MITSUBISHI HEAVY INDUSTRIES, LTD.

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TOKYO, JAPAN

July 12, 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-10196

Subject: MHI's Response to US-APWR DCD RAI No. 590-4753 REVISION 0

Reference: 1)   "Request for Additional Information No.590-4753 Revision 0, SRP Section:
16 - Technical Specifications, Application Section: SRP 16" dates June 8,
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. 590-4753 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,

[signature]

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

Enclosure:

1. Response to Request for Additional Information No. 590-4753 Revision 0

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-10196
Docket Number 52-021

Response to Request for Additional Information
No. 590-4753 Revision 0

July 2010

7/12/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 590-4753 REVISION 0
SRP SECTION:	16 - TECHNICAL SPECIFICATIONS
APPLICATION SECTION:	16
DATE OF RAI ISSUE:	6/8/2010

QUESTION NO.: 16-301

In Comanche Peak (CP) RAI 91, Question 16-16, the staff requested that Luminant resolve the COL Holder Items identified in Section 3.3 (Instrumentation) of the CP Units 3 and 4 Plant-Specific Technical Specifications (PTS), in accordance with Interim Staff Guidance Document DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications When a Combined License is Issued." MHI, in cooperation with Luminant, decided on Option (3) of the ISG, and subsequently established a Setpoint Control Program (SCP) Administrative Controls TS in the DCD to resolve the COL Holder Items. In a letter to the NRC dated October 30, 2009, MHI transmitted proposed updates to the DCD to support incorporation of the SCP Specification.

MHI is requested to address the following items (see attached) associated with these proposed updates, which are identified as Enclosure 1 in the referenced letter.

1. On page 1.1-2, the last sentence in the fourth paragraph of the definition for CHANNEL CALIBRATION states "[t]he confirmed setpoint are monitored on the safety VDUs." Clarify the reference to "setpoint." Does "setpoint" refer to the five calibration settings of 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent, or does it refer to the Limiting Safety System Setting (LSSS) values? Also, it appears that "setpoint" should be pluralized.

2. On page 3.1.9-3, Surveillance Requirement (SR) 3.1.9.1 states "[p]erform a CHANNEL CALIBRATION TEST on power range and intermediate range channels per SR 3.3.1.10, and Setpoint Control Program." The word "TEST" does not appear in the defined term for CHANNEL CALIBRATION in GTS Definitions Section 1.1. In addition, the reference to "Setpoint Control Program" does not constitute adequate incorporation of the statement provided in RAI 91, Question 16-16, which reads: "Perform CHANNEL CALIBRATION on each required channel consistent with Specification 5.5.X.X, "Setpoint Control Program (SCP)."

3. It does not appear that CHANNEL CALIBRATION SRs 3.3.1.9, 3.3.1.10, 3.3.1.11, 3.3.2.7, and 3.3.6 have been revised to incorporate the statement provided in RAI 91, Question 16-16, which reads: "Perform CHANNEL CALIBRATION on each required channel consistent with Specification 5.5.X.X, "Setpoint Control Program (SCP)."

4. There is no longer a reference to Table 3.3.1-1, Note 1, in Table 3.3.1-1, Function 6, Overtemperature ΔT on page 3.3.1-15. If Note 1 is to be retained in Table 3.3.1-1, consider the use of a footnote to link the associated Overtemperature ΔT setpoint derivation information to Function 6.

5. There is no longer a reference to Table 3.3.1-1, Note 2, in Table 3.3.1-1, Function 7, Overpower ΔT on page 3.3.1-16. If Note 2 is to be retained in Table 3.3.1-1, consider the use of a footnote to link the associated Overpower ΔT setpoint derivation information to Function 7.

6. MUAP-09022-P(R0), "US-APWR Instrument Setpoint Methodology," states that the Loss of Power (LOOP) Function is implemented via a conventional analog bistable and that a Channel Operational Test (COT) confirms bistable accuracy. Table 3.3.2-1 on page 3.3.2-17 does not specify a COT SR for Function 6.e, LOOP Signal.

7. SR 3.3.5.3 on page 3.3.5-2 states: "[p]erform CHANNEL CALIBRATION for LOP undervoltage relays in accordance with the SCP with following time delay." The reference to "SCP" does not constitute adequate incorporation of the statement provided in RAI 91, Question 16-16, which reads: "Perform CHANNEL CALIBRATION on each required channel consistent with Specification 5.5.X.X, "Setpoint Control Program (SCP)." Also, it appears that the word "delay" at the end of the sentence should be pluralized.

8. Inconsistencies in SCP Specification terminology exist with respect to the following:

   a. Step 5.5.21.b on page 5.5.20, specifies "As-Found Tolerance (AFT)," whereas step 5.5.21.f on page 5.5-21 specifies "PTAC" (Performance Test Acceptance Criteria).

   b. Step 5.5.21.b on page 5.5.20, specifies "As-Left Tolerance (ALT)," whereas step 5.5.21.f on page 5.5-21 specifies "CT" (Calibration Tolerance).

9. SCP Specification discrepancies associated with step 5.5.21.d on page 5.5-21 exist with respect to the following:

   a. Step 5.5.21.d states: "[f]or each Technical Specification required automatic protection instrumentation function implemented with an analog bistable function, performance of a CHANNEL CALIBRATION surveillance ..." MUAP-09022-P(R0), "US-APWR Instrument Setpoint Methodology," states that a Channel Calibration confirms the instrument accuracy over its entire range and that a COT confirms analog bistable accuracy. Determine the correct SR to be specified for analog bistable functions in step 5.5.21.d.

   b. Although the last sentence in 5.5.21.d describes CT limits, there is no guidance, similar to that in step 5.5.X.X.c.2 of the Example SCP Specification provided in CP RAI 120, Question 16-17, that specifically states that the instrument channel trip setting shall be set to a value within the specified CT around the NTSP at the completion of the surveillance.

10. SCP Specification discrepancies associated with step 5.5.21.c on pages 5.5-20 and 5.5-21 exist with respect to the following:

    a. Although the last sentence in 5.5.21.c describes CT limits, there is no guidance,

similar to that in step 5.5.X.X.c.2 of the Example SCP Specification provided in CP RAI 120, Question 16-17, that specifically states that the instrument channel calibration settings shall be set to values within the specified CT around each of the five calibration settings (0 percent, 25 percent, 50 percent, 75 percent, and 100 percent) at the completion of the surveillance.

11. Step 5.5.21.e on page 5.5-21 includes provisions for trending and evaluating "As-Found" versus "As-Left" data only for those instrumentation functions implemented via conventional analog bistables. The SCP Specification must also include provisions for trending and evaluation of "As-Found" versus "As-Left" data at the five calibration settings (0 percent, 25 percent, 50 percent, 75 percent, and 100 percent) for protection functions implemented via digital bistables.

12. SCP Specification discrepancies associated with REVIEWER'S NOTES on page 5.5-22 exist with respect to the following:

   a. Reviewer's Notes 2 and 3 are written for automatic protection instrumentation functions implemented via analog bistables. The same Note criteria should also apply to the "As-Found" and "As-Left" values at the five calibration settings (0 percent, 25 percent, 50 percent, 75 percent, and 100 percent) for protection instrumentation functions implemented via digital bistables.

   b. Reviewer's Note 4 states: "[i]f the requirements of 5.5.21.c or 5.5.21.d include an allowance for the as-found value to be compared with the specified calibration setting or NTSP, ..." Neither 5.5.21.c or 5.5.21.d include an allowance for the as-found value to be compared to anything other than the specified calibration setting or NTSP. Comparable step 5.5.X.X.c.1 of the Example SCP Specification provided in CP RAI 120, Question 16-17, specifically states: "[t]he as-found value of the instrument channel trip setting shall be compared with the previous as-left value or the specified NTSP." There are no provisions in GTS SCP Specification steps 5.5.21.c or 5.5.21.d, to compare either the as-found value of the calibration setting or the as-found value of the NTSP, to the "previous asleft" value. Therefore, the criteria delineated in Reviewer's Notes 4.a, 4.b, and 4.c of the GTS SCP Specification always apply when comparing the as-found value only to the specified calibration setting or NTSP. The first sentence of Reviewer's Note 4 could be misleading. Clarify the Reviewer's Note. Also, make any necessary corrections to the first sentence of the third paragraph on Bases page B 3.3.6-13, which states:"[t]he difference between the current "as-found" value and the previous test "as-left" value must be consistent with the drift allowance used in the setpoint methodology." The referenced Bases statement is not supported by the GTS SCP Specification for the reasons stated above.

13. The adequacy of the word "administered" in the following Bases statements to convey SCP implementation of the Allowable Values (AVs) and Trip Setpoints is questionable. Consider use of the phrase "recorded and maintained in a document established by the Setpoint Control Program (SCP)."

   a. Page B 3.3.1-2, third paragraph, first sentence states: "[t]he Allowable Value administered in the Setpoint Control Program (SCP) serves as the LSSS such that ..."

   b. Page B 3.3.1-5, last paragraph (Allowable Values and RTS Setpoints), third sentence states: "... the Trip Setpoints administered in the SCP in the accompanying

LCO ..."

   c. Page B 3.3.1-6, first sentence of the NOTE states: "[t]he Allowable Value administered in the SCP is the maximum deviation ..."

   d. Page B 3.3.2-3, third paragraph (Allowable Values and ESFAS Setpoints), third sentence states: "... the Allowable Values and Trip Setpoints in the SCP in the accompanying LCO ..."

   e. Page B 3.3.6-3, second paragraph, second sentence states: "the Allowable Values administered in the SCP in the accompanying LCO ..."

14. The last sentence of the third paragraph on page B 3.3.1-47 states: "[t]he CHANNEL CALIBRATION is performed in a manner that is consistent with Section 5.5.21, SCP." To promote consistency within the Bases, consider revising the sentence so that it reads: "[t]he CHANNEL CALIBRATION is performed in a manner that is consistent with the methods and assumptions of Section 5.5.21, SCP."

15. The last sentence of the third paragraph on page B 3.3.2-64 states: "[t]he CHANNEL CALIBRATION is performed in a manner that is consistent with Section 5.5.21, SCP." To promote consistency within the Bases, consider revising the sentence so that it reads: "[t]he CHANNEL CALIBRATION is performed in a manner that is consistent with the methods and assumptions of Section 5.5.21, SCP."

16. The first sentence of the third paragraph on page B 3.3.1-2 states: "[t]he Allowable Value administered in the Setpoint Control Program (SCP) serves as the LSSS such that a channel is OPERABLE if the measured accuracy is found not to exceed the Allowable Value during CHANNEL CALIBRATION." MUAP-09022-P(R0), "US-APWR Instrument Setpoint Methodology," Section 5.3, states that "[t]he LTSP is an LSSS managed by the plant Technical Specifications." Provide the additional information and make any necessary changes to resolve apparent inconsistencies associated with the LSSS value.

17. Bases B 3.3 editorial items:

   a. Page B 3.3.1-2, third paragraph, second sentence: the word "setting" should be pluralized.

   b. Page B 3.3.1-9, last paragraph, third sentence reads: "[f]or digital functions Allowable Values are defined in terms pertinent to the channel calibration setpoints." The word "setpoints" should be changed to "settings."

   c. Page B 3.3.1-56, third paragraph, first sentence reads: "[t]he Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in Section 5.5.21, SCP." The last part of the sentence should be revised to read "... magnitude of equipment drift in accordance with Section 5.5.21, SCP."

   d. Page B 3.3.1-57, third paragraph, first sentence reads: "[t]he Frequency is justified by the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in Section 5.5.21, SCP." The last part of the sentence should be revised to read "... magnitude of equipment drift in accordance with

Section 5.5.21, SCP."

    e. Page B 3.3.2-68, next to last paragraph, first sentence reads: "[t]he Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in Section 5.5.21, SCP." The last part of the sentence should be revised to read "... magnitude of equipment drift in accordance with Section 5.5.21, SCP."

    f. Page B 3.3.2-4, first paragraph, third sentence reads: "[a]ny channel is considered to be properly adjusted when the "as-left" accuracy value is within the established Calibration Tolerance (CT) band in accordance with the methods and assumptions in the SCP." The word "accuracy" should be deleted from this statement to ensure consistency with SCP Specification Reviewer's Note 2 which specifies "as-left value" rather than "as-left accuracy value."

    g. Page B 3.3.6-5, last paragraph, first sentence reads: "[a] channel is OPERABLE provided the "as-found" accuracy value does not exceed its Allowable Value." The word "accuracy" should be deleted from this statement to ensure consistency with SCP Specification steps 5.5.21.c and 5.5.21.d which specify "as-found values" rather than "as-found accuracy values."

ANSWER:

The following answers are numbered in a manner that matches each of the above questions.

1. The term "setpoint" is referring to calibration settings. The last sentence of the fourth paragraph on page 1.1-2 will be replaced with the following sentence to be consistent with MUAP-07004-P (R4), Safety I&C TR:

   "During the calibration of the instrument, the analog signal generated by the instrument is confirmed via the calibration settings on the any VDU (e.g., Operational VDU or Safety VDU)"

2. MHI agrees. SR 3.1.9.1 on page 3.1.9-3 will be replaced with the following sentence:

   "Perform a CHANNEL CALIBRATION on power range and intermediate range channels consistent with SR 3.3.1.10 and Specification 5.5.21, Setpoint Control Program (SCP)."

3. MHI agrees. Regarding the reference to SR 3.3.6, it is our belief that the staff meant to list SR 3.3.6.3 instead of SR 3.3.6. SRs 3.3.1.9, 3.3.1.10, 3.3.1.11, 3.3.2.7, and 3.3.6.3 will be revised to read as follows:

   "Perform a CHANNEL CALIBRATION on each required channel consistent with Specification 5.5.21, Setpoint Control Program (SCP)."

4. The reference to Note 1 in Table 3.3.1-1, Function 6, was inadvertently deleted when columns 6 and 7 in this table were deleted. The following footnote will be added for Function 6 on page 3.3.1.-15:

   "Refer to Note 1 after this table."

5. The reference to Note 2 in Table 3.3.1-1, Function 7, was inadvertently deleted when columns 6 and 7 in this table were deleted. The following footnote will be added for Function 7 on page 3.3.1.-16:

   "Refer to Note 2 after this table."

6. MUAP-09022 is incorrect. Please see the response to item 9, below. The LOP setpoint and AV are confirmed via CHANNEL CALIBRATION.

7. MHI agrees. The first sentence in SR 3.3.5.3 on page 3.3.5-2 will be revised as follows:

"Perform CHANNEL CALIBRATION for LOP undervoltage relays ~~in accordance~~ consistent with ~~the SCP~~ Specification 5.5.21, Setpoint Control Program (SCP), with following time delay~~s~~:"

8. See below:

   a. "PTAC" is the correct term.

   b. "CT" is the correct term.

   The terms "As-Found Tolerance (AFT)" and "As-Left Tolerance (ALT)" in specification 5.5.21.b, will be replaced with "Performance Test Acceptance Criteria (PTAC)" and "Calibration Tolerance (CT)" respectively.

9. See below:

   a. The Technical Specifications distinguish binary sensors from analog bistables in terms of how signals are processed (digital or analog). Binary sensors (e.g., pressure switches, UV relays) connected to PSMS are surveilled the same way as analog sensors connected to PSMS, whereby CHANNEL CALIBRATION confirms the complete channel accuracy in one step for periodic surveillance (with the exception that channel accuracy is checked at the binary sensor trip setting) and COT is used to confirm memory integrity. This approach is valid because the binary sensor signals are ultimately processed in PSMS via contact inputs. In this approach, CHANNEL CALIBRATION must check binary sensor accuracy at one value (setpoint) as opposed to five values for analog sensors (calibration settings). This is why the CHANNEL CALIBRATION surveillance includes devices such as sensors, binary devices (e.g., pressure switches, UV relays), analog input devices, RTDs, and thermocouples.

   The only function where no digital processing is performed in any manner is in DAS, where both COT-analog and CHANNEL CALIBRATION are required (SR 3.3.6.2 and 3.3.6.3, respectively).

   Sections 5.3.1 and 5.3.2 of MUAP-09022-P(R1) are incorrect. MHI will revise sections 5.3.1 and 5.3.2, and add a new section 5.3.2.2 with a new Figure 5-7 in MUAP-09022 (please see "Impact on DCD").

   Step 5.5.21.d is applicable to the following Tech Specs:

   - Section 3.3.1 (Low Turbine Oil Pressure, Function 13.a in Table 3.3.1-1)
     > SR 3.3.1.9
   - Section 3.3.2 (LOP, Function 6.e in Table 3.3.2-1)
     > SR 3.3.2.7
   - Section 3.3.5 (LOP)
     > SR 3.3.5.3
   - Section 3.3.6 (DAS)
     > SR 3.3.6.3

   To clarify the application of CHANNEL CALIBRATION to channels with binary sensors connected to PSMS and the application of COT-analog for analog bistables, the first sentence of step 5.5.21.d will be revised as follows:

   "For each Technical Specification required automatic protection instrumentation function

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implemented with a binary sensor connected to a digital channel or an analog bistable function, performance of a CHANNEL CALIBRATION surveillance (binary sensors connected to digital channels) or a COT-analog surveillance (analog bistables) shall include the following:"

To clarify the applicability of COT-analog, SR 3.3.6.2 will be revised as follows:

"SR 3.3.6.2   Perform ~~CHANNEL OPERATION TEST~~ COT-analog."

In addition, the fifth and sixth sentences in the second paragraph of page B 3.3.6-3 will be revised as follows:

"The trip setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for measurement errors detectable by the COT-analog. The Allowable Value serves as the Technical Specification OPERABILITY limit for the purpose of the COT-analog."

And the third sentence in the third paragraph of page B 3.3.6-3 will be revised as follows:

"The trip setpoint value is therefore considered a "nominal" value (i.e. expressed as a value without inequalities) for the purposes of COT-analog and CHANNEL CALIBRATION."

Finally, the first sentence of the first paragraph on page B 3.3.6-13 will be revised as follows:

"A COT-analog is performed on each required channel to ensure the entire channel will perform the intended Function."

b. MHI agrees. The following sentence will be inserted after the first sentence of the last paragraph in 5.5.21.d:

"The instrument channel trip setting shall be set or confirmed to be within the specified CT around the NTSP at the completion of each COT-analog surveillance."

10. See below:

a. MHI agrees. The following sentence will be inserted after the first sentence of the last paragraph in 5.5.21.c:

"The instrument channel calibration settings shall be set or confirmed to be within the specified CT around the five calibration settings (0, 25, 50, 75 and 100 percent) at the completion of each CHANNEL CALIBRATION surveillance."

11. MHI agrees, but 5.5.21 e should also have more correctly required that trending for analog bistable functions and binary sensors (e.g., pressure switches, UV relays) should trend the difference between the as-found value and the as-left trip setting value or the specified NTSP. Specification 5.5.21 e will be replaced with the following:

"For each Technical Specification required automatic protection instrumentation function implemented with an analog bistable function, the difference between the instrument channel trip setting as-found value and the as-left trip setting value or the specified NTSP shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis.

For each Technical Specification required automatic protection instrumentation function implemented with a binary sensor connected to a digital channel (e.g., pressure switches, UV relays), the difference between the instrument channel trip setting as-found value and the

as-left trip setting value or the specified NTSP shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis.

For each Technical Specification required automatic protection instrumentation function implemented with a digital bistable function, the difference between the instrument channel calibration setting (0, 25, 50, 75 and 100 percent) as-found and as-left values shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis."

12. See below:

   a. MHI agrees, except that typical sensors are calibrated via zero and span settings. The intermediate calibration settings of 25, 50 and 75 percent are not typically "set," but they can be observed and trended. The following sentence will be added to Reviewers Note 2:

   "For each Technical Specification required automatic protection instrumentation function implemented with a digital bistable function, the as-left value of the instrument channel calibration setting shall be the value at which the channel was set or left at the completion of the surveillance with no additional adjustment of the instrument channel."

   b. Specification 5.5.21.e will be revised as described in response 11, above. The proposed revision is now in alignment with Reviewers Note 4, which no longer needs to be clarified. Regarding the third paragraph on Bases page 3.3.6-13, the first sentence will be deleted because the PTAC term addresses drift (among other terms) during surveillance testing.

13. MHI agrees. Each point where the phrase "...administered in..." appears on pages B 3.3.1-2, B 3.3.1-5, B 3.3.1-6, B 3.3.2-2, and B 3.3.6-3 will be replaced with the phrase "...recorded and maintained in a document established by..."

14. MHI agrees. The last sentence of the third paragraph on page B 3.3.1-47 will be replaced with the following sentence:

   "The CHANNEL CALIBRATION is performed in a manner that is consistent with the methods and assumptions of Section 5.5.21, Setpoint Control Program (SCP)."

15. MHI agrees. The last sentence of the third paragraph on page B 3.3.2-64 will be replaced with the following sentence:

   "The CHANNEL CALIBRATION is performed in a manner that is consistent with the methods and assumptions of Section 5.5.21, Setpoint Control Program (SCP)."

16. MHI has changed the LSSS from the LTSP (and the AV) to the NTSP in Revision 1 of MUAP-09022-P(R1), as discussed in a meeting with NRO and Tech Spec Branch staff on March 17 and 18, 2010. Accordingly, the last sentence of the second paragraph on page B 3.3.1-2 will be deleted, because the AV is not a component of the LSSS.

   Likewise, the first sentence in the third paragraph on page B 3.3.1-2 will be replaced with the following sentence, which also reflects the changes described in items 6, 9.a and 13:

   "The Allowable Value recorded and maintained in a document established by the Setpoint Control Program (SCP) demonstrates that a channel is OPERABLE if the measured accuracy is found not to exceed the Allowable Value during CHANNEL CALIBRATION (protection functions implemented with digital bistable functions) or COT (protection functions implemented with analog bistable functions)."

17. See below.

   a. MHI agrees. The word "setting" in the second sentence of the third paragraph on page B 3.3.1-2 will be replaced with the word "settings."

   b. MHI agrees. The word "setpoints" in the third sentence of the last paragraph on page B 3.3.1-9 will be replaced with the word "settings."

c. MHI agrees. The last part of the first sentence in the third paragraph of page B 3.3.1-56 will be revised to read "...magnitude of equipment drift in accordance with Section 5.5.21, Setpoint Control Program (SCP)."

d. MHI agrees. The last part of the first sentence in the third paragraph of page B 3.3.1-57 will be revised to read "...magnitude of equipment drift in accordance with Section 5.5.21, Setpoint Control Program (SCP)."

e. MHI agrees. The last part of the first sentence in the next to last paragraph of page B 3.3.2-68 will be revised to read "...magnitude of equipment drift in accordance with Section 5.5.21, Setpoint Control Program (SCP)."

f. MHI agrees. The word "accuracy" will be deleted from the third sentence of the first paragraph on page B 3.3.2-4. Also, the word "accuracy" will be deleted from the third sentence of the first paragraph on page B 3.3.1-6.

g. MHI agrees. The word "accuracy" will be deleted from the first sentence of the last paragraph on page B 3.3.6-5. Also, the word "accuracy" will be deleted from the second sentence of the fifth paragraph on page B 3.3.2-5.

Impact on DCD

The remaining responses described above will result in the following changes to Chapter 16 of the DCD and MUAP-09022:

1. The last sentence of the fourth paragraph on page 1.1-2 will be replaced with the following sentence:

> ~~The confirmed setpoint are monitored on the safety VDUs.~~ During the calibration of the instrument, the analog signal generated by the instrument is confirmed via the calibration settings on any VDU (e.g., Operational VDU or Safety VDU).

2. SR 3.1.9.1 on page 3.1.9-3 will be replaced with the following sentence:

> Perform a CHANNEL CALIBRATION ~~TEST~~ on power range and intermediate range channels ~~per~~ consistent with SR 3.3.1.10, and Specification 5.5.21, Setpoint Control Program (SCP).

3. SRs 3.3.1.9, 3.3.1.10, 3.3.1.11, 3.3.2.7 and 3.3.6.3 will be revised to read as follows:

> Perform a CHANNEL CALIBRATION on each required channel consistent with Specification 5.5.21, Setpoint Control Program (SCP).

4. Footnote (j) will be added for Function 6 on page 3.3.1.-15 as follows:

Table 3.3.1-1 (page 2 of 9)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
5. High Source Range Neutron Flux	2[(d)]	2	I,J	SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.10 SR 3.3.1.13

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
	$3^{(a)}$, $4^{(a)}$, $5^{(a)}$	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.13
6. Overtemperature $\Delta T^{(i)}$	1,2	3	F	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.13

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(i)   Refer to Note 1 after this table.

5. Footnote (k) will be added for Function 7 on page 3.3.1.-16:

Table 3.3.1-1 (page 3 of 9)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
7. Overpower $\Delta T^{(k)}$	1,2	3	F	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.13
8. Pressurizer Pressure				
a. Low Pressurizer Pressure	$1^{(e)}$	3	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13
b. High Pressurizer Pressure	1,2	3	F	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13
9. High Pressurizer Water Level	$1^{(e)}$	3	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13
10. Low Reactor Coolant Flow	$1^{(e)}$	3 per loop	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13

11. Low Reactor Coolant Pump (RCP) Speed	1(e)	3	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(k) Refer to Note 2 after this table.

6. There is no impact on the DCD for item 6.

7. The first sentence in SR 3.3.5.3 on page 3.3.5-2 will be revised as follows:

Perform CHANNEL CALIBRATION for LOP undervoltage relays in accordance consistent with the SCP Specification 5.5.21, Setpoint Control Program (SCP), with following time delays:

8. Specification 5.5.21 b on page 3.3.5-20 will be revised as follows:

The Limiting Trip Setpoint (LTSP), Nominal Trip Setpoint (NTSP), Allowable Value (AV), As-Found Tolerance (AFT) Performance Test Acceptance Criteria (PTAC), and As-Left Tolerance (ALT) Calibration Tolerance (CT) for each Technical Specification required automatic protection instrumentation function shall be calculated in conformance with the instrumentation setpoint methodology previously reviewed and approved by the NRC in [Title, Revision No., dated Month dd, yyyy, (MLxxxxxxxxx)] and the conditions stated in the associated NRC safety evaluation, [Letter to MHI from NRC, Title, dated Month, dd, yyyy, MLxxxxxxxxx)].

9. See below:

a. MHI will revise sections 5.3.1 and 5.3.2 of MUAP-09022 and add a new section 5.3.2.2 with a new Figure 5-7 in MUAP-09022.

5.3.1 Protection Functions via Analog Bistables

Figure 5-5 illustrates the relationships between the trip setpoints and other parameters for protection functions implemented via conventional analog bistables. This figure illustrates how NTSP is derived, and how PTAC and AV are related to the trip setpoints. The protection functions implemented via analog bistables are associated with the DAS., the reactor trip on a turbine trip (TT) function and the loss of power (LOOP) signal, e.g., under voltage (UV).

5.3.2 Protection Functions via Digital Bistables

Figure 5-6 illustrates the relationships between the trip setpoint and other parameters for protection functions implemented via digital bistables. This figure illustrates how the NTSP is derived, and how PTAC and AV are related to the calibration setting. The protection functions implemented via digital bistables in the US-APWR are all those that are not implemented via analog bistables (identified above) and those not originating as binary measurements (identified below).

5.3.2.2 Binary Sensors

Figure 5-7 illustrates the relationships between the trip setpoint and other parameters for

protection functions implemented via binary sensors connected to digital PSMS channels. These functions are 1) reactor trip (RT) on turbine trip (TT) via low turbine oil pressure (pressure switch) and 2) Loss of Power (LOP) signal (UV relay).
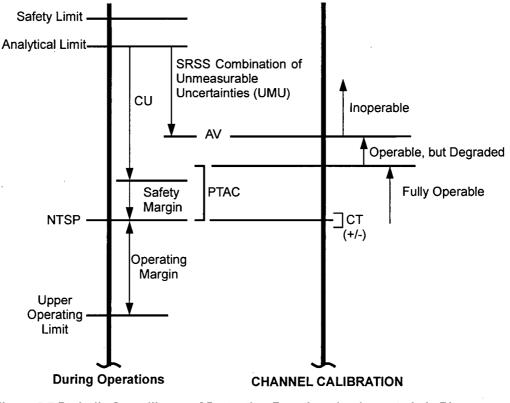
Binary sensors connected to PSMS are surveilled the same way as analog sensors connected to PSMS, whereby channel calibration confirms the complete channel accuracy in one step for periodic surveillance, with the exception that channel accuracy is checked at the binary sensor trip setting. AV, PTAC and CT limits are therefore applied to the NTSP.

The AV is used during channel calibration to determine operability. The PTAC term is described in Section 5.4. PTAC is used (relative to NTSP) to determine degradation, thus avoiding the use of excessive tolerances as required by Reference 3.2.4 (RIS 2006-17). Plant procedures will reflect this approach (increasing process; invert for decreasing process):

- If the as-found trip value is less than NTSP + PTAC, then the channel is fully operable

- If the as-found trip value is greater than NTSP + PTAC and less than AV, then the channel is operable but degraded, and corrective action is required to restore the channel to within specifications.

- If the as-found trip value is greater than AV, then the channel is inoperable, and corrective action is required, including those actions required by 10 CFR 50.36 when automatic protective devices do not function as required.

During Operations   CHANNEL CALIBRATION

Figure 5-7 Periodic Surveillance of Protection Functions Implemented via Binary

Sensors Connected to PSMS (Increasing Process)

The first sentence of 5.5.21.d will be revised as follows:

> For each Technical Specification required automatic protection instrumentation function implemented with <u>a binary sensor connected to a digital channel or</u> an analog bistable function, performance of a CHANNEL CALIBRATION surveillance <u>(binary sensors connected to digital channels) or a COT-analog surveillance (analog bistables)</u> shall include the following:

In addition, SR 3.3.6.2 will be revised as follows:

> SR 3.3.6.2   Perform ~~CHANNEL OPERATION TEST~~ <u>COT-analog</u>.

And the fifth and sixth sentences in the second paragraph of page B 3.3.6-3 will be revised as follows:

> The trip setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for measurement errors detectable by the COT<u>-analog</u>. The Allowable Value serves as the Technical Specification OPERABILITY limit for the purpose of the COT<u>-analog</u>.

And the third sentence in the third paragraph of page B 3.3.6-3 will be revised as follows:

> The trip setpoint value is therefore considered a "nominal" value (i.e. expressed as a value without inequalities) for the purposes of COT<u>-analog</u> and CHANNEL CALIBRATION.

Finally, the first sentence of the first paragraph on page B 3.3.6-13 will be revised as follows:

> A COT<u>-analog</u> is performed on each required channel to ensure the entire channel will perform the intended Function.

b. The following sentence will be inserted after the first sentence of the last paragraph in 5.5.21.d:

> The instrument channel trip setting shall be set or confirmed to be within the specified CT around the NTSP at the completion of each COT-analog surveillance.

10. The following sentence will be inserted after the first sentence of the last paragraph in 5.5.21.c:

> The instrument channel calibration settings shall be set or confirmed to be within the specified CT around the five calibration settings (0, 25, 50, 75 and 100 percent) at the completion of each CHANNEL CALIBRATION surveillance.

11. Specification 5.5.21.e will be revised as follows:

> For each Technical Specification required automatic protection instrumentation function implemented with an analog bistable function, the difference between the instrument channel trip setting as-found value and <u>the as-left trip setting value or</u> the specified NTSP shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis.
>
> <u>For each Technical Specification required automatic protection instrumentation function implemented with a binary sensor (e.g., pressure switches, UV relays), the difference between the instrument channel trip setting as-found value and the as-left trip setting value or the specified NTSP shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis.</u>
>
> <u>For each Technical Specification required automatic protection instrumentation function implemented with a digital bistable function, the difference between the instrument channel calibration setting (0, 25, 50, 75 and 100 percent) as-found and as-left values</u>

shall be trended and evaluated to verify that the instrument channel is functioning in accordance with its design basis.

12. a. The following sentence will be added to Reviewers Note 2 in Specification 5.5.21:

    For each Technical Specification required automatic protection instrumentation function implemented with a digital bistable function, the as-left value of the instrument channel calibration setting shall be the value at which the channel was set or left at the completion of the surveillance with no additional adjustment of the instrument channel.

    b. The first sentence in the third paragraph on page B 3.3.6-13 will be deleted as follows:

    ~~The difference between the current "as-found" value and the previous test "as-left" value must be consistent with the drift allowance used in the setpoint methodology.~~ The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology

13. The first sentence of the third paragraph on page B 3.3.1-2 will be revised as follows:

    The Allowable Value ~~administered in~~ recorded and maintained in a document established by the Setpoint Control Program (SCP) serves as the LSSS such that a channel is OPERABLE if the measured accuracy is found not to exceed the Allowable Value during CHANNEL CALIBRATION.

    The third sentence of the third paragraph on page B 3.3.1-5 will be revised as follows:

    To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RTS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 5), the Trip Setpoints ~~administered in~~ recorded and maintained in a document established by the SCP in the accompanying LCO are conservative with respect to the Analytical Limits.

    The NOTE on page B 3.3.1-6 will be revised as follows:

    The Allowable Value ~~administered in~~ recorded and maintained in a document established by the SCP is the maximum deviation at the calibration setpoints that can be measured during CHANNEL CALIBRATION. This value is included in the calculations that determined the TRIP SETPOINT ~~administered in~~ recorded and maintained in a document established by the SCP. The "expected as-found value" shall be as specified in the plant-specific setpoint analysis. The expected as-found value reflects the expected normal drift of actual plant equipment, so that a degraded device can be identified before the Allowable Value limit is reached.

    The third sentence of the third paragraph on page B 3.3.2-3 will be revised as follows:

    To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 5), the Allowable Values and Trip Setpoints ~~administered in~~ recorded and maintained in a document established by the SCP in the accompanying LCO are conservative with respect to the Analytical Limits.

    The second sentence of the third paragraph on page B 3.3.6-3 will be revised as follows:

    To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those DAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 4), the Allowable Values ~~administered in~~ recorded and maintained in a document established by the SCP in the accompanying LCO are conservative with respect to the analytical limits.

14. The last sentence of the third paragraph on page B 3.3.1-47 will be revised as follows:

The CHANNEL CALIBRATION is performed in a manner that is consistent with <u>the methods and assumptions of</u> Section 5.5.21, <u>Setpoint Control Program (SCP)</u>.

15. The last sentence of the third paragraph on page B 3.3.2-64 will be revised as follows:

The CHANNEL CALIBRATION is performed in a manner that is consistent with <u>the methods and assumptions of</u> Section 5.5.21, <u>Setpoint Control Program (SCP)</u>.

16. The second and the third paragraphs on page B 3.3.1-2 will be revised as follows:

However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the Technical Specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value. ~~The Allowable Value is another important component of the LSSS.~~

The Allowable Value ~~administered in~~ <u>recorded and maintained in a document established by</u> the Setpoint Control Program (SCP) ~~serves as the LSSS such~~ <u>demonstrates</u> that a channel is OPERABLE if the measured accuracy is found not to exceed the Allowable Value during CHANNEL CALIBRATION <u>(protection functions implemented with digital bistable functions) or COT (protection functions implemented with analog bistable functions)</u>. ...

The first sentence of Specification 5.5.21.b will be revised as shown in the response to item 8.

Specification 5.5.21.f will be revised as follows:

The SCP shall establish a document containing the current values of the specified ~~LTSP,~~ NTSP, AV, PTAC, and CT for each Technical Specification required automatic protection instrumentation function, and references to the calculation documentation. Changes to this document shall be governed by the regulatory requirements of 10 CFR 50.59. In addition, changes to the specified ~~LTSP,~~ NTSP, AV, PTAC, and CT values shall be governed by the approved setpoint methodology. This document including any midcycle revisions or supplements shall be provided upon issuance for each reload cycle to the NRC.

17. a. The second sentence of the third paragraph on page B 3.3.1-2 will be revised as follows:

The CHANNEL CALIBRATION verifies the instrument at five calibration setting<u>s</u> corresponding to 0%, 25%, 50%, 75% and 100% of the instrument range.

b. The third sentence of the last paragraph on page B 3.3.1-9 will be revised as following:

For digital functions Allowable Values are defined in terms pertinent to the channel calibration ~~setpoints~~ <u>settings</u>.

c. The last part of the first sentence in the third paragraph on page B 3.3.1-56 will be revised as follows:

[The Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in <u>accordance with</u> Section 5.5.21, <u>Setpoint Control Program (SCP)</u>. ...

d. The last part of the first sentence in the third paragraph of page B 3.3.1-57 will be revised as follows:

[The Frequency is justified by the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in <u>accordance with</u> Section 5.5.21, <u>Setpoint Control Program (SCP)</u>. ...

e. The last part of the first sentence in the next to last paragraph of page B 3.3.2-68 will be revised as follows:

[The Frequency of 24 months is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in accordance with Section 5.5.21, Setpoint Control Program (SCP). ...

f. The third sentence of the first paragraph on page B 3.3.2-4 will be revised as follows:

Any channel is considered to be properly adjusted when the "as-left" ~~accuracy~~ value is within the established Calibration Tolerance (CT) band in accordance with the methods and assumptions in the SCP.

The third sentence of the first paragraph on page B 3.3.1-6 will be revised as follows:

Any channel is considered to be properly adjusted when the "as left" ~~accuracy~~ value is within the established Calibration Tolerance (CT) band, in accordance with the methods and assumptions in the SCP.

g. The first sentence of the last paragraph on page B 3.3.6-5 will be revised as follows:

A channel is OPERABLE provided the "as-found" ~~accuracy~~ value does not exceed its associated Allowable Value.

The second sentence of the fifth paragraph on page B 3.3.2-5 will be revised as follows:

A channel is OPERABLE provided the "as-found" ~~accuracy~~ value does not exceed its associated Allowable Value. A trip setpoint may be set more conservative than the Trip Setpoint as necessary in response to plant conditions.

Impact on COLA

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

Impact on PRA

There is no impact on the PRA.