US-APWR DCD Tier 1 Enhancement Project

Thursday 2/17/11 Afternoon Handout No.2

Table of Contents

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.5.1

Item No.	Explanation/Basis for Change
Design Description 2.7.5.1.1	
A	Editorial corrections/changes and to provide consistency among Tier 1 sections. Subheadings are deleted from the Design Description.
B	Moved discussion within the Design Description. See item I.
C	Note 1 and Note 2. See item Q.
D	Note 1 and Note 2. See items A and U. Information deleted as it is redundant to introductory paragraph, and not necessary for Tier 1.
E	Notes 1 and 2. See items Q, KK and LL.
F	Notes 1 and 2. See item V. This change alters the response to RAI 54, Question 14.03.07-2, RAI 14.3.7.3.2-8.
G	Notes 1 and 2. See Item R. This change alters the response to RAI 184 question 14.03.07-19.
H	Deleted redundant information to Table 2.7.5.1-1. See item S, HH, II and JJ. The change alters the response to RAI 242, question 14.03.03-11 and RAI 404-3063 Question 14.03.03-22.
I	Notes 1 and 2. See Items B, Q, V, CC and DD. This change alters the Design Description changes made in response to RAI 54, question 14.03.07-2 RAI, 14.3.7.3.2-5.
J	Notes 1 and 2. See Items AA, BB, and EE.
K	Notes 1 and 2. See Items W, DD and EE. This change alters the Design Description changes made in response to RAI 54, question 14.03.07-5.
L	Notes 1 and 2. See Items W, X, Y and Z.
M	Notes 1 and 2. See Item T.
N	Deleted negative statements, and deleted text to include only the necessary attributes for Tier 1.
O	Deleted negative statements from Tier 1.
P	Notes 1 and 2. See Item U. This change alters the response to RAI 381, 14.03.07-36.
Q	Notes 1 and 2, See Item E. This change alters the response to RAI 381 question 14.03.07-36.
R	Notes 1 and 2, See Item G.
S	Notes 1 and 2, See Item H.
T	Notes 1 and 2, See Item M.
U	Notes 1 and 2, See Items I and K.
V	Notes 1 and 2, See Item P.
W	Notes 1 and 2, See Items F, K and L.
X	Note 1. See item L.
Y	Note 1. See item L.
Z	Note 1.
AA	Notes 1 and 2. See Item J.
BB	Notes 1 and 2, See Items F and L.
CC	Notes 1 and 2. See Item J.
DD	Notes 1 and 2. See Items I and K.
EE	Notes 1 and 2. See Items I and K.
FF	Notes 1 and 2. See Item J.

GG	Note 1.
Table 2.7.5.1-1	
	Editorial change to Table heading.
HH	Addition of cooling coils to table. This change alters the response to RAI 242-3063, 14.03.03-11 and RAI 404-3063 Question 14.03.03-22.
II	Added Main control room emergency filtration unit electric heating coils. See item D.
JJ	Added Main control room fan unit electric heating coils for technical accuracy.
MM	Error correction.
Table 2.7.5.1-2	
KK	Added Main control room Air handling Unit electric heating coils. See item D.
LL	Added Main control room fan unit electric heating coils for technical accuracy.
ITAAC Table 2.7.5.1-3	
1.a	DC, ITA, AC – Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS, Scope, 2nd bullet.]
1.b	DC, ITA, AC – Generic changes to ITAAC for mechanical separation to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change alters the response to RAI 184, Question 14.03.07-19.
2	DC, ITA, AC – Generic changes to ITAAC for seismic qualification to provide clarity and consistency. [RIS p7, ITAAC Scope]
3.a	DC, ITA – Generic changes to ITAAC for electrical separation to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change -alters the response to RAI 54, Question 14.3.7.3.2-18 and RAI 184, Question 14.03.07-16.
3.b	DC, AC – Generic changes to ITAAC for electrical separation to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change alters the response to RAI 191, Question 14.03.04-9.
4.a	DC – Clarification of design commitment, editorial correction and clarification of operating modes. [RIS, Scope, 1st bullet.] This change alters the response to RAI 184, 14.03.07-26. AC – Revised to make the AC consistent with the ITA requirements, and to reflect the revised DC. [RIS, Focus, 6th and 7th bullets] This change alters the response to RAI 184, 14.03.07-26.
4.b	DC – Editorial changes for clarity, and to reflect revisions to the AC. ITA (4.b.ii and 4.b.iii) – Editorial correction. AC (4.b.i, 4.b.ii and 4.b.iii) – Revised to provide the correct means for closure verification, and provide specific criteria for acceptance. This change alters the response to RAI 381, 14.03.07-36.

5.a	DC – Generic changes to ITAAC for MOVs adapted to HVAC dampers to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change does not impact the response to RAI 54, question 14.3.7.3.2-8. ITA and AC (5.a.i) – Generic changes to ITAAC for MOVs adapted to HVAC dampers to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change alters the response to RAI 184, 14.03.07-22.
5.b	No changes.
5.c 5.d	DC, ITA and AC – Editorial corrections; isolation valves not specifically called out in the reference table. [RIS, Standardization, 2nd bullet; Scope, 1st bullet.] This change alters the response to RAI 184, 14.03.07-22. AC – Revised to identify the isolation dampers and their required closure time. [RIS, Standardization, 2nd bullet; Scope 1st bullet.] This change alters the response to RAI 184, 14.03.07-22. This change does not alter the response to RAI 54, 14.3.7.3.2-15. DC – Generic changes to ITAAC for MOVs adapted for dampers to provide clarity and consistency. [RIS, Scope, 2nd bullet.] . ITA – Revised to specify the correct ITA for the DC. [RIS, Focus, 6th and 7th bullets.] AC – Revised to provide AC for the ITA and DC requirements, and editorial changes. [RIS, Focus, 7th bullet.] These changes alter the response to RAI 30, Question 09.05.01-11
5.e	DC, ITA, AC – Generic changes to ITAAC for MCR controls to provide clarity and consistency. [RIS, Scope, 2nd bullet.] These changes alter the response to RAI 452, question 14.03.02-13.
5.f	DC, ITA, AC DC – Generic changes to ITAAC for MOVs adapted for dampers to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change does not impact the response to RAI 54, question 14.3.7.3.2-8. ITA and AC (5.f.i) – Generic changes to ITAAC for MOVs incorporated for dampers to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change alters the response to RAI 184, 14.03.07-22. ITA (5.f.ii) – Revised to reflect the correct wording for the ITA for the tornado dampers. This change alters the response to RAI 54, question 14.3.7.3.2-8. AC (5.f.ii) – Revised to provide criteria consistent with the ITA for tornado dampers. This change alters the response to RAI 54, question 14.3.7.3.2-8.

6.a	DC, ITA, AC – Generic changes to ITAAC for MCR controls to provide clarity and consistency. [RIS, Scope, 2nd bullet.] These changes alter the response to RAI 452, question 14.03.02-13.
6.b	DC and AC – Revised to include the electric heaters in the emergency filtration units. [RIS, Standardization, 2nd bullet.] This change does not impact the response to RAI 184, 14.03.07-22 or the response to RAI 54, question 14.03.07.03.02-5.
6.c	DC, ITA, AC – Editorial changes. This change does not impact the response to RAI 184, 14.03.07-22 or the response to RAI 54, question 14.03.07.03.02-5.
7	DC, ITA, AC – Generic changes to ITAAC for MCR alarms and displays to provide clarity and consistency. [RIS p7, ITAAC Scope.
8	DC, ITA, AC – Generic changes to ITAAC for RSC alarms, displays and controls to provide clarity and consistency. [RIS, Scope, 2nd bullet.] This change alters the response to RAI 184, 14.03.07-18, and the revisions included in UAP-HF-10043 (for ITA/AC 8.ii).

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.3

Item No.	Explanation/Basis for Change
Design Description 2.7.6.3.1	
A	Deleted subheading text for consistency with other Tier 1 sections
B	Condensed and revised bullets into the opening paragraph to make consistent with other Tier 1 sections. This change alters the response to RAI 184, Question 14.03.07-20.
C	Sentence revised and relocated to introduction for consistency. See Item N.
D	Notes 1 and 2. See Item L and M.
E	Notes 1 and 2. See Item O.
F	Notes 1 and 2. See Item S.
G	Notes 1 and 2. See Item U.
H	Notes 1 and 2. See Item Q.
I	Notes 1 and 2. See Item Q.
J	Notes 1 and 2. See Item Q.
K	Note 1.
L	Notes 1 and 2. See Item D.
M	Notes 1 and 2. See Item D.
N	Paragraph revised and relocated for consistency. See Item C.
O	Notes 1 and 2. See Item E.
P	Text deleted to include only the necessary attributes for Tier 1 Design Description information.
Q	Notes 1 and 2. See Items H, I, and J. This change alters the response to RAI 132, Question 09.01.02-14.
R	Deleted negative statement to ensure consistency within Tier 1.
S	Notes 1 and 2. See Item F.
T	Deleted negative statement to ensure consistency within Tier 1. This change alters the response to RAI 184, Question 14.03.07-24.
U	Notes 1 and 2. See Item G.
Table 2.7.6.3-1	
Revised as a result of Tier1/Tier2 consistency review.	
Table 2.7.6.3-2	
Editorial change.	
Table 2.7.6.3-3	
No Changes.	
Table 2.7.6.3-4	
Editorial changes.	
ITAAC Table 2.7.6.3-5	
1	DC, ITA, AC – Generic changes to functional arrangement ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet]

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.3

Item No.	Explanation/Basis for Change
2.a.i	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 242, Question 14.03.03-5.
2.a.ii	DC, ITA, AC – Editorial change to agree with generic format for ITAAC. – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 404, Question 14.03.03-20 and RAI 242, Question 14.03.03-5.
2.b.i	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 242, Question 14.03.03-6 and Question 14.03.03-21.
2.b.ii	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 242, Question 14.03.03-6 and RAI 404, Question 14.03.03-21.
3.a	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 242, Question 14.03.03-8.
3.b	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet]
4.a	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] – Editorial change to agree with generic format for ITAAC.
4.b	DC, ITA, AC – Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] Editorial change to agree with generic format for ITAAC.
5	DC, ITA, AC – Generic changes to seismic ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] – Revised to delete the term ‘and/or’. [RIS p3, Language, fifth bullet] Generic changes made to provide consistency with DC and AC wording. [RIS p5, Logic, seventh bullet] – Revised to identify the specific equipment to which the AC applies. [RIS p7, Standardization, second bullet]
6	DC, ITA, AC – Generic changes to seismic ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 452, 14.03.02-12, and RAI 242, 14.03.03-9.

Item No.	Explanation/Basis for Change
7.a	DC, ITA, AC – Editorial change to agree with generic format for ITAAC. – Generic changes to electrical separation ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters the response to RAI 184, 14.03.07-16.
7.b	DC, ITA, AC – Generic changes to electrical separation ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet]
8	DC, ITA, AC – Revised to provide clarity to the commitment. [RIS p7, Scope, first bullet] – Revised to provide the appropriate ITA to be performed to verify the DC. [RIS p7, Focus, sixth bullet] – Revised to identify the specific criteria for acceptance. [RIS p7, Standardization, second bullet; Focus, seventh bullet] This change alters RAI 184, Question 14.03.07-20.
9	DC, ITA, AC – Generic changes to MCR controls ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] This change alters response to RAI 191, Question 14.03.04-5.
10	DC, ITA, AC – Generic changes to RSC controls ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, second bullet] – Generic changes made to provide consistency with DC and AC wording, and added text to include reference to Table 2.7.6.3-1. [RIS p7, Standardization, second bullet] [RIS p5, Logic, seventh bullet] – Editorial change to agree with generic format for ITAAC. This change alters the response to RAI 191, 14.03.04-5 and UAP-HF-10043.
11	DC, ITA, AC – Editorial change to agree with generic format for ITAAC.
12	DC, ITA, AC – Generic changes to ITAAC of check valve active safety function to provide clarity and consistency. [RIS p7, Consistency, second bullet]
Figure 2.7.6.3-1	
Editorial changes to remarks.	

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.4

Item No.	Explanation/Basis for Change
Design Description 2.7.6.4	
A	Sentence revised and relocated for a more concise design description; added "…containment and.." for clarification of equipment location. See Item F.
B	Sentence relocated for a more concise design description. See Item Q.
C	Sentences relocated for a more concise design description. See Item Y
D	Sentence deleted, "This encompasses…fuel cask.", to include only the necessary information in the design description.
E	Sentence revised and relocated for a more concise design description. See Item R. This change alters the response to RAI 200, Revision 1, Question 09.01.04-03
F	Note 1. Editorial change. Some text revised and relocated for a more concise design description. See Item A.
G	Notes 1 and 2. See Item S
H	Notes 1 and 2. See Item S
I	Notes 1 and 2. Corrected typographical error. See Item AA
J	Notes 1 and 2. See Item BB
K	Note 2. See Item CC
L	Note 1.
M	Note 1.
N	Note 1.
O	Note 1.
P	Note 1.
Q	Relocated sentence for a more concise design description. See Item B.
R	Text relocated and revised for a more concise design description. See Item E.
S	Notes 1 and 2. See Items G and H.
T	Deleted text to include only necessary design information in the design description in accordance with NRC guidance in SRP Section 14.3.
U	Deleted text to include only necessary design information in the design description in accordance with NRC guidance in SRP Section 14.3.
V	Deleted text to include only necessary design information in the design description in accordance with NRC guidance in SRP Section 14.3.
W	Deleted text to include only necessary design information in the design description in accordance with NRC guidance in SRP Section 14.3.
X	Negative statement deleted from design description for consistency within Tier 1.
Y	Relocated sentences for a more concise design description. See Item C.
Z	Sentence was deleted because it was redundant to information in 3.a and 6.a of the design description. (See Items I and L).
AA	Notes 1 and 2. See Item I
BB	Notes 1 and 2. See Item J
CC	Note 2. See Item K
DD	Negative statements deleted from design description for consistency within Tier 1.
EE	Editorial change for clarity
Table 2.7.6.4-1	
	No changes
ITAAC Table 2.7.6.4-2	

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.4

Item No.	Explanation/Basis for Change
1	ITA, AC – Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p.8, Scope, Second bullet]
2a	DC, ITA, AC Generic changes to ITAAC for seismic Category I equipment to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet] These changes alter the response to RAI 184, Question 14.03.07-31.
2b	DC, AC – Editorial changes to ITAAC for seismic wording to provide clarity and consistency. [RIS, p.7, Scope, second bullet] ITA – "tests" deleted where not to be performed, [RIS p.2, Format third bullet]; Removed use of "and/or" [RIS p.3, Nomenclature, fourth bullet]. These changes alter the response to RAI 184, Question 14.03.07-31.
3	ITA – Added "analysis" to determine radiation shielding [RIS p.5, Logic, seventh bullet] Editorial change to provide clarity to ITA requirements. This change does not impact the response to RAI 184, Question 14.03.07-32
3a	AC – Additional text to provide clarity to inadvertent operation "opening" of gripper controls. This change alters the response to RAI 184, Question 14.03.07-32
3b	DC – Corrected reference to "refueling cavity" for refueling machine. [RIS p.7, Standardization, fourth bullet] ITA – Reworded and split the ITA to i) include an analysis of the appropriate shielding depth, and ii) to test the preset stop of the refueling machine. [RIS p.5, Logic seventh bullet] AC –Split the AC i) to include a report for the analysis of the shielding depth and ii) acceptance of the lifting preset position test of the refueling machine. [RIS, p.3, Language, fifth bullet]. These changes alter the response to RAI 184, Question 14.03.07-32.
3c	No changes. There is no impact to the response to RAI 184, Question 14.03.07-32
4	DC, ITA and AC: Added clarification to the include the suspension hoist is on the spent fuel cask handling crane.
5	AC – Editorial change, corrected typo: "winch" from "which" [RIS p.7, Standardization, fourth bullet] This change does not impact the response to RAI 184, Question 14.03.07-34
6	ITA - Change to provide clarity to ITA requirements, added "analysis". [RIA p.5, Logic, seventh bullet] This change alters to the response to RAI 200, Question 09.01.04-13.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.4

Item No.	Explanation/Basis for Change
6.a	DC, AC – added "due to inadvertent operation of the gripper controls" to be consistent with wording of ITAAC 2.7.6.4, 3.a [RIS p.7, Standardization, third bullet] AC – Additional text to provide clarity to inadvertent operation "opening" of gripper controls. This change alters the response to RAI 200, Question 09.01.04-13.
6.b	DC - Revised "spent fuel pit" from "reactor cavity" [RIS p.7, Standardization, second bullet] ITA – Reworded and split the ITA to i) include an analysis of the appropriate shielding depth, and ii) to test the preset stop of the refueling machine. [RIS p.5, Logic seventh bullet] AC –Split the AC to i) include a report for the analysis of the shielding depth and ii) acceptance of the lifting preset position test of the fuel handling machine. [RIS, p.3, Language, fifth bullet]. These changes alter the response to RAI 200, Question 09.01.04-13.
6.c	No changes This does not impact the response to RAI 200, Question 09.01.04-13.
7	Deleted ITAAC Item #7 per UAP-HF-10043, Attachment 4 The new ITAAC 2.7.6.4-2 #7 based on UAP-HF-10043, Attachment 4 was also deleted since the information to be verified is also included in the added ITAAC 2.7.6.4-2 #8 This change alters the responses of RAI 200, Question 09.01.04-13 and UAP-HF-10043, Attachment 4..
8	DC, ITA AC New system specific ITAAC added per UAP-HF-10043 Attachment 4 with a change to that ITAAC wording to the typical ASME ITAAC wording to provide clarity and consistency. The ITAAC 2.7.6.4-2 #7i and 2.7.6.4-2 #9 from UAP-HF-10043 are combined to create the ITAAC 2.7.6.4-2 #8. These changes alter the response to MHI letter UAP-HF-10043 dated February 15, 2010.
9	DC, ITA AC New system specific ITAAC 2.7.6.4-2 #9 added per UAP-HF-10043 Attachment 4 is renumbered and combined with UAP-HF-10043 ITAAC 2.7.6.4-2 #7.i to create the ITAAC 2.7.6.4-2 #8. The ITA and AC portion of UAP-HF-10043 2.7.6.4-2 #7.ii is the bases for the word of 2.7.6.4-2 #9. This change alters the response to MHI letter UAP-HF-10043 dated February 15, 2010.

Item No.	Explanation/Basis for Change
10	DC, ITA AC New system specific ITAAC added based on the ITAAC 2.7.6.4-2 #8 of UAP-HF-10043 Attachment 4, is renumbered to 2.7.6.4-2 #10 with a change to that ITAAC wording to the typical ASME ITAAC wording to provide clarity and consistency. These changes alter the response to MHI letter UAP-HF-10043 dated February 15, 2010.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.6

Item No.	Explanation/Basis for Change
Design Description Section 2.7.6.6.1	
A	Editorial change and changes to agree with Tier 2 wording.
B	Notes 1 and 2. See Item H.
C	Revised text to include only the necessary attributes for Tier 1; subheadings deleted. This change does not impact the response to RAI 54, Revision 0, 14.03.07-1, RAI 14.3.7.3.1-1.
D	Notes 1 and 2. See Item K. This change alters the response to RAI 191, Revision 0, 14.03.07-19.
E	Notes 1 and 2. See Item I.
F	Notes 1 and 2. See Item L.
G	Notes 1 and 2. See Item J.
H	Notes 1 and 2. See Item B.
I	Notes 1 and 2. See Item E.
J	Notes 1 and 2. See Item G.
K	Notes 1 and 2. See Item D.
L	Notes 1 and 2. See Item F.
Table 2.7.6.6-1	
M	Added monitor location information to table. This change does not impact the response to RAI 183, Revision 0, 14.03.07-7.
ITAAC Table 2.7.6.6-2	
1	DC and AC – Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS - Scope, second bullet.] This change does not impact the response to RAI 183, Revision 0, 14.03.07-7.
2	DC, ITA and AC – Generic changes to ITAAC for seismic to provide clarity and consistency. [RIS - Scope, second bullet.] This change does not impact the response to RAI 183, Revision 0, 14.03.07-7.
3.a	ITA – Generic changes to ITAAC for electrical separation to provide clarity and consistency. [RIS - Scope, second bullet.] This change does not impact the response to RAI 184, Revision 0, 14.03.07-16.
3.b	DC and AC – Generic changes to ITAAC for electrical separation to provide clarity and consistency. [RIS - Scope, second bullet.] This change alters the response to RAI 191, Revision 0, 14.03.04-09.

Item No.	Explanation/Basis for Change
4	DC and AC – Revised to clarify physical separation is in accordance with RG 1.75. [RIS - Standardization & Consistency, second bullet.] This change alters the response to RAI 184, Revision 0, 14.03.07-19.
5	DC, ITA and AC – Revised to correct sentence grammar, clarify design commitment and AC scope, and other generic changes to ITAAC for alarms and displays to provide clarity and consistency. [RIS p.7, Scope, first and second bullet.] This change alters the response to RAI 184, Revision 0, 14.03.07-21.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.7 - Process and Post-accident Sampling System

Item No.	Explanation/Basis for Change
Design Description 2.7.6.7.1	
Editorial corrections and changes made to provide consistency among Tier 1 sections. Subheadings are deleted from the Design Description.	
A	Text revised to align with the Tier 2 description and for consistency within other areas of Tier 1 Section 2.7.6.7.1, including the Key Design Features. See Item E.
B	Note 1.
C	Notes 1 and 2. See Item D.
D	Note 1. See Item C.
E	Text deleted as this information is not consistent with SRP 14.3 guidance and some pertinent information has been relocated to the first paragraph. See Item A.
F	Notes 1 and 2. See Items G and H
G	Notes 1 and 2. See Item F
H	Notes 1 and 2. See Item F
I	Notes 1 and 2. See Item U
J	Notes 1 and 2. See Item T
K	Notes 1 and 2. See Items E and P
L	Notes 1 and 2. See Item Q
M	Notes 1 and 2. See Item Q
N	Notes 1 and 2. See Items R and Q
O	Notes 1 and 2. See Item Q
P	Notes 1 and 2. See Item K
Q	Notes 1 and 2. See Items L, M, N and O. This change alters the response to RAI 183-1935, Revision 0, 14.03.07-8.
R	Notes 1 and 2. See Item N
S	Negative statement deleted from Tier 1 Design Description.
T	Notes 1 and 2. See Item J
U	Notes 1 and 2. See Item I
V	Negative statement deleted from Tier 1 Design Description.
W	Negative statement deleted from Tier 1 Design Description.
X	Note 1.
Y	Note 1.
Z	Changed the statement to use a similar wording. This change alters the response to RAI 184-1912, Question 14.03.07-27.
Table 2.7.6.7-1	
	No Change.
Table 2.7.6.7-2	
	No Change.
Table 2.7.6.7-3	
	Inserted “PSS-VLV-“ prior to 072 to match all other valve tags listed in table.
Table 2.7.6.7-4	
	No Change.

Item No.	Explanation/Basis for Change
ITAAC Table 2.7.6.7-5	
1	DC, ITA, and AC: Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
2.a.i	ITA and AC: Generic changes to ITAAC for ASME Code Section III component inspection to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] These changes alter the response to RAI 242-2153 14.03.03-5 and RAI 404-3063 14.03.03-20.
2.a.ii	ITA: Generic changes made to ITAAC for ASME Code Section III component design reconciliation to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] AC: Generic change made to provide consistency with the DC. [RIS R1, p5, Logic, 6th bullet] These changes alter the response to RAI 242-2153 14.03.03-5 and RAI 404-3063 14.03.03-20.
2.b.i	DC: ITA: Generic changes made to ITAAC for ASME Code Section III piping and supports to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] These changes alter the response to RAI 242-2153 14.03.03-6 and RAI 404-3063 14.03.03-21.
2.b.ii	ITA: Generic changes made to ITAAC for ASME Code Section III piping and support design reconciliation to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] AC: Generic change made to provide consistency with the DC. [RIS R1, p5, Logic, 6th bullet] These changes alter the response to RAI 242-2153 14.03.03-6 and RAI 404-3063 14.03.03-21.
3.a	ITA, AC: Generic changes made to ITAAC for ASME Code Section III component NDE to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] These changes do not alter the response to RAI 242-2153 14.03.03-8.

Item No.	Explanation/Basis for Change
3.b	ITA, AC: Generic changes made to ITAAC for ASME Code Section III piping NDE to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] These changes do not alter the response to RAI 242-2153 14.03.03-8.
4.a	ITA: Generic changes made to ITAAC for ASME Code Section III component hydrostatic testing to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] AC: Generic change made to provide consistency with the DC. [RIS R1, p5, Logic, 6th bullet]
4.b	ITA: Generic changes made to ITAAC for ASME Code Section III piping hydrostatic testing to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] AC: Generic change made to provide consistency with the DC. [RIS R1, p5, Logic, 6th bullet]
5.a	DC: Generic changes made to ITAAC for seismic Category I equipment to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 183-1935, Revision 0, 14.03.07-7.
5.a.i	ITA, AC: Generic changes made to ITAAC for seismic Category I equipment location to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 183-1935, Revision 0, 14.03.07-7.
5.a.ii	ITA, AC: Generic changes made to ITAAC for seismic Category I equipment loads to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 183-1935, Revision 0, 14.03.07-7.
5.a.iii	ITA, AC: Generic changes made to ITAAC for seismic Category I equipment bounding to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]

Item No.	Explanation/Basis for Change
5.b	DC: Generic changes made to ITAAC for seismic Category 1 piping to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
5.b.i	ITA, AC: Generic changes made to ITAAC for seismic Category I piping to provide clarity and consistency. [RIS R1, p3, Language, 4th bullet] This change does not alter the response to RAI 452-3297, Revision 1, 14.03.02-12.
5.b.ii	ITA, AC: Generic changes made to ITAAC for seismic Category I piping to provide clarity and consistency. [RIS R1, p3, Language, 4th bullet] This change alters the response to RAI 452-3297, Revision 1, 14.03.02-12. This change alters the changes made in UAP-HF-10043.
6.a	DC: Generic changes made to ITAAC for 1E equipment qualified for a harsh environment to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] , [RIS R1, p3, Language, 4th bullet]
6.a.i	ITA: Generic changes made to ITAAC for 1E equipment qualified for a harsh environment to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet], [RIS R1, p3, Language, 4th bullet] This change alters the response to RAI 191-2048, Revision 0, 14.03.04-03 and RAI 511-3739, Revision 0, 03.11-21.
6.a.ii	ITA, AC: Generic changes made to ITAAC for 1E equipment qualified for a harsh environment to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
6.b	DC: Generic changes made to ITAAC for 1E power divisions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 184-1912, Revision 0, 14.03.07-16
6.c	DC, AC: Generic changes made to ITAAC for 1E separation to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet], [RIS R1, p3, Language, 4th bullet] This change alters the response to RAI 191-2048, Revision 0, 14.03.04-09
7.	DC, ITA, AC: No change. This ITAAC remains deleted.

Item No.	Explanation/Basis for Change
8.	DC, AC: Generic changes made to ITAAC for PSS functional capabilities to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 184-1912, Revision 0, 14.03.07-21.
9.	DC: Generic changes made to ITAAC for MOVs, AOVs and check valves with safety functions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
9.i	ITA, AC: Generic changes made to ITAAC for MOVs and AOVs with active safety functions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
9.ii	ITA, AC: Generic changes made to ITAAC for MOVs and AOVs with active safety functions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
9.iii	ITA, AC: Generic changes made to ITAAC for MOVs and AOVs with active safety functions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
9.iv	ITA, AC: Generic changes made to ITAAC for check valves with active safety functions to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
10.a	DC, ITA, AC: Generic changes made to ITAAC for MOV controls in the MCR to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change does not alter the response to RAI 193-1842, Revision 0, 14.03.04-29.
10.b	DC, ITA, AC: No change
11	AC: Generic changes made to ITAAC for MOV motive power to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet]
12	DC, ITA, AC: Generic changes made to ITAAC for MCR alarms and displays to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 222-1933, Revision 1, 14.03.11-24.

Item No.	Explanation/Basis for Change
13	DC: Generic changes made to ITAAC for RSC alarms, displays and controls to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 222-1933, Revision 1, 14.03.11-24.
13.i	ITA, AC: Generic changes made to ITAAC for RSC alarms, displays and controls retrievability to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the response to RAI 222-1933, Revision 1, 14.03.11-24, and does not alter the changes made in UAP-HF-10043.
13.ii	ITA, AC: Generic changes made to ITAAC for RSC alarms, displays and controls operability to provide clarity and consistency. [RIS R1, p7, Standardization and Consistency, 2nd bullet] This change alters the changes made in UAP-HF-10043.
Figure 2.7.6.7-1 Process and Post-accident Sampling System	
REMARK	Revised to correct grammar and changed system “name” to “Code” and “drawing” to “figure” for consistency.
The non-safety related portion is in dash dot line to be consistent with Figure symbol defined in Tier 1 Section 1.3.	

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC Table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.8

Item No.	Explanation/Basis for Change
Design Description Section 2.7.6.8.1	
A	Editorial corrections, and deletion of redundant (second) sentence.
B	Relocated and revised information for a concise introductory paragraph. See Item E.
C	Deleted sentence redundant to information in Item G. This change alters the response to RAI 299, Revision 1, 09.03.03-13.
D	Revised and relocated information to the introduction paragraph. See Item L.
E	Relocated information to introductory paragraph (See Item B), and deleted information not required for Tier 1 Design Description. This change alters the response to RAI 299, Revision 1, 09.03.03-13.
F	Notes 1 and 2. See Item N.
G	Revised and relocated to consolidate information for ESF rooms EFDS design description. See Item L.
H	Negative statement removed from Design Description, not required for Tier 1.
I	Deleted information not required for Tier 1 Design Description.
J	Notes 1 and 2. See Items Q and T.
K	Deleted redundant information and detail not required for Tier 1 Design Description.
L	Revised and relocated information within the Design Description introductory paragraphs, and deleted detail not required for Tier 1 Design Description. See Items D, G, O and P.
M	Negative statements removed from Design Description, not required for Tier 1.
N	Notes 1 and 2. See Item F.
O	Notes 1 and 2. See Item L.
P	Notes 1 and 2. See Item L.
Q	Notes 1 and 2. See Item J.
R	Note 1.
S	Note 1.
T	Notes 1 and 2. See Item J.
Figure 2.7.6.8-1	
U	Editorial corrections to the "REMARK" text, and revised the equipment area designators to agree with Design Description text. This change alters the response to RAI 299, Revision 1, 09.03.03-13.
ITAAC Table 2.7.6.8-1	
1	DC, ITA and AC – Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS - Scope, 2nd bullet.]
2	DC, ITA, and AC – Generic changes to ITAAC for MCR alarms and displays to provide clarity and consistency. [RIS - Scope, 2nd bullet.]

Item No.	Explanation/Basis for Change
3	DC – Corrections to DC wording to reflect system function as described in Tier 2, for clarification, and for deletion of reference to site-specific system WWS. [RIS – Standardization, 4th bullet; Scope, 1st bullet.] ITA and AC – Changes to align ITA and AC with the DC, and to clarify testing method and acceptance criteria, and for deletion of reference to site-specific system WWS. [RIS – Focus, 6th and 7th bullets; Standardization, 3rd bullet.]
4	DC, ITA, and AC – Generic changes to ITAAC for seismic to provide clarity and consistency. [RIS - Scope, 2nd bullet.] This change alters the response to RAI 242, Revision 0, 14.03.03-16.
5.a	DC, ITA and AC – ITAAC is deleted. The drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are manual valves, not remotely operated valves. [RIS – Standardization & Consistency, 4th bullet.] This change alters the response to RAI 242, Revision 0, 14.03.03-16.
5.b	DC, ITA and AC – ITAAC is deleted because it is redundant to ITAAC #2, and the isolation valves have no remote indication (See ITAAC 5.a basis above). [RIS – Standardization & Consistency, 4th bullet.] This change alters the response to RAI 242, Revision 0, 14.03.03-16.
6.a	DC, ITA and AC – Generic changes to ITAAC for ASME Code requirements to provide clarity and consistency. [RIS - Scope, 2nd bullet.] This change alters the response to RAI 242, Revision 0, 14.03.03-16, and the response to RAI 404, Revision 0, 14.03.03-20.
6.b	DC, ITA, AC – Generic changes to ITAAC for ASME Code requirements to provide clarity and consistency. [RIS - Scope, 2nd bullet.] This change alters the response to RAI 242, Revision 0, 14.03.03-16, and the response to RAI 404, Revision 0, 14.03.03-20.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.10

Item No.	Explanation/Basis for Change
Design Description Section 2.7.6.10.1	
A	Revised text to include only the necessary attributes for Tier 1 Design Description. Subheadings deleted throughout to provide consistent Design Description format in Tier 1.
B	Deleted reference to plant security communications as this is described in Tier 1 Section 2.12.
C	Note 1.
D	Note 1. Revised to make the reference to the emergency response data system more generic to accommodate possible future changes to the ERDS.
E	Note 1.
F	Revised text to include only the necessary attributes for Tier 1 Design Description and remove negative statements from Tier 1. This change alters the response to RAI 184, Revision 0, 14.03.07-29.
G	Added text to refer to Section 2.12 for security system communications ITAAC.
ITAAC Table 2.7.6.10-1	
1	DC and AC – Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS – Scope, 2nd bullet]
2	ITA – Editorial correction only.
3	DC, AC – Revised to make the reference to the emergency response data system more generic to accommodate possible future changes to the ERDS. [RIS – Scope, 1st bullet]
4	DC, ITA, AC – ITAAC deleted as it is redundant; TSC communications are verified by ITAAC #2 and #3.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.13

Item No.	Explanation/Basis for Change
Design Description Section 2.7.6.13.1	
A	Editorial to agree with Tier 2 wording. Removed subheadings throughout.
B	Add additional design objectives from Tier 2.
C	Editorial changes.
D	Text relocated within the Design Description section, and added reference to Table 2.7.6.13-1. See item F.
E	Remove information not related to functional arrangement, and design criteria not appropriate for Tier 1.
F	Deleted text to include only the necessary information for Tier 1. Relocated information within the Design Description section; see Item D.
G	Notes 1 and 2. See Item V.
H	Notes 1 and 2. See Item R.
I	Deleted information not required for the Tier 1 Design Description.
J	Revised first and second sentences to agree with Tier 2 wording.
K	Notes 1 and 2. See Item W. (third and fourth sentences)
L	Note 1. Interlocks and logic from the containment high range area monitors are verified in Tier 1 Section 2.5.1 ITAAC.
M	Notes 1 and 2. See Items T and U.
N	Notes 1 and 2. See Item S.
O	Deleted negative statements not required for the Tier 1 Design Description.
P	Revised to add reference to Table 2.7.6.13-2, and remove information not appropriate for the Tier 1 Design Description.
Q	Notes 1 and 2. See Item F.
R	Notes 1 and 2. See Item H.
S	Notes 1 and 2. See Item N.
T	Notes 1 and 2. See Item M.
U	Notes 1 and 2. See Item M.
V	Notes 1 and 2. See Item G.
W	Notes 1 and 2. See Items K and X.
X	Deleted information not required for the Tier 1 Design Description. Deleted negative statements not required for the Tier 1 Design Description.
Table 2.7.6.13-1	
Y	Revised to add building location of ARMS monitors. This change does not impact the response to RAI 183, Revision 0, 14.03.07-7.
Table 2.7.6.13-2	
Z	Revised to add building location of airborne radioactivity monitors. This change does not impact the response to RAI 183, Revision 0, 14.03.07-7.
ITAAC Table 2.7.6.13-3	
1	DC and AC – Editorial change. This change does not impact the response to RAI 184, Revision 0, 14.03.07-21.

Item No.	Explanation/Basis for Change
2	DC, ITA and AC – Generic changes to ITAAC for seismic to provide clarity and consistency. [RIS – Scope 2nd bullet.] This change alters the response to RAI 183, Revision 0, 14.03.07-7.
3	DC, ITA and AC – Generic changes to ITAAC for equipment qualification to provide clarity and consistency. [RIS – Scope 2nd bullet.] This change alters the response to RAI 184, Revision 0, 14.03.07-24, the response to RAI 511 03.11-21, and the response to RAI 191, Revision 0, 14.03.04-03.
4.a	ITA – Revised to be consistent with DC and AC wording. [RIS p6, Standardization & Consistency, 2nd bullet.] This change does not impact the response to RAI 184, Revision 0, 14.03.07-16.
4.b	DC and AC – Generic changes to ITAAC for electrical separation to provide clarity and consistency. [RIS – Scope 2nd bullet.] This change alters the response to RAI 191, Revision 0, 14.03.04-9.
5	DC, AC – Editorial change, and change to provide means for acceptance. [RIS p6, Standardization & Consistency, 2nd bullet.] This change alters the response to RAI 184, Revision 0, 14.03.07-19.
6	DC and AC – Generic changes to ITAAC for MCR alarms and displays to provide clarity and consistency, and to clarify design commitment scope. [RIS p7, Scope, 1st and 2nd bullets.] This change alters the response to RAI 184, Revision 0, 14.03.07-21.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the Design Description section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

2.7.5 Heating, Ventilation, and Air Conditioning (HVAC) Systems

2.7.5.1 Main Control Room HVAC System

2.7.5.1.1 Design Description

System Purpose and Functions

The main control room (MCR) HVAC system is designed to protects the operators against a release of radioactive material, provides protection from smoke in the outside air intakes, and. The MCR HVAC system is also designed to provides conditioning conditioned air to maintain the proper environmental condition of the MCR and other areas within the control room envelope (CRE). The capability to purge smoke from the MCR is also provided. The MCR HVAC system is a safety-related system, except for the toilet/kitchen exhaust and smoke purge fans. A B

Location and Functional Arrangement

The MCR HVAC system is located within the reactor building. and As shown in Figure 2.7.5.1-1, the MCR HVAC system consists of two 100% capacity MCR emergency filtration units and four 50% capacity MCR air handling units. The MCR air handling units are connected to a common overhead air distribution ductwork. C

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Key Design Features

The key design features of MCR HVAC system are reflected in the system design bases, which include: D

- The MCR HVAC system is designed to exclude entry of airborne radioactivity into the CRE and remove radioactive material from the CRE environment.
- The MCR HVAC system is designed to provide conditioning air to maintain the proper environmental condition of the CRE during all plant conditions.
- The MCR emergency filtration unit consists, in direction of airflow, of a high efficiency filter, an electric heating coil, a high-efficiency particulate air filter, a charcoal absorber and a high efficiency filter. E
- The adverse effects associated with tornado depressurization of the outside air intakes and exhaust outlets are prevented by the specially designed tornado dampers located at the outside air intakes and exhaust outlets. F

- The MCR air handling units and the MCR emergency filtration units are physically separated from the other divisions by a structural barrier, which also serves as a fire barrier. G

Seismic and ASME Code Classifications

The seismic classifications for system components are identified in Table 2.7.5.1-1. The system components are not designed or constructed to ASME Code Section III requirements. H

System Operation

The MCR HVAC system provides the proper environmental conditions within the CRE during all plant operating conditions, including normal plant operating, abnormal and accident conditions.

There are four different MCR HVAC system modes of operation:

1. Normal mode - the MCR HVAC system is aligned to take in fresh outside air. The CRE is maintained at the proper ambient conditions during this mode of operation.
2. Emergency pressurization mode is automatically started upon a MCR isolation signal. Outside air is directed to both MCR emergency filtration units and the CRE is maintained at a positive pressure 0.125 inches w.g. as a minimum relative to external areas adjacent to the CRE boundary. I
3. Emergency isolation mode provides the capability to protect the control room operators from smoke in the outside air intakes. The MCR HVAC system goes into full recirculation and there is no positive pressurization of the CRE during this mode.
4. Smoke purge mode is manually initiated to route outside air into the MCR. In this mode, the air temperature controls are defeated. The outside air is removed from the MCR through the MCR smoke purge fan.

Alarms, Displays, and Controls

Table 2.7.5.1-2 identifies alarms, displays and controls associated with the system that are located in the MCR. J

Logic

Emergency Pressurization Mode: K

Upon the receipt of an MCR isolation signal:

- MCR toilet/kitchen exhaust line isolation dampers and smoke purge line isolation dampers automatically close or remain in the closed position.
- The two MCR emergency filtration units start, MCR air intake isolation dampers open automatically and the MCR air handling units start, or continue to operate if running.
- The Class 1E electric heating coils that are contained in MCR emergency filtration units automatically start to maintain a relative humidity level of 70% for charcoal filter efficiency.

Emergency Isolation Mode:

Upon the receipt of a signal to initiate emergency isolation mode (smoke):

- The outside air intake isolation dampers automatically close.
- The standby MCR air handling units automatically start.
- If running, the smoke purge fan automatically trips and the associated dampers close.
- The MCR toilet/kitchen exhaust fan automatically trips and the associated dampers close.

Interlocks

The dampers in the MCR HVAC system reposition to establish the flow path for the required mode. L

Class 1E Electrical Power Sources and Divisions M

The equipment identified in Table 2.7.5.1-1 as Class 1E is powered from their respective Class 1E divisions, and separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cable.

Equipment to be Qualified for Harsh Environments

The MCR HVAC system is located in controlled environmental conditions that exist before, during, and following a design basis event. Therefore the MCR HVAC system equipment is not qualified for harsh environments. N

Interface Requirements

There are no safety-related interfaces with systems outside of the certified design. O

~~**Numeric Performance Values**~~

~~Selected numerical performance values of the MCR HVAC system used in the safety analysis are shown on the table below:~~ P

~~Unfiltered CRE inleakage~~	~~120 cfm~~
~~Filtered air intake flow~~	~~1,200 cfm~~
~~Filtered air recirculation flow~~	~~2,400 cfm~~
~~Filter efficiencies~~	
~~Elemental iodine~~	~~95%~~
~~Organic iodine~~	~~95%~~
~~Particulates~~	~~99%~~

1.a The functional arrangement of the MCR HVAC system is as described in the Design Description of Subsection 2.7.5.1.1 and as shown in Figure 2.7.5.1-1. Q

1.b Each mechanical division of the MCR air handling units (Divisions A, B, C & D) and MCR emergency filtration units (Divisions A & B) as identified in Table 2.7.5.1-1 are physically separated from the other divisions so as not to preclude accomplishment of the safety function. R

2. The seismic Category I equipment, identified in Table 2.7.5.1-1, can withstand seismic design basis loads without loss of safety function. S

3.a Class 1E equipment, identified in Table 2.7.5.1-1, is powered from its respective Class 1E division. T

3.b Separation is provided between redundant divisions of Class 1E cables, and between Class 1E cables and non-Class 1E cables.

4.a The MCR HVAC system provides conditioned air to maintain the temperature and relative humidity within design limits of the CRE during plant operating conditions, including normal, emergency pressurization and emergency isolation modes. U

4.b The MCR HVAC system provides design filter efficiencies, airflow and unfiltered CRE inleakage used in the safety analysis. V

5.a The remotely operated dampers identified in Table 2.7.5.1-1 as having PSMS control, perform an active safety function after receiving a signal from PSMS. W

X

5.b After loss of motive power, the remotely operated dampers, identified in Table 2.7.5.1-1, assume the indicated loss of motive power position.

5.c The MCR HVAC system isolation dampers close within their design basis closure time after receiving a MCR isolation signal. Y

5.d The fire dampers in the ductwork that penetrates the fire barriers that are required to protect safe-shutdown capability close under design air flow conditions. Z

5.e Controls are provided in the MCR to open and close the remotely operated dampers identified in Table 2.7.5.1-2. AA

5.f The remotely operated dampers and tornado dampers, identified in Table 2.7.5.1-1 as having an active safety function, perform an active safety function to change position as indicated in the table. BB

6.a Controls are provided in the MCR to start and stop the MCR HVAC system air handling units and filtration units identified in Table 2.7.5.1-2. CC

6.b The MCR HVAC system air handling unit fans and emergency filtration unit fans and electric heaters identified in Table 2.7.5.1-2, start after receiving a MCR isolation signal (emergency pressurization mode). DD

6.c The MCR HVAC system air handling unit fans identified in Table 2.7.5.1-2 start after receiving an outside air smoke detection signal to initiate CRE emergency isolation mode. EE

7. Alarms and displays identified in Table 2.7.5.1-2 are provided in the MCR. FF

8. Alarms, displays and controls identified in Table 2.7.5.1-2 are provided in the RSC. GG

2.7.5.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.5.1-3 specifies the inspections, tests analyses, and associated acceptance criteria for the MCR HVAC system.

Table 2.7.3.5-5 specifies the ITAAC for the ECWS piping that supplies cooling water to the main control room air handling unit cooling coils.

HH
II
JJ

Table 2.7.5.1-1 Main Control Room HVAC System Equipment Characteristics (Sheet 1 of 3)

Equipment Name	Tag No.	ASME Section III Class	Seismic Category I	Remotely Operated ValveDamper	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
Main Control Room Air Handling Units	VRS-MAH-101 A, B, C, D	–	Yes	–	–/No	–	None	–
Main Control Room Air Handling Unit Fans	VRS-MFN-101 A, B, C, D	–	Yes	–	Yes/No	MCR isolation	Start	–
Main Control Room Air Handling Unit Cooling Coils	VRS-MCL-101 A, B, C, D	–	Yes	–	–/No	–	None	–
Main Control Room Emergency Filtration Units	VRS-MFU-111 A, B	–	Yes	–	–/No	–	None	–
Main Control Room Air Handling Unit Electric Heating Coils	VRS-MEH-101 A, B, C, D	–	Yes	–	Yes/No	MCR isolation	Energized	Deenergized
Main Control Room Emergency Filtration Unit Fans	VRS-MFN-111 A, B	–	Yes	–	Yes/No	MCR isolation	Start	–
Main Control Room Emergency Filtration Unit Electric Heating Coils	VRS-MEH-111 A, B	–	Yes	–	Yes/No	MCR isolation	Energized	Deenergized
Main Control Room Air Intake Isolation Dampers	VRS-EHD-101 A, B, 102A, B	–	Yes	Yes	Yes/No	MCR isolation	Transfer Open (pressurization mode)	Closed

						Smoke detection	Transfer Closed (isolation mode)	
Main Control Room Toilet/Kitchen Exhaust Line Isolation Dampers	VRS-AOD-121, 122	–	Yes	Yes	Yes/No	MCR isolation	Transfer Closed	Closed
Main Control Room Smoke Purge Line Isolation Dampers	VRS-AOD-131, 132	–	Yes	Yes	Yes/No	MCR isolation	Transfer Closed	Closed
Main Control Room Emergency Filtration Unit Air Intake Dampers	VRS-MOD-111 A, B	–	Yes	Yes	Yes/No	MCR isolation	Transfer Open	As is

Table 2.7.5.1-1 Main Control Room HVAC System Equipment Characteristics (Sheet 2 of 3)

Equipment Name	Tag No.	ASME Section III Class	Seismic Category I	Remotely Operated ~~Valve~~Damper	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
Main Control Room Emergency Filtration Unit Air Return Dampers	VRS-MOD-112 A, B	–	Yes	Yes	Yes/No	MCR isolation	Transfer Open	As is
Main Control Room Normal Air Intake Line Isolation Dampers	VRS-AOD-103 A, B	–	Yes	Yes	Yes/No	MCR isolation	Transfer Closed	Closed
Main Control Room Circulation Line Changeover Dampers	VRS-EHD-104 A, B, 107A, B	–	Yes	Yes	Yes/No	MCR isolation	Transfer Open	Closed
Main Control Room Air Handling Unit Inlet Dampers	VRS-EHD-105 A, B, C, D	–	Yes	Yes	Yes/No	Fan Start~~MCR isolation~~	Transfer Open	Closed
Main Control Room Air Handling Unit Outlet Dampers	VRS-EHD-106 A, B, C, D	–	Yes	Yes	Yes/No	Fan Start~~MCR isolation~~	Transfer Open	Closed
Main Control Room Emergency Filtration Unit Fan Outlet Dampers	VRS-MOD-113 A, B	–	Yes	Yes	Yes/No	Fan Start~~MCR isolation~~	Transfer Open	As is
Tornado Dampers	VRS-OTD-108A,B, -124, -133	–	Yes	–	–/No	–	Transfer Closed (Tornado condition)	–
Ductwork	–	–	Yes	–	–/No	–	None	–

Table 2.7.5.1-1 Main Control Room HVAC System Equipment Characteristics (Sheet 3 of 3)

Equipment Name	Tag No.	ASME Section III Class	Seismic Category I	Remotely Operated ~~Valve~~Damper	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
Main Control Room Temperature	VRS-TS-146, 156, 166, 176	–	Yes	–	Yes/No	–	–	–

NOTE: Dash (-) indicates not applicable

Table 2.7.5.1-2 Main Control Room HVAC System Equipment Alarms, Displays and Control Functions (Sheet 1 of 2)

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display	
Main Control Room Air Handling Unit Fans (VRS-MFN-101 A, B, C, D)	No	Yes	Yes	Yes	
Main Control Room Air Handling Unit Electric Heating Coils (VRS-MEH-101 A, B, C, D)	Yes	Yes	Yes	Yes	KK
Main Control Room Emergency Filtration Unit Fans (VRS-MFN-111 A, B)	~~Yes~~No	Yes	Yes	Yes	
Main Control Room Emergency Filtration Unit Electric Heating Coils (VRS-MEH-111 A, B)	Yes	Yes	Yes	Yes	LL
Main Control Room Air Intake Isolation Dampers (VRS-EHD-101 A, B, 102 A, B)	No	Yes	Yes	Yes	
Main Control Room Toilet/Kitchen Exhaust Line Isolation Dampers (VRS-AOD-121,122)	No	Yes	Yes	Yes	
Main Control Room Smoke Purge Line Isolation Dampers (VRS-AOD-131,132)	No	Yes	Yes	Yes	
Main Control Room Emergency Filtration Unit Air Intake Dampers (VRS-MOD-111 A, B)	No	Yes	Yes	Yes	
Main Control Room Emergency Filtration Unit Air Return Dampers (VRS-MOD-112 A, B)	No	Yes	Yes	Yes	
Main Control Room Normal Air Intake Line Isolation Dampers (VRS-AOD-103 A, B)	No	Yes	Yes	Yes	
Main Control Room Circulation Line Changeover Dampers (VRS-EHD-104 A, B, 107 A, B)	No	Yes	Yes	Yes	

Main Control Room Air Handling Unit Inlet Dampers (VRS-EHD-105 A, B, C, D)	No	Yes	No	Yes
Main Control Room Air Handling Unit Outlet Dampers (VRS-EHD-106 A, B, C, D)	No	Yes	No	Yes

Table 2.7.5.1-2 Main Control Room HVAC System Equipment Alarms, Displays and Control Functions (Sheet 2 of 2)

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
Main Control Room Emergency Filtration Unit Fan Outlet Dampers (VRS-MOD-113 A, B)	No	Yes	No	Yes
Main Control Room Temperature (VRS-TCA-146, 156, 166, 176)	Yes	No	No	No

Table 2.7.5.1-3 Main Control Room HVAC System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a The functional arrangement of the MCR HVAC system is as described in the Design Description of ~~this~~ Subsection 2.7.5.1.1 and as shown in Figure 2.7.5.1-1.	1.a ~~An i~~Inspection of the as-built MCR HVAC system will be performed.	1.a The as-built MCR HVAC system conforms to~~with~~ the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.5.1.1 and as shown in Figure 2.7.5.1-1.
1.b Each mechanical division of ~~The~~ the MCR air handling units (Divisions A, B, C & D) and MCR emergency filtration units (Divisions (A & B) ~~that are~~ identified in Table 2.7.5.1-1 ~~are~~ is physically separated from the other divisions so as not to preclude accomplishment of the safety function.	1.b Inspections and analysis of the as-built MCR air handling units and MCR emergency filtration units identified in Table 2.7.5.1-1~~MCR HVAC system~~ will be performed.	1.b A report exists and concludes that ~~Each~~ each mechanical division of the as-built MCR air handling unit and the MCR emergency filtration units ~~that are~~ identified in Table 2.7.5.1-1 ~~are~~ is physically separated from other mechanical divisions by spatial separation, ~~structural~~ barriers or enclosures so as to assure that the functions of the safety-related system are maintained.
2. The seismic Category I equipment, identified in Table 2.7.5.1-1, ~~is designed to~~can withstand seismic design basis loads without loss of safety function.	2.i Inspections will be performed to verify that the as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.5.1-1 is located in a seismic Category I structure~~the reactor building~~.	2.i The as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.5.1-1 is located in a seismic Category I structure~~the reactor building~~.
	2.ii Type tests~~and/or~~, analyses, or a combination of type tests and analyses of ~~the~~ seismic Category I equipment identified in Table 2.7.5.1-1 will be performed using analytical assumptions, or will be performed under conditions, which bound the seismic design basis requirements.	2.ii ~~The results of the type tests and/or analyse~~A report exists and~~s~~ concludes that the seismic Category I equipment identified in Table 2.7.5.1-1 can withstand seismic design basis loads without loss of safety function.

	2.iii Inspections and analyses will be performed to verify that the as-built seismic Category I equipment identified in Table 2.7.5.1-1 on the as-built equipment ,including anchorages, is seismically bounded by the tested or analyzed conditions.	2.iii A report exists and concludes that the The as-built seismic Category I equipment identified in Table 2.7.5.1-1, including anchorages, is seismically bounded by the tested or analyzed conditions.
3.a The Class 1E equipment, identified in Table 2.7.5.1-1, is powered from their its respective Class 1E division.	3.a A test will be performed on each division of the as-built Class 1E equipment identified in Table 2.7.5.1-1 by providing a simulated test signal only in the Class 1E division under test.	3.a The simulated test signal exists at the as-built Class 1E equipment, identified in Table 2.7.5.1-1, under test.
3.b Separation is provided between between redundant divisions of MCR HVAC system Class 1E divisionscables, and between Class 1E divisions cables and non-Class 1E cables.	3.b Inspections of the as-built Class 1E divisional cables will be performed.	3.b Physical separation or electrical isolation is provided in accordance with RG 1.75 between the as-built cables of MCR HVAC system redundant Class 1E divisions and between Class 1E divisions cables and non-Class 1E cables.

Table 2.7.5.1-3 Main Control Room HVAC System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4.a The MCR HVAC system provides conditioned ~~conditioning~~ air to maintain the ~~proper design~~ temperature and relative humidity within design limits of~~for~~ the CRE during ~~all~~ plant operating conditions, including normal, emergency pressurization and emergency isolation modes~~plant operations, abnormal and accident conditions~~.	4.a Tests and analyses of the as-built MCR HVAC system will be performed.	4.a A report exists and concludes that the~~The~~ as-built MCR HVAC system is capable of providing conditioned air to maintain the ~~proper design~~ temperature and relative humidity within design limits of~~for~~ the CRE during ~~all~~ plant operating conditions including normal ~~plant operations, abnormal and accident conditions~~, emergency pressurization and emergency isolation modes.
4.b The MCR HVAC system ~~is capable of meeting of the selected numerical performance values~~ provides design filter efficiencies, airflow and unfiltered CRE inleakage used in the safety analysis ~~listed in Subsection 2.7.5.1.1~~.	4.b.i Type tests, tests and analyses of filter efficiencies for the MCR HVAC system will be performed.	4.b.i A report exists and concludes that the~~The~~ MCR HVAC system is capable of meets or exceeds the following filter efficiencies ~~identified in Subsection 2.7.5.1.1~~ Elemental iodine 95% Organic iodine 95% Particulates 99%.
	4.b.ii Tests of the airflow for the as-built MCR HVAC system will be performed.	4.b.ii The as-built MCR HVAC system ~~is meeting~~ provides ~~the~~ filtered air intake flow of <1200 cfm and filtered air recirculation flow of >2400 cfm in the pressurization mode. ~~airflow identified in Subsection 2.7.5.1.1~~.
	4.b.iii Tests and analyses of as-built unfiltered CRE inleakage will be performed.	4.biii A report exists and concludes that ~~The~~ the as-built CRE unfiltered inleakage ~~identified~~ is < 120 cfm in the pressurization mode. ~~in Subsection 2.7.5.1.1~~.

5.a The ~~MCR HVAC system isolation~~ remotely operated dampers ~~and tornado dampers~~, identified in Table 2.7.5.1-1~~,~~ as having PSMS control, perform an active safety function ~~to change position as indicated in the table~~after receiving a signal from PSMS.	5.a.~~i~~ Tests on ~~of~~ the as-built ~~MCR HVAC system~~ remotely operated ~~isolation~~ dampers identified in Table 2.7.5.1-1 as having PSMS control will be performed using simulated signals.	5.a.~~i~~ ~~Each~~ The as-built ~~MCR HVAC system isolation~~ remotely operated dampers ~~performs the active safety function~~ identified in Table 2.7.5.1-1 as having PSMS control perform the active safety function identified in the table after receiving a simulated signal. ~~after receiving an outside air smoke detection signal or a MCR isolation signal~~.
	~~5.a.ii Tests of the as-built tornado dampers identified in Table 2.7.5.1-1 will be performed under preoperational test pressure, and fluid flow conditions.~~	~~5.a.ii Each as-built tornado damper changes position as identified in Table 2.7.5.1-1.~~
5.b After loss of motive power, the remotely operated ~~MCR HVAC system~~ dampers, identified in Table 2.7.5.1-1, assume the indicated loss of motive power position.	5.b Tests of the as-built ~~MCR HVAC system~~ -remotely operated dampers identified in Table 2.7.5.1-1 will be performed under the conditions of loss of motive power.	5.b Upon loss of motive power, each as-built ~~MCR HVAC system~~ remotely operated damper identified in Table 2.7.5.1-1 assumes the indicated loss of motive power position.

Table 2.7.5.1-3 Main Control Room HVAC System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.c The MCR HVAC system isolation dampers identified in Table 2.7.5.1-1 close within their design basis closure time after receiving a MCR isolation signal.	5.c Tests of the as-built MCR HVAC system isolation dampers will be performed identified in Table 2.7.5.1-1 will be performed using a a simulated MCR isolation signal.	5.c The following as-built MCR HVAC system isolation dampers identified in Table 2.7.5.1-1 close in less than or equal to within the required times 10 seconds after receiving a MCR isolation signal.: ≤10 seconds VRS-EHD-101 A,B, 102 A,B VRS-AOD-121, 122 VRS-AOD-131, 132
5.d The fire dampers in the ductwork that penetrates the fire barriers that are required to protect safe-shutdown capability close fully when called upon to do sounder design air flow conditions.	5.d Type Ttests, tests, a combination of type tests and analyses, or a combination of tests and analyses of the fire dampers will be performed under the design air conditions or under conditions which bound the design air flow conditions. ,	5.d Each as-built fire damper in the ductwork that penetrates a A report exists and concludes that the fire barrier dampers in the ductwork that penetrates a fire barrier that isare required to protect safe-shutdown capability close under design air flow conditions or the conditions which bound design air flow conditions.
5.e Controls exist are provided in the MCR to open and close the remotely operated dampers identified in Table 2.7.5.1-2.	5.e Tests will be performed on the as-built remotely operated dampers listed identified in Table 2.7.5.1-2 using controls in the as-built MCR.	5.e Controls exist in the as-built MCR to open and close the as-built remotely operated dampers listed identified in Table 2.7.5.1-2.
5.f The remotely operated dampers and tornado dampers, identified in Table 2.7.5.1-1 as having an active safety function, perform an active safety function to change position as indicated in the table.	5.f.i Tests of the as-built remotely operated dampers identified in Table 2.7.5.1-1 as having an active safety function will be performed under preoperational test conditions.	5.f.i Each as-built remotely operated damper identified in Table 2.7.5.1-1 as having an active safety function changes position as identified in Table 2.7.5.1-1 under preoperational test conditions.
	5.f.ii Tests of the as-built tornado dampers identified in Table 2.7.5.1-1 will be performed under preoperational test conditions.	5.f.ii Each as-built tornado damper changes position as identified in Table 2.7.5.1-1 under preoperational test conditions.

6.a Controls are providedexist in the MCR to start and stop the MCR HVAC system air handling units and filtration units identified in Table 2.7.5.1-2.	6.a Tests will be performed on the as-built air handling units and filtration units identified in Table 2.7.5.1-2 using controls in the as-built MCR.	6.a Controls exist in the as-built MCR to start and stop the as-built MCR HVAC system air handling units and filtration units identified in Table 2.7.5.1-2.
6.b The MCR HVAC system air handling unit fans and emergency filtration unit fans and electric heaters, identified in Table 2.7.5.1-2, start after receiving a MCR isolation signal (emergency pressurization mode).	6.b.Tests of the as-built MCR HVAC system air handling unit fans and emergency filtration unit fans and electric heaters, identified in Table 2.7.5.1-2, will be performed using a simulated signal.	6.b The as-built MCR HVAC system air handling unit fans and emergency filtration unit fans and electric heaters, identified in Table 2.7.5.1-2, start after receiving a simulated MCR isolation signal (emergency pressurization mode).
6.c.The MCR HVAC system air handling unit fans identified in Table 2.7.5.1-2 start after receiving an outside air smoke detection signal to initiate CRE emergency isolation mode.	6.c. Tests of the as-built MCR HVAC system air handling unit fans identified in Table 2.7.5.1-2 will be performed using a simulated signal.	6.c. The as-built MCR HVAC system air handling unit fans identified in Table 2.7.5.1-2 start after receiving an simulated outside air smoke detection signal to initiate CRE emergency isolation mode.

Table 2.7.5.1-3 Main Control Room HVAC System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
7. ~~MCR a~~Alarms and displays ~~of the MCR HVAC system parameters~~ identified in Table 2.7.5.1-2 ~~can be retrieved~~are provided in the MCR.	7. Inspection~~s~~ will be performed for retrievability of the ~~MCR HVAC system parameters~~alarms and displays identified in Table 2.7.5.1-2 in the as-built MCR.	7. ~~MCR a~~Alarms and displays, identified in Table 2.7.5.1-2, can be retrieved in the as-built MCR.
8. ~~RSC a~~Alarms, displays and controls ~~are~~ identified in Table 2.7.5.1-2 are provided in the RSC.	8.i Inspection~~s of the as-built RSC alarmsand displays and controls~~ will be performed for retrievability of the alarms and displays identified in Table 2.7.5.1-2 in the as-built RSC.	8.i Alarms ~~,~~ and displays ~~and controls exist on the as-built RSC as identified~~ in Table 2.7.5.1-2. can be retrieved in the as-built RSC.
	8.ii Tests of the as-built RSC control functions identified in Table 2.7.5.1-2 will be performed.	8.ii Controls in the as-built RSC operate each as-built equipment identified in Table 2.7.5.1-2 with an RSC control function.

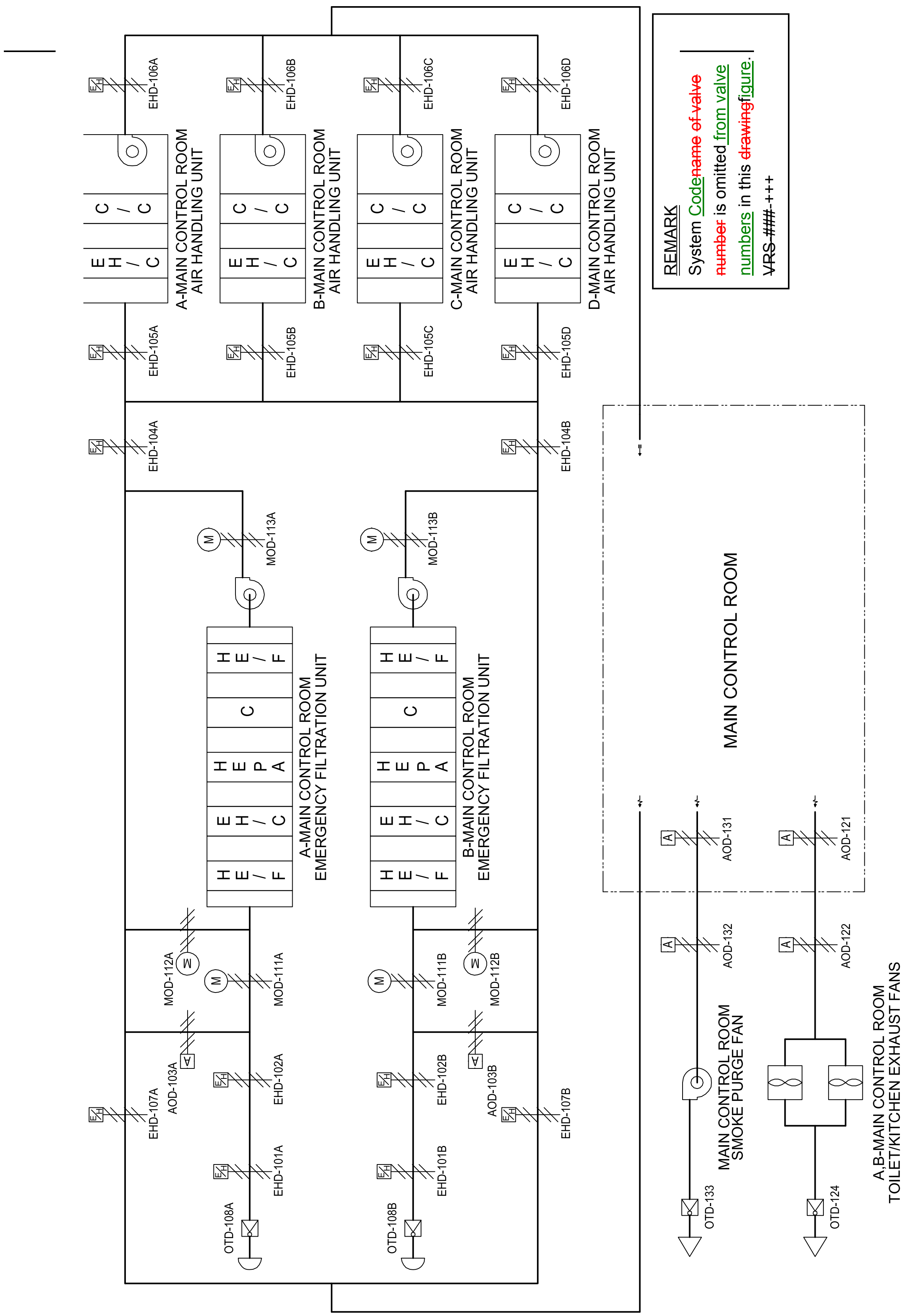


Figure 2.7.5.1-1 Main Control Room HVAC System

2.7.6.3 Spent Fuel Pit Cooling and Purification System

2.7.6.3.1 Design Description

~~**System Purpose and Functions**~~ A

The ~~purpose and functions of the~~ spent fuel pit cooling and purification system (SFPCS) ~~include:~~ removes the decay heat generated by spent fuel assemblies in the spent fuel pit (SFP) during all plant operating conditions, as well as providing purification and clarification of the SFP water. The SFPCS provides purification of the water in the refueling water storage pit (RWSP), the refueling cavity, and the refueling water storage auxiliary tank (RWSAT) in conjunction with the refueling water system, and transfers water to the chemical and volume control system (CVCS) charging pump as an alternative water source. The SFP can supply water for RCS makeup by gravity injection as a countermeasure for loss of RHR. B

- ~~Circulate the spent fuel pit (SFP) water through the SFP heat exchangers to remove the decay heat generated by spent fuel assemblies in the SFP during all plant operating conditions, including normal plant operating, abnormal and accident conditions.~~ U
- ~~Purification and clarification of the SFP water.~~ B
- ~~Purification of the boric acid water for the refueling water storage pit (RWSP), the refueling cavity, and the refueling water stage auxiliary tank (RWSAT) in conjunction with the refueling water system.~~
- ~~Transfer boric acid water to the fuel transfer canal, fuel inspection pit and cask pit in conjunction with the refueling water system~~.
- ~~Transfer boric acid water to the chemical and volume control system (CVCS) charging pump as an alternate water source.~~
- ~~Supply water for RCS makeup by gravity injection from spent fuel pit as a countermeasure for loss of RHR.~~

The SFPCS cooling portion, including the makeup line from the RWSP into the discharge line of the SFPCS cooling loop, is safety-related, as shown in Tables 2.7.6.3-1 and 2.7.6.3-2. The purification portion of the SFPCS is non safety-related. C

1. The functional arrangement of the SFPCS is as described in the Design Description of Subsection 2.7.6.3.1 and in Table 2.7.6.3-4, and as shown in Figure 2.7.6.3-1. D

2.a.i The ASME Code Section III components of the SFPCS, identified in Table 2.7.6.3-1, are fabricated, installed and inspected in accordance with ASME Code Section III requirements. E

2.a.ii The ASME Code Section III components of the SFPCS identified in Table 2.7.6.3-1 are reconciled with the design requirements. E

2.b.i The ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

2.b.ii The ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2 are reconciled with the design requirements.

3.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.7.6.3-1, meet ASME Code Section III requirements for non-destructive examination of welds.

3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.6.3-2, meet ASME Code Section III requirements for non-destructive examination of welds.

4.a The ASME Code Section III components, identified in Table 2.7.6.3-2, retain their pressure boundary integrity at their design pressure.

4.b The ASME Code Section III piping, identified in Table 2.7.6.3-2, retain its pressure boundary integrity at its design pressure.

5. The seismic Category I equipment, identified in Table 2.7.6.3-1 can withstand seismic design basis loads without loss of safety function.

6. The seismic Category I piping, including supports, identified in Table 2.7.6.3-2 can withstand seismic design basis loads without a loss of its safety function.

7.a Class 1E equipment, identified in Table 2.7.6.3-1, is powered from its respective Class 1E division. F

7.b Separation is provided between redundant divisions of SFPCS Class 1E cables, and between Class 1E cables and non-Class 1E cables.

8. The SFPCS circulates the SFP water through the SFP heat exchangers to remove the decay heat generated by spent fuel assemblies. G

9. Alarms and displays identified in Table 2.7.6.3-3 are provided in the MCR. H

10. Alarms, displays, and controls identified in Table 2.7.6.3-3 are provided in the RSC. I

11. Controls are provided in the MCR to start and stop the spent fuel pit pumps identified in Table 2.7.6.3-3. J

~~8.~~12. The check valves, identified in Table 2.7.6.3-1 as having an active safety function, perform an active safety function to change position as indicated in the table. K

L

Location and Functional Arrangement

The location of SFPCS components is given in Table 2.7.6.3-4. Figure 2.7.6.3-1 shows the functional arrangement of the SFPCS. The functional arrangement and design characteristics of the system are further discussed below.

Key Design Features

M

The SFPCS, which consists of two cooling loops and two purification loops, is shown in Figure 2.7.6.3-1.

N

A safety-related makeup source of borated water is provided from the RWSP supply line. Borated RWSP water is pumped into the discharge line of the spent fuel cooling portion.

O

Seismic and ASME Code Classifications

SFPCS components and piping identified in Tables 2.7.6.3-1 and 2.7.6.3-2 meet seismic Category I standards.

SFPCS components and piping identified in Tables 2.7.6.3-1 and 2.7.6.3-2 are designed and constructed to ASME Code Section III requirements. Likewise, pressure boundary welds in ASME Code Section III components and piping meet ASME Code Section III requirements.

P

System Operation

During plant startup, normal plant operation, and shutdown, one SFPCS train is normally operating to provide SFP cooling and purification. The other train is available to perform other system functions, such as RWSP or RWSAT purification and water transfers. During half core off-load, two trains of SFPCS are used for SFP cooling. During full core off-loads, two trains of SFPCS in conjunction with two trains of RHRS are used for SFP cooling.

Q

Alarms, Displays, and Controls

Alarms and displays of the SFP water level and temperature are installed both locally and in the main control room. SFPCS equipment displays and control functions are shown in Table 2.7.6.3-3.

R

Logic

There is no logic needed for direct safety functions related to the spent fuel pit purification and cooling system.

Interlocks

There are no interlocks needed for direct safety functions related to the spent fuel pit purification and cooling system.

Class 1E Electrical Power Sources and Divisions S

The SFPCS equipment identified in Table 2.7.6.3-1 as Class 1E is powered from their respective Class 1E divisions, and separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cable.

Equipment to be Qualified for Harsh Environments T

Not applicable

Interface Requirements

There are no safety-related interfaces with systems outside of the certified design.

Numeric Performance Values

Not applicable.

2.7.6.3.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.3-5 describes the ITAAC for the spent fuel pit cooling and purification system.

Table 2.7.6.3-1 Spent Fuel Pit Cooling and Purification System Equipment Characteristics

Equipment Name	Tag No.	ASME Code Section III Class	Seismic Category I	Remotely Operated Valve	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
Spent fuel pit pumps	SFS-MPP-001A,B	3	Yes	–	Yes/No	Remote Manual	Start	–
						~~ECCS Actuation~~ Undervoltage signal	~~Start~~Stop	
Spent fuel pit heat exchangers	SFS-MHX-001A,B	3	Yes	–	—/—	—/—	—	–
Spent fuel pit	SFS-MPT-001	—	Yes	—	—/—	—	—	–
Spent fuel pump discharge check valves	SFS-VLV-006A,B	3	Yes	—	—/—	—	Transfer Open/ Transfer Close	–

Note: Dash (-) indicates not applicable

Table 2.7.6.3-2 Spent Fuel Pit Cooling and Purification System Piping Characteristics

Pipe Line Name	ASME Code Section III Class	Seismic Category I
SFP cooling piping up to and including the following valves: Purification line isolation valves: SFS-VLV-101A, B and SFS-VLV-133A, B	3	Yes
Safety-related SFP make up line from RWSP	3	Yes
Connection piping to and from RHRS	3	Yes
Water transfer line to transfer canal, cask pit, fuel inspection pit.	3	Yes

Table 2.7.6.3-3 Spent Fuel Pit Cooling and Purification System Equipment Alarms, Displays and Control Functions

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
SFP pump SFS-MPP-001A, B	No	Yes	Yes	No

Table 2.7.6.3-4 Spent Fuel Pit Cooling and Purification System Location of Equipment and Piping

System and Components	Location
Spent fuel pit	Reactor Building
Spent fuel pit pumps	Reactor Building
Spent fuel pit heat exchangers	Reactor Building
SFP cooling piping up to and including the following valves—: Purification line isolation valves: SFS-VLV-101A, B and SFS-VLV-133A, B	Reactor Building
Safety related SFP make up line from RWSP	Reactor Building
Connection piping to and from RHRS	Reactor Building
Water transfer line to transfer canal, cask pit, fuel inspection pit.	Reactor Building

Table 2.7.6.3-5 Spent Fuel Pit Cooling and Purification System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the SFPCS is as described in the Design Description of Subsection 2.7.6.3.1 and in Table 2.7.6.3-4 and as shown on in Figure 2.7.6.3-1.	1. An iInspection of the as-built SFPCS will be performed.	1. The as-built SFPCS conforms to the functional arrangement as described in the Design Description of this Subsection 2.7.6.3.1 and in Table 2.7.6.3-4 and as shown in Figure 2.7.6.3-1.
2.a.i The ASME Code Section III components of the SFPCS, identified in Table 2.7.6.3-1, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	2.a.i An iInspection of the as-built ASME Code Section III components of the SFPCS, identified in Table 2.7.6.3-1, will be performed.	2.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 SFPCS identified in Table 2.7.6.3-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.a.ii The ASME Code Section III components of the SFPCS identified in Table 2.7.6.3-1 are reconciled with the design requirements.	2.a.ii A reconciliation analysis of the components identified in Table 2.7.6.3-1 using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	2.a.ii The ASME Code Section III design report(s) (certified, when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the as-built ASME Code, for the as-built ASME Code Section III components of the SFPCS identified in Table 2.7.6.3-1 are reconciled with the design requirements. The report documents the results of the reconciliation analysis.

2.b.i The ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	2.b.i ~~An i~~Inspection of the as-built ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2, will be performed.	2.b.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 piping of the SFPCS, including supports, identified in Table 2.7.6.3-2 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

Table 2.7.6.3-5 Spent Fuel Pit Cooling and Purification System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2.b.ii The ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2 ~~is~~are reconciled with the design requirements.	2.b.ii A reconciliation analysis of the piping of the SFPCS, including supports, identified in Table 2.7.6.3-2, using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	2.b.ii The ASME Code Section III design report(s) (certified when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the ASME Code, for the as-built ASME Code Section III piping of the SFPCS, including supports, identified in Table 2.7.6.3-2. ~~is reconciled with the design requirements.~~ The report documents the results of the reconciliation analysis.
3.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.7.6.3-1, meet ASME Code Section III requirements for non-destructive examination of welds.	3.a Inspections of the as-built pressure boundary welds in ASME Code Section III components identified in Table 2.7.6.3-1, will be performed in accordance with the ASME Code Section III.	3.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 2.7.6.3-1.
3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.6.3-2, meet ASME Code Section III requirements for non-destructive examination of welds.	3.b Inspections of the as-built pressure boundary welds in ASME Code Section III piping identified in Table 2.7.6.3-2 will be performed in accordance with the ASME Code Section III.	3.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 2.7.6.3-2.
4.a The ASME Code Section III components, identified in Table 2.7.6.3-1, retain~~s~~ their pressure boundary integrity at their design pressure.	4.a A hydrostatic test will be performed on the as-built components, identified in Table 2.7.6.3-1, required by the ASME Code Section III to be hydrostatically tested.	4.a ASME Code Data Report(s) exist and conclude that ~~T~~the results of the hydrostatic test of the as-built components identified in Table 2.7.6.3-1 as ASME Code Section III conform ~~with~~to the requirements of the ASME Code Section III.

4.b The ASME Code Section III piping, identified in Table 2.7.6.3-2, retains its pressure boundary integrity at its design pressure.	4.b A hydrostatic test will be performed on the as-built piping, identified in Table 2.7.6.3-2, required by the ASME Code Section III to be hydrostatically tested.	4.b ASME Code Data Report(s) exist and conclude that Tthe results of the hydrostatic test of the as-built piping identified in Table 2.7.6.3-2 as ASME Code Section III conform with to the requirements of the ASME Code Section III.

Table 2.7.6.3-5 Spent Fuel Pit Cooling and Purification System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 4)

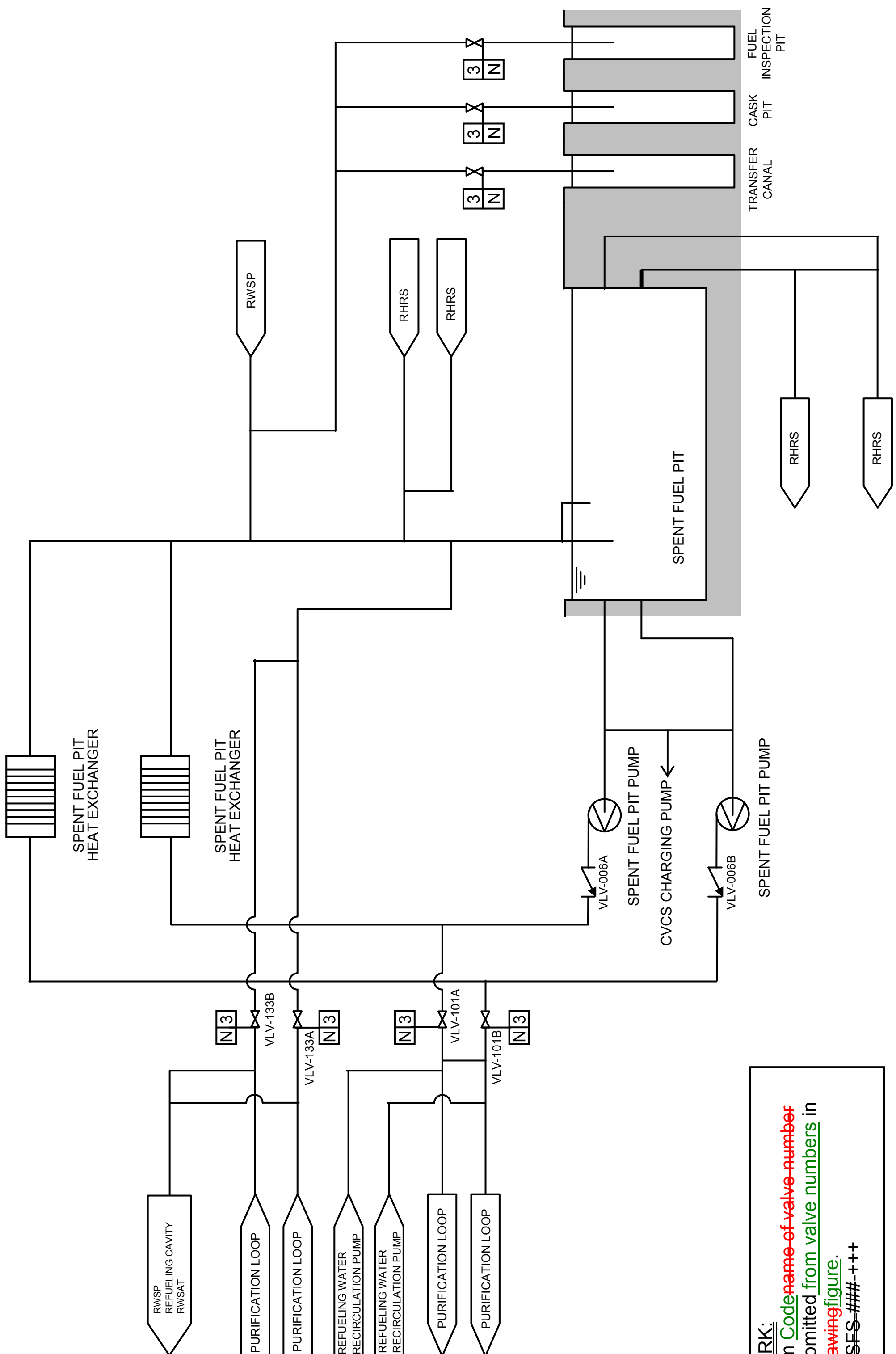
Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. The seismic Category I equipment, identified in Table 2.7.6.3-1 is designed tocan withstand seismic design basis loads without loss of safety function.	5.i Inspections will be performed to verify that the as-built seismic Category I as-built equipment identified in Table 2.7.6.3-1 is located in the containment and reactor buildinga seismic Category I structure.	5.i The as-built seismic Category I as-built equipment identified in Table 2.7.6.3-1 is located in the containment and reactor building.a seismic Category I structure.
	5.ii Type tests, and/or analyses, or a combination of type tests and analyses of seismic Category I equipment identified in Table 2.7.6.3-1 will be performed using analytical assumptions, or will be performed under conditions, which bound the seismic design basis requirements.	5.ii A report exists and concludes that the The results of the type tests and/or analyses conclude that the seismic Category I equipment identified in Tables 2.7.6.3-1 can withstand seismic design basis loads without loss of safety function.
	5.iii Inspections and analyses will be performed to verify that theon the as-built seismic Category I equipment identified in Table 2.7.6.3-1, including anchorages, is seismically bounded by the tested or analyzed conditions.	5.iii A report exists and concludes that the as-built seismic Category I equipment identified in Table 2.7.6.3-1, including anchorages, The as-built equipment including anchorage is seismically bounded by the tested or analyzed conditions.
6. Each of tThe seismic Category I piping, including supports, identified in Table 2.7.6.3-2 is designed tocan withstand combined normal and seismic design basis loads without a loss of its safety function.	6.i Inspections will be performed to verify that the as-built seismic Category I piping, including supports, identified in Table 2.7.6.3-2 areis supported by a seismic Category I structure(s).	6.i Reports(s) document that each of tThe as-built seismic Category I piping, including supports, identified in Table 2.7.6.3-2 is supported by a seismic Category I structure(s).

	6.ii Inspections and analyses will be performed to verify~~for the existence of a report verifying~~ that the as-built seismic Category I piping, including supports, identified in Table 2.7.6.3-2 can withstand ~~combined normal and~~ seismic design basis loads without a loss of its safety function.	6.ii A report exists and concludes that ~~each of~~ the as-built seismic Category I piping, including supports, identified in Table 2.7.6.3-2 can withstand ~~combined normal and~~ seismic design basis loads without a loss of its safety function.
7.a ~~The~~ Class 1E equipment, identified in Table 2.7.6.3-1, is powered from its~~their~~ respective Class 1E division.	7.a A test will be performed on each division of the as-built Class 1E equipment identified in Table 2.7.6.3-1 by providing a simulated test signal only in the Class 1E division under test.	7.a The simulated test signal exists at the as-built Class 1E equipment identified in Table 2.7.6.3-1~~,~~ under test.
7.b Separation is provided between redundant divisions of SFPCS Class 1E ~~divisions~~cables, and between Class 1E ~~divisions~~cables and non-Class 1E cables.	7.b Inspections of the as-built Class 1E divisional cables will be performed.	7.b Physical separation or electrical isolation is provided in accordance with RG 1.75, between the as-built cables of redundant SFPCS Class 1E divisions and between Class 1E ~~divisions~~ cables and non-Class 1E cables.

Table 2.7.6.3-5 Spent Fuel Pit Cooling and Purification System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 4)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8. The SFPCS circulates the SFP water through the SFP heat exchangers to remove~~components identified in Table 2.7.6.3-1 remove~~ the decay heat generated by ~~the~~ spent fuel assemblies. ~~in the SFP during all plant operating conditions, including normal plant operating, abnormal and accident conditions.~~	8.a An ~~inspection for the existence of a report that~~analysis will be performed that determines the heat removal ~~capacity~~capability of the as-built SFP heat exchangers ~~will be performed~~.	8.a A report exists and concludes that the product of the overall heat transfer coefficient and the effective heat ~~exchanger~~transfer area, UA, of each ~~the~~ SFP heat exchanger~~s identified in Table 2.7.6.3-1 is greater than or equal to the design values for all plant operating conditions, including normal plant operating, abnormal and accident conditions~~ is ≥ 4.3 x 10^6 Btu/hr-°F.
	8.b Tests will be performed to confirm that the as-built SFP pumps can provide flow to the SFP heat exchangers.	8.b ~~The~~Each as-built SFP pump~~s identified in Table 2.7.6.3-1 are capable of achieving their design flow rate~~ delivers at least 3600 gpm to the SFP heat exchangers.
9. Alarms and displays~~MCR displays~~ identified~~of the parameters identified~~ in Table 2.7.6.3-3 ~~can be retrieved~~ are provided in the MCR.	9. Inspection~~s~~ will be performed for the retrievability of the ~~SFPCS parameters in the as-built~~alarms and displays identified in Table 2.7.6.3-3 in the as-built MCR.	9. Alarms and displays~~MCR displays~~ identified in Table 2.7.6.3-3 can be retrieved in the as-built MCR.
10. Alarms,~~RSC~~ displays, and controls ~~are~~ identified in Table 2.7.6.3-3 are provided in the RSC.	10.i Inspection~~s of the as-built~~ will be performed for retrievability of the alarms and displays identified in Table 2.7.6.3-3 in the as-built RSC~~ displays and controls will be performed~~.	10.i Alarms and ~~D~~displays identified in Table 2.7.6.3-3~~and controls exist on~~can be retrieved in the as-built RSC~~ as identified in Table 2.7.6.3-3~~.
	10.ii Tests of the as-built RSC control~~s~~ functions identified in Table 2.7.6.3-3 will be performed.	10.ii Controls in the as-built RSC~~exist to~~ operate the as-built equipment identified in Table 2.7.6.3-3 with an RSC control function ~~identified in Table 2.7.6.3-3.~~
11. Controls are provided ~~exist~~ in the MCR to start and stop the spent fuel pit pumps identified in Table 2.7.6.3-3.	11. Tests will be performed on the as-built spent fuel pit pumps identified in Table 2.7.6.3-3 using controls in the as-built MCR.	11. Controls ~~exist~~ in the as-built MCR ~~to~~ start and stop the as-built spent fuel pit pumps ~~listed~~ identified in Table 2.7.6.3-3.

12. The check valves, identified in Table 2.7.6.3-1 as having an active safety function, perform an active safety function to change position as indicated in the table.	12. Tests of the as-built check valves identified in Table 2.7.6.3 as having an active safety function will be performed under pre-operational test pressureflow, differential pressure, and temperature, and fluid flow conditions.	12. Each as-built check valve identified in Table 2.7.6.3 as having an active safety function changes position as indicated in Table 2.7.6.3-1 under pre-operational test conditions.



REMARK:
System Code~~name of valve number are~~ is omitted from valve numbers in this ~~drawing~~figure.
~~SFS-###-+++~~

Figure 2.7.6.3-1 Spent Fuel Pit Cooling and Purification System

2.7.6.4 Light Load Handling System

2.7.6.4.1 Design Description

System Purpose and Functions

The light load handling system (LLHS), which is located in the containment vessel and the fuel storage and handling area of the reactor building,. It consists of mechanical and electrical equipment and building structural features related to refueling operations. The LLHS equipment includes the refueling machine, the fuel handling machine, the new fuel elevator, the suspension hoist on the spent fuel cask handling crane, the fuel transfer tube, and the fuel transfer tube blind flange. The LLHS has interlock actuation annunciation lamps to visually prompt the operator with the interlock status. Additionally, movement of the fuel handling machine and refueling machine bridge is audibly signaled.This encompasses the fuel handling cycle from receipt of new fuel through loading of spent fuel into the spent fuel cask. All of the LLHS, except tThe safety related fuel transfer tube and blind flange ensure containment pressure boundary integrity when refueling operations are not being performed., is non-safety related. A B C D E

1. The LLHS is located in the fuel storage and handling area of the reactor building. The functional arrangement of the LLHS is as described in the Design Description of Subsection 2.7.6.4.1.and design characteristics of the LLHS are discussed below. F

2.a The seismic Category I equipment identified in Table 2.7.6.4-1 can withstand seismic design basis loads without the loss of safety function. G

2.b The seismic Category II LLHS equipment identified in Table 2.7.6.4-1 does not interact with seismic Category I SSCs during or following an SSE. H

3. The refueling machine utilizes electrical interlocks, limit switches, and mechanical stops to: I
   a) prevent damage to a fuel assembly due to inadvertent operation of the gripper controls
   b) assure appropriate radiation shielding depth below the water level in the refueling cavity, and
   c) monitor the fuel assembly load for imparted loads greater than the nominal weight of the fuel assembly.

4. The suspension hoist of the spent fuel cask handling crane is precluded from lifting a load greater than its rated capacity by a load limit interlock. J

5. The new fuel elevator winch has a load sensing device which prevents a fuel assembly from being raised. K

6. The fuel handling machine utilizes electrical interlocks, limit switches, and mechanical stops to: L

a) prevent damage to a fuel assembly due to inadvertent operation of the gripper controls L

b) assure appropriate radiation shielding depth below the water level in the spent fuel pit, and

c) Monitor the fuel assembly load for imparted loads greater than the nominal weight of the fuel assembly.

7. DELETED M

8. The fuel transfer tube is fabricated, installed and inspected in accordance with ASME Code Section III requirements. N

9. The fuel transfer tube is reconciled with the design requirements. O

10. Pressure boundary welds in the fuel transfer tube meet ASME Code Section III requirements for non-destructive examination of welds. P

Key Design Features

The LLHS equipment includes the refueling machine, the fuel handling machine, the new fuel elevator, the suspension hoist of the spent fuel cask handling crane, the fuel transfer tube, and the fuel transfer tube blind flange. Q

The fuel transfer tube blind flange assures the containment pressure boundary integrity outside of refueling operations R

Seismic and ASME Code Classifications

Table 2.7.6.4-1 shows the seismic Category classification of the LLHS. S

System Operation

The LLHS operation includes: T

- New Fuel Receipt – The new fuel shipping container is raised from the truck to the operating floor using the suspension hoist on the spent fuel cask handling crane. Using the suspension hoist, new fuel is removed from the shipping container and stored in the new fuel storage pit. U

- Reactor Refueling – The LLHS is used to remove irradiated fuel assemblies from the core and relocate them to the spent fuel pit. Partially used fuel and new fuel assemblies are then transferred and installed into their designated positions in the reactor core by the LLHS. V

- Spent Fuel Shipment – The fuel handling machine is used to lift the spent fuel assembly out of the spent fuel rack, transfer it across the SFP, and insert the assembly into the spent fuel cask. W

Alarms, Displays, and Controls

There are no main control room alarms, displays, or controls associated with the LLHS. The LLHS has interlock actuation annunciation lamps to visually prompt the operator of interlock status. Additionally, movement of the fuel handling machine and the refueling machine bridge is audibly signaled. X Y

Logic

The LLHS is designed such that following loss of control or power function, the load remains in a safe condition. Z

Interlocks

The refueling machine utilizes electrical interlocks, limit switches, and mechanical stops to: 1) prevent damage to a fuel assembly, 2) assure appropriate radiation shielding depth below the water level in the reactor cavity, and 3) monitor the fuel assembly load for imparted loads greater than the nominal weight of the fuel assembly. AA

The suspension hoist on the spent fuel cask handling crane (Subsection 2.7.6.5) has a load limit interlock. This interlock precludes the suspension hoist from lifting a load greater than its rated capacity. BB

The new fuel elevator winch has a load sensing device which prevents a fuel assembly from being raised. CC

Class 1E Electrical Power Sources and Divisions DD

Not applicable.

Equipment to be Qualified for Harsh Environments

Not applicable.

Interface Requirements

There are no safety-related interfaces with systems outside of the certified design.

Numeric Performance Values

Not applicable.

2.7.6.4.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.4-2 describes the ITAAC for the light load handling system. EE

Table 2.7.6.4-1 Light Load Handling System Characteristics

Name	Seismic Category
New Fuel Elevator	II
Suspension Hoist and Auxiliary Hoist on the Spent Fuel Cask Handling Crane	II
Refueling Machine	II
Fuel Handling Machine	II
Fuel Transfer Tube	I
Fuel Transfer Tube Blind Flange	I

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 36)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the LLHS is as described in the Design Description of Subsection 2.7.6.4.1.	1. Inspections of the as-built LLHS will be performed.	1. The as-built LLHS conforms to the functional arrangement as described in the Design Description of this Subsection 2.7.6.4.1.
2.a The seismic Category I LLHS equipment identified in Table 2.7.6.4-1 is designed tocan withstand seismic design basis loads without the loss of safety function.	2.a.i Inspections will be performed to verify that the as-built seismic Category I LLHS equipment identified in Table 2.7.6.4-1 is located in the reactor buildinga seismic Category I structure.	2.a.i The as-built seismic Category I LLHS equipment identified in Table 2.7.6.4-1 is located in the reactor buildinga seismic Category I structure.
	2.a.ii Type tests, and/or analyses or a combination of type tests and analyses of the seismic Category I equipment identified in Table 2.7.6.4-1 will be performed using analytical assumptions, or will be performed under conditions, which bound the seismic design basis requirements.	2.a.ii The results of the type test and/or analysesA report exists and concludes that the seismic Category I LLHS equipment identified in Table 2.7.6.4-1 can withstand seismic design basis loads without loss of safety function.
	2.a.iii Inspections and analysis will be performed to verify that on the as-built seismic Category I equipment identified in Table 2.7.6.4-1, including anchorages, is seismically bounded by the tested or analyzed conditions.	2.a.iii The as-builtA report exists and concludes that the as-built seismic Category I equipment identified in Table 2.7.6.4-1, including anchorages, is seismically bounded by the tested or analyzed conditions.

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2.b The seismic Category II LLHS ~~LLHS~~ equipment identified in Table 2.7.6.4-1 does not ~~are designed so that the SSE could not cause unacceptable structural~~ interact~~ion~~ with ~~or failure of with~~ seismic Category I SSCs during or following an SSE.	2.b A combination of inspections~~, tests~~ and~~/or~~ analyses ~~will be performed on~~ of the as-built seismic Category II LLHS equipment identified in Table 2.7.6.4-1 will be performed.	2.b A report exists and concludes that the as-built seismic Category II LLHS equipment identified in Table 2.7.6.4-1 ~~are designed so that the SSE could not cause unacceptable structural~~ does not interact~~ion or failure of~~ with seismic Category I SSCs during or following an SSE.

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3. The refueling machine utilizes electrical interlocks, limit switches, and mechanical stops to: a) prevent damage to a fuel assembly due to inadvertent operation of the gripper controls b) assure appropriate radiation shielding depth below the water level in the refueling~~reactor~~ cavity, and c) monitor the fuel assembly load for imparted loads greater than the nominal weight of the fuel assembly.	3.a) A ~~T~~test~~s~~ of the as-built ~~electrical interlocks, limit switches, and mechanical stops of the as-built~~ refueling machine will be performed by operating~~,~~ ~~including:~~ ~~a) Operating~~ the open controls of the gripper while suspending a dummy fuel assembly. ~~b) Attempting to raise a dummy fuel assembly above a preset height that is established to maintain adequate shielding depth below the water level in the refueling cavity.~~ 3.b.i) An analysis will be performed to determine the preset position of the limit switch to stop lifting of spent fuel to maintain shielding depth of water above a spent fuel assembly being handled in the refueling cavity. 3.b.ii) A test will be performed to verify that the as-built refueling machine stops lifting a dummy fuel assembly at the preset position. 3.c) A Test of the as-built refueling machine will be performed by a~~A~~ttempting to lift a dummy fuel assembly that is heavier than the nominal fuel assembly.	3.a) The gripper of the as-built refueling machine does not open while suspending a dummy fuel assembly.~~utilizes electrical interlocks, limit switches, and mechanical stops to:~~ ~~a) prevent damage to a fuel assembly due to inadvertent operation of the gripper controls.~~ ~~b) assure appropriate radiation shielding depth below the water level in the reactor cavity, and~~ 3.b.i) A report exists and concludes that the preset position of the limit switch maintains a shielding depth of water of 11’ -1” or greater, above a spent fuel assembly being handled in the refueling cavity. 3.b.ii) The as-built refueling machine stops lifting the dummy fuel assembly at the preset position determined by the analysis. 3.c) The as-built refueling machine ~~monitor~~ can not lift the load of the dummy fuel assembly that is heavier ~~load for imparted loads greater~~ than the nominal weight of the fuel assembly.

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4. The suspension hoist of the spent fuel cask handling crane is precluded from lifting a load greater than its rated capacity by a load limit interlock.	4. Test of the as-built spent fuel cask handling crane suspension hoist's load limit interlock will be performed.	4. The as-built spent fuel cask handling crane suspension hoist is precluded from lifting a load greater than its rated capacity of 2 metric tons.
5. The new fuel elevator winch has a load sensing device which prevents a fuel assembly from being raised.	5. Test of the as-built load sensing device on the new fuel elevator will be performed.	5. The as-built new fuel elevator ~~which~~ winch has a load sensing device which prevents a fuel assembly from being raised.

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6. The fuel handling machine utilizes electrical interlocks, limit switches, and mechanical stops to: a) prevent damage to a fuel assembly due to inadvertent operation of the gripper controls, b) assure appropriate radiation shielding depth below the water level in the reactor cavity.spent fuel pit, and. c) monitor the fuel assembly load for imparted loads greater than the nominal weight of the fuel assembly.	6.a) A Test of the as-built electrical interlocks, limit switches, and mechanical stops of the as-built fuel handling machine will be performed by operating, including: a) Operating the open controls of the gripper while suspending a dummy fuel assembly. b) Attempting to raise a dummy fuel assembly above a preset height. 6.b.i) An analysis will be performed to determine the preset position of the limit switch to stop lifting of spent fuel to maintain shielding depth of water above a spent fuel assembly being handled in the spent fuel pit. 6.b.ii) A test will be performed to verify that the as-built fuel handling machine stops lifting a dummy fuel assembly at the preset position. 6.c) A test of the as-built fuel handling machine will be performed by aAttempting to lift a dummy assembly that is heavier than the nominal fuel assembly.	6.a) The gripper of the as-built fuel handling machine does not open while suspending the dummy fuel assembly.utilizes electrical interlocks, limit switches, and mechanical stops to: a) prevent damage to a fuel assembly., b) assure appropriate radiation shielding depth below the water level in the reactor . 6.b.i) A report exists and concludes that the preset position of the limit switch maintains a shielding depth of water of 11’ -1” or greater, above a spent fuel assembly being handled in the spent fuel pit. 6.b.ii) The as-built fuel handling machine stops lifting the dummy fuel assembly at the preset position determined by the analysis. 6.c) The as-built fuel handling machine monitor can not lift the load of the dummy fuel assembly that is heavier load for imparted loads greater than the nominal weight of the fuel assembly.

Table 2.7.6.4-2 Light Load Handling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 6 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
7. ITAAC for fuel transfer tube: Refer to DCD Tier 1 Table 2.11.2-2, ITAAC Items 1, 2b, 3b, and 4b.DELETED		
8. The fuel transfer tube is fabricated, installed and inspected in accordance with ASME Code Section III requirements.	8. Inspection of the as-built fuel transfer tube will be performed.	8. 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 fuel transfer tube is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
9. The fuel transfer tube is reconciled with the design requirements.	9. A reconciliation analysis of the fuel transfer tube using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	9. The ASME Code Section III design report(s) (certified, when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the ASME Code, for the as-built fuel transfer tube. The report documents the results of the reconciliation analysis.
10. Pressure boundary welds in the fuel transfer tube meet ASME Code Section III requirements for non-destructive examination of welds.	10. Inspections of the as-built pressure boundary welds in the fuel transfer tube will be performed in accordance with the ASME Code Section III.	10. 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 fuel transfer tube.

2.7 Auxiliary Systems

2.7.6.6 Process Effluent Radiation Monitoring and Sampling System

2.7.6.6.1 Design Description

System Purpose and Functions C

The purpose and functions of the process effluent radiation monitoring and sampling system (PERMS) are:

- Sample, measure, control, and record the radioactivity levels of selected process streams within the plant and effluent streams released into the environment
- Actuate Activate alarms and control releases of radioactivity
- Provide data to keep exposure doses to workers ALARA
- Provide process data to support plant operation

The process and effluent radiological monitoring and sampling system is used to verify that releases to the environment are within the dose limit and the numerical guidelines of applicableThe performance of the PERMS in controlling and monitoring process and effluent streams is in accordance with the applicable NRC regulations. A

The Main Control Room (MCR) Outside Air Intake Radiation mMonitors are safety-related, while the remainder of the PERMS is non-safety--related.

The safety function of the MCR Outside Air Intake Radiation Mmonitors is that the detection of radioactivity levels in the stream exceeding the predetermined setpoints automatically activates signals to start the main control room isolation, and activates an alarm in the MCR for operator actions.

Location and Functional Arrangement C

The PERMS monitors are located in the R/B, the A/B, and the T/B. Table 2.7.6.6-1 provides information on the design characteristics of PERMS components. Information in the table is discussed below. B

Key Design Features

The key design features of the PERMS are reflected in the system design bases, which include: C

- Monitor the radioactivity in plant radiological effluents released to unrestricted areas during normal plant operations and anticipated operational occurrences (AOO).

- Provide state-of-the-art monitoring equipment, and controls to assure that doses in unrestricted areas from liquid and gaseous effluents are ALARA.

- Provide state-of-the-art monitoring equipment for the liquid and gaseous effluents from the plant systems to facilitate the preparation of annual release reports of nuclides to unrestricted areas.

- Provide operational data to minimize and/or prevent the contamination of the facility and of the environment.

- Control the release of liquid and gaseous effluents from the plant.

- Provide monitoring of radioactive waste systems to detect conditions that may result in excessive radiation levels.

- Provide monitoring of the containment atmosphere, the spaces containing components for recirculation of loss-of coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, AOOs, and during post-accident conditions. C

- Provide monitoring instruments to measure radiation levels and quantities of noble gases at key potential release points. Monitoring of radioactive iodine and particulates in gaseous effluents from all potential accident release points is provided.

- Provide monitoring capability for in-plant radiation and airborne radioactivity for a broad range of routine and accident conditions.

- Provide radiation monitoring capabilities to assure plant systems operate as they are designed and installed.

- Each division of the Class 1E radiation monitors identified in Table 2.7.6.6-1 is physically separated from the other divisions by a structural barrier, which also serves as a fire barrier. D

Seismic Classifications

The PERMS monitors with seismic classification are the MCR monitors and the containment radiation particulate monitor. E

System Operation

PERMS radiological monitoring instruments are provided for all effluent streams during normal operations, AOOs, and post-accident conditions. Likewise, PERMS monitoring is provided for the reactor containment atmosphere, the spaces containing components for recirculation of loss-of coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, AOOs, and during post-accident conditions. C

Alarms, Displays, and Controls

Monitoring and alarm data from the PERMS are transmitted to the MCR and made accessible to plant operators. F

Logic

When the MCR monitors detect radiation levels above predetermined setpoints, the emergency MCR HVAC system is actuated.

Interlocks C

When the MCR monitors detect radiation levels above predetermined setpoints, interlocks are activated to maintain the integrity of the MCR envelope.

Class 1E Electrical Power Sources and Divisions

As identified in Table 2.7.6.6-1, the MCR monitors are the only PERMS monitors that are powered from their respective Class 1E divisions. Separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cables. G

Equipment to be Qualified for Harsh Environments

As identified in Table 2.7.6.6-1, there are no PERMS monitors that need to be able to withstand the harsh environments.

Interface Requirements C

There are no safety-related interfaces with systems outside of the certified design.

Numeric Performance Values

No selected PERMS numerical performance values are used in the safety analyses.

1. The functional arrangement of the PERMS is as described in the Design Description of Subsection 2.7.6.6.1 and in Table 2.7.6.6-1. H

2. The seismic Category I radiation monitors identified in Table 2.7.6.6-1 can withstand seismic design basis loads without loss of safety function. I

3.a The Class 1E radiation monitors identified in Table 2.7.6.6-1 are powered from their respective Class 1E division. J

3.b Separation is provided between redundant divisions of PERMS Class 1E cables, and between Class 1E cables and non-Class 1E cables.

4. Each redundant division of the Class 1E radiation monitors identified in Table 2.7.6.6-1 is physically separated from the other divisions. K

5. Data and alarms, including power failure alarms, from the Class 1E monitors identified in Table 2.7.6.6-1 are provided in the main control room. L

2.7.6.6.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.6-2 describes the ITAAC for process effluent radiological monitoring and sampling system.

Table 2.7.6.6-1 Process Effluent Radiation Monitoring and Sampling System Equipment Characteristics (Sheet 1 of 2)

PERMS Monitor Name	Detector Number	Safety Related	Seismic Category I	Class 1E/ Harsh	Location
Containment Radiation Gas	RMS-RE-041	No	No	No/No	R/B
Containment Radiation Particulate	RMS-RE-040	No	Yes	No/No	R/B
Containment Low Volume Purge Radiation Gas	RMS-RE-023	No	No	No/No	R/B
Containment Exhaust Radiation Gas	RMS-RE-022	No	No	No/No	R/B
High Sensitivity Main Steam Line (N-16ch.)	RMS-RE-065A,B, 066A,B, 067A,B, 068A,B	No	No	No/No	R/B
Main Steam Line	RMS-RE-087, 088, 089, 090	No	No	No/No	R/B
Gaseous Radwaste Discharge	RMS-RE-072	No	No	No/No	A/B
Main Control Room Outside Air Intake Gas Radiation	RMS-RE-084A,B	Yes	Yes	Yes/No	R/B
Main Control Room Outside Air Intake Iodine Radiation	RMS-RE-085A,B	Yes	Yes	Yes/No	R/B
Main Control Room Outside Air Intake Particulate Radiation	RMS-RE-083A,B	Yes	Yes	Yes/No	R/B
TSC Outside Air Intake Gas Radiation	RMS-RE-101	No	No	No/No	A/B
TSC Outside Air Intake Iodine Radiation	RMS-RE-102	No	No	No/No	A/B
TSC Outside Air Intake Particulate Radiation	RMS-RE-100	No	No	No/No	A/B
CCW Radiation	RMS-RE-056A,B	No	No	No/No	R/B
Auxiliary Steam Condensate Water Radiation	RMS-RE-057	No	No	No/No	A/B
Primary Coolant Radiation	RMS-RE-070	No	No	No/No	R/B
Turbine Building Floor Drain Radiation	RMS-RE-058	No	No	No/No	T/B
SG Blowdown Water Radiation	RMS-RE-055	No	No	No/No	R/B
SG Blowdown Return Water Radiation	RMS-RE-036	No	No	No/No	A/B
Plant Vent Radiation Gas (Normal Range)	RMS-RE-021A,B	No	No	No/No	R/B
Plant Vent Extended Radiation Gas (Accident Mid Range)	RMS-RE-080A	No	No	No/No	R/B
Plant Vent Extended Radiation Gas (Accident High Range)	RMS-RE-080B	No	No	No/No	R/B
Condenser vacuum pump exhaust line radiation (Normal Range)	RMS-RE-043A,B	No	No	No/No	T/B

M

Table 2.7.6.6-1 Process Effluent Radiation Monitoring and Sampling System Equipment Characteristics (Sheet 2 of 2)

PERMS Monitor Name	Detector Number	Safety Related	Seismic Category I	Class 1E/ Harsh	Location
Condenser vacuum pump exhaust line radiation (Accident Mid Range)	RMS-RE-081A	No	No	No/No	T/B
Condenser vacuum pump exhaust line radiation (Accident High Range)	RMS-RE-081B	No	No	No/No	T/B
GSS exhaust fan discharge line radiation (Normal Range)	RMS-RE-044A,B	No	No	No/No	T/B
GSS exhaust fan discharge line radiation (Accident Mid Range)	RMS-RE-082A	No	No	No/No	T/B
GSS exhaust fan discharge line radiation (Accident High Range)	RMS-RE-082B	No	No	No/No	T/B
Liquid Radwaste Discharge	RMS-RE-035	No	No	No/No	A/B
ESW Radiation	RMS-RE-074A,B,C,D	No	No	No/No	R/B

M

Table 2.7.6.6-2 Process Effluent Radiation Monitoring and Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the PERMS is as described in the Design Description of Subsection 2.7.6.6.1 and in Table 2.7.6.6-1.	1. An inspection of the as-built PERMS will be performed.	1. The functional arrangement of the as-built PERMS conforms to the functional arrangement is as described in the Design Description of Subsection 2.7.6.6.1 and in Table 2.7.6.6-1.
2. The seismic Category I radiation monitors identified in Table 2.7.6.6-1 are designed to can withstand seismic design basis loads without loss of safety function.	2.i Inspections will be performed to verify that the as-built, seismic Category I radiation monitors, identified in Table 2.7.6.6-1, are located in a seismic Category I structure.	2.i The as-built seismic Category I radiation monitors identified in Table 2.7.6.6-1 are located in a seismic Category I structure.
	2.ii Type tests, and/or analyses analyses, or a combination of type tests and analyses of the seismic Category I radiation monitors identified in Table 2.7.6.6-1 will be performed using analytical assumptions, or will be performed under conditions which bound the seismic design basis requirements.	2.ii A report exists and concludes that the The seismic Category I radiation monitors identified in Table 2.7.6.6-1 can withstand seismic design basis loads without loss of safety function.
	2.iii An iInspections and analyses will be performed to verify that on the as-built seismic Category I radiation monitors identified in Table 2.7.6.6-1, including anchorages, are seismically bounded by the tested or analyzed conditions.	2.iii A report exists and concludes that Tthe as-built seismic Category I radiation monitors identified in Table 2.7.6.6-1, including anchorages, are seismically bounded by the tested or analyzed conditions.
3.a The Class 1E radiation monitors identified in Table 2.7.6.6-1 are powered from their respective Class 1E division.	3.a A test will be performed on each division of the as-built Class 1E radiation monitors identified in Table 2.7.6.6-1 by providing a simulated test signal only in the Class 1E division under test.	3.a The simulated test signal exists at the as-built Class 1E radiation monitors, identified in Table 2.7.6.6-1 ,under test.

Table 2.7.6.6-2 Process Effluent Radiation Monitoring and Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3.b Separation is provided between redundant divisions of PERMS Class 1E divisions cables, and between Class 1E divisions cables and non-Class 1E cables.	3.b Inspections of the as-built Class 1E divisional cables will be performed.	3.b Physical separation or electrical isolation is provided in accordance with RG 1.75, between the as-built PERMS cables of redundant Class 1E divisions and between Class 1E divisions cables and non-Class 1E cables.
4. Each redundant division of the Class 1E radiation monitors identified in Table 2.7.6.6-1 is physically separated from the other divisions.	4. Inspections of the as-built Class 1E radiation monitors of the PERMS will be performed.	4. Each redundant division of the as-built Class 1E radiation monitors identified in Table 2.7.6.6-1 is physically separated from other divisions by structural barriersin accordance with RG 1.75.
5. Data and alarms signals, including control logic, annunciation, and power failure alarms, from the Class 1E monitors identified in Table 2.7.6.6--1 are transmitted to provided in the main control roomMCR and made accessible to plant operators.	5. An inspection will be performed for retrievability of data and alarms in the as-built MCR.	5. The as-built data and alarms, signals, including control logic, annunciation, and power failure alarms, from the as-built Class 1E monitors identified in Table 2.7.6.6-1 are transmitted to can be retrieved in the as-built main control roomMCR and made accessible to plant operators.

2.7.6.7 Process and Post-accident Sampling System (PSS)

2.7.6.7.1 Design Description

System Purpose and Functions

TheseThe PSS systems contains equipment to collect representative samples of the various process fluids (liquid and gaseous) in a safe and convenient manner during normal and post-accident conditions and provides the means to monitor the unit and various system conditions using the collected and analyzed samples. These systems include sample lines, pressure reduction valves, sample heat exchangers, sampling units and automatic analysis equipment.

A

B

The PSS serves no safety function, and therefore has no safety design basis, except for providing containment isolation. The containment isolation function is described in Subsection 2.11.2.

Location and Functional Arrangement

C

The PSS is located in the auxiliary building, reactor building, access control building and turbine building.

1. The functional arrangement of the containment isolation capabilities of the PSS is as described in the Design Description of Subsection 2.7.6.7.1 and in Table 2.7.6.7-2, and as shown on in Figure 2.7.6.7-1.

D

Key Design Features

E

The PSS is designed to cool and depressurize samples collected at high temperature and high pressure, ensure that containment isolation is not violated while collecting samples following an accident. The PSS permits the collection of liquid and gas samples from various locations during normal plant operation.

The PSS is also designed to obtain post-accident liquid and gaseous samples following the accident for the purpose of analyzing the post accident conditions to augment the monitoring capability in the long term.

Seismic and ASME Code Classifications

F

The seismic and ASME code classifications of the containment isolation components and piping for the PSS are identified in Table 2.7.6.7-1 and Table 2.7.6.7-3. The ASME Code Section III requirements for system components and piping are also identified in Table 2.7.6.7-1 and Table 2.7.6.7-3. Pressure boundary welds in ASME Code Section III components and piping meet ASME Code Section III requirements.

2.a.i The ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

G

2.a.ii The ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 are reconciled with the design requirements. G

2.b.i The ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

2.b.ii The ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3 is reconciled with the design requirements.

3.a Pressure boundary welds in ASME Code Section III components identified in Table 2.7.6.7-1 meet ASME Code Section III requirements for non-destructive examination of welds. H

3.b Pressure boundary welds in ASME Code Section III piping identified in Table 2.7.6.7-3 meet ASME Code Section III requirements for non-destructive examination of welds.

4.a The ASME Code Section III components, identified in Table 2.7.6.7-1, retain their pressure boundary integrity at their design pressure.

4.b The ASME Code Section III piping, identified in Table 2.7.6.7-3, retains its pressure boundary integrity at its design pressure.

5.a The seismic Category I equipment identified in Table 2.7.6.7-1 can withstand seismic design basis loads without loss of safety function.

5.b The seismic Category I piping, including supports, identified in Table 2.7.6.7-3 can withstand seismic design basis loads without a loss of its safety function.

6.a The Class 1E equipment identified in Table 2.7.6.7-1 as being qualified for a harsh environment can 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. I

6.b Class 1E equipment, identified in Table 2.7.6.7-1, is powered from its respective Class 1E division. J

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

7. Deleted. X

8. The PSS provides the capability of obtaining reactor coolant and containment atmosphere samples. K

9. The motor operated valves, air-operated valves and check valves, identified in Table 2.7.6.7-1, perform an active safety function to change position as indicated in the table. L

10.a Controls are provided in the MCR to open and close the remotely operated valves identified in Table 2.7.6.7-1. M

10.b The valves identified in Table 2.7.6.7-1 as having PSMS control perform an active safety function after receiving a signal from PSMS. N

11. After loss of motive power, the remotely operated valves identified in Table 2.7.6.7-1 assume the indicated loss of motive power position.

12. Alarms and displays identified in Table 2.7.6.7-4 are provided in the MCR. O

13. Alarms, displays and controls identified in Table 2.7.6.7-4 are provided in the RSC. Y

~~**System Operation**~~

~~The PSS is manually initiated and adjusting the sample conditions for collecting the samples and collects the liquid and gaseous samples during normal operation and post accident.~~ P

~~**Alarms, Displays, and Controls**~~

~~The valves identified in table 2.7.6.7-1 as having PSMS control perform an active safety function after receiving a signal from PSMS. Table 2.7.6.7-4 identifies the alarms, displays and controls associated with the PSS that are located in the MCR.~~

~~**Logic**~~

~~The containment isolation valves in the PSS operate properly with receipt of a containment isolation signal as described in Subsection 2.11.1.~~

~~**Interlocks**~~

~~There are no interlocks needed for direct safety functions related to the PSS.~~

~~**Class 1E Electrical Power Sources and Divisions**~~

~~The PSS equipment identified in Table 2.7.6.7-1 as Class 1E is powered from their respective Class 1E divisions, and separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cable.~~

~~**Equipment to be Qualified for Harsh Environments**~~

~~The equipment identified in Table 2.7.6.7-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.~~

~~**Interface Requirements**~~

~~There are no safety-related interfaces with systems outside of the certified design.~~

~~**Numeric Performance Values**~~

~~Not applicable.~~

2.7.6.7.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.7-5 describes the ITAAC for process and post-accident sampling system.

The ITAAC associated with the PSS ~~equipment,~~ components, and piping ~~and~~ that comprise a portion of the CIS are described in Table 2.11.2-2.

Table 2.7.6.7-1 Process and Post-accident Sampling System Equipment Characteristics

Equipment Name	Tag No.	ASME Code Section III Class	Seismic Category I	Remotely Operated Valve	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
Isolation valves on RHR down stream of containment spray and residual heat removal heat exchanger	PSS-MOV-052A,B,C,D	2	Yes	Yes	Yes / No	—	Transfer Closed	As Is
Containment isolation valves inside CV on sample from RCS Hot Leg	PSS-MOV-013,023	2	Yes	Yes	Yes/Yes	Containment Isolation Phase A	Transfer Closed	As Is
Containment isolation valves outside containment on sample from RCS Hot Leg	PSS-MOV-031A,B	2	Yes	Yes	Yes/ No	Containment Isolation Phase A	Transfer Closed	As Is
Containment isolation valve outside CV on post-accident liquid sample return to containment sump	PSS-MOV-071	2	Yes	Yes	Yes/ No	Containment Isolation Phase A	Transfer Closed	As Is
Containment isolation valve inside CV on post-accident liquid sample return to containment sump	PSS-VLV-072	2	Yes	No	— / —	—	Transfer Closed	—
Containment isolation valve inside CV on gas sample from Pressurizer	PSS-AOV-003	2	Yes	Yes	Yes/Yes	Containment Isolation Phase A	Transfer Closed	Closed
Containment isolation valve inside CV on liquid sample from Pressurizer	PSS-MOV-006	2	Yes	Yes	Yes/Yes	Containment Isolation Phase A	Transfer Closed	As Is
Containment isolation valves inside CV on sample from Accumulator	PSS-AOV-062A,B,C,D	2	Yes	Yes	Yes /Yes	Containment Isolation Phase A	Transfer Closed	Closed
Containment isolation valve outside CV on sample from Accumulator	PSS-AOV-063	2	Yes	Yes	Yes /No	Containment Isolation Phase A	Transfer Closed	Closed

Note: Dash (-) indicates not applicable

Table 2.7.6.7-2 Process and Post-accident Sampling System Location of the Equipment

System and Components	Location
Isolation valves on RHR downstream of containment spray and residual heat removal heat exchanger	Reactor Building
Containment isolation valves inside CV on sample from RCS Hot Leg	Containment
Containment isolation valves outside containment on sample from RCS Hot Leg	Reactor Building
Containment isolation valve outside CV on post-accident liquid sample return to containment sump	Reactor Building
Containment isolation valve inside CV on post-accident liquid sample return to containment sump	Containment
Containment isolation valve inside CV on gas sample from Pressurizer	Containment
Containment isolation valve inside CV on liquid sample from Pressurizer	Containment
Containment isolation valves inside CV on sample from Accumulator	Containment
Containment isolation valve outside CV on sample from Accumulator	Reactor Building

Table 2.7.6.7-3 Process and Post-accident Sampling System Piping Characteristics

Pipe Line Name	ASME Code Section III Class	Seismic Category I
Accumulator sampling piping and valves from accumulator up to and including the outermost containment isolation valve PSS-AOV-063	2	Yes
Hot leg sampling piping and valves from hot leg up to and including the outermost containment isolation valve PSS-MOV-031A,B	2	Yes
Pressurizer liquid sampling piping and valves from hot leg up to and including the outermost containment isolation valve PSS-MOV-031A,B	2	Yes
Containment isolation valves PSS-MOV-071and PSS-VLV-072 and piping between them	2	Yes
RHS loop sampling piping and valves up to and including the valves PSS-MOV-052A,B,C,D	2	Yes

Table 2.7.6.7-4 Process and Post-accident Sampling System Equipment Alarms, Displays, and Control Functions

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
Containment isolation valve inside CV on gas sample from Pressurizer (PSS-AOV-003)	No	Yes	Yes	Yes
Containment isolation valve inside CV on liquid sample from Pressurizer (PSS-MOV-006)	No	Yes	Yes	Yes
Containment isolation valves inside CV on sample from RCS Hot Leg (PSS-MOV-013, 023)	No	Yes	Yes	Yes
Containment isolation valves outside containment on sample from RCS Hot Leg (PSS-MOV-031 A,B)	No	Yes	Yes	Yes
Containment isolation valves inside CV on sample from Accumulator (PSS-AOV-062A,B,C,D)	No	Yes	Yes	Yes
Containment isolation valve outside CV on sample from Accumulator (PSS-AOV-063)	No	Yes	Yes	Yes
Containment isolation valve outside CV on post-accident liquid sample return to containment sump (PSS-MOV-071)	No	Yes	Yes	Yes
Isolation valves on RHR down stream of containment spray and residual heat removal heat exchanger (PSS-MOV-052A,B,C,D)	No	Yes	Yes	Yes

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the PSS is as described in the Design Description of Subsection 2.7.6.7.1 and in Table2.7.6.7-2 and as shown in Figure 2.7.6.7-1.	1. ~~An i~~Inspection of the as-built PSS will be performed.	1. The as-built PSS conforms ~~with~~ to the functional arrangement as described in Design Description of ~~this~~ Subsection 2.7.6.7.1 and in Table 2.7.6.7-2 and as shown in Figure 2.7.6.7-1.
2.a.i The ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	2.a.i ~~An i~~Inspection of the as-built ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 will be performed.	2.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 PSS identified in Table 2.7.6.7-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.a.ii The ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 are reconciled with the design requirements.	2.a.ii A reconciliation analysis of the components identified in Table 2.7.6.7-1 using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	2.a.ii The ASME Code Section III design report(s) (certified, when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the ASME Code, for the as-built ASME Code Section III components of the PSS identified in Table 2.7.6.7-1. ~~the as-built ASME Code Section III components of the PSS identified in Table 2.7.6.7-1 are reconciled with the design requirements~~. The report documents the results of the reconciliation analysis.

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2.b.i The ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements	2.b.i ~~An i~~Inspection of the as-built ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3, will be performed.	2.b.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 piping of the PSS, including supports, identified in Table 2.7.6.7-3 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.b.ii The ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3 is reconciled with the design requirements	2.b.ii A reconciliation analysis of the piping of the PSS, including supports, identified in Table 2.7.6.7-3, using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	2.b.ii The ASME Code Section III design report(s) (certified when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the ASME Code, for the as-built ASME Code Section III piping of the PSS, including supports, identified in Table 2.7.6.7-3~~ is reconciled with the design requirements~~. The report documents the results of the reconciliation analysis.
3.a Pressure boundary welds in ASME Code Section III components identified in Table 2.7.6.7-1 meet ASME Code Section III requirements for non-destructive examination of welds.	3.a Inspections of the as-built pressure boundary welds identified in ASME Code Section III components identified in Table 2.7.6.7-1, will be performed in accordance with the ASME Code Section III.	3.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 2.7.6.7-1.

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3.b Pressure boundary welds in ASME Code Section III piping identified in Table 2.7.6.7-3 meet ASME Code Section III requirements for non-destructive examination of welds.	3.b Inspections of the as-built pressure boundary welds in ASME Code Section III piping identified in Table 2.7.6.7-3 will be performed in accordance with the ASME Code Section III.	3.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 2.7.6.7-3.
4.a The ASME Code Section III components, identified in Table 2.7.6.7-1, retain their pressure boundary integrity at their design pressure.	4.a A Hhydrostatic tests will be performed on the as-built components, identified in Table 2.7.6.7-1, required by the ASME Code Section III to be hydrostatically tested.	4.a ASME Code Data Report(s) exist and conclude that Tthe results of the hydrostatic tests of the as-built components identified in Table 2.7.6.7-1 as ASME Code Section III conform with to the requirements of the ASME Code Section III.
4.b The ASME Code Section III piping, identified in Table 2.7.6.7-3, retains its pressure boundary integrity at its design pressure.	4.b A Hhydrostatic tests will be performed on the as-built piping, identified in Table 2.7.6.7-3, required by the ASME Code Section III to be hydrostatically tested.	4.b ASME Code Data Report(s) exist and conclude that Tthe results of the hydrostatic tests of the as-built piping identified in Table 2.7.6.7-3 as ASME Code Section III conform towith the requirements of the ASME Code Section III.
5.a The seismic Category I equipment identified in Table 2.7.6.7-1 is designed tocan withstand seismic design basis loads without loss of safety function.	5.a.i Inspections will be performed to verify that the seismic Category I as-built seismic Category I equipment identified in Table 2.7.6.7-1, is located in the located in containment or the reactor buildinga seismic Category I structure.	5.a.i The as-built seismic Category I as-built equipment identified in Table 2.7.6.7-1 is located in the containment or the reactor buildinga seismic Category I structure(s).

	5.a.ii Type tests, ~~and/or~~ analyses, or a combination of type tests and analyses of the seismic Category I equipment identified in Table 2.7.6.7-1 will be performed using analytical assumptions, or will be performed under conditions, which bound the seismic design basis requirements.	5.a.ii A report exists and ~~The results of the type tests and/or analyses~~ concludes that the seismic Category I equipment identified in Table 2.7.6.7-1 can withstand seismic design basis loads without loss of safety function.
	5.a.iii Inspections and analyses will be performed to verify that the as-built seismic Category I equipment identified in Table 2.7.6.7-1, including anchorages, is seismically bounded by the tested or analyzed conditions. ~~on the as-built equipment including anchorage.~~	5.a.iii A report exists and concludes that ~~T~~the as-built seismic Category I equipment identified in Table 2.7.6.7-1, including anchorages, is seismically bounded by the tested or analyzed conditions.

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.b Each of tThe seismic Category I piping, including supports, identified in Table 2.7.6.7-3 is designed tocan withstand combined normal and seismic design basis loads without a loss of its safety function.	5.b.i Inspections will be performed to verify that the as-built seismic Category I piping, including supports, identified in Table 2.7.6.7-3 are is supported by a seismic Category I structure(s).	5.b.i Reports(s) document that each of tThe as-built seismic Category I piping, including supports, identified in Table 2.7.6.7-3 is supported by a seismic Category I structure(s).
	5.b.ii Inspections and analyses will be performed for the existence of a reportto verifying that the as-built seismic Category I piping, including supports, identified in Table 2.7.6.7-3 can withstand combined normal and seismic design basis loads without a loss of its safety function.	5.b.ii A report exists and concludes that each of the as-built seismic Category I piping, including supports, identified in Table 2.7.6.7-3 can withstand combined normal and seismic design basis loads without a loss of its safety function.
6.a The Class 1E equipment identified in Tables 2.7.6.7-1 as being qualified for a harsh environment is designed tocan withstand the environmental conditions that would exist before, during, and following a design basis event accident without loss of safety function for the time required to perform the safety function.	6.a.i Type tests and/oror a combination of type tests and analyses using the design environmental conditions, or under the conditions which bound the design environmental conditions, will be performed on the Class 1E equipment identified in Table 2.7.6.7-1 as being qualified forlocated in a harsh environment.	6.a.i The results of the type tests A report exists and/or analyses concludes that the Class 1E equipment identified in Table 2.7.6.7-1 as being qualified for a harsh environment withstands the environmental conditions that would exist before, during, and following a design basis event accident without loss of their safety function, for the time required to perform the safety function.

	6.a.ii An iInspection will be performed on of the as-built Class 1E equipment identified in Table 2.7.6.7-1 as being qualified for a harsh environment and the associated wiring, cables, and terminations located in a harsh environment.	6.a.ii The as-built Class 1E equipment and the associated wiring, cables, and terminations identified in Table 2.7.6.7-1 as being qualified for a harsh environment are bounded by type tests, and/oror a combination of type tests and analyses.
6.b The Class 1E equipment, identified in Table 2.7.6.7-1 is powered from their its respective Class 1E division.	6.b A test will be performed on each division of the as-built Class 1E equipment identified in Table 2.7.6.7-1 by providing a simulated test signal only in the Class 1E division under test.	6.b The simulated test signal exists at the as-built Class 1E equipment, identified in Table 2.7.6.7-1, under test.

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.c Separation is provided between redundant divisions of PSS Class 1E divisionscables, and between Class 1E divisions cables and non-Class 1E cables.	6.c Inspections of the as-built Class 1E divisional cables will be performed.	6.c Physical separation or electrical isolation is provided in accordance with RG 1.75, between the as-built cables of redundant PSS Class 1E divisions and between Class 1E divisions cables and non-Class 1E cables.
7. Deleted.	7. Deleted.	7. Deleted.
8. The PSS provides the non safety-related function of providing the capability of obtaining reactor coolant and containment atmosphere samples.	8. Tests of the as-built system will be performed to obtain samples of the reactor coolant and containment atmosphere.	8. The as-built PSS provides the non-safety related function of providing the capability of obtainsing reactor coolant and containment atmosphere samples.

9. The motor-operated valves, air-operated valves and check valves, identified in Table 2.7.6.7-1 as having an active safety function perform an active safety function to change position as indicated in the table.	9.i Type ~~T~~tests or a combination of type tests and analyses of the ~~remotely~~ motor-operated valves and air-operated valves identified in Table 2.7.6.7-1 as having an active safety function will be performed that demonstrate the capability of the valve to operate under its design conditions.	9.i A report exists and concludes that ~~E~~each ~~remotely operated~~ motor-operated valve and air-operated valve identified in Table 2.7.6.7-1 as having an active safety function changes position as identified ~~indicated~~ in Table 2.7.6.7-1 under design conditions.
	9.ii Tests of the as-built ~~remotely~~ motor-operated valves and air-operated valves identified in Table 2.7.6.7-1 as having an active safety function will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.ii Each as-built ~~remotely operated~~ motor-operated valve and air-operated valve identified in Table 2.7.6.7-1 as having an active safety function changes position as ~~indicated~~ identified in Table 2.7.6.7-1 under ~~the~~ pre-operational test conditions.
	9.iii Inspections will be performed of the as-built motor-operated and air operated valves identified in Table 2.7.6.7-1 as having an air-active safety function.	9.iii Each as-built motor-operated and air-operated valve identified in Table 2.7.6.7-1 as having an active safety function is bounded by the type tests, or a combination of type tests and analyses.
	9.~~ii~~iv Tests of the as-built check valves ~~with active safety functions~~ identified in Table 2.7.6.7-1 as having an active safety function will be performed under preoperational test pressure, temperature, and fluid flow conditions.	9.~~ii~~iv Each as-built check valve identified in Table 2.7.6.7-1 as having an active safety function changes position as indicated in Table 2.7.6.7-1.

Table 2.7.6.7-5 Process and Post-accident Sampling System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 6 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
10.a Controls ~~exist~~ are provided in the MCR to open and close the remotely operated valves identified in Table 2.7.6.7-1.	10.a Tests will be performed on the as-built remotely operated valves identified in Table 2.7.6.7-1 using the controls in the as-built MCR.	10.a Controls ~~exist~~ in the as-built MCR ~~to~~ open and close the as-built remotely operated valves identified in Table 2.7.6.7-1.
10.b The valves identified in Table 2.7.6.7-1 as having PSMS control perform an active safety function after receiving a signal from PSMS.	10.b Tests will be performed on the as-built remotely operated valves listed in Table 2.7.6.7-1 as having PSMS control using simulated signals.	10.b The as-built remotely operated valves identified in Table 2.7.6.7-1 as having PSMS control, perform the active function identified in the table after receiving a simulated signal.
11. After loss of motive power, the remotely operated valves identified in Table 2.7.6.7-1 assume the indicated loss of motive power position.	11. Tests of the as-built remotely operated valves identified in Table 2.7.6.7-1 will be performed under the conditions of loss of motive power.	11. ~~After~~ Upon loss of motive power, each as-built remotely operated valve identified in Table 2.7.6.7-1 assumes the indicated loss of motive power position.
12. ~~MCR a~~Alarms and displays ~~of the parameters~~ identified in Table 2.7.6.7-4 ~~can be retrieved~~are provided in the MCR.	12. Inspection~~s~~ will be performed for retrievability of the ~~PSS parameters~~alarms and displays identified in Table 2.7.6.7-4 in the as-built MCR.	12. ~~MCR a~~Alarms and displays identified in Table 2.7.6.7-4 can be retrieved in the as-built MCR.
13. ~~RSC a~~Alarms, displays, and controls ~~are~~ identified in Table 2.7.6.7-4 are provided in the RSC.	13.i Inspection~~s~~ will be performed for retrievability of the ~~as-built RSC~~ alarms and ~~,~~ displays identified in Table 2.7.6.7-4 in the as-built RSC.~~and controls will be performed.~~	13.i Alarms and~~,~~ displays identified in Table 2.7.6.7-4 can be ~~and controls exist on~~ retrieved in the as-built RSC~~ as identified in Table 2.7.6.7-4~~.
	13.ii Tests of the as-built RSC control functions identified in Table 2.7.6.7-4 will be performed.	13.ii Controls in the as-built RSC operate the as-built equipment identified in Table 2.7.6.7-4 with an RSC control function.

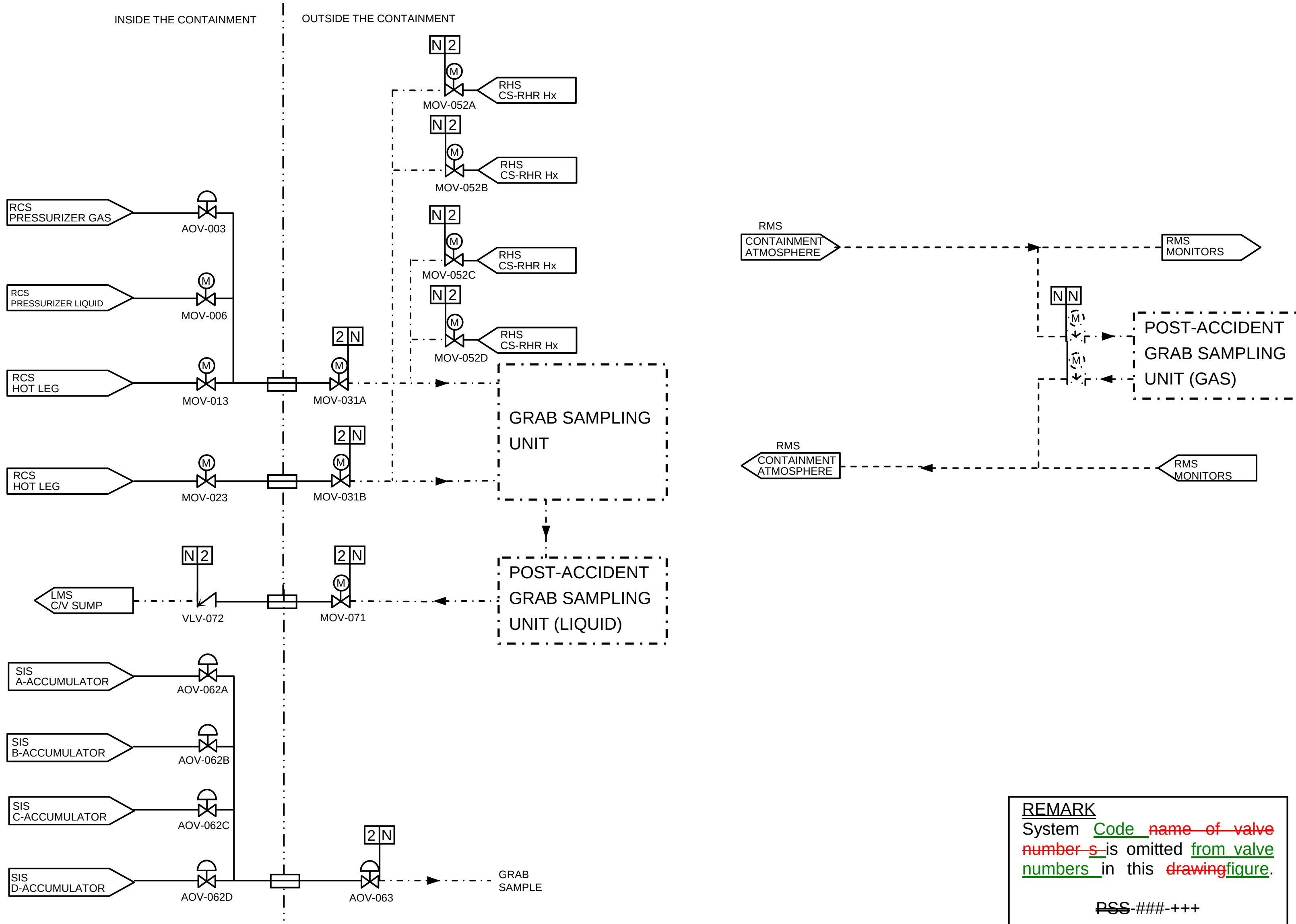


Figure 2.7.6.7-1 Process and Post-accident Sampling System

2.7 Auxiliary Systems

2.7.6.8 Equipment and Floor Drainage Systems

2.7.6.8.1 Design Description

~~**System purpose and functions**~~

The equipment and floor drainage systems are not safety-related systems with exception of ~~for~~ the isolation valves ~~installed~~ in the drainage piping from engineered safety features (ESF) equipment rooms. ~~The equipment and floor drainage systems collect liquid waste from equipment and floor drains during all modes of operation.~~ The equipment and floor drainage systems collect liquid waste from equipment and floor drains ~~during all modes of operation~~in the containment vessel (C/V), the auxiliary building (A/B), the reactor building (R/B), the power source building (PS/B), the turbine building (T/B), and the access building (AC/B), separate the contaminated effluents and transfer them to the ~~proper~~ processing and disposal systems. ~~The systems are designed to prevent flooding and excess water accumulation due to backflow.~~ Radioactive contamination in the T/B sump is detected by a radiation monitor in the sump discharge and alarmed in the main control room.

A B C D

~~**Location and Functional Arrangement**~~

~~The equipment and floor drains include drains of the containment vessel (C/V), the auxiliary building (A/B), the reactor building (R/B), the power source building (PS/B), the turbine building (T/B), and the access building (AC/B). Floor drains and equipment drains are piped from plant equipment to the collection sumps, where sump pumps, piping, and instrumentation connect to the waste water system (WWS), for non-radioactive drainage, and the liquid waste management system (LWMS), for radioactive drainage. The functional arrangement of the equipment and floor drain system is shown on Figure 2.7.6.8-1.~~

E F

~~**Key Design Features**~~

The drain systems from ESF equipment rooms are designed to detect a flooded condition and to prevent flooding due to backflow by the virtue of a difference in elevation of the ESF equipment rooms and the collection sump. Additionally, isolation valves are ~~also~~ provided on the ESF equipment rooms drainage piping in order to protect against flooding due to backflow. A common alarm in the main control room is provided for indication of a flooded condition.

G

~~Equipment and floor drainage systems failures do not prevent the proper function of any safety-related equipment.~~

H

~~Equipment and floor drainage is classified and segregated by type, being (1) radioactive liquid waste, (2) non-radioactive liquid waste, (3) chemical and detergent liquid waste, and (4) oily liquid waste.~~

I

The drain systems are designed with no cross-connection between the radioactive and non-radioactive drainage system to prevent contamination due to possible backflow. I

Seismic and ASME Code Classifications

The seismic Category I and ASME code Section III requirements are applied to these isolation valves installed in the drainage piping from engineered safety features (ESF) equipment rooms. J

System Operation

Liquid wastes is directed and collected to tanks or sumps in their respective buildings. The radioactive waste is discharged to the LWMS for further processing prior to release to the environment. K

Alarms, Displays, and Controls

The radioactive contamination in the T/B sump is detected by a radiation monitor in the sump discharge and alarmed in the main control room. T/B sump discharge radiation instrumentation and controls automatically divert flow from the waste water system to the LWMS on a pre-determined radiation set point. Furthermore ESF equipment rooms have provisions for detection of a flooded condition to provide indication in the main control room. A common alarm in the main control room is provided indication of a leak. L

Logic

There is no logic needed for direct safety functions related to the equipment and floor drainage systems.

Interlocks

There are no interlocks needed for direct safety functions related to the equipment and floor drainage systems.

Class 1E Power Sources and Divisions

Not applicable. M

Equipment to be Qualified for Harsh Environments

Not applicable.

Interface Requirements

There are no safety-related interfaces with systems outside of the certified design.

Numeric Performance Values

Not applicable.

1. The functional arrangement of the equipment and floor drainage systems is as described in the Design Description of Subsection 2.7.6.8.1, and as shown in Figure 2.7.6.8-1.

2. Alarms identified in Subsection 2.7.6.8.1 are provided in the MCR.

3. Flow from the T/B sump is isolated when the T/B sump discharge radiation monitor setpoint is reached.

4. The seismic Category I drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 can withstand seismic design basis loads without loss of safety function.

5.a Deleted.

5.b Deleted.

6.a The ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

6.b The ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are reconciled with the design requirements.

2.7.6.8.2 Inspections, Tests, Analyses, and Acceptance Criteria~~.~~

Table 2.7.6.8-1 describes the ITAAC for the equipment and floor drainage systems.

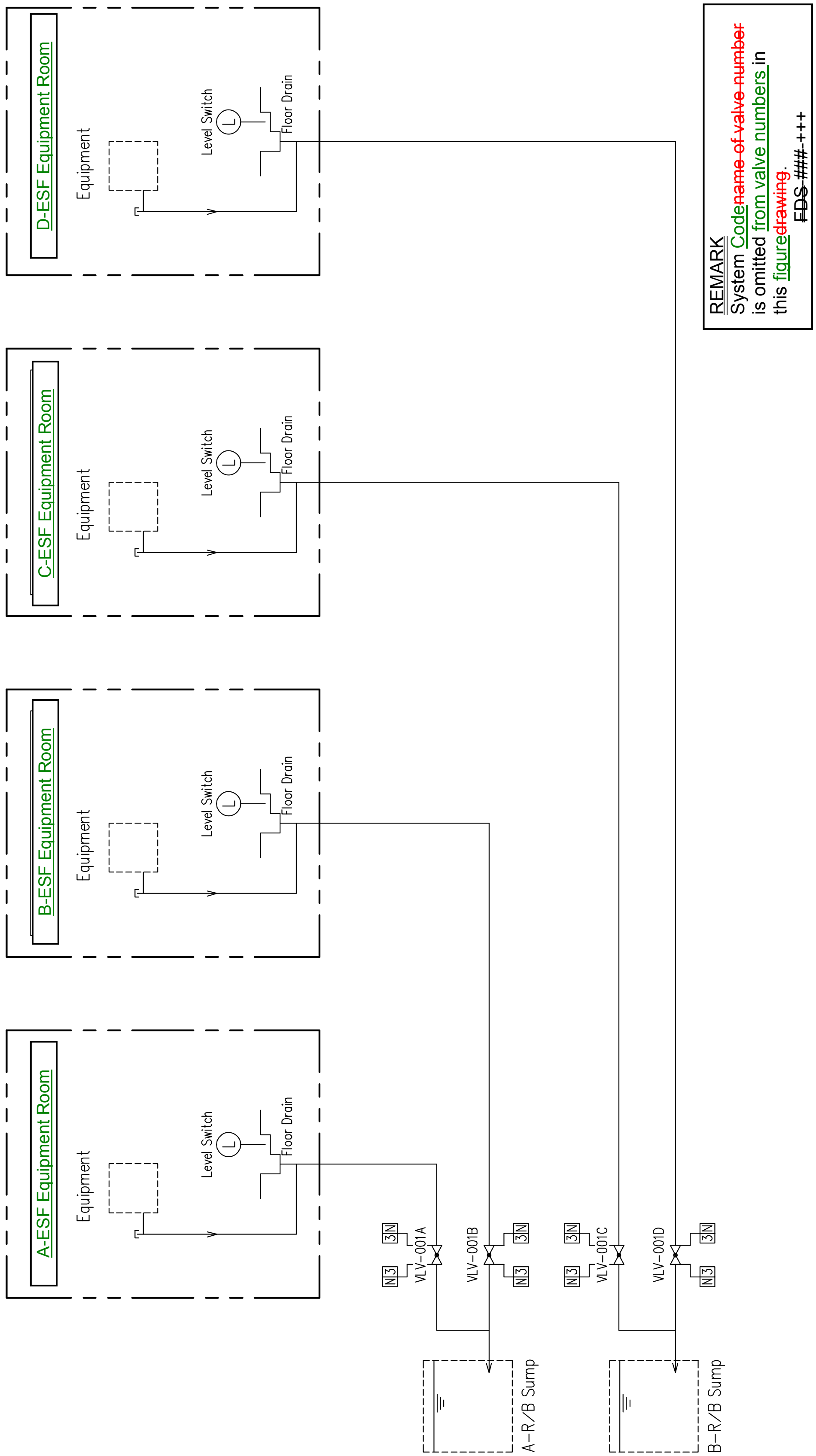
Table 2.7.6.8-1 Equipment and Floor Drainage Systems Inspections ,Tests , Analyses and Acceptance Criteria (Sheet 1 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the equipment and floor drainage systems is as described in the Design Description of Subsection 2.7.6.8.1, and as shown ~~on~~ in Figure 2.7.6.8-1.	1. Inspection~~s~~ of the as-built equipment and floor drainage systems will be performed.	1. The as-built equipment and floor drainage systems conform to the functional arrangement as described in the Design Description of Subsection 2.7.6.8.1, and as shown ~~on~~ in Figure 2.7.6.8-1.
2. ~~MCR a~~Alarms ~~provided for the equipment and floor drainage systems are defined~~ identified in Subsection 2.7.6.8.1 are provided in the MCR.	2. Inspection~~s~~ will be performed ~~on the~~ for retrievability of the alarms identified in Subsection 2.7.6.8.1 in the as-built MCR ~~alarms for the equipment and floor drainage systems~~.	2. ~~The as-built a~~Alarms identified in Subsection 2.7.6.8.1 can be retrieved ~~exist~~ in the as-built MCR ~~as defined in Subsection 2.7.6.8~~.
3. Flow from the T/B sump is ~~designed to divert from the waste water system to the LWMS~~ isolated when the T/B sump discharge radiation monitor setpoint is reached.	3. A test will be performed on the as-built T/B sump discharge ~~flow divert~~ valve ~~function of the as-built Equipment and Floor Drainage Systems~~using a simulated signal.	3. ~~When~~ Upon receipt of a simulated ~~the as-built~~ T/B sump discharge radiation monitor signal~~setpoint is reached~~, ~~flow~~ the as-built T/B sump discharge valve closes~~diverts from the as-built waste water system to the LWMS~~.
4. The seismic Category I drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 ~~are designed to~~ can withstand seismic design basis loads without loss of safety function.	4.a Inspections will be performed to verify that the as-built seismic Category I ~~as-built~~ ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1 are located in ~~the drain lines from the ESF equipment rooms.~~ a seismic Category I structure.	4.a The as-built seismic Category I ~~as-built~~ ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1 are located in a seismic Category I structure~~the drain lines from the ESF equipment rooms~~.
	4.b Type tests, ~~and/or~~ analyses, or a combination of type tests and analyses of the seismic Category I ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1 will be performed using analytical assumptions, or will be performed under conditions which bound the seismic design basis requirements.	4.b A report exists and ~~The results of the type tests and/or analyses~~ concludes that the seismic Category I ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1~~equipment~~ can withstand seismic design basis loads without loss of safety function.

	4.c Inspections and analyses will be performed to verify that on the as-built seismic Category I ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1, including anchorages, are seismically bounded by the tested or analyzed conditions.	4.c A report exists and concludes that Tthe as-built seismic Category I ESF equipment rooms drain isolation valves identified in Figure 2.7.6.8-1, including anchorage, are seismically bounded by the tested or analyzed conditions.
5.a Controls exist in the MCR to close the remotely operated drain isolation valves, identified in Subsection 2.7.6.8.1, from the ESF equipment roomsDeleted.	5.a DeletedTests will be performed on the as-built remotely operated drain isolation valves from the ESF equipment rooms using controls in the as-built MCR.	5.a DeletedControls exist in the as-built MCR to close the as-built remotely operated drain isolation valves, identified in Subsection 2.7.6.8.1, from the ESF equipment rooms.

Table 2.7.6.8-1 Equipment and Floor Drainage Systems Inspections ,Tests , Analyses and Acceptance Criteria (Sheet 2 of 2)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.b DeletedAlarms and displays of the remotely operated drain isolation valves, identified in Subsection 2.7.6.8.1, from the ESF equipment rooms can be retrieved from the MCR.	5.b DeletedInspections will be performed for retrievability of the alarms and displays in the as-built MCR.	5.b DeletedAlarms and displays of the parameters for the remotely operated drain isolation valves, identified in Subsection 2.7.6.8.1, from the ESF equipment room can be retrieved from the as-built MCR.
6.a The ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	6.a An iInspection of the as-built ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 will be performed.	6.a 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 drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
6.b The ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are reconciled with the design requirements.	6.b A reconciliation analysis of the drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 components using as-designed and as-built information and ASME Code Section III design report(s) (NCA-3550) will be performed.	6.b The ASME Code Section III design report(s) (certified, when required by ASME Code) exist and conclude that design reconciliation has been completed in accordance with the as-built ASME Code, Section III for the as-built ASME Code Section III drain isolation valves from the ESF equipment rooms identified in Figure 2.7.6.8-1 are reconciled with the design documents. The report documents the results of the reconciliation analysis.



U

Figure 2.7.6.8-1 Equipment and Floor Drain System Flow Schematic

2.7 Auxiliary Systems

2.7.6.10 Communication Systems

2.7.6.10.1 Design Description

System Purpose and Functions

The plant's communication systems are not safety related. The communication systems provide for effective interplant intra-plant and plant-to-offsite communications during normal, transient, fire, accidents, off-normal phenomena (e.g., loss of offsite power), and security related events.

A

Location and Functional Arrangement

The following locations within the US-APWR facility contain communication system arrangements:

- Reactor building (R/B) and containment structure
- Turbine building (T/B)
- Power source building (PS/B)
- Auxiliary building (A/B)
- Access buildings (AC/B)

The US-APWR communication systems consist of the following physically independent systems:

- Public address system/page
- Telephone system
- Sound powered telephone system (SPTS)
- Plant radio system
- Offsite communications system including emergency communication systems
- Plant security communication systems

B

1. The functional arrangement of the communication systems is as described in the Design Description of Subsection 2.7.6.10.1.

C

2. The means exists for communications among the MCR, TSC, EOF, principal State and local emergency operations centers, and radiological field assessment teams.

3. The means exist for communications are provided from the MCR, TSC, and EOF to the NRC headquarters and regional office emergency operations centers, (including establishment of the emergency response data system (ERDS) [or its successor system] between the onsite computer system and the NRC Operations Center). D

4. Deleted. E

Key Design Features

Depending on the specific installed plant location, the selected components are qualified to operate in environments, as applicable.

The plant communication systems are arranged in a redundant fashion to provide for a minimum of two verbal communication paths between all plant locations as well as external communications.

The plant communication systems are independent of each other and either have a built-in dc battery power source (e.g., portable radios) or are powered from non-safety related uninterruptible power supply (UPS) systems. F

Seismic and ASME Code Classifications

Not applicable.

System Operation

The plant communication systems are used for conveying verbal information as well as facsimile transmissions and digital based communications. Emergency telephones are color-coded to distinguish them from normal telephones.

Interfaces Requirements

There are no safety-related interfaces with systems outside of the certified design.

2.7.6.10.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.10-1 provides the inspections, tests, analyses, and associated acceptance criteria for the Communication Systems.

Table 2.12-1 provides the inspections, tests, analyses, and acceptance criteria for the Physical Security communications systems. G

Table 2.7.6.10-1 Communication Systems Inspections ,Tests ,Analyses and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the communication systems is as described in the dDesign dDescription of this Subsection 2.7.6.10.1.	1. Inspection of the as-built communication systems will be performed.	1. The as-built communication systems conform with to the functional arrangement as described in the Design Description of Subsection 2.7.6.10.1.
2. The means exists for communications among the MCR, TSC, EOF, principal State and local emergency operations centers, and radiological field assessment teams.	2. A test of the as-built communication systems will be performed.	2. The as-built communications are established among the as-built MCR, TSC, EOF, principal State and local emergency operations centers, and radiological field assessment teams.
3. The means exist for communications from the MCR, TSC, and EOF to the NRC headquarters and regional office emergency operations centers, (including establishment of the emergency response data system (ERDS) [or its successor system] between the onsite computer system and the NRC Operations Center).	3. A test of the as-built communication systems will be performed.	3. The as-built communications are established from the as-built MCR, TSC and EOF to the NRC headquarters and regional office emergency operations centers, and an access port for ERDS [or its successor system] the emergency response data system is provided.
4. TSC has voice communication systems.Deleted.	4. Inspections of the as-built TSC voice communication systems will be performed.Deleted.	4. The as-built TSC voice communication equipment is installed, and voice transmission and reception are accomplished.Deleted.

2.7 Auxiliary Systems

2.7.6.13 Area Radiation and Airborne Radioactivity Monitoring Systems

2.7.6.13.1 Design Description

2.7.6.13.1.1 Area Radiation Monitoring System

~~**System Purpose and Functions**~~

The ~~purpose and functions~~design objectives of the area radiation monitoring system (ARMS) are: A

- To record radiation levels in specific areas of the plant
- To warn of uncontrolled or inadvertent movement of radioactive material in the plant
- To provide local and remote indication of ambient gamma radiation and local and remote alarms at key points where substantial change in radiation levels might be of immediate importance to personnel in the area
- To furnish information for making radiation surveys
- To provide the capability to alarm and initiate a containment ventilation isolation signal in the event of a LOCA or abnormally high radiation inside the containment. B
- To provide long-term post-accident monitoring

By meeting the above objectives, the ARMS aids ~~health physics~~ plant personnel in keeping radiation exposures as low as reasonably achievable (ALARA). C

The containment high range area monitors are safety-related, while the remainder of the ARMS is non-safety-related. The safety function of ARMS is the isolation of the containment ventilation system when a high radiation alarm is given by the containment high range area monitors.

~~**Location and Functional Arrangement**~~

The ARMS monitors are located at selected locations throughout the plant to detect, indicate, and store radiation level information through their associated data processing module and, if necessary, annunciate abnormal radiation conditions. Area radiation monitors are installed in locations identified in Table 2.7.6.13-1. D

~~Considerations for area monitor locations and design are based on the following:~~ E

- Areas which are normally accessible, and where changes in plant conditions can cause significant increases in personnel exposure rate above that expected for the area
- Areas which are normally accessible or occasionally accessible where significant increase in exposure rate may result from operational transients or maintenance activities
- Containment areas for indicating the level of radioactivity and detecting the presence of fission products due to a design basis accident
- Area monitor detectors are located such that inadvertent shielding by structural materials is minimized
- In the selection of area monitors, consideration is given to the range of temperature, pressure and humidity of the areas where the detectors or electronics are located.

E

Key Design Features

The ARMS monitors are located at selected locations throughout the plant to detect, indicate, and store radiation level information through their associated data processing module and, if necessary, annunciate abnormal radiation conditions. The detectors for all ARMS monitors are gamma-sensitive. If exposed to radiation in excess of full-scale indication, the ARMS monitors indicate that the full-scale reading has been exceeded and remain at the full-scale value.

F

Each division of the Class 1E radiation monitors identified in Table 2.7.6.13-1 is physically separated from the other divisions.

G

Seismic Classifications

The safety-related containment high range area monitors meet seismic Category I standards.

H

System Operation

The ARMS is operational during normal operations, anticipated operational occurrences, and post-accident conditions.

I

Alarms, Displays, and Controls

The ARMS provides a continuous, direct indication or recording of radiation levels in the control room and provide alarms locally and in the control room when radiation levels exceed set values. The ARMS provides direct indication or recording in the main control room (MCR) and locally. When radiation levels exceed preset values indication is provided in the MCR. The Containment High Range Area monitors, which are safety-related, Class 1E, are also indicated and annunciated at the safety-related display

J

K

~~console. The radwaste processing facility monitors' alarm gives a visual and audible indication to the personnel near the detector in the radwaste processing facility local control room and in the MCR.~~

K

Logic

The control function of the containment high range area monitor is the isolation of the containment ventilation system on a containment high range area monitor high radiation alarm.

Interlocks

When the containment high range area monitors detect radiation levels above predetermined setpoints, interlocks are activated to maintain the isolation of the containment ventilation system.

L

Class 1E Electrical Power Sources and Divisions

As indicated in Table 2.7.6.13-1, the Class 1E containment high range area monitors are powered from their respective Class 1E divisions, and separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cables.

M

Equipment to be Qualified for Harsh Environments

The monitors identified in Table 2.7.6.13-1 as being qualified for a harsh environment can 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.

N

Interface Requirements

There are no safety-related interfaces with systems outside of the certified design.

O

Numeric Performance Values

Not applicable.

2.7.6.13.1.2 Airborne Radioactivity Monitoring System

System Purpose and Functions

The purpose and function of the airborne radioactivity monitoring system is to measure and warn operators of excessive airborne radioactivity in the air exhausted from cubicles through HVAC exhaust ducts.

The monitors of the airborne radioactivity monitoring system are non-safety related, as such, the airborne radioactivity monitoring system has no safety function.

Location and Functional Arrangement

Airborne monitor locations are within HVAC exhaust ducts which are installed in the radioactive controlled area. The airborne radioactivity monitors are installed at locations where airborne radioactivity may normally exist as identified in Table 2.7.6.13-2.

P

1. The functional arrangement of the area radiation and airborne radioactivity monitoring systems is as described in the Design Description of Subsection 2.7.6.13.1, and in Tables 2.7.6.13-1 and 2.7.6.13-2. Q

2. The seismic Category I radiation monitors identified in Table 2.7.6.13-1 can withstand seismic design basis loads without loss of safety function. R

3. The Class 1E radiation monitors identified in Table 2.7.6.13-1 as being qualified for a harsh environment can 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. S

4.a The Class 1E radiation monitors identified in Table 2.7.6.13-1 are powered from their respective Class 1E division. T

4.b Separation is provided between redundant divisions of Class 1E radiation monitor cables, and between Class 1E cables and non-Class 1E cables. U

5. Each redundant division of Class 1E radiation monitors identified in Table 2.7.6.13-1 is physically separated from the other divisions. V

6. Data and alarms, including power failure alarms, from the Class 1E radiation monitors identified in Table 2.7.6.13-1 are provided in the main control room. W

~~**Key Design Features**~~

~~Key design features of the airborne radioactivity monitoring system are given in Table 2.7.6.13-2.~~

~~**Seismic and ASME Code Classifications**~~

~~The airborne radioactivity monitoring system monitors are non-seismic.~~

~~**System Operation**~~

~~The airborne radioactivity monitoring system is operational during normal operations, anticipated operational occurrences, and post-accident conditions.~~ X

~~**Alarms, Displays, and Controls**~~

~~Monitoring and alarm data from the airborne radioactivity monitoring system are transmitted to the main control room and made accessible to plant operators.~~

~~**Logic**~~

~~The airborne radioactivity monitoring system has no control function.~~

~~**Interlocks**~~

~~The airborne radioactivity monitoring system has no interlocks associated with direct safety functions.~~

~~Class 1E Electrical Power Sources and Divisions~~

~~None of the airborne radioactivity monitoring system monitors is Class 1E.~~

~~Equipment to be Qualified for Harsh Environments~~

~~None of the airborne radioactivity monitoring system monitors is qualified for harsh environments.~~

~~Interface Requirements~~

~~There are no safety-related interfaces with systems outside of the certified design.~~ X

~~Numeric Performance Values~~

~~No selected airborne radioactivity monitoring system numerical performance values are used in the safety analyses.~~

2.7.6.13.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.13-3 describes the ITAAC for area radiation and airborne radioactivity monitoring systems.

Table 2.7.6.13-1 Area Radiation Monitoring System Equipment Characteristics

ARMS Monitor Name	Detector Number	Safety Related	Seismic Category I	Class 1E/ Harsh	Location
MCR Area Radiation	RMS-RE-001	No	No	No/No	R/B
Containment Air Lock Area Radiation	RMS-RE-002	No	No	No/No	C/V
Radio Chemical Lab. Area Radiation	RMS-RE-003	No	No	No/No	AC/B
SFP Area Radiation	RMS-RE-005	No	No	No/No	R/B
Nuclear Sampling Room Area Radiation	RMS-RE-006	No	No	No/No	AC/B
ICIS Area Radiation	RMS-RE-007	No	No	No/No	C/V
Waste management system Area Radiation	RMS-RE-008	No	No	No/No	A/B
TSC Area Radiation	RMS-RE-009	No	No	No/No	A/B
Containment High Range Area Radiation	RMS-RE-091A,B, 092A,B, 093A,B, 094A,B	Yes	Yes	Yes/Yes	C/V

Y

Table 2.7.6.13-2 Airborne Radioactivity Monitoring System Equipment Characteristics

Z

Radiation Gas Monitor Name	Detector Number	Safety Related	Seismic Category I	Class 1E/ Harsh	Location
Fuel Handling Area HVAC Radiation Gas	RMS-RE-049	No	No	No/No	A/B
Annulus and Safeguard Area HVAC Radiation Gas	RMS-RE-046	No	No	No/No	R/B
Reactor Building HVAC Radiation Gas	RMS-RE-048A	No	No	No/No	A/B
Auxiliary Building HVAC Radiation Gas	RMS-RE-048B	No	No	No/No	A/B
Sample and Lab Area HVAC Radiation Gas	RMS-RE-048C	No	No	No/No	A/B

Table 2.7.6.13-3 Area Radiation and Airborne Radioactivity Monitoring Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the area radiation and airborne radioactivity monitoring systems is as described in the Design Description of Subsection 2.7.6.13.1, and in Tables 2.7.6.13-1 and 2.7.6.13-2.	1. An inspection of the as-built area radiation and airborne radioactivity monitoring systems will be performed.	1. The functional arrangement of the as-built area radiation and airborne radioactivity monitoring systems is as described in the Design Description of Subsection 2.7.6.13.1, and in Tables 2.7.6.13-1 and 2.7.6.13-2.
2. The seismic Category I radiation monitors identified in Table 2.7.6.13-1 ~~are designed to~~ can withstand seismic design basis loads without loss of safety function.	2.i Inspections will be performed to verify that the as-built, seismic Category I radiation monitors, identified in Table 2.7.6.13-1, are located in a seismic Category I structure~~the containment or the reactor building~~.	2.i The as-built seismic Category I radiation monitors identified in Table 2.7.6.13-1 are located in a seismic Category I structure~~the containment or the reactor building~~.
	2.ii Type tests, ~~and/or~~ analyses, or a combination of type tests and analyses of the seismic Category I radiation monitors identified in Table 2.7.6.13-1 will be performed using analytical assumptions, or will be performed under conditions which bound the seismic design basis requirements.	2.ii A report exists and ~~The results of the type tests and/or analyses~~ concludes that the seismic Category I radiation monitors identified in Table 2.7.6.13-1 can withstand seismic design basis loads without loss of safety function.
	2.iii ~~An i~~Inspections and analyses will be performed to verify that ~~on~~ the as-built seismic Category I radiation monitors identified in Table 2.7.6.13-1, including anchorages, are seismically bounded by the tested or analyzed conditions.	2.iii A report exists and concludes that the ~~The~~ as-built seismic Category I radiation monitors identified in Table 2.7.6.13-1, including anchorages, are seismically bounded by the tested or analyzed conditions.

Table 2.7.6.13-3 Area Radiation and Airborne Radioactivity Monitoring Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3. The Class 1E radiation monitors identified in Table 2.7.6.13-1 as being ~~designed~~ qualified for a harsh environment ~~are designed to~~ can withstand the environmental conditions that would exist before, during, and following a design basis ~~event~~ accident without loss of safety function for the time required to perform the safety function.	3.i Type tests, ~~and/or analyses,~~ or a combination of type tests and analyses will be performed on the Class 1E radiation monitors identified in Table 2.7.6.13-1 ~~located in~~ as being qualified for a harsh environment.	3.i A report exists and~~The results of the type tests, and/or analyses, or a combination of type tests and analyses~~ concludes that the Class 1E radiation monitors identified in Table 2.7.6.13-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis ~~event~~ accident without loss of safety function for the time required to perform the safety function.
	3.ii Inspections will be performed on the as-built Class 1E radiation monitors identified in Table 2.7.6.13-1 as being qualified for a harsh environment, ~~equipment~~ and the associated wiring, cables, and terminations located in a harsh environment.	3.ii The as-built Class 1E radiation monitors ~~equipment~~ and the associated wiring, cables, and terminations identified in Table 2.7.6.13-1 as being qualified for a harsh environment are bounded by type tests~~,~~ ~~and/or analyses,~~ or a combination of type tests and analyses.
4.a The Class 1E radiation monitors identified in Table 2.7.6.13-1 are powered from their respective Class 1E division.	4.a A test will be performed on each division of the as-built radiation Class 1E monitors identified in Table 2.7.6.13-1 by providing a simulated test signal only in the Class 1E division under test.	4.a The simulated test signal exists at the as-built Class 1E radiation monitors, identified in Table 2.7.6.13-1, under test.
4.b Separation is provided between redundant ~~Class 1E~~ divisions of Class 1E radiation monitor cables, and between Class 1E ~~divisions~~ cables and non-Class 1E cables.	4.b Inspections of the as-built Class 1E divisional cables will be performed.	4.b Physical separation or electrical isolation is provided in accordance with RG 1.75, between the as-built cables of redundant Class 1E divisions and between Class 1E ~~divisions~~ cables and non-Class 1E cables.

Table 2.7.6.13-3 Area Radiation and Airborne Radioactivity Monitoring Systems Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. Each redundant division of Class 1E radiation monitors identified in Table 2.7.6.13-1 is physically separated from the other divisions.	5. Inspections of the as-built Class 1E radiation monitors will be performed.	5. Each redundant division of the Class 1E radiation monitors identified in Table 2.7.6.13-1 is physically separated from other divisions in accordance with RG 1.75.
6. Data and alarms ~~signals~~, including ~~control logic, annunciation, and~~ power failure alarms, from the Class 1E radiation monitors identified in Table 2.7.6.13-1 are ~~transmitted to~~ provided in the ~~main control room~~ MCR~~and made accessible to plant operators~~.	6. An inspection will be performed for retrievability of data and alarms in the ~~as-built~~ MCR.	6. The ~~as-built~~ data and alarms, ~~signals,~~ including ~~control logic, annunciation, and~~ power failure alarms, from the as-built Class 1E radiation monitors identified in Table 2.7.6.13-1 ~~are transmitted to~~ can be retrieved in the ~~main control room~~MCR ~~and made accessible to plant operators~~.