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July 15, 2011

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-11222

Subject: MHI's Responses to US-APWR DCD RAI NO. 754-5617 REVISION 3 (SRP 14.03.06)

References: 1) "Request for Additional Information No. 754-5617 Revision 3, SRP Section: 14.03.06, Application Section: 14.3.6," dated May 10, 2011.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 754-5617 Revision 3."

Enclosed are the responses to all of the RAIs 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.

Enclosures:

1. Responses to Request for Additional Information No. 754-5617 Revision 3

CC: J. A. Ciocco
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Enclosure 1

UAP-HF- 11222
Docket Number 52-021

Responses to Request for Additional Information No. 754-5617
Revision 3

July, 2011

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

07/15/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 754-5617 REVISION 3**
SRP SECTION:	**14.03.06 - ELECTRICAL SYSTEMS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA**
APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-20

Section 2.6.4.1, Item 12.b – Rev 3 of Tier 1 of the US-APWR DCD has replaced the statement that "Each Class 1E EPS is located in a separate room in the PS/B" with the statement that "The Class 1E EPSs are located in separate rooms in the PS/B." This new statement in 12.b should similarly make it clear that each Class 1E EPS train is located in a separate room of the PS/B. This comment also applies to the description in Tier 1, Table 2.6.4-1, Item 12.b.

ANSWER:

MHI will revise US-APWR DCD Tier 1, Table 2.6.4-1, ITAAC #12.b, Design Commitment to state that "Each redundant division of Class 1E EPSs is located in a separate room of the PS/B". The corresponding ITAAC Acceptance Criteria and Section 2.6.4.1, Design Description, will be similarly revised.

MHI has also determined that DCD Tier 1 Section 2.6.1.1, Design Description 5 and corresponding Table 2.6.1-3 ITAAC #5 are redundant to the aforementioned Design Description and ITAAC in 2.6.4 and, thus, will be deleted.

Impact on DCD

US-APWR DCD Tier 1 Sections 2.6.1.1 Design Description 5 and 2.6.4.1 Design Description 12.b and Tables 2.6.1-3 ITAAC #5and 2.6.4-1 ITAAC #12.b will be revised as described above and shown in the Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-21

Rev 3 of US-APWR DCD, Tier 1, Table 2.6.4-1, Items 7.a and 7.b – The acceptance criteria requires that the results of the hydrostatic tests "conform with the requirements of ASME Code Section III." The tests should also conform to the Code.

ANSWER:

US-APWR DCD Revision 3 Tier 1 Table 2.6.4-1, ITAAC #7.a and ITAAC #7.b, in the "Acceptance Criteria" column, state that an "ASME Code Data Report(s) exists and concludes ..." ASME Code defines the form and content of an ASME Code Data Report and sets testing requirements for the hydrostatic test. ASME test conformance to ASME Code is implicit in the results of said test being in conformance with the Code. The provided level of detail regarding ASME Code requirements is consistent with "top-level" verification described by SRP 14.3.

Wording of the subject Acceptance Criteria is consistent with SRP 14.3 Appendix D ITAAC Entries on page 14.3-58. This ITAAC template is consistently used for hydrostatic testing throughout US-APWR Tier 1 ITAAC.

Impact on DCD

No change will be made to the US-APWR DCD as a result of this RAI question.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-22

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 11 – The DC and AC for this ITAAC that the intake and exhaust are simply "separated" does not provide adequate verification that GT exhaust will not be drawn into the combustion air intake. This ITAAC should verify a design that provides adequate separation of the intake and exhaust in accordance with the design description in Tier 2 Section 9.5.8.3.A which states that the exhaust is "located appropriately away" from the intake, "thereby minimizing the chances of the turbine exhaust being drawn into the intake."

ANSWER:

SRP Section 14.3 states "In general, the acceptance criteria should be objective and unambiguous. In some cases, the acceptance criteria may be more general because the detailed supporting information in Tier 2 does not lend itself to concise verification."

This ITAAC fits the SRP case. The nature of the subject to be verified by this ITAAC does not lend itself to concise verification, as there is no practical way to precisely determine or control the amount of exhaust gas that might be drawn into the GTG air-intake. US-APWR DCD Revision 3 Tier 2, Section 9.5.8.3.A provides detailed supporting information for the acceptance criteria, which is permitted by the SRP.

MHI will revise US-APWR DCD Revision 3 Tier 1, Section 2.6.4.1 Design Description 11 and corresponding Table 2.6.4-1, ITAAC #11 to specify that the Class 1E EPS engine air intake is "appropriately separated from the engine exhaust to minimize recirculation of exhaust gases to the air intake."

Impact on DCD

US-APWR DCD Revision 3 Section 2.6.4.1 Design Description 11 and Table 2.6.4-1, ITAAC #11 will be revised as described above and shown in Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-23

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 16 – The AC for this ITAAC should require that the as-built protection systems are automatically bypassed when the Class 1E EPS is started by an ECCS actuation signal.

ANSWER:

MHI will revise US-APWR DCD Revision 3 Section 2.6.4.1 Design Description 16 and corresponding Table 2.6.4-1 ITAAC #16 to specify the automatic bypass feature.

Impact on DCD

US-APWR DCD Revision 3 Section 2.6.4.1 Design Description 16 and Table 2.6.4-1 ITAAC #16 will be revised as described above and shown in the Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-24

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 19 – This item addresses the functional arrangements of the fuel oil storage and transfer system and the ventilation/cooling air intake and exhaust system. There is no similar item in Section 2.6.4.1 for the lube oil and starting air systems. Since all of these systems are required to support the safety function of the EPS, they should be treated similarly in this section.

ANSWER:

US-APWR DCD Revision 3 Tier 1 Section 2.6.4.2 and Table 2.6.4-1 do not verify the Class 1E emergency power supply (EPS) gas turbine generator (GTG) lubrication system configuration because this system is a shaft driven integral component of each GTG unit and can only be verified by disassembling the GTG.

MHI will revise US-APWR DCD Revision 3 Section 2.6.4.2 Design Description 19 and corresponding Table 2.6.4-1 ITAAC #19 to verify GTG compressed air starting system configuration.

Impact on DCD

US-APWR DCD Revision 3 Tier 1 Section 2.6.4.2 Design Description 19 and Table 2.6.4-1 ITAAC #19 will be revised and 2 new paragraphs will be added in section 2.6.4.2 as described above and shown in the Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-25

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 25 – This item addresses the power supply for the fuel oil transfer pumps. There are other support system components that are also powered by the respective Class 1E division power supply, such as the ventilation/cooling supply and exhaust fans. The DCD should be revised to include all of the Class 1E powered support system components in this ITAAC, or provide separate ITAAC for them.

ANSWER:

MHI will revise US-APWR DCD Revision 3 Tier 1, Section 2.6.4.2 Design Description 25 and Table 2.6.4-1 ITAAC #25, to verify Class 1E power for Class 1E EPS ventilation fans. In conjunction with the previously identified fuel oil transfer pumps, all Class 1E EPS support systems that require Class 1E power are now described in Tier 1. In addition, consistent wording changes will be made to generic templates for other Tier 1 sections.

Impact on DCD

US-APWR DCD Revision 3 Tier 1, Section 2.6.4.2 Design Description 25 and Table 2.6.4-1 ITAAC #25 will be revised as described above and shown in the Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-26

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 30 – This ITAAC should require that the oil capacity verified is based on the maximum expected oil consumption rate, e.g., just prior to a scheduled overhaul.

ANSWER:

MHI will revise US-APWR DCD Revision 3 Tier 1, Section 2.6.4.3 Design Description 30 and Table 2.6.4-1 ITAAC #30 to specify the lubricating oil consumption rate assumed in calculating lubricating oil tank capacity (e.g., maximum expected oil consumption rate immediately prior to scheduled overhaul).

Impact on DCD

US-APWR DCD Revision 3 Tier 1, Section 2.6.4.2 Design Description 30 and Table 2.6.4-1 ITAAC #30 will be revised as described above and shown in the Attachment 1.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-27

Rev 3 of US-APWR DCD, Table 2.6.4-1, Item 31 – Verification that lube oil is simply being circulated is not adequate to ensure that the lube oil system is operating according to the required design. Lube oil flow rate, temperature, and/or pressure should be checked and verified to be in accordance with the design parameters. The ITAAC should be revised to require verification of parameters that will ensure that the system is operating according to design.

ANSWER:

Each US-APWR Class 1E emergency gas turbine generator (GTG) lubrication system is an integral part of its respective GTG package and overall package performance is verified by other EPS ITAAC.

Detailed lubrication system performance parameters, such as lubricating oil temperature, flow rate, and pressure, represent a level of detail that is inappropriate for the "top-level" Tier 1 ITAAC verification described by SRP 14.3 and do not meet SRP 14.3 selection criteria. Lubrication system parameters will be verified by factory or construction tests in general and the integrated performance of GTG system package will be verified in initial test program described in US-APWR DCD Revision 3 Tier 2 Section 14.2.12.1.44.

Impact on DCD

No change will be made to the US-APWR DCD as a result of this RAI question.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the RRA.

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APPLICATION SECTION:	**14.3.6**
DATE OF RAI ISSUE:	**05/10/2011**

QUESTION NO. : 14.03.06-28

Rev 3 of US-APWR DCD, Table 2.6.4-2 – According to this table, the starting air system piping and valves are ASME Section III, Class 3 from the discharge of the starting air compressors through to the piping connection for the air starter at the GTG skid.
According to US-APWR DCD Tier 2 Figure 9.5.6-1 (Rev 2), the starting air system is nonsafety-related up to the inlet of the check valve at the inlet of each starting air receiver. The applicant should address this inconsistency and revise the DCD accordingly.

ANSWER:

US-APWR DCD Revision 3 Tier 2 Figure 9.5.6-1 appropriately indicates ASME Code boundaries between ASME Code Section III and non-Code piping. The starting air system is ASME Code Section III up to interface of air starter of GENSET, and inside of GENSET is non ASME Code Section III. Although Figure 9.5.6-1 appropriately indicates the boundaries, the description of flexible connection legend is unsuitable and, thus, will be deleted. MHI will also revise Figure 9.5.4-1 and 9.5.6-1 for the same reason.

DCD Tier 1 Table 2.6.4-2 will be revised to be consistent with revised Figure 9.5.6-1.

DCD Tier 1 Table 2.6.4-2 compressed air starting system corrections notwithstanding, MHI reviewed the remainder of this table and DCD Tier 2 Figures 9.5.4-1 and 9.5.7-1 and confirmed that all EPS equipment, piping, and support systems are appropriately described or shown.

Impact on DCD

US-APWR DCD Revision 3 Tier 1 Table 2.6.4-2, Tier 2 Figure 9.5.6.1 and Figure 9.5.4.1 will be revised as described above and shown in the Attachment 1 and Attachment 2.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

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.

1. The functional arrangement of the ac electrical power systems is as described in the Design Description of Subsection 2.6.1.1 and as shown in Figure 2.6.1-1.

2. Independence is provided between each division of the four divisions of the Class 1E distribution equipment and circuits, and between Class 1E distribution equipment and circuits and non-Class 1E distribution equipment and circuits.

3. Independence between Class 1E electric power distribution equipment and non-Class 1E loads is provided by Class 1E qualified isolation devices.

4. Class 1E electric power distribution equipment of redundant divisions, identified in Table 2.6.1-1, is located in separate rooms in the reactor building.

5. ~~Each Class 1E EPS is located in a separate room in the power source buildings.~~ **5. Deleted.**

6.a The seismic Category I Class 1E ac electrical power system equipment, identified in Table 2.6.1-1, can withstand seismic design basis loads without loss of safety function.

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.c If both offsite power sources are not available, each Class 1E medium voltage bus automatically connects to its respective EPS.

7. For all plant trip conditions, except for a trip due to electrical fault in the MT, MG, GLBS, UATs or associated equipment and circuits, the GLBS opens.

8. For electrical faults in the MT, MG, GLBS, UATs and associated equipment and circuits, the MT circuit breaker at the switchyard opens.

9. Deleted

10. The UATs and RATs power sources are sized for worst case loading conditions for all modes of plant operation and accident conditions.

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 to support accomplishment of their safety functions.

Table 2.6.1-3 AC Electric Power Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 7)

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 Subsection 2.6.1.1 and as shown in Figure 2.6.1-1.	1. 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 Subsection 2.6.1.1 and as shown in Figure 2.6.1-1.
2. Independence is provided between each of the four divisions of the Class 1E distribution equipment and circuits, and between Class 1E distribution equipment and circuits and non-Class 1E distribution equipment and circuits.	2. Tests will be performed on the as-built Class 1E and non-Class 1E distribution equipment and circuits by providing a test signal in only one division at a time.	2. The test signal exists in the as-built Class 1E division or non-Class 1E division under test.
3. Independence between Class 1E electric power distribution equipment and non-Class 1E loads is provided by Class 1E qualified isolation devices. 5. Deleted. ~~Each Class 1E EPS is located in a separate room in the power source buildings.~~	3.i Type tests, analyses, or a combination of type test and analyses will be performed to verify the qualification of isolation devices.	3.i A report exists and concludes that the Class 1E electric power distribution equipment is isolated from the as-built non-Class 1E loads by the Class 1E qualified isolation devices so as to meet RG 1.75.
	3.ii Inspection will be performed of the as-built Class 1E electric po[illegible] 5. Deleted. ~~Inspection of the as-built EPS will be performed.~~	3.ii Independence between the as-built Class 1E electric power distribution equipment and non-Class 1E loads is provided by Class 1E [illegible] 5. Deleted. ~~Each as-built Class 1E EPS is located in a separate room in the power source buildings.~~
4. The Class 1E electric power distribution equipment of redundant divisions, identified in Table 2.6.1-1, is located in separate rooms in the reactor building.	4. Inspection of the as-built Class 1E electric power distribution equipment will be performed.	4. [illegible] of redundant divisions, identified in Table 2.6.1-1, is located in the separate rooms in the reactor building.
5. Each Class 1E EPS is located in a separate room in the power source buildings.	5. Inspection of the as-built EPS will be performed.	5. Each as-built Class 1E EPS is located in a separate room in the power source buildings.
6.a The seismic Category I Class 1E ac electrical power system equipment, identified in Table 2.6.1-1, can withstand seismic design basis loads without	6.a.i Inspections will be performed to verify that the seismic Category I as-built Class 1E ac electrical power system equipment identified in Table 2.6.1-1, is located in a seismic Category I structure.	6.a.i The seismic Category I as-built Class 1E ac electric power system equipment, identified in Table 2.6.1-1, is located in a seismic Category I structure.

11. The Class 1E EPS engine combustion air intake is separated from the engine exhaust **<u>to minimize recirculation of exhaust gases to the air intake</u>**.

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

12.a Independence is maintained between each of the four Class 1E EPSs.

12.b The Class 1E EPSs are located in separate rooms in the PS/B.

12.b **<u>Each redundant division of</u>** ~~The~~ Class 1E EPSs **<u>is</u>** ~~are~~ located in **<u>a</u>** separate rooms in the PS/B.

13. Ea
fre
signal.

14.a The ECCS actuation signal starts the Class 1E EPSs.

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.c After the Class 1E EPS circuit breaker closes, the 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 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.

15.b After the closing of the Class 1E EPS circuit breaker, the LOOP sequencer sequentially starts the required safety-related loads.

16. All Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.

<u>automatically</u>

17. The Class 1E EPSs are capable of responding to an automatic start signal when running for test purposes.

18. Controls are provided in the MCR and the Class 1E EPS room to start and stop each Class 1E EPS.

2.6.4.2 EPS Support Systems Design Description

Each Class 1E EPS is provided with a dedicated and independent safety-related fuel oil supply system (FOS), fuel oil day tank and storage tank such 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 contents are protected from the effects of low temperatures.

- Each fuel oil day tank is located inside the associated Class 1E EPS room in

<u>Each Class 1E EPS has a single combustion-engine-driven electric generator set and each engine has a separate compressed air starting system. Each compressed air starting system is supplied with compressed air through separate air-lines from redundant compressed air receiver-tanks. Each compressed air starting system is equipped with valves and cross-connects necessary to prevent a single component failure from disabling its ability to start its respective engine.</u>

<u>Class 1E EPS electric generator set engine lubrication systems are contained within their respective engine units.</u>

fuel oil day tanks.

- Low pressure in the air receivers.
- Low pressure and high temperature of the lubrication oil system.

The Class 1E EPS ventilation/cooling air intake and exhaust system provides cooling for EPS operation. The Class 1E EPS turbine intake and exhaust and ventilation/cooling air intake and exhaust openings are above the roof of the power source buildings (PS/B), and the portion of the piping/ducts above the roof is protected by a guard structure against precipitation and tornado missiles.

19. The functional arrangement of the Class 1E EPS fuel oil storage and transfer system and the Class 1E EPS ventilation/cooling air intake and exhaust system are as described in the Design Description of Subsection 2.6.4.2.

20. Deleted.

21. Each fuel oil transfer pump transfers fuel oil from the fuel oil storage tank to the Class 1E EPS day tank at a flow rate to support Class 1E EPS operation at continuous rated load while simultaneously increasing day tank level. Sufficient transfer pump NPSH is maintained under all design conditions.

19. The functional arrangement of the Class 1E EPS **<u>support systems</u>** ~~fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system~~ are as described in the Design Description of Subsection 2.6.4.2.

23. Alarms identified in Subsection 2.6.4.2 are provided in the MCR.

24. The fuel oil transfer pump starts automatically on a fuel oil day tank low level signal and stops automatically on a fuel oil day tank high-level signal.

25. The fuel oil transfer pumps are powered from their respective Class 1E division.

26.a.i The ASME Code Section III components of the EPS support systems, identified in Table 2.6.4-2, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

25. ~~The~~ **<u>Class 1E EPS</u>** fuel oil transfer pumps **<u>and ventilation fans</u>** are powered from their respective Class 1E division.

26. in Table 2.6.4-2, are reconciled with the design requirements.

26.b.i The ASME Code Section III piping of the EPS support systems, including supports, identified in Table 2.6.4-2, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

26.b.ii The ASME Code Section III piping of the of the EPS support systems, including supports, identified in Table 2.6.4-2, is reconciled with the design requirements.

27.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.6.4-2, meet ASME Code Section III requirements for non-destructive examination of welds.

27.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2. ex

30. Each **<u>Class 1E EPS</u>** lubrication **<u>system lubricating</u>** oil tank provides a seven day supply of lubrication oil ~~to its respective Class 1E EPS~~.

28. Deleted.

29. Each fuel oil storage tank provides a seven day supply of fuel oil to its respective Class 1E EPS while operating at rated load.

30. Each lubrication oil tank provides a seven day supply of lubrication oil to its respective Class 1E EPS.

31. Each main shaft driven lubrication oil pump circulates lubrication oil to the engine during EPS operation.

32. Each division of the Class 1E EPS combustion air intake and exhaust system is capable of supplying combustion air to the EPS and of disposing exhaust gases of the EPS when operating at 110% of nameplate rating.

2.6.4.3 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.4-1 describes the ITAAC for the Class 1E EPS and the FOS systems.

11. The as-built Class 1E EPS engine combustion air intake is separated from the as-built engine exhaust **<u>to minimize recirculation of exhaust gases to the air intake</u>.**

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, a Criteria (Sheet 4 of 10)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
11. The Class 1E EPS engine combustion air intake is separated from the engine exhaust.	11. Inspection of the as-built Class 1E EPS engine will be performed.	11. The as-built Class 1E EPS engine combustion air intake is separated from the as-built engine exhaust.
12.a Independer maintained of the four	rformed on the 1E EPSs by st signal in only t a time.	12.a The test signal exists in the as-built Class 1E EPS division under test.
12.b The Class 1E EPSs are located in separate rooms in the PS/B.	12.b Inspection of the as-built Class 1E EPSs will be performed.	12.b The as-built Class 1E EPSs are located in separate rooms in the PS/B.
13. Each Class 1E EPS is cap at t freq 6.9 sec sig	13. A test will be performed to verify 1E EP voltag 100 se start si	13. The as-built Class 1E EPS reaches the and frequenc seconds of re start signal.
14.a The ECCS actuation signal starts the Class 1E EPSs.	14.a A test will be performed to verify that the simulated ECCS actuation signal starts the as-built Class 1E EPSs.	14.a The simulated ECCS actuation signal starts the as-built Class 1E EPSs.
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 shedding of loads.	14.b 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.
14.c After the Class 1E EPS circuit 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 Class 1E EPS circuit 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 After the Class 1E EPS circuit 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 operation of the respective Class 1E EPS upon a loss of power to the as-built Class 1E bus.	15.a 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.

11. The Class 1E EPS engine combustion air intake is separated from the engine exhaust **<u>to minimize recirculation of exhaust gases to the air intake</u>.**

12.b **<u>Each redundant division of</u>** ~~The~~ Class 1E EPSs **<u>is</u>** ~~are~~ located in **<u>a</u>** separate rooms in the PS/B.

12.b Inspection of **<u>each</u>** ~~the~~ as-built **<u>redundant division of</u>** Class 1E EPSs will be performed.

12.b ~~The~~ **<u>Each redundant division of</u>** as-built Class 1E EPSs **<u>is</u>** ~~are~~ located in **<u>a</u>** separate rooms in the PS/B.

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 10)

16. All Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are **automatically** bypassed when the Class 1E EPS is started by an ECCS actuation signal.

16. A test will be performed to verify that the as-built Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are **automatically** bypassed when the Class 1E EPS is started by an ECCS actuation signal.

16. The as-built Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are **automatically** bypassed when the Class 1E EPS is started by an ECCS actuation signal.

19. The functional arrangement of the Class 1E EPS **support systems** ~~fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system~~ are as described in the Design Description of Subsection 2.6.4.2.

19. Inspection of the functional arrangement of the as-built Class 1E EPS **support systems** ~~fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system~~ will be performed.

19. The as-built ~~onsite~~ Class 1E EPS **support systems** ~~fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system~~ conform to the functional arrangement as described in the Design Description of Subsection 2.6.4.2.

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15. [illegible]	15. [illegible]	15. [illegible] of the as-built Class 1E EPS circuit [illegible] potentially [illegible] safety- [illegible]
16. All Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.	16. A test will be performed to verify that the as-built Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.	16. The as-built Class 1E EPS protection systems, except for overspeed, generator differential current, and high exhaust gas temperature, are bypassed when the Class 1E EPS is started by an ECCS actuation signal.
17. The Class 1E EPSs are [illegible]	17. A test will be performed to [illegible]	17. The as-built Class 1E EPSs are capable of [illegible]
18. [illegible]	18. [illegible] EPS room.	18. [illegible]
19. The functional arrangement of the Class 1E EPS fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system are as described in the Design Description of Subsection 2.6.4.2.	19. Inspection of the functional arrangement of the as-built Class 1E EPS fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system will be performed.	19. The as-built onsite Class 1E EPS fuel oil storage and transfer system and Class 1E EPS ventilation/cooling air intake and exhaust system conform to the functional arrangement as described in the Design Description of Subsection 2.6.4.2.
20. Deleted	20. Deleted	20. Deleted

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 7 of 10)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	22.ii Inspection of the as-built FOS day tank will be performed to verify that the tank capacity bounds the analysis.	22.ii The as-built FOS day tank's capacity bounds the analyses.
23. Alarms identified in Subsection 2.6.4.2 are provided in the MCR.	23. Inspection will be performed for retrievability of the alarms identified in Subsection 2.6.4.2 [illegible]	23. Alarms identified in Subsection 2.6.4.2 can be retrieved in the as-built [illegible]
[illegible] tra[illegible] mat[illegible] tan[illegible] stop[illegible] lly [illegible] day tank high-[illegible]	[illegible] fo[illegible] il[illegible] e[illegible] a[illegible] st[illegible] l transfer pump.	[illegible] 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 oil transfer pumps by providing a simulated test signal in each Class 1E division.	25. The results of the test conclude 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.
26.a.i The ASME Code Section III components of the EPS support systems, identified in Table 2.6.4-2, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	26.a.i Inspection of the as-built ASME Code Section III components of the EPS support systems, identified in Table 2.6.4-2, will be performed.	26.a.i The ASME Code Section III data report(s) (certified, when required by ASME Code) and inspection reports (including N-5 Data Reports where applicable) exist and conclude that the as-built ASME Code Section III components of the EPS support systems, identified in Table 2.6.4-2, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

25. ~~The~~ **Class 1E EPS** fuel oil transfer pumps **and ventilation fans** are powered from their respective Class 1E division.

25. A test will be performed on ~~the~~ **each** as-built **Class 1E EPS** fuel transfer pump **and ventilation fan** by providing a simulated test signal **only** in ~~each~~ **the** Class 1E division **under test.**

25. The ~~results of the test conclude that a~~ simulated test signal exists at ~~the~~ **each** as-built **Class 1E EPS** fuel oil transfer pump **and ventilation fan under test** ~~when the assigned Class 1E division is provided a test signal~~.

Table 2.6.4-1 EPS Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 9 of 10)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
27.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.6.4-2, meet ASME Code Section III requirements for non-destructive examination of welds.	27.a Inspection of the as-built pressure boundary welds in ASME Code Section III components identified in Table 2.6.4-2, will be performed in accordance with the ASME Code Section III.	27.a The ASME Code Section III code reports exist and conclude that the ASME Code Section III requirements are met for non-destructive examination of the as-built pressure boundary welds in ASME Code Section III components identified in Table 2.6.4-2.
27.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.6.4-2, meet ASME Code Section III requirements for non-destructive examination of welds.	27.b Inspection of the as-built pressure boundary welds in ASME Code Section III piping identified in Table 2.6.4-2, will be performed in accordance with the ASME Code Section III.	27.b The ASME Code Section III code reports exist and conclude that the ASME Code Section III requirements are met for non-destructive examination of the as-built pressure boundary welds in ASME Code Section III piping identified in Table 2.6.4-2.
28. Deleted		2
29. Each fuel oil storage tank provides a seven day ... its ... E EPS ... rated	... d ... e	2
	... ed to verify that the capacity of the as-built fuel oil storage tank bounds the analyses.	2 ... storage tank capacity bounds the analyses.
30. Each lubrication oil tank provides a seven day supply of lubrication oil to its respective Class 1E EPS.	30.i Analyses will be performed to determine the required lubricating oil tank volume to provide a seven day supply of lubricating oil to its respective Class 1E EPS.	30.i A report exists and concludes that each lubrication oil tank for the Class 1E EPS provides a seven day supply of lubrication oil to its respective Class 1E EPS.
	30.ii Inspection will be performed to verify that the as-built lubricating oil tank volume bounds the analyses.	30.ii The as-built lubricating oil tank volume bounds the analyses.

30. Each **Class 1E EPS** lubrication **system** **lubricating** oil tank provides a seven day supply of lubrication oil ~~to its respective Class 1E EPS~~.

30.i Analyses will be performed to determine the **Class 1E EPS lubrication system** ~~required~~ lubricating oil tank volume **required** to ~~provide~~ **support** ~~a~~ seven days ~~supply~~ of ~~lubricating oil to its respective~~ Class 1E EPS operation **based on the maximum expected lubricating oil consumption rate**.

30.i A report exists and concludes that each **Class 1E EPS** lubrication **system** **lubricating** oil tank ~~for the Class 1E EPS~~ provides a seven day supply of lubrication oil ~~to its respective Class 1E EPS~~ **based on the maximum expected lubricating oil consumption rate**.

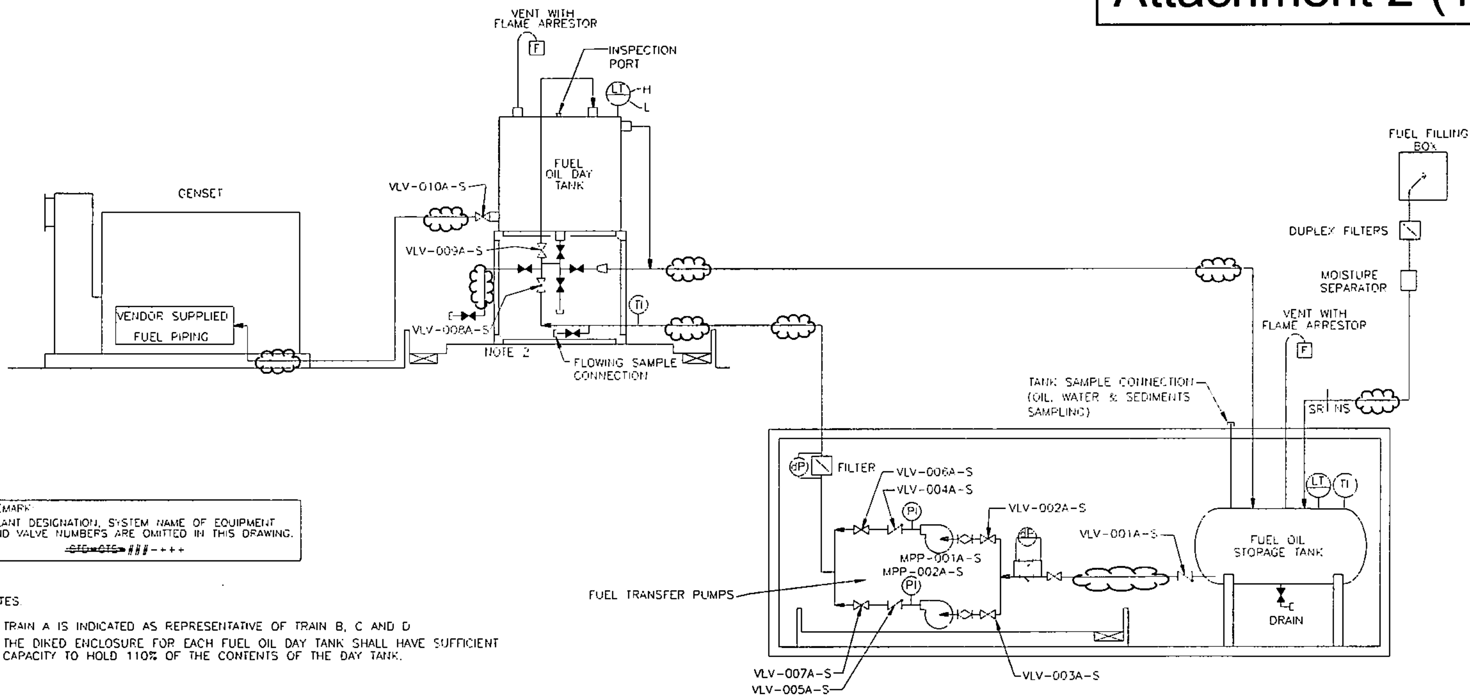
30.ii Inspection will be performed to verify that the as-built **Class 1E EPS lubrication system** lubricating oil tank volume bounds the analyses.

30.ii The as-built **Class 1E EPS lubrication system** lubricating oil tank volume bounds the analyses.

Table 2.6.4-2 EPS Support Systems Equipment and Piping Characteristics

Equipment or Pipe Line Name	ASME Code Section III Class	Seismic Category
EPS fuel oil storage tanks	3	I
EPS fuel oil transfer pump suction lines from EPS fuel oil storage tank to EPS fuel oil transfer pumps	3	I
EPS fuel oil transfer pump suction line outlet check valves	3	I
EPS fuel oil transfer pump suction line isolation valves	3	I
EPS fuel oil transfer pumps	3	I
EPS fuel oil transfer pump discharge lines up to EPS fuel oil day tank	3	I
EPS starting system cross-tie lines to air receivers	**3**	**I**
EPS fuel oil transfer pump discharge line isolation valves	3	I
EPS fuel oil day tanks	3	I
EPS fuel oil day tank outlet lines up to EPS	3	I
EPS fuel oil day tank outlet valves	3	I
~~EPS starting system air compressor discharge lines up to air supply header~~	~~3~~	~~I~~
~~EPS starting system air compressor discharge line isolation valves~~	~~3~~	~~I~~
~~EPS starting system air supply headers~~	~~3~~	~~I~~
~~EPS starting system air supply header outlet lines up to air receiver~~	~~3~~	~~I~~
~~EPS starting system air supply header outlet line isolation valves~~	~~3~~	~~I~~
EPS starting system air receiver inlet check valves	3	I
EPS starting system air receiver inlet check valves **and outlet lines up to air receivers**		
EPS starting system air		
EPS starting system air receiver relief valves	3	I
EPS starting system air receiver outlet lines up to air starting unit	3	I
EPS starting system air receiver outlet lines up to ~~air~~ starting **valve** unit		
EPS starting system air start valves		
EPS starting system ~~air~~ start**ing** valves **unit piping and valves**		
~~EPS starting system air start pilot valves~~	~~3~~	~~I~~
EPS starting system air starting unit outlet lines up to air starter	3	I
EPS starting system ~~air~~ starting **valve** unit outlet lines up to ~~air starter~~ **generator set enclosure**		
EPS lubrication system main oil pumps	-	I
EPS lubrication system oil coolers		
EPS lubrication system reduction gear reservoirs	-	I
EPS lubrication system		
EPS lubrication system main lube oil strainers	-	I
EPS lubrication system piping, fittings and valves	-	I
EPS combustion air intake and exhaust system intake silencers	-	I
EPS combustion air intake and exhaust system turbine exhaust silencers	-	I
EPS combustion air intake and exhaust system piping	-	I

Attachment 2 (1/2)



REMARK
PLANT DESIGNATION, SYSTEM NAME OF EQUIPMENT AND VALVE NUMBERS ARE OMITTED IN THIS DRAWING.

NOTES

1 TRAIN A IS INDICATED AS REPRESENTATIVE OF TRAIN B, C AND D
2 THE DIKED ENCLOSURE FOR EACH FUEL OIL DAY TANK SHALL HAVE SUFFICIENT CAPACITY TO HOLD 110% OF THE CONTENTS OF THE DAY TANK.

Figure 9.5.4-1 Gas Turbine Generator Fuel Oil Storage and Transfer System Schematic Diagram

Attachment 2 (2/2)

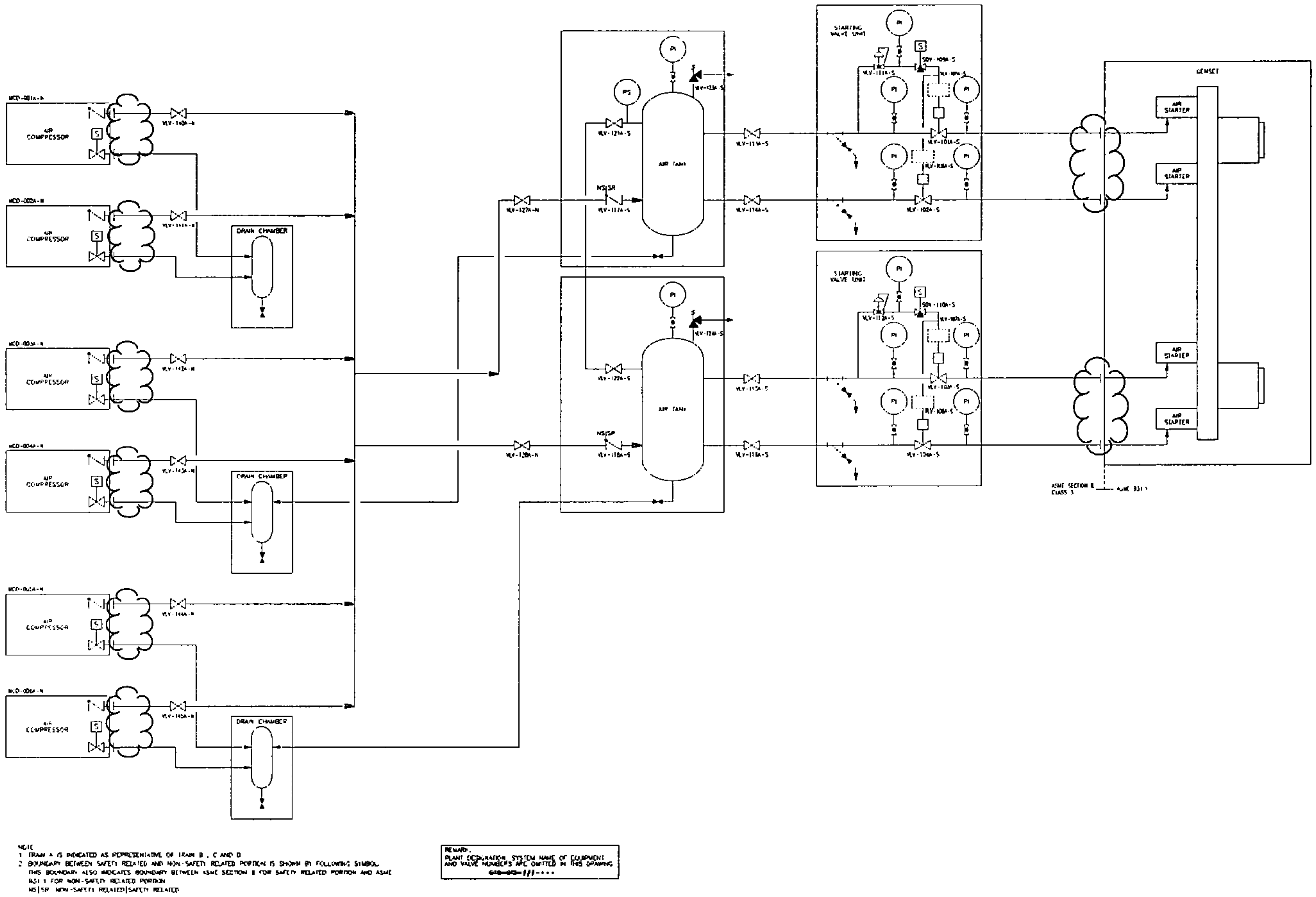


Figure 9.5.6-1 Gas Turbine Generator Starting System Schematic Diagra