


MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

July 17, 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-09382

Subject: MHI's Second Responses to US-APWR DCD RAI No. 354-2585 Rev 0

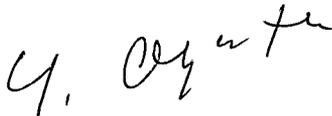
Reference: [1] "Request for Additional Information No. 354-2585 Revision 0, SRP Section: 06.02.02 – Containment Heat Removal System - Design Certification and New License Applicants, Application Section: 6.2.2 and 6.3," dated May 7, 2009.
[2] Letter from Yoshiki Ogata, MHI, to NRC dated July 7, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09365; Subject: MHI's Responses to US-APWR DCD RAI No. 354-2585 Rev 0.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document as listed in Enclosure.

Enclosed is the second response to the RAI contained within Reference [1]. In the initial responses submitted with Reference [2], MHI committed to submit response to Question 06.02.02-44 by 17th of July 2009.

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,



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

DOS/ NRC

Enclosure:

1. Second Response to Request for Additional Information No. 354-2585 Revision 0

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

Contact Information

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Docket No. 52-021
MHI Ref: UAP-HF-09382

Enclosure 1

UAP-HF-09382
Docket No. 52-021

Second Response to Request for Additional Information
No. 354-2585 Revision 0

July 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

07/17/2009

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

RAI NO.: NO. 354-2585 REVISION 0
SRP SECTION: 06.02.02 – Containment Heat Removal System
APPLICATION SECTION: 6.2.2 & 6.3
DATE OF RAI ISSUE: 05/07/2009

QUESTION NO.: 06.02.02-44

As part of its review of the US-APWR design aspects that address GSI-191, the staff reviewed the applicant's sump strainer performance to the applicable regulatory criteria 10CFR52.47 "Contents of Applications; technical information" using the guidance of RG 1.206 Combined License Applications for Nuclear Power Plants. RG 1.206 outlines information to be submitted with design certification applications that will facilitate review by the NRC staff. The following information items, outlined in Section C.I.6.2.2 Containment Heat Removal Systems, as it relates to sumps, were not provided in the US-APWR DC application and form the basis for this request for additional information:

- 1) Discuss [in the DCD FSAR] the types of insulation used inside the containment and identify where and in what quantities each type is used. As part of the DCD FSAR discussion, identify the design basis debris source term used for the strainer performance analysis to include LOCA generated and Latent debris types and quantities.
- 2) Describe the methods used to attach the insulation to piping and components.

ANSWER:

MHI agrees that US-APWR DCD does not discuss the types of insulation used inside the containment and identify where and in what quantities each type is used or identify the design basis debris source term used for the strainer performance analysis to include LOCA generated and Latent debris types and quantities. This information is provided in MUAP-08001, September 2008" which is included the DCD by Reference (6.2-34). The Reference 6.2-34 documents have been revised and reference 6.2-34 will be revised to indicate the current revision and date for these documents. MHI will also revise the DCD Tier-2 Section 6.2.2.3 "Design Evaluation" to include the detailed discussion regarding the types of insulation used inside the containment and will identify where and in what quantities each type is used. This discussion will identify the design basis debris source term used for the strainer performance analysis to include LOCA generated and Latent debris types and quantities.

MHI will also revise the DCD Tier-2 Section 6.2.2.3 to describe the methods used to attach the insulation to piping and components.

Followings are the information not provided in MUAP-08001 for type, application and quantity of insulation applied in the containment, and the methods used to attach the insulation to piping and components:

1) Type, application and quantity of insulation

The primal insulation used in the containment is reflective metallic insulation (RMI). Fibrous (blanket) insulation is locally applied for gap filling or other portions which are not suitable to apply RMI. Pre-formed, buoyant type insulation is used as anti-sweat insulation chiller piping. NEI GR discusses that the buoyant insulation is not considered a problem for fully submerged strainer plant, and therefore it is excluded from debris source. Refer the response to Question 06.02.02-26 for discussion of fully submergence of the US-APWR strainer.

The type, application and quantity of insulation in the containment are listed as follow:

Table-1 Insulation used in the containment

Type	Application	Quantity(ft3) (Rounded)
RMI	Reactor Vessel	800
	Steam Generator (A)	1,150
	Steam Generator (B)	1,150
	Steam Generator (C)	1,150
	Steam Generator (D)	1,150
	Reactor Coolant Pump (A)	90
	Reactor Coolant Pump (B)	90
	Reactor Coolant Pump (C)	90
	Reactor Coolant Pump (D)	90
	Main Coolant Pipe (A)	300
	Main Coolant Pipe (B)	300
	Main Coolant Pipe (C)	300
	Main Coolant Pipe (D)	300
	Pressurizer	600
	Regenerative heat exchanger	150
	Letdown heat exchanger	20
	Excess letdown heat exchanger	20
	RCS piping and valves	950
	CVS piping and valves	400
	SIS piping and valves	150
	RHS piping and valves	900
	NFS piping and valves	650
	NMS piping and valves	1,500
	SGS piping and valves	300
	RWS piping and valves	80
	Total	12,680
Fibrous	Steam Generator (A)	20
	Steam Generator (B)	20
	Steam Generator (C)	20
	Steam Generator (D)	20
	Pressurizer	20

	RCS piping and valves	150
	CVS piping and valves	60
	SIS piping and valves	10
	RHS piping and valves	50
	NFS piping and valves	40
	NMS piping and valves	100
	SGS piping and valves	20
	RWS piping and valves	10
	<u>Total</u>	<u>540</u>
Anti-sweat	Letdown heat exchanger	30
	Excess letdown heat exchanger	10
	NCS piping and valves	650
	VWS piping and valves	850
	<u>Total</u>	<u>1,540</u>

2) Methods used for attachment the insulation

As described above in part 1), reflective metal insulation is used to the maximum extent practical for piping and component insulation, while fibrous insulation is minimized. Pre-formed, buoyant type insulation is used for component cooling water pipes and chiller water pipes as anti-sweat insulation. Methods used to attach different types of insulation are as follows:

- Reflective Metal Insulation (RMI):

Insulation shall form a system comprised of pre-fabricated units - modules or panels - engineered as integrated assemblies to fit the surface to be insulated and to fit easily against piping and equipment.

Insulation shall be supported on surfaces being insulated, or from existing lugs or brackets. No welding is allowed to attach insulation to insulating surface except welding of insulation supporting steel, either to itself or to equipment supports.

Metal jackets shall be provided with quick-release latches, closure handles and positive-lock type latches as required per the design of the specific insulation systems.

- Fiber Insulation:

Insulation forms a system comprised of pre-fabricated units - blankets, modules or panels – engineered as integrated assemblies to fit surface to be insulated and to fit easily against piping and equipment.

All portions of the insulation shall be designed to allow easy installation, removal, and replacement without the use of any tools.

Insulation blankets are held in place with hook and loop fasteners. Stainless steel jackets, provided with quick-release latches, may be used to encase fibrous insulation.

- Anti-sweat Insulation:

Insulation forms a system comprised of pre-fabricated units - modules or panels – engineered as integrated assemblies to fit surface to be insulated and to fit easily against piping.

All portions of the insulation shall be designed to allow easy installation, removal, and replacement without the use of any tools.

Insulation will be held in place with sealant or equivalent that depends on specific to procured product.

Impact on DCD

The DCD Tier-2 Section 6.2.2.3 and Reference 6.2-34 will be revised to add the requested information discussed in the above Answer.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There will be no impact on the PRA.