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March 14, 2013

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-13063

Subject: MHI's Revised Response to US-APWR DCD RAI No. 423-2710 Revision 1 (SRP 19)

- References:** 1) "Request for Additional Information No. 423-2710 Revision 1, SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation, Application Section: PRA," dated July 9, 2009.
2) Letter MHI Ref: UAP-HF-09443 from Y. Ogata to U.S. NRC, "MHI's Revised Response to US-APWR DCD RAI No.423-2710 Revision 1", dated September 7, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Revised Response to Request for Additional Information No. 423-2710 Revision 1".

Enclosed is the revised response to one of the RAI questions (Question 19-376) that is contained within Reference 1. The original response to the RAI was submitted in Reference 2. This revision to the Question 19-376 response is submitted only to include an additional Design Control Document ("DCD") markup that was inadvertently omitted from previous DCD revisions. No other changes have been made to the response previously submitted in Reference 2.

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is below.

Sincerely,



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

Enclosures:

1. Revised Response to Request for Additional Information No. 423-2710 Revision 1

DOB
MRO

CC: J. A. Ciocco
J. Tapia

Contact Information

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Enclosure 1

UAP-HF-13063
Docket Number 52-021

Revised Response to Request for Additional Information
No. 423-2710 Revision 1

March 2013

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

03/14/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No.52-021

RAI NO.: NO. 423-2710 REVISION 1
SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation
APPLICATION SECTION: 19.1
DATE OF RAI ISSUE: 7/9/2009

QUESTION NO. : 19-376

In the response to RAI Question 19-191, the following statements are made:

- (1) It is more likely that the actual out of service time will be determined by failure type and repair time with an expectation that the newer design pumps will experience higher reliability.
- (2) The actual outage times are also expected to be impacted by regulations such as MSPI and derivative requirements that impact availability monitoring.
- (3) A sensitivity study, assuming a seven day yearly outage of each EFW pump, indicates an increase in CDF of about 9%.

The staff views this issue as a source of uncertainty that needs to be tracked and taken into account in risk-informed applications involving decision-making. Please discuss.

Answer:

The original response to RAI 423-2710 Question 19-376, submitted by MHI letter UAP-HF-09443 dated September 7, 2009, indicated that the component outage of the alternate AC power source is risk-significant. However, the addition of the alternate AC power sources was inadvertently not included in Table 19.1-38 in the previous DCD revisions. Therefore, MHI will revise Table 19.1-38 to include the alternate AC power source. The revised response is being submitted only to provide this additional markup (provided in Attachment 1). No other changes were made to the RAI response below.

As discussed in response to question 19-191, outage times of components during will not be unnecessarily be extended even though limited condition for operation of some systems do not require all trains to be operable. It is also true that the expected unavailability of components due to maintenance is uncertain at the design stage, when there is no operating experience.

Component outages modeled in the at power level 1 PRA that are risk significant are the following components.

- Turbine driven EFW pump
- Essential service water pump
- Alternate AC power source

Component outages of these components have RAW larger than 2.0 and/or FV importance larger than 5.0E-03. Uncertainty associated with the unavailability of these components may impact the time averaged core damage frequency. The unavailability of components will be documented as

source of uncertainty in the DCD.

Impact on DCD

The unavailability of components will be documented as source of uncertainty in the DCD.
(See attachment 1.)

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on PRA.

Impact on Topical / Technical Report

There is no impact on topical and technical report.

**19. PROBABILISTIC RISK ASSESSMENT
AND SEVERE ACCIDENT EVALUATION**

US-APWR Design Control Document

**Table 19.1-38 Key Sources of Uncertainty and Key Assumptions (Level 1 PRA for Internal Events at Power)
(Sheet 3 of 9)**

Key Sources of Uncertainty and Key Assumptions		Type (Note)	Summary Results of Qualitative Assessments	Quantitative Approach
Event Tree Analysis	Identification of accident sequences	M	Considered realistic accident sequences.	NA
Success Criteria Analysis	Boundary conditions Plant parameters	M	Appropriate simplified evaluations for the US-APWR have been performed.	NA
System Analysis	Plugging before events occurred is not modeled.	M	It would be hard to plug during normal operation in RCS and safety related systems.	NA
	System unavailability due to test and maintenance	M	US generic data is considered appropriate at design stage. The following components have RAW higher than 2.0 or FV importance higher than 5.0E-03 and are required for adequate control for on-line maintenance. - Turbine driven EFW pump - Essential service water pump - <u>Alternate AC power source</u> - Component cooling water pump and heat exchanger - Essential chilled water pump Component unavailability will be adequately controlled by the maintenance rule. Sensitivity analysis is performed to study the impact caused by on-line maintenance.	Sensitivity Analysis (Case 1-1, 1-2, 1-3, 1-4)

DCD_19-376
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