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TOKYO, JAPAN

April 1, 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-09142

Subject: MHI's Responses to US-APWR DCD RAI 250-2143 Revision 1

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION 250-2143 REVISION 1, SRP Section: 10.03.06 - Steam and Feedwater System Materials, Application Section: 10.3.6, dated March 2, 2009.

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 250-2143 Revision 1."

Enclosed are the responses to 7 RAIs 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. Responses to Request for Additional Information 250-2143 Revision 1

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

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Docket No. 52-021
MHI Ref: UAP-HF-09142

Enclosure 1

UAP-HF-09142
Docket No. 52-021

Responses to Request for Additional Information No. 250-2143
Revision 1

April 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-1

DCD Tier 2, Tables 10.3.2-3 and 10.3.2-4, list material specifications and grades for ASME Code Classes 2 and 3 and non-Code MSS and CFS piping. The applicant did not, however, include material specifications and grades for components such as valves and fittings. In addition, the applicant did not list weld-filler material specifications and classifications. In order for the staff to determine that MSS and CFS materials meet the requirements of GDC 1 and 10 CFR 50.55a, the staff requests the following:

1. Modify Tables 10.3.2-3 and 10.3.2-4 to include materials specifications and grades for components such as valves and fittings used in the ASME Code Class 2 and 3 portions of the MSS and CFS. In addition, identify which components in the Tables are ASME Code Class 2 and 3 and non-Code.

2. Modify Tables 10.3.2-3 and 10.3.2-4 to include weld-filler material specifications and classifications that will be used in the ASME Code Class 2 and 3 portions of the MSS and CFS.

ANSWER:

DCD Tables 10.3.2-3 and 10.3.2-4 will be revised as requested.

Impact on DCD

DCD Tables 10.3.2-3 and 10.3.2-4 will be revised as shown below, and a new Table 10.3.2-5 that identifies the weld-filler materials will be added.

Table 10.3.2-3 Main Steam and Feedwater Piping Design Data

Main Steam Piping

Segment	Material specification	Nominal OD	ASME Class
SG outlet to containment penetration	SA-333, Grade 6 (Seamless)	32 inch	Section III, Class 2
Containment penetration to MSIV	SA-333, Grade 6 (Seamless)	32 inch	Section III, Class 2
MSIV to main steam/feedwater piping area wall	SA-333, Grade 6 (Seamless)	32 inch	Section III, Class 3
Fittings	SA-181, Gr. 70 or SA-333, Grade 6 (Seamless)	32 inch	Note: Material Spec. for fittings, flanges and valves is same between ASME Section III Class 2 and 3.
Flanges	SA-508 Class 1, Class 900		
Valves (Globe, Gate, Check)	SA-352, Grade LCB		
Main steam/feedwater piping area wall to equalization piping	ASTM A-672 Grade~~.~~ B60	32 inch	B31.1
Equalization piping	ASTM A-672 Grade~~.~~ B60	28 inch & 42 inch	
Lines to TSV	ASTM A-672 Grade~~.~~ B60	32~~-28~~ inch & 30 inch	
Fittings	ASTM A-105, A-672 Grade B60	28 inch, 32 inch, 42 inch	
Flanges	ASTM A-105		
Valves (Globe, Gate, Check)	ASTM A-181 Grade 70 or ASTM A-216 Grade WCB, Class 900		

Feedwater Piping

Segment	Material specification	Nominal OD	ASME Class
Feedwater pump outlet to feedwater pump discharge equalization piping	ASTM A-672 Grade~~.~~ B60	22 inch	B31.1
Feedwater pump discharge equalization piping	ASTM A-672 Grade~~.~~ B60	36 inch	
Feedwater pump discharge equalization piping to feedwater heaters 6/7	ASTM A-672 Grade~~.~~ B60	26 inch	
Feedwater heaters 6/7 outlet to feedwater heater 7 discharge equalization piping	ASTM A-672 Grade~~.~~ B60	26 inch	
Feedwater heater 7 discharge equalization piping	ASTM A-672 Grade~~.~~ B60	36 inch	
Fittings	ASTM A-105	22 inch, 26 inch & 36 inch	
Flanges	ASTM A-105		
Valves (Globe, Gate, Check)	ASTM A-181 Grade 70, or ASTM A-216 Grade WCB, Class 900		
Feedwater heater 7 discharge ~~E~~equalization piping to ~~MFIV~~main/steam feedwater piping area wall	~~SA-335,~~ Grade P22	18 inch	B31.1
Fittings	A-182 Grade F22, A-336 Grade F22 or A-335 Grade P22	18 inch	
Flanges	A-182 Grade F22	18 inch	
Valves (Globe, Gate, Check)	SA-182 or SA-217, Grade WC9		
Main/steam feedwater piping area wall to MFIV	SA-335 Grade P22 (Seamless)	18 inch	Section III, Class 3
MFIV to SG	SA-335~~,~~ Grade P22 (Seamless)	16 inch	Section III, Class 2
Fittings	SA-182 Grade F22 or SA-336 Grade F22 or SA-335 Grade P22	16 inch & 18 inch	Note: Material Spec. for fittings, flanges and valves is same between ASME Section III Class 2 and 3.
Flanges	SA-182 Grade F22		
Valves (Globe, Gate, Check)	SA-182 or SA-217 Grade WC9		

Table 10.3.2-4 Main Steam Branch Piping Design Data (2.5-INCH AND LARGER)

Segment	Material specification	Nominal OD	ASME Class
Main steam piping to MSRV/MSDV	SA-~~106~~333, Grade. ~~B~~6 (Seamless)	6 inch	Section III, Class 2
MSRV/MSDV discharge piping to main steam/feedwater piping area wall	~~ASTM~~ SA-106 Grade. A ~~(Welded)~~	6 inch & 12 inch	Section III, Class 3
Main steam piping to MSSV	SA-333 Grade. 6 (Seamless)	6 inch	Section III, Class 2
MSSV discharge piping to main steam/feedwater piping area wall	~~ASTM~~ SA-106 Grade. A (Welded)	12 inch 16 inch	Section III, Class 3
Main steam piping to turbine-driven EFW pump turbine steam isolation valve	SA-~~106~~333, Grade. ~~B~~6 (Seamless)	6 inch	Section III, Class 2
EFW pump turbine steam isolation valve to turbine-driven EFW pump steam turbine	SA-333, Grade 6 (Seamless)	6 inch	Section III, Class 3
Fittings	SA-105 or SA-333 Grade 6	6 inch 12 inch 16 inch	Note: Material Spec. for fittings, flanges and valves is same between ASME Section III Class 2 and 3.
Flanges	SA-105		
Valves (Globe, Gate, Check)	SA-216 Grade WCB, Class 900 or SA-181 Grade 70		
MSRV/MSDV discharge piping outside main steam/feedwater piping area	A-106 Grade A	12 inch	B31.1
MSSV discharge piping outside main steam/ feedwater piping area	A-106 Grade A	16 inch	
Fittings	ASTM A-105 or A 106 Grade A	12 inch 16 inch	
Flanges	ASTM A-105 (or equal), Class 150		
Valves (Globe, Gate, Check)	ASTM A-105, ASTM A-216, Grade WCB (or equal), Class 150		
Reheating steam to moisture separator reheater	ASTM A-387 Grade 22	46 inch	B31.1
Fittings	ASTM A-387 Grade 22		
Flanges	ASTM A-182 F22		
Valves (Globe, Gate, Check)	ASTM A-182 F22 or ASTM A-217 Grade WC9, Class 900		
Moisture separator reheater steam to LP turbine	ASTM A-672 Grade. C60	46 inch	B31.1
Fittings	ASTM A-105		
Flanges	ASTM A-181 Grade 70 or A-216 Grade WCB, Class 900		
Valves (Globe, Gate, Check)	ASTM A-216 Grade WCB, Class 900		

Table 10.3.2-5 ASME Material Specifications with Filler Metal Specifications and Classification

ASME Material Specification	Mat'l P #	Mat'l Group #	Tensile Strength (ksi)	Filler Metal (Note 1, 6, 7, 8)			
				GTAW (Note 2)		SMAW (Note 3)	
				Specification	Classification	Specification	Classification
A-333 Grade 6	1	1	60	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-672 Grade B60	1	1	60	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-335 Grade P22	5A	1	60	AWS A5.28	ER90S-B3	AWS A5.5	E901X-B3
SA-182 F22	5A	1	Note 4	AWS A5.28	ER90S-B3	AWS A5.5	E901X-B3
SA-217 Grade WC9	5A	1	70	AWS A5.28	ER90S-B3	AWS A5.5	E901X-B3
SA-508 Grade 1	1	2	70	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-352 Grade LCB	1	1	65	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-106 Grade B	1	1	60	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-106 Grade A	1	1	48	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-387 Grade 22	5A	1	Note 5	AWS A5.28	ER90S-B3	AWS A5.5	E901X-B3
SA-672 Grade C60	1	1	60	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-181 Grade 70	1	2	70	AWS A5.18	ER70S-X	AWS A5.1	E701X
SA-105	1	2	70	AWS A5.18	ER70S-X	AWS A5.1	E701X

Notes:

1. Filler metal specifications and classifications were given for GTAW and SMAW only (the most likely welding processes). Filler metal information can be provided for other welding processes if required.
2. GTAW – Gas Tungsten Arc Welding process (Tig)
3. SMAW – Shielded Metal Arc Welding process (Stick)
4. Class 1 has a tensile strength of 60 ksi and Class 3 has a tensile strength of 75 ksi.
5. Class 1 has a tensile strength of 60 ksi and Class 2 has a tensile strength of 75 ksi.
6. In some cases filler metal classifications contain an "X" in the classification number. The welding procedure specification would need to be consulted to determine the complete classification number before ordering filler metal.
7. ASTM and ASME material specifications both recognize the AWS filler metal specifications. However, ASME has adopted SFA as their own prefix for the AWS specification (i.e. AWS A5.18 becomes SFA-5.18).
8. The filler metal specifications and classifications shown assume that the base metal is being joined to itself.

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

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-2

FSAR Tier 2, Section 10.3.6.2 states that the welding of low-alloy steel is implemented at preheat temperatures specified in Regulatory Guide 1.50, "Control of Preheat Temperature for Welding of Low-Alloy Steel." The applicant further states that the preheat temperatures for carbon steel materials conform with Section III, Appendix D, Article D-1000, of the ASME Code. FSAR Table 1.9.1-1 does not reference FSAR Section 10.3.6.2 in the line item for RG 1.50.

The staff notes that RG 1.50 does not provide specified minimum preheat temperatures but provides guidance on preheat control. In order to provide clarity, the staff requests that the applicant modify FSAR Section 10.3.6.2 and Table 1.9.1-1 to clarify that welding of low-alloy materials will conform to the guidance provided in RG 1.50 for the MSS and CFS. If the applicant does not intend to conform to the guidance in RG 1.50 for the MSS and CFS in its entirety, the applicant should provide its alternative including a basis for its alternative. In addition, the applicant should state, in Section 10.3.6.2, that the minimum preheat temperatures for carbon-steel and low-alloy-steel materials conforms to the recommendations in ASME Code, Section III, Appendix D, Article D-1000.

ANSWER:

The descriptions and information in DCD 10.3.6.2 and Table 1.9.1-1 will be revised to incorporate the staff requests and comments.

Impact on DCD

DCD 10.3.6.2 Material Selection and Fabrication, a new bullet will be added and new language will added in the fourth bullet as shown below, note the bullets presented in response to this question also show changes that will come from another question later 10.03.06-4 and 10.03.06-5:

The material selection and fabrication methods used for Class 2 and 3 components conform to the following:

- In designing US-APWR, the material used for the piping and components of the CFS and the MSS conform with Appendix I to Section III (Reference 10.3-12), Parts A (Reference

10.3-13), Parts B (Reference 10.3-14), and Parts C (Reference 10.3-15) of Section II of the ASME Code Regulatory Guide 1.84 (Reference 10.3-16).

- ~~Austenitic stainless steel components conform with Regulatory Guide 1.36, "Nonmetallic Thermal Insulation for Austenitic Stainless Steel" (Reference 10.3-17), and Regulatory Guide 1.44, "Control of the Use of Sensitized Stainless Steel" (Reference 10.3-18).~~

- Cleaning and handling of Class 2 and Class 3 components of the MSS and CFS are conducted in accordance with the acceptable procedures described in RG 1.37.

- The welding of low-alloy materials conform to the guidance provided~~steel is implemented at preheat temperatures specified~~ in Regulatory Guide 1.50, "Control of Preheat Temperature for Welding of Low-Alloy Steel" (Reference 10.3-19) for the MSS and the CFS. ~~Controls in the welding procedures are stated with respect to carbon or low-alloy steel components.~~ The minimum preheat temperatures for carbon steel and low alloy materials conform to the recommendations in ASME~~with~~ Section III, Appendix D, Article D-1000~~, of the ASME Code~~ (Reference 10.3-6).

- As for welds in areas of limited accessibility, the qualification procedure is specified in conformances with the guidance of Regulatory Guide 1.71 (Reference 10.3-20) (i.e., assurance of the integrity of welds in locations of restricted direct physical and visual accessibility) and as described with respect to all applicable components.

- The nondestructive examination procedures and acceptance criteria used for the examination of tubular products conform to the provisions of the ASME Code, Section III, Paragraphs NC/ND-2550 through 2570 (Reference 10.3-6). Refer to Section 6.6 for details on equipment class 2 and 3 components.

- ~~Cast austenitic stainless steel materials are inspected by volumetric methods.~~

Table 1.9.1-1, US-APWR Conformance with Division 1 Regulatory Guides (sheet 4 of 15), the item regarding Regulatory Guide Number 1.50 will be revised as shown below:

1.50	Control of Preheat Temperature for Welding of Low-Alloy Steel (Rev. 0, May 1973)	Conformance with no exceptions identified.	5.3.1.2, 5.3.1.4, 10.3.6.2

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

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-3

The guidelines listed in RG 1.71 ensure the integrity of welds in locations of restricted direct physical and visual accessibility. The applicant states in FSAR Section 10.3.6.2 that for welds made in areas of limited accessibility, the qualification procedure is specified in conformance with the guidance of Regulatory Guide 1.71. Although the staff finds this acceptable, the staff notes that FSAR Table 1.9.1-1 under the line item for RG 1.71 does not reference FSAR Section 10.3.6.2 as a corresponding subsection where RG 1.71 is applicable. The staff requests that the applicant modify Table 1.9.1-1, accordingly.

ANSWER:

DCD Table 1.9.1-1 under the line item for RG 1.71 will be revised to refer to DCD Section 10.3.6.2 as a corresponding subsection where RG 1.71 is applicable.

Impact on DCD

DCD Table 1.9.1-1 US-APWR Conformance with Division 1 Regulatory Guides (sheet 5 of 15), item regarding Reg Guide Number 1.71 will be revised as shown below:

1.71	Welder Qualification for Areas of Limited Accessibility (Rev. 1, March 2007)	Conformance with no exceptions identified.	5.2.3.3.2, 5.2.3.4.4 5.3.1.4, 10.3.6.2

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

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: **NO. 250-2143 REVISION 1**

SRP SECTION: **10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS**

APPLICATION SECTION: **10.3.6**

DATE OF RAI ISSUE: **3/2/2009**

QUESTION NO.: 10.03.06-4

RG 1.37 provides procedures acceptable to the staff for cleaning and handling Class 2 and 3 components in the MSS and the CFS. FSAR Section 10.3.6 does not reference RG 1.37. In addition, Table 1.9.1-1 under the line item for RG 1.37 does not reference FSAR Section 10.3.6. The staff requests that the applicant modify the FSAR to reference RG 1.37 or provide an alternative.

ANSWER:

The description and reference regarding RG 1.37, which provides procedures acceptable to the staff for cleaning and handling Class 2 and 3 components in the MSS and the CFS will be added to DCD Section 10.3.6.
Table 1.9.1-1 will be revised as requested.

Impact on DCD

DCD 10.3.6.2 Material Selection and Fabrication, have a new bullet will be added as shown below:

The material selection and fabrication methods used for Class 2 and 3 components conform to the following:

- In designing US-APWR, the material used for the piping and components of the CFS and the MSS conform with Appendix I to Section III (Reference 10.3-12), Parts A (Reference 10.3-13), Parts B (Reference 10.3-14), and Parts C (Reference 10.3-15) of Section II of the ASME Code Regulatory Guide 1.84 (Reference 10.3-16).

- ~~Austenitic stainless steel components conform with Regulatory Guide 1.36, "Nonmetallic Thermal Insulation for Austenitic Stainless Steel" (Reference 10.3-17), and Regulatory Guide 1.44, "Control of the Use of Sensitized Stainless Steel" (Reference 10.3-18).~~

- Cleaning and handling of Class 2 and Class 3 components of the MSS and CFS are conducted in accordance with the acceptable procedures described in RG 1.37.

- The welding of low-alloy materials conform to the guidance provided~~steel is implemented at preheat temperatures specified~~ in Regulatory Guide 1.50, "Control of Preheat Temperature for Welding of Low-Alloy Steel" (Reference 10.3-19) for the MSS and the CFS. ~~Controls in the welding procedures are stated with respect to carbon or low-alloy steel components.~~ The minimum preheat temperatures for carbon steel and low alloy materials conform to the recommendations in ASME~~with~~ Section III, Appendix D, Article D-1000~~, of the ASME Code~~ (Reference 10.3-6).

- As for welds in areas of limited accessibility, the qualification procedure is specified in conformances with the guidance of Regulatory Guide 1.71 (Reference 10.3-20) (i.e., assurance of the integrity of welds in locations of restricted direct physical and visual accessibility) and as described with respect to all applicable components.

- The nondestructive examination procedures and acceptance criteria used for the examination of tubular products conform to the provisions of the ASME Code, Section III, Paragraphs NC/ND-2550 through 2570 (Reference 10.3-6). Refer to Section 6.6 for details on equipment class 2 and 3 components.

- ~~Cast austenitic stainless steel materials are inspected by volumetric methods.~~

Table 1.9.1-1, US-APWR Conformance with Division 1 Regulatory Guides (sheet 4 of 15), line item regarding Regulatory Guide Number 1.37 will be revised as shown below:

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, 10.3.6.2

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

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-5

FSAR Section 10.3.6.2 states that austenitic stainless steels conform with RG 1.36 and 1.44; but, the staff was unable to locate any stainless steel specifications in Table 10.3.2-3 or Table 10.3.2-4. The staff requests that the applicant explain this inconsistency.

ANSWER:

Steam and Feedwater system of the US-APWR has no stainless steels so the description will be revised. The bullet regarding stainless steels was written as an option.

Impact on DCD

DCD 10.3.6.2 Material Selection and Fabrication, 5th paragraph, 2nd and last bullets will be deleted as shown below:

The material selection and fabrication methods used for Class 2 and 3 components conform to the following:

- In designing US-APWR, the material used for the piping and components of the CFS and the MSS conform with Appendix I to Section III (Reference 10.3-12), Parts A (Reference 10.3-13), Parts B (Reference 10.3-14), and Parts C (Reference 10.3-15) of Section II of the ASME Code Regulatory Guide 1.84 (Reference 10.3-16).

~~• Austenitic stainless steel components conform with Regulatory Guide 1.36, "Nonmetallic Thermal Insulation for Austenitic Stainless Steel" (Reference 10.3-17), and Regulatory Guide 1.44, "Control of the Use of Sensitized Stainless Steel" (Reference 10.3-18).~~

- Cleaning and handling of Class 2 and Class 3 components of the MSS and CFS are conducted in accordance with the acceptable procedures described in RG 1.37.

- The welding of low-alloy materials conform to the guidance provided~~steel is implemented at preheat temperatures specified~~ in Regulatory Guide 1.50, "Control of Preheat Temperature for Welding of Low-Alloy Steel" (Reference 10.3-19) for the MSS and the CFS. ~~Controls in the welding procedures are stated with respect to carbon or low-alloy steel components.~~ The minimum preheat temperatures for carbon steel and low alloy materials conform to the recommendations in ASME~~with~~ Section III, Appendix D, Article D-1000~~, of the ASME Code~~ (Reference 10.3-6).

- As for welds in areas of limited accessibility, the qualification procedure is specified in conformances with the guidance of Regulatory Guide 1.71 (Reference 10.3-20) (i.e., assurance of the integrity of welds in locations of restricted direct physical and visual accessibility) and as described with respect to all applicable components.

- The nondestructive examination procedures and acceptance criteria used for the examination of tubular products conform to the provisions of the ASME Code, Section III, Paragraphs NC/ND-2550 through 2570 (Reference 10.3-6). Refer to Section 6.6 for details on equipment class 2 and 3 components.

~~• Cast austenitic stainless steel materials are inspected by volumetric methods.~~

From the references in DCD 10.3.8 References, Reference 10.3-17 will be deleted as shown below.

10.3-17 Deleted ~~NONMETALLIC THERMAL INSULATION FOR AUSTENITIC STAINLESS STEEL, Regulatory Guide 1.36.~~

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

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-6

COL Information Item 10.3(1) states, "The Combined License Applicant is to address preparation of a FAC monitoring program for carbon steel portions of the steam and power conversion systems that contain water or wet steam." The applicant's COL Information Item is not clear as to what is to be provided by the applicant or a timetable for the implementation of the FAC program. For example, the COL Information Item should be clear that the COL applicant will provide a description of its FAC program and a schedule for its implementation. In addition, it should be clear that the FAC program will be consistent with Generic Letter 89-08 and an industry program guidance document such as NSAC-202L-R3. The staff requests that the applicant modify COL 10.3(1) and Table 1.8-2, accordingly.

ANSWER:

The interface between the DCD COL Item and the COL Applicant's FSAR close-out of the item needs to be cleaner and provide continuity. By appropriately expanding the statement of the DCD COL Item slightly the COL Applicant's FSAR can be more specifically closed-out.

Impact on DCD

DCD Section 10.3.7 COL Item 10.3(1) will be revised as shown below:

COL 10.3(1) *FAC monitoring program*
The Combined License Applicant ~~is to address preparation~~ will provide a description of a the FAC monitoring program for carbon steel portions of the steam and power conversion systems that contain water or wet steam. The description will be address consistency with Generic Letter 89-08 and NSAC-202L-R3 and will provide a milestone schedule for implementation of the program.

DCD Table 1.8.2 Compilation of All Combined License Applicant Items for Chapters 1-19 (sheet 29 of 44) will be revised as shown below.

COL ITEM NO.	COL ITEM
COL 9.5(9)	*The COL Applicant addresses the emergency communication system requirements delineate in 10 CFR 73.55(f) such that a single act cannot remove onsite capability of calling for assistance and also as redundant system during onsite emergency crisis.*
COL 9.5(10)	*Deleted*
COL 10.2(1)	*Inservice Inspection* *The Combined License Applicant is to develop turbine maintenance and inspection procedure and then to implement prior to fuel load. Plant startup procedure including warm-up time will be completed therein.*
COL 10.3(1)	*FAC monitoring program; The Combined License Applicant ~~is to address preparation~~ will provide a description of a the FAC monitoring program for carbon steel portions of the steam and power conversion systems that contain water or wet steam. The description will be address consistency with Generic Letter 89-08 and NSAC-202L-R3 and will provide a milestone schedule for implementation of the program.*
COL 10.3(2)	*Safety and relief valve information; The Combined License Applicant is to address the actual throat area of the MSSV.*
COL 10.4(1)	*Circulating Water System; The Combined License Applicant is to determine the site specific final system configuration and system design parameters for the CWS including makeup water and blowdown.*
COL 10.4(2)	*Steam Generator Blowdown System; The Combined License applicant is to address the discharge to Waste Water System including site specific requirements.*
COL 10.4(3)	*Deleted*
COL 10.4(4)	*Deleted*
COL 10.4(5)	*System Design for Steam Generator Drain; The Combined License applicant is to address the nitrogen or equivalent system design for Steam Generator Drain Mode. (This is dependent on Waste water system design)*

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 250-2143 REVISION 1

SRP SECTION: 10.03.06 STEAM AND FEEDWATER SYSTEM MATERIALS

APPLICATION SECTION: 10.3.6

DATE OF RAI ISSUE: 3/2/2009

QUESTION NO.: 10.03.06-7

In order for the staff to determine that the applicant has designed the MSS and CFS to mitigate the effects of FAC and other flow induced degradation mechanisms, the staff requests that the applicant modify the FSAR to include a detailed discussion regarding the US-APWR design to mitigate FAC and other flow-induced degradation mechanisms. The applicant should address flow rates, fluid temperatures (including flash points), pressure, and other contributing factors that are taken into consideration in order to establish the design life of safety-related systems susceptible to FAC or other flow-induced degradation mechanisms. The staff requests that the applicant's response encompass all ASME Code Class 2 and 3 systems as well as high-energy, non-safety systems that could adversely impact safety-related systems susceptible to FAC and other flow-induced degradation mechanisms. In addition, the staff requests that the applicant identify the computer program (e.g., CHECKWORKS) utilized to design systems in order to minimize the effects of FAC for the design life of the plant.

ANSWER:

All the safety systems are contained in safety buildings such as containment or reactor building and there are no non-safety systems in the safety buildings, therefore, non-safety systems susceptible to FAC and the other degradation mechanisms do not impact safety-related system. The flow rates, fluid temperatures, pressure of ASME Code Class 2 and 3 piping for steam and feedwater system are shown below. In the steam generator blowdown piping, the fluid water will be flashed at the downstream of angle valves; however, the fluid keeps single-phase in the ASME Class 2 or 3 regions in the reactor building.

The computer program like CHECWORKS or equivalent utilized to design systems in order to minimize the effect of FAC depends on the COL applicant. Therefore, the request to identify the computer program is not incorporated.

Segment	Fluid	Flow rate	Temperature	Pressure
Main steam piping (32 inch piping, ASME Class 2 or 3)	Steam (Two-phase with 0.1 % moisture)	5,050,000 lb/hr	541.2 degF	972 psia
Feedwater piping (18 inch or 16 inch piping, ASME Class 2 or 3)	Water (Single-phase)	5,050,000 lb/hr	456.7 degF	972 psia
Steam generator blowdown piping (4 inch or 3 inch piping, ASME Class 2 or 3)	Water (Single-phase)	50,500 lb/hr	456.7 degF	972 psia

Impact on DCD

The sentence will be added after 3rd paragraph of DCD 10.3.6.3 Flow-Accelerated Corrosion (FAC) as shown below:

The type of fluid, flow rates, fluid temperatures and pressure of ASME Code Class 2 and 3 piping for steam and feedwater system are shown in Table 10.3.2-6.

New table 10.3.2-6 showing the flow rates, fluid temperatures, pressure of ASME Code Class 2 and 3 piping for steam and feedwater system will be added as shown below:

Table 10.3.2-6 Main Steam and Feedwater Piping Fluid Data

Segment	Fluid	Flow rate	Temperature	Pressure
Main steam piping (32 inch piping, ASME Class 2 or 3)	Steam (Two-phase with 0.1 % moisture)	5,050,000 lb/hr	541.2 degF	972 psia
Feedwater piping (18 inch or 16 inch piping, ASME Class 2 or 3)	Water (Single-phase)	5,050,000 lb/hr	456.7 degF	972 psia
Steam generator blowdown piping (4 inch or 3 inch piping, ASME Class 2 or 3)	Water (Single-phase)	50,500 lb/hr	456.7 degF	972 psia

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.