MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

June 16, 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-09320

Subject: **MHI's Responses to US-APWR DCD RAI No.373-2826 Revision 0**

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION NO. 373-2826 REVISION 1, SRP Section: 14.03.04 – Reactor Systems – Inspections, Tests, Analyses, and Acceptance Criteria Application Section: 14.3.4, QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)" dated May 21, 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.373-2826 Revision 1."

Enclosed is the responses to Questions 14.03.04-36 through 14.03.04-40 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.373 Revision 0

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

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NRO

Contact Information

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Enclosure 1

UAP-HF-09320
Docket No. 52-021

Responses to Request for Additional Information No.373-2826
Revision 0

June 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/16/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 373-2826 REVISION 1**
SRP SECTION:	**14.03.04 – REACTOR SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.3.4**
DATE OF RAI ISSUE:	**5/21/2009**

QUESTION NO.: 14.03.04-36

In Table 2.4.2-5, 10.a.i. Acceptance Criteria, the sum of the relieving capacities of safety valves must exceed $1.728X10^6$ lb/hr. What is the basis for this number and where is it documented?

ANSWER:

As described in DCD Subsection 5.2.2.4, the total capacity of the pressurizer safety valves is determined from the maximum surge rate resulting from complete loss of load with only main steam safety valves actuation. Minimum required capacity per valve is documented in DCD Table 5.2.2-1.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.

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DATE OF RAI ISSUE:	**5/21/2009**

QUESTION NO.: 14.03.04-37

In Table 2.4.2-5, 10.a.ii. Acceptance Criteria, the safety valve set point is less than or equal to 2485 psig or approximately 2500 psia. In the loss of load accident the safety valves are assumed to open at 2515 psia and be fully open by 2575 psia. What is the valve set point uncertainty value? Is the 2500 psia Acceptance Criteria an open or fully open position pressure?

ANSWER:

The requirement for Pressurizer safety valve set point uncertainty value is less than +/- 1%, which complies with ASME Code, Section III, NB 7500 requirements. 2500 psia is acceptance criteria for valve start to open.
For conservatism, Pressurizer safety valve open pressure at loss of load analysis is assumed as 2525 psia. (2515 psia is not correct.)

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

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APPLICATION SECTION:	**14.3.4**
DATE OF RAI ISSUE:	**5/21/2009**

QUESTION NO.: 14.03.04-38

In Table 2.4.4-5, 7.b.i Acceptance Criteria, the injected water volume of the advanced accumulator is required to be greater than 1326.8 ft^3 during large flow injection. DCD Section 6.3 includes accumulator large flow injection values of 1,307 and 1342 ft^3. The 1326.8 ft^3 bounds the 1307 ft^3 but does not bound the 1,342 ft^3. Explain why the Acceptance Criteria of 1326.8 ft^3 is conservative and its basis?

ANSWER:

The value of 1307 ft^3 is the water volume required to fill the reactor vessel downcomer and the lower plenum region, and is the base value of the large flow injection water volume. For details, please refer to Section 3.1, page 3-1 of the Reference 1.

When the accumulator tank water level decreases to the inlet of the standpipe, the injection phase is switched from the large flow injection to the small flow injection. The value of1342 ft^3 is the water volume stored upper region of the standpipe inlet. The required functions of advanced accumulator in the PCT evaluation are to inject water immediately to the lower plenum during the refill period as well as to increase downcomer water level. Therefore, it is the quantitatively conservative treatment to shorten the large flow injection period of the advanced accumulator. In the safety analysis, the uncertainty of switching water level is considered to minimize the large flow injection period. The water volume of 1326.8 ft^3 includes this uncertainty of switching water level and is described in DCD Chapter 6, Section 6.3 Table 6.3-5, (page 6.3-48). For the uncertainty of switching water level, please refer to the Section 5.3, page 5-5 of Reference 1.

Reference 1: The Advanced Accumulator, MUAP-07001-P, Rev. 2, September 2008.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

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APPLICATION SECTION:	**14.3.4**
DATE OF RAI ISSUE:	**5/21/2009**

QUESTION NO.: 14.03.04-39

In Table 2.4.5-5, 8.f. Acceptance Criteria, is the NPSH of 17.9 ft at 3650 gpm determined by the RHR or Containment Spray system need? If RHR, what is the Containment Spray NPSH and flow rate required values? When aligned for Containment Spray what NPSH loss is assumed for degraded sump strainer performance?

ANSWER:

The NPSH of 17.9 ft at 3650 gpm is determined by the Containment Spray System need. The maximum NPSH loss is assumed to be 4.7 ft for degraded sump strainer performance. Please refer to DCD Chapter 6, Section 6.2 Table 6.2.2-1 (page 6.2-142).

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.

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QUESTION NO.: 14.03.04-40

Back leakage through check values used to protect boron dilution of the accumulators is a known industry problem. Significant dilution of the accumulators could lead to recriticality following injection during a LBLOCA. Has back leakage from the RCS to the accumulators been evaluated? If so, is there an ITAAC item which would validate the check valve back leakage assumption?

ANSWER:

The back leakage of through check valves has not been quantitatively evaluated. The back leakage through check valves may increase accumulator water level and dilutes boron concentration. However, the accumulator boron dilution due to the back leakage through check valves will not be the safety problem since the accumulator inventory and boron concentration are required to be maintained within the limit value in the T-Spec. LCO 3.5.1 (DCD Chapter 16, page 3.5.1-1 to 3.5.1-3). Therefore, the ITAAC for the back leakage through check valves is considered unnecessary.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.