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TOKYO, JAPAN

February 22, 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-10048

Subject: MHI's Response to US-APWR DCD RAI No. 520-4183 REVISION 0

Reference: 1) "Request for Additional Information No.520-4183 Revision 0, SRP Section: 16 – TECHNICAL SPECIFICATIONS, Application Section: 3.3 instrumentation" dates January 19, 2010.

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. 520-4183 Revision 0."

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,

Y. Ogata

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

Enclosure:

1. Response to Request for Additional Information No. 520-4183 Revision 0

CC: J. A. Ciocco
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Contact Information

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Docket No. 52-021
MHI Ref: UAP-HF-10048

Enclosure 1

UAP-HF-10048
Docket Number 52-021

Response to Request for Additional Information
No. 520-4183 Revision 0

February 2010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/18/2010

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

RAI NO.: NO. 520-4183 REVISION 0
SRP SECTION: 16 - TECHNICAL SPECIFICATIONS
APPLICATION SECTION: 3.3 INSTRUMENTATION
DATE OF RAI ISSUE: 1/19/2010

QUESTION NO.: 16-300

During review of confirmatory items in Revision 2 of the US-APWR TS, Section 3.3 Instrumentation, and associated bases the following apparent typographical or editorial errors were noted:

1. RAI-SRP-16-CTSB-1769/202, Page B 3.3.1-36, 1st paragraph, 5th line: Replace the word "tri" with "trip."
2. RAI-SRP-16-CTSB-1769/222, Page 3.3.1-8, Section 3.3.1, Action T: There is no logical connector between T.1 and T.2. The original RAI response included an "OR" connector. Validate the correct connector and add to this step.
3. RAI-SRP-16-CTSB-1769/222, Page B 3.3.1-39, Section B 3.3.1, ACTIONS, L.1 and L.2: With the addition of CONDITION T, the reference to "Turbine Trip – Main Turbine Stop Valve Position" should be removed from the Bases section for ACTIONS L.1 and L.2.
4. RAI-SRP-16-CTSB-1769/222, Page B 3.3.1-44/45: In both places within the RAI response text, change "12.hour" to "12 hours." Additionally, the text for Condition T.1 and T.2 in Chapter 16 Bases should be replaced with the text from the RAI response. In Revision 2, there are numerous editorial errors or deletions from the RAI response.
5. RAI-SRP-16-CTSB-1769/229, Page 3.3.1-14, Table 3.3.1-1, Item 3.b: Add a space between SR and 3.3.1.1.
6. RAI-SRP-16-CTSB-1769/235, Page B 3.3.1-49: In the last paragraph, first item, add "of" in between "verification" and "RTB operability."
7. RAI-SRP-16-CTSB-1769/235, Page B 3.3.1-49: In the last paragraph, third item, the original RAI response uses text "The Manual Reactor Trip Test for verification of RTB operability using hardwired switches." Revision 2 includes text "The Manual Reactor Trip hardwired switches." Validate the correct text.
8. RAI-SRP-16-CTSB-1769/246, During review of a TS reference, US-APWR DCD Chapter 7, Table 7.3-4, item "Main Feedwater Isolation (b) Low Tavg coincident with RT (P-4)," the Response

Time is listed as 8 seconds, vice 3 seconds as indicated in the response to RAI No. 167-1769 REVISION 0, Question No. 16-246. Validate the correct value in this table.

9. RAI-SRP-16-CTSB-1769/248, Page 3.3.2-16, Table 3.3.2-1, Item 5A: The word "valve" should be capitalized.

10. RAI-SRP-16-CTSB-1769/263, Page B 3.3.2-40, last paragraph: Correct the first sentence to match the amended response: "While in MODES 5 and 6 including fuel handling in progress, the..."

11. RAI-SRP-16-CTSB-1769/268, Page 3.3.2-22, Table 3.3.2-1: The ALLOWABLE VALUE for item 14.c "Low-low Tavg Signal" should include a plus or minus sign to indicate the span allowed. Also, the word "low" should be capitalized in the description for Function 14.c in Table 3.3.2-1 and in the underlined description for 14.c on Bases page B 3.3.2-44.

12. RAI-SRP-16-CTSB-1769/268, Page 3.3.2-22, Table 3.3.2-1: Footnote (j) is specified for Functions 14.a, 14.b and 14.c in Modes 2 and 3. It appears that footnote (h) should be specified instead of (j), since footnote (h) already provides the same information within Table 3.3.2-1. Validate the footnote reference.

13. RAI-SRP-16-CTSB-1769/276, Page B 3.3.1-52: Under SR 3.3.1.7, the text used in the Amended response is not incorporated. Per the response, the paragraph should open with "The PSMS is self-tested on a continuous basis from..." Validate the need to effect this change in section 3.3.1, as there are other references to the RTS which would need to be changed as well. This change is correctly, and appropriately, incorporated for section 3.3.2.

14. RAI-SRP-16-CTSB-1769/291, Page B 3.3.6-5: In the third paragraph from the bottom, last sentence, change "satisfy" to "satisfies."

15. RAI-SRP-16-CTSB-1769/291, Page: B 3.3.6-6: In the first paragraph, second sentence, change "function" to "functions."

16. RAI-SRP-16-CTSB-1769/291, Page: B 3.3.6-10: In the last paragraph, change the following sentence to indicate plural usage: "...that cannot be confirmed in the continuous CHANNEL CHECK on the PSMS, are confirmed by this SR."

17. RAI-SRP-16-CTSB-1769/294, Page 3.3.1-17, Table 3.3.1-1, item 13.b: Add RAI response text to "Main Turbine Stop Valve Position" along with footnote (i). This was completed for the LOOP Signal, item 6.e, on page 3.3.2-17.

18. RAI-SRP-16-CTSB-1784/169, Page B 3.3.1-53: The second paragraph contains errors and should read: "The Note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.1.7 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for 4 hours this Surveillance must be performed prior to over 4 hours after entry into MODE 3."

19. RAI-SRP-16-CTSB-1784/195, Page B 3.3.1-36: Item 6 for ACTIONS F.1/F.2 Bases was not answered. The last sentence of the 4th paragraph should read "The 12 hour time limit is based on operating experience." This is verbatim out of the WOG STS Bases for Condition E, which corresponds to Condition F in the US-APWR DCD and meets the intent of this ACTION.

20. Page 1.1-2, Definitions, CHANNEL CALIBRATION: In the third paragraph, last sentence, change "setpoint" to "setpoints."

21. Page 3.3.2-21, Table 3.3.2-1, Item 13.b: Add a space between SR and 3.3.2.4.

22. Page B 3.3.2-30: The words "coincident" and "no" should be capitalized in the header for item 7.c at the top of the page.

23. Page B 3.3.2-36, Section 11.a: In item 11.a, 4th bullet, the words "level" and "non" should be capitalized, since they describe the coincident functions of the P-4 interlock.

24. Page B 3.3.5-7, SR 3.3.5.4 Bases discussion, second paragraph from the bottom, last sentence: The word "Channel" in "Channel CALIBRATION" should be entirely capitalized.

ANSWER:

The typographical or editorial errors in US-APWR TS LCO 3.3 and associated BASES Revision 2 will be revised to incorporate the comments in QUESTION NO.16-300 as described in the following "Impact on DCD" section.

It is noted that the Allowable Value and Trip Setpoint will be deleted as stated on the letter (UAP-HF-09493) since MHI choose the Setpoint Control Program.

Impact on DCD

1. Page B 3.3.1-36, 1st paragraph, fifth line will be revised as follows:

... one-out-of three logic (for the trip functions where the required number of ...

2. Page 3.3.1-8, Section 3.3.1, Action T will be revised as follows:

T. Main Turbine Stop Valve Position channel inoperable	-----NOTE-----	
	One channel may be bypassed for up to 12 hours for surveillance testing.	

T.1	Place channel in trip.	12 hours
<u>OR</u>		
T.2	Reduce thermal power to < P-7	18 hours

3. Page B 3.3.1-39, Section B 3.3.1, ACTIONS, L.1 and L.2 will be revised as follows:

- High-High SG Water Level, and
- Turbine Trip – Turbine Emergency Trip Oil Pressure, and
- ~~Turbine Trip – Main Turbine Stop Valve Position.~~

4. Pages B 3.3.1-44/45, ACTIONS, T.1 and T.2 will be revised as follows:

T.1 and T.2

Condition T applies to Main Turbine Stop Valve Closure. With one channel inoperable, the inoperable channel must be placed in the trip condition within 12 hours. If placed in the tripped condition, this results in a partial trip condition requiring three additional channels to initiate a reactor trip. If the channel cannot be restored to OPELRABLE status or placed in the trip condition, then power must be reduced below the P-7 setpoint within the next 6 hours.

The 6 hours allowed for reducing power is consistent with other power reduction action completion times.

The Required Actions are modified by a Note that allows placing one channel in bypass for up to 12 hours while performing routine surveillance testing. These times are justified because this is an anticipatory trip that is not credited in the safety analysis, and a diverse turbine trip is also initiated from the Turbine Emergency Oil Pressure.

5. Page 3.3.1-14, Table 3.3.1-1, Item 3.b will be revised as follows:

b. Negative Rate	1,2	4	F	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.13	[±2]% RTP ^(f)	[7]% RTP with time- constant ≥ [1] sec
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6. Page B 3.3.1-49, last paragraph, first item will be revised as follows:

(1) The Undervoltage Test for verification of RTB operability using only the undervoltage trip mechanism.

7. Page B 3.3.1-49, last paragraph, third item will be revised as follows:

(3) The Manual Reactor Trip Test for verification of RTB operability using the hardwired switches.

8. The response of RAI-SRP-16-CTSB-1769/246 is in error. The time of 8 seconds is correct, so Table 7.3-4 of DCD Revision 2, Chapter 7 will not be changed. Therefore, the response of RAI-SRP-16-CTSB-1769/246 should be described as follows;

(b) coincident with RT (P-4)	Low T _{avg}	Reactor Coolant Temperature	530 to 630 °F	2.0°F	3.0 sec 8.0 sec	564 °F
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9. Page 3.3.2-16, Table 3.3.2-1, Item 5A will be revised as follows:

5A. Main Feedwater Regulation Valve Closure

10. Page B 3.3.2-40, last paragraph, first sentence will be revised as follows:

While in MODES 5 and 6 ~~without~~ including fuel handling in progress, the ...

11. Page 3.3.2-22, Table 3.3.2-1, item 14.c will be revised as follows:

c. Low- I Low T _{avg} Signal	1,2 ^(j) ,3 ^(j)	3	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.7 SR 3.3.2.8	[±2.0]°F	[553]°F
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Also, Page B 3.3.2-44, item 14.c will be revised as following;

c. Block Turbine Bypass and Cooldown Valves - Low-~~I~~Low T_{avg} Signal

12. Page 3.3.2-22, Table 3.3.2-1, item 14.a, b and c, and associated footnote (j) will be revised as follows:

a. Manual Initiation	1,2 ^(jh) ,3 ^(jh)	Trains A and D	F	SR 3.3.2.6	NA	NA
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b. Actuation Logic and Actuation Outputs	1,2 ^(jh) , 3 ^(jh)	Trains A and D	S,T	SR 3.3.2.2 SR 3.3.2.4	NA	NA
c. Low-low T _{avg} Signal	1,2 ^(jh) , 3 ^(jh)	3	D	SR 3.3.2.1 SR 3.3.2.3 SR 3.3.2.7 SR 3.3.2.8	[2.0]°F	[553]°F

(jh) Except when all MSIVs are closed.

13. Page B 3.3.1-52, SR 3.3.1.7, second paragraph, first sentence will be revised as follows:

The RTS PSMS is self-tested on a continuous basis from the digital side of all input modules to the digital side of all output modules.

- Also, Page B 3.3.1-50, SR 3.3.1.5, first paragraph, second sentence will be revised as follows:

The RTS PSMS is self-tested on a continuous basis from the digital side of all input modules to the digital side of all output modules.

14. Page B 3.3.6-5, third paragraph from the bottom, last sentence will be revised as follows:

The DAS ~~satisfy~~ satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii) (Ref. 5).

15. Page B 3.3.6-6, first paragraph, second sentence will be revised as follows:

All functions of the DAS are required to be OPERABLE in MODES 1, 2 and 3 with the pressurizer pressure > P-11.

16. Page B 3.3.6-10, last paragraph, second sentence will be revised as follows:

The isolation module of the PSMS and the indicator of the DAS, that cannot be confirmed in the continuous CHANNEL CHECK on the PSMS, ~~is~~ are confirmed by this SR.

17. Trip Setpoint will be deleted from the DCD Chapter 16 Section 3.3 (UAP-HF-09493). Thus footnote (l) described in Table 3.3.2-1 (6/11) is not applicable to Table 3.3.1-1.

18. Page B 3.3.1-53, second paragraph will be revised as follows:

The Note allows a normal shutdown to proceed without a ~~delay~~ delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.1.7 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs ~~else~~ closed for 4 hours this Surveillance must be performed prior to ~~over~~ 4 hours ~~agfter~~ after entry into MODE 3.

19. Page B 3.3.1-36, fourth paragraph, last sentence will be revised as follows:

The 12 hour time limit is based on operating experience.

20. Page 1.1-2, third paragraph, last sentence will be revised as follows:

The confirmed setpoints are monitored on the safety VDUs.

21. Page 3.3.2-21, Table 3.3.2-1, Item 13.b will be revised as follows:

b. Actuation Logic and Actuation Output	1,2,3,4, ^(k)	3 trains including A and D ^(m)	M, N, O,P	SR 3.3.2.2 SR_3.3.2.4	NA	NA
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22. Page B 3.3.2-30, item 7.c at the top of the page will be revised as follows:

- c Emergency Feedwater Isolation - High Steam Generator Water Level ~~e~~Coincident with P-4 signal and ~~n~~No Low Main Steam Line Pressure

23. Page B 3.3.2-36, Section 11.a, item 11.a, fourth bullet will be revised as follows:

- EFW Isolation with coincident High SG Water ~~l~~Level and ~~n~~No Low Main Steam Line Pressure, and

24. Page B 3.3.5-7, second paragraph from the bottom, last sentence will be revised as follows:

The ~~Channel~~ CHANNEL CALIBRATION, ACTUATION LOGIC TEST and TADOT, which are manual tests, overlap with the CHANNEL CHECK and self-testing and confirm the functioning of the self-testing.

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.