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August 23, 2012

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-12231

Subject: MHI's Response to US-APWR DCD RAI No. 937-6478 Revision 3 (SRP 14.03.11)

Reference: 1) "Request for Additional Information No. 937-6478 Revision 3, SRP Section 14.03.11 – Containment Systems and Severe Accidents - Inspections, Tests, Analyses, and Acceptance Criteria - Application Section: Tier 1, 2.11", dated May 29, 2012.

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. 937-6478 Revision 3."

Enclosed is the response to the questions contained within Reference 1.

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 provided below.

Sincerely,

Y. Ogata

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

Enclosure:

1. Response to Request for Additional Information No. 937-6478 Revision 3

D081
NRO

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-12231
Docket No. 52-021

Response to Request for Additional Information No. 937-6478
Revision 3

August 2012

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

8/23/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 937-6478 REVISION 3**
SRP SECTION:	**14.03.11 – CONTAINMENT SYSTEMS AND SEVERE ACCIDENTS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**TIER 1, 2.11**
DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-44

Tier 1 Table 2.11.1-1, ITAAC 3 – The term "physical arrangement" is more appropriate than "functional arrangement". The second part of the ITAAC (i.e. verification of the dimentions [*sic*]) should be clearly delineated in the DC/ITA/AC.

ANSWER:

The term "functional arrangement" is revised to state "physical arrangement" in DCD Tier 1 Subsection 2.11.1.1 Item 3, and DCD Tier 1 Table 2.11.1-2, ITAAC 3, DC and AC. The DC and AC delineate the required dimensions by reference to Figure 2.11.1-1, combined with the required dimensional tolerances listed in the AC. No further DCD change is required.

Impact on DCD

DCD Tier 1 Subsection 2.11.1.1 Item 3, and DCD Tier 1 Table 2.11.1-2, ITAAC 3, will be revised as described in this response and shown in 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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-45

Tier 1 Table 2.11.1-1, ITAAC 4 – The ITAAC lacks specificity as to the number, location, and size of the required drain lines.

ANSWER:

The purpose of this ITAAC is to verify diverse reactor cavity flooding capability by the drain paths from the SG compartments to the reactor cavity, based upon the following design features that are identified as PRA and Severe Accident Analysis Key Design Features as described in Table 14.3-1d, Table 19.1-119 and Section 19.2.3.3.3:

> "A set of drain lines from SG compartment to the reactor cavity is provided in order to achieve reactor cavity flooding. Spray water which flows into the SG compartment drains to the cavity and cools down the molten core after reactor vessel breach."

Thus, the design information required to be verified is the existence of the drain paths, and the ITAAC will verify the number and the functional location of these drain paths. The size of the drain paths is not a critical design requirement because of the timing of the reactor vessel breach which allows significant time for spray water to flow to the cavity.

DCD Tier 1 Table 2.11.1-2, ITAAC 4, was revised to provide the specificity of this ITAAC as part of letter UAP-HF-12135, Transmittal of the US-APWR DCD GSI-191 Tracking Report, (May 2012 Version), dated, June 1, 2012, Enclosure 1, Proposed Changes for GSI-191 Closure Activities, as follows:

1. The DC is revised to change the word "lines" to "paths", and states "A set of drain paths from the SG compartments to the reactor cavity exists."
2. The ITA is revised to change the word "lines" to "paths" and to add reference to Figure 2.4.4-1, and states "Inspections of the as-built drain paths from the as-built SG compartments to the as-built reactor cavity as shown in Figure 2.4.4-1 will be performed.

3. The AC is revised to delete the current statement “Drain lines from the as-built SG compartments to the as-built reactor cavity exist.” and replace with “Eight floor openings to provide drain paths from the as-built SG compartments to the reactor cavity through the header compartment as shown in Figure 2.4.4-1 exist.”

In addition to the changes provided as part of letter UAP-HF-12135, DCD Tier 1 Subsection 2.11.1.1 Item 4 is revised to change the word “lines” to “paths.”

Impact on DCD

Refer to Enclosure 1 of UAP-HF-12135, Transmittal of the US-APWR DCD GSI-191 Tracking Report, (May 2012 Version), dated, June 1, 2012. In addition, DCD Tier 1 Subsection 2.11.1.1 Item 4 will be revised as described in this response and shown in 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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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APPLICATION SECTION:	**TIER 1, 2.11**
DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-46

Tier 1 Table 2.11.1-1, ITAAC 5 – The ITAAC lacks specificity. A diagram should be provided with the necessary details to verify its adequacy.

ANSWER:

DCD Tier 2, Subsection 6.2.1.2.2, states that the area under the reactor vessel is designed to hold molten core debris in case of a Severe Accident, and refers to DCD Tier 2, Figures 6.2.1-70 and 6.2.1-71. DCD Tier 1 Figure 2.2-10 provides the same details as DCD Tier 2, Figure 6.2.1-70. Therefore, DCD Tier 1 Subsection 2.11.1.1 Item 5, and the DC and AC for DCD Tier 1, Table 2.11.1-2, ITAAC 5, is revised to refer to DCD Tier 1 Figure 2.2-10.

Impact on DCD

DCD Tier 1 Subsection 2.11.1.1 Item 5, and DCD Tier 1, Table 2.11.1-2, ITAAC 5, will be revised as described in this response and shown in Attachments 1 and 2, respectively.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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APPLICATION SECTION:	**TIER 1, 2.11**
DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-47

Tier 1 Table 2.11.1-1, ITAAC 6 – What is the intent of the analysis? The required dimensions are given.

ANSWER:

DCD Tier 1, Table 2.11.1-2, ITAAC 6, ITA is revised to delete "and analysis" because simple hand calculations are used for determining the as-built reactor cavity floor area and depth based on the as-built dimensions of the reactor cavity area.

Impact on DCD

DCD Tier 1, Table 2.11.1-2, ITAAC 6, will be revised as described in this response and shown in Attachment 2.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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SRP SECTION: 14.03.11 – CONTAINMENT SYSTEMS AND SEVERE ACCIDENTS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

APPLICATION SECTION: TIER 1, 2.11

DATE OF RAI ISSUE: 5/29/2012

QUESTION NO.: 14.03.11-48

Tier 1 Table 2.11.2-2, ITAAC 6.a.i – Table 2.11.2-1 identifies RMS-MOV-003 as not required to be qualified for a Harsh Environment but Appendix 3D Table 2D-2 identifies the valve is in a harsh radiation environment.

ANSWER:

MHI's response to RAI 945-6452, Question 14.03-13, provides for a generic discussion of changes to DCD Tier 1 equipment tables and DCD Tier 2, Appendix 3D to correct discrepancies in identifying equipment to be qualified for a Harsh Environment, including this discrepancy. DCD Tier 2, Subsection 3.11.1.2, defines Harsh Environment and states in the fourth sentence of the second paragraph that, "These environmental conditions that the equipment is qualified for include applicable time dependent temperature and pressure profiles, humidity, chemical effects, radiation, ...". Therefore, DCD Tier 1, Table 2.11.2-1 (Sheet 5 of 10), is revised to indicate "Yes" for "Qual. for Harsh Envir." for both RMS-MOV-002 and RMS-MOV-003.

Impact on DCD

DCD Tier 1, Table 2.11.2-1 (Sheet 5 of 10), will be revised as described in this response, and will be provided in an attachment to MHI's response to RAI 945-6452, Question 14.03-13.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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RAI NO.: **NO. 937-6478 REVISION 3**

SRP SECTION: **14.03.11 – CONTAINMENT SYSTEMS AND SEVERE ACCIDENTS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**

APPLICATION SECTION: TIER 1, 2.11

DATE OF RAI ISSUE: **5/29/2012**

QUESTION NO.: 14.03.11-49

Tier 1 Table 2.11.2-2, ITAAC 14 – Clarify the ITAAC, MOVs fail as is with loss of motive power?

ANSWER:

The MOV valves indicated in DCD Tier 1, Table 2.11.2-2, ITAAC 14 AC do fail "As-Is" as specified in DCD Tier 1, Tables 2.4.6-2 and 2.11.2-1, as summarized below:

a. CVS-MOV-203, 204 Loss of Motive Power Position = As Is
b. IAS-MOV-002 Loss of Motive Power Position = As Is

But these valves are powered by Class 1E dc power sources, so the loss of motive power would be a loss of their Class 1E dc power source. In the event of an SBO event with alternate ac power sources unavailable, the valves would still have motive power available to be automatically isolated by their respective protection and safety monitoring system (PSMS) signals as shown in DCD Tier 1 Tables 2.4.6-2 and 2.11.2-1, respectively. To clarify the ITAAC, the existing DC, ITA, and DC are revised as follows:

- The DC will state "Containment penetrations are capable of automatically isolating on their respective PSMS control signals during an SBO event with alternate ac power sources unavailable."
- The ITA will state "Tests of the as-built valves will be performed to verify the valves are capable of automatically isolating on their respective PSMS control signals during the conditions of an SBO event with alternate ac power sources unavailable."
- The AC will state "Each of the following as-built valves automatically isolate on their respective PSMS control signals identified in Table 2.11.2-1 during the conditions of an SBO event with alternate ac power sources unavailable.

  CVS-MOV-203, 204

LMS-AOV-104, 105
IAS-MOV-002
VCS-AOV-306, 307, 356, 357"

Impact on DCD

DCD Tier 1, Table 2.11.2-2, ITAAC 14, will be revised as described in this response and shown in Attachment 3.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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APPLICATION SECTION:	**TIER 1, 2.11**
DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-50

Tier 1 Table 2.11.2-2, ITAAC 15 – The ITAAC should be verified by test not inspection.

ANSWER:

DCD Tier 1, Table 2.11.2-2, ITAAC 15, ITA is revised to state "Tests of the remotely operated CIVs located inside and outside the containment in series on the same penetration will be performed."

Impact on DCD

DCD Tier 1, Table 2.11.2-2, ITAAC 15, will be revised as described in this response and shown in Attachment 4.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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APPLICATION SECTION:	**TIER 1, 2.11**
DATE OF RAI ISSUE:	**5/29/2012**

QUESTION NO.: 14.03.11-51

Tier 1 Table 2.11.4-1, ITAAC 6 – The ITAAC should be verified by test not inspection.

ANSWER:

DCD Tier 1, Table 2.11.4-1, ITAAC 6, DC and AC were previously revised by the response to RAI 871-6121 Question 19-560, submitted by letter UAP-HF-12181 dated June 27, 2012. In response to this additional question, the DC and AC are revised, and the appropriate ITA is specified, to provide a separate ITAAC 6.a for verifying the power sources to the twenty hydrogen igniters of the CHS similar to the original ITAAC 6, and a new ITAAC 6.b for verification of the capacity of the dedicated batteries to eleven out of twenty hydrogen igniters of the CHS.

- The DC for ITAAC 6.a will state "The twenty hydrogen igniters of the CHS shown in Figure 2.11.4-1 are powered by two non-class 1E buses, with non-class 1E alternate ac (AAC) power sources."

- The ITA for ITAAC 6.a will state "Tests will be performed on the twenty as-built hydrogen igniters of the CHS."

- The AC for ITAAC 6.a will state "The twenty as-built hydrogen igniters of the CHS shown in Figure 2.11.4-1 are powered by two non-class 1E buses, with non-class 1E AAC power sources."

- The DC for ITAAC 6.b will state "Dedicated batteries are provided with the capacity to provide power for at least 24 hours to eleven out of twenty hydrogen igniters of the CHS."

- The ITA for ITAAC 6.b.i will state "Analysis will be performed to verify dedicated batteries have enough capacity to carry the load profile of eleven out of twenty hydrogen igniters of the CHS for a duration of twenty-four hours assuming charger is unavailable."

- The AC for ITAAC 6.b.i will state "A report exists and concludes that the dedicated batteries have enough capacity to carry the load profile of eleven out of twenty hydrogen igniters of the CHS for a duration of twenty-four hours assuming charger is unavailable."

- The ITA for ITAAC 6.b.ii will state "A capacity test of the as-built dedicated batteries will be performed."

- The AC for ITAAC 6.b.ii will state "Capacity of the as-built dedicated batteries carries greater than or equal to the analyzed load profile."

Impact on DCD

DCD Tier 1, Table 2.11.4-1, ITAAC 6, will be revised as new ITAAC 6.a and 6.b as described in this response and shown in Attachment 5.

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 the PRA.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

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

Attachment 1 to
RAI 937-6478

2.11 CONTAINMENT SYSTEMS

The containment vessel (C/V), commonly referred to as the containment or prestressed concrete containment vessel (PCCV), is addressed in this section, along with the following related systems:

- The containment isolation system (CIS)
- The containment spray system (CSS)
- The containment hydrogen monitoring and control system (CHS)

2.11.1 Containment Vessel

2.11.1.1 Design Description

The containment is a safety-related structure with the primary purpose of providing an essentially leak tight barrier that safely accommodates calculated temperature and pressure conditions resulting from the complete size spectrum of piping breaks, up to and including a double-ended, guillotine type break of a reactor coolant loop or main steam line. Key containment design and performance characteristics are provided in Table 2.11.1-1.

Instruments are installed to monitor conditions inside the containment and actuate appropriate safety functions when an abnormal condition is sensed. These instruments send information to the protection and safety monitoring system (PSMS), diverse actuation system (DAS), and plant control and monitoring system (PCMS), as described in Section 2.5.

1.a Deleted.

1.b The PCCV liner is fabricated, installed, and inspected in accordance with ASME Code, Section III requirements.

1.c The PCCV liner welds meet ASME Code, Section III requirements for non-destructive examination of welds.

2. Deleted.

3. The ~~functional~~physical arrangement of the PCCV is as described in the Design Description of Subsection 2.11.1.1 and as shown in Figure 2.11.1-1. DCD_14.03.11-44

4. A set of drain ~~lines~~paths from the SG compartments to the reactor cavity exists. DCD_14.03.11-45

5. The reactor cavity includes a core debris trap as shown in Figure 2.2-10. DCD_14.03.11-46

6. The reactor cavity floor area and depth facilitate debris spreading and cooling.

7. Reactor cavity floor concrete provides protection for the liner plate.

2.11.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.11.1-2 describes the ITAAC for the PCCV.

Attachment 1 to RAI 937-6478

Table 2.11.1-2 Containment Vessel Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a Deleted.	1.a Deleted.	1.a Deleted.
1.b The PCCV liner is fabricated, installed, and inspected in accordance with ASME Code, Section III requirements.	1.b Inspection of the as-built PCCV liner will be performed.	1.b The ASME Code, Section III data report(s) (certified, when required by ASME Code) and inspection reports (including N-5 Data Reports where applicable) exist and conclude that the as-built PCCV liner was fabricated, installed, and inspected in accordance with ASME Code, Section III requirements.
1.c The PCCV liner welds meet ASME Code, Section III requirements for non-destructive examination of welds.	1.c Inspections of the as-built PCCV liner welds will be performed in accordance with ASME Code, Section III.	1.c The ASME Code, Section III code reports exist and conclude that the ASME Code, Section III requirements are met for non-destructive examination of the as-built PCCV liner welds.
2. Deleted.	2. Deleted.	2. Deleted.
3. The ~~functional~~ physical arrangement of the PCCV is as described in the Design Description of Subsection 2.11.1.1 and as shown in Figure 2.11.1-1.	3. Inspections of the as built PCCV will be performed.	3. The as-built PCCV conforms to the ~~functional~~ physical arrangement as described in the Design Description of Subsection 2.11.1.1 and as shown in Figure 2.11.1-1 with the following dimensional tolerances: D1, R1: +6.0/-6.0 inches H1, H2, H3: +3.0/-3.0 inches H4: +6.0/-6.0 inches t1, t2, t3: +3.0/-3.0 inches
4. A set of drain ~~lines~~paths from the SG compartments to the reactor cavity exists.	4. Inspections of the as-built drain ~~lines~~paths from the as-built SG compartments to the as-built reactor cavity as shown in Figure 2.4.4-1 will be performed.	4. ~~Drain lines from the as-built SG compartments to the as-built reactor cavity exist.~~ Eight floor openings to provide drain paths from the as-built SG compartments to the reactor cavity through the header compartment as shown in Figure 2.4.4-1 exist.

DCD_14.03.11-44

MIC-03-T1-0006

Attachment 2 to
RAI 937-6478

Table 2.11.1-2 Containment Vessel Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. The reactor cavity includes a core debris trap as shown in Figure 2.2-10.	5. An inspection of the as-built reactor cavity will be performed.	5. The as-built reactor cavity includes a core debris trap as shown in Figure 2.2-10.
6. The reactor cavity floor area and depth facilitate debris spreading and cooling.	6. Inspections ~~and analyses~~ of the as-built reactor cavity floor area and depth will be performed.	6. The as-built reactor cavity floor area and depth are greater than or equal to 970 ft^2 and 20 ft, respectively, to facilitate debris spreading and cooling.
7. Reactor cavity floor concrete provides protection for the liner plate.	7. Inspections of the as-built reactor cavity floor concrete will be performed.	7. The as-built reactor cavity floor concrete thickness is greater than or equal to 3 ft to provide protection for the liner plate.

DCD_14.03.11-46

DCD_14.03.11-47

and following a design basis accident without loss of safety function for the time required to perform the safety function.

6.b Class 1E equipment, identified in Table 2.11.2-1, is powered from its respective Class 1E division.

6.c Separation is provided between redundant divisions of CIS Class 1E cables, and between Class 1E cables and non-Class 1E cables.

7. The remotely operated valves identified in Table 2.11.2-1 as having PSMS control perform an active safety function after receiving a signal from PSMS.

8. CIV closure times are established to limit potential releases of radioactivity to amounts as low as reasonably achievable.

9. The Containment Isolation System (CIS) provides a safety-related function of containment isolation to prevent or limit the release of fission products to the environment in the event of an accident.

10. Controls are provided in the MCR to open and close the remotely operated valves identified in Table 2.11.2-3.

11.a Displays identified in Table 2.11.2-3 are provided in the MCR.

11.b Displays and controls identified in Table 2.11.2-3 are provided in the RSC.

12. The motor-operated, air-operated and check valves, identified in Table 2.11.2-1 as having an active safety function, perform an active safety function to change position as indicated in the table.

13. After loss of motive power, the remotely operated valves, identified in Table 2.11.2-1, assume the indicated loss of motive power position.

14. Containment penetrations are ~~isolated~~ capable of automatically isolating on their respective PSMS control signals during an SBO event with alternate ac power sources unavailable. DCD_14.03.11-49

15. Remotely operated CIVs located inside and outside the containment in series on the same penetration are powered from different Class 1E divisions.

2.11.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.11.2-2 describes the ITAAC for the CIS.

The MSIVs and MSBIVs ITAAC for closure times and testing in response to a closure signal are described in ITAAC Table 2.7.1.2-5 Items 8.b and 14.

Attachment 3 to RAI 937-6478

Table 2.11.2-2 Containment Isolation System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 10 of 10)

14. Containment penetrations are capable of automatically isolating on their respective PSMS control signals during an SBO event with alternate ac power sources unavailable.	14. Tests of the as-built valves will be performed to verify the valves are capable of automatically isolating on their respective PSMS control signals during the conditions of an SBO event with alternate ac power sources unavailable.	14. Each of the following as-built valves automatically isolate on their respective PSMS control signals identified in Table 2.11.2-1 during the conditions of an SBO event with alternate ac power sources unavailable CVS-MOV-203, 204 LMS-AOV-104, 105 IAS-MOV-002 VCS-AOV-306, 307, 356, 357

DCD_14.03.11-49

Attachment 4 to
RAI 937-6478

Table 2.11.2-2 Containment Isolation System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 10 of 10)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15. Remotely operated CIVs located inside and outside the containment in series on the same penetration are powered from different Class 1E divisions.	15. ~~Inspection~~Tests of the remotely operated CIVs located inside and outside the containment in series on the same penetration will be performed.	15. The following CIVs located inside and outside the containment in series on the same penetration are powered from different Class 1E divisions.

DCD_14.03.11-50

Inside containment	Outside containment
RCS-AOV-147	RCS-AOV-148
CVS-AOV-005	CVS-AOV-006
CVS-MOV-203	CVS-MOV-204
NCS-MOV-436A ~~NCS-MOV-447A~~	NCS-MOV-438A ~~NCS-MOV-448A~~
NCS-MOV-436B ~~NCS-MOV-447B~~	NCS-MOV-438B ~~NCS-MOV-448B~~
LMS-AOV-052	LMS-AOV-053
LMS-AOV-055	LMS-AOV-056 LMS-AOV-060
LMS-LCV-010A	LMS-LCV-010B
LMS-AOV-104	LMS-AOV-105
PSS-AOV-003 PSS-MOV-006 PSS-MOV-013	PSS-MOV-031A
PSS-MOV-023	PSS-MOV-031B
PSS-AOV-062A PSS-AOV-062B PSS-AOV-062C PSS-AOV-062D	PSS-AOV-063
RWS-MOV-002	RWS-MOV-004
VCS-AOV-306	VCS-AOV-307
VCS-AOV-305	VCS-AOV-304
VCS-AOV-356	VCS-AOV-357
VCS-AOV-355	VCS-AOV-354
VWS-MOV-422	VWS-MOV-407
RMS-MOV-001	RMS-MOV-002
IGS-AOV-002	IGS-AOV-001

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(approximately 10% hydrogen in air), thereby preventing further hydrogen accumulation that could become a threat to containment integrity.

1. The functional arrangement of the CHS is as described in the Design Description of Subsection 2.11.4.1 and as shown in Figure 2.11.4-1.

2. Deleted.

3. The hydrogen igniters, identified on Figure 2.11.4-1, are energized after receiving an ECCS actuation signal.

4. An alarm and a display for containment hydrogen concentration measured by a hydrogen concentration detector of the CHS are provided in the MCR.

5. Controls are provided in the MCR to energize and deenergize the twenty hydrogen igniters of the CHS.

6.a The twenty hydrogen igniters of the CHS shown in Figure 2.11.4-1 are powered by two non-class 1E buses~~(i.e., ten igniters per bus)~~ with non-class 1E alternate ac (AAC) power sources. DCD_19-560

DCD-14.03.11-51

6.b Dedicated batteries have enough capacity to carry the load profile of eleven out of twenty hydrogen igniters of the CHS for a duration of twenty-four hours assuming charger is unavailable.

2.11.4.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.11.4-1 describes the ITAAC for the CHS.

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Table 2.11.4-1 Containment Hydrogen Monitoring and Control System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
1. The functional arrangement of the CHS is as described in the Design Description of Subsection 2.11.4.1 and as shown in Figure 2.11.4-1.	1. Inspection of the as-built CHS will be performed.	1. The as-built CHS conforms to the functional arrangement as described in the Design Description of Subsection 2.11.4.1 and as shown in Figure 2.11.4-1.	
2. Deleted.	2. Deleted.	2. Deleted.	
3. The hydrogen igniters, identified on Figure 2.11.4-1, are energized after receiving an ECCS actuation signal.	3. Tests will be performed on the as-built hydrogen igniters, identified on Figure 2.11.4-1, using a simulated signal.	3. The as-built hydrogen igniters, identified on Figure 2.11.4-1, are energized after receiving a simulated signal.	
4. An alarm and a display for containment hydrogen concentration measured by a hydrogen concentration detector of the CHS are provided in the MCR.	4. Inspection will be performed for retrievability of the alarm and display for containment hydrogen concentration measured by a hydrogen concentration detector of the CHS in the as-built MCR.	4. An alarm and a display for containment hydrogen concentration measured by a hydrogen concentration detector of the CHS can be retrieved in the as-built MCR.	
5. Controls are provided in the MCR to energize and deenergize the twenty hydrogen igniters of the CHS.	5. Tests will be performed on the twenty as-built hydrogen igniters using controls in the as-built MCR.	5. Controls in the as-built MCR energize and deenergize each of the twenty as-built hydrogen igniters of the CHS.	
6.a. The twenty hydrogen igniters of the CHS shown in Figure 2.11.4-1 are powered by two non-class 1E buses~~ (i.e., ten igniters per bus),~~ with non-class 1E alternate ac (AAC) power sources.	6.a. ~~Inspections~~Tests will be performed on the twenty as-built hydrogen igniters of the CHS.	6.a. The twenty as-built hydrogen igniters of the CHS shown in Figure 2.11.4-1 are powered by two non-class 1E buses~~ (i.e., ten igniters per bus),~~ with non-class 1E AAC power sources.	DCD_14.03.11-51 DCD_19-560 DCD_14.03.11-51
6.b. Dedicated batteries are provided with the capacity to provide power for at least 24 hours to eleven out of twenty hydrogen igniters of the CHS.	6.b.i Analysis will be performed to verify dedicated batteries have enough capacity to carry the load profile of eleven out of twenty hydrogen igniters of the CHS for a duration of twenty-four hours assuming charger is unavailable.	6.b.i A report exists and concludes that the dedicated batteries have enough capacity to carry the load profile of eleven out of twenty hydrogen igniters of the CHS for a duration of twenty-four hours assuming charger is unavailable.	DCD_14.03.11-51
	6.b.ii A capacity test of the as-built dedicated batteries will be performed.	6.b.ii Capacity of the as-built dedicated batteries carries greater than or equal to the analyzed load profile.	DCD_14.03.11-51