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April 23, 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-09203

Subject: MHI's Response to US-APWR DCD RAI No. 284-2214 REVISION 1 and RAI

No. 285-2334 REVISION 1

Reference: 1) "Request for Additional Information No. 284-2214 Revision 1, SRP Section: 05.03.01– Reactor Vessel Materials" dated March 24, 2009.

2) "Request for Additional Information No. 285-2334 Revision 1, SRP Section: 05.03.02 — Pressure-Temperature Limits, Upper-Shelf Energy, and Pressurized Thermal Shock" dated March 24, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") documents entitled "Response to Request for Additional Information No. 284-2214 Revision 1 and RAI No. 285-2334 Revision 1.

Enclosed are the responses to the RAI contained within Reference 1 and 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,

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Yoshiki Ogata

General Manager- APWR Promoting Department

Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No. 284-2214 Revision 1

2. Response to Request for Additional Information No. 285-2334 Revision 1

CC: J. A. Ciocco

C. K. Paulson

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Enclosure 1

UAP-HF-09203 Docket Number 52-021

Response to Request for Additional Information No. 284-2214 Revision 1

April 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/23/2009

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

RAI NO.:

NO. 284-2214 REVISION 1

SRP SECTION:

05.03.01 - REACTOR VESSEL MATERIALS

APPLICATION SECTION:

05.03.01

DATE OF RAI ISSUE:

3/24/2009

QUESTION NO.: 05.03.01-1

US-APWR DCD Section 5.3.1.6.2, "Neutron Flux and Fluence Calculations," makes reference to DCD Section 4.3.2.8 in providing the methodology used to calculate the fluence. However, the methodology should also be reviewed and approved by the NRC. Discuss your plans for submitting to the NRC your methodology used to calculate fluence.

ANSWER:

The methodology to calculate the fluence will be provided as a technical report. This report will contain the standard methodology that is applied to calculate the fluence values provided in the DCD. This report will be submitted as part of the US-APWR Design Certification, for review and approval by the NRC. The scheduled submittal date of the technical report to the NRC is July 31, 2009.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/23/2009

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

RAI NO .:

NO. 284-2214 REVISION 1

SRP SECTION:

05.03.01 - REACTOR VESSEL MATERIALS

APPLICATION SECTION:

05.03.01

DATE OF RAI ISSUE:

3/24/2009

QUESTION NO.: 05.03.01-2

Table 5.3-1 limits copper, nickel, phosphorous, and vanadium content for weld and base material being used in the beltline region of the reactor vessel. But Regulatory Guide 1.99 recommends that sulfur content also be controlled to low levels, and base material specifications such as ASME (ASTM) SA-508 (A508) and SA-533 (A533) have supplementary requirements that recommend that lower sulfur content limits be imposed on material used in the nuclear reactor beltline or when otherwise agreed upon between the manufacturer and the purchaser.

Describe how controls on sulfur will be imposed on weld and base materials purchased for use in the beltline (i.e. adding sulfur content restrictions to the DCD, or mandating base material specification supplementary requirements such as S9.2 to SA-508).

ANSWER:

For the US-APWR reactor vessel beltline region, the sulfur content of the weld and base material will be controlled to max. 0.005 and 0.01 wt%, respectively.

The above sulfur content requirements will be added to Table 5.3-1 of the US-APWR DCD.

Impact on DCD

The first sentence of the third paragraph of US-APWR DCD Subsection 5.3.1.1 will be revised as follows:

In order to reduce effects of irradiation embrittlement on beltline region ferritic base and weld material during plant operation, copper, nickel, and phosphorus and sulfur content are limited as shown in Table 5.3-1.

Table 5.3-1 of the US-APWR DCD will be revised as follows:

Table 5.3-1 Chemical Composition Requirements for Reactor Vessel Materials

Element	Beltline Region Forging (wt %)	Beltline Region As-Welded Weld Material (wt %)
Copper	0.05 max.	0.08 max.
Nickel	1.00 max.	0.95 max.
Phosphorus	0.005 max.	0.012 max.
Vanadium	0.05 max.	0.05 max.
<u>Sulfur</u>	0.005 max.	0.01 max.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

Enclosure 2

UAP-HF-09203 Docket Number 52-021

Response to Request for Additional Information No. 285-2334 Revision 1

April 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/23/2009

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

RAI NO.:

NO. 285-2334 REVISION 1

SRP SECTION:

05.03.02 - PRESSURE-TEMPERATURE LIMITS, UPPER-

SHELF ENERGY, AND PRESSURIZED THERMAL

SHOCK

APPLICATION SECTION:

05.03.02

DATE OF RAI ISSUE:

3/24/2009

QUESTION NO.: 05.03.02-1

Based on the US-APWR Design Center Working Group (DCWG) meeting on March 9, 2009 between Mitsubishi Heavy Industries (MHI), Luminant Power and NRC staff, it is our understanding that MHI plans to submit either a generic pressure-temperature (P-T) limits curve or a pressure and temperature limits report (PTLR) using the bounding material properties and projected fluence as part of Design Certification. Therefore, the NRC staff requests the following additional information:

- Confirm your decision to submit P-T limits or a PTLR (following NRC Generic Letter 96-03)
- · Provide an estimated time of submission based on your decision (P-T limits curve or PTLR)
- Provide the detailed methodologies, assumptions, etc. used in the development of P-T limits curve or PTLR
- · Revise the FSAR including all related COL Action Items, accordingly

NOTE: If the applicant (MHI) chooses to submit P-T limit curves based on generic, bounding values, then submittal of fluence calculations at the design certification stage in not necessary, but a new COL item should be included in the DCD for the COL applicant to provide fluence calculations based on final fuel design and material properties. However, if the applicant (MHI) chooses too submit a PTLR, then the applicant will need to submit fluence calculations during the design certification stage.

ANSWER:

MHI will submit a generic pressure and temperature limits report (PTLR) using the bounding material properties and projected fluence as part of US-APWR Design Certification.

The PTLR will be submitted as a technical report and the scheduled submittal date to the NRC is June 1, 2009.

The detailed methodology, assumptions, etc. to develop the PTLR are discussed in the US-APWR DCD Subsection 5.3.2.1. This subsection will be referenced in the PTLR as necessary, and additional information, as required, will be included in the PTLR.

Based on the discussions at the US-APWR Design Center Working Group (DCWG) meeting on March 9, 2009 between the NRC staff, Luminant Power and MHI, all COLA referencing the US-APWR DCD will be revised so that the COL applicant confirms the use of the generic US-APWR PTLR that is approved by the NRC.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

In order to address COL 5.3(1) shown in the US-APWR DCD Subsection 5.3.4, the following will be added to or replace existing statements in COL 5.3(1) of all COLA referencing the US-APWR DCD:

The generic pressure and temperature limits reports (PTLR) for the US-APWR reactor vessel will be applied for [state applicable site name(s)].

Impact on PRA

There is no impact on the PRA.