

  
**MITSUBISHI HEAVY INDUSTRIES, LTD.**  
16-5, KONAN 2-CHOME, MINATO-KU  
TOKYO, JAPAN

December 3, 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-09549

**Subject: MHI's Responses to US-APWR DCD RAI No.487-3939 Revision 1**

**Reference:** 1) "REQUEST FOR ADDITIONAL INFORMATION 487-3939 REVISION 1, SRP Section: 06.01.01 – Engineered Safety Features Materials Application Section: 6.1.1, QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)" dated November 9, 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 No.487-3939 Revision 1."

Enclosed are the responses to Questions 06.01.01-11 through 06.01.01-12 that are 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 No.487-3939 Revision 1

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

D081  
NRO

Contact Information

C. Keith Paulson, Senior Technical Manager  
Mitsubishi Nuclear Energy Systems, Inc.  
300 Oxford Drive, Suite 301  
Monroeville, PA 15146  
E-mail: [ck\\_paulson@mnes-us.com](mailto:ck_paulson@mnes-us.com)  
Telephone: (412) 373-6466

Docket No. 52-021  
MHI Ref: UAP-HF-09549

**Enclosure 1**

**UAP-HF-09549  
Docket No. 52-021**

**Responses to Request for Additional Information No.487-3939  
Revision 1**

**December 2009**

---

---

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

---

---

12/3/2009

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

**RAI NO.:** NO. 487-3939 REVISION 1  
**SRP SECTION:** 06.01.01 – ENGINEERED SAFETY FEATURES MATERIALS  
**APPLICATION SECTION:** 6.1.1  
**DATE OF RAI ISSUE:** 11/9/2009

---

**QUESTION NO.: 06.01.01-11**

Background

In the response to RAI 379-2756 question 06.01.01-10, the applicant provided a limit on turbidity of 1 ppm for the RWSP. The EPRI Guidelines do not provide a recommended value for turbidity or total suspended solids in refueling water storage tanks. However, turbidity is typically measured in nephelometric turbidity units (NTU) rather than parts per million. Parts per million (ppm) would generally be an appropriate unit for total suspended solids. The staff believes the applicant intended to apply the limit of 1 ppm to total suspended solids rather than turbidity. The EPRI guidelines allow either turbidity or total suspended solids to be measured for refueling water storage tanks.

Requested Information

Clarify whether the applicant intended to specify measurement of total suspended solids rather than turbidity since the limiting value for turbidity was given in parts per million, which is a unit more appropriate for total suspended solids. If so, the staff requests that applicant modify their proposed Table 6.1-3 accordingly.

---

**ANSWER:**

In Japan, kaolin suspension is standard of turbidity in officially. Unit of turbidity is 1g/L (1000ppm). However, MHI considers that unit of turbidity should be consistent with primary coolant system. Therefore, suspended solid is used for RWSP, and limiting value is 0.35ppm as the same as primary coolant.

**Impact on DCD**

Table 6.1-3 will be revised as follows:

5. Turbidity Suspended Solids ppm  $\leq$  4.0 0.35

**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**

---

---

12/3/2009

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

**RAI NO.:** NO. 487-3939 REVISION 1  
**SRP SECTION:** 06.01.01 – ENGINEERED SAFETY FEATURES MATERIALS  
**APPLICATION SECTION:** 6.1.1  
**DATE OF RAI ISSUE:** 11/9/2009

---

**QUESTION NO.: 06.01.01-12**

Background

Regarding sodium, the EPRI PWR Primary Water Chemistry Guidelines recommend sampling for sodium in the refueling water storage tank if there is a possible mechanism whereby sodium could contaminate the refueling water storage tank. In the response to RAI 379-2756 question 06.01.01-10, the applicant provided the following explanation for the absence of a limiting value for sodium:

“In US-APWR, NaTB is used at letdown line of spray system, therefore ingress of Na dose [sic] not occur. This specification is almost consistent with EPRI Guidelines except Na.”

The staff notes that the NaTB (sodium tetraborate) buffer used for post-accident sump pH control is stored in baskets in containment, and would not have the potential for ingress into the RWSP unless the containment spray system were inadvertently actuated. Therefore, the staff agrees that sodium would not need to be sampled on a regular basis. However, the meaning of the applicant's statement that “NaTB is used at letdown line of spray system is unclear.

Requested Information

1. Clarify the meaning of “letdown line of spray system” included in the explanation for sodium not being subject to routine measurement in the RWSP.
  2. Is there any potential for the sodium from the sodium tetraborate (NaTB) baskets to reach the RWSP during normal operation (in the absence of an inadvertent actuation of the containment spray system)? If so, what corrective actions would be recommended?
- 

**ANSWER:**

1. NaTB baskets are located on the maintenance platform in the containment. During an accident, the containment spray water falls into the NaTB containers, then solution of NaTB flows into the RWSP. Therefore, the meaning of “letdown line of spray” describes that this system is downstream of the containment spray system (CSS). NaTB containers are not connected with any piping except injection pipe to the RWSP and the CSS does not operate during normal operation, so there is no potential for the sodium from the NaTB baskets to reach the RWSP during normal operation. As you indicated, if an inadvertent actuation of the CSS, the NaTB solution may be injected to the RWSP. But an inadvertent actuation of the CSS does not occur very often, so MHI considers that the sodium would not need to be

sampled on a regular basis.

2. As stated the above, there is no potential for the sodium from the NaTB to be injected into the RWSP during normal operation except an inadvertent actuation of the CSS. Should the sodium be in the RWSP, it can be removed by using demineralizers. The water in the RWSP is purified using the refueling water storage system (RWS). The RWS may be cross-connected to one of two SFPCS filter and demineralizer vessels to remove the solid materials and the dissolved impurities for purification.

**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.