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TOKYO, JAPAN

December 2, 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-09545

Subject: MHI's Response to US-APWR DCD RAI No. 478-3837 REVISION 1

Reference: 1) "Request for Additional Information 478-3837 Revision 1, SRP Section: 05.02.05 - Reactor Coolant Pressure Boundary Leakage Detection, Application Section: 5.2.5," dated October 21, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 478-3837 Revision 1."

Enclosed is the response to the 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,



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

Enclosure:

1. Response to Request for Additional Information No. 478-3837 Revision 1

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

Contact Information

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NRC

Docket No. 52-021
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Enclosure 1

UAP-HF-09545
Docket Number 52-021

Response to Request for Additional Information
No. 478-3837 Revision 1

December 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

12/2/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 478-3837 REVISION 1
SRP SECTION: 05.02.05 – Reactor Coolant Pressure Boundary Leakage Detection
APPLICATION SECTION: 5.2.5
DATE OF RAI ISSUE: 10/21/2009

QUESTION NO. : 05.02.05-11

This RAI is a follow-up to eRAI 448-3079/12424 Question 05.02.05-8. In the response (dated September 14, 2009, MHI ref. UAP-HF-09448, ML092600316), the applicant promised to add a new item in the inspections, tests, analysis, and acceptance criteria (ITAAC) for the reactor coolant pressure boundary (RCPB) leakage detection system in Tier 1 of the DCD. The applicant provided a proposed markup of the RCPB ITAAC that adds descriptions of acceptance criteria, which include the required sensitivity, response time, and alarm setpoints for the liquid leakage detection systems (Containment Sump Level and Containment Cooler Stand Pipe Level). However, the markup provided for the revised ITAAC does not address the means for testing the sensitivity, response time, and alarm limits for the Containment Radiation Particulate Monitor, RMS-RE-40. The applicant referred an existing ITAAC item for that instrument, RMS-RE-40, in DCD, Revision 1, Tier 1 Section 2.7.6.6 for checking radiation monitoring equipment.

The NRC staff reviewed the referenced Tier 1 Section 2.7.6.6, and found that this section does not identify the function of RCPB leakage detection, and therefore, the ITAAC acceptance criteria provided in Table 2.7.6.6-2 do not specify the verification of RMS-RE-40 instrument sensitivities, response times, or alarm setpoints for its function of RCPB leakage detection. Thus, the staff has determined that the applicant's response is inadequate. It is important that the ITAAC for the RCPB leakage detection system be sufficiently complete to allow the staff to verify the compliance with the design criteria required by General Design Criteria (GDC) 30. Consequently, the staff requests the applicant to supplement the revised new ITAAC item for the RCPB leakage detection system by adding a testing and the acceptance criteria for the Containment Radiation Particulate Monitor, RMS-RE-40, that will include a means to verify the instrument sensitivity, response time, and alarm setpoint to be consistent with the design.

ANSWER:

The ITAAC table for the RCPB leakage detection system will be revised to add the ITAAC for the radiation monitor RMS-RE-040. The RCS leakage detection Instruments are designed to have a capability to detect leakage of less than 0.5 gpm within one hour of detector response time. The alarm set point of the monitor will be set at several times the background level. Typically, the alarm set point is expected to be on the order of 1×10^{-9} $\mu\text{Ci}/\text{cm}^3$ level which is low enough to provide adequate warning for operator. Vendor tests and/or analyses based on the actual instruments utilized will be performed to confirm that the monitor has enough capability to detect

and alert leakage. An inspection of the as-built monitor for its functional arrangement will be performed per Tier 1 Subsection 2.7.6.6. The redundant ITAAC items stated in Table 2.4.7-1 that refer Tier 1 Section 2.7.6.6 will be deleted.

Impact on DCD

DCD Tier 1, Section 2.4.7, Table 2.4.7-1 will be revised as follows:

Table 2.4.7-1 Reactor Coolant Pressure Boundary Leakage Detection System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>1. Reactor coolant pressure boundary leakage detection methods provide the nonsafety-related function of detecting leaks from the reactor coolant system.</p>	<p>1.i Inspection will be performed for retrievability of the displays of the following channels in the MCR.</p> <ul style="list-style-type: none"> • Containment sump level channels LMS-LT-093A,B • Standpipe level channel LMS-LT-092 	<p>1.i Nonsafety-related displays of the following channels can be retrieved in the MCR.</p> <ul style="list-style-type: none"> • Containment sump level channels LMS-LT-093A,B • Standpipe level channel LMS-LT-092
	<p>1.ii Testing will be performed by adding water to the sump and observing display of sump level.</p>	<p>1.ii A report exists and concludes sump level channels LMS-LT-093A,B can detect level change due to adding water, which corresponds to required sensitivity, response time and set point.</p>
	<p>1.iii Testing will be performed by adding water to the standpipe and observing display of standpipe level.</p>	<p>1.iii A report exists and concludes standpipe level channel LMS-LT-092 can detect level change due to adding water, which corresponds to required sensitivity, response time and set point.</p>
	<p>1.iv See Tier1 Material sections: Section 2.7.6.6 for the containment radiation particulate monitor RMS-RE-040</p> <p><u>1.iv Tests and/or analyses of the containment radiation particulate monitor RMS-RE-040 will be performed.</u></p>	<p>1.iv See Tier1 Material sections: Section 2.7.6.6 for the containment radiation particulate monitor RMS-RE-040</p> <p><u>1.iv A report exists and concludes containment radiation particulate monitor RMS-RE-040 can detect radiation level, which corresponds to required sensitivity, response time and set point.</u></p>
<p>2. The functional arrangement of the reactor coolant pressure boundary leakage detection monitors is as described in Subsection 2.7.6.6 Design Description.</p>	<p>2. An inspection of the as-built RCPB leakage detection monitors will be performed.</p>	<p>2. The as-built RCPB leakage detection monitors conform to the functional arrangement as described in the Design Description of this Subsection 2.7.6.6.</p>

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

This completes MHI's response to the NRC's question.