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TOKYO, JAPAN

February 5, 2010

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-10035

Subject: MHI's Response to US-APWR DCD RAI No. 521-4248 Revision 0

Reference: 1) "Request for Additional Information No. 521-4248 Revision 0, SRP Section: 14.02 – Initial Plant Test Program – Design Certification and New License Applicants, Application Section: 14.2 Initial Plant Test Program" dated January 19, 2010.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No. 521-4248 Revision 0."

Enclosed is the response to Question 14.02-120 that is contained within Reference 1.

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. Response to Request for Additional Information No. 521-4248 Revision 0

CC: J. A. Ciocco
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Docket No. 52-021
MHI Ref: UAP-HF-10035

Enclosure 1

UAP-HF-10035
Docket No. 52-021

Responses to Request for Additional Information No. 521-4248
Revision 0

February 2010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

02/05/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 521-4248 REVISION 0**
SRP SECTION:	**14.02- INITIAL PLANT TEST PROGRAM**
APPLICATION SECTION:	**14.2**
DATE OF RAI ISSUE:	**1/19/2010**

QUESTION NO.: 14.02-120

Followup Items Based on Staff Comparison of Chapter 14.2 of DCD Rev. 2 and RAI Responses

a. Minor edits:

1. DCD Table 1.9.1-1, row for RG 1.35.1, last column, should be "14.2.7" rather than "14.27. "
2. DCD test 14.2.12.1.15, Step C.3 wording is not correct, "...and the its lithium concentration."
3. DCD test 14.2.12.1.115, Step A.2 appears to refer to RG 1.45.3 which does not exist. But Paragraphs A.2 and A.3 were merged and the second "A" was dropped to create this mistake. Need a hard return to separate them.
4. DCD Section 14.2.13, COL Item 14.2(11) - change "test" in line 1 to "tests" since there are two first-plant-only tests in Section 14.2.8.

b. New Item:

When reviewing the responses to RAI 371-2617, Question 14.02-117 and RAI 455-3648, Question and 14.02-119 and related DCD Rev. 2 changes, the staff noted a revision in RG 1.45, Reactor Coolant pressure Boundary Leakage Detection Systems, (from Rev. 0 to Rev. 1). While verifying that Rev. 1 of RG 1.45 is being met, the staff noted the following issues:

1. Regulatory positions C.2.1 and C.2.5 of RG 1.45, Rev. 1 did not appear to be addressed in the DCD. Please address.
2. Section 5.2.5 of DCD Rev. 2 still refers to portions of RG 1.45, Rev. 0: e. g.,
   a. Section 5.2.5.4.1.1 refers to positions 5 and 7 of Rev. 0.
   b. Section 5.2.5.8 refers to position 9 of Rev. 0.

Please update accordingly.

ANSWER:

Response to Question a:

1. MHI has corrected the typographical error of the referenced section in Table 1.9.1-1.

2. MHI has deleted "the" from the text "... and the its lithium concentration" in Subsection 14.2.12.1.15.
3. MHI has corrected the editorial error and separated the merged paragraphs A.2 and A.3 in Subsection 14.2.12.1.115.
4. MHI has revised "test" to "tests" in line 1 of COL item 14.2(11) in Subsection 14.2.13. A similar change has been also made in COL 14.2(11) of Table 1.8-2 (sheet 39 of 44).

Response to Question b:

1. MHI has revised DCD Subsections 5.2.5.7 and 5.2.5.8 to refer to Regulatory Positions 2.5 and 2.1 of RG 1.45 Revision 1 respectively.

2.a MHI has revised DCD Subsection 5.2.5.4.1.1 to refer to Regulatory Positions 2.2 and 3.3 of RG 1.45 Revision.1.

2.b MHI has revised DCD Subsection 5.2.5.8 to refer to Regulatory Position 4.1 of RG 1.45 Revision 1 .

MHI has also revised the references in Technical Specification Bases 3.4.13 and 3.4.15, to specify revision 1 as the applicable RG 1.45 reference.

Impact on DCD

Response to Question a:

See the proposed mark-up of Chapters 1 and 14 in Attachment 1.

Response to Question b:

Subsection 5.2.5.4.1.1 has been revised as follows:

A leak rate greater than or equal to 0.5 gpm is detectable within one hour, with an alarm actuating in the MCR to alert the operators, consistent with ~~as stated in~~ regulatory positions 2.2 and 3.3 ~~5 and 7~~ of regulatory guide 1.45.

Subsection 5.2.5.7 has been added to the beginning of the first paragraph as follows:

Consistent with Regulatory Position C.2.5 of RG 1.45, leakage monitoring systems, including those with location detection capability, have provisions to permit calibration and testing during plant operation, as appropriate.

Subsection 5.2.5.8 has been revised as follows:

In accordance with the regulatory position 4.1 ~~9~~ of regulatory guide 1.45, the limiting conditions for identified, ~~and~~ unidentified, RCPB and intersystem reactor coolant leakage~~s~~ are identified in the Chapter 16 Technical Specifications (TS). Subsections 3.4.13 and 3.4.14 address~~es~~ RCS operational leakage and pressure isolation valve (intersystem) leak limits, respectively. Subsection 3.4.15 addresses RCS leak detection instrument requirements.

The leakage management procedure is to be developed as Operating and Emergency Operating Procedures described in DCD Section 13.5.2.1 to identify leak source, monitor and trend leak rate, evaluate various corrective action plans in response to prolonged low leakage conditions that exceeds normal leakage rates and not exceed the ~~Technical Specification~~ (TS) limit in order to provide the operator sufficient time to take corrective actions before the leakage exceeds TS limit value. In accordance with the guidance in RG 1.45 position C.2.1, the procedure includes the collection of leakage to the containment from unidentified sources so the total flow rate can be detected, monitored and quantified for flow rates greater than or equal to 0.05 gal/min.

Reference 2 in Technical Specifications Bases 3.4.13 has been revised as follows:

2. Regulatory Guide 1.45 Revision 1, May 2008 ~~1973~~.

Reference 2 in Technical Specifications Bases 3.4.15 has been revised as follows:

2. Regulatory Guide 1.45 Revision 1, May 2008.

Impact on COLA

Table 1.8-201 (Sheet 54 of 62) of Part 2 "FSAR" will be revised to be consistent with the revision of Table 1.8-2 proposed in the response to Question a.4.

Reference 2 in Bases 3.4.13 and 3.4.15 of Part 4 "Technical Specifications" will be revised to be consistent with the revision proposed in the response to Question b.

Impact on PRA

There is no impact on the PRA.

Table 1.8-2 Compilation of All Combined License Applicant Items for Chapters 1-19 (sheet 39 of 44)

COL ITEM NO.	COL ITEM
COL 14.2(8)	*Deleted*
COL 14.2(9)	*Deleted*
COL 14.2(10)	*The COL applicant is responsible for the testing outside scope of the certified design in accordance with the test criteria described in subsection 14.2.1. [14.2.12]*
COL 14.2(11)	*The COL holder for the first plant is to perform the first plant only tests and prototype test. For subsequent plants, either these tests are performed, or the COL applicant provides a justification that the results of the first-plant only tests are applicable to the subsequent plant and are not required to be repeated. [14.2.8]*
COL 14.2(12)	*The COL holder makes available approved test procedures for satisfying testing requirements described in Section 14.2 to the NRC approximately 60 days prior to their intended use. [14.2.3, 14.2.11, 14.2.12.1]*
COL 14.3(1)	*The COL applicant provides the ITAAC for the site specific portion of the plant systems specified in Subsection 14.3.5, Interface Requirements. [14.3.4.6,14.3.4.7]*
COL 14.3(2)	*The COL applicant provides proposed ITAAC for the facility's emergency planning not addressed in the DCD in accordance with RG 1.206 (Reference 14.3-1) as appropriate. [14.3.4.10]*
COL 14.3(3)	*The COL applicant provides proposed ITAAC for the facility's physical security hardware not addressed in the DCD in accordance with RG 1.206 (Reference 14.3-1) as appropriate. [14.3.4.12]*
COL 15.0(1)	*In the COLA, if the site-specific χ/Q values exceed DCD χ/Q values, then the COL Applicant is to demonstrate how the dose reference values in 10 CFR 50.34 and 10 CFR 52.79 and the control room dose limits in 10 CFR 50, Appendix A, General Design Criterion 19 are met for affected events using site-specific χ/Q values. Additionally, the Technical Support Center (TSC) dose should be evaluated against the habitability requirements in Paragraph IV.E. 8 to 10 CFR Part 50, Appendix E, and 10 CFR 50.47(b)(8) and (b)(11).*

Table 1.9.1-1 US-APWR Conformance with Division 1 Regulatory Guides (sheet 3 of 15)

Reg Guide Number	Title	Status	Corresponding Chapter/Section /Subsection
1.29	Seismic Design Classification (Rev. 4, March 2007)	Conformance with no exceptions identified.	3.2.1, 5.2.5, 5.2.2.1, 5.4.11.1, 7.1.3.7, 8.1.5.3, 9.1.1, 9.1.2, 9.3.1
1.30	Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment (Rev. 0, August 1972)	Conformance with exceptions. Installation is not included in Design Certification phase.	14.2.7, 17.5
1.31	Control of Ferrite Content in Stainless Steel Weld Metal (Rev. 3, April 1978)	Conformance with no exceptions identified.	4.5.2, 5.2.3.4.4, 5.3.1.4, 6.1.1
1.32	Criteria for Power Systems for Nuclear Power Plants (Rev. 3, March 2004)	Conformance with no exceptions identified.	8.1.5.3, 16.3
1.33	Quality Assurance Program Requirements (Operation) (Rev. 2, February 1978)	Conformance with exceptions. Implementation of RG applies to a site-specific operational program for which COL Applicant will be responsible.	12.1.3 13.5
1.34	Control of Electroslag Weld Properties (Rev. 0, December 1972)	Not applicable. Electroslag welding is not employed in structural welds of low alloy steel. Electroslag welding is only applied for cladding.	5.2.3.3.2, 5.2.3.4.4, 5.3.1.4
1.35	In-Service Inspection (ISI) of Ungrouted Tendons in Prestressed Concrete Containments (Rev. 3, July 1990)	Conformance with no exceptions identified.	3.8.1.2, 3.8.1.7, 14.2.7
1.35.1	Determining Prestressing Forces for Inspection of Prestressed Concrete Containments (Rev. 0, July 1990)	Conformance with no exceptions identified.	3.8.1.2, 3.8.1.7, 14.2.7
1.36	Nonmetallic Thermal Insulation for Austenitic Stainless Steel (Rev. 0, February 1973)	Conformance with no exceptions identified.	5.2.3.2, 6.1.1.2
1.37	Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (Rev. 1, March 2007)	Conformance with exception. Programmatic/operational aspect is not applicable to US-APWR design certification.	3.13.1, 4.5.1, 5.2.3, 5.3.1, 6.1.1, 14.2.7
1.38	Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants (Rev. 2, May 1977)	Not applicable. RG applies to a site-specific operational program.	N/A
1.39	Housekeeping Requirements for Water-Cooled Nuclear Power Plants (Rev. 2, September 1977)	Not applicable. RG applies to a site-specific operational program.	N/A
1.40	Qualification Tests of Continuous-Duty Motors Installed Inside the Containment of Water-Cooled Nuclear Power Plants (Rev. 0, March 1973)	Not applicable. US-APWR has no Class 1 continuous-duty motors in the containment.	N/A

2. At several sampling points (e.g., RCS loops, pressurizer liquid, and demineralizer inlet), each lithium concentration is measured until the lithium concentration is almost equal at each sampling point.

3. The RCS volume without fuel assembles is calculated from the amount of lithium to be added and ~~the~~ its lithium concentration. The quantity and concentration of injected lithium divided by increased concentration of lithium is used to estimate the RCS volume. This volume is reference data.

4. Following completion of hot functional testing, lithium is removed until it is approximately equal to the initial concentration (example: almost 0.5 ppm).

D. Acceptance Criteria

1. The lithium concentrations from all sample points are within +/-0.05 ppm following analytical measurement with an accuracy of +/- 0.05 ppm or better.

2. Lithium mixing, charging to the RCS, and removal performs as described in Subsections 9.3.4.

14.2.12.1.16 Primary Makeup Water System (PMWS) Preoperational Test

A. Objective

1. To demonstrate the operation of the PMWS.

B. Prerequisites

1. Required construction testing is completed.

2. Component testing and instrument calibration is completed.

3. Test instrumentation is available and calibrated.

4. Required support systems are available, including the Demineralized Water Storage Tank (DWST) and the Demineralized Water Transfer Pumps.

C. Test Method

1. Verify manual and automatic system controls.

2. Verify system flowrates.

3. Verify indications and alarms.

D. Acceptance Criteria

1. The PMWS operates as described in Subsection 9.2.6.

2. Indications and alarms operate as described in Subsections 9.2.6.5 and 9.3.4.5.5.6.

4. Operate exhaust fans in battery room and verify operating condition.

D. Acceptance Criteria

1. Turbine building area ventilation system (electric equipment area) operates as described in Subsection 9.4.4.

2. Indications and alarms operate as described in Subsection 9.4.4.

3. Battery room exhaust fan operation maintains the hydrogen concentration below 1% by volume in the battery room per Subsection 9.4.4.1.2.

14.2.12.1.112 Reserved

14.2.12.1.113 Reserved

14.2.12.1.114 Reserved

14.2.12.1.115 RCPB Leak Detection Systems Preoperational Test

A. Objective

1. To verify operability of RCPB leak detection systems and adjust the alarm setpoints.

2. To demonstrate the function described in Subsection 5.2.5 with reference to RG 1.45.

3. To determine quantitative conversion data from measured quantities that correspond to RCS leak rate.

Note: This test may be performed in conjunction with subsection 14.2.12.1.80, "Liquid Waste Management System Preoperational Test."

B. Prerequisites

1. Component testing and instrument calibration is completed.

2. Test instrumentation is available and calibrated.

C. Test Method

1. Verify the calibration, alarm setpoints and alarm functions to each channel of RCPB leak detection systems and associated systems used to determine RCS leakage identified below.

Note: Instrument channel verification should be performed in conjunction with the associated tests identified below.

a. Intersystem leakage, SG tube leakage and unidentified leakage detection design features:

14.2.13 Combined License Information

COL 14.2(1) *Deleted*

COL 14.2(2) *The COL Applicant reconciles the site-specific organization, organizational titles, organizational responsibilities, and reporting relationships to be consistent with US-APWR Test Program Description Technical Report, MUAP-08009 (Reference 14.2-29) [14.2.2].*

COL 14.2(3) *Deleted*

COL 14.2(4) *Deleted*

COL 14.2(5) *Deleted*

COL 14.2(6) *Deleted*

COL 14.2(7) *The COL applicant provides an event-based schedule, relative to fuel loading, for conducting each major phase of the test program, and a schedule for the development of plant procedures that assures required procedures are available for use during the preparation, review and performance of preoperational and startup testing. For multiunit sites, the COL applicant discusses the effects of overlapping initial test program schedules on organizations and personnel participating in each ITP. The COL applicant identifies and cross-references each test or portion of a test required to be completed prior to fuel load which satisfies ITAAC requirements. [14.2.9] [14.2.11]*

COL 14.2(8) *Deleted*

COL 14.2(9) *Deleted*

COL 14.2(10) *The COL applicant is responsible for the testing outside scope of the certified design in accordance with the test criteria described in subsection 14.2.1. [14.2.12]*

COL 14.2(11) *The COL holder for the first plant is to perform the first plant only tests and prototype test. For subsequent plants, either these tests are performed, or the COL applicant provides a justification that the results of the first-plant only tests are applicable to the subsequent plant and are not required to be repeated. [14.2.8]*

COL 14.2(12) *The COL holder makes available approved test procedures for satisfying testing requirements described in Section 14.2 to the NRC approximately 60 days prior to their intended use. [14.2.3, 14.2.11, 14.2.12.1]*