MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

April 6, 2009

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco,

Docket No. 52-021
MHI Ref: UAP-HF-09157

Subject: MHI's Responses to US-APWR DCD RAI No. 182-1888 Revision 0

Reference: 1) "Request for Additional Information No. 182-1888 Revision 0, SRP Section: 14.03.06 - Electrical Systems - Inspections, Tests, Analyses, and Acceptance Criteria Application Section: DCD Tier 1 Section 2.6" dated February 09, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No. 182-1888 Revision 0."

Enclosed are the responses to Questions 14.03.06-06 through 14.03.06-14 that are 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. Responses to Request for Additional Information No.182-1888 Revision 0

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

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

D081
NRO

Enclosure 1

UAP-HF-09157
Docket No. 52-021

Responses to Request for Additional Information No. 182-1888
Revision 0

April 2009

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-06

The following typographical or editorial errors were noted in US-APWR Tier 2, Chapter 14, Section 14.3.4.6 and Tier 1, Chapter 2, Section 2.6:

1. Page 2.6-6, Table 2.6.1-3, Item 5, Design Commitment description: "Each Class 1E EPS is located in separate rooms" should be "Each Class 1E EPS is located in a separate room."
2. Page 2.6-6, Table 2.6.1-3, Item 5, Acceptance Criteria description: "The as-built each EPS is located in the separate rooms in the seismic Category I buildings" should be "Each as-built EPS is located in a separate room in the seismic Category I buildings."
3. Page 2.6-7, Table 2.6.1-3, Items 10, and 11b, Acceptance Criteria description: "The results of analyses" should be "The results of the analyses."
4. Pages 2.6-8 and 2.6-9, Table 2.6.1-3, Items 11b, 12, and 18, Acceptance Criteria description: "The result of analysis" should be "The results of the analysis."
5. Page 2.6-14, Table 2.2.2-2, Item 2, Acceptance Criteria description: "and/or analysis" should be "and/or analyses."
6. Pages 2.6-14-2.6-16, Table 2.6.2-2, Items 3, 6, 11, 12, and 14, Acceptance criteria description: "The result of analysis" should be "The results of the analysis."
7. Page 2.6-15, Table 2.6.2-2, Item 7, Acceptance Criteria description: "The result of test concludes" should be "The results of the test conclude."
8. Page 2.6-15, Table 2.6.2-2, Item 9, Design Commitment and Acceptance Criteria statements, Last Word: "room" should be "rooms."
9. Page 2.6-18, Section 2.6.3.1, Third Paragraph, First Sentence, "power supply system division are located in separate rooms" should be "power supply system division is located in a separate room."
10. Page 2.6-18, Section 2.6.3.1, Fourth Paragraph, "Transfer from UPS unit" should be "Transfer from the UPS unit.
11. Page 2.6-18, Section 2.6.3.1, Fourth Paragraph, "automatic on undervoltage" should be "automatic on an undervoltage"
12. Page 2.6-21, Table 2.6.3-3, Item 2, Acceptance Criteria description: "result of analysis concludes" should be "result of the analysis concludes."
13. Page 2.6-21, Table 2.6.3-3, Item 3, Design Commitment description: "Tabel" should be "Table."
14. Page 2.6-21, Table 2.6.3-3, Item 3, Acceptance Criteria description: "type tests and/or analysis" should be "type tests and/or analyses."
15. Page 2.6-21, Table 2.6.3-3, Item 3, Acceptance Criteria description: "is designed seismic Category I" should be "is designed as seismic Category I."
16. Page 2.6-21, Table 2.6.3-3, Item 5, Design Commitment description: "Each Class 1E I&C power system equipment is located in separate rooms" should be "Equipment for each Class 1E I&C power supply system is located in a separate room."

17. Page 2.6-21, Table 2.6.3-3, Item 5, Inspection, Tests, Analyses description: "system equipment." should be "system equipment will be performed."
18. Page 2.6-21, Table 2.6.3-3, Item 5, Acceptance Criteria description: "Each asbuilt Class 1E I&C power system equipment is located in separate rooms" should be "Equipment for each as-built Class 1E I&C power supply system is located in a separate room."
19. Page 2.6-22, Table 2.6.3-3, Item 8, Design Commitment description: "Power supply to Class 1E panel board from Class 1E UPS unit is transferred to transformer automatically on undervoltage signal" should be "The Power supply to the Class 1E panel board from the Class 1E UPS unit is transferred to the transformer automatically on an undervoltage signal."
20. Page 2.6-22, Table 2.6.3-3, Item 8, Inspection, Tests, Analyses description: "performed to verify that power supply" should be "performed to verify that the power supply."
21. Page 2.6-22, Table 2.6.3-3, Item 8, Inspection, Tests, Analyses description: "automatically on undervoltage signal." should be "automatically on an undervoltage signal."
22. Page 2.6-22, Table 2.6.3-3, Item 8, Acceptance Criteria description: "The result of test concludes that power supply to the" should be "The results of the test conclude that the power supply to the."
23. Page 2.6-22, Table 2.6.3-3, Item 8, Acceptance Criteria description: "automatically on undervoltage signal." should be "automatically on an undervoltage signal."
24. Page 2.6-22, Table 2.6.3-3, Item 9, Acceptance Criteria description: "The result of test concludes" should be "The results of the test conclude."
25. Page 2.6-23, Table 2.6.3-3, Item 11, Acceptance Criteria description: "The result of analysis" should be "The results of the analysis."
26. Page 2.6-23, Table 2.6.3-3, Item 14, Acceptance Criteria description: "The result of test concludes" should be "The results of the test conclude."
27. Page 2.6-23, Table 2.6.3-3, Item 14, Design Commitment description: "The alarms initiate in MCR" should be "Alarms initiate in the MCR."
28. Page 2.6-25, Section 2.6.4.1, EPS Design Description, First Paragraph, First Sentence: "Emergency power supply" should be "The emergency power supply."
29. Page 2.6-25, Section 2.6.4.1, EPS Design Description, First Paragraph, First Sentence: "provided by an Class 1E" should be "provided by a Class 1E."
30. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Second Paragraph, First Sentence: "The Class 1E" should be "Each Class 1E."
31. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Second Paragraph, Second Sentence: "are required to perform safety" should be "are required for the Class 1E EPS to perform the safety."
32. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Third Paragraph: "The Class 1E EPSs are sized to provide power to safety-related loads subsequent to LOOP or LOOP and concurrent LOCA conditions." should be "The Class 1E EPSs are sized to provide power to safety-related loads subsequent to a LOOP or a LOOP and concurrent LOCA conditions."
33. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Fifth Paragraph: "The Class 1E EPSs are capable to provide power at set voltage and frequency to the Class 1E 6.9kV buses within 100 seconds from the start signal." should be "The Class 1E EPSs are capable of providing power at a set voltage and frequency to the Class 1E 6.9kV buses within 100 seconds from a start signal."
34. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Seventh Paragraph, First Sentence: "initiates automatic start" should be "initiates an automatic start."
35. Page 2.6-25, Section 2.6.4.1, EPS Design Description, Ninth Paragraph: "capable to respond" should be "capable of responding."
36. Page 2.6-26, Section 2.6.4.2, EPS Fuel Oil Storage and Transfer Systems (FOS) Design Description, Paragraph One, First Bullet: "The FOS is a safety-related system." should be The FOS are safety-related systems.
37. Page 2.6-26, Section 2.6.4.2, EPS Fuel Oil Storage and Transfer Systems (FOS) Design Description, Paragraph One, Bullets Two and Three: "FOS systems" should be "FOS."
38. Page 2.6-26, Section 2.6.4.2, EPS Fuel Oil Storage and Transfer Systems (FOS) Design Description, Paragraph Five: "fuel oil storage tank and" should be fuel oil storage tanks and."
39. Pages 2.6-28-2.6-30, In Table 2.6.4-1, Items 2, 7, 9, 10, 13, 14a, 14b, 14c, 15a, 15b, 16, 17, & 18, Acceptance Criteria description: "The result of test (analysis) concludes" should be "The results of the test (analysis) conclude."

40. Page 2.6-28, Table 2.6.4-1, Item 6, Design Commitment description: "The Class 1E EPS and the associated equipment are as designed Class 1E and seismic category I." should be "Each Class I EPS and its associated equipment are designed as Class 1 E and seismic Category I."
41. Page 2.6-28, Table 2.6.4-1, Item 6, Inspections, Tests, Analyses description: "of the Class 1E EPS" should be "Each Class I EPS."
42. Page 2.6-28, Table 2.6.4-1, Items 6 & 8, Acceptance Criteria description: "The results of tests and/or analysis conclude that the Class 1E EPS" should be "The results of tests and/or analyses conclude that each Class I EPS."
43. Page 2.6-28, Table 2.6.4-1, Item 7, Design Commitment description; The support systems for piping that is required to perform safety functions of starting and operating the Class 1E EPS are classified ASME Section III." should be "The support systems that are required for the Class 1E EPS to perform the safety functions of starting and operating the Class 1E EPS are classified ASME Code Section III, Class 3."
44. Page 2.6-29, Table 2.6.4-1, Item 9, Design Commitment, Inspections, Tests, Analyses, and Acceptance Criteria descriptions: "EPS is sized" should be "EPS are sized," and "to LOOP or LOOP" should be "to a LOOP or a LOOP."
45. Page 2.6-29, Table 2.6.4-1, Item 9, Inspections, Tests, Analyses description: "capable to provide" should be "capable of providing."
46. Page 2.6-29, Table 2.6.4-1, Item 13, Design Commitment description: "1E EPS is capable of" should be "1E EPS are capable of" and "the starting signal" should be "a start signal."
47. Page 2.6-29, Table 2.6.4-1, Item 13, Inspections, Tests, Analyses description, "receiving signal" should be "receiving a start signal."
48. Page 2.6-29, Table 2.6.4-1, Item 14, Design Commitment and Inspections, Tests, Analyses descriptions, "condition" should be "conditions."
49. Page 2.6-30, Table 2.6.4-1, Item 14c, Inspections, Tests, Analyses description: "Class 1E buses." should be "Class 1E buses are started in sequence by the ECCS load sequencer."
50. Page 2.6-30, Table 2.6.4-1, Item 15a, Design Commitment description: "initiates automatic" should be "initiates an automatic."
51. Page 2.6-30, Table 2.6.4-1, Item 15a, Inspections, Tests, Analyses description: "verify that operation upon" should be "verify operation of the respective Class 1E EPSs upon."
52. Page 2.6-30, Table 2.6.4-1, Item 15b, Inspections, Tests, Analyses description: "verify operation after" should be "verify operation of the LOOP sequencer after" and "1E EPS." should be "1E EPS circuit breaker."
53. Page 2.6-30, Table 2.6.4-1, Item 16, Inspections, Tests, Analyses description: "verify operation of the as-built all Class" should be "verify operation of all the asbuilt Class.."
54. Page 2.6-30, Table 2.6.4-1, Item 16, Acceptance Criteria description: "that the as-built all Class" should be "that all the as-built Class."
55. Page 2.6-31, Table 2.6.4-1, Item 19, Design Commitment and Acceptance criteria descriptions: Subsection 2.6.4.1" should be "Subsection 2.6.4.2."
56. Page 2.6-31, Table 2.6.4-1, Items 23, 24, and 25, Acceptance Criteria description: "result of test concludes" should be "results of the test conclude."
57. Page 2.6-32, Section 2.6.5.2, AAC Fuel Oil Storage and Transfer Systems (FOS) Design Description, Paragraph One, First Bullet: "The FOS is a non safetyrelated system." should be . The FOS are non safety-related systems."
58. Page 2.6-34, Table 2.6.5-1, Item 3, Design Commitment, Inspections, Tests, Analyses, and Acceptance Criteria descriptions: "The AAC power source" should be "Each AAC power source."
59. Page 2.6-34, Table 2.6.5-1, Item 3, Acceptance Criteria description: "the Class 1E circuit breaker" should be "a Class 1E circuit breaker."
60. Page 2.6-34, Table 2.6.5-1, Item 3, Inspections, Tests, Analyses Description: AAC power source" should be "AAC power sources."
61. Page 2.6-34 and 2.6-35, Table 2.6.5-1, Items 6 and 9, Acceptance Criteria description: "result of test concludes" should be "results of the test conclude."
62. Page 2.6-34, Table 2.6.5-1, Item 8, Design Commitment and Acceptance Criteria descriptions: "power source are" should be "power sources are."
63. Page 2.6-35, Table 2.6.5-1, Item 9, Design Commitment description: "power source is capable to provide power at the set" should be "power sources are capable of providing power at the set."

64. Page 2.6-35, Table 2.6.5-1, Item 9, Design Commitment description: "receiving the start signal" should be "receiving a start signal."
65. Page 2.6-35, Table 2.6.5-1, Item 11, Design Commitment and Acceptance Criteria description: "Subsection 2.6.5.1" should be "Subsection 2.6.5.2."
66. Page 2.6-38, Section 2.6.7.1, Paragraph 3, Last Sentence: "voltage neutrals is grounded" should be "voltage neutrals are grounded."
67. Page 2.6-38, Section 2.6.7.1, Last Paragraph, First Sentence: "exposed structure" should be "exposed structures."

Page 2.6-39, Table 2.6.7-1, Item 1, Design Commitment and Inspections, Tests, Analyses descriptions: "system connects" should be "systems connect.

ANSWER:

MHI will incorporate the above editorial comments, unless they are superseded by other DCD changes. Specific exceptions are noted below.

Item 16: Instead of the wording suggested in Item 16, ITAAC Item 5 in Table 2.6.3-3 will use the following DC: "The equipment of each I&C power supply system division is located in separate rooms."

Item 18: Instead of the wording suggested in Item 18, ITAAC Item 5 in Table 2.6.3-3 will use the following AC: "The equipment of each as-built I&C power supply system division is located in separate rooms."

Item 43: Instead of the wording suggested in Item 43, the changes to Table 2.6.4-1, Item 7 will be addressed in response to RAI 242-2153, question 14.03.03-14.

Item 51: Instead of the wording suggested in Item 51 for the ITA in Item 15.a of Table 2.6.4-1, the following change will be made ("EPS" is used, not "EPSs" because the test is for each individual EPS on loss of its respective bus.):

"A test will be performed to verify ~~that~~ operation **<u>of the respective Class 1E EPS</u>** upon a loss of power to the as-built Class 1E bus."

Item 60. Table 2.6.5-1, Item 3, Inspections, Tests, Analyses Description: instead of "AAC power sources" the ITA will be revised to state "each AAC power source."

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the editorial changes incorporated as described above.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-07

ITAAC Item 2 in Table 2.6.1-3

The AC of this ITAAC is confusing after words 'under test'. What is meant by the words 'in the each division system.'?

Also applicable to ITAAC:

ITAAC Item 4 in Table 2.6.2-2
ITAAC Item 6 in Table 2.6.3-3

ANSWER:

The ITAAC referenced in this question address tests for independence of electrical divisions, and were developed using NUREG-0800 Section 14.3, including Appendix D, "ITAAC Entries – Examples." The phrase "in the each division system" at the end of each of the acceptance criteria can be deleted without affecting the meaning of the test.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the changes as shown below.

ITAAC Item 2 in Table 2.6.1-3:

2. Independence is maintained between each of the four divisions of the Class 1E distribution equipment, and between Class 1E distribution equipment and non-Class 1E distribution equipment.	2. Tests will be performed on the as-built Class 1E and non-Class 1E distribution equipment by providing a test signal in only one division at a time.	2. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test ~~in the each division system~~.

ITAAC Item 4 in Table 2.6.2-2:

4. Independence is maintained between each of the four divisions of the Class 1E dc power system distribution equipment, and between Class 1E dc power system distribution equipment and non-Class 1E dc power system distribution equipment.	4. Tests will be performed on the as-built Class 1E and non-Class 1E dc power system distribution equipment by providing a test signal in only one division at a time.	4. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test ~~in the each division system~~.

ITAAC Item 6 in Table 2.6.3-3:

6. Independence is maintained between each of the four divisions of the Class 1E I&C power supply system distribution equipment, and between Class 1E I&C power supply system distribution equipment and non-Class 1E I&C power supply system distribution equipment.	6. Tests will be performed on the as-built Class 1E and non-Class 1E I&C power supply system distribution equipment by providing a test signal in only one division at a time.	6. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test ~~in the each division system~~.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-08

ITAAC Item 6a in Table 2.6.1-3

This ITAAC should be similar to ITAAC Item 5 in Table 2.4.6-5 by listing the three steps. The qualifications for environmental conditions should be a separate ITAAC and include both inspection and analyses.

Also applicable to ITAAC:

ITAAC Item 2 in Table 2.6.2-2
ITAAC Item 3 in Table 2.6.3-3
ITAAC Item 6 in Table 2.6.4-1
ITAAC Item 5 in Table 2.6.6-1

ANSWER:

MHI agrees to revise the Tier 1 Section 2.6 seismic qualification ITAAC, to list the three steps consistent with ITAAC Item 5 in Table 2.4.6-5. Environmental qualification (EQ) ITAAC will be treated separately as appropriate, using the following guidance in paragraph 2.A of the Electrical Systems Checklist in NUREG-0800, Section 14.3 (March 2007):

> "Tier 1 should only deal with electrical equipment in harsh environments. Electrical equipment in a "mild" environment should be treated in Tier 2 only. An exception is made for I&C state-of-the-art digital equipment in "other than harsh" environment, which I&C ITAAC should cover. Since there is some of this type equipment which may be utilized in the electrical distribution systems, the I&C ITAAC should cover this potential. The basis for this exception is that recent I&C equipment in "mild" environments has some operating experience that shows sensitivity particularly to temperature, and new digital equipment may have even more sensitivity."

1. ITAAC Item 6a in Table 2.6.1-3 applies to Class 1E AC power equipment in Table 2.6.1-1, none of which is qualified for a harsh environment. Therefore, separate electrical system ITAAC for EQ is not needed in Table 2.6.1-3. Seismic qualification ITAAC will be listed in three steps as requested. Tier 1 Subsection 2.6.1.1 will be revised to be consistent with Tier 2 Class 1E equipment locations. The Design Description will be revised to address the number of divisions consistent with the ITAAC Design Commitment, similar to the response to

Question No. 14.03.06-11 for ITAAC Item 6 in Table 2.6.3-3.

2. ITAAC Item 2 in Table 2.6.2-2 applies to Class 1E DC power equipment in Table 2.6.2-1, none of which is qualified for a harsh environment. Therefore, separate electrical system ITAAC for EQ is not needed in Table 2.6.2-2. Seismic qualification ITAAC will be listed in three steps as requested. Tier 1 Subsection 2.6.2.1 will be revised to be consistent with Tier 2 Class 1E equipment locations. The Design Description will be revised to address the number of divisions consistent with the ITAAC Design Commitment, similar to the response to Question No. 14.03.06-11 for ITAAC Item 6 in Table 2.6.3-3.

3. ITAAC Item 3 in Table 2.6.3-3 applies to Class 1E I&C power supply equipment in Table 2.6.3-1, none of which is qualified for a harsh environment. Therefore, separate electrical system ITAAC for EQ is not needed in Table 2.6.3-3. Seismic qualification ITAAC will be listed in three steps as requested, and editorial corrections to the Design Commitment will be made. Tier 1 Subsection 2.6.3.1 will be revised to be consistent with Tier 2 Class 1E equipment locations. The Design Description will be revised to address the number of divisions consistent with the ITAAC Design Commitment, as shown in response to Question No. 14.03.06-11 for ITAAC Item 6 in Table 2.6.3-3.

4. ITAAC Item 6 in Table 2.6.4-1 applies to the Emergency Power Sources (EPS) and associated equipment. As indicated in DCD Tier 2, Table 3D-2, *US-APWR Environmental Qualification Equipment List,* the Class 1E Gas Turbine Generators (GTGs) and other equipment located in the Power Source Building (PS/B) are subject to mild environmental conditions. Therefore, separate electrical system ITAAC for EQ is not needed in Table 2.6.4-1. ITAAC Items 5, 6 and 8 of Table 2.6.4-1 each address EPS qualification. These ITAAC will be revised to use the requested three-step seismic qualification ITAAC, and to eliminate duplication. Tier 1 Subsection 2.6.4.1 will be revised to be consistent with Tier 2 Class 1E equipment locations. The Design Description will be revised to address the number of EPS divisions consistent with the ITAAC Design Commitment, similar to the response to Question No. 14.03.06-11 for ITAAC Item 6 in Table 2.6.3-3.

5. ITAAC Item 5 in Table 2.6.6-1 is the seismic qualification ITAAC for the emergency lighting system, and does not include any EQ ITAAC. This ITAAC will be listed in three steps as requested.

6. In addition to the ITAAC cited in this question, MHI identified a similar change for ITAAC Item 2 in Table 2.6.8-1, which applies to seismic and environmental qualification of the Electrical Penetration Assemblies (EPAs). As indicated in DCD Tier 2, Table 3D-2, the containment electrical penetrations are qualified for a harsh environment. ITAAC Item 2 in Table 2.6.8-1 will be revised to separate seismic qualification into three steps. ITAAC for EQ will be addressed separately.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the changes as shown below.

1. ITAAC Item 6a in Table 2.6.1-3

Paragraph 5 in Tier 1 Subsection 2.6.1.1 will be revised as follows:

Independence is established between each of the four divisions of the Class 1E AC electric power system and its associated distribution equipment. Class 1E electric power distribution equipment ~~of redundant divisions~~**, shown in Table 2.6.1-1, is** ~~are~~ located in separate rooms in the ~~seismic Category I~~ **Reactor Building.** ~~buildings~~. Areas containing Class 1E power distribution equipment are designated as vital areas and have controlled access.

ITAAC Item 6a in Tier 1 Table 2.6.1-3 will be revised as follows:

6.a **Each of the four divisions of** ~~The~~ **the** Class 1E **AC electric power system** equipment, **identified in Table 2.6.1-1** is designed ~~as seismic Category I~~ **to withstand seismic design basis loads without loss of safety function.** ~~and qualified for postulated environmental conditions as shown in Table 2.6.1-1~~.	~~6.a Type tests and/or analyses will be performed to verify that the Class 1E equipment are designed as seismic Category I and qualified for postulated environmental conditions.~~ **6.a.i Inspections will be performed to verify that the Class 1E equipment is located in the Reactor Building.**	~~6.a The results of the type tests and/or analyses conclude that the Class 1E equipment is designed as seismic Category I and qualified for postulated environmental conditions.~~ **6.a.i Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, is located in the Reactor Building.**
	6.a.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**6.a.ii Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, can withstand seismic design basis loads without loss of safety function.**
	6.a.iii. Inspection will be performed on the as-built equipment including anchorage.	**6.a.iii Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, including anchorage is seismically bounded by the tested or analyzed conditions.**

2. ITAAC Item 2 in Table 2.6.2-2

Paragraph 8 in Tier 1 section 2.6.2.1 will be revised as follows:

Independence is established between each of the four divisions of the Class 1E DC power supply system and its associated distribution equipment. The Class 1E ~~batteries are located in separate battery rooms in the seismic Category I building. The Class 1E dc switchboards and battery chargers of each division are located in~~ **dc power system equipment is located in** separate rooms in the **PS/B and R/B.** ~~seismic Category I building, adjacent to the associated battery rooms.~~ Areas containing Class 1E dc power system distribution equipment are designated as vital areas and have controlled access.

ITAAC Item 2 in Tier 1 Table 2.6.2-2 will be revised as follows:

2. ~~All~~ **Each of the four divisions of** Class 1E **DC power supply system** equipment**, identified in Table 2.6.2-1, are** ~~is~~ designed ~~I~~ **to withstand seismic design basis loads without loss of safety function.** ~~as seismic Category I qualified for postulated environmental conditions as shown in Table 2.6.2-1.~~	~~2. Type tests and/or analyses will be performed to verify that all Class 1E equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **2.i Inspections will be performed to verify that the as-built Class 1E equipment is located in the PS/B and R/B.**	~~2. The results of type tests and/or analysis conclude that all Class 1E equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **2.i Each of the four divisions of as-built Class 1E DC power supply system equipment identified in Table 2.6.2-1 is located in the PS/B and R/B.**

	2.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**2.ii Each of the four divisions of Class 1E DC power supply system equipment, identified in Table 2.6.2-1 can withstand seismic design basis loads without loss of safety function.**
	2.iii An inspection will be performed to verify that the as-built Class 1E equipment including anchorage is seismically bounded.	**2.iii Each of the four divisions of as-built Class 1E DC power supply system equipment, identified in Table 2.6.2-1, including anchorage is seismically bounded by the tested or analyzed conditions.**

3. ITAAC Item 3 in Table 2.6.3-3

The Design Description in Subsection 2.6.3.1 will be revised as shown in response to Question No. 14.03.06-11.

ITAAC Item 3 in Tier 1 Table 2.6.3-3 will be revised as follows:

3 ~~All~~ **Each of the four divisions of** Class 1E I&C power supply system equipment **identified in Table 2.6.3-1** is designed **to withstand seismic design basis loads without loss of safety function.** ~~as seismic Category I and is qualified for postulated environmental conditions as shown in Tabel 2.6.3-1.~~	~~3. Type tests and/or analyses will be performed to verify that the all Class 1E I&C power supply system equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **3.i Inspections will be performed to verify that the as-built seismic Category I equipment is located in the Reactor Building.**	~~3. The results of type tests and/or analysis conclude that the Class 1E I&C power supply system equipment is designed seismic Category I and is qualified for postulated environmental conditions.~~ **3.i Each of the four divisions of the as-built Class 1E I&C power supply system equipment identified in Table 2.6.3-1 is located in the Reactor Building.**
	3.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**3.ii The Class 1E equipment, identified in Table 2.6.3-1, can withstand seismic design basis loads without loss of safety function.**
	3.iii An inspection will be performed to verify that the as-built Class 1E equipment including anchorage is seismically bounded.	**3.iii The as-built Class 1 E equipment, identified in Table 2.6.3-1, including anchorage is seismically bounded by the tested or analyzed conditions.**

4. ITAAC Item 6 in Table 2.6.4-1

Paragraph 1 of Tier 1 section 2.6.4.1 will be revised as follows:

The emergency ~~Emergency~~ power supply to each of the four divisions of the Class 1E power distribution systems is provided by ~~an~~ **a** Class 1E EPS. The Class 1E EPSs are **normally** ~~always~~ in standby mode and provide power to the Class 1E 6.9kV buses upon loss of offsite power sources. ~~Each Class 1E EPS has its own fuel oil storage and transfer, lubrication, starting, and air intake and exhaust systems. Auxiliary power for Class 1E EPS support systems is provided by same division of the Class 1E power system. Each Class 1E EPS is located in a separate room in the seismic Category I building.~~

Insert the following paragraph in Tier 1 section 2.6.4.1

Independence is established between each of the four Class 1E EPSs and its associated distribution equipment. Each Class 1E EPS has its own fuel oil storage and transfer, lubrication, starting, and air intake and exhaust systems. Auxiliary power for Class 1E EPS support systems is provided by same division of the Class 1E power system. Each Class 1E EPS is located in a separate room in the PS/B.

ITAAC Item 5, 6 and 8 in Tier 1 Table 2.6.4-1 will be revised as follows:

5. **Deleted** ~~Each Class 1E EPS is located in a separate room. in the seismic Category I building.~~	5. **Deleted** ~~An inspection of the as-built Class 1E EPSs will be performed.~~	5. **Deleted** ~~Each as-built Class 1E EPS is located in a separate room. in the seismic Category I building.~~
6. ~~The Class 1E EPS and the associated equipment are as designed Class 1E and seismic Category I.~~ **Each of the four Class 1E EPSs are designed to withstand seismic design basis loads without loss of safety function.**	~~6. Type tests and/or analyses will be performed to verify the design of the Class 1E EPS and its associated equipment.~~ **6.i Inspections will be performed to verify that each as-built Class 1E EPS is located in the PS/B.**	~~6. The results of tests and/or analysis conclude that the Class 1E EPS and its associated equipment are designed as Class 1E and seismic Category I.~~ **6.i Each of the four as-built Class 1E EPSs is located in the PS/B.**
	6.ii Type tests and/or analyses of each Class 1E EPS will be performed.	**6.ii Each of the four as-built Class 1E EPSs can withstand seismic design basis loads without loss of safety function.**
	6.iii An inspection will be performed to verify that each as-built Class 1E EPS including anchorage is seismically bounded.	**6.iii Each of the four as-built Class 1E EPSs including anchorage is seismically bounded by the tested or analyzed conditions.**

8. The ~~Class 1E EPS and the~~ ASME Code Section III **Class 3** portion**s** of the **EPS** support systems are designed ~~as seismic Category I.~~ **to withstand seismic design basis loads without loss of safety function.**	~~8. Type tests and/or analyses will be performed on the Class 1E EPS and the ASME Code Section III portion of the support systems.~~	~~8. The result of~~ **the** ~~tests and/or analysis concludes that the Class 1E EPS and the ASME Code Section III portion of the support systems are designed as the seismic Category I.~~
	8.i Inspections will be performed to verify that the ASME Code Section III Class 3 portions of the EPS support systems are located within seismic Category I structures.	**8.i Each of the as-built ASME Code Section III, Class 3 portions of the EPS support systems is located within seismic Category I structures.**
	8.ii Type tests and/or analyses of the ASME Code Section III Class 3 portion of the EPS support systems will be performed.	**8.ii Each of as-built ASME Code Section III, Class 3 portions of the EPS support systems can withstand seismic design basis loads without loss of safety function.**
	8.iii An inspection will be performed to verify that the ASME Code Section III Class 3 portion of the EPS support systems including anchorage is seismically bounded.	**8.iii Each of the as-built ASME Code Section III, Class 3 portions of the EPS support systems including anchorage is seismically bounded by the tested or analyzed conditions.**

5. ITAAC Item 5 in Table 2.6.6-1

ITAAC Item 5 in Tier 1 Table 2.6.6-1 will be revised as follows:

5. The emergency lighting system in **the** MCR **is designed to withstand seismic design basis loading without loss of safety function.** ~~meets seismic Category I requirements.~~	~~5. Type tests and/or analyses will be performed to verify that the emergency lighting system in the MCR meets seismic Category I requirements.~~ **5.i Inspections will be performed to verify that the as-built equipment is located in the Reactor Building.**	~~5. The results of the type tests and/or analyses conclude that the emergency lighting system in the MCR meets seismic Category I requirements.~~ **5.i The as-built emergency lighting system in the MCR is located in the Reactor Building.**
	5.ii Type tests and/or analyses of the equipment will be performed.	**5.ii The emergency lighting system in the MCR can withstand seismic design basis loads without loss of safety function.**
	5.iii An inspection will be performed to verify that the as-built equipment including anchorage is seismically bounded.	**5.iii The as-built emergency lighting system in the MCR including anchorage is seismically bounded by the tested or analyzed conditions.**

6. ITAAC Item 2 in Table 2.6.8-1

ITAAC Item 2 in Tier 1 Table 2.6.8-1 will be revised as follows:

2. ~~The EPAs are classified as seismic Category I and qualified for postulated environmental conditions.~~ **Each EPA is designed to withstand seismic design basis loads without loss of safety function.**	~~2. Type tests and/or an analyses will be performed to verify that the EPAs are classified as the seismic Category I and qualified for postulated environmental conditions.~~ **2.i Inspections will be performed to verify that each as-built EPA is located in the Reactor Building and Containment vessel.**	~~2. The results of the type tests and/or analyses conclude that the EPAs are classified as the seismic Category I and qualified for postulated environmental conditions.~~ **2.i Each as-built EPA is located in the Reactor Building and Containment vessel.**
	2.ii Type tests and/or analyses of each EPA will be performed.	**2.ii Each EPA can withstand seismic design basis loads without loss of safety function.**
	2.iii An inspection will be performed to verify that each as-built EPA including anchorage is seismically bounded.	**2.iii Each as-built EPA including anchorage is seismically bounded by the tested or analyzed conditions.**

The following ITAAC will be added to Tier 1 Table 2.6.8-1:

7. Each EPA is qualified for a harsh environment to withstand the environmental conditions that would exist before, during, and following a design basis event without loss of safety function for the time required to perform the safety function.	7.i Type tests and/or analyses will be performed for the EPAs.	7.i The results of the type tests and/or analyses conclude that each EPA is qualified for a harsh environment to withstand the environmental conditions that would exist before, during, and following a design basis event without loss of safety function for the time required to perform the safety function.
	7.ii Inspection will be performed on each as-built EPA.	7.ii Each as-built EPA is bounded by harsh environment qualification type tests and/or analyses.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-09

ITAAC Item 6.b in Table 2.6.1-3

The AC should be more definitive than the design commitment not vice versa. Simply repeat the design commitment in the AC.

Also applicable to ITAAC

ITAAC Item 6.c in Table 2.6.1-3
ITAAC Item 7 in Table 2.6.1-3
ITAAC Item 8 in Table 2.6.1-3
ITAAC Item 9 in Table 2.6.5-1
ITAAC Item 1 in Table 2.6.7-1

ANSWER:

MHI will revise the identified ITAAC to have more definitive acceptance criteria consistent with the design commitments.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the changes to Tables 2.6.1-3, 2.6.5-1 and 2.6.7-1 as shown below.

The following ITAAC in Tier 1 table 2.6.1-3 will be revised as shown.

6.b	If power through the RATs is not available, **each** Class 1E medium voltage bus is automatically transferred to the UATs if available.	6.b	A test will be performed to verify that ~~the~~ **each** as-built Class 1E medium voltage bus is automatically transferred to the UAT upon simulated loss of power from the RAT.	6.b	~~The~~ **Each** as-built Class 1E medium voltage bus is automatically transferred to the UAT **if power through the RATs is not available.**

6.c If both offsite power sources are not available, ~~the~~ **each** Class 1E medium voltage bus automatically connects to their respective EPS.	6.c A test will be performed to verify that ~~the~~ **each** as-built Class 1E medium voltage bus automatically connects to the respective EPS upon simulated loss of power from the RAT and UAT.	6.c ~~The~~ **Each** as-built Class 1E medium voltage bus automatically connects to its respective EPS **if both offsite power sources are not available**.
7. For all plant trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs and associated equipment and circuits, the GLBS is opened.	7. A test will be performed to verify that the as-built GLBS is opened by a simulated non-electrical fault trip signal, including a simulated ECCS actuation signal.	7. **For all plant trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs and associated equipment and circuits, the**~~The~~ as-built GLBS **opens.** ~~is opened~~.
8. For electrical faults in the MT, MG, GLBS, UATs and associated equipment and circuits, the MT circuit breaker at the switchyard **opens.** ~~is opened.~~	8. A test will be performed to verify that the as-built MT circuit breaker trip signal is actuated by a simulated electrical fault trip signal for a fault in the MT, MG, GLBS, UATs and associated equipment and circuits.	8. **For electrical faults in the MT, MG, GLBS, UATs and associated equipment and circuits, the** ~~The~~ as-built MT circuit breaker at the switchyard **opens.** ~~is opened~~.

The following ITAAC in Tier 1 Table 2.6.5-1will be revised.

9. ~~The~~ **Each** AAC power source is capable ~~to provide~~ **of providing** power at **the** set voltage and frequency to the non Class 1E 6.9kV buses within 100 seconds from receiving ~~the~~ **a** start signal.	9. A test will be performed to verify that the as-built AAC power source can reach set voltage and frequency.	9. ~~The result of the test concludes that the~~ **Each** as-built AAC power source is **capable of providing power at the** ~~reaches~~ set voltage and frequency **to the non Class 1E 6.9kV buses** within 100 seconds from receiving ~~the starting~~ **a start** signal.

The following ITAAC in Tier 1 Table 2.6.7-1will be revised.

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The ~~follow~~ **following** grounding and lightning protection **systems connect** ~~system connects~~ to the station grounding grid:	1. An inspection of the as-built grounding and lightning protection system will be performed to verify :	1. The **following** as-built **grounding and lightning protection systems** ~~connection~~ connect to **the** station grounding grid ~~exists for the following~~:
a. the system ~~natural~~ **neutral** grounding of the MG, MT, UATs, RATs, SSTs, Class 1E EPSs and AAC power ~~AAC s~~ **sources**	a. the system ~~natural~~ **neutral** grounding connects to station grounding grid	a. the system ~~natural~~ **neutral** grounding **of the MG, MT, UATs, RATs, SST, Class 1E EPSs and AAC power sources.**
b. the equipment grounding of the equipment enclosures, raceways and metal structures	b. the equipment grounding connects to station grounding grid	b. the equipment grounding **of the equipment enclosures, raceways and metal structures**
c. the I&C grounding	c. the I&C grounding connects to station grounding grid	c. the I&C grounding
d. the lightning protection	d. the lightning protection connects to station grounding grid	d. the lightning protection.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-10

ITAAC Item 10 in Table 2.6.1-3

The ITA should include an inspection to verify that the items listed are the ones analyzed in regard to ratings and type of cooling.

Also applicable to ITAAC.

ITAAC Item 11.a in Table 2.6.1-3
ITAAC Item 11.b in Table 2.6.1-3
ITAAC Item 12 in Table 2.6.1-3
ITAAC Item 6 in Table 2.6.2-2
ITAAC Item 12 in Table 2.6.2-2
ITAAC Item 2 in Table 2.6.3-3
ITAAC Item 11 in Table 2.6.3-3
ITAAC Item 9 in Table 2.6.4-1
ITAAC Item 5 in Table 2.6.8-1
ITAAC Item 6 in Table 2.6.8-1

ANSWER:

The identified ITAAC will be revised to include an inspection of the equipment that is being analyzed. In addition the acceptance criteria for the analyses will be revised for consistency with similar US-APWR ITAAC.

The revised ITAAC will include inspection of equipment ratings for consistency with the analyses. However, review of the electrical systems' ITAAC guidance in NUREG-0800 Section 14.3 and Subsection 14.3.6, and Regulatory Guide 1.206, Section C.II, suggest that type of cooling is below the level of detail for ITAAC.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the following changes to ITAAC Item 10 in Tier 1 Table 2.6.1-3:

10. The UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident condition.	~~10.~~**10.i.** Analyses will be performed to verify ~~that~~ the ~~as-built~~ UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident ~~condition~~ **conditions**.	~~10.~~**10.i.** The ~~results of analyses conclude that the as-built~~ UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident ~~condition~~ **conditions**.
	10.ii Inspections will be performed to verify that the ratings of as-built UATs, RATs, SSTs and EPS power sources' meet the size requirements determined by the analysis for worst case loading conditions for all modes of plant operation and accident conditions.	**10.ii The ratings of as-built UATs, RATs, SSTs and EPS power sources bound the size requirements determined by the analysis for worst case loading conditions for all modes of plant operation and accident conditions.**

ITAAC Item 11.a in Tier 1 Table 2.6.1-3 will be revised as follows:

11.a The Class 1E distribution equipment and circuits are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~11.a~~ **11.a.i** Analyses will be performed to verify ~~that~~ the ~~as-built~~ Class 1E distribution equipment and circuits are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~11.a~~ **11.a.i** The ~~results of analyses conclude that the as-built~~ Class 1E distribution equipment and circuits are sized to carry the worst case load currents, can withstand the maximum fault currents, and are able to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.
	11.a.ii An inspection will be performed to verify that the ratings of as-built Class 1E distribution equipment and circuits bound the results of the analysis to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	**11.a.ii The ratings of as-built Class 1E distribution equipment and circuits bound the results of the analysis to carry the worst case load currents, can withstand the maximum fault currents, and are able to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.**

ITAAC Item 11.b in Tier 1 Table 2.6.1-3 will be revised as follows:

11.b The cables are sized considering derating due to ambient temperature and raceway loading.	~~11.b~~ **11.b.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ cables are sized considering derating due to ambient temperature and raceway loading.	~~11.b~~ **11.b.i** The ~~result of analysis concludes that the as-built~~ cables are sized considering derating due to ambient temperature and raceway loading.
	11.b.ii An inspection will be performed to verify that the as-built cables' size bounds the minimum size determined by the analysis.	**11.b.ii The as-built cables' size bound the minimum size determined by the analysis.**

ITAAC Item 12 in Tier 1 Table 2.6.1-3 will be revised as follows:

12. The interrupting ratings of the circuit breakers and fuses are adequate for maximum available fault currents.	~~12.~~ **12.i** An analysis will be performed to verify ~~that~~ interrupting ratings of the ~~as-built~~ circuit breakers and fuses are adequate for maximum available fault currents.	~~12.~~ **12.i** The ~~result of analysis concludes that the~~ interrupting ratings of the ~~as-built~~ circuit breakers and fuses are adequate for maximum available fault currents.
	12.ii An inspection will be performed to verify the interrupting ratings of the circuit breakers and fuses bound the requirements of the analysis for maximum available fault currents.	**12.ii The interrupting ratings of the as-built circuit breakers and fuses bound the requirements of the analysis for maximum available fault currents.**

ITAAC Item 6 in Tier 1 Table 2.6.2-2 will be revised as follows:

6. The Class 1E battery chargers have enough capacity to carry the continuous dc system loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.	~~6.~~ **6.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E battery chargers have enough capacity to carry the continuous dc systems loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.	~~6.~~ **6.i** The ~~result of analysis concludes that the as-built~~ Class 1E battery chargers have enough capacity to carry the continuous dc systems loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.
	6.ii An inspection will be performed to verify that the ratings of the as-built Class 1E battery chargers bound the ratings of the analysis.	**6.ii The ratings of the as-built Class 1E battery chargers bound the ratings of the analysis.**

ITAAC Item 12 in Tier 1 Table 2.6.2-2 will be revised as follows:

12. The Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.	~~12~~ **12.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.	~~12.~~ **12.i** The ~~result of analysis concludes that the as-built~~ Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.
	12.ii An inspection will be performed to verify that the ratings of the as-built Class 1E system equipment, circuit breakers and fuses bound the size requirements of the analysis.	**12.ii The ratings of the as-built Class 1E dc system equipment, circuit breakers and fuses bound the size requirements of the analysis.**

ITAAC Item 2 in Tier 1 Table 2.6.3-3 will be revised as follows:

2. The Class 1E I&C power supply system equipment and cables are sized to meet load requirements and provide minimum design bases voltage at load terminals, considering derating due to ambient temperature and raceway loading.	~~2.~~ **2.**i An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E I&C power supply system equipment and cables are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~2.~~ **2.**i The ~~result of analysis concludes that the as-built~~ Class 1E I&C power supply system equipment and cables are sized to meet load requirements and provide minimum design bases voltage at load terminals, considering derating due to ambient temperature and raceway loading.
	2.ii An inspection will be performed to verify that the ratings of as-built Class 1E I&C power supply system equipment and cables bound the size requirements of the analysis.	**2.ii The ratings of as-built Class 1E I&C power supply system equipment and cables bound the size requirements of the analysis.**

ITAAC Item 11 in Tier 1 Table 2.6.3-3 will be revised as follows:

11. The Class 1E I&C power supply system circuit breakers and fuses are rated adequately to interrupt the fault currents.	~~11.~~ **11.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E I&C power supply system breakers and fuses are rated adequately to interrupt the fault currents.	~~11.~~ **11.i** The ~~result of analysis concludes that the as-built~~ Class 1E I&C power supply system breakers and fuses are rated adequately to interrupt the fault currents.
	11.ii An inspection will be performed to verify the interrupting ratings of as-built Class 1E I&C power supply system breakers and fuses bound the requirements of the analysis.	**11.ii The interrupting ratings of as-built Class 1E I&C power supply system breakers and fuses bound the requirements of the analysis.**

ITAAC Item 9 in Tier 1 Table 2.6.4-1 will be revised as follows with editorial corrections from Question No. 14.03.06-6:

9. The Class 1E EPS**s are** sized to provide power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.	~~9.~~ **9.i** An analysis will be performed to verify ~~that as-built~~ **the** Class 1E EPS**s** ~~is~~ **are** capable ~~to provide~~ **of providing** power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.	~~9.~~ **9.i** The ~~result of analysis conclude that the as-built~~ Class 1E EPS**s** ~~is~~ **are** sized to provide power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.
	9.ii An inspection will be performed to verify that ratings of as-built Class 1E EPSs bound the size requirements of the analysis.	**9.ii The ratings of the as-built Class 1E EPSs bound the size requirements of the analysis.**

ITAAC Item 5 in Tier 1 Table 2.6.8-1 will be revised as follows:

5. The primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.	~~5.~~ **5.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.	~~5.~~ **5.i** The ~~results of the analysis concludes that the as-built~~ primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.
	5.ii An inspection will be performed to verify the ratings of the as-built primary circuit protection device for each EPA circuit bound the requirements of the analysis.	**5.ii The ratings of the as-built primary circuit protection device for each EPA circuit bound the requirements of the analysis.**

ITAAC Item 6 in Tier 1 Table 2.6.8-1 will be revised as follows:

6. The back up circuit protection device for each EPA circuit is sized to ensure mechanical integrity of the EPA for postulated overload and short-circuit conditions, during normal and accident conditions.	~~6.~~ **6.i** An analysis will be performed to verify ~~that~~ the back up circuit protection device for each ~~as-built~~ EPA circuit is sized to ensure mechanical integrity of the ~~as-built~~ EPA for postulated overload and short-circuit conditions, during normal and accident conditions.	~~6.~~ **6.i** The ~~results of the analysis concludes that~~ back up circuit protection device for each ~~as-built~~ EPA circuit is sized to ensure mechanical integrity of the ~~as-built~~ EPA for postulated overload and short-circuit conditions, during normal and accident conditions.
	6.ii An inspection will be performed to verify ratings of the back-up circuit protection device for each as-built EPA circuit bound the requirements of the analysis.	**6.ii The ratings of the back-up circuit protection device for each as-built EPA circuit bound the requirements of the analysis.**

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-11

ITAAC Item 11 in Table 2.6.2.-2

Revise the Design Commitment statement on Page 2.6-15, Table 2.6.2-2, Item 11 to be consistent with the design description on Page 2.6-12, Section 2.6.2.1, Fourth Paragraph from the end.

The design description in Section 2.6.2.1, Fourth Paragraph from the end discusses cable sizing for dc power systems. The cables are sized to carry load currents and provide design basis voltage at the load terminals considering derating due to ambient temperature and raceway loading; however, the design commitment in Table 2.6.2-2, Item 11 does not indicate this additional information.

Also applicable to ITAAC:

ITAAC Item 6 in Table 2.6.3-3

Revise the Design Commitment statement in Table 2.6.3-3, Item 6, Page 2.6-22 to be consistent with the Design Description on Page 2.6-18, Section 2.6.3.1, Third Paragraph.

The design description on Page 2.6-18, Section 2.6.3.1, in the Third Paragraph does not specify how many divisions there are in the Class 1E I&C power supply system, but the Design Commitment of Table 2.6.3-3, Item 6 indicates there are four divisions. These two descriptions should both indicate how many divisions there are.

ITAAC Item 8 in Table 2.6.3-3

Revise the Design Description on Page 2.6-18, Section 2.6.3.1, Fourth Paragraph so that it is more specific as to what is to be transferred from the UPS unit and to which transformer. Also, revise the Design Commitment and Acceptance Criteria statements in Table 2.6.3.-3, Item 8, Page 2.6-22 to be consistent with the design description on Page 2.6-18, Section 2.6.3.1, Fourth Paragraph.

The design description on Page 2.6-18, Section 2.6.3.1, in the Fourth Paragraph does not specify what is transferred from the UPS unit to the transformer as indicated in the table; however, Table 2.6.3-3, Item 8 indicates the Class 1E panel board is transferred from UPS to the transformer. In addition, the same description does not identify which transformer is receiving the load from the UPS unit, this is also reflected in the ITAAC of Table 2.6.3-3, Item 8 on Page 2.6-22.

ITAAC Item 2 in Table 2.6.4-1

Clarify the Design Commitment statement on Page 2.6-25, Section 2.6.4.1, in the First, Fifth and Sixth Paragraphs so that the paragraphs are consistent with one another.

Paragraph One of the Design Commitment statement in Section 2.6.4.1 on Page 2.6-25 indicates in the Second Sentence that the Class 1E EPS provide power to the 6.9kV buses in the event that offsite power sources are lost; however, in the Fifth and Sixth paragraphs of the same section a "start" or "actuation" signal is referred to as the mechanism that starts the Class 1E EPS. Verify that "start or actuation signal" is the same as loss of offsite power sources cited in the second sentence of the first paragraph in Section 2.6.4.1.

ITAAC Item 10 in Table 2.6.4-1

Revise the EPS Design Description on Page 2.6-25 of Section 2.6.4.1 to be consistent with Table 2.6.4-1, Item 10 on Page 2.6-29.

Table 2.6.4-1, Item 10 indicates the Design Commitment, Inspections, Tests, Analyses, and Acceptance Criteria for the Class 1E EPS stored-air starting system; however, the air start system for the Class 1E EPS is not discussed or mentioned in Section 2.6.4.1

ITAAC Item 7 in Table 2.6.5-1

Specify in Section 2.6.5.1 on Page 2.6-32 in the AAC Design Description the coping capability of the AAC power source.

Table 2.6.5-1, Item 7 on Page 2.6-34 indicates in the Design Commitment and Acceptance Criteria descriptions that the AAC power source has adequate fuel to operate the required system while coping with an SBO for 8 hours; however, Section 2.6.5.1 does not discuss the coping capability of the AAC power source during an SBO.

ITAAC Item 9 in Table 2.6.5-1

Specify in Section 2.6.5.1, on Page 2.6-32 in the AAC Design Description the capability of the AAC power to provide power at the set voltage and frequency to the non Class 1E 6.9kV buses within 100 seconds of receiving a start signal.

Table 2.6.5-1, Item 9 on Page 2.6-35 indicates in the Design Commitment and Acceptance Criteria descriptions that the AAC power source is capable of providing power to the non Class 1E 6.9kV buses within 100 seconds of receiving a start signal; however, Section 2.6.5.1 does not discuss the time limit for providing this power.

ITAAC Item 10 in Table 2.6.5-1

Explain the Design Commitment and Acceptance Criteria descriptions of Table 2.6.5-1, Item 10 on Page 2.6-35.

The Design Commitment and Acceptance Criteria descriptions of Table 2.6.5-1, Item 10 on Page 2.6-35 are not consistent with the ACC Design Description of Section 2.6.5.1 on Page 2.6-32. Section 2.6.5.1 indicates the AAC power source and circuit breaker status information are available in the MCR; however, the status of each of the 6.9kV breakers of the engineered safety features are not included or explained in this discussion; however, this information is discussed in Table 2.6.5-1, Item 10 on Page 2.6-35.

ITAAC Item 3 in Table 2.6.6-1

Revise Section 2.6.6.1, Design Description on Page 2.6-36 of the plant lighting systems to be consistent with Table 2.6.6-1, Item 3, Design Commitment and Acceptance Criteria descriptions on Page 2.3-37.

Table 2.6.6-1, Item 3 indicates that the normal/emergency lighting system is power from the 480V AAC buses; however, the design description of Section 2.6.6.1 does not have this information.

ITAAC Item 6 in Table 2.6.6-1

Revise Table 2.6.6-1, Item 6, Design Commitment and Acceptance Criteria descriptions on Page 2.3-37 to be consistent with Section 2.6.6.1.

Section 2.6.6.1, Design Description of the plant lighting system discusses on Page 2.3-36 that the self-contained battery pack emergency lighting system is normally powered from the ac power systems; however, in Table 2.6.6-1, Item 6 the Design Commitment and Acceptance Criteria descriptions indicate that the self-contained battery packs have self-contained battery packs.

ANSWER:

ITAAC Item 11 in Table 2.6.2.-2

ITAAC Item 11 will be revised as shown in response to Question No. 14.03.06-13, to address cable sizing and derating due to ambient temperature and raceway loading.

ITAAC Item 6 in Table 2.6.3-3

The Design Description will be revised to indicate the number of divisions. There is no change required to the design commitment in ITAAC Item 6 because the design commitment states there are 4 divisions of the Class 1E I&C power supply system.

ITAAC Item 8 in Table 2.6.3-3

The Design Description and ITAAC will be revised to clearly identify the transformer to which the Class 1E panels are transferred. In addition, the Design Description will indicate what is being transferred.

ITAAC Item 2 in Table 2.6.4-1

The phrase "loss of offsite power sources" is equivalent to a "loss of offsite power" (LOOP). The LOOP and an ECCS actuation signal will each start the EPS; however they are separate signals. The Design Description explains the different EPS and load sequencer response to loss of power to the Class 1E buses and ECCS actuation. In addition to ITAAC Item 2 in Table 2.6.4-1, the EPS starts and sequences loads as demonstrated by ITAAC Items 14 and 15 of the same table. The EPS is designed to provide a set voltage and frequency to the Class 1E 6.9kV buses within 100 seconds of a start signal, regardless of the source of the signal. Therefore, the 100 second criterion in the Design Description and ITAAC Item 13 do not specify the source of the start signal.

ITAAC Item 10 in Table 2.6.4-1

A description of the stored air system will be added to Tier 1 section 2.6.4.1.

ITAAC Item 7 in Table 2.6.5-1

As stated in Tier 2 Subsection 8.4.1.3;

> *"The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours."*

The above statement will be added to the Tier 1 section 2.6.5.1 Design Description and will replace the design commitment and acceptance criteria of ITAAC Item 7.

ITAAC Item 9 in Table 2.6.5-1

The commitment that the AAC power sources are capable of providing power at a set voltage and frequency to the non-Class 1E 6.9kV buses within the maximum allowable time from receipt of a start signal, will be added to Tier 1 Subsection 2.6.5.1. The design commitment for ITAAC Item 9 in Table 2.6.5-1 will be revised to be consistent with the design description. MHI believes that specifying the numeric value of the maximum allowable time in the Tier 1 design description is not warranted for the non-Class 1E AAC power sources, consistent with the following guidance in NUREG-0800 Standard Review Plan (SRP) Section 14.3, Appendix A:

"Numeric performance values and key parameters in safety analyses should be specified in the design descriptions based on their safety significance; however, numbers for all parameters need not be specified unless there is a specific reason to include them (e.g., important to be maintained for the life of the facility)."

The numeric value of the maximum allowable time, 100 seconds, is specified in the acceptance criteria of ITAAC Item 9 in Table 2.6.5-1, and in DCD Tier 2 Subsection 8.4.1.3. Therefore, the proposed DCD provisions would require a US-APWR licensee to verify the 100 second limit is met prior to initial fuel load, and evaluate potential future changes against the Tier 2 requirement,

ITAAC Item 10 in Table 2.6.5-1

The Design Description and the ITAAC will be revised to use the term "Each Class 1E 6.9kV breaker".

ITAAC Item 3 in Table 2.6.6-1

The capability of 480 V AAC to provide power to the normal/emergency lighting system will be clarified in Tier 1 Subsection 2.6.6.1.

ITAAC Item 6 in Table 2.6.6-1

ITAAC Item 6 will be revised to be consistent with the Design Description and Tier 2 to demonstrate battery pack operation upon loss of normal power.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with changes as shown below.

ITAAC Item 11 Table 2.6.2-2

ITAAC Item 11will be revised as shown in RAI 182-1888 Question No. 14.03.06-13.

ITAAC Item 6 in Table 2.6.3-3

The Design Description in section 2.6.3.1 will be revised as follows with minor editorial changes noted from Question No. 14.03.06-6:

Independence is established between each of the four divisions of Class 1E I&C power supply distribution equipment. The equipment of each I&C power supply system division **is** ~~are~~ located in **a** separate ~~rooms~~ **room** in the seismic Category I **reactor** building. Areas containing Class 1E equipment are designated as vital areas and have controlled access.

ITAAC Item 8 in Table 2.6.3-3

The Design Description in section 2.6.3.1 will be revised as follows with minor editorial changes noted from Question No. 14.03.06-6:

The power supply to each of the four Class 1E panel boards ~~Transfer~~ **transfers** from **its Class 1E** UPS unit to **its** **Class 1E I&C power** transformer ~~is~~ ~~automatic~~ **automatically** on **an** undervoltage signal.

ITAAC Item 8 in Table 2.6.3-3 will be revised as follows with minor editorial changes as noted in Question No. 14.03.06-6:

8. **The power** ~~Power~~ supply to **each of the four** Class 1E panel boards **transfers** from **its** Class 1E UPS unit ~~is transferred~~ to **its Class 1E I&C power** transformer automatically on **an** undervoltage signal.	8. A test will be performed to verify that **the** power supply to **each** as-built Class 1E panel board **transfers** from i**ts** as-built Class 1E UPS unit ~~is transferred~~ to ~~the~~ **its** as-built **Class 1E I&C Power** transformer automatically on **an** undervoltage signal.	8. The result**s** of **the** test conclude~~s~~ that **the** power supply to **each** **of the four** as-built Class 1E panel board**s** **transfers** from **its** as-built Class 1E UPS unit ~~is transferred~~ to i**ts** as-built **Class 1E I&C power** transformer automatically on **an** undervoltage signal.

ITAAC Item 2 in Table 2.6.4-1

No changes.

ITAAC Item 10 in Table 2.6.4-1

The following statement will be added to Tier 1 Subsection 2.6.4.1.

> "The stored air starting system is capable of providing starting air to each of the four Class 1E EPSs without requiring replenishment."

ITAAC Item 7 in Table 2.6.5-1

The following statement will be added to Tier 1 Subsection 2.6.5.1.

> "The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours."

ITAAC item 7 in Table 2.6.5-1 will be revised as follows:

7. **The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours.** ~~The AAC power source has adequate fuel to operate required system for coping with SBO for 8 hours.~~	7. An inspection of the ~~as-build~~ **as-built** AAC power source**s** will be performed.	7. **The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours.** ~~The as-built AAC power source has adequate fuel to operate required system for coping with SBO for 8 hours.~~

ITAAC Item 9 in Table 2.6.5-1

The following statement will be added to Tier 1 Subsection 2.6.5.1.

> "Each AAC power source is capable of providing power at the set voltage and frequency to the non-Class 1E 6.9kV buses within the maximum allowable time from receiving a start signal."

The design commitment of ITAAC Item 9 in Table 2.6.5-1 will be revised for consistency with the above change to Subsection 2.6.5.1, as shown in Attachment 1.

ITAAC Item 10 in Table 2.6.5-1

The last sentence of the last paragraph in Tier 1 Subsection 2.6.5.1 will be revised as follows:

> "The AAC power source and ~~circuit~~ **each Class 1E 6.9kV** breaker status information is available in the MCR."

ITAAC item 10 in Table 2.6.5-1 will be revised as follows:

10. The AAC power source status and the breaker status of each **Class 1E** 6.9kV breaker ~~of the engineered safety features system~~ is displayed in the MCR.	10. An inspection of the as-built MCR will be performed.	10. The as-built AAC power source status and the breaker status of each **Class 1E** 6.9kV breaker ~~of the engineered safety features system~~ is displayed in the as-built MCR.

ITAAC Item 3 in Table 2.6.6-1

The third and fourth paragraph in Tier 1 Subsection 2.6.6.1 will be revised as follows:

"The emergency lighting system includes normal/emergency (N/E) lighting system, emergency lighting system **being** powered by the Class 1E power system, and self-contained battery pack emergency lighting system.

~~N/E lighting system is powered from the non-Class 1E power system that has ac backup.~~ **The N/E lighting system is capable of being powered by the non-Class 1E 480 V permanent buses.** N/E lighting is provided in all areas of the plant except the areas that have emergency lighting powered by the Class 1E power sources."

ITAAC Item 6 in Table 2.6.6-1

The sixth paragraph in Tier 1 Subsection 2.6.6.1 will be revised as follows:

Self-contained battery pack emergency lighting system is normally powered from the ac power systems **and powered from self-contained battery packs if normal ac power is lost**. **The** ~~S~~self-contained ~~battery pack~~ battery pack emergency lighting system is provided in areas where emergency operations are performed, **to enable** safe ingress and egress of personnel.

ITAAC Item 6 in Tier 1 Table 2.6.6-1 will be revised as follows:

6. The self-contained battery pack lighting **system is normally powered from the ac power system and powered from self-contained battery packs if the normal ac power is lost.** ~~have self-contained battery pack~~.	6. An inspection the as-built self-contained battery pack lighting **system** will be performed.	6. The as-built self-contained battery pack lighting **system is normally powered from the ac power system and powered from self-contained battery packs if the normal ac power is lost.** ~~have self-contained battery pack.~~

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 182-1888 REVISION 0**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**DCD TIER 1 SECTION 2.6**
DATE OF RAI ISSUE:	**02/09/2009**

QUESTION NO.: 14.03.06-12

ITAAC Item 13 in Table 2.6.2-2

Typically selective coordination is determined by analysis and inspection. The ITA should be revised to indicate both inspection and analysis. The acceptance criterion should be revised accordingly. Coordination requires analysis to verify whether the protective devices coordinate with each other, and inspection should be done to verify that the protective devices used in the analysis are the ones installed in the field.

ANSWER:

ITAAC item 13 in Tier 1 Table 2.6.2-2 will be revised to include both an analysis and inspection, and will also clarify that the ITAAC item applies to each of the four Class 1E dc power divisions.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the following changes to ITAAC Item 13 in Tier 1 Table 2.6.2-2:

13. The main circuit protection device in the switchboard **of each of the four Class 1E dc power divisions,** has selective coordination with downstream protective devices.	~~13.~~**13.i** **An analysis will be performed to verify the main circuit protection devices have selective coordination with the downstream protective devices.**	~~13.~~**13.i** **The main circuit protection device in the switchboard of each of the four Class 1E dc power divisions, has selective coordination with the downstream protective devices.**
	13.ii An inspection of the as-built main circuit protection devices in the as-built switchboards will be performed.	**13.ii** The as-built main circuit protection ~~device~~ **devices** ~~in the as-built switchboard~~ **are the same as those used in the coordination analyses**.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 182-1888 REVISION 0

SRP SECTION: 14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

APPLICATION SECTION: DCD TIER 1 SECTION 2.6

DATE OF RAI ISSUE: 02/09/2009

QUESTION NO.: 14.03.06-13

Revise the Inspections, Tests, Analyses statement in Table 2.6.2-2, Item 11, Page 2.6-15 to also include an inspection as well as the analysis of the as-built cables.

Section 2.6.2.1, in the Fourth Paragraph from the end of the design description discusses cable sizing for dc power systems. The description indicates the cables are sized to carry load currents and provide design basis voltage at the load terminals considering derating due to ambient temperature and raceway loading; however, the Inspections, Tests, Analyses in Table 2.6.2-2, Item 11 do not require any such inspection.

ANSWER:

The ITAAC will be revised to include the inspection of the cables. The wording and style of the ITAAC will be consistent with similar US-APWR ITAAC.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the following changes toITAAC Item 11 in Tier 1 Table 2.6.2-2:

11. The cables are sized to carry required load currents and provide minimum design basis voltage at load terminals **considering derating due to ambient temperature and raceway loading.**	11i. An analysis will be performed to verify~~-that~~ the ~~as-built~~ cables are sized to carry required load currents and provide minimum design basis voltage at load terminals, **considering derating due to ambient temperature and raceway loading.**	11.i. The ~~result of analysis concludes that the as-built~~ cables are sized to carry required load currents and provide minimum design basis voltage at load terminals, **considering derating due to ambient temperature and raceway loading.**
	11.ii An inspection will be performed to verify the size of cables installed bound the minimum size required by the analysis.	**11.ii The as-built cables are sized to bound the minimum sizes determined by the analyses.**

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

04/06/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 182-1888 REVISION 0
SRP SECTION:	14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA
APPLICATION SECTION:	DCD TIER 1 SECTION 2.6
DATE OF RAI ISSUE:	02/09/2009

QUESTION NO.: 14.03.06-14

ITAAC Item 4 in Table 2.6.4-1

Typically independence is established by both test and inspection. Inspection by itself can not verify electrical independence.

Also applicable to ITAAC:

ITAAC Item 12 in Table 2.6.4-1

ANSWER:

ITAAC Item 4 in Tier 1 Table 2.6.4-1will be revised to include testing as a sub-step. MHI reviewed ITAAC Item 12 in Tier 1 Table 2.6.4-1, which currently requires an inspection of the Class 1E EPSs to verify their independence, and concludes that an additional step to require testing is not warranted. The basis for this conclusion is as follows:

ITAAC Item 1 in Table 2.6.1-3, *AC Electric Power Systems Inspections, Tests, Analyses, and Acceptance Criteria,* requires inspection of the ac electric power systems to verify their conformance to the functional arrangement as described in Tier 1 Subsection 2.6.1 and as shown on Figure 2.6.1-1. Subsection 2.6.1 includes statements of ac electrical system divisional independence:

> "Class 1E power systems have four independent redundant divisions, A, B, C and D, corresponding to four divisions of safety-related load groups except for systems containing two 100% redundant load groups. The two 100% load groups are powered from divisions A and D distribution systems identified as A1 and D1. The A1 buses can be powered from A or B division power sources, and D1 buses can be powered from D or C division power sources."

> "Independence is maintained between each division of the Class 1E equipment and circuits, and between Class 1E equipment and circuits and non-Class 1E equipment and circuits."

Tests for independence between each of the four Class 1E divisions of Class 1E distribution equipment, and between Class 1E distribution equipment and non-Class 1E distribution equipment, are required by ITAAC Item 2 in Table 2.6.1-3.

ITAAC Item 5 in Table 2.6.4-1 requires inspection to verify the EPSs are located in separate rooms. ITAAC Item 12 requires inspection to verify the EPSs are isolated from each other. Table 2.6.4-1 also requires testing to verify EPS circuit breaker closure and load shedding of each EPS in response to de-energizing its respective Class 1E bus (ITAAC Item 14.b for loss of bus during ECCS and ITAAC Item 15.a during loss of bus). Required sequencing of ECCS and LOOP loads are tested via Table 2.6.4-1 ITAAC items 14.c and 15.b, respectively. The acceptance criteria for ECCS load sequencing specifically requires testing conclude that the safety related loads on the same division Class 1E buses are started in sequence. The acceptance criteria for LOOP sequencing specifies that the required safety related loads are started. As shown in Tier 2 Table 8.3.1-4, the loads automatically sequenced during a LOOP are also on the same Class 1E division as the EPS.

ITAAC Item 4 in Table 2.6.4-1, as modified below, will include testing to verify the EPS support systems are powered from the same division as their respective EPSs.

In summary, ITAAC Item 12 of Table 2.6.4-1 is one of several ITAAC that demonstrate separation and electrical independence of the Class 1E ac power systems, including EPS, and additional testing is not required.

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 1, Section 2.6, Revision 2, with the following changes to ITAAC Item 4 in Tier 1 Table 2.6.4-1:

4.	The auxiliary power for each Class 1E EPS' support system~~s~~ is provided by **the** same division of the Class 1E power system.	~~4.~~ **4.i** An inspection of ~~the~~ **each** as-built ~~power sources~~ **Class 1E EPS'** ~~of the~~ support system~~s~~ ~~for each Class 1E EPS~~ will be performed.	~~4.~~ **4.i** The auxiliary power for each as-built Class 1E EPS' support system~~s~~ is provided by same division of the Class 1E power system.
		4.ii A test of each as-built Class 1E EPS' support system will be performed to verify that auxiliary power is provided by the same division of the Class 1E power system.	**4.ii The auxiliary power for each as-built Class 1E EPS' support system is provided by the same division of the Class 1E power system.**

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

Attachment 1

US-APWR DCD Tier 1 Section 2.6 Mark-up

RESPONSE TO RAI NO. 182-1888 REVISION 0,

Attachment 1

RAI No.182
14.03.06-08

2.6.1 AC Electric Power Systems

2.6.1.1 Design Description

The ac electric power system includes the following system and components: offsite transmission system, plant switchyard, main transformer (MT), main generator (MG), generator load break switch (GLBS), unit auxiliary transformers (UATs), reserve auxiliary transformers (RATs), station service transformers (SSTs), switchgear, load centers, motor control centers (MCCs), panel boards, and cables for power, control and instrumentation. The 6.9kV buses of the onsite Class 1E ac electric power systems are supplied from offsite sources through the UATs, RATs or from onsite EPSs. Normal preferred supply to the Class 1E 6.9kV buses is through the RATs. During SBO, these buses can be powered from onsite AAC power sources. Separation is maintained between these buses for all incoming circuits. Class 1E divisional independence is maintained through all voltage levels.

The onsite electric power system configuration is depicted on Figure 2.6.1-1. Table 2.6.1-1 shows electrical and seismic classification of major Class 1E ac electrical power distribution equipment.

Class 1E power systems have four independent redundant divisions, A, B, C and D, corresponding to four divisions of safety-related load groups except for systems containing two 100% redundant load groups. The two 100% load groups are powered from divisions A and D distribution systems identified as A1 and D1. The A1 buses can be powered from A or B division power sources, and D1 buses can be powered from D or C division power sources.

Independence is maintained between each division of the Class 1E equipment and circuits, and between Class 1E equipment and circuits and non-Class 1E equipment and circuits.

Independence is established between each of the four divisions of the Class 1E AC electric power system and its associated distribution equipment. Class 1E electric power distribution equipment ~~of redundant divisions~~**, shown in Table 2.6.1-1, is** ~~are~~ located in separate rooms in the ~~seismic Category I~~ **Reactor Building.** ~~buildings~~. Areas containing Class 1E power distribution equipment are designated as vital areas and have controlled access.

The A, B, C and D EPSs are located in separate rooms in seismic Category I buildings.

All Class 1E equipment and raceway are seismic Category I and qualified for postulated environmental conditions.

During all normal modes of plant operation and accident conditions, the Class 1E 6.9kV buses are powered through the RATs. If power from the RATs is not available, the buses are automatically transferred to the UATs, if they are available. If both offsite sources are not available, the buses automatically connect to their respective EPS. For all trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs and

RAI No.182
14.03.06-06
14.03.06-07
14.03.06-08

Attachment 1

Table 2.6.1-3 AC Electric Power Systems Inspections, Tests, Analyses Acceptance Criteria (Sheet 1 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the ac electric power systems is as described in the Design Description of this Subsection 2.6.1 and as shown in Figure 2.6.1-1.	1. An inspection of the as-built ac electric power systems will be performed.	1. The as-built ac electric power systems conform to the functional arrangement as described in the Design Description of this Subsection 2.6.1 and as shown in Figure 2.6.1-1.
2. Independence is maintained between each of the four divisions of the Class 1E distribution equipment, and between Class 1E distribution equipment and non-Class 1E distribution equipment.	2. Tests will be performed on the as-built Class 1E and non-Class 1E distribution equipment by providing a test signal in only one division at a time.	2. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test ~~in the each division system~~.
3. Independence is maintained between Class 1E electric power distribution equipment and non safety-related loads by Class 1E qualified isolation devices.	3. An inspection of the as-built Class 1E electric power distribution equipment will be performed.	3. The as-built Class 1E electric power distribution equipment is isolated from the as-built non safety-related loads by the Class 1E qualified isolation devices.
4. The Class 1E electric power distribution equipment of redundant divisions is located in separate rooms in the seismic Category I buildings.	4. An inspection of the as-built Class 1E electric power distribution equipment will be performed.	4. The as-built Class 1E electric power distribution equipment of redundant divisions is located in the separate rooms in the seismic Category I buildings.
5. Each Class 1E EPS is located in **a** separate ~~rooms~~ **room** in the seismic Category I buildings.	5. An inspection of the as-built EPS will be performed.	5. ~~The~~ **Each** as-built ~~each~~ EPS is located in ~~the~~ **a** separate ~~rooms~~ **room** in the seismic Category I buildings.
6.a **Each of the four divisions of** ~~The~~ **the** Class 1E **AC electric power system** equipment, **identified in Table 2.6.1-1** is designed ~~as seismic Category I~~ **to withstand seismic design basis loads without loss of safety function.** ~~and qualified for postulated environmental conditions as shown in Table 2.6.1-1~~.	~~6.a Type tests and/or analyses will be performed to verify that the Class 1E equipment are designed as seismic Category I and qualified for postulated environmental conditions.~~ **6.a.i Inspections will be performed to verify that the Class 1E equipment is located in the Reactor Building.**	~~6.a The results of the type tests and/or analyses conclude that the Class 1E equipment is designed as seismic Category I and qualified for postulated environmental conditions.~~ **6.a.i Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, is located in the Reactor Building.**

Attachment 1

	6.a.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**6.a.ii Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, can withstand seismic design basis loads without loss of safety function.**
	6.a.iii. Inspection will be performed on the as-built equipment including anchorage.	**6.a.iii Each of the four divisions of the as-built Class 1E AC electric power system equipment, identified in Table 2.6.1-1, including anchorage is seismically bounded by the tested or analyzed conditions.**
6.b If power through the RATs is not available, **each** Class 1E medium voltage bus is automatically transferred to the UATs if available.	6.b A test will be performed to verify that ~~the~~ **each** as-built Class 1E medium voltage bus is automatically transferred to the UAT upon simulated loss of power from the RAT.	6.b ~~The~~ **Each** as-built Class 1E medium voltage bus is automatically transferred to the UAT **if power through the RATs is not available.**

RAI No.182
14.03.06-09
14.03.06-10

Attachment 1

Table 2.6.1-3 AC Electric Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.c If both offsite power sources are not available, ~~the~~ **each** Class 1E medium voltage bus automatically connects to their respective EPS.	6.c A test will be performed to verify that ~~the~~ **each** as-built Class 1E medium voltage bus automatically connects to the respective EPS upon simulated loss of power from the RAT and UAT.	6.c ~~The~~ **Each** as-built Class 1E medium voltage bus automatically connects to its respective EPS **if both offsite power sources are not available**.
7. For all plant trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs and associated equipment and circuits, the GLBS is opened.	7. A test will be performed to verify that the as-built GLBS is opened by a simulated non-electrical fault trip signal, including a simulated ECCS actuation signal.	7. **For all plant trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs and associated equipment and circuits, the**~~The~~ as-built GLBS **opens.** ~~is opened~~.
8. For electrical faults in the MT, MG, GLBS, UATs and associated equipment and circuits, the MT circuit breaker at the switchyard **opens.** ~~is opened.~~	8. A test will be performed to verify that the as-built MT circuit breaker trip signal is actuated by a simulated electrical fault trip signal for a fault in the MT, MG, GLBS, UATs and associated equipment and circuits.	8. **For electrical faults in the MT, MG, GLBS, UATs and associated equipment and circuits, the** ~~The~~ as-built MT circuit breaker at the switchyard **opens.** ~~is opened~~.
9. The Class 1E ac power systems are designed to permit appropriate periodic inspection and testing in order to assess the system continuity, availability and condition of the system components.	9. An inspection of the as-built Class 1E ac power systems will be performed.	9. The as-built Class 1E ac power systems can perform appropriate periodic inspection and testing in order to assess the system continuity, availability and condition of the system components.
10. The UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident condition.	~~10.~~**10.i.** Analyses will be performed to verify ~~that~~ the ~~as-built~~ UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident ~~condition~~ **conditions**.	~~10.~~**10.i.** The ~~results of analyses conclude that the as-built~~ UATs, RATs, SSTs and EPS power sources are sized for worst case loading conditions for all modes of plant operation and accident ~~condition~~ **conditions**.

Attachment 1

RAI No.182
14.03.06-10

	10.ii Inspections will be performed to verify that the ratings of as-built UATs, RATs, SSTs and EPS power sources' meet the size requirements determined by the analysis for worst case loading conditions for all modes of plant operation and accident conditions.	**10.ii The ratings of as-built UATs, RATs, SSTs and EPS power sources bou the size requirements determined by the analy for worst case loading conditions for all modes of plant operation and accident conditions.**

RAI No.182

14.03.06-10

Attachment 1

Table 2.6.1-3 AC Electric Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
11.a The Class 1E distribution equipment and circuits are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~11.a~~ **11.a.i** Analyses will be performed to verify ~~that~~ the ~~as-built~~ Class 1E distribution equipment and circuits are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~11.a~~ **11.a.i** The ~~results of analyses conclude that the as-built~~ Class 1E distribution equipment and circuits are sized to carry the worst case load currents, can withstand the maximum fault currents, and are able to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.
	11.a.ii An inspection will be performed to verify that the ratings of as-built Class 1E distribution equipment and circuits bound the results of the analysis to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	**11.a.ii The ratings of as-built Class 1E distribution equipment and circuits bound the results of the analysis to carry the worst case load currents, can withstand the maximum fault currents, and are able to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.**
11.b The cables are sized considering derating due to ambient temperature and raceway loading.	~~11.b~~ **11.b.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ cables are sized considering derating due to ambient temperature and raceway loading.	~~11.b~~ **11.b.i** The ~~result of analysis concludes that the as-built~~ cables are sized considering derating due to ambient temperature and raceway loading.
	11.b.ii An inspection will be performed to verify that the as-built cables' size bounds the minimum size determined by the ~~analyses~~analysis.	**11.b.ii The as-built cables' size bound the minimum size determined by the analysis.**

RAI No.182

14.03.06-10

Attachment 1

12. The interrupting ratings of the circuit breakers and fuses are adequate for maximum available fault currents.	~~12.~~ **12.i** An analysis will be performed to verify ~~that~~ interrupting ratings of the ~~as-built~~ circuit breakers and fuses are adequate for maximum available fault currents.	~~12.~~ **12.i** The ~~result of analysis concludes that the~~ interrupting ratings of the ~~as-built~~ circuit breakers and fuses are adequate for maximum available fault currents.
	12.ii An inspection will be performed to verify the interrupting ratings of the circuit breakers and fuses bound the requirements of the analysis for maximum available fault currents.	**12.ii The interrupting ratings of the as-built circuit breakers and fuses bound the requirements of the analysis for maximum available fault currents.**
13. The MT, UATs, and RATs have their own fire deluge system, oil pit and drain system.	13. An inspection of the as-built fire deluge system, oil pit and drain system for the MT, UATs, and RATs will be performed.	13. The as-built MT, UATs, and RATs have their own fire deluge system, oil pit and drain system.
14. The UATs power feeders are separated from RATs power feeders.	14. An inspection of the as-built UATs power feeders and the as-built RATs power feeders will be performed.	14. The as-built UATs power feeders are separated from the as-built RATs power feeders.
15. The MT and GLBS power feeders are separated from the RATs power feeders.	15. An inspection of the as-built MT, GLBS and RATs will be performed.	15. The as-built MT and GLBS power feeders are separated from the as-built RATs power feeders.

RAI No.182

14.03.06-06

Attachment 1

Table 2.6.1-3 AC Electric Power Systems Inspections, Tests, Analyses Acceptance Criteria (Sheet 4 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
16. The dc control power for Class 1E switchgear and load centers of each division are supplied from the same division of the dc system.	16. An inspection of the as-built dc control power source of the Class 1E switchgear and load centers will be performed.	16. The dc control power for as-built Class 1E switchgear and load centers of each division are supplied from the same division of the dc system.
17. Equipment and circuits of each Class 1E division are uniquely identified.	17. An inspection of the as-built equipment and circuits of each Class 1E division will be performed.	17. The as-built equipment and circuits of each Class 1E division are uniquely identified.
18. The Class 1E equipment is protected from sustained degraded voltage conditions.	18. An analysis will be performed to verify that the as-built Class 1E equipment is protected from sustained degraded voltages conditions.	18. The results of the analysis concludes that the as-built Class 1E equipment is protected from sustained degraded voltage conditions.
19. There is no provision for automatic connection between redundant Class 1E buses.	19. An inspection of the as-built Class 1E buses will be performed.	19. There is no provision for automatic connection between redundant as-built Class 1E buses.
20. The voltage and current of the Class 1E medium voltage bus are displayed in the MCR.	20. An inspection of the as-built MCR will be performed.	20. The voltage and current of the Class 1E medium voltage bus are displayed in the as-built MCR.

RAI No.182

14.03.06-08

Attachment 1

Independence is established between each of the four divisions of the Class 1E DC power supply system and its associated distribution equipment. The Class 1E ~~batteries are located in separate battery rooms in the seismic Category I building. The Class 1E dc switchboards and battery chargers of each division are located in~~ **dc power system equipment is located in** separate rooms in the **PS/B and R/B.** ~~seismic Category I building, adjacent to the associated battery rooms.~~ Areas containing Class 1E dc power system distribution equipment are designated as vital areas and have controlled access.

Cables are sized to carry required load currents and provide minimum design basis voltage at load terminals, considering derating due to ambient temperature and raceway loading. Class 1E dc system circuit breakers and fuses are sized to supply their load requirements.

The main circuit protection device in the switchboard has selective coordination with downstream protective devices.

The Class 1E dc power system operating voltage range is 108V to 140V at the battery terminals.

Equipment and circuits of each division of Class 1E dc power systems are uniquely identified. Class 1E dc cables are routed in seismic Category I raceways within their respective division.

2.6.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.2-2 describes the ITAAC for the non-Class 1E dc power systems.

RAI No.182

14.03.06-06
14.03.06-08

Attachment 1

Table 2.6.2-2 DC Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the dc electric power systems is as described in the Design Description in this Subsection 2.6.2.1 and as shown in Figure 2.6.2-1.	1. An inspection of the functional arrangement of the as-built dc electric power systems will be performed.	1. The as-built dc power systems conform to the functional arrangement as described in the Design Description in this Subsection 2.6.2.1 and as shown in Figure 2.6.2-1.
2. ~~All~~ **Each of the four divisions of** Class 1E **DC power supply system** equipment**, identified in Table 2.6.2-1, are** ~~is~~ designed ~~I~~ **to withstand seismic design basis loads without loss of safety function.** ~~as seismic Category I qualified for postulated environmental conditions as shown in Table 2.6.2-1.~~	~~2. Type tests and/or analyses will be performed to verify that all Class 1E equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **2.i Inspections will be performed to verify that the as-built Class 1E equipment is located in the PS/B and R/B.**	~~2. The results of type tests and/or analysis conclude that all Class 1E equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **2.i Each of the four divisions of as-built Class 1E DC power supply system equipment identified in Table 2.6.2-1 is located in the PS/B and R/B.**
	2.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**2.ii Each of the four divisions of Class 1E DC power supply system equipment, identified in Table 2.6.2-1 can withstand seismic design basis loads without loss of safety function.**
	2.iii An inspection will be performed to verify that the as-built Class 1E equipment including anchorage is seismically bounded.	**2.iii Each of the four divisions of as-built Class 1E DC power supply system equipment, identified in Table 2.6.2-1, including anchorage is seismically bounded by the tested or analyzed conditions.**
3. The Class 1E batteries have enough capacity to carry the worst case load profile for duration of two hours assuming chargers are unavailable.	3. An analysis will be performed to verify that the as-built Class 1E batteries have enough capacity to carry the worst case load profile for duration of two hours assuming chargers are unavailable.	3. The result**s** of **the** analysis concludes that the as-built Class 1E batteries have enough capacity to carry the worst case load profile for duration of two hours assuming chargers are unavailable.

RAI No.182

14.03.06-06
14.03.06-07
14.03.06-10

Attachment 1

Table 2.6.2-2 DC Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4. Independence is maintained between each of the four divisions of the Class 1E dc power system distribution equipment, and between Class 1E dc power system distribution equipment and non-Class 1E dc power system distribution equipment.	4. Tests will be performed on the as-built Class 1E and non-Class 1E dc power system distribution equipment by providing a test signal in only one division at a time.	4. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test ~~in the each division system~~.
5. Independence is maintained between Class 1E dc power system distribution equipment and non safety-related loads by Class 1E qualified isolation devices.	5. An inspection of the as-built Class 1E dc power system distribution equipment will be performed.	5. The as-built Class 1E dc power system distribution equipment is isolated from the as-built non safety-related loads by the Class 1E qualified isolation devices.
6. The Class 1E battery chargers have enough capacity to carry the continuous dc system loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.	~~6.~~ **6.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E battery chargers have enough capacity to carry the continuous dc systems loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.	~~6.~~ **6.i** The ~~result of analysis concludes that the as-built~~ Class 1E battery chargers have enough capacity to carry the continuous dc systems loads and charge the associated battery (which has undergone design basis discharge) to 95% of its full capacity within twenty-four hours.
	6.ii An inspection will be performed to verify that the ratings of the as-built Class 1E battery chargers bound the ratings of the analysis.	**6.ii The ratings of the as-built Class 1E battery chargers bound the ratings of the analysis.**
7. The alarms initiate in MCR to indicate Class 1E system malfunctions and status conditions.	7. A test will be performed to verify that alarms initiate in the as-built MCR to indicate the as-built Class 1E system malfunctions and status conditions	7. The ~~result~~ **results** of **the** test conclude~~s~~ that the alarms initiate in the as-built MCR to indicate the as-built Class 1E system malfunctions and status conditions
8. Each Class 1E battery is located in separate battery rooms.	8. An inspection of each as-built Class 1E battery will be performed.	8. Each as-built Class 1E battery is located in separate battery rooms.
9. The Class 1E dc switchboard and battery charger of each division are located in separate ~~room~~**rooms**.	9. An inspection of the as-built Class 1E dc switchboard and battery charger will be performed.	9. The as-built Class 1E dc switchboard and battery charger of each division are located in separate ~~room~~ **rooms**.

RAI No.182

14.03.06-10
14.03.06-11
14.03.06-13

Attachment 1

Table 2.6.2-2 DC Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
10. The areas containing Class 1E dc power system distribution equipment are designated as vital areas and have controlled access.	10. An inspection of the as-built areas containing Class 1E dc power system distribution equipment will be performed.	10. The as-built areas containing Class 1E dc power system distribution equipment are designated as vital areas and have controlled access.
11. The cables are sized to carry required load currents and provide minimum design basis voltage at load terminals **considering derating due to ambient temperature and raceway loading.**	11i. An analysis will be performed to verify ~~that~~ the ~~as-built~~ cables are sized to carry required load currents and provide minimum design basis voltage at load terminals, **considering derating due to ambient temperature and raceway loading.**	11.i. The ~~result of analysis concludes that the as-built~~ cables are sized to carry required load currents and provide minimum design basis voltage at load terminals, **considering derating due to ambient temperature and raceway loading.**
	11.ii An inspection will be performed to verify the size of cables installed bound the minimum size required by the analysis.	**11.ii The as-built cables are sized to bound the minimum sizes determined by the analyses.**
12. The Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.	~~12~~ **12.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.	~~12.~~ **12.i** The ~~result of analysis concludes that the as-built~~ Class 1E dc system equipment, circuit breakers and fuses are sized to supply their load requirements.
	12.ii An inspection will be performed to verify that the ratings of the as-built Class 1E system equipment, circuit breakers and fuses bound the size requirements of the analysis.	**12.ii The ratings of the as-built Class 1E dc system equipment, circuit breakers and fuses bound the size requirements of the analysis.**

Attachment 1

RAI No.182

14.03.06-06
14.03.06-12

13. The main circuit protection device in the switchboard **of each of the four Class 1E dc power divisions,** has selective coordination with downstream protective devices.	13. **13.i An analysis will be performed to verify the main circuit protection devices have selective coordination with the downstream protective devices.**	13. **13.i The main circuit protection device in the switchboard of each of the four Class 1E dc power divisions, has selective coordination with the downstream protective devices.**
	13.ii An inspection of the as-built main circuit protection devices in the as-built switchboards will be performed.	**13.ii** The as-built main circuit protection device **devices** in the as-built switchboard **are the same as those used in the coordination analyses**.
14. The Class 1E dc system operating voltage range at the terminals of the safety-related equipment is within the equipment's voltage limit.	14. An analysis will be performed to verify that the as-built Class 1E dc system operating voltage range at the terminals of the safety-related equipment.	14. The results of **the** analysis concludes that the as-built Class 1E dc system operating voltage range at the terminals of the Class 1E equipment is within the voltage limit of the safety-related equipment.
15. The equipment and circuits of each division of Class 1E dc systems are uniquely identified.	15. An inspection of the as-built equipment and circuits of each division of Class 1E dc systems will be performed.	15. The as-built equipment and circuits of each division of Class 1E dc systems are uniquely identified.
16. The Class 1E dc cables are routed in their respective divisions through seismic Category I structures and the cables and raceways are identified the same as their respective Class 1E division.	16. An inspection of the as-built Class 1E dc cables routing will be performed.	16. The as-built Class 1E dc cables are routed in their respective division through the seismic Category I structures and the cables and raceways are identified the same as their respective Class 1E division.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-11

2.6.3 I&C Power Supply Systems

2.6.3.1 Design Description

Functional arrangement of onsite I&C power supply systems are depicted on Figure 2.6.3-1.

All Class 1E I&C power supply system equipment are seismic Category I and qualified for postulated environmental conditions. The Table 2.6.3-1 shows electrical and seismic classification of major Class 1E I&C power supply system equipment.

Independence is established between each of the four divisions of Class 1E I&C power supply distribution equipment. The equipment of each I&C power supply system division **is** ~~are~~ located in **a** separate ~~rooms~~ **room** in the seismic Category I **reactor** building. Areas containing Class 1E equipment are designated as vital areas and have controlled access.

The power supply to each of the four Class 1E panel boards ~~Transfer~~ **transfers** from **its Class 1E** UPS unit to **its Class 1E I&C power** transformer ~~is automatic~~ **automatically** on **an** undervoltage signal.

When a LOOP occurs, input to the UPS unit is provided by the Class 1E battery without interruption to the loads.

The Class 1E I&C power supply system equipment and cables are sized to meet load requirements and provide minimum design bases voltage at load terminals, considering derating due to ambient temperature and raceway loading. Class 1E I&C power supply system circuit breakers and fuses of the power supply system are rated adequately to interrupt the fault currents.

Equipment and circuits of each Class 1E I&C power supply division are uniquely identified. Class 1E I&C power supply system cables are routed in seismic Category I raceways within their respective division.

Independence is maintained between Class 1E I&C power supply system distribution equipment and non safety-related I&C loads by Class 1E qualified isolation devices.

Alarms initiate in MCR to indicate Class 1E power supply system malfunctions and status conditions. System control and status display that are available in the MCR are shown on Table 2.6.3-2.

2.6.3.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.3-3 describes the ITAAC for the Class 1E I&C power supply systems.

RAI No.182

14.03.06-08
14.03.06-10

Attachment 1

Table 2.6.3-3 I&C Power Supply Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the I&C power supply systems is as described in the Design Description of this Subsection 2.6.3.1 and is as shown on Figure 2.6.3-1.	1. An inspection of the functional arrangement of the as-built I&C power supply systems will be performed.	1. The as-built I&C power supply systems conform to the functional arrangement described in the Design Description of this Subsection 2.6.3.1 and is as shown in Figure 2.6.3-1.
2. The Class 1E I&C power supply system equipment and cables are sized to meet load requirements and provide minimum design bases voltage at load terminals, considering derating due to ambient temperature and raceway loading.	~~2.~~ **2.**i An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E I&C power supply system equipment and cables are sized to carry the worst case load currents, to withstand the maximum fault currents, and to provide minimum design basis voltage at load terminals for all modes of plant operation and accident conditions.	~~2.~~ **2.**i The ~~result of analysis concludes that the as-built~~ Class 1E I&C power supply system equipment and cables are sized to meet load requirements and provide minimum design bases voltage at load terminals, considering derating due to ambient temperature and raceway loading.
	2.ii An inspection will be performed to verify that the ratings of as-built Class 1E I&C power supply system equipment and cables bound the size requirements of the analysis.	**2.ii The ratings of as-built Class 1E I&C power supply system equipment and cables bound the size requirements of the analysis.**
3. ~~All~~ **Each of the four divisions of** Class 1E I&C power supply system equipment **identified in Table 2.6.3-1** is designed **to withstand seismic design basis loads without loss of safety function.** ~~as seismic Category I and is qualified for postulated environmental conditions as shown in Tabel 2.6.3-1.~~	~~3. Type tests and/or analyses will be performed to verify that the all Class 1E I&C power supply system equipment is seismic Category I and is qualified for postulated environmental conditions.~~ **3.i Inspections will be performed to verify that the as-built seismic Category I equipment is located in the Reactor Building.**	~~3. The results of type tests and/or analysis conclude that the Class 1E I&C power supply system equipment is designed seismic Category I and is qualified for postulated environmental conditions.~~ **3.i Each of the four divisions of the as-built Class 1E I&C power supply system equipment identified in Table 2.6.3-1 is located in the Reactor Building.**
	3.ii Type tests and/or analyses of the Class 1E equipment will be performed.	**3.ii The Class 1E equipment, identified in Table 2.6.3-1, can withstand seismic design basis loads without loss of safety function.**

RAI No.182

14.03.06-06
14.03.06-08

Attachment 1

Design Commitment	Inspections, Tests, Analyses	Acceptan
	3.iii An inspection will be performed to verify that the as-built Class 1E equipment including anchorage is seismically bounded.	**3.iii The as-built Class 1 E equipment, identified in Table 2.6.3-1, including anchorage is seismically bounded by the tested or analyzed conditions.**
4. The areas containing Class 1E I&C power supply system equipment are designated as vital areas and have controlled access.	4. An inspection of the as-built areas containing the as-built Class 1E I&C power supply system equipment will be performed.	4. The as-built areas containing the as-built Class 1E I&C power supply system equipment are designated as vital areas and have controlled access.
5. **The equipment of each I&C power supply system division is located in separate rooms.** ~~Each Class 1E I&C power supply system equipment is located in separate rooms~~ .	5. An inspection of each **division of the** as-built Class 1E I&C power supply system equipment **will be performed**.	**5. The equipment of each as-built I&C power supply system division is located in separate rooms.** ~~Each as-built Class 1E I&C power supply system equipment is located in separate rooms~~

Attachment 1

RAI No.182

14.03.06-06
14.03.06-07

Table 2.6.3-3 I&C Power Supply Systems Inspections, Tests, Ar Acceptance Criteria (Sheet 2 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6. Independence is maintained between each of the four divisions of the Class 1E I&C power supply system distribution equipment, and between Class 1E I&C power supply system distribution equipment and non-Class 1E I&C power supply system distribution equipment.	6. Tests will be performed on the as-built Class 1E and non-Class 1E I&C power supply system distribution equipment by providing a test signal in only one division at a time.	6. The test signal exists only in the as-built Class 1E division or non-Class 1E division under test**.** ~~in the each division system.~~
7. Independence is maintained between Class 1E I&C power supply system distribution equipment and non safety-related loads by Class 1E qualified isolation devices.	7. An inspection of the as-built Class 1E I&C power supply system distribution equipment will be performed.	7. The as-built Class 1E I&C power supply system distribution equipment is isolated from the as-built non safety-related loads by the Class 1E qualified isolation devices.
8. **The power** ~~Power~~ supply to **each of the four** Class 1E panel boards **transfers** from **its** Class 1E UPS unit ~~is transferred~~ to **its Class 1E I&C power** transformer automatically on **an** undervoltage signal.	8. A test will be performed to verify that **the** power supply to **each** as-built Class 1E panel board **transfers** from i**ts** as-built Class 1E UPS unit ~~is transferred~~ to ~~the~~ **its** as-built **Class 1E I&C Power** transformer automatically on **an** undervoltage signal.	8. The result**s** of **the** test conclude~~s~~ that **the** power supply to **each of the four** as-built Class 1E panel board**s** **transfers** from **its** as-built Class 1E UPS unit ~~is transferred~~ to i**ts** as-built **Class 1E I&C power** transformer automatically on **an** undervoltage signal.
9. When ac input power to the Class 1E UPS unit is lost, input to the Class 1E UPS unit is provided by the Class 1E battery without interruption of power supply to the loads.	9. A test will be performed to verify that when ac input power to the as-built Class 1E UPS unit is lost, input to the Class 1E UPS unit is provided by the Class 1E battery without interruption of power supply to the loads.	9. The result**s** of **the** test conclude~~s~~ that when ac input power to the as-built Class 1E UPS unit is lost, input to the Class 1E UPS unit is provided by the Class 1E battery without interruption of power supply to the loads.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-10

Table 2.6.3-3 I&C Power Supply Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
11. The Class 1E I&C power supply system circuit breakers and fuses are rated adequately to interrupt the fault currents.	~~11.~~ **11.i** An analysis will be performed to verify ~~that~~ the ~~as-built~~ Class 1E I&C power supply system breakers and fuses are rated adequately to interrupt the fault currents.	~~11.~~ **11.i** The ~~result of analysis concludes that the as-built~~ Class 1E I&C power supply system breakers and fuses are rated adequately to interrupt the fault currents.
	11.ii An inspection will be performed to verify the interrupting ratings of as-built Class 1E I&C power supply system breakers and fuses bound the requirements of the analysis.	**11.ii The interrupting ratings of as-built Class 1E I&C power supply system breakers and fuses bound the requirements of the analysis.**
12. The equipment and circuits of each Class 1E I&C power supply system division are uniquely identified.	12. An inspection of each as-built Class 1E I&C equipment and circuits of each Class 1E I&C power supply system division will be performed.	12. The equipment and circuits of each as-built Class 1E I&C power supply system division are uniquely identified.
13. The Class 1E I&C power supply system cables are routed in their respective division through seismic Category I structures and the cables and raceways are identified the same as their Class 1E division.	13. An inspection of the as-built Class 1E I&C power supply system cables routing will be performed.	13. The as-built Class 1E I&C power supply system cables are routed in their respective division through seismic Category I structures and the cables and raceways are identified the same as their Class 1E division.
14. ~~The alarms~~ **Alarms** initiate in **the** MCR to indicate Class 1E I&C power supply system malfunctions and status conditions.	14. A test will be performed to verify that alarms initiate in the as-built MCR to indicate the as-built Class 1E I&C power supply system malfunctions and status conditions.	14. The result**s** of **the** test conclude~~s~~ that alarms initiate in the as-built MCR to indicate the as-built Class 1E I&C power supply system malfunctions and status conditions.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-08

2.6.4 Emergency Power Sources (EPS)

2.6.4.1 EPS Design Description

The emergency ~~Emergency~~ power supply to each of the four divisions of the Class 1E power distribution systems is provided by ~~an~~ **a** Class 1E EPS. The Class 1E EPSs are **normally** ~~always~~ in standby mode and provide power to the Class 1E 6.9kV buses upon loss of offsite power sources. ~~Each Class 1E EPS has its own fuel oil storage and transfer, lubrication, starting, and air intake and exhaust systems. Auxiliary power for Class 1E EPS support systems is provided by same division of the Class 1E power system. Each Class 1E EPS is located in a separate room in the seismic Category I building.~~

~~The~~ **Each** Class 1E EPS and its associated equipment are Class 1E and are classified seismic Category I. The support systems that are required ~~to~~ **for the Class 1E EPS to** perform **the** safety functions of starting and operating the Class 1E EPS are classified ASME Code Section III, Class 3. The Class 1E EPS and the ASME Code Section III, Class 3 portion of the support systems are seismic Category I.

Independence is established between each of the four Class 1E EPSs and its associated distribution equipment. Each Class 1E EPS has its own fuel oil storage and transfer, lubrication, starting, and air intake and exhaust systems. Auxiliary power for Class 1E EPS support systems is provided by same division of the Class 1E power system. Each Class 1E EPS is located in a separate room in the PS/B.

The Class 1E EPSs are sized to provide power to safety-related loads subsequent to **a** LOOP or **a** LOOP and concurrent LOCA conditions.

The Class 1E EPS engine intake combustion air is separated from the engine exhaust.

Mechanical and electrical systems are designed so that a single failure affects the operation of only one Class 1E EPS. Separation criteria are applied among any redundant Class 1E EPS and between any Class 1E EPS and non-Class 1E systems.

The Class 1E EPSs are capable ~~to provide~~ **of providing** power at **a** set voltage and frequency to the Class 1E 6.9kV buses within 100 seconds from ~~the~~ **a** start signal.

The ECCS actuation signal starts the Class 1E EPSs and sheds the non-accident loads connected to the Class 1E buses. The Class 1E EPS circuit breaker automatically closes if the buses are de-energized. After the breaker closes, the accident loads on the Class 1E buses are started in sequence by the ECCS load sequencer.

A loss of power to a Class 1E bus initiates **an** automatic start of the respective Class 1E EPS, load shedding of connected loads, and closing of the Class 1E EPS circuit breaker. After the closing of the Class 1E EPS circuit breaker, the LOOP sequencer sequentially starts the required non-accident loads.

RAI No.182

14.03.06-06
14.03.06-11

Attachment 1

All Class 1E EPS protection systems, except for severe failure protection, are bypassed by an ECCS actuation signal.

The Class 1E EPSs are capable ~~to respond~~ **<u>of responding</u>** to an ECCS actuation signal when running for test purposes.

Each Class 1E EPS can be controlled from the MCR and from the Class 1E EPS room.

<u>The stored air starting system is capable of providing starting air to each of the four Class 1E EPSs without requiring replenishment.</u>

Attachment 1

RAI No.182

14.03.06-06

2.6.4.2 EPS Fuel Oil Storage and Transfer Systems (FOS) Design Descriptio

Each Class 1E EPS is provided with dedicated and independent fuel oil supply systems, fuel oil day tank and storage tank such that:

- The FOS ~~is a~~ **are** safety-related ~~system~~ **systems**.
- The FOS ~~systems~~ are not shared between the Class 1E EPSs of redundant divisions.
- The FOS ~~systems~~ are designed to minimize common cause failure of Class 1E EPSs of redundant divisions.

The FOS design features include:

- Four redundant and independent divisions, each dedicated to its respective Class 1E EPS
- Each fuel oil storage tank provides a seven day supply of fuel oil to its respective Class 1E EPS.
- Each fuel oil day tank provides sufficient fuel for 1.5 hours of Class 1E EPS operation and is elevated above its Class 1E EPS to provide gravity flow.
- The FOS is designed so that a single failure of any active component of the system cannot affect the ability of the system to store and deliver fuel oil.
- The system is designed to remain operational during and after a safe-shutdown earthquake.
- The system contents are protected from the effects of low temperatures.
- Each fuel oil day tank is located inside the associated Class 1E EPS room in the seismic Category I building.
- Two skid mounted transfer pumps serve each Class 1E EPS.

The FOS and the related tank and pump compartments are designed to seismic Category I standards. The system is designed to meet the requirements of the ASME Code, Section III. The tanks and the related piping and valves are made of carbon steel, which is painted for corrosion resistance.

One of the two pumps transfers fuel oil from the fuel oil storage tank to the Class 1E EPS fuel oil day tank. Fuel oil in the fuel oil day tank flows by gravity to feed the Class 1E EPS.

Alarms are provided in the MCR for low fuel oil level in the fuel oil storage ~~tank~~ **tanks** and low and high level in the fuel oil day tanks.

System logic involves the fuel oil transfer pump starting automatically on a fuel oil day tank low level signal and stopping automatically on a fuel oil day tank high-level signal. There are no system interlocks.

Attachment 1

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the Class 1E EPS is as described in this Subsection 2.6.4.1	1. An inspection of the functional arrangement of the as-built Class 1E EPS will be performed.	1. The as-built onsite Class 1E EPS conforms to the functional arrangement as described in this Subsection 2.6.4.1
2. Each Class 1E EPS is always in standby mode and provides power to the Class 1E 6.9kV buses upon loss of offsite power sources.	2. A test of each as-built Class 1E EPS will be performed.	2. The results of **the** test concludes that each as-built Class 1E EPS is always in standby mode and provides power to the as-built Class 1E 6.9kV buses upon loss of offsite power sources.
3. Each Class 1E EPS has its own fuel oil storage and transfer, lubrication, starting, and combustion air intake and exhaust systems.	3. An inspection of each as-built Class 1E EPS and support systems will be performed.	3. Each as-built EPS has its own fuel oil storage and transfer, lubrication, starting, and combustion air intake and exhaust systems.
4. The auxiliary power for each Class 1E EPS' support systems is provided by **the** same division of the Class 1E power system.	~~4.~~ **4.i** An inspection of ~~the~~ **each** as-built ~~power sources~~ **Class 1E EPS'** ~~of the~~ support systems ~~for each Class 1E EPS~~ will be performed.	~~4.~~ **4.i** The auxiliary power for each as-built Class 1E EPS' support systems is provided by same division of the Class 1E power system.
	4.ii A test of each as-built Class 1E EPS' support system will be performed to verify that auxiliary power is provided by the same division of the Class 1E power system.	**4.ii The auxiliary power for each as-built Class 1E EPS' support system is provided by the same division of the Class 1E power system.**
5. **Deleted** ~~Each Class 1E EPS is located in a separate room. in the seismic Category I building.~~	5. **Deleted** ~~An inspection of the as-built Class 1E EPSs will be performed.~~	5. **Deleted** ~~Each as-built Class 1E EPS is located in a separate room. in the seismic Category I building.~~
6. ~~The Class 1E EPS and the associated equipment are as designed Class 1E and seismic Category I.~~ **Each of the four Class 1E EPSs are designed to withstand seismic design basis loads without loss of safety**	~~6. Type tests and/or analyses will be performed to verify the design of the Class 1E EPS and its associated equipment.~~ **6.i Inspections will be performed to verify that each as-built Class 1E EPS is located in the PS/B.**	~~6. The results of tests and/or analysis conclude that the Class 1E EPS and its associated equipment are designed as Class 1E and seismic Category I.~~ **6.i Each of the four as-built Class 1E EPSs is located in the PS/B.**

RAI No.182

14.03.06-06
14.03.06-08

Attachment 1

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
function.	**6.ii Type tests and/or analyses of each Class 1E EPS will be performed.**	**6.ii Each of the four as-built Class 1E EPSs can withstand seismic design basis loads without loss of safety function.**
	6.iii An inspection will be performed to verify that each as-built Class 1E EPS including anchorage is seismically bounded.	**6.iii Each of the four as-built Class 1E EPSs including anchorage is seismically bounded by the tested or analyzed conditions.**
7. The support systems for piping that is required to perform safety functions of starting and operating, the Class 1E EPS are classified ASME Code Section III.	7. Pressure tests will be conducted on the code components of the as-built support systems piping.	7. The result**s** of **the** tests conclude~~s~~ that the as-built support systems for piping that is required to perform safety functions of starting and operating the Class 1E EPS are classified the ASME Code Section III.
8. The ~~Class 1E EPS and the~~ ASME Code Section III **Class 3** portion**s** of the **EPS** support systems are designed ~~as seismic Category I.~~ **to withstand seismic design basis loads without loss of safety function.**	~~8. Type tests and/or analyses will be performed on the Class 1E EPS and the ASME Code Section III portion of the support systems.~~ **8.i Inspections will be performed to verify that the ASME Code Section III Class 3 portions of the EPS support systems are located within seismic Category I structures.**	~~8. The result of **the** tests and/or analysis concludes that the Class 1E EPS and the ASME Code Section III portion of the support systems are designed as the seismic Category I.~~ **8.i Each of the as-built ASME Code Section III, Class 3 portions of the EPS support systems is located within seismic Category I structures.**
	8.ii Type tests and/or analyses of the ASME Code Section III Class 3 portion of the EPS support systems will be performed.	**8.ii Each of as-built ASME Code Section III, Class 3 portions of the EPS support systems can withstand seismic design basis loads without loss of safety function.**
	8.iii An inspection will be performed to verify that the ASME Code Section III Class 3 portion of the EPS support systems including anchorage is seismically bounded.	**8.iii Each of the as-built ASME Code Section III, Class 3 portions of the EPS support systems including anchorage is seismically bounded by the tested or analyzed conditions.**

RAI No.182

14.03.06-06
14.03.06-10

Attachment 1

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Accepta Criteria (Sheet 2 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9. The Class 1E EPS**s** **are** sized to provide power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.	~~9.~~ **9.i** An analysis will be performed to verify ~~that as-built~~ **the** Class 1E EPS**s** ~~is~~ **are** capable ~~to provide~~ **of providing** power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.	~~9.~~ **9.i** The ~~result of analysis conclude that the as-built~~ Class 1E EPS**s** ~~is~~ **are** sized to provide power to safety-related loads subsequent to **a** LOOP or **a** LOOP concurrent with LOCA conditions.
	9.ii An inspection will be performed to verify that ratings of as-built Class 1E EPSs bound the size requirements of the analysis.	**9.ii The ratings of the as-built Class 1E EPSs bound the size requirements of the analysis.**
10. The stored air starting system is capable of providing start of the Class 1E EPS without requiring replenishment.	10. A test of the as-built Class 1E EPS starting system will be performed.	10. The result**s** of **the** test conclude~~s~~ that the as-built Class 1E EPS stored air starting system is capable of providing start of the as-built Class 1E EPS without requiring replenishment.
11. The Class 1E EPS engine combustion air intake portion is separated from the engine exhaust portion.	11. An inspection of the as-built Class 1E EPS engine will be performed.	11. The as-built Class 1E EPS engine combustion air intake portion is separated from the as-built engine exhaust portion.
12. Independence is maintained between each of four Class 1E EPSs	12. An inspection of the as-built Class 1E EPSs will be performed.	12. The as-built Class 1E EPSs are isolated **from** each other.
13. The Class 1E EPS**s** ~~is~~ **are** capable of providing power at the set voltage and frequency to the Class 1E 6.9kV buses within 100 seconds of receiving ~~the starting~~ **a start** signal.	13. A test will be performed to verify that the as-built Class 1E EPS power sources can reach set voltage and frequency within 100 seconds of receiving **a start** signal.	13. The result**s** of **the** test conclude~~s~~ that the as-built Class 1E EPS power reaches the set voltage and frequency within 100 seconds of receiving ~~the starting~~ **a start** signal.
14.a The ECCS actuation signal starts the Class 1E EPSs under a LOOP concurrent with LOCA ~~condition~~ **conditions**.	14.a A test will be performed to verify that the ECCS actuation signal starts the as-built Class 1E EPSs under a simulated LOOP concurrent with LOCA ~~condition~~ **conditions**.	14.a The result**s** of **the** test conclude~~s~~ that the ECCS actuation signal starts the as-built Class 1E EPSs.

RAI No.182

14.03.06-06

Attachment 1

14.b Each Class 1E EPS circuit breaker automatically closes and loads are shed if its respective division Class 1E medium voltage bus is de-energized	14.b A test will be performed to verify operation of each as-built Class 1E EPS circuit breaker and loads.	14.b The result~~s~~ of **the** test concludes that each as-built Class 1E EPS circuit breaker automatically closes and loads are shed if its respective division Class 1E medium voltage bus is de-energized.

Attachment 1

RAI No.182

14.03.06-06

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
14.c After the breaker closes, the safety-related loads on the same division Class 1E buses are started in sequence by the ECCS load sequencer.	14.c A test will be performed to verify operation that after the breaker closes, the as-built safety-related loads on the same division Class 1E buses **are started in sequence by the ECCS load sequencer**.	14.c The results of **the** test concludes that after the breaker closes, the as-built safety-related loads on the same division Class 1E buses are started in sequence by the ECCS load sequencer.
15.a A loss of power to a Class1E bus initiates **an** automatic start of the respective Class 1E EPS, load shedding of connected loads, and closing of the Class 1E EPS circuit breaker.	15.a A test will be performed to verify ~~that~~ operation **of the respective Class 1E EPS** upon a loss of power to the as-built Class 1E bus.	15.a The results of **the** test concludes that a loss of power to the as-built Class 1E bus initiates **an** automatic start of the respective as-built Class 1E EPS, load shedding of connected loads, and closing of the as-built Class 1E EPS circuit breaker.
15.b After the closing of the Class 1E EPS circuit breaker, the LOOP sequencer sequentially starts the required safety-related loads.	15.b A test will be performed to verify operation **of the LOOP sequencer** after the closing of the as-built Class 1E EPS **circuit breaker**.	15.b The results of **the** test concludes that after the closing of the as-built Class 1E EPS circuit breaker, the LOOP sequencer sequentially starts the required safety-related loads.
16. All Class 1E EPS protection systems, except for severe failure protection, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.	16. A test will be performed to verify operation of **all** the as-built ~~all~~ Class 1E EPS protection systems when the Class 1E EPS is started by an ECCS actuation signal.	16. The results of **the** test concludes that **all** the as-built ~~all~~ Class 1E EPS protection systems, except for severe failure protection, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.
17. The Class 1E EPSs are capable of responding to an automatic start signal when running for test purposes.	17. A test will be performed to verify that the as-built Class 1E EPSs are capable of responding to an automatic start signal.	17. The results of **the** test concludes that the as-built Class 1E EPSs are capable of responding to an automatic start signal when running for test purposes.
18. Each Class 1E EPS can be controlled from the MCR and from the Class 1E EPS room.	18. A test will be performed to verify control of each as-built Class 1E EPS.	18. The results of **the** test concludes that each as-built EPS can be controlled from the as-built MCR and from the Class 1E EPS room.

Attachment 1

RAI No.182

14.03.06-06

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
19. The functional arrangement of the Class 1E EPS fuel oil storage and transfer system is as described in this Subsection ~~2.6.4.1~~ **2.6.4.2.**	19. An inspection of the functional arrangement of the as-built Class 1E EPS fuel oil storage and transfer system will be performed.	19. The as-built onsite Class 1E EPS fuel oil storage and transfer system conforms to the functional arrangement as described in this Subsection ~~2.6.4.1.~~**2.6.4.2.**
20. The fuel oil storage and transfer system is designed and constructed in accordance with seismic Category I standards and ASME Code Section III requirements.	20. An inspection of the as-built fuel oil storage and transfer system will be performed.	20. The as-built fuel oil storage and transfer system is designed and constructed in accordance with seismic Category I standards and ASME Code Section III.
21. Each fuel oil transfer pump transfers fuel oil from the fuel oil storage tank to the Class 1E EPS day tank.	21. An inspection of each as-built fuel oil transfer pump will be performed.	21. Each as-built fuel oil transfer pump is designed to transfer fuel oil from the fuel oil storage tank to the as-built Class 1E EPS day tank.
22. The fuel oil in the fuel oil day tank flows by gravity to feed the Class 1E EPS.	22. An inspection of the as-built fuel oil day tank will be performed.	22. The as-built fuel oil in the day tank flows by gravity to feed the as-built Class 1E EPS.
23. Alarms are provided in the MCR for low fuel oil level in the fuel oil storage tanks and low and high level in the fuel oil day tanks.	23. A test will be performed on the as-built fuel oil storage and transfer system by providing simulated fuel oil storage and fuel oil day tank test signals.	23. The result**s** of **the** test conclude~~s~~ that alarms are provided in the as-built MCR for low fuel oil level in the as-built fuel oil storage tanks and low and high level in the as-built fuel oil day tanks.
24. The system logic involves the fuel oil transfer pump starting automatically on a day tank low level signal and stopping automatically on a fuel oil day tank high-level signal.	24. A test will be performed on the as-built fuel oil storage and transfer system by providing a simulated fuel oil day tank level test signal testing the fuel oil transfer pump.	24. The result**s** of **the** test conclude~~s~~ that as-built system logic involves the fuel oil transfer pump starting automatically on a fuel oil day tank low level signal and stopping automatically on a fuel oil day tank high-level signal.
25. The fuel oil transfer pumps are powered from their respective Class 1E division.	25. A test will be performed on the as-built fuel transfer pumps by providing a simulated test signal in each Class 1E division.	25. The result**s** of **the** test conclude~~s~~ that a simulated test signal exists at the as-built fuel oil transfer pumps when the assigned Class 1E division is provided a test signal.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-11

2.6.5 Alternate AC (AAC) Power Source

2.6.5.1 AAC Design Description

Two AAC power sources are provided to supply AAC power in case there is a complete loss of offsite power and of Class 1E EPSs. AAC power sources supply power to loads required to bring and maintain the plant in a safe shutdown condition for an station blackout (SBO) condition. AAC power sources also provide power to the 6.9kV permanent buses during a LOOP condition. The AAC sources and their connections to Class 1E 6.9kV buses and to non-Class 1E 6.9kV permanent buses are shown on Figure 2.6.1-1. These AAC power sources are non-Class 1E and non-seismic.

The AAC power sources are located in separate dedicated rooms.

AAC power sources are sized to meet load requirements for SBO and LOOP conditions. The generator lead cables are adequately sized to carry the rated output of the AAC power source and withstand the maximum available fault current.

The connection between the Class 1E 6.9kV buses and non-Class 1E AAC power sources are provided through two isolation devices in series which are normally open. One Class 1E circuit breaker is provided at the Class 1E 6.9kV switchgear and the other is a non-Class 1E disconnect switch at the selector circuit.

From the onset of an SBO event, one Class 1E 6.9kV switchgear bus is manually connected to an AAC power source within one hour. Loads required for SBO are manually started to allow the plant to achieve and maintain a safe shutdown condition.

The AAC power sources are capable of providing power at a set voltage and frequency to the non-Class 1E 6.9kV buses within the acceptable time from receipt of a start signal.

The AAC power system is inspected and tested periodically to demonstrate operability and reliability. **Periodic testing includes verification of the capability of providing power at a set voltage and frequency within the acceptable time from the receipt of a start signal.**

The AAC power sources are of different size and have different starting system from the EPSs.

The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours.

Manual and automatic operation (e.g. start, stop and synchronization) are provided in the MCR. The AAC power source and ~~circuit~~ **each Class 1E 6.9kV** breaker status information is available in the MCR.

Attachment 1

2.6.5.2 AAC Fuel Oil Storage and Transfer Systems (FOS) Design Description

Each AAC power source is provided with dedicated fuel oil supply system, fuel oil day tank and storage tank:

RAI No.182

14.03.06-06

- The AAC FOS ~~is a~~ **are** non safety-related ~~system~~ **systems**.
- FOS is not shared by the EPS power sources.

The AAC FOS design features include:

- Each fuel oil day tank provides sufficient fuel for 1.5 hours of AAC power source operation.
- Each fuel oil day tank is located inside the associated AAC power source room in the PS/B.

2.6.5.3 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.5.1-1 describes the ITAAC for the AAC power source.

RAI No.182
14.03.06-06
14.03.06-11

Attachment 1

Table 2.6.5-1 AAC Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the AAC power sources are as described in Subsection 2.6.5.1.	1. An inspection of the functional arrangement of the as-built AAC power sources will be performed.	1. The as-built AAC power sources conform to the functional arrangement described in Subsection 2.6.5.1.
2. The AAC power sources are located in separate dedicated rooms.	2. An inspection of the location of the as-built AAC power sources will be performed.	2. The as-built AAC power sources are located in separate dedicated rooms.
3. ~~The~~ **Each** AAC power source is isolated from the Class 1E power supply systems by a non-Class 1E disconnect switch and Class 1E circuit breaker.	3. An inspection of the as-built non-safety disconnect switch and Class 1E circuit breaker between ~~the~~ **each** AAC power source and the emergency Class 1E power supply systems will be performed.	3. ~~The~~ **Each** as-built AAC power source is isolated from the as-built Class 1E power supply systems by a non-safety disconnect switch and ~~the~~ **a** Class 1E circuit breaker.
4. The Class 1E circuit breakers in Class 1E medium voltage switchgears are connected to disconnect switches (non-Class 1E) in selector circuits which are normally open and do not have any automatic closing function.	4. An inspection of the as-built Class 1E circuit breakers in the Class 1E medium voltage switchgears which are connected to disconnect switches (non-Class 1E) in selector circuits will be performed.	4. The as-built Class 1E circuit breakers in the Class 1E medium voltage switchgears are connected to disconnect switches (non-Class 1E) in selector circuits which are normally open and do not have any automatic closing function.
5. Separate and independent fuel supply systems and onsite fuel storage tanks are provided for Class 1E EPSs and AAC power sources.	5. An inspection of the as-built fuel supply systems and onsite fuel storage tanks for the Class 1E EPSs and the AAC power sources will be performed.	5. Separate and independent fuel supply systems and onsite fuel storage tanks are provided for the as-built Class 1E EPSs and the AAC power sources.
6. The AAC power sources can be started and connected manually to onsite Class 1E medium voltage buses within 60 minutes during SBO conditions.	6. A test will be performed to verify that the as-built AAC power sources can be started and connected manually to the as-built onsite Class 1E medium voltage buses within 60 minutes during SBO conditions.	6. The result**s** of **the** test conclude~~s~~ that the as-built AAC power sources can be started and connected manually to the as-built onsite Class 1E medium voltage buses within 60 minutes during SBO conditions.
7. **The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours.** ~~The AAC power source has adequate fuel to operate required system for coping with SBO for 8 hours.~~	7. An inspection of the ~~as-build~~ **as-built** AAC power source**s** will be performed.	7. **The AAC GTGs have enough fuel capacity to supply power to the required SBO loads for 8 hours.** ~~The as-built AAC power source has adequate fuel to operate required system for coping with SBO for 8 hours~~.
8. The operation (e.g. start, stop and synchronization) of AAC power ~~source~~ **sources** are provided in the MCR.	8. An inspection of the as-built MCR will be performed.	8. The operation (e.g. start, stop and synchronization) of AAC power source**s** ~~is~~ **are** provided in the as-built MCR.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-09
14.03.06-11

Table 2.6.5-1 AAC Systems Inspections, Tests, Analyses, and Acceptance C (Sheet 2 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9. ~~The~~ **Each** AAC power source is capable ~~to provide~~ **of providing** power at **the** set voltage and frequency to the non Class 1E 6.9kV buses within ~~100 seconds~~ **the maximum allowable time** from receiving ~~the~~ **a** start signal.	9. A test will be performed to verify that the as-built AAC power source can reach set voltage and frequency.	9. ~~The result of the test concludes that the~~ **Each** as-built AAC power source is **capable of providing power at the** ~~reaches~~ set voltage and frequency **to the non Class 1E 6.9kV buses** within 100 seconds from receiving ~~the starting~~ **a start** signal.
10. The AAC power source status and the breaker status of each **Class 1E** 6.9kV breaker ~~of the engineered safety features system~~ is displayed in the MCR.	10. An inspection of the as-built MCR will be performed.	10. The as-built AAC power source status and the breaker status of each **Class 1E** 6.9kV breaker ~~of the engineered safety features system~~ is displayed in the as-built MCR.
11. The functional arrangement of the AAC fuel oil storage and transfer system is as described in Subsection ~~2.6.5.1.~~ **2.6.5.2**	11. An inspection of the functional arrangement of the as-built AAC fuel oil storage and transfer system will be performed.	11. The as-built AAC fuel oil storage and transfer system conforms to the functional arrangement as described in Subsection ~~2.6.5.1~~ **2.6.5.2**.

Attachment 1

RAI No.182

14.03.06-11

2.6.6 Plant Lighting Systems

2.6.6.1 Design Description

The plant lighting systems includes normal, and emergency lighting systems. The plant lighting systems are non safety-related and non-Class 1E.

The normal plant lighting is provided in all plant indoor and outdoor areas during all normal and emergency modes of plant operation. Normal plant lighting is powered from plant non-Class 1E ac power systems.

The emergency lighting system includes normal/emergency (N/E) lighting system, emergency lighting system **being** powered by the Class 1E power system, and self-contained battery pack emergency lighting system.

~~N/E lighting system is powered from the non-Class 1E power system that has ac backup.~~ **The N/E lighting system is capable of being powered by the non-Class 1E 480 V permanent buses.** N/E lighting is provided in all areas of the plant except the areas that have emergency lighting powered by the Class 1E power sources.

Emergency lighting powered by the Class 1E power system in MCR is powered from the redundant Class 1E dc power systems. Emergency lighting powered by the Class 1E power system in areas where emergency operations are performed (e.g. MCR, Remote shutdown console room) is powered by the Class 1E 480V power system.

Self-contained battery pack emergency lighting system is normally powered from the ac power systems **and powered from self-contained battery packs if normal ac power is lost**. **The** ~~S~~self-contained ~~battery pack~~ battery pack emergency lighting system is provided in areas where emergency operations are performed, **to enable** safe ingress and egress of personnel.

Emergency lighting system in MCR meets seismic Category I requirements.

Normal and emergency lighting system, together, provide the required illumination levels in each area.

2.6.6.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.6-1 describes the ITAAC for the plant lighting systems.

Attachment 1

RAI No.182

14.03.06-08

Table 2.6.6-1 Plant Lighting Systems Inspections, Tests, Analyses, Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The plant lighting systems includes normal, emergency, and security lighting systems.	1. An inspection of the as-built plant lighting systems will be performed.	1. The as-built plant lighting systems includes normal, emergency, and security lighting systems.
2. The emergency lighting system includes normal/emergency lighting system, emergency lighting system powered by Class 1E power system, and self-contained battery pack emergency lighting system.	2. An inspection of the as-built emergency lighting system will be performed.	2. The as-built emergency lighting system includes normal/emergency lighting system, Class 1E emergency lighting system powered by Class 1E power system and self-contained battery pack emergency lighting system.
3. The normal/emergency lighting system is powered from the 480V AAC buses.	3. An inspection of the as-built normal/emergency lighting system will be performed.	3. The as-built normal/emergency lighting system is powered from the 480V AAC buses.
4. The emergency lighting powered by Class 1E power system in the MCR is powered from redundant Class 1E dc systems.	4. An inspection of the as-built emergency lighting powered by the Class 1E power system in the as-built MCR will be performed.	4. The as-built emergency lighting powered by the Class 1E power system in the as-built MCR is powered from redundant Class 1E dc systems.
5. The emergency lighting system in **the** MCR **is designed to withstand seismic design basis loading without loss of safety function.** ~~meets seismic Category I requirements.~~	~~5. Type tests and/or analyses will be performed to verify that the emergency lighting system in the MCR meets seismic Category I requirements.~~ **5.i Inspections will be performed to verify that the as-built equipment is located in the Reactor Building.**	~~5. The results of the type tests and/or analyses conclude that the emergency lighting system in the MCR meets seismic Category I requirements.~~ **5.i The as-built emergency lighting system in the MCR is located in the Reactor Building.**
	5.ii Type tests and/or analyses of the equipment will be performed.	**5.ii The emergency lighting system in the MCR can withstand seismic design basis loads without loss of safety function.**
	5.iii An inspection will be performed to verify that the as-built equipment including anchorage is seismically bounded.	**5.iii The as-built emergency lighting system in the MCR including anchorage is seismically bounded by the tested or analyzed conditions.**

Attachment 1

6. The self-contained battery pack lighting **system is normally powered from the ac power system and powered from self-contained battery packs if the normal ac power is lost.** ~~have self-contained battery pack~~.	6. An inspection the as-built self-contained battery pack lighting **system** will be performed.	**6.** The as-built self-contained battery pack lighting **system is normally powered from the ac power system and powered from self-contained battery packs if the normal ac power is lost.** ~~have self-contained battery pack.~~

Attachment 1

RAI No.182

14.03.06-06

2.6.7 Grounding and Lightning Protection System

2.6.7.1 Design Description

The grounding and lightning protection system consists of the following:

- Station ground grid
- System neutral grounding
- Equipment grounding
- I&C grounding
- Lightning protection

The station ground grid consists of buried, interconnected bare copper conductors and ground rods forming a plant ground grid matrix.

The system neutral grounding provides grounding of the neutral points of the MG, MT, UATs, RATs, SSTs, Class 1E EPSs and AAC power sources. The neutrals of the MG, Class 1E EPSs and AAC power sources is grounded through grounding transformers providing high-resistance grounding. The MT and SST low voltage neutrals ~~is~~ **are** grounded solidly. The UAT and RAT low voltage winding neutrals are resistance-grounded.

The equipment grounding provides bonding of the equipment enclosures, raceways, metal structures, metallic tanks and ground bus of switchgear, load centers, MCCs, switchboards, panelboards and control cabinets to the station ground grid.

The I&C grounding provides the isolated signal ground required by plant I&C systems. A separate radial grounding system consisting of isolated instrumentation ground buses and insulated cables is provided. The radial grounding systems are connected to the station ground grid and are insulated from all other grounding circuits.

Lightning protection is provided for buildings and exposed ~~structure~~ **structures**. Surge arrestors are provided to protect the MT, UATs, RATs, isolated phase busduct and the medium-voltage switchgear from lightning surges. Surge arresters are connected directly to the ground grid in order to provide a low-impedance path to ground for the surges caused or induced by lightning. Thus, fire or damage to the plant from a lightning stroke is avoided.

2.6.7.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.7-1 describes the ITAAC for the grounding and lightning protection system.

Attachment 1

RAI No.182

14.03.06-06
14.03.06-09

Table 2.6.7-1 Grounding and Lightning Protection System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The ~~follow~~ **following** grounding and lightning protection **systems connect** ~~system connects~~ to the station grounding grid:	1. An inspection of the as-built grounding and lightning protection system will be performed to verify :	1. The **following** as-built **grounding and lightning protection systems** ~~connection~~ connect to **the** station grounding grid ~~exists for the following~~:
a. the system ~~natural~~ **neutral** grounding of the MG, MT, UATs, RATs, SSTs, Class 1E EPSs and AAC power ~~AAC s~~ **sources**	a. the system ~~natural~~ **neutral** grounding connects to station grounding grid	a. the system ~~natural~~ **neutral** grounding **of the MG, MT, UATs, RATs, SST, Class 1E EPSs and AAC power sources.**
b. the equipment grounding of the equipment enclosures, raceways and metal structures	b. the equipment grounding connects to station grounding grid	b. the equipment grounding **of the equipment enclosures, raceways and metal structures**
c. the I&C grounding	c. the I&C grounding connects to station grounding grid	c. the I&C grounding
d. the lightning protection	d. the lightning protection connects to station grounding grid	d. the lightning protection.

Attachment 1

RAI No.182

14.03.06-08

Table 2.6.8-1 Containment Electrical Penetration Assemblies Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The electric power, control and instrumentation circuits pass through the containment vessel boundary wall via electrical penetration assemblies (EPAs).	1. An inspection of the as-built electric power, control and instrumentation circuits pass through the as-built containment vessel boundary wall will be performed.	1. The as-built electric power, control and instrumentation circuits pass through the as-built containment vessel boundary wall via the as-built EPAs.
2. ~~The EPAs are classified as seismic Category I and qualified for postulated environmental conditions.~~ **Each EPA is designed to withstand seismic design basis loads without loss of safety function.**	~~2. Type tests and/or an analyses will be performed to verify that the EPAs are classified as the seismic Category I and qualified for postulated environmental conditions.~~ **2.i Inspections will be performed to verify that each as-built EPA is located in the Reactor Building and Containment vessel.**	~~2. The results of the type tests and/or analyses conclude that the EPAs are classified as the seismic Category I and qualified for postulated environmental conditions.~~ **2.i Each as-built EPA is located in the Reactor Building and Containment vessel.**
	2.ii Type tests and/or analyses of each EPA will be performed.	**2.ii Each EPA can withstand seismic design basis loads without loss of safety function.**
	2.iii An inspection will be performed to verify that each as-built EPA including anchorage is seismically bounded.	**2.iii Each as-built EPA including anchorage is seismically bounded by the tested or analyzed conditions.**
3. Separation is maintained between redundant divisions of EPAs containing Class 1E circuits and between EPAs containing Class 1E circuit and EPAs containing non-Class 1E circuits.	3. An inspection of the as-built EPAs containing the Class 1E circuit and the as-built EPAs containing the non-Class 1E circuits will be performed.	3. The separation is maintained between the as-built redundant divisions of EPAs containing the Class 1E circuits and between the as-built EPAs containing the Class 1E circuit and the as-built EPAs containing the non-Class 1E circuits.
4. Separate penetrations are provided for medium voltage and low voltage power, control, and instrumentation functions.	4. An inspection of the as-built penetrations for the medium voltage and low voltage power, control, and instrumentation functions will be performed.	4. The as-built separate penetrations are provided for the medium voltage and low voltage power, control, and instrumentation functions.

5. The primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.	~~5.~~ **5.i**An analysis will be performed to verify ~~that~~ the ~~as-built~~ primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.	~~5.~~ **5.i**The ~~results of the analysis concludes that the as-built~~ primary circuit protection device for each EPA circuit is sized to ensure electrical integrity of the circuit for postulated overload and short-circuit conditions.
	5.ii An inspection will be performed to verify the ratings of the as-built primary circuit protection device for each EPA circuit bound the requirements of the analysis.	**5.ii The ratings of the as-built primary circuit protection device for each EPA circuit bound the requirements of the analysis.**
6. The back up circuit protection device for each EPA circuit is sized to ensure mechanical integrity of the EPA for postulated overload and short-circuit conditions, during normal and accident conditions.	~~6.~~ **6.i** An analysis will be performed to verify ~~that~~ the back up circuit protection device for each ~~as-built~~ EPA circuit is sized to ensure mechanical integrity of the ~~as-built~~ EPA for postulated overload and short-circuit conditions, during normal and accident conditions.	~~6.~~ **6.i** The ~~results of the analysis concludes that~~ back up circuit protection device for each ~~as-built~~ EPA circuit is sized to ensure mechanical integrity of the ~~as-built~~ EPA for postulated overload and short-circuit conditions, during normal and accident conditions.
	6.ii An inspection will be performed to verify ratings of the back-up circuit protection device for each as-built EPA circuit bound the requirements of the analysis.	**6.ii The ratings of the back-up circuit protection device for each as-built EPA circuit bound the requirements of the analysis.**
7. Each EPA is qualified for a harsh environment to withstand the environmental conditions that would exist before, during, and following a design basis event without loss of safety function for the time required to perform the safety function.	**7.i Type tests and/or analyses will be performed for the EPAs.**	**7.i The results of the type tests and/or analyses conclude that each EPA is qualified for a harsh environment to withstand the environmental conditions that would exist before, during, and following a design basis event without loss of safety function for the time required to perform the safety function.**
	7.ii Inspection will be performed on each as-built EPA.	**7.ii Each as-built EPA is bounded by harsh environment qualification type tests and/or analyses.**