**MITSUBISHI HEAVY INDUSTRIES, LTD.**
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**TOKYO, JAPAN**

October 6, 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-10270

**Subject: MHI's Responses to US-APWR DCD RAI 630-5044 Revision 2**

**Reference:** 1) "REQUEST FOR ADDITIONAL INFORMATION 630-5044 REVISION 2, SRP Section: 10.04.06 – Condensate Cleanup System, Application Section: 10.4.6, dated September 7, 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 630-5044 Revision 2."

Enclosed are the responses to a RAI 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 630-5044 Revision 2

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-10270
Docket No. 52-021

Responses to Request for Additional Information No. 630-5044
Revision 2

October 2010

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**10/6/2010**

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

**RAI NO.:** **NO. 630-5044 REVISION 2**

**SRP SECTION:** **10.04.06 CONDENSATE CLEANUP SYSTEM**

**APPLICATION SECTION:** **10.4.6**

**DATE OF RAI ISSUE:** **9/7/2010**

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**QUESTION NO.: 10.04.06-16**

This is a follow-up question related to RAI 3461 and RAI 4368 to clarify apparent discrepancies between information in the DCD and responses to these RAIs. In response to RAI 441-3461, Question 10.04.06-9 the applicant states that it will supply all missing limits. However, the table provided did not contain Action Level 3 values for Na, SO4, and feedwater O2; and Action Level 2 values for condensate O2. Also in that table, the applicant provided Action Level 2 limits for Cl and SO4 that exceed EPRI Guidelines, but these limits are identical to values it has defended. However, the Action Level 3 limit for Cl is nearly an order-of-magnitude higher than the corresponding value in the EPRI Guidelines. The staff requests that the applicant provide an explanation or justification for this discrepancy because, combined with the definition of Action Level 3 proposed by the applicant, this would allow operation with greater than 2000 ppb Cl for up to 24 hours. Consequently, a US-APWR plant could also operate for up to 1 week with chloride between 100-2000 ppm given the definition of Action Level 2 and the proposed Cl action levels. In response to RAI 543-4368, Question 10.04.06-13, the applicant declared that the EPRI Guidelines do not define Action Level 2 and 3 limits for dissolved O2. However, the EPRI guidelines do indeed specify Action Level 2 limits for both (Table 5-4 for feedwater, Table 5-6 for condensate). Please clarify this discrepancy.

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**ANSWER:**

US-APWR secondary water chemistry guideline was based on Mitsubishi experience for new Japanese PWR plant (Tomari Unit 3) which began commercial operation in 2009.
However, Mitsubishi has decided that the COL applicant should establish the appropriate commitments to secondary water chemistry and actions levels, or alternatively provide a commitment to EPRI "PWR Secondary Water Chemistry Guidelines".

**Impact on DCD**

Mitsubishi will revise the DCD as follows, and delete Tables 10.3.5-1, 10.3.5-2, 10.3.5-3, 10.4.6-2.

**10.3.5.5 Action Levels for Abnormal Conditions**
Appropriate responses to abnormal chemistry conditions provide for the long-term integrity of the secondary cycle components. Remedial actions are taken when chemistry parameters are outside normal operating ranges.

~~Secondary side water chemistry guidelines are provided in Table 10.3.5-1.~~ The COL applicant will provide secondary side water chemistry threshold values and recommended operator actions for chemistry excursions, or provide a commitment to the latest version of the EPRI "PWR Secondary Water Chemistry Guidelines" in effect at the time of COLA submittal.

### 10.3.5.6 Lay Up and Heatup

US-APWR anticipates no long-term SG layup under dry conditions. When inspection or maintenance is required on the secondary side, the SGs are drained hot water under a nitrogen atmosphere. After cooling, the nitrogen is purged and inspection/maintenance is performed.

Wet layup conditions are established for corrosion protection during outages. ~~Guidelines for this are given in Table 10.3.5-2.~~

The bulk water in the SGs is generally brought into power operation specifications before heatup to full power. This is done by either draining and refilling or feeding and bleeding.

~~Guidelines for heatup are provided in Table 10.3.5-3.~~

### 10.3.5.7 Chemical Analysis Basis

~~Guidelines for control and diagnostic parameters for chemicals important for corrosion control in feedwater and SGs are listed in Table 10.3.5-1.~~ Each chemical's impact is discussed below:

### 10.4.6.2.1 General Description

The CPS is designed with prefilters to remove corrosion products and with deep bed mixed resin vessels (demineralizers) to remove ionic impurities from the condensate during plant startup, hot standby, shutdown operations, and power operation.

Condensate polishing vessels and prefilters are installed in the 2nd floor of T/B.

The condensate bypass valve is located in the condensate pump discharge header to bypass condensate polishing vessels. The flow rates to condensate polishing vessel are controlled by the condensate bypass valve according to the requirements of the CPS.

The condensate polishing system is shown in Figure 10.4.6-1.

The requirements for the condensate purity of the CPS effluent are determined ~~as shown in Table 10.4.6-2~~ to satisfy secondary side water chemistry guidelines for feedwater as described in Subsection 10.3.5.

**Impact on COLA**

There is no impact on the COLA.

**Impact on PRA**

There is no impact on the PRA.