Guides, Branch Technical Positions, NUREG-Series</li></ul>	3.11
Design Basis	<ul style="list-style-type: none"><li>• Definition of applicable environmental conditions and equipment operating times</li></ul>	3.11
Program Basis	<ul style="list-style-type: none"><li>• Description of the general design features and seismic environmental qualification</li></ul>	3.11
Design programmatic aspects	<ul style="list-style-type: none"><li>• Description of the industry standard practices for group reviews/audits and the EPRI programs</li></ul>	3.11
Procurement of qualified equipment	<ul style="list-style-type: none"><li>• Description of QA procedures</li><li>• Description of procurement procedures</li></ul>	3.11
Final controlling authority of the EQ program post combined license	<ul style="list-style-type: none"><li>• Utility customer assumptions</li><li>• Construction phase</li><li>• Startup phase</li></ul>	3.11

# Outline of Technical Reports (5/7)



## US Operator Static V&V Results (including HFE Analysis Results) (12/2008)

<b>Contents</b>	<b>Summary Outline</b>	<b>Related DCD Section/Sub-Section</b>
<b>HFE analysis</b>	<ul style="list-style-type: none"><li>• Results from the latest Operator experience review</li><li>• Additional analysis based on Japanese experience</li></ul>	18.2 18.3 18.4
<b>V&amp;V evaluation strategy</b>	<ul style="list-style-type: none"><li>• Strategy using full scope simulator Japanese standard PWR plant and HSI design</li><li>• Strategy with U.S. plant operating crews</li><li>• Operation scenarios include normal/abnormal/accidental operation with normal/degraded HSI condition</li></ul>	18.10
<b>V&amp;V Results</b>	<ul style="list-style-type: none"><li>• Evaluation of the HEDs identified by U.S. operators and identification of those HEDs that will result in changes for the USAPWR</li></ul>	18.10

# Outline of Technical Reports (6/7)



## Mechanical Analyses for US-APWR New and Spent Fuel Racks (03/2009)

<b>Contents</b>	<b>Summary Outline</b>	<b>Related DCD Section/Sub-Section</b>
<b>Description of Fuel Racks</b>	<ul style="list-style-type: none"><li>• Description of structural features of new and spent fuel racks</li></ul>	<b>9.1.1</b> <b>9.1.2</b>
<b>Load Definition</b>	<ul style="list-style-type: none"><li>• Definition of load in accordance with SRP 3.8.4 Appendix-D: Accidental Load: Fuel Drop, Uplift Seismic Load: Sliding, Overturning</li></ul>	<b>9.1.2</b>
<b>Design and Analysis Procedures</b>	<ul style="list-style-type: none"><li>• Description of the design and the analysis procedure in accordance with ASME Code Section III, Division 1, Article NF3000</li></ul>	<b>9.1.2</b>
<b>Analysis Results</b>	<ul style="list-style-type: none"><li>• Description of the analysis results</li></ul>	<b>9.1.2</b>

# Outline of Technical Reports (7/7)



HSI Design (06/2009)

Contents	Summary Outline	Related DCD Section/Sub-Section
Background	<ul style="list-style-type: none"><li>• HSI design for US-APWR is based on the standard Japanese HSI design</li><li>• V&amp;V results identified by U.S. operators is reflected in the standard Japanese HSI design</li></ul>	18.7 (18.10)
HSI design description	<ul style="list-style-type: none"><li>• HSI description addition to the HSI topical report</li><li>• HSI description includes considerations from HEDs</li></ul>	18.7
Results	<ul style="list-style-type: none"><li>• Solutions to those HEDs and USAPWR HSI basic design.</li></ul>	18.7

# Summary



- **Table of contents and summary outline of the future technical reports will insure that the NRC has the information needed to plan for an expeditious review of the related DCD sections.**