US-APWR DCD Tier 1 Enhancement Project

Thursday 2/17/11 Afternoon Handout No. 1

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Item No.	Explanation/Basis for Change
2.7.1.1.1 Design Description	
A	Reformatted to remove subheader.
B	Reformatted to remove subheader.
C	Added full names of valves to define first use of abbreviations; MHI's Response to US-APWR DCD RAI No. 599-4756 Revision 2 affected
D	Reformatted to remove subheader.
E	Deleted information not required for the Tier 1 Design Description.
F	Affects MHI's Amended Response to US-APWR DCD RAI No. 323-2071. Deleted information not required for the Tier 1 Design Description. DD#2 replaced necessary description; see Item AA
G	Deleted information which is redundant to new DD # 2. MHI's amended Response to US-APWR DCD RAI No. 323-2071 Revision 2 affected
H	Text deleted added by RAI response as redundant to combination of DD 3.a, 3.b, 4, & 5. MHI's Response to US-APWR DCD RAI No. 599-4756 Revision 2 affected
I	Not used
J	Removed negative statement not necessary in Tier 1.
K	Reformatted to remove subheader.
L	Deleted information not required for the Tier 1 Design Description.
M	Reformatted to remove subheader.
N	Statement concerning trip from MCR deleted as redundant to new DD # 4; Response to US-APWR DCD RAI No. 599-4756 Revision 2 affected
O	Reformatted to remove subheader.
P	Negative statements are deleted. Turbine trip statement deleted as redundant to new DD #7. Response to US-APWR DCD RAI No. 599-4756 Revision 2 affected
Q	Reformatted to remove subheader.
R	Negative statements are deleted.
S	Reformatted to remove subheader.
T	Negative statements are deleted.
U	Reformatted to remove subheader.
V	Negative statements are deleted.
W	Reformatted to remove subheader.
X	Negative statements are deleted.
Y	Reformatted to remove subheader.
Z	Negative statements are deleted.
AA	Note 2. Note 1. Bases for iIndividual DD changes are listed with the associated ITAAC
BB	Reformatted to remove subheader.
2.7.1.1.2 Inspections, Tests, Analyses, and Acceptance Criteria	
	No changes
ITAAC Table 2.7.1.1-1	
1	DC, ITA, AC Generic changes made to functional arrangement ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]

Item No.	Explanation/Basis for Change
2	DC, ITA, AC Changes from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Corrected “main turbine” from RAI response to be “LPT” since analysis is limited to LPT. Deleted “testing and”. DC has been revised to be more generic description. Renumbered ITAAC from 2.a to 2.
3.a	DC, ITA, AC ITAAC 2.b changed to 3.a & b. Changes from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2. AC changed from RAI response to match anticipated test performance.
3.b	DC, ITA, AC ITAAC 2.b changed to 3.a & b. Changes from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2.
4	DC, ITA, AC New ITAAC from Rev 2 to R3A6 is from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2.
5	DC, ITA, AC TAAC 2.c changed to 5. Changes from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2.
6.a	DC, ITA, AC New ITAAAC from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2.
6.b	DC, ITA, AC New ITAAC from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2.
7	DC, ITA, AC TAAC 3 changed to 7. Changes from Rev 2 to R3A6 are from response to US-APWR DCD RAI No. 599-4756 Revision 2. Additional changes affect response to US-APWR DCD RAI No. 599-4756 Revision 2. Changes made for clarity.

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 2.7.1.2 MSS

Item No.	Explanation/Basis for Change
Design Description 2.7.1.2.1	
A	Reformatted to remove subheader.
B	Reformatted to remove subheader. Notes 1 and 2. See Item M
C	Reformatted to remove subheader.
D	Reformatted to remove subheader. Notes 1 and 2. See Item O through X
E	Reformatted to remove subheader. Deleted information not required for the Tier 1 Design Description.
F	Reformatted to remove subheader. Notes 1 and 2. See Item CC, DD, JJ, KK
G	Reformatted to remove subheader.
H	Reformatted to remove subheader. Deleted negative statements from Tier 1.
I	Reformatted to remove subheader. Notes 1 and 2. See Item Z, AA
J	Reformatted to remove subheader. Note 1 & 2. See Item Y
K	Reformatted to remove subheader. Deleted negative statements from Tier 1.
L	Reformatted to remove subheader. Deleted information not required for the Tier 1 Design Description.
M	Notes 1and 2. See Item B
N	Note 1
O	Notes 1 and 2. See Item D
P	Notes 1 and 2. See Item D
Q	Notes 1 and 2. See Item D
R	Notes 1 and 2. See Item D
S	Notes 1 and 2. See Item D
T	Notes 1 and 2. See Item D
U	Notes 1 and 2. See Item D
V	Notes 1 and 2. See Item D
W	Notes 1 and 2. See Item D
X	Notes 1 and 2. See Item D
Y	Notes 1 and 2. See Item J
Z	Notes 1 and 2. See Item I
AA	Notes 1 and 2. See Item I
BB	Note 1
CC	Notes 1 and 2. See Item F
DD	Notes 1 and 2. See Item F
EE	Note 1
FF	Note 1
GG	Note 1
HH	Note 1
II	Note 1
JJ	Notes 1 and 2. See Item F
KK	Notes 1 and 2. See Item F

Item No.	**Explanation/Basis for Change**
LL	Note 1
MM	Note 1
NN	Note 1
OO	Note 1
PP	Editorial change – deleted "and so on" as inappropriate ambiguity
QQ	Editorial change – deleted space
RR	Deleted redundant text – number of valves can be determined from table 2.7.1.2-4. 110% criteria is not a necessary attribute for Tier 1.
SS	Redundant info to table 2.7.1.2-4 & Fig 2.7.1.2-1. Function of MSRV is not necessary for Tier 1
TT	Redundant info to table 2.7.1.2-4 & Fig 2.7.1.2-1. Function of MSDV is not necessary for Tier 1
UU	Redundant info to table 2.7.1.2-4 & Fig 2.7.1.2-1.
VV	Redundant info to table 2.7.1.2-4 & Fig 2.7.1.2-1. Function of MSCV is not necessary for Tier 1
WW	Note 1 & 2 – see ITAAC 5a & 5b
XX	Redundant to info in table 2.7.1.2-4
YY	Note 1 & 2 – see ITAAC 1.b
ZZ	Note 1 & 2 – see ITAAC 9
Table 2.7.1.2-1 NO CHANGES	
Table 2.7.1.2-2 NO CHANGES	
Table 2.7.1.2-3 NO CHANGES	
Table 2.7.1.2-4 Changed MS Relief Valve MCR/RSC control function to agree with design	
ITAAC Table 2.7.1.2-5	
1.a	DC, ITA, AC Generic changes made to functional arrangement ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]
1.b	DC, ITA, AC Generic changes made to mechanical separation ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet.
2.a.i	ITA Generic changes made to ASME ITAAC to provide clarity and consistency. This change alters the response to RAI 404, 14.03.03-20 and RAI 242, 14.03.03-5. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]
2.a.ii	ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. This change does not alter the response to RAI 404, 14.03.03-20 and RAI 242, 14.03.03-5. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
2.b.i	ITA Generic changes made to ASME ITAAC to provide clarity and consistency. This change does not alter the response to RAI 404, 14.03.03-21 and RAI 242, 14.03.03-6. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet

Item No.	Explanation/Basis for Change
2.b.ii	DC, ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. This change does not alter the response to RAI 404, 14.03.03-21 and RAI 242, 14.03.03-6. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
3.a	ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. This change does not alter the response to RAI 404, 14.03.04-21 RAI 242, 14.03.03-8. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
3.b	ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. This change does not alter the response to RAI 404, 14.03.04-21 or RAI 242, 14.03.03-8. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
4.a	ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
4.b	ITA, AC Generic changes made to ASME ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
4.b	Deleted duplicate 4.b ITAAC
5.a.i	DC, ITA, AC Generic changes made to Seismic ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
5.a.ii	ITA, AC Generic changes made to Seismic ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
5.a.iii	ITA, AC Generic changes made to Seismic ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet
5.b.i	DC, ITA, AC Generic changes made to Seismic ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet. This change alters the response to RAI 452, 14.03.02-12
5.b.ii	DC, ITA, AC Generic changes made to Seismic ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet. This change alters the response to RAI 452, 14.03.02-12
6.a.i	DC, ITA, AC Generic changes made to EQ ITAAC to provide clarity and consistency. This change alters the response to RAI 511 03.11-21 and RAI 193 14.03.04-22 [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]
6.a.ii	ITA, AC Generic changes made to EQ ITAAC to provide clarity and consistency. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]
6.b	DC, ITA Generic changes made to electrical independence ITAAC to provide clarity and consistency. This change does not alter the response to RAI 193, 14.03.04-23. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]

Item No.	Explanation/Basis for Change
6.c	DC, AC Generic changes made to electrical separation ITAAC to provide clarity and consistency. Impacts RAI 191 14.03.04-07. [RIS p5, Logic, seventh bullet and p7, Consistency, second bullet]
7	No changes
8.a	DC, AC Generic changes to MCR controls ITAAC. Text clarified. [RIS p5, Logic, seventh bullet]
8.b	DC, ITA Generic changes to valve ITAAC. The DC is modified to add the clarifying text, "remotely operated" to clearly identify the equipment that is within the scope of the ITAAC. A reference to a table is provided, where needed. [RIS 2008-05, "Standardization and Consistency," 2nd bullet]. Editorial changes are made for clarity and consistency in the ITA. This wording is similar to corresponding ITAAC in the AP1000 DCD.
9.a.i	DC, ITA, AC Generic changes to valve ITAAC. The ITA is modified to identify that "type tests," "analysis," or a combination of these is acceptable [RIS 2008-05, "ITAAC Nomenclature and Language," 4th bullet]. The ITA is modified to clarify the conditions that apply to the type tests and analyses. This ITA is modified to include a reference to a specific list of equipment, as needed [RIS 2008-05, Standardization," 2nd bullet].
9.a.ii	ITA, AC Generic changes to valve ITAAC. The ITA and AC are modified to reference a specific list of equipment, as needed [RIS 2008-05, "Standardization," 2nd bullet]. This wording is consistent with corresponding ITAAC in the AP1000 DCD.
9.a.iii	ITA, AC Generic changes to valve ITAAC. The ITA is modified to add inspections to recognize that analysis alone is not sufficient to verify the as-built equipment is bounded by the tested or analyzed condition [RIS 2008-05, "Focus, Logic, Practicality," 6th and 7th bullets].
9.b.i	DC, ITA, AC Generic changes to valve ITAAC. The ITA is modified to identify that "type tests," "analysis," or a combination of these is acceptable [RIS 2008-05, "ITAAC Nomenclature and Language," 4th bullet]. The ITA is modified to clarify the conditions that apply to the type tests and analyses. This ITA is modified to include a reference to a specific list of equipment, as needed [RIS 2008-05, Standardization," 2nd bullet].

Item No.	Explanation/Basis for Change
9.b.ii	ITA, AC Generic changes to valve ITAAC. The ITA and AC are modified to reference a specific list of equipment, as needed [RIS 2008-05, "Standardization," 2nd bullet]. This wording is consistent with corresponding ITAAC in the AP1000 DCD.
9.b.iii	ITA, AC Generic changes to valve ITAAC. The ITA is modified to add inspections to recognize that analysis alone is not sufficient to verify the as-built equipment is bounded by the tested or analyzed condition [RIS 2008-05, "Focus, Logic, Practicality," 6th and 7th bullets].
9.c	DC, ITA, AC Generic changes to valve ITAAC. The ITA and AC are modified to reference a specific list of equipment, as needed [RIS 2008-05, "Standardization," 2nd bullet]. This wording is consistent with corresponding ITAAC in the AP1000 DCD.
9.d	ITA The ITA is modified to add the clarifying text, "remotely operated" to clearly identify the equipment that is within the scope of the ITAAC. A reference to a table is provided, where needed. [RIS 2008-05, "Standardization and Consistency," 2nd bullet]. This wording is consistent with corresponding ITAAC in the AP1000 DCD.
9.e.i	ITA, AC Generic changes to valve ITAAC. The ITA is modified to identify that "type tests," "analysis," or a combination of these is acceptable [RIS 2008-05, "ITAAC Nomenclature and Language," 4th bullet]. The ITA is modified to clarify the conditions that apply to the type tests and analyses. This ITA is modified to include a reference to a specific list of equipment, as needed [RIS 2008-05, Standardization," 2nd bullet].
9.e.ii	ITA, AC Generic changes to valve ITAAC. The ITA and AC are modified to reference a specific list of equipment, as needed [RIS 2008-05, "Standardization," 2nd bullet]. This wording is consistent with corresponding ITAAC in the AP1000 DCD.
9.e.iii	ITA, AC Generic changes to valve ITAAC. The ITA is modified to add inspections to recognize that analysis alone is not sufficient to verify the as-built equipment is bounded by the tested or analyzed condition [RIS 2008-05, "Focus, Logic, Practicality," 6th and 7th bullets].
10	DC, ITA, AC Generic changes to MCR controls ITAAC to provide clarity and consistency. Text clarified. This change alters the response to RAI 193, 14.03.04-30. [RIS p5, Logic, seventh bullet]

Item No.	Explanation/Basis for Change
11	DC, ITA, AC Generic changes to RSC controls ITAAC to provide clarity and consistency. Requirement added to ITA for tests of control functions. Text clarified. This change alters the response to RAI 193, 14.03.04-30. [RIS p5, Logic, seventh bullet]
12	DC, AC Changes to LBB to provide clarity and consistency with other LBB ITAAC. [RIS p3, Language, fifth bullet]. DC reworded for clarity
13.a.i	ITA, AC Consistency with Tier 2 and change to a per valve acceptance criteria [RIS p7, Consistency, third bullet] Editorial clarity change in ITA
13.a.ii	ITA, AC Consistent use of "report" language for an ITA with analysis [RIS p3, Language, fifth bullet]
13.b.i	ITA Make scope consistent with ITAAC 14 ITA [RIS p5, Logic, seventh bullet]
13.b.ii	ITA, AC Enhance clarity [RIS p5, Logic, seventh bullet]
14	ITA, AC Enhance clarity [RIS p5, Logic, seventh bullet]
FIGURE 2.7.1.2-1 Revised the "REMARK" text for consistency and clarity.	

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 2.7.1.9

Item No.	Explanation/Basis for Change
Design Description 2.7.1.9.1	
A	Wording revised to include only the necessary attributes and relocated to introductory paragraph for consistency. See item C. This change does not impact the response to RAI 184, 14.03.07-27.
B	Note 1.
C	Wording revised and relocated to introductory paragraph for consistency with Tier 1 format. See item A.
D	Notes 1 and 2. See Items Z and AA.
E	Note 1. This change alters the response to RAI 192, 14.03.04-10.
F	Notes 1 and 2. See Item Q.
G	Notes 1 and 2. See Item Q.
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	Notes 1 and 2. See Item Q.
L	Notes 1 and 2. See Item Q.
M	Notes 1 and 2. See Item Q.
N	Notes 1 and 2. See Item Q.
O	Notes 1 and 2. See Item Q.
P	Notes 1 and 2. See Item EE.
Q	Notes 1 and 2. See Items F through O.
R	Revised to delete text not required for a Tier 1 Design Description.
S	Notes 1 and 2. See Items Y and CC.
T	Notes 1 and 2. See Item DD.
U	Revised to delete text not required for a Tier 1 Design Description. The ESF signals that actuate FWS isolation are described in Section 2.5.1 and verified in Tier 1 Table 2.5.1-6 Design Commitment 14a; therefore this material is redundant.
V	Note 1.
W	Note 1.
X	Note 1.
Y	Notes 1 and 2. See Item S.
Z	Notes 1 and 2. See Item D.
AA	Notes 1 and 2. See Item D.
BB	Note 1.
CC	Notes 1 and 2. See Item S.
DD	Notes 1 and 2. See Item T.
EE	Notes 1 and 2. See Item P.
FF	Revised to delete text not required for a Tier 1 Design Description.
GG	Editorial change. This change does not impact the response to RAI 184, 14.03.07-27.
Table 2.7.1.9-1	
No change.	
Table 2.7.1.9-2	
No change.	
Table 2.7.1.9-3	

Item No.	Explanation/Basis for Change
No change.	
Table 2.7.1.9-4	
No change.	
ITAAC Table 2.7.1.9-5	
1.a	DC, ITA, AC Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
1.b	DC Generic changes to ITAAC for physical separation to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet] ITA Generic changes to ITAAC for physical separation to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet] AC Text added to make AC consistent with Design Commitment. [RIS p5, ITAAC Logic, 6th bullet]
2.a.i	DC Editorial change. ITA Revised to provide consistency with DC and AC wording. This change does not impact the response to RAI 242, 14.03.03-5 or the response to RAI 404, 14.03.03-20. [RIS p5, Logic, 7th bullet]
2.a.ii	ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. This change alters the response to RAI 242, 14.03.03-5 and RAI 404, 14.03.03-20. [RIS p7, ITAAC Scope, 2nd bullet]
2.b.i	DC, ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. This change does not impact the responses to RAI 242, 14.03.03-6 or RAI 404, 14.03.03-21. [RIS p7, ITAAC Scope, 2nd bullet]
2.b.ii	DC, ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. This change alters the responses to RAI 242, 14.03.03-6 and RAI 404, 14.03.03-21. [RIS p7, ITAAC Scope, 2nd bullet]
3.a	ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. This change does not impact the response to RAI 242, 14.03.03-8. [RIS p7, ITAAC Scope, 2nd bullet]
3.b	ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. This change does not impact the response to RAI 242, 14.03.03-8. [RIS p7, ITAAC Scope, 2nd bullet]
4.a	ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
4.b	ITA, AC Generic changes to ASME ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]

Item No.	Explanation/Basis for Change
5.a	DC, ITA, AC Generic changes to Seismic ITAAC to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
5.b	DC, ITA, AC Generic changes to Seismic ITAAC to provide clarity and consistency. This change alters the responses to RAI 242, 14.03.03-9 and RAI 452, 14.03.02-12. [RIS p7, ITAAC Scope, 2nd bullet]
6.a	DC, ITA, AC Generic changes to ITAAC for harsh environment to provide clarity and consistency. This change alters the responses to RAI 511, 03.11-21 and RAI 191, 14.03.04-3. [RIS p7, ITAAC Scope, 2nd bullet]
6.b	DC, ITA Generic changes to ITAAC for electrical separation to provide clarity and consistency. This change alters the response to RAI 193, 14.03.04-23. [RIS p7, ITAAC Scope, 2nd bullet]
6.c	DC, AC Generic changes to ITAAC for electrical separation to provide clarity and consistency. This change alters the response to RAI 191, 14.03.04-09. [RIS p7, ITAAC Scope, 2nd bullet]
7.	No change.
8.a	DC, AC Generic changes to ITAAC for MCR controls to provide clarity and consistency. This change alters the response to RAI 193, 14.03.04-29. [RIS p7, ITAAC Scope, 2nd bullet]
8.b	DC, ITA, AC Generic changes to ITAAC for PSMS control to provide clarity and consistency. ITAAC Item 8.b.ii is separated in ITAAC Item 8.c to provide clarity for the intent of the design commitment. This change alters the responses to RAI 191, 14.03.04-01 and RAI 192, 14.03.04-16. [RIS p7, ITAAC Scope, 2nd bullet]
8.c	DC – DC is provided to clarify the intent of ITA and AC. ITA – Reworded to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet] AC – Reworded to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
9.a	DC, ITA, AC Generic changes to ITAAC for MOV safety function to provide clarity and consistency. This change does not impact the responses to RAI 456, 14.03.07-49, RAI 191, 14.03.04-01, and RAI 191 14.03.04-07. [RIS p7, ITAAC Scope, 2nd bullet]
9.b	ITA, AC Generic changes to ITAAC loss of motive power position to provide clarity and consistency. This change does not impact the response to RAI 191, 14.03.04-01. [RIS p7, ITAAC Scope, 2nd bullet]
10	DC, ITA, AC Generic changes to ITAAC for MCR alarms, displays and controls to provide clarity and consistency. This change alters the response to RAI 193, 14.03.04-30. [RIS p7, ITAAC Scope, 2nd bullet]

Item No.	Explanation/Basis for Change
11	AC, ITA, AC Generic changes to ITAAC for RSC alarms, displays and controls to provide clarity and consistency. This change alters the response to RAI 193, 14.03.04-30. [RIS p7, ITAAC Scope, 2nd bullet]
Figure 2.7.1.9-1	
Editorial changes to the Remark text box for clarification. This change does not impact the response to RAI 288, Question 03.09.06-29.	

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 2.7.1.10

Item No.	Explanation/Basis for Change
Design Description 2.7.1.10	
A	Editorial.
B	Editorial. This change alters part of the response to RAI #184, Question 14.03.07-27.
C	Editorial.
D	Paragraph deleted as this section should be a discussion for safety-related portion of the SGBDS because the non-safety related portion of SGBDS has no safety significance and no ITAAC is required for theses features.
E	Editorial.
F	Notes 1 and 2. See item G. This change alters part of the response to RAI #193, Question 14.03.04-26.
G	Notes 1 and 2. See item F.
H	Notes 1 and 2. See item X.
I	Notes 1 and 2. See item X.
J	Notes 1 and 2. See item X.
K	Notes 1 and 2. See item X.
L	Notes 1 and 2. See item X.
M	Notes 1 and 2. See item X.
N	Notes 1 and 2. See item X.
O	Notes 1 and 2. See item X.
P	Notes 1 and 2. See item X.
Q	Notes 1 and 2. See item X.
R	Paragraph deleted as the description is not appropriate for a Tier 1 description.
S	Paragraph deleted as the description is not appropriate for a Tier 1 description.
T	Paragraph deleted as the description is not appropriate for a Tier 1 description. This change alters part of the response to RAI #191, Question 14.03.04-01.
U	Paragraph deleted to eliminate redundancy because this radiation monitor is addressed in Tier 1, Section 2.7.6.6, Table 2.7.6.6-1.
V	Sentence deleted because the containment isolation function has already been described and therefore would be redundant. See item B. This change alters the response to RAI #184, Question 14.03.07-27.
W	Notes 1 and 2. See item EE. This change alters the response to RAI #192, Question 14.03.04-10.
X	Notes 1 and 2. See items H through Q.
Y	Paragraph deleted as the description is not appropriate for a Tier 1 description.
Z	Notes 1 and 2. See items FF and HH. Please note that Table 2.7.1.10-3 indicates that there are no RSC or MCR alarms. This change alters the response to RAI #222, Question 14.03.11-24.
AA	Notes 1 and 2. Redundant to introductory paragraphs. See items B, C, and JJ.
BB	Negative statements deleted from Design Description for consistency with Tier 1.
CC	Note 1.
DD	Note 1.
EE	Notes 1 and 2. See item W.
FF	Notes 1 and 2. See item Z.
GG	Note 1.

Item No.	Explanation/Basis for Change
HH	Notes 1 and 2. See item Z.
II	Note 1.
JJ	Notes 1 and 2. See item AA.
KK	Negative statements deleted from Design Description for consistency with Tier 1.
LL	Subsection deleted as it is not applicable. This is consistent with other ITAAC format.
MM	Editorial. This change alters part of the response to RAI #184, Question 14.03.07-27.
NN	Note 1.
Table 2.7.1.10-1	
	No change.
Table 2.7.1.10-2	
	No change.
Table 2.7.1.10-3	
	Typographical error on valve numbering. See Figure 2.7.1.10-1.
ITAAC Table 2.7.1.10-4	
1	DC, ITA, and AC - Changes made to align with generic wording for the Functional Arrangement ITAAC to provide clarity and consistency. [RIS, p7, Scope, first bullet]
2.a.i	ITA - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] This change alters part of the response to RAI #242, Question 14.3.3-5. This change alters part of the response to RAI #404, Question 14.3.3-20.
2.a.ii	ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Standardization, second bullet] This change alters part of the response to RAI #242, Question 14.3.3-5. This change alters part of the response to RAI #404, Question 14.3.3-20.
2.b.i	DC, ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Standardization, second bullet] This change alters part of the response to RAI #242, Question 14.3.3-6. This change alters part of the response to RAI #404, Question 14.3.3-21.
2.b.ii	DC, ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Standardization, second bullet] This change alters part of the response to RAI #242, Question 14.3.3-6. This change alters part of the response to RAI #404, Question 14.3.3-21.
3.a	ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Standardization, second bullet] This change alters the response to RAI #242, Question 14.3.3-8.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.1.10

Item No.	Explanation/Basis for Change
3.b	ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Standardization, second bullet] This change alters the response to RAI #242, Question 14.3.3-8.
4.a	ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet].
4.b	ITA and AC - Changes made to align with generic wording for ASME Code ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet].
5.a	DC - Changes made to align with generic wording for Seismic ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet]. Clarified the commitment to be consistent with AC language. [RIS p4, Logic, 6th bullet]. ITA and AC - Delete "and/or" as it is not appropriate. [RIS p3, Language, 4th bullet] - Changes made to align with generic wording for Seismic ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] - Change made to ensure ITAAC references exist and provide appropriate information. [RIS p7, Standardization, 2nd bullet]
5.b	DC - Changes made to align with generic wording for Seismic ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet]. Clarified the commitment to be consistent with AC language as well. [RIS p4, Logic, 6th bullet]. ITA and AC - Editorial - Changes made to align with generic wording for Seismic ITAAC to provide clarity and consistency. [RIS p7, Standardization, 2nd bullet] These changes alter the response to RAI #242, Question 14.3.3-9. These changes alter the response to RAI #452, Question 14.3.2-12.
6	DC and ITA - Changes made to align with generic wording for the Electrical Separation ITAAC for clarity and consistency. [RIS p5, Logic, Bullet 6 and p7, Scope, Bullet 1] [RIS p7, Standardization, 2nd bullet] These changes do not impact response to RAI #193, Question 14.3.4-23.
7	DC and AC - Changes made to align with generic wording for the Electrical Separation ITAAC for clarity and consistency. [RIS p5, Logic, Bullet 7] These changes alter part of the response to RAI #191, Question 14.3.4-9.

Item No.	Explanation/Basis for Change
8	DC - Changes made to align with generic wording for the MOV ITAAC for clarity and consistency. [RIS p5, Logic, Bullet 7] ITA - Change made to ensure ITAAC references exist and provide appropriate information. [RIS p7, Standardization, 2nd bullet]
9	DC, ITA and AC - Changes made to align with generic wording for Physical Separation ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] These changes alter part of the response to RAI #192, Question 14.3.4-10.
10	DC - Changes made to align with generic wording for MCR controls ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] ITA - Change made to ensure ITAAC references exist and provide appropriate information. [RIS p7, Standardization, 2nd bullet] AC - Editorial change for clarity. Consistency with DC.
11	Since Rev.2 of the DCD Tier 1, MHI created a new ITA and AC for the RSC control functions. DC - Changes made to align with generic wording for RSC controls ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] ITA - Changes made to align with generic wording for RSC Controls ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] - Change made to ensure ITAAC references exist and provide appropriate information. [RIS p7, Standardization, 2nd bullet] - The separate controls function ITA has been created which require tests and not inspections. [RIS, p5, Logic, 7th bullet] AC - Changes made to align with generic wording for RSC Controls ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet].

Item No.	Explanation/Basis for Change
12	DC - Changes made to align with generic wording for EQ ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet]. - Replaced "event" with "accident" for consistency with Tier 1 definitions and use. ITA - Delete "and/or" as it is not appropriate. [RIS p3, Language, 4th bullet] - Changes made to align with generic wording for EQ ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] AC - Delete "and/or" as it is not appropriate. [RIS p3, Language, 4th bullet] - Changes made to align with generic wording for EQ ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet] This change alters part of the response to RAI #191, Question 14.3.4-3 (p.14.03.04-7) and RAI #511, Question 3.11-21 (p. 3.11-10).
13.a	DC and AC - Changes made to align with generic wording for MOV controls ITAAC to provide clarity and consistency. [RIS p7, Scope, 1st bullet]
13.b	DC - Changes made to align with generic wording for MCR controls ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet]
14	DC, ITA, and AC - Changes made to align with generic wording for MOVs ITAAC to provide clarity and consistency. [RIS p7, Scope, second bullet]
Figure 2.7.1.10-1	
	Figure is revised to depict necessary attributes to be verified by functional arrangement ITAAC. (Non-safety portion: Dashed line, discharge line of SGBD flash tank is simplified.). The "remark" box wording is modified for editorial purposes.

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 2.7.4.1

Item No.	Explanation/Basis for Change
Design Description 2.7.4.1.1	
A	Edited to improve clarity and technical accuracy..
B	Text added per response to RAI 523, Question 11.02-32 and revised. This change alters the response to RAI 523, Question 11.02-32.
C	Editorial changes made for clarity.
D	Paragraph edited for clarity and reduced verbosity.
E	Edited to improve clarity and technical accuracy.
F	Deleted text redundant with text in the introductory paragraphs.
G	Note 1.
H	Notes 1 and 2. See Item Q.
I	Note 1.
J	Note 1.
K	Note 1. Text added per response to RAI 523, Question 11.02-32 and revised. This change alters the response to RAI 523, Question 11.02-32.
L	Note 1.
M	Deleted text not required per SRP 14.3. This alters the response to RAI 523, Question 11.02-32.
N	Deleted text redundant with text in introductory paragraphs. This change alters the response to RAI 184, Question 14.03.07-27.
O	Deleted text redundant with text in introductory paragraphs. Deleted second sentence in paragraph as the A/B is addressed in Tier 1 Section 2.2.
P	Deleted redundant text and text not required per SRP 14.3.
Q	Notes 1 and 2. See Item H. This change alters the response to RAI 523, Question 11.02-32.
R	Deleted redundant text.
S	Negative statements deleted from the Design Description (DD).
T	Deleted text redundant to information provided in introductory paragraphs and in Section 2.7.4.1.2 regarding the containment isolation function and corresponding ITAAC as described in Section 2.11.2. This change alters the response to RAI 184, Question 14.03.07-24.
U	Negative statements deleted from the Design Description (DD).
V	Editorial change.
ITAAC Table 2.7.4.1-1	
1	DC, ITA, AC Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet.]. [RIS, Standardization, 2nd bullet].
2.	DC– Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. ITA– Revised description of valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. AC – Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23.

Item No.	Explanation/Basis for Change
3.	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The LWMS does not include ASME III components. [RIS, Standardization, 4th bullet].
4.	No change.
5.a, b	ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The LWMS does not include ASME III components. This change does not alter the response to RAI 242, Question 14.03.03-15.
6.	DC, ITA, AC – New ITAAC added (and altered) per response to RAI 523, Question 11.02-32. [RIS p7, Standardization, 2nd bullet]. This change alters the response to RAI 523, Question 11.02-32.
7.	DC, ITA, AC – New ITAAC added to verify that the alarm from the liquid radwaste discharge radiation monitor is provided in the MCR.

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 2.7.4.2

Item No.	Explanation/Basis for Change
Design Description 2.7.4.2	
A	Editorial changes made for clarity.
B	Text proposed in RAI 533 Question 11.03-15 is included and revised. This change alters the response to RAI 533, Question 11.03-15.
C	Text revised and relocated to introductory paragraphs. See Item F.
D	Text reformatted, revised, and relocated for consistency within Tier 1. See Items F and G.
E	Note 1.
F	First sentence of paragraph relocated to introductory paragraphs. See Item C. Text reformatted, revised, and relocated for consistency within Tier 1. See Item D.
G	Text reformatted, revised, and relocated for consistency within Tier 1. See Item D.
H	Note 1 and Note 2. See Item O. This change alters the response to RAI 533, Question 11.03-15.
I	Note 1 and Note 2. See Item M.
J	Text deleted as GWMS does not adversely impact any safety-related system thus it does not need to meet seismic Category II criteria.
K	Deleted redundant text to provide consistency within Tier 1.
L	Paragraph deleted as the description is not appropriate for a Tier 1 description.
M	Notes 1 and 2. See Item I.
N	Note 1.
O	Note 1 and Note 2. See Item H. This change alters the response to RAI 533, Question 11.03-15.
P	Note 1.
Q	Negative statements deleted from the Design Description (DD) for consistency within Tier 1.
ITAAC Table 2.7.4.2-1	
1	DC, ITA, AC – Generic changes made to be consistent with functional arrangement ITAAC. [RIS, Scope, 2nd bullet]. [RIS, Standardization, 2nd bullet].
2	DC– Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. ITA– Revised description of valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. AC – Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-21.
3	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The GWMS does not include ASME III components. [RIS, Standardization, 4th bullet].
4	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The GWMS does not include ASME III valves and piping. [RIS, Standardization, 4th bullet]. This deletion alters the response to RAI 242 Question 14.03.03-15.

Item No.	Explanation/Basis for Change
5	DC, ITA, AC – New ITAAC added (but altered) due to response RAI 533, Question 11.03-15. [RIS, pg 5, Logic, 6th and 7th bullets]. The changes to DC, ITA, and AC alter the response to RAI 533, Question 11.03-15.
6	DC, ITA, AC – New ITAAC added to verify that the alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR.

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 2.7.4.3

Item No.	Explanation/Basis for Change
Design Description 2.7.4.3.1	
A	Revised to clarify and delete text not required for a Tier 1 Design Description.
B	Information on the spent resin tanks was added to the Design Description and to the (new) Table 2.7.4.3-2 to provide a basis for verifying the design attributes for this portion of the solid waste management system (SWMS).
C	This portion of the text deleted from the Design Description wording was added by the response to DCD RAI 187, Question 11.4-6, to specifically address seismic classification of the A/B. However, this design description information is presented in Tier 1, Section 2.2.1.7 and Table 2.2-1, and need not be repeated here.
D	Negative statements deleted from the Design Description (DD) for consistency within Tier 1.
E	Note 1.
ITAAC Table 2.7.4.3-1	
1	Generic changes to ITAAC for functional arrangement made to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
2	ITAAC deleted. SRP Section 14.3.3 requires that ASME Code Section III components have ITAAC. Because the SWMS does not include ASME Section III tanks and pumps, there is not a need for this ITAAC. The SWMS includes only ASME Section VIII, Division 1 and 2 tanks and pumps.
3	ITAAC deleted. SRP Section 14.3.3 requires that ASME Code Section III components have ITAAC. Because the SWMS does not include ASME Section III piping and valves, there is not a need for this ITAAC. The SWMS includes only B31.3 piping and valves.
4	This ITAAC was added to verify the performance of the solid waste management system.
Table 2.7.4.3-2	
	The (new) Table 2.7.4.3-2 was added to provide a basis for verifying the design attributes for this portion of the solid waste management system (SWMS).

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.

2.7 PLANT SYSTEMS

2.7.1 Power Generation Systems

2.7.1.1 Turbine Generator (T/G)

2.7.1.1.1 Design Description

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

The T/G is non safety-related system. The T/G provides capability to convert energy in the main steam to electrical energy at the generator output.

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

The T/G is located within the T/B, and consists of:

- One double-flow high-pressure turbine
- Three double-flow low pressure turbines
- A generator / exciter
- Two sets of external moisture separator/reheaters
- Associated piping, valves, control system
- Auxiliary subsystems

The Main Turbine Stop Valves (MTSVs) and Main Turbine Control Valves (MTCVs) are arranged in series at the high-pressure turbine inlet, and control steam flow entering the high-pressure turbine. The Reheat Stop Valves (RSVs) and Intercept Valves (IVs) are arranged in series in the cross-over pipes at the inlet to the low-pressure turbines (LPTs), and control steam flow to the LPTs. Extraction nonreturn valves are installed in the extraction lines to the feedwater heaters. C

~~**Key Design Features**~~ D

~~The turbine is an 1800 rpm, tandem compound, six exhaust flow, reheat unit. Two external moisture separator/reheaters (MS/R) with two stages of reheating are located on each side of the T/G centerline. The generator is a direct-driven, three-phase, 60 Hz, four-pole synchronous generator with water-cooled stator and hydrogen-cooled rotor.~~ E

~~The turbine rotors, valves and control/protection system are designed to minimize the possibility of turbine missile generation less than 1.0E-5 per year. Orientation of the T/G is such that a high-energy missile to be directed at an approximately 90 degree angle away from safety-related structures, systems, and components. On the top of this,~~ F

~~any safety-related systems, structures and components are located outside the low-trajectory missile strike zones, which are defined by ±25-degree lines emanating from the centers of the first and last low-pressure turbines wheels as measured from the plane of the wheels. For the purpose to keep the probability equal or less than the above~~, ~~turbine rotor integrity is provided by the integrated combination of rotor design, fracture toughness requirements, tests, and inspections.~~

~~Inspections and tests of the as-built low-pressure turbine (LPT) rotors are conducted to verify that as-built test data and calculated toughness curves satisfy the material properties assumptions in the turbine rotor analysis, which determines the turbine maintenance program and inspection interval to meet the requirements of the turbine missile probability analysis.~~ G

H

BB

~~Seismic and ASME Code Classifications~~

~~The T/G is non-seismic category and is not designed to ASME code specifications.~~ J

~~System Operation~~ K

~~Steam flow is controlled by turbine megawatt and valve position. Under normal conditions, the turbine requests a certain megawatt load target. Through a coordinated mode of control, the turbine valves adjust the steam flow to the turbine.~~ L

~~Alarms, Displays, and Controls~~ M

~~Instruments, controls, and protective devices are provided to confirm reliable operation. Redundant, fast actuating controls are installed to prevent damage to the T/G resulting from overspeed and/or full load rejection. The control system initiates turbine trip upon reactor trip.~~ N

~~Logic~~ O

~~There is no logic needed for direct safety functions related to the T/G.~~ P

~~Interlocks~~ Q

~~There are no interlocks needed for direct safety functions related to the T/G.~~ R

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

~~Not applicable.~~ T

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

~~Not applicable.~~ V

W
X
Y
Z

Interface Requirements

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

Numeric Performance Values

Not applicable.

AA

1. The functional arrangement of the turbine generator is as described in the Design Description of Subsection 2.7.1.1.1.

2. The LPT rotor integrity is ensured by the combination of design, fracture toughness, tests, and inspections of the rotor to minimize the probability of turbine missile generation.

3.a. The main turbine is equipped with a mechanical overspeed trip (MOST) device which can be used to locally initiate a manual turbine trip

3.b The electrical overspeed trip (EOST) protection system trips the turbine generator in response to an EOST signal.

4. Controls are provided in the MCR to trip the turbine generator.

5. The MTSVs, MTCVs, RSVs and IVs close in response to a turbine trip signal.

6. The extraction nonreturn valves close in response to a turbine trip signal.

7. A turbine generator trip is initiated in response to a reactor trip.

2.7.1.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1.1-1 describes the ITAAC for the T/G.

Table 2.7.1.1-1 Turbine Generator Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the turbine generator is as described in the Design Description of Subsection 2.7.1.1.1.	1. ~~An i~~Inspection of the as-built Turbine Generator system will be performed.	1. The as-built turbine generator conforms to the functional arrangement as described in the Design Description of Subsection 2.7.1.1.1.
2.~~a~~ ~~The probability of turbine missile generation is less than 1.0E-5 per year.~~The LPT rotor integrity is ensured by the combination of design, fracture toughness, tests, and inspections of the rotor to minimize the probability of turbine missile generation.	2.~~a~~ ~~Inspections and tests of the as-built LPT rotors will be performed.~~An inspection of the as-built ~~main turbine~~LPT rotor material properties, turbine rotor and blade designs, pre-service inspection and testing results, and in-service ~~testing and~~ inspection requirements will be conducted.	2.~~a~~ The as-built ~~LPT rotor material conforms to the specified requirements as described in Subsection 2.7.1.1.1~~LPT rotor material properties, turbine rotor and blade designs, pre-service inspection and testing results, and in-service ~~testing and~~ inspection requirements meet the requirements of the Turbine Missile Generation Probability Analysis..
3.a~~2.b~~ The main turbine is equipped with a mechanical overspeed trip (MOST) device which can be used to locally initiate a manual turbine trip~~The turbine generator trips in response to actual or simulated signal from mechanical or electrical overspeed trip system~~.	3.a ~~2.b~~ Test~~ing~~ will be performed on ~~the main turbine using mechanical or electrical overspeed trip system.~~the as-built main turbine MOST device using the test device.	3.a ~~2.b~~ ~~The main turbine trips after receiving a~~Oil pressure to detect the ~~mechanical overspeed trip~~MOST operation is reduced after operating a MOST ~~signal~~device.
3.b The electrical overspeed trip (EOST) protection system trips the turbine generator in response to an EOST signal.	3.b Test will be performed on the as-built main turbine EOST system using an actual or a simulated EOST signal.	3.b The as-built MTSVs, MTCVs, RSVs and IVs close in response to an EOST signal.
4 Controls are provided in the MCR to trip the turbine generator.	4 Tests will be performed on the as-built turbine generator using controls in the as-built MCR.	4 Controls in the as-built MCR close the MTSVs, MTCVs, RSVs and IVs.
5~~2.c~~The MTSVs, MTCVs, RSVs and IVs close in response to a turbine trip signal.~~move smoothly to a fully closed position in the event of emergency.~~	5~~2.c~~~~Valve testing~~Tests will be performed on the as-built MTSVs, MTCVs, RSVs and IVs using an actual or simulated turbine trip signal~~during the main turbine operation~~.	5~~2.c~~Each MTSV, MTCV, RSV and IV closes within 0.3 seconds of receiving a turbine trip signal. ~~valve moves smoothly to a fully closed position.~~
6. The extraction nonreturn valves close in response to a turbine trip signal.	6.a Tests will be performed on the as-built extraction nonreturn valves using an actual or a simulated turbine trip signal.	6.a The arm of each extraction nonreturn valve moves to the close position in response to an actual or a simulated turbine trip signal.
	6.b Test will be performed using	6.b Actuator operation time is

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	as-built actuator in response to releasing air from air cylinder.	within 1.0 second in response to releasing air from air cylinder.
73. The A turbine generator trips is initiated in response toon a reactor trip.	73. A test of the as-built system will be performed using a simulated test signal.	73. The as-built control logic provides a simulated turbine generator trip in response toon a simulated reactor trip signal.

2.7.1.2 Main Steam Supply System (MSS)

2.7.1.2.1 Design Description

A

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

The MSS is provided with safety-related main steam isolation valves (MSIVs) and associated main steam bypass isolation valves (MSBIVs) in each main steam line. These valves isolate the secondary side of the steam generators (SGs) to prevent the uncontrolled blowdown of more than one SG and isolate non~~-~~safety-related portions of the system.

QQ

The main function of the MSS is to transport steam from the SGs to the high-pressure turbine and to the moisture separator/reheater (MS/R) over a range of flows and pressures covering the entire operating range from system warmup to valve wide open (VWO) turbine conditions.

MSS also supplies steam to the gland seal system, the emergency feedwater pump turbines, and the deaerator heater~~, and so on~~. The system also dissipates heat generated by the nuclear steam supply system (NSSS) by means of turbine bypass valves to the condenser or to the atmosphere through air-operated main steam relief valves (MSRVs) or motor-operated main steam depressurization valves (MSDVs) or spring-loaded main steam safety valves (MSSVs) when either the turbine, generator, or the condenser is unavailable.

PP

The MSS provides the containment isolation function, as described in Section 2.11.2, of the MSS lines penetrating the containment.

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

B

~~MSS piping and components are located within the containment, in the reactor building, and the turbine building. Figure 2.7.1.2-1 illustrates the MSS, showing the arrangement of the MSS components including the MSIVs. Table 2.7.1.2-1 also provides a tabulation of the location of MSS equipment.~~

~~**Key Design Features**~~

C

RR

~~Six MSSVs are provided per main steam line. MSSVs with sufficient rated capacity are provided to prevent the steam pressure from exceeding 110 percent of the MSS design pressure.~~

~~One air-operated MSRV is installed on the MSS piping from each SG. The primary function of the MSRVs is to prevent an unnecessary lifting of the MSSVs.~~

SS

~~One motor-operated MSDV is installed on the main steam piping from each SG. MSDV provides controlled removal of reactor decay heat (in conjunction with the emergency feedwater system) during safe shutdown, after plant transient, accident condition, and emergency condition.~~

TT

~~One MSIV is provided on each main steam piping to limit uncontrolled steam release from one SG in the event of steam line break.~~ UU

~~One main steam check valve (MSCV) is provided downstream of the MSIVs on each main steam piping to prevent blowdown of the SGs by reverse flow in the event the break is upsteam of a MSIV.~~ VV

~~The safety-related portions of the MSS are designed to withstand the effects of a safe-shutdown earthquake (SSE), and to perform its intended functions during normal conditions, adverse environmental occurrences and accident conditions, including loss of offsite power, with a single malfunction or failure of an active component.~~ WW

~~The MSS is designed to provide containment isolation of the MSS lines penetrating the containment.~~ XX

~~Each mechanical division of the main steam supply system is physically separated from the other divisions by a structural barrier, which also serves as a fire barrier. The piping, components of reactor building exterior and components inside the containment are exceptions.~~ YY

~~Seismic and ASME Code Classifications~~

~~The seismic category and ASME Code Section III requirements are identified in Tables 2.7.1.2-2 and 2.7.1.2-3 for safety-related MSS components and piping, respectively.~~ D

~~System Operation~~

~~The MSS transports and distributes steam from the SGs to the main turbine during power generation and directly to the main condenser when the main turbine is not available. Four main steam lines, one from each SG, supply steam to the turbine generator (T/G). The main steam lines from the SGs are connected to an equalization piping. A portion of the steam from the equalization piping flows to steam seals, the moisture separator reheaters, and deaerator heating, with the high pressure turbine receiving balance of the flow via four individual lines with a set of turbine stop and control valves.~~ E

~~Alarms, Displays, and Controls~~

~~The valves identified in Table 2.7.1.2-2 as having PSMS control perform an active safety function after receiving a signal from PSMS.~~ F

~~Table 2.7.1.2-4 identifies alarms, displays, and controls associated with the MSS that are located in the main control room (MCR). MSS equipment and instrumentation that is required for remote shutdown and that is available at the remote shutdown console (RSC) is also shown on Table 2.7.1.2-4.~~

~~Logic~~ G

~~Closure of the MSIV is initiated by following:~~ ZZ

- ~~High-high containment pressure~~
- ~~Low main steam line pressure~~
- ~~High main steam line pressure negative rate~~
- ~~Manual actuation~~

~~Interlocks~~ H

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

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

~~The safety-related MSS equipment identified in Table 2.7.1.2-2 as Class 1E is powered from their respective Class 1E division. Separation is provided between these Class 1E divisions and between non-Class 1E divisions and non-Class 1E electrical cable.~~ I

~~Equipment to be Qualified for Harsh Environments~~

~~The safety-related MSS equipment identified in Table 2.7.1.2-2 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.~~ J

~~Interface Requirements~~

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

~~Numeric Performance Values~~

~~When necessary to demonstrate satisfaction of a design commitment, numeric performance values for selected components have been specified as ITAAC acceptance criteria in Table 2.7.1.2-5. Key parameters of the MSS design that are used in the safety analysis and which are included in the Table 2.7.1.2-5 are over-pressurization protection and isolation of MSS.~~ L

1.a The functional arrangement of the MSS is as described in the Design Description of Subsection 2.7.1.2.1 and Table 2.7.1.2-1, and as shown in Figure 2.7.1.2-1. M

1.b Each mechanical division of the MSS except for piping (Division A&B and C&D pairs) is physically separated from the other divisions with the exception of the reactor building exterior and inside the containment so as not to preclude accomplishment of the safety function. N

2.a.i The ASME Code Section III components of the MSS, identified in Table 2.7.1.2-2, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements. O

2.a.ii The ASME Code Section III components of the MSS identified in Table 2.7.1.2-2 are reconciled with the design requirements. P

2.b.i The ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements. Q

2.b.ii The ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3 are reconciled with the design requirements. R

3.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.7.1.2-2, meet ASME Code Section III requirements for non-destructive examination of welds. S

3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.1.2-3, meet ASME Code Section III requirements for non-destructive examination of welds. T

4.a The ASME Code Section III components, identified in Table 2.7.1.2-2, retain their pressure boundary integrity at their design pressure. U

4.b The ASME Code Section III piping, identified in Table 2.7.1.2-3, retains its pressure boundary integrity at its design pressure. V

5.a The seismic Category I equipment, identified in Table 2.7.1.2-2, can withstand seismic design basis loads without loss of safety function. W

5.b The seismic Category I piping, including supports, identified in Table 2.7.1.2-3 can withstand seismic design basis loads without a loss of its safety function. X

6.a The Class 1E equipment identified in Table 2.7.1.2-2 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. Y

6.b Class 1E equipment, identified in Table 2.7.1.2-2, is powered from its respective Class 1E division. Z

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

7. Deleted. BB

8.a Controls are provided in the MCR to open and close the remotely operated valves identified in Table 2.7.1.2-2. CC

8.b The remotely operated valves identified in Table 2.7.1.2-2 as having PSMS control perform an active safety function after receiving a signal from PSMS. DD

9.a The motor-operated valves identified in Table 2.7.1.2-2 as having an active safety function perform an active safety function to change position as indicated in the table. EE

9.b The air-operated valves identified in Table 2.7.1.2-2 as having an active safety function perform an active safety function to change position as indicated in the table. FF

9.c The check valves, identified in Table 2.7.1.2-2 as having an active safety function perform an active safety function to change position as indicated in the table. GG

9.d After loss of motive power, the remotely operated valves, identified in Table 2.7.1.2-2, assume the indicated loss of motive power position. HH

9.e The MSIVs identified in Table 2.7.1.2-2 perform an active safety function to change position as indicated in the table. II

10. Alarms and displays identified in Table 2.7.1.2-4 are provided in the MCR. JJ

11. Alarms, displays, and controls identified in Table 2.7.1.2-4 are provided in the RSC. KK

12. The as-built piping identified in Table 2.7.1.2-3 as designed for LBB meets the LBB criteria, or an evaluation is performed of the protection from the dynamic effects of a rupture of the line. LL

13.a The MSSVs provide overpressure protection for the secondary side of the steam generators and for pressure boundary components in the MSS. MM

13.b During design basis events, the MSS limits SG blowdown. NN

14. The MSIVs and MSBIVs will close within the required response time. OO

2.7.1.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1.2-5 describes the ITAAC for the MSS.

The ITAAC associated with the MSS equipment, components, and piping and that comprise a portion of the CIS are described in Table 2.11.2-2 and Table 2.7.1.2-5 Items 8.b and 14.

Table 2.7.1.2-1 Main Steam Supply System Location of Equipment and Piping

System and Components	Location
Main Steam Isolation Valves	Reactor Building
Main Steam Bypass Isolation Valves	Reactor Building
Main Steam Safety Valves	Reactor Building
Main Steam Relief Valves	Reactor Building
Main Steam Depressurization Valves	Reactor Building
Main Steam Relief Valve Block Valves (MSRVBVs)	Reactor Building
Main Steam Drain Line Isolation Valves (MSDIVs)	Reactor Building
Main Steam Check Valves	Reactor Building
Main steam piping in the PCCV	Containment
Piping in the reactor building including branch piping from main steam piping up to and including the following valves; MSIV, MSBIV, MSSV, MSRV, MSDV, MSRVBV, MSDIV	Reactor Building
Branch lines from the main steam piping to the emergency feedwater pump turbine steam isolation valve excluding this valve	Reactor Building
Main steam drain piping located in the reactor building downstream MSDIV and excluding the MSDIV	Reactor Building
MSS piping downstream of MSIV and MSBIV up to and including the first restraint located between the reactor building and the turbine building	Reactor Building
Discharge piping of the MSSV in the reactor building	Reactor Building
Discharge piping of the MSRV and MSDV in the reactor building	Reactor Building

Table 2.7.1.2-2 Main Steam Supply System Equipment Characteristics (Sheet 1 of 2)

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
Main Steam Isolation Valves	MSS-SMV-515A,B,C,D	2	Yes	Yes	Yes/Yes	Main steam line isolation Remote Manual	Transfer Closed	Closed
Main Steam Bypass Isolation Valves (air-operated valves)	MSS-HCV-565 MSS-HCV-575 MSS-HCV-585 MSS-HCV-595	2	Yes	Yes	Yes/Yes	Main steam line isolation Remote Manual	Transfer Closed	Closed
Main Steam Safety Valves	MSS-SRV-509A,B,C,D MSS-SRV-510A,B,C,D MSS-SRV-511A,B,C,D MSS-SRV-512A,B,C,D MSS-SRV-513A,B,C,D MSS-SRV-514A,B,C,D	2	Yes	No	-/-	-	Transfer Open Transfer Closed	-
Main Steam Relief Valves	MSS-PCV-515 MSS-PCV-525 MSS-PCV-535 MSS-PCV-545	2	Yes	Yes	Yes/Yes	-	-	Closed
Main Steam Depressurization Valves	MSS-MOV-508A,B,C,D	2	Yes	Yes	Yes/Yes	Remote Manual	Transfer Open Transfer Closed	As Is
Main Steam Relief Valve Block Valves	MSS-MOV-507A,B,C,D	2	Yes	Yes	Yes/Yes	Remote Manual	Transfer Closed	As Is

Table 2.7.1.2-2 Main Steam Supply System Equipment Characteristics (Sheet 2 of 2)

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
Main Steam Drain Line Isolation Valves	MSS-MOV-701A,B,C,D	2	Yes	Yes	Yes/Yes	Remote Manual	Transfer Closed	As Is
Main Steam Check Valves	MSS-VLV-516A,B,C,D	3	Yes	No	-/-	-	Transfer Closed	-
Main Steam Line Pressure	MSS-PT-515, 516, 517, 518, 525, 526, 527, 528, 535, 536, 537, 538, 545, 546, 547, 548	-	Yes	-	Yes/No	-	-	-
Turbine Inlet Pressure	MSS-PT-555, 556, 557, 558	-	No	-	Yes/No	-	-	-

Note: Dash (-) indicates not applicable

Table 2.7.1.2-3 Main Steam Supply System Piping Characteristics

Pipe Line Name	ASME Code Section III Class	Leak Before Break	Seismic Category I
Main steam piping in the PCCV	2	Yes	Yes
Piping in the reactor building including branch piping from main steam piping up to and including the following valves; MSIV, MSBIV, MSSV, MSRV, MSDV, MSRVBV, MSDIV	2	No	Yes
Branch lines from the main steam piping to the emergency feedwater pump turbine steam isolation valve excluding this valve	2	No	Yes
Main steam drain piping located in the reactor building downstream MSDIV and excluding the MSDIV	3	No	Yes
MSS piping downstream of MSIV and MSBIV up to and including the first restraint located between the reactor building and the turbine building	3	No	Yes
Discharge piping of the MSSV in the reactor building	3	No	Yes
Discharge piping of the MSRV and MSDV in the reactor building	3	No	Yes

Table 2.7.1.2-4 Main Steam Supply System Equipment Alarms, Displays, and Control Functions

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
Main Steam Isolation Valves (MSS-SMV-515A, B, C, D)	No	Yes	Yes	Yes
Main Steam Bypass Isolation Valve (MSS-HCV-565, 575, 585, 595)	No	Yes	Yes	Yes
Main Steam Safety Valve (Position Indication) (MSS-SRV-509A,B,C,D MSS-SRV-510A,B,C,D MSS-SRV-511A,B,C,D MSS-SRV-512A,B,C,D MSS-SRV-513A,B,C,D MSS-SRV-514A,B,C,D)	No	Yes	No	Yes
Main Steam Relief Valve (MSS-PCV-515, 525, 535, 545)	No	Yes	~~No~~Yes	Yes
Main Steam Depressurization Valves (MSS-MOV-508A. B, C, D)	No	Yes	Yes	Yes
Main Steam Relief Valve Block Valves (MSS-MOV-507A, B, C, D)	No	Yes	Yes	Yes
Main Steam Drain Line Isolation Valve (MSS-MOV-701A, B, C, D)	No	Yes	Yes	Yes
Main Steam Line Pressure (MSS-PT-515, 516, 517, 518, 525, 526, 527, 528, 535, 536, 537, 538, 545, 546, 547, 548)	Yes	Yes	No	Yes
Turbine Inlet Pressure (MSS-PT-555, 556, 557, 558)	Yes	Yes	No	Yes

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a The functional arrangement of the MSS is as described in the Design Description of Subsection 2.7.1.2.1 and Table 2.7.1.2-1, ~~Design Description~~ and as shown in Figure 2.7.1.2-1.	1.a ~~An i~~Inspection of the as-built MSS system will be performed.	1.a The as-built MSS system conforms with the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.1.2.1 and Table 2.7.1.2-1, and as shown in Figure 2.7.1.2-1.
1.b Each mechanical division of the MSS except for piping (Division A&B and C&D pairs) is physically separated from the other divisions with the exception of the reactor building exterior and inside the containment so as not to preclude accomplishment of the safety function.	1.b Inspection and analysis of the as-built MSS will be performed.	1.b A report exists and concludes that each ~~Each~~ mechanical division of the as-built MSS, except for piping (Division A&B and C&D pairs), is physically separated by spatial separation, barriers, or enclosures with the exception of the reactor building exterior and inside the containment, so as to assure that the functions of the safety related system are maintained.~~from other mechanical divisions of the system by structural barriers with the exception of reactor building exterior and inside the containment~~.
2.a.i The ASME Code Section III components of the MSS, identified in Table 2.7.1.2-2, 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 MSS, identified in Table 2.7.1.2-2, 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 MSS identified in Table 2.7.1.2-2 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

2.a.ii The ASME Code Section III components of the MSS identified in Table 2.7.1.2-2 are reconciled with the design requirements.	2.a.ii A reconciliation analysis of the components in Table 2.7.1.2-2 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 ASME Code, for the as-built ASME Code Section III components of the MSS identified in Table 2.7.1.2-2. ~~are reconciled with the design requirements.~~ The report documents the results of the reconciliation analysis.

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 2 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2.b.i The ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	2.b.i An iInspection of the as-built ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3, 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 MSS, including supports, identified in Table 2.7.1.2-3 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.b.ii The ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3 is are reconciled with the design requirements.	2.b.ii A reconciliation analysis of the piping of the MSS, including supports, identified in Table 2.7.1.2-3, 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 the design reconciliation has been completed in accordance with the ASME Code, for the as-built ASME Code Section III piping of the MSS, including supports, identified in Table 2.7.1.2-3 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 2.7.1.2-2, 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 2.7.1.2-2, 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 2.7.1.2-2.
3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.1.2-3, 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 2.7.1.2-3 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 2.7.1.2-3.

4.a The ASME Code Section III components, identified in Table 2.7.1.2-2, retain their pressure boundary integrity at their design pressure.	4.a A ~~Hydrostatic~~ hydrostatic test~~s~~ will be performed on the as-built components, identified in Table 2.7.1.2-2, 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~~s~~ of the as-built components identified in Table 2.7.1.2-2 as ASME Code Section III conform ~~with~~ to the requirements of the ASME Code Section III.

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4.b The ASME Code Section III piping, identified in Table 2.7.1.2-3, retains its pressure boundary integrity at its design pressure.	4.b A ~~Hydrostatic~~ hydrostatic test~~s~~ will be performed on the as-built piping, identified in Table 2.7.1.2-3, required by the ASME Code Section III to be hydrostatically tested.	4.b ASME Code Data Report(s) exist and conclude that the ~~The~~ results of the hydrostatic test~~s~~ of the as-built piping identified in Table 2.7.1.2-3 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 2.7.1.2-3, retains its pressure boundary integrity at its design pressure.~~	~~4.b Hydrostatic tests will be performed on the as-built piping required by the ASME Code Section III to be hydrostatically tested.~~	~~4.b The results of the hydrostatic tests of the as-built piping identified in Table 2.7.1.2-3 as ASME Code Section III conform with the requirements of the ASME Code Section III.~~
5.a The seismic Category I equipment, identified in Table 2.7.1.2-2, ~~is designed to~~can withstand seismic design basis loads without loss of safety function.	5.a.i Inspections will be performed to verify that the as-built seismic Category I ~~as-built~~ equipment~~-~~ identified in Table 2.7.1.2-2 is located in ~~the containment and reactor building~~a seismic Category I structure.	5.a.i The as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.1.2-2 is located in ~~the containment and reactor building~~a seismic Category I structure.
	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 2.7.1.2-2 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 concludes ~~The results of the type tests and/or analyses conclude~~ that the seismic Category I equipment identified in Table 2.7.1.2-2 can withstand seismic design basis loads without loss of safety function.
	5.a.iii Inspections and analyses will be performed to verify that ~~on~~ the as-built seismic Category I equipment identified in Table 2.7.1.2-2, including anchorages, is seismically bounded by the tested or analyzed conditions.	5.a.iii ~~The~~ A report exists and concludes that the as-built seismic Category I equipment identified in Table 2.7.1.2-2, including anchorages, is seismically bounded by the tested or analyzed conditions.

5.b Each of theThe seismic Category I piping, including supports, identified in Table 2.7.1.2-3 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 2.7.1.2-3 are is supported by a seismic Category I structure(s).	5.b.i Reports(s) document that each of theThe as-built seismic Category I piping, including supports, identified in Table 2.7.1.2-3 is supported by a seismic Category I structure(s).

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	5.b.ii Inspections and analyses will be performed to verifyfor the existence of a report verifying that the as-built seismic Category I piping, including supports, identified in Table 2.7.1.2-3 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 2.7.1.2-3 can withstand combined normal and seismic design basis loads without a loss of its safety function.
6.a The Class 1E equipment identified in Table 2.7.1.2-2 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/or analyses, or a combination of type tests and analyses using the design environmental conditions, or under conditions which bound the design environmental conditions, will be performed on the Class 1E equipment identified in Table 2.7.1.2-2 as being qualified for located in a harsh environment.	6.a.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 equipment identified in Table 2.7.1.2-2 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.
	6.a.ii Inspections will be performed ofn the as-built Class 1E equipment identified in Table 2.7.1.2-2 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 2.7.1.2-2 as being qualified for a harsh environment are bounded by type tests, and/or analyses, or a combination of type tests and analyses.
6.b The Class 1E equipment, identified in Table 2.7.1.2-2, 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 2.7.1.2-2 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 2.7.1.2-2 under test.

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

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
7. Deleted.	7. Deleted.	7. Deleted.
8.a Controls exist are provided in the MCR to -open and close the remotely operated valves identified in Table 2.7.1.2-2.	8.a Tests will be performed on the as-built remotely operated valves listed in Table 2.7.1.2-2 using controls in the as-built MCR.	8.a Controls exist in the as-built MCR to open and close -the as-built remotely operated valves listed in Table 2.7.1.2-2.
8.b The remotely operated valves identified in Table 2.7.1.2-2 as having PSMS control perform an active safety function after receiving a signal from PSMS.	8.b Tests will be performed on the as-built remotely operated valves listed identified in Table 2.7.1.2-2 as having PSMS control using simulated signals.	8.b The as-built remotely- operated valves identified in Table 2.7.1.2-2 as having PSMS control perform the active function identified in the table after receiving a simulated signal.
9.a The motor-operated valves, identified in Table 2.7.1.2-2, as having an active safety function perform an active safety function to change position as indicated in the table.	9.a.i Type tTests or a combination of type tests and analyses of the motor-operated valves identified in Table 2.7.1.2-2 as having an active safety function will be performed that demonstrate the capability of the valve to operate under its design conditions.	9.a.i A report exists and concludes that eEach motor-operated valve identified in Table 2.7.1.2-2 as having an active safety function changes position as indicated identified in Table 2.7.1.2-2 under design conditions.
	9.a.ii Tests of the as-built motor-operated valves identified in Table 2.7.1.2-2 as having an active safety function will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.a.ii Each as-built motor-operated valve identified in Table 2.7.1.2-2 as having an active safety function changes position as indicated identified in Table 2.7.1.2-2 under pre-operational test conditions.
	9.a.iii Inspections will be performed of the as-built motor-operated valves identified in Table 2.7.1.2-2 as having an active safety function.	9.a.iii Each as-built motor-operated valve identified in Table 2.7.1.2-2 as having an active safety function is bounded by the type tests, or a combination of type tests and analyses.
9.b The air-operated valves, identified in Table 2.7.1.2-2 as having an active safety function, perform an active safety function to change position as indicated in the table.	9.b.i Type tTests or a combination of type tests and analyses of the air-operated valves identified in Table 2.7.1.2-2 as having an active safety function will be performed that demonstrate the capability of the valve to operate under its design conditions.	9.b.i A report exists and concludes that eEach air-operated valve identified in Table 2.7.1.2-2 as having an active safety function changes position as indicated identified in Table 2.7.1.2-2 under design conditions.

	9.b.ii Tests of the as-built air-operated valves identified in Table 2.7.1.2-2 as having an active safety function will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.b.ii Each as-built air-operated valve identified in Table 2.7.1.2-2 as having an active safety function changes position as ~~indicated~~ identified in Table 2.7.1.2-2 under pre-operational test conditions.
	9.b.iii Inspections will be performed of the as-built air-operated valves identified in Table 2.7.1.2-2 as having an active safety function.	9.b.iii Each as-built air-operated valve identified in Table 2.7.1.2-2 as having an active safety function is bounded by the type tests, or a combination of type tests and analyses.
9.c The check valves, identified in Table 2.7.1.2-2 as having an active safety function~~,~~ perform an active safety function to change position as indicated in the table.	9.c Tests of the as-built check valves ~~with active safety functions~~ identified in Table 2.7.1.2-2 as having an active safety function will be performed under pre-operational flow, differential pressure, and ~~test pressure,~~ temperature~~, and fluid flow~~ conditions.	9.c Each as-built check valve identified in Table 2.7.1.2-2 as having an active safety function changes position as ~~indicated~~ identified in Table 2.7.1.2-2 under preoperational test conditions.

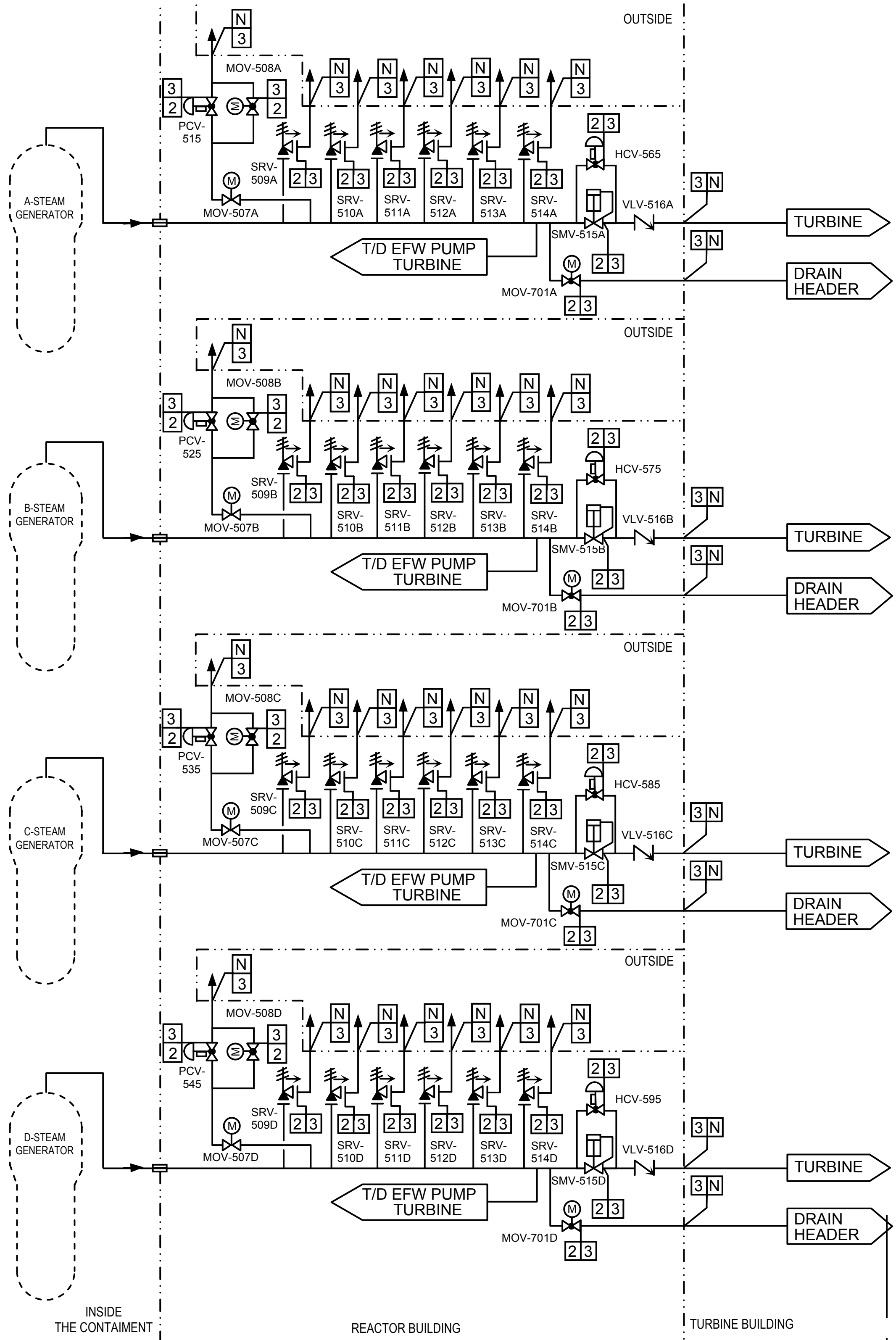
Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 6 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9.d After loss of motive power, the remotely operated valves, identified in Table 2.7.1.2-2, assume the indicated loss of motive power position.	9.d Tests of the as-built remotely operated valves identified in Table 2.7.1.2-2 will be performed under the conditions of loss of motive power.	9.d Upon loss of motive power, each as-built remotely operated valve identified in Table 2.7.1.2-2 assumes the indicated loss of motive power position.
9.e The MSIVs identified in Table 2.7.1.2-2 perform an active safety function to change position as indicated in the table.	9.e.i Type t~~T~~ests or a combination of type tests and analyses of the MSIVs identified in Table 2.7.1.2-2 will be performed ~~to~~ that demonstrate the capability of the valve to operate under its design conditions.	9.e.i A report exists and concludes that e~~E~~ach MSIV identified in Table 2.7.1.2-2 changes position as ~~indicated~~ identified in Table 2.7.1.2-2 under design conditions.
	9.e.ii Tests of the as-built MSIVs identified in Table 2.7.1.2-2 will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.e.ii Each as-built MSIV identified in Table 2.7.1.2-2 changes position as ~~indicated~~ identified in Table 2.7.1.2-2 under pre-operational test conditions.
	9.e.iii Inspections will be performed of the as-built MSIVs identified in Table 2.7.1.2-2.	9.e.iii Each as-built MSIV identified in Table 2.7.1.2-2 is bounded by the type tests, or a combination of type tests and analyses.
10. ~~MCR a~~Alarms and displays ~~of the parameters~~ identified in Table 2.7.1.2-4 ~~can be retrieved~~are provided in the MCR.	10. Inspection~~s~~ will be performed for retrievability of the alarms and displays identified in Table 2.7.1.2-4 ~~MSS parameters~~ in the ~~as-built~~ MCR.	10. ~~The MCR a~~Alarms and displays identified in Table 2.7.1.2-4 can be retrieved in the as-built MCR.
11. ~~RSC a~~Alarms, displays, and controls ~~are~~ identified in Table 2.7.1.2-4 are provided in the RSC.	11.i Inspection~~s~~ will be performed for retrievability of the ~~as-built RSC~~ alarms and~~,~~ displays ~~and controls will be performed~~identified in Table 2.7.1.2-4 in the RSC.	11.i Alarms~~,~~ and displays ~~and controls exist on the as-built RSC as~~ identified in Table 2.7.1.2-4 can be retrieved in the as-built RSC.
	11.ii Tests of the as-built RSC control~~s~~ functions identified in Table 2.7.1.2-4 will be performed.	11.ii Controls ~~exist to operate each~~in the as-built RSC ~~control function~~operate each as-built component identified in Table 2.7.1.2-4 with an RSC control function.

12. Each of tThe as-built piping identified in Table 2.7.1.2-3 as designed for leak before break (LBB) meets the LBB criteria, or an evaluation is performed of the protection from the dynamic effects of a rupture of the line.	12. Inspections of the as-built piping identified in Table 2.7.1.2-3 will be performed based on the evaluation report for LBB or for the evaluation of protection from dynamic effects of a pipe break, as specified in Section 2.3.	12. An LBB evaluation report exists and concludes that Tthe LBB acceptance criteria are met by the as-built piping identified in Table 2.7.1.2-3 and pipe piping materials, or a pipe break hazards analysis report exists and concludes that the protection is provided forfrom the dynamic effects of the pipinga line break is provided.

Table 2.7.1.2-5 Main Steam Supply System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 7 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
13.a The MSSVs provide overpressure protection for the secondary side of the steam generators and for pressure boundary components in the MSS.	13.a.i Inspections of the MSSVs will be performed to confirm that the value of the vendor ASME Ccode nameplate rating of the as-built -MSSV is greater than or equal to system relief requirements.	13.a.i The sum of the rated capacities recorded on the valve ASME Code plates of the as-built MSSVs exceeds 21,210,000 lb/hr. The minimum capacity for each MSSV is greater than or equal to 884,000 lb/hr at design pressure.
	13.a.ii Tests and analyses in accordance with ASME Code Section III of the MSSVs will be performed to confirm set pressure.	13.a.ii The results of the tests and analyses conform with the following as-built A report exists and concludes the following as-built safety valvesMSSVs set pressure: First stage: 1185 psig ± 1% Second stage: 1215 psig ± 1% Third stage: 1244 psig ± 1%
13.b During design basis events, the MSS limits SG blowdown.	13.b.i Tests will be performed to demonstrate that the as-built remotely operated MSIVs and MSBIVs close within the required response times. See item 14 in this table.	13.b.i See item 14 in this table.
	13.b.ii Inspections will be performed on the area of the as-built flow restrictor within the SG main steam outlet nozzles will limit releases to the containment.	13.b.ii The as-built flow restrictor within the each SG main steam line discharge outlet nozzle does not exceed 1.4 sq. ft.
14. The MSIVs and MSBIVs will close within the required response time.	14. Tests will be performed using a simulated test signal to demonstrate that as-built MSIVs and MSBIVs close within the required response time.	14. The as-built valves close within the following times after receiving a simulated signal: The as-built MSIVs close within 5 seconds. The as-built MSBIVs close within 5 seconds.



REMARK
System ~~name~~ Code ~~of valve number~~ is omitted from valve numbers in this ~~drawing~~figure.

Figure 2.7.1.2-1 Main Steam Supply System

2.7.1.9 Condensate and Feedwater System (CFS)

2.7.1.9.1 Design Description

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

The safety-related function of the CFS is to provide containment and feedwater isolation following ~~a~~ design basis accidents and after receipt of an isolation signal. The containment isolation function is described in ~~section~~ Section 2.11.2. The CFS provides feedwater ~~at the required temperature, pressure, and flow rate~~ to the SGs during startup, during shutdown from power, at power levels up to the rated power, and during plant design transients. A

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

CFS equipment and piping are located in the containment, the reactor building and the turbine building. Figure 2.7.1.9-1 illustrates the main feedwater lines, showing the arrangement of the safety-related CFS components. Table 2.7.1.9-1 also provides a tabulation of the location of CFS equipment. The CFS ~~is composed of~~includes both the condensate system (CDS) and the feedwater system (FWS).

1.a The functional arrangement of the CFS is as described in the Design Description of Subsection 2.7.1.9.1 and in Table 2.7.1.9-1 and as shown in Figure 2.7.1.9-1. B

~~Key Design Features~~

~~The CFS is designed with the capability of automatically providing the required flow to the SGs during startup, shutdown at power levels up to the rated power and during the plant design transients without interruption of operation or damage to equipment.~~ C

~~The system provides main feedwater isolation valves (MFIVs), main feedwater regulatory valves (MFRVs), main feedwater bypass regulation valves (MFBRVs) and steam generator water filling control valves (SGWFCVs) for the main feedwater lines routed into containment. The MFIVs, MFRVs, MFBRVs and SGWFCVs close after receipt of an isolation signal in sufficient time to limit the mass and energy release to containment consistent with the containment analysis.~~ D

1.b Each mechanical division of the ~~condensate and feedwater system~~CFS except for piping (Division A & B and C & D pairs) is physically separated from the other divisions ~~by a structural barrier, which also serves as a fire barrier. The piping, components~~with the exception of outside of the reactor building ~~reactor building exterior~~ and ~~components~~ inside the containment so as not to preclude accomplishment of the safety function.~~are exceptions.~~ E F

2.a.i The ASME Code Section III components of the CFS, identified in Table 2.7.1.9-2, are fabricated, installed and inspected in accordance with ASME Code Section III requirements.

2.a.ii The ASME Code Section III components of the CFS identified in Table 2.7.1.9-2 are reconciled with the design requirements. G

2.b.i The ASME Code Section III piping of the CFS, including supports, identified in Table 2.7.1.9-3 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements. H

2.b.ii The ASME Code Section III piping of the CFS, including supports, identified in Table 2.7.1.9-3 are reconciled with the design requirements. I

3.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.7.1.9-2, meet ASME Code Section III requirements for non-destructive examination of welds. J

3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.1.9-3, meet ASME Code Section III requirements for non-destructive examination of welds. K

4.a The ASME Code Section III components, identified in Table 2.7.1.9-2, retain their pressure boundary integrity at their design pressure. L

4.b The ASME Code Section III piping, identified in Table 2.7.1.9-3, retains its pressure boundary integrity at its design pressure. M

5.a The seismic Category I equipment identified in Table 2.7.1.9-2 can withstand seismic design basis loads without loss of safety function. N

5.b The seismic Category I piping, including supports, identified in Table 2.7.1.9-3 can withstand seismic design basis loads without a loss of its safety function. O

6.a Class 1E equipment identified in Table 2.7.1.9-2 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. P

~~Seismic and ASME Classifications~~

~~The seismic category and ASME Code Section III requirements are identified in Tables 2.7.1.9-2 and 2.7.1.9-3 for safety-related CFS components and piping, respectively.~~ Q

~~System Operation~~

~~The CFS supplies the SGs with heated feedwater in a closed steam cycle using regenerative feedwater heating~~ R

~~The CDS takes suction from the main condenser hotwell and pumps condensate forward to the deaerator utilizing the condensate pumps. The FWS takes suction from the deaerator and pumps feedwater forward to the SGs utilizing the feedwater booster/main feedwater pumps.~~

Alarms, Displays, and Controls

Table 2.7.1.9-4 identifies alarms, displays, and controls associated with the CFS that are located in the MCR. CFS equipment and instrumentation that is required for remote shutdown and that is available at the remote shutdown console (RSC) is also shown on Table 2.7.1.9-4. S T

Logic

Engineered safety features actuation signal for main feedwater isolation functions when any of the following signals are present: U

- Manual actuation
- ECCS actuation
- High-high SG water level

The CFS is not required to supply feedwater under accident conditions to affect plant shutdown or to mitigate the consequences of an accident.

Interlocks

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

Class 1E Electrical Power Sources and Divisions

6.b The safety-related CFSClass 1E equipment, identified in Table 2.7.1.9-2, as Class 1E is powered from their its respective Class 1E division. V

6.c Separation is provided between these redundant divisions of CFS Class 1E divisions cables and between non-Class 1E divisions cables and non-Class 1E electrical cables. W

7. Deleted X

8.a Controls are provided in the MCR to open and close the remotely operated valves identified in Table 2.7.1.9-2. Y

8.b The remotely operated valves identified in Table 2.7.1.9-2 as having PSMS control perform an active safety function after receiving a signal from PSMS. Z

8.c Main feedwater isolation valves (MFIVs), main feedwater regulation valves (MFRVs), main feedwater bypass regulation valves(MFBRVs), and steam generator water filling control valves (SGWFCVs) isolate feedwater to limit the mass and energy release to containment as low as reasonably achievable. Z

9.a The valves, identified in Table 2.7.1.9-2 as having an active safety function perform an active safety function to change position as indicated in the table. AA

9.b After loss of motive power, the remotely operated valves, identified in Table 2.7.1.9-2, assume the indicated loss of motive power position. BB

10. Alarms and displays identified in Table 2.7.1.9-4 are provided in the MCR. CC

11. Alarms, displays and controls identified in Table 2.7.1.9-4 are provided in the RSC. DD

Equipment to be Qualified for Harsh Environments

The safety-related CFS equipment identified in Table 2.7.1.9-2 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. EE

Interface Requirements

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

Numeric Performance Values

When necessary to demonstrate satisfaction of a design commitment, numeric performance values for selected components have been specified as ITAAC acceptance criteria in Table 2.7.1.9-5. Key parameters of the CFS design that are used in the safety analysis and which are included in the Table 2.7.1.9-5 are main feedwater isolation.

2.7.1.9.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1.9-5 describes the ITAAC for the CFS.

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

Table 2.7.1.9-1 Condensate and Feedwater System Location of Equipment and Piping

System and Components	Location
Main Feedwater Isolation Valves	Reactor Building
Main Feedwater Regulation Valves	Reactor Building
Main Feedwater Bypass Regulation Valves	Reactor Building
Steam Generator Water Filling Control Valves	Reactor Building
Main Feedwater Check Valves	Reactor Building
The portion of the FWS piping from the SGs inlets outward through the containment up to and including the MFIVs.	Containment and Reactor Building
The piping upstream of MFIVs to the first piping restraint at the interface between the reactor building and turbine building.	Reactor Building

Table 2.7.1.9-2 Condensate and Feedwater System Equipment Characteristics (Sheet 1 of 2)

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
Main Feedwater Isolation Valves	FWS-SMV-512 A,B,C,D	2	Yes	Yes	Yes/Yes	Main Feedwater Isolation Remote Manual	Transfer Closed	Closed
Main Feedwater Regulation Valves	FWS-FCV-510, 520, 530, 540	3	Yes	Yes	Yes/Yes	Main Feedwater Isolation Remote Manual	Transfer Closed	Closed
Main Feedwater Bypass Regulation Valves	FWS-FCV-511, 521, 531, 541	3	Yes	Yes	Yes/Yes	Main Feedwater Isolation Remote Manual	Transfer Closed	Closed
Steam Generator Water Filling Control Valves	FWS-LCV-610, 620, 630, 640	3	Yes	Yes	Yes/Yes	Main Feedwater Isolation Remote Manual	Transfer Closed	Closed
Main Feedwater Check Valves	FWS-VLV-511 A,B,C,D	3	Yes	No	-	-	Transfer Closed	-

Table 2.7.1.9-2 Condensate and Feedwater System Equipment Characteristics (Sheet 2 of 2)

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
Steam Generator Water Level (Narrow Range)	FWS-LT-510, 511, 512, 513, 520, 521, 522, 523, 530, 531, 532, 533, 540, 541, 542, 543,	-	Yes	-	Yes/ Yes	-	-	-
Steam Generator Water Level (Wide Range)	FWS-LT-514, 524, 534, 544	-	Yes	-	Yes/ Yes	-	-	-

Note: Dash (-) indicates not applicable

Table 2.7.1.9-3 Condensate and Feedwater System Piping Characteristics

Pipe Line Name	ASME Code Section III Class	Leak Before Break	Seismic Category I
The portion of the FWS piping from the SGs inlets outward through the containment up to and including the MFIVs.	2	No	Yes
The piping upstream of MFIVs to the first piping restraint at the interface between the reactor building and turbine building.	3	No	Yes

Table 2.7.1.9-4 Condensate and Feedwater System Equipment Alarms, Displays, and Control Functions

Equipment/Instrument Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
Main Feedwater Isolation Valves (FWS-SMV-512A, B, C, D)	No	Yes	Yes	Yes
Main Feedwater Regulation Valves (FWS-FCV-510, 520, 530, 540)	No	Yes	Yes	Yes
Main Feedwater Bypass Regulation Valves (FWS-FCV-511, 521, 531, 541)	No	Yes	Yes	Yes
Steam Generator Water Filling Control Valves (FWS-LCV-610, 620, 630, 640)	No	Yes	Yes	Yes
Steam Generator Water Level (Wide Range) (FWS-LT-514, 524, 534, 544)	Yes	Yes	No	Yes
Steam Generator Water Level (Narrow Range) (FWS-LT-510, 511, 512, 513, 520, 521, 522, 523, 530, 531, 532, 533, 540, 541, 542, 543)	Yes	Yes	No	Yes

Table 2.7.1.9-5 Condensate and Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a The functional arrangement of the CFS is as described in the Design Description of Subsection 2.7.1.9.1 and in Table 2.7.1.9-1 Design Description and as shown in Figure 2.7.1.9-1.	1.a An Inspection of the as-built CFS will be performed.	1.a The as-built CFS conforms with to the functional arrangement as described in the Design Description of this Subsection 2.7.1.9.1 and in Table 2.7.1.9-1 and as shown in Figure 2.7.1.9-1.
1.b Each mechanical division of the CFS except for piping (Division A & B and C & D pairs) is physically separated from the other divisions with the exception of outside of the reactor building exterior and inside the containment so as not to preclude accomplishment of the safety function.	1.b Inspections and analysis of the as-built CFS will be performed.	1.b A report exists and concludes that Eeach mechanical division of the as-built CFS except for piping (Division A & B and C & D pairs) is physically separated from other mechanical divisions of the system by structuralspatial separation, barriers, or enclosures with the exception of outside of the reactor building exterior and inside the containment so as to assure that the functions of the safety related system are maintained.
2.a.i The ASME Code Section III components of the CFS, identified in Table 2.7.1.9-2, 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 CFS identified in Table 2.7.1.9-2, 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 CFS identified in Table 2.7.1.9-2 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.a.ii The ASME Code Section III components of the CFS identified in Table 2.7.1.9-2 are reconciled with the design requirements.	2.a.ii A reconciliation analysis of the components identified in Table 2.7.1.9-2 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 cCode, for the as-built ASME Code Section III components of the CFS identified in Table 2.7.1.9-2. are reconciled with the design requirements. The report documents the results of the reconciliation analysis.

Table 2.7.1.9-5 Condensate and Feedwater 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 CFS, including supports, identified in Table 2.7.1.9-3, 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 CFS, including supports, identified in Table 2.7.1.9-3, 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 CFS, including supports, identified in Table 2.7.1.9-3 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.b.ii The ASME Code Section III piping of the CFS, including supports, identified in Table 2.7.1.9-3 ~~is~~ are reconciled with the design requirements.	2.b.ii A reconciliation analysis of the piping of the CFS, including supports, identified in Table 2.7.1.9-3, 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 ~~system~~ of the CFS, including supports, identified in Table 2.7.1.9-3. ~~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 2.7.1.9-2, 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 2.7.1.9-2, 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 2.7.1.9-2.
3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.1.9-3, 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 2.7.1.9-3 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 2.7.1.9-3.

Table 2.7.1.9-5 Condensate and Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 3 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4.a The ASME Code Section III components, identified in Table 2.7.1.9-2, retain their pressure boundary integrity at their design pressure.	4.a A ~~H~~hydrostatic test~~s~~ will be performed on the as-built components, identified in Table 2.7.1.9-2, 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~~s~~ of the as-built components identified in Table 2.7.1.9-2 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 2.7.1.9-3, retains its pressure boundary integrity at its design pressure.	4.b A ~~H~~hydrostatic test~~s~~ will be performed on the as-built piping, identified in Table 2.7.1.9-3, required by the ASME Code Section III to be hydrostatically tested.	4.b ASME Code Data Report(s) exist and conclude that ~~T~~the results of the hydrostatic test~~s~~ of the as-built piping identified in Table 2.7.1.9-3 as ASME Code Section III conform ~~with~~ to the requirements of the ASME Code Section III.
5.a The seismic Category I equipment~~,~~ identified in Table 2.7.1.9-2~~, is designed to~~ can withstand seismic design basis loads without loss of safety function.	5.a.i Inspections will be performed to verify that the as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.1.9-2 is located in ~~the reactor building~~a seismic Category I structure.	5.a.i The as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.1.9-2 is located in ~~the reactor building.~~a seismic Category I structure.
	5.a.ii Type tests, analyses, or a combination of type tests and~~/or~~ analyses of ~~the~~ seismic Category I equipment identified in Table 2.7.1.9-2 will be performed using analytical assumptions, or will be performed under conditions, which bound the seismic design basis requirements.	5.a.ii ~~The results of the type tests and/or analyses~~A report exists and concludes that the seismic Category I equipment identified in Table 2.7.1.9-2 can withstand seismic design basis loads without loss of safety function.
	5.a.iii Inspections and analyses will be performed to verify that ~~on~~ the as-built seismic Category I equipment identified in Table 2.7.1.9-2, including anchorages, is seismically bounded by the tested or analyzed conditions.	5.a.iii A report exists and concludes that ~~T~~the as-built seismic Category I equipment identified in Table 2.7.1.9-2, including anchorages, is seismically bounded by the tested or analyzed conditions.

Table 2.7.1.9-5 Condensate and Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.b ~~Each of t~~The seismic Category I piping, including supports, identified in Table 2.7.1.9-3 ~~is designed to~~can 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 2.7.1.9-3 ~~are~~ is supported by a seismic Category I structure(s).	5.b.i ~~Reports(s) document that each of t~~The as-built seismic Category I piping, including supports, identified in Table 2.7.1.9-3 is supported by a seismic Category I structure(s).
	5.b.ii Inspections and analyses will be performed ~~for the existence of a report verifying~~to verify that the as-built seismic Category I piping, including supports, identified in Table 2.7.1.9-3 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 2.7.1.9-3 can withstand ~~combined normal and~~ seismic design basis loads without a loss of its safety function.
6.a The Class 1E equipment identified in Table 2.7.1.9-2 as being qualified for a harsh environment ~~is 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.	6.a.i Type tests ~~and/or analyses~~, or a combination of type tests and analyses using the design environmental conditions, or under conditions which bound the design environmental conditions, will be performed on ~~the~~ Class 1E equipment identified in Table 2.7.1.9-2 ~~located in~~as being qualified for a harsh environment.	6.a.i ~~The results of the type tests and/or analyses~~A report exists and concludes that the Class 1E equipment identified in Table 2.7.1.9-2 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.
	6.a.ii Inspection~~s~~ will be performed ~~on~~ of the as-built Class 1E equipment identified in Table 2.7.1.9-2 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 2.7.1.9-2 as being qualified for a harsh environment are bounded by type tests ~~and/or, analyses,~~ or a combination of type tests and analyses.

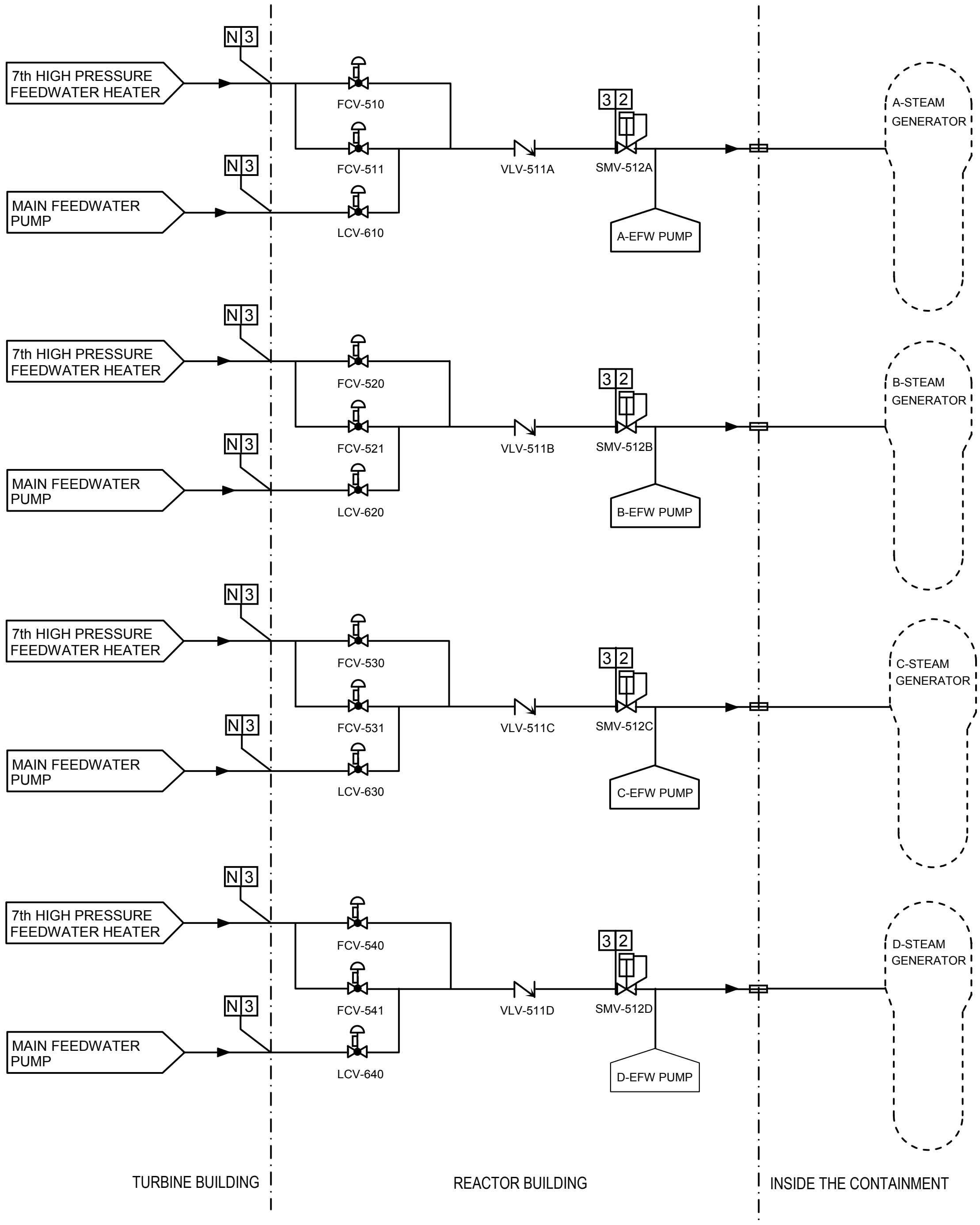
Table 2.7.1.9-5 Condensate and Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.b The Class 1E equipment, identified in Table 2.7.1.9-2, 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 2.7.1.9-2 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 2.7.1.9-2 under test.
6.c Separation is provided between redundant divisions of CFS 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 CFS Class 1E divisions and between Class 1E divisions cables and non-Class 1E cables.
7. Deleted.	7. Deleted.	7. Deleted.
8.a Controls exist are provided in the MCR to- open and close the remotely operated valves identified in Table 2.7.1.9-2.	8.a Tests will be performed on the as-built remotely operated valves listed identified in Table 2.7.1.9-2 using controls in the as-built MCR.	8.a Controls exist in the as-built MCR to open and close- the as-built remotely operated valves listed identified in Table 2.7.1.9-2.
8.b The remotely operated valves identified in Table 2.7.1.9-2 as having PSMS control perform an active safety function after receiving a signal from PSMS.	8.b.i – Tests will be performed on the as-built remotely operated valves listed identified in Table 2.7.1.9-2 as having PSMS control using simulated signals.	8.b.i The as-built remotely-operated valves identified in Table 2.7.1.9-2 as having PSMS control perform the active function identified in the table after receiving a simulated signal.
8.c Main feedwater isolation valves (MFIVs), main feedwater regulation valves (MFRVs), main feedwater bypass regulation valves(MFBRVs), and steam generator water filling control valves (SGWFCVs) isolate feedwater to limit the mass and energy release to containment as low as reasonably achievable.	8.cb.ii Tests will be performed to verifydemonstrate that remotely operated as-built MFIVs, MFRVs, MFBRVs and SGWFCVs identified in Table 2.7.1.9-2 close within the required response time using simulated signalsunder preoperational conditions.	8.c b.ii The as-built MFIVs, MFRVs, MFBRVs and SGWFCVs identified in Table 2.7.1.9-2valves close within the following times 5 seconds after receipt ofreceiving an simulatedactuation signal. The as-built MFIVs, MFRVs, MFBRVs and SGWFCVs close within 5 seconds.

Table 2.7.1.9-5 Condensate and Feedwater System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 6 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9.a The valves, identified in Table 2.7.1.9-2 as having an active safety function perform an active safety function to change position as indicated in the table.	9.a.i Tests or Ttype tests or a combination of type tests and analyses of the air operated valves and MFIVs identified in Table 2.7.1.9-2 as having an active safety function will be performed that demonstrate the capability of the valve to operate under its design conditions.	9.a.i A report exists and concludes that Eeach air operated valve and each MFIV changes position as indicated identified in Table 2.7.1.9-2 as having an active safety function under design condition.
	9.a.ii Tests of the as-built air operated valves and MFIVs identified in Table 2.7.1.9-2 as having an active safety function will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.a.ii Each as-built air operated valve and each as-built MFIV changes position as indicated identified in Table 2.7.1.9-2 as having an active safety function under the pre-operational test conditions.
	9.a.iii Tests of the as-built check valves with active safety functions identified in Table 2.7.1.9-2 as having an active safety function will be performed under preoperational test pressure, temperature, and fluid flow conditions.	9.a.iii Each as-built check valve identified in Table 2.7.1.9-2 as having an active safety function changes position as indicated in Table 2.7.1.9-2.
	9.a.iv Inspections will be performed of the as-built air operated valves and MFIVs identified in Table 2.7.1.9-2 as having an active safety function .	9.a.iv Each as-built air operated valve and MFIV identified in Table 2.7.1.9-2 as having an active safety function is bounded by the type tests, or a combination of type tests and analyses.
9.b After loss of motive power, the remotely operated valves, identified in Table 2.7.1.9-2, assume the indicated loss of motive power position.	9.b Tests of the as-built remotely operated valves identified in Table 2.7.1.9-2 will be performed under the conditions of loss of motive power.	9.b Upon loss of motive power, each as-built remotely operated valves identified in Table 2.7.1.9-2 assumes the indicated loss of motive power position.

10. MCR aAlarms and displays of the parameters identified in Table 2.7.1.9-4 can be retrievedare provided in the MCR.	10. Inspections will be performed for retrievability of the CFS parametersalarms and displays identified in Table 2.7.1.9-4 -in the as-built MCR.	10. MCR aAlarms and displays identified in Table 2.7.1.9-4 can be retrieved in the as-built MCR.
11. RSC aAlarms, displays and controls are identified in Table 2.7.1.9-4 are provided in the RSC.	11.i Inspections of the as-built RSC will be performed for retrievability of the alarms and displays and controls will be performed.identified in Table 2.7.1.9-4 in the as-built RSC.	11.i Alarms ,and displays and controls exist on the as-built RSC as identified in Table 2.7.1.9-4 can be retrieved in the as-built RSC.
	11.ii Tests of the as-built RSC control functions identified in Table 2.7.1.9-4 will be performed.	11.ii Controls in the as-built RSC operate the as-built equipment identified in Table 2.7.1.9-4 with an RSC control function.



REMARK
System ~~name~~ Code is omitted from~~of~~ valve numbers ~~is omitted~~ in this ~~drawing~~figure.

~~FWS-###-+++~~

Figure 2.7.1.9-1 Feedwater System

2.7.1.10 Steam Generator Blowdown System (SGBDS)

2.7.1.10.1 Design Description

System Purpose and Functions

The SGBDS ~~has~~ includes a safety-related function of isolating the secondary side of the SG using two isolation valves in series in the blowdown line from each SG. This ~~provides~~ maintains~~a~~ the SG as a heat sink for achieving a safe shutdown or ~~to mitigate~~mitigating the consequences of a design basis accident. A C

~~The SGBDS assists in maintaining secondary side water chemistry within acceptable limits during normal plant operation and during anticipated operational occurrences (AOO) due to main condenser in leakage or primary to secondary steam generator tube leakage.~~ D

The SGBDS also performs a ~~provides the~~ containment isolation function, as described in Section 2.11.2, for ~~of~~ the SGBDS lines penetrating the containment. B

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

The safety related portions of the SGBDS equipment and piping are located in the ~~containment~~C/V~~,~~ and the R/B~~, the A/B and the T/B~~. Seismic Category I piping identified in Table 2.7.1.10-2 is also located in the ~~containment~~C/V and the R/B. ~~Figure 2.7.1.10-1 illustrates the SGBDS, showing the arrangement of the SGBDS components.~~ E F

1. The functional arrangement of the steam generator blowdown system is as described in the Design Description of Subsection 2.7.1.10 and as shown in Figure 2.7.1.10-1. G

2.a.i The ASME Code Section III components of the SGBDS, identified in Table 2.7.1.10-1, are fabricated, installed, and inspected in accordance with ASME Code Section III requirements. H

2.a.ii The ASME Code Section III components of the SGBDS identified in Table 2.7.1.10-1 are reconciled with the design requirements. I

2.b.i The ASME Code Section III piping of the SGBDS, including supports, identified in Table 2.7.1.10-2, is fabricated, installed, and inspected in accordance with ASME Code Section III requirements. J

2.b.ii The ASME Code Section III piping of the SGBDS, including supports identified in Table 2.7.1.10-2, is reconciled with the design requirements. K

3.a Pressure boundary welds in ASME Code Section III components, identified in Table 2.7.1.10-1, meet ASME Code Section III requirements for non-destructive examination of welds. L

3.b Pressure boundary welds in ASME Code Section III piping, identified in Table 2.7.1.10-2, meet ASME Code Section III requirements for non-destructive examination of welds. M

4.a. The ASME Code Section III components, identified in Table 2.7.1.10-1, retain their pressure boundary integrity at their design pressure. N

4.b The ASME Code Section III piping, identified in Table 2.7.1.10-2, retains its pressure boundary integrity at its design pressure. O

5.a The seismic Category I equipment identified in Table 2.7.1.10-1 can withstand seismic design basis loads without loss of safety function. P

5.b The seismic Category I piping, including supports, identified in Table 2.7.1.10-2 can withstand seismic design basis loads without a loss of its safety function. Q

Key Design Features

One blowdown line per SG is provided. The blowdown line from each steam generator is provided with two flow paths: (1) purify and recovery line for normal plant operation and (2) line discharging to the condenser, the liquid waste management system and waste water system used during startup and abnormal water conditions. R

The blowdown water is drawn from each SG from a location above the tube sheet where impurities are expected to accumulate. The blowdown from each SG is depressurized by a throttle valve located downstream of the isolation valves. The throttle valves can be manually adjusted to control blowdown rate. S

Impurity removal includes filters and demineralizers. These demineralizers include cation demineralizers and mix bed demineralizers. T

The radiation monitor provided downstream of the demineralizers and the radiation monitor provided in the blowdown sampling line measure the radiation level. The blowdown water samples provide the information about impurities in blowdown water. U

The SGBDS is designed to provide containment isolation of the SGBDS lines penetrating the containment. V

Each mechanical division of the Steam Generator Blowdown System is physically separated from the other divisions by a structural barrier, which also serves as a fire barrier. The piping, components of reactor building exterior and components inside the containment are the exceptions. W

Seismic and ASME Code Classifications

The seismic category and ASME Code Section III requirements are identified in Tables 2.7.1.10-1 and 2.7.1.10-2 for safety-related SGBDS components and piping, respectively. X

~~**System Operation**~~

~~The SG blowdown water flows to a flash tank, where water and flashing vapor are separated. During plant startup, when the pressure in the flash tank is low, the vapor flows to the condenser. During normal plant operation, the vapor flows to the deaerator and the water is transferred to regenerative and non-regenerative heat exchangers for further cooling. The condensate feedwater system provides cooling in the regenerative heat exchanger(s) to recover thermal energy. The impurities from the cooled blowdown water are removed in the filters and demineralizers. The purified water is returned to the condenser. If this processed water exceeds the allowable limit of radiation level, this water is directed to the liquid waste management system for further processing.~~ Y

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

~~Table 2.7.1.10-3 identifies alarms, displays, and controls associated with the SGBDS that are located in the main control room.~~ Z

~~**Logic**~~

~~The isolation valves close automatically upon receipt of the blowdown line isolation signals:~~ AA

~~In addition, the containment isolation valve closes automatically upon receipt of a containment isolation signal. The containment isolation valve in the blowdown sample line close automatically upon receipt of the blowdown sampling line isolation signals:~~

~~**Interlocks**~~ BB

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

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

6. Class 1E ~~The safety-related SGBDS~~ equipment, identified in Table 2.7.1.10-1, ~~as Class 1E~~ is powered from its ~~their~~ respective Class 1E division. CC

7. Separation is provided between ~~these Class 1E~~redundant divisions of SGBDS Class 1E cables and between ~~non-~~Class 1E ~~divisions~~cables and non-Class 1E ~~electrical~~ cables. CC

8. After loss of motive power, the remotely operated valves, identified in Table 2.7.1.10-1, assume the indicated loss of motive power position. DD

9. Each mechanical division of the SGBDS (Divisions A, B, C & D) is physically separated from the other divisions with the exception of inside the containment so as not to preclude accomplishment of the safety function. EE

10. Displays identified in Table 2.7.1.10-3 are provided in the MCR. FF

11. Displays and controls identified in Table 2.7.1.10-3 are provided in the RSC. NN

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

12. The Class 1E ~~safety-related SGBDS~~ equipment identified in Table 2.7.1.10-1 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. GG

13.a Controls are provided in the MCR to open and close the remotely operated valves identified in Table 2.7.1.10-3. HH

13.b The remotely operated valves identified in Table 2.7.1.10-1 as having PSMS control perform an active safety function after receiving a signal from PSMS. II

14. The valves, identified in Table 2.7.1.10-1 perform an active safety function to change position as indicated in the table. JJ

~~**Interface Requirements**~~ KK

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

~~**Numeric Performance Values**~~ LL

~~Not applicable.~~

2.7.1.10.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1.10-4 describes the ITAAC for the SGBDS.

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

Table 2.7.1.10-1 Steam Generator Blowdown System Equipment Characteristics

System 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
SG blowdown isolation valves	SGS-AOV-001 A,B,C,D	2	Yes	Yes	Yes/Yes	Containment Isolation Phase A and Emergency Feedwater Actuation	Transfer Closed	Closed
SG blowdown isolation valves	SGS-AOV-002 A,B,C,D	3	Yes	Yes	Yes/Yes	Emergency Feedwater Actuation	Transfer Closed	Closed
SG Blowdown sampling line isolation valves	SGS-AOV-031 A,B,C,D	2	Yes	Yes	Yes/Yes	Containment Isolation Phase A and Emergency Feedwater Actuation	Transfer Closed	Closed

Table 2.7.1.10-2 Steam Generator Blowdown System Piping Characteristics

Pipe Line Name	ASME Section III Class	Seismic Category I
The piping and valves up to and including the first containment isolation valve outside the containment.	2	Yes
The SGBDS piping and valves from the outlet of the first containment isolation valve up to and including pipe anchors located in the main steam piping room wall.	3	Yes

Table 2.7.1.10-3 Steam Generator Blowdown System Equipment Alarms, Displays and Control Functions

Equipment Name	MCR/RSC Alarm	MCR Display	MCR/RSC Control Function	RSC Display
SG blowdown Isolation valves (SGS-AOV-001 A,B,C,D)	No	Yes	Yes	Yes
SG blowdown Isolation valves (SGS-AOV-0012 A,B,C,D)	No	Yes	Yes	Yes
SG Blowdown sampling line Isolation valves (SGS-AOV-031 A,B,C,D)	No	Yes	Yes	Yes

Table 2.7.1.10-4 Steam Generator Blowdown System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 1 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the steam generator blowdown system is as described in the Design Description of this Subsection 2.7.1.10, and as shown inon Figure 2.7.1.10-1.	1. An iInspection of the as-built steam generator blowdown system will be performed.	1. The as-built steam generator blowdown system conforms to the functional arrangement as described in the Design Description of this Subsection 2.7.1.10, and as shown on in Figure 2.7.1.10-1.
2.a.i The ASME Code Section III components of the SGBDS, identified in Table 2.7.1.10-1, 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 SGBDS, identified in Table 2.7.1.10-1, 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 SGBDS identified in Table 2.7.1.10-1 are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.a.ii The ASME Code Section III components of the SGBDS identified in Table 2.7.1.10-1 are reconciled with the design requirements.	2.a.ii A reconciliation analysis of the components identified in Table 2.7.1.10-1 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 SGBDS identified in Table 2.7.1.10-1. are reconciled with the design requirements. The report documents the results of the reconciliation analysis.

Table 2.7.1.10-4 Steam Generator Blowdown 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 SGBDS, including supports, identified in Table 2.7.1.10-2, 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 SGBDS, including supports, identified in Table 2.7.1.10-2, 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 SGBDS, including supports, identified in Table 2.7.1.10-2 is fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
2.b.ii The ASME Code Section III piping of the SGBDS, including supports, identified in Table 2.7.1.10-2 is reconciled with the design requirements.	2.b.ii A reconciliation analysis of the piping of the SGBDS, including supports, identified in Table 2.7.1.10-2, 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 SGBDS, including supports, identified in Table 2.7.1.10-2. ~~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 2.7.1.10-1, 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 2.7.1.10-1, 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 2.7.1.10-1.

Table 2.7.1.10-4 Steam Generator Blowdown 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 2.7.1.10-2, 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 2.7.1.10-2 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 2.7.1.10-2.
4.a The ASME Code Section III components, identified in Table 2.7.1.10-1, retain their pressure boundary integrity at their design pressure.	4.a A hydrostatic test will be performed on the as-built components, identified in Table 2.7.1.10-1, required by the ASME Code Section III to be hydrostatically tested.	4.a ASME Code Data Report(s) exist and conclude~~The~~ that the results of the hydrostatic ~~pressure~~ test of the as-built components identified in Table 2.7.1.10-1 as ASME Code Section III conform to ~~with~~ the requirements of the ASME Code Section III.
4.b The ASME Code Section III piping, identified in Table 2.7.1.10-2, 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 2.7.1.10-2, required by the ASME Code Section III to be hydrostatically tested.	4.b ASME Code Data Report(s) exist and conclude~~The~~ that the results of the hydrostatic~~pressure~~ test of the as-built piping identified in Table 2.7.1.10-2 as ASME Code Section III conform to ~~with~~ the requirements of the ASME Code Section III.
5.a The seismic Category I equipment identified in Table 2.7.1.10~~-~~-1 can ~~is designed to~~ withstand seismic design basis loads without loss of safety function.	5.a.i Inspections will be performed to verify that the as-built seismic Category I ~~as-built~~ equipment identified in Table 2.7.1.10~~-~~-1 is located in a seismic Category I structure ~~the reactor building~~.	5.a.i The as-built seismic Category I ~~as-built~~ equipment identified in Tables 2.7.1.10~~-~~-1 is located in a seismic Category I structure.~~the reactor building.~~
	5.a.ii Type tests, analyses, ~~and/~~or a combination of type tests and analyses of ~~the~~ seismic Category I equipment identified in Table 2.7.1.10-1 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 2.7.1.10-1 can withstand seismic design basis loads without loss of safety function.
	5.a.iii Inspections and analyses will be performed ~~on~~to verify that the as-built seismic Category I equipment identified in Table 2.7.1.10-1, including anchorages, is seismically	5.a.iii A report exists and concludes that t~~T~~he as-built seismic Category I equipment identified in Table 2.7.1.10-1, including anchorages, is seismically

	bounded by the tested or analyzed conditions.	bounded by the tested or analyzed conditions.

Table 2.7.1.10-4 Steam Generator Blowdown System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 4 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.b ~~Each of t~~The seismic Category I piping, including supports, identified in Table 2.7.1.10-2 ~~is designed to~~ can 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 2.7.1.10-2 is~~are~~ supported by a seismic Category I structure(s).	5.b.i ~~Reports(s) document that each of t~~The as-built seismic Category I piping, including supports, identified in Table 2.7.1.10-2 is supported by a seismic Category I structure(s).
	5.b.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 2.7.1.10-2 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 2.7.1.10-2 can withstand ~~combined normal and~~ seismic design basis loads without a loss of its safety function.
6. ~~The~~ Class 1E equipment, identified in Table 2.7.1.10-1, is powered from ~~their~~its respective Class 1E division.	6. A test will be performed on each division of the as-built Class 1E equipment identified in Table 2.7.1.10-1 by providing a simulated test signal only in the Class 1E division under test.	6. The simulated test signal exists at the as-built Class 1E equipment identified in Table 2.7.1.10-1 under test.
7. Separation is provided between redundant divisions of SGBDS Class 1E cables ~~divisions~~, and between Class 1E ~~divisions~~cables and non-Class 1E cables~~equipment~~.	7. Inspections of the as-built Class 1E divisional cables will be performed.	7. Physical separation or electrical isolation is provided in accordance with R.G. 1.75, between the as-built cables of redundant SGBDS Class 1E divisions and between Class 1E ~~divisions~~cables and non-Class 1E cables.
8. After loss of motive power, the ~~air~~remotely -operated valves, identified in Table 2.7.1.10-1, assume the indicated loss of motive power position.	8. Tests of the as-built remotely operated valves identified in Table 2.7.1.10-1 will be performed under the conditions of loss of motive power.	8. Upon loss of motive power, each as-built remotely operated valve~~s~~ identified in Table 2.7.1.10-1 assumes the indicated loss of motive power position.
9. Each mechanical division of the SGBDS ~~except for piping~~ (Divisions A, B, C & D ~~A&B and C&D pairs~~) is physically separated from the other divisions with the exception of ~~reactor building exterior and~~ inside the containment so as not to preclude accomplishment of the safety function.	9. Inspections and analysis of the as-built SGBDS will be performed.	9. A report exists and concludes that ~~E~~each mechanical division of the as-built SGBDS ~~except for piping~~ is physically separated from other mechanical divisions of the ~~as-built SGBDS by~~system by ~~structural~~spatial separation, barriers, or enclosures with the exception of ~~reactor building exterior and~~ inside the containment so as to assure that the functions of

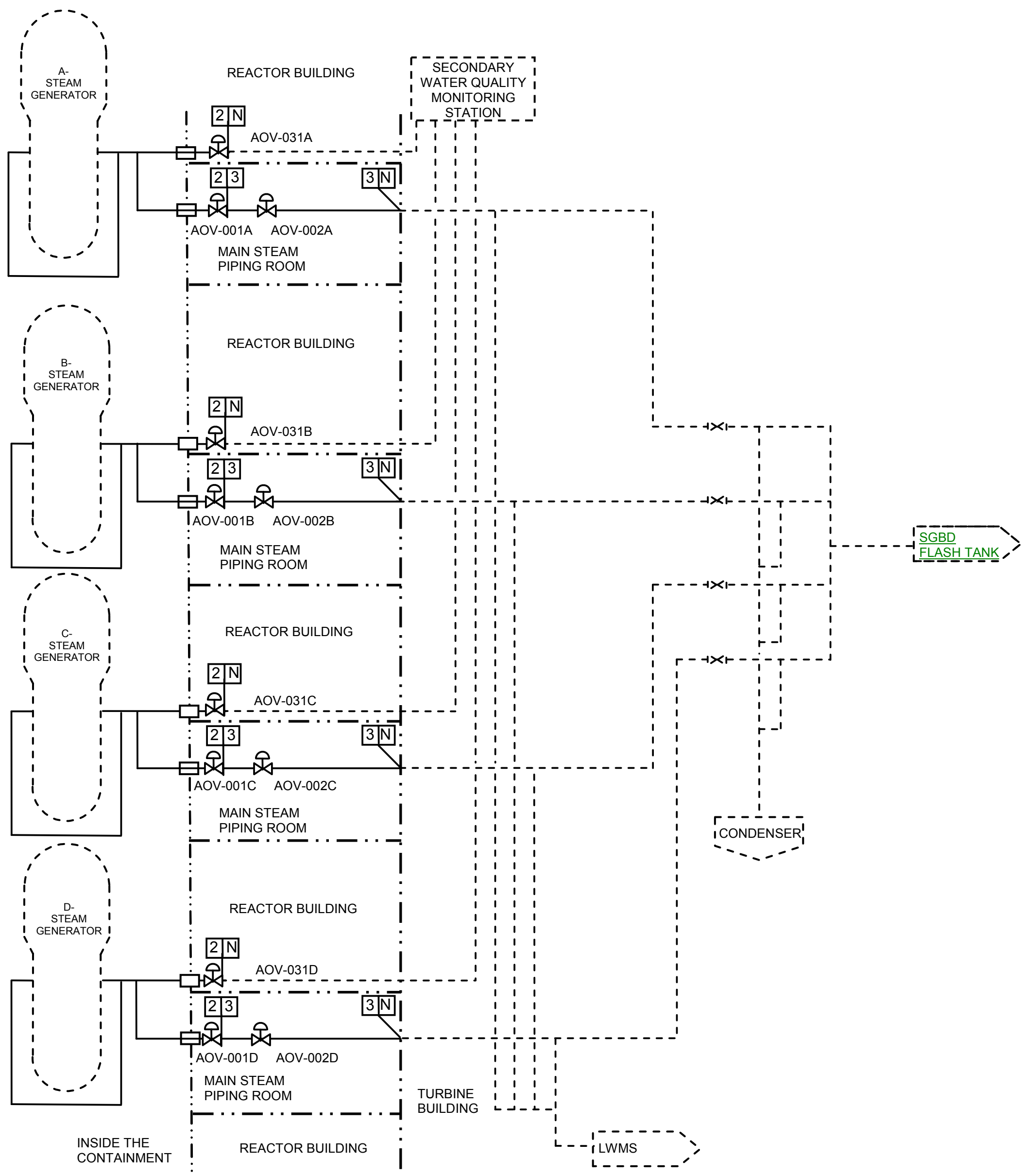
		the safety related system are maintained.
10. MCR alarms and dDisplays of the parameters identified in Table 2.7.1.10-3 can be retrievedare provided in the MCR.	10. Inspections will be performed for retrievability of the SGBDS parametersdisplays identified in Table 2.7.1.10-3 in the as-built MCR.	10. The MCR alarms and dDisplays identified in Table 2.7.1.10-3 can be retrieved in the as-built MCR.
11. RSC alarms, dDisplays and controls are identified in Table 2.7.1.10-3 are provided in the RSC.	11.i Inspections of the as-built RSC alarms, displays and controls will be performed for retrievability of the displays identified in Table 2.7.1.10-3 in the as-built RSC.	11.i Alarms, dDisplays and controls exist on the as-built RSC as identified in Table 2.7.1.10-3 can be retrieved in the as-built RSC.

Table 2.7.1.10-4 Steam Generator Blowdown System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 5 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	ii. Tests of the as-built RSC control functions identified in Table 2.7.1.10-3 will be performed.	ii. Controls in the as-built RSC operate the as-built equipment identified in Table 2.7.1.10-3 with an RSC control function.
12. The Class 1E equipment identified in Table 2.7.1.10-1 as being qualified for a harsh environment can~~are designed to~~ 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.	12.i Type tests ~~and/~~or a combination of type tests and analyses using the design environmental conditions, or under conditions which bound the design environmental conditions, will be performed on ~~the~~ Class 1E equipment identified in Table 2.7.1.10-1 as being qualified ~~located in~~for a harsh environment.	12.i ~~The results of the type tests and/or analyses~~A report exists and concludes that the Class 1E equipment identified in Table 2.7.1.10-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident ~~event~~ without loss of safety function for the time required to perform the safety function.
	12.ii Inspection~~s~~ will be performed ~~on~~ of the as-built Class 1E equipment identified in Table 2.7.1.10-1 as being qualified for a harsh environment and the associated wiring, cables, and terminations located in a harsh environment.	12.ii The as-built Class 1E equipment and the associated wiring, cables, and terminations identified in Table 2.7.1.10-1 as being qualified for a harsh environment are bounded by type tests ~~and/~~or a combination of type tests and analyses.
13.a Controls are provided ~~exist~~ in the MCR to open and close the remotely operated valves identified in Table 2.7.1.10-3.	13.a Tests will be performed on the as-built remotely operated valves identified~~listed~~ in Table 2.7.1.10-3 using controls in the as-built MCR.	13.a Controls ~~exist~~ in the as-built MCR ~~to~~ open and close the as-built remotely operated valves ~~listed~~ identified in Table 2.7.1.10-3.
13.b The remotely operated valves identified in Table 2.7.1.10-1 as having PSMS control perform an active safety function after receiving a signal from PSMS.	13.b Test will be performed on the as-built remotely operated valves identified ~~listed~~ in Table 2.7.1.10-1 as having PSMS control using simulated signals.	13.b The as-built remotely operated valves identified in Table 2.7.1.10-1 as having PSMS control perform the active safety function identified in the table after receiving a simulated signal.

Table 2.7.1.10-4 Steam Generator Blowdown System Inspections, Tests, Analyses, and Acceptance Criteria (Sheet 6 of 6)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
14. The air-operated valves, identified in Table 2.7.1.10-1 as having an active safety function perform an active safety function to change position as indicated in the table.	14.i Type ~~T~~tests or a combination of type tests and analyses of the air operated valves identified in Table 2.7.1.10-1 as having an active safety function will be performed that demonstrate the capability of the valve to operate under its design conditions.	14.i A report exists and concludes that ~~E~~each air operated valve changes position as ~~indicated~~identified in Table 2.7.1.10-1 as having an active safety function under design conditions.
	14.ii Tests of the as-built air operated valves identified in Table 2.7.1.10-1 as having an active safety function will be performed under pre-operational flow, differential pressure, and temperature conditions.	14.ii Each as-built air operated valve changes position as ~~indicated~~ identified in Table 2.7.1.10-1 as having an active safety function under ~~the~~ pre-operational test conditions.
	14.iii Inspections will be performed of the as-built air-operated valves identified in Table 2.7.1.10-1 as having an active safety function.	14.iii Each as-built air-operated valve identified in Table 2.7.1.10-1 as having an active safety function is bounded by the type tests, or a combination of type tests and analyses.



REMARK
System name Code ofin valve numbers is omitted from valve numbers in this drawingfigure.

SGS ###-+++

Figure 2.7.1.10-1 Steam Generator Blowdown System

2.7.4 Radwaste Systems

2.7.4.1 Liquid Waste Management System (LWMS)

2.7.4.1.1 Design Description

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

The LWMS is a non safety-related system. The reactor coolant drain tank and the containment vessel sump discharge piping penetrate the PCCV pressure boundary and include~~ a~~ safety-related containment isolation~~ function~~ valves as described in Section 2.11.2. The LWMS ~~is designed to safely~~ monitors, controls, collects, processes, handles, stores, and disposes of liquid radioactive waste generated ~~as a result of~~ during normal operation, including anticipated operational occurrences (AOOs). The LWMS ensures that liquid waste releases comply with 10 CFR 20, Appendix B, Table 2, effluent concentration and dose limits, and 10 CFR 50, Appendix I dose objectives for liquid effluents. A B

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

The LWMS is located in the containment, the auxiliary building (A/B), and the reactor building (R/B). C

~~**Key Design Features**~~

The LWMS ~~has different~~ subsystems ~~so that the~~ separately process liquid wastes from various sources ~~can be segregated and processed separately~~ in the most appropriate manner for ~~the~~ each type of waste. These subsystems are interconnected ~~in order~~ to provide ~~additional~~ processing flexibility ~~in processing the wastes~~ and ~~to provide~~ redundancy. D

The LWMS subsystems include~~s the following~~: D

- ~~The e~~Equipment and floor drain ~~processing~~ subsystem
- ~~The d~~Detergent drain subsystem
- ~~The c~~Chemical drain subsystem
- ~~The r~~Reactor coolant drain subsystem

The LWMS ~~provides the capability to~~ segregates, collects, and treats ~~the~~ liquid waste using ion exchanger columns and filters to reduce radioactivity to levels acceptable for release or ~~recycle specifications for plant~~ re-use. ~~The LWMS also provides the capability to store, sample, and analyze treated liquid for safe control and disposal.~~ E F

1. The functional arrangement of the LWMS is as described in the Design Description of Subsection 2.7.4.1.1 and Table 2.7.4.1-2. G

2. Upon receipt of a high radiation signal above the pre-determined setpoint, the LWMS discharge valves close automatically. H

3. Deleted. I

4. Deleted. J

5. Deleted.

6. LWMS filters and demineralizers identified in Table 2.7.4.1-2 have the capacity to maintain radioactivity releases within regulatory limits. K

7. Alarm from the liquid radwaste discharge radiation monitor is provided in the MCR. L

~~Tanks, equipment, pumps, etc., used for storing and processing radioactive material are located in controlled areas and shielded in accordance with their design basis source term inventories. After the waste has been processed, it is temporarily stored in monitor tanks where it is sampled prior to recycle or discharge. Connections are provided to forward liquid waste to contracted mobile systems or temporary equipment.~~ M

~~LWMS is designed in compliance with the as low as reasonable achievable (ALARA) principle.~~

~~The LWMS is designed to provide containment isolation of the LWMS lines penetrating containment.~~ N

~~Seismic and ASME Code Classifications~~

~~The seismic and ASME code classifications of the containment isolation components of the reactor coolant drain tank and the containment vessel sump are described in Table 2.11.2-1. The portions of the auxiliary building (A/B) that house the principal LWMS equipment are designed to seismic Category II. The LWMS is a non-safety system and the components are non-seismic.~~ O

~~System Operation~~

~~The LWMS is designed to process liquid waste generated from normal operation. Treated effluent is normally recycled for plant use. In the event that there is excess water, or that the treated effluent does not meet recycled water quality specifications, the water is discharged after sampling and analysis. The discharge valve is under supervisory control and requires approval to open for discharge.~~ P

~~Alarms, Displays, and Controls~~

~~A radiation monitor and dual isolation valves are installed on the sole discharge line to monitor and control effluents to the environment. Detection of radioactivity levels in the stream exceeding the predetermined setpoint automatically closes the discharge valves.~~ Q

~~Logic~~

~~The containment isolation logic for the reactor coolant drain tank and the containment vessel sump is consistent with Subsection 2.11.2.~~ R

~~Interlocks~~

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

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

~~Not applicable.~~

~~Equipment to be Qualified for Harsh Environments~~

~~The safety related LWMS equipment to be qualified for harsh environments is identified in Table 2.11.2-1.~~ T

~~Interface Requirements~~

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

~~Numeric Performance Values~~ U

~~Not applicable.~~

2.7.4.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.1-1 describes the ITAAC for the LWMS.

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

Table 2.7.4.1-1 Liquid Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the LWMS is as described in the Design Description of this Subsection 2.7.4.1.1 and in Table 2.7.4.1-2.	1. Inspections of the as-built LWMS system will be performed.	1. The as-built LWMS conforms with to the functional arrangement as described in the Design Description of this Subsection 2.7.4.1.1 and in Table 2.7.4.1-2.
2. Upon receipt of LWMS effluent discharge isolation a high radiation signal above the pre-determined setpoint, the LWMS effluent discharge valves close automatically.	2. Tests of the as-built LWMS effluent discharge valves will be performed using a simulated test signal.	2. Upon receipt of a simulated LWMS high radiation test signal, the as-built LWMS effluent discharge valves close automatically.
3. The ASME components of the LWMS retain their pressure boundary integrity at their design pressure. Deleted.	3. A pressure test will be performed on the as-built ASME components of the LWMS required to be hydrostatically examined by the ASME B31.3 as described by Regulatory Guide 1.143. Deleted.	3. The results of the pressure test of the as-built ASME components of the LWMS conform with the requirements in the ASME B31.3, as described by Regulatory Guide 1.143. Deleted.
4. Deleted.	4. Deleted.	4. Deleted.
5. The LWMS valves and piping are designed and constructed in accordance with ASME B31.3 requirements. Deleted.	5.a Inspections will be conducted of the fabrication and installation of as-built components. Deleted.	5.a Design documentation exists and concludes that the as-built valves and piping of the LWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements. Deleted.
	5.b Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation. Deleted.	5.b The analysis concludes that the as-built LWMS valves and piping are reconciled with the design documents. Deleted.
6. LWMS filters and demineralizers identified in Table 2.7.4.1-2 have the capacity to maintain radioactivity releases within regulatory limits.	6. Inspections will be performed to verify the amount of filtration and ion exchange media loaded in LWMS filters and demineralizer vessels.	6. The vendor specified filter and ion exchange media for LWMS filters and demineralizers identified in Table 2.7.4.1-2 is loaded in the filter housings and demineralizer vessels.
7. Alarm from the liquid radwaste discharge radiation monitor is provided in the MCR.	7. Inspection will be performed for retrievability of the alarm from the liquid radwaste discharge radiation monitor in the as-built MCR.	7. Alarm from the liquid radwaste discharge radiation monitor can be retrieved in the as-built MCR.

Table 2.7.4.1-2 Liquid Waste Management System Major Component

Component Name	Quantity	Component Location
Equipment and floor drain subsystem		
Waste holdup tanks	4	Auxiliary Building
Waste holdup tank pumps	2	Auxiliary Building
Waste monitor tanks	2	Auxiliary Building
Waste monitor tank pump	2	Auxiliary Building
Waste effluent Inlet filter	2	Auxiliary Building
Waste demineralizer	4	Auxiliary Building
Activated carbon filter	1	Auxiliary Building
Detergent drain subsystem		
Detergent drain tank	1	Auxiliary Building
Detergent drain tank pump	1	Auxiliary Building
Detergent drain monitor tank	1	Auxiliary Building
Detergent drain monitor tank pump	1	Auxiliary Building
Detergent Drain Filter	1	Auxiliary Building
Chemical drain subsystem		
Chemical drain tank	1	Auxiliary Building
Chemical drain tank pump	1	Auxiliary Building
Reactor coolant drain subsystem		
Containment vessel reactor coolant drain tank	1	Containment
Containment vessel reactor coolant drain pumps	2	Containment

2.7.4.2 Gaseous Waste Management System (GWMS)

2.7.4.2.1 Design Description

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

The GWMS is a ~~not~~non safety-related system. The GWMS ~~is designed to~~ monitors, controls, collects, processes, handles, stores, and disposes of gaseous radioactive waste generated as the result of normal operation, including anticipated operational occurrences (AOOs). The GWMS processes potentially radioactive gases using charcoal beds to remove iodine and create sufficient delay time to allow decay of short half-life radioactive isotopes prior to release. The GWMS ensures that gaseous waste releases comply with 10 CFR Part 20, Appendix B, concentration and dose limits, and 10 CFR Part 50, Appendix I dose objectives for gaseous effluents. The GWMS is located in the auxiliary building (A/B). B C

The GWMS includes the following components: D

- Waste gas surge tanks
- Charcoal beds
- Waste gas compressors
- Waste gas dryer

1. The functional arrangement of the GWMS is as described in the Design Description of Subsection 2.7.4.2.1 and in Table 2.7.4.2-2. E

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

~~The GWMS is located in the A/B. The GWMS uses the gas surge tanks to provide temporary storage of radioactive gas for the decay of the short-lived isotopes that contribute the majority of radioactivity. It also includes the charcoal beds for radioactive gases decay before the gases are released into the environment.~~ F

~~**Key Design Features**~~

~~The GWMS design provides sufficient capacity and flexibility to collect and process incoming radioactive waste gases for release. Streams in the GWMS are monitored for both hydrogen and oxygen content to prevent flammable mixture. The waste gas compressor packages are used to compress the nitrogen waste gas. The charcoal beds provide adequate delay and decay time before the gases are released into the environment. The radiation level in the treated gases is verified with radiation monitors prior to release to the environment. These radiation monitors send signal to close the GWMS discharge valves upon detection of radiation levels above the set point.~~ G H I

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

~~The portions of the A/B that house the principal GWMS equipment are designed to seismic Category II. The GWMS is a non-safety system and the components are non-seismic.~~ J K

~~**System Operation**~~

~~A gas compressor operates continuously to draw gaseous waste from the holdup tanks, volume control tank and the reactor coolant drain tank and directs the gaseous waste into the gas surge tanks for radioactive decay of short-half life isotopes. Then the gaseous waste is processed through the dryer, the charcoal bed absorbers, and sent to the plant stack for release to the environment.~~ L

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

2. Upon ~~detection~~ receipt of a high radiation ~~levels~~ signal above the pre-determined setpoint, the ~~GWMS radiation monitor activates an alarm and sends signals to close the~~ GWMS discharge valves close automatically. M

3. Deleted. N

4. Deleted.

5. GWMS charcoal bed columns each contain the design basis volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits. O

6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR. P

~~**Logic**~~ Q

~~There is no logic needed for direct safety functions related to the GWMS.~~

~~**Interlocks**~~

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

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

~~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.~~

2.7.4.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.2-1 describes the ITAAC for the GWMS.

Table 2.7.4.2-1 Gaseous Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the GWMS is as described in the Design Description of this Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.	1. Inspections of the as-built system GWMS will be performed.	1. The as-built GWMS conforms with to the functional arrangement as described in the Design Description of this Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.
2. Upon the receipt of GWMS effluent discharge isolation a high radiation signal above the pre-determined setpoint, the GWMS effluent discharge valves close automatically.	2. Tests of the as-built GWMS effluent discharge valves will be performed using a simulated test signal.	2. Upon the receipt of a simulated GWMS effluent discharge isolation high radiation test signal, the as-built GWMS effluent discharge valves close automatically.
3. The ASME Code components of the GWMS retain their pressure boundary integrity at their design pressure. Deleted..	3. A pressure test will be performed on the as-built ASME code components of the GWMS required to be hydrostatically examined by applicable ASME code.Deleted.	3. The results of the pressure test of the as-built ASME Code components of the GWMS conform with the requirements in the applicable ASME Code.Deleted.
4. The GWMS valves and piping are designed and constructed in accordance with ASME B31.3 requirements. Deleted.	4.a Inspections will be conducted of the fabrication and installation of as-built components.Deleted.	4.a Design documentation exists and concludes that the as-built valves and piping of the GWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.Deleted.
	4.b Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.Deleted.	4.b The analysis concludes that the as-built GWMS valves and piping are reconciled with the design documents.Deleted.
5. GWMS charcoal bed columns each contain the volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits.	5. Inspections will be performed to verify the contained volume of each of the charcoal beds.	5. The contained volume in each of the charcoal beds is equal to or greater than 70 ft^3/column.
6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR.	6. Inspection will be performed for the retrievability of the alarm from the gaseous radwaste discharge monitor in the as-built MCR.	6. Alarm from gaseous radwaste discharge radiation monitor can be retrieved in the as-built MCR.

Table 2.7.4.2-2 Gaseous Waste Management System Major Component

Component Name	Quantity	Component Location
Waste gas surge tanks	4	Auxiliary Building
Charcoal beds	4	Auxiliary Building
Waste gas compressors	2	Auxiliary Building
Waste gas dryer	1	Auxiliary Building

2.7.4.2 Gaseous Waste Management System (GWMS)

2.7.4.2.1 Design Description

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

The GWMS is a ~~not~~non safety-related system. The GWMS ~~is designed to~~ monitors, controls, collects, processes, handles, stores, and disposes of gaseous radioactive waste generated as the result of normal operation, including anticipated operational occurrences (AOOs). The GWMS processes potentially radioactive gases using charcoal beds to remove iodine and create sufficient delay time to allow decay of short half-life radioactive isotopes prior to release. The GWMS ensures that gaseous waste releases comply with 10 CFR Part 20, Appendix B, concentration and dose limits, and 10 CFR Part 50, Appendix I dose objectives for gaseous effluents. The GWMS is located in the auxiliary building (A/B). B C

The GWMS includes the following components: D

- Waste gas surge tanks
- Charcoal beds
- Waste gas compressors
- Waste gas dryer

1. The functional arrangement of the GWMS is as described in the Design Description of Subsection 2.7.4.2.1 and in Table 2.7.4.2-2. E

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

~~The GWMS is located in the A/B. The GWMS uses the gas surge tanks to provide temporary storage of radioactive gas for the decay of the short-lived isotopes that contribute the majority of radioactivity. It also includes the charcoal beds for radioactive gases decay before the gases are released into the environment.~~ F

~~**Key Design Features**~~

~~The GWMS design provides sufficient capacity and flexibility to collect and process incoming radioactive waste gases for release. Streams in the GWMS are monitored for both hydrogen and oxygen content to prevent flammable mixture. The waste gas compressor packages are used to compress the nitrogen waste gas. The charcoal beds provide adequate delay and decay time before the gases are released into the environment. The radiation level in the treated gases is verified with radiation monitors prior to release to the environment. These radiation monitors send signal to close the GWMS discharge valves upon detection of radiation levels above the set point.~~ G H I

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

~~The portions of the A/B that house the principal GWMS equipment are designed to seismic Category II. The GWMS is a non-safety system and the components are non-seismic.~~ J K

~~**System Operation**~~

~~A gas compressor operates continuously to draw gaseous waste from the holdup tanks, volume control tank and the reactor coolant drain tank and directs the gaseous waste into the gas surge tanks for radioactive decay of short-half life isotopes. Then the gaseous waste is processed through the dryer, the charcoal bed absorbers, and sent to the plant stack for release to the environment.~~ L

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

2. Upon ~~detection~~ receipt of a high radiation ~~levels~~ signal above the pre-determined setpoint, the ~~GWMS radiation monitor activates an alarm and sends signals to close the~~ GWMS discharge valves close automatically. M

3. Deleted. N

4. Deleted.

5. GWMS charcoal bed columns each contain the design basis volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits. O

6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR. P

~~**Logic**~~ Q

~~There is no logic needed for direct safety functions related to the GWMS.~~

~~**Interlocks**~~

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

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

~~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.~~

2.7.4.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.2-1 describes the ITAAC for the GWMS.

Table 2.7.4.2-1 Gaseous Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the GWMS is as described in the Design Description of this Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.	1. Inspections of the as-built system GWMS will be performed.	1. The as-built GWMS conforms with to the functional arrangement as described in the Design Description of this Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.
2. Upon the receipt of GWMS effluent discharge isolation a high radiation signal above the pre-determined setpoint, the GWMS effluent discharge valves close automatically.	2. Tests of the as-built GWMS effluent discharge valves will be performed using a simulated test signal.	2. Upon the receipt of a simulated GWMS effluent discharge isolation high radiation test signal, the as-built GWMS effluent discharge valves close automatically.
3. The ASME Code components of the GWMS retain their pressure boundary integrity at their design pressure. Deleted..	3. A pressure test will be performed on the as-built ASME code components of the GWMS required to be hydrostatically examined by applicable ASME code.Deleted.	3. The results of the pressure test of the as-built ASME Code components of the GWMS conform with the requirements in the applicable ASME Code.Deleted.
4. The GWMS valves and piping are designed and constructed in accordance with ASME B31.3 requirements. Deleted.	4.a Inspections will be conducted of the fabrication and installation of as-built components.Deleted.	4.a Design documentation exists and concludes that the as-built valves and piping of the GWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.Deleted.
	4.b Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.Deleted.	4.b The analysis concludes that the as-built GWMS valves and piping are reconciled with the design documents.Deleted.
5. GWMS charcoal bed columns each contain the volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits.	5. Inspections will be performed to verify the contained volume of each of the charcoal beds.	5. The contained volume in each of the charcoal beds is equal to or greater than 70 ft^3/column.
6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR.	6. Inspection will be performed for the retrievability of the alarm from the gaseous radwaste discharge monitor in the as-built MCR.	6. Alarm from gaseous radwaste discharge radiation monitor can be retrieved in the as-built MCR.

Table 2.7.4.2-2 Gaseous Waste Management System Major Component

Component Name	Quantity	Component Location
Waste gas surge tanks	4	Auxiliary Building
Charcoal beds	4	Auxiliary Building
Waste gas compressors	2	Auxiliary Building
Waste gas dryer	1	Auxiliary Building

2.7.4.3 Solid Waste Management System (SWMS)

2.7.4.3.1 Design Description

System Purpose and Functions A

The SWMS is non safety-related system. The SWMS is designed to provide collection, processing, packaging, and storage of that collects and temporarily stores radioactive wastes prior to processing or shipmentproduced during normal operation and anticipated operational occurrences (AOOs) including startup, shutdown, and refueling operations.

Location and Functional Arrangement

The SWMS is located in the A/B. The SWMS consists of several subsystems, each of which is designed functionally arranged to managehandle various solid radioactive waste products, including different types of wastes as follows: spent resin, and spent carbon, spent filter elements, sludge and oily waste, and dry active wastes, including contaminated clothing, contaminated and/or broken tools and other contaminated maintenance materials.

The SWMS includes two spent resin storage tanks described in Table 2.7.4.3-2. These tanks are used for temporary storage of radwaste prior to dewatering and shipment. B

A

The spent resin and spent carbon handling and dewatering subsystem consists of spent resin storage tanks and a modular dewatering station consisting of a control console, a fillhead, and a dewatering pump.

Spent filter elements are handled with remote handling equipment to minimize worker exposure.

Sludge and oily wastes are collected in specially designed sumps and are pumped to shipping containers for offsite treatment and/or disposal.

The dry active wastes are separately collected at the point of generation and are packaged for separate disposal. The onsite wastes storage area is equipped with an overhead crane and an indoor truck bay to load packaged waste for off-site transportation and disposal.

Key Design Features

The SWMS has the capability of processing, packaging, and storing radioactive wet solid wastes that mainly consist of spent resin, spent activated carbon, oily waste, and sludge.

The SWMS provides storage of the packaged wastes in the A/B.

The spent resin storage tanks are cross-connected so that the failure or maintenance of one component does not impair system or plant operation.

The SWMS is designed with permanently installed equipment and modular equipment.

~~Seismic and ASME Code Classifications~~

~~The portions of the A/B that house the principal SWMS equipment are designed to seismic Category II. The SWMS is a non-safety system and the components are non seismic.~~ C

~~System Operation~~

~~The spent resin storage tanks receive spent resin from various plant sources and provide staging for decay and transfer capability into disposal containers for off-site disposal. The spent charcoal handling subsystem shares the use of the spent resin storage tanks and the resin dewatering equipment. Spent resin, spent charcoal, and spent filter packaging operations are controlled remotely and/or from a local control console for filter replacement and spent resin dewatering. Lubricants and waste solvents drainage is collected in the area sump tanks which are specially designed to provide staging and gravitational oil separation. The separated oils are transferred directly into disposable drums.~~ A

~~Alarms, Displays, and Controls~~ D

~~There are no important alarms, displays, and controls.~~

~~Logic~~

~~There is no logic needed for direct safety functions related to the SWMS.~~

~~Interlocks~~

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

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

~~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.~~

1. The functional arrangement of the SWMS is as described in the Design Description of Subsection 2.7.4.3.1 and in Table 2.7.4.3-2. E

2. DELETED

3. DELETED

4. The SWMS provides the nonsafety-related function of storing radioactive spent resins prior to processing or shipment.

2.7.4.3.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.3-1 describes the ITAAC for the SWMS.

Table 2.7.4.3-1 Solid Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the SWMS is as described in the Design Description of this the Subsection 2.7.4.3.1 and in Table 2.7.4.3-2.	1. Inspections of the as-built system SWMS will be performed.	1. The as-built SWMS conforms with to the functional arrangement as described in the Design Description of this Subsection 2.7.4.3.1 and in Table 2.7.4.3-2.
~~2. The ASME Code components of the liquid containing portions of the SWMS retain their pressure boundary integrity at their design pressure.~~ 2. DELETED	~~2. A pressure test will be performed on the as-built ASME code components of the liquid containing portions of the SWMS required to be hydrostatically examined by the applicable ASME code.~~	~~2. The results of the pressure test of the as-built ASME Code components of the liquid containing portions of the SWMS conform with the requirements in the applicable ASME code.~~
~~3. The valves and piping of the liquid containing portions of the SWMS are designed and constructed in accordance with ASME B31.3 requirements.~~ 3. DELETED	~~3.a Inspections will be conducted of the fabrication and installation of as-built components.~~	~~3.a Design documentation exists and concludes that the as-built valves and piping of the liquid containing portions of the SWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.~~
	~~3.b Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.~~	~~3.b The analysis concludes that the as-built valves and piping of the liquid containing portions of the SWMS are reconciled with the design documents.~~
4. The SWMS provides the nonsafety-related function of storing radioactive spent resins prior to processing or shipment.	4. Inspection will be performed to verify that the volume of each of the spent resin tanks, MTK-001A-N and MTK-001B-N, is at least 800 ft^3.	4. A report exists and concludes that the volume of each of the spent resin tanks, MTK-001A-N and MTK-001B-N, is at least 800 ft^3.

B

Table 2.7.4.3-2 Solid Waste Management System Spent Resin Tanks

Component Name	Tank Type	Tag No.	Component Location
SWMS A-Spent Resin Storage Tank	Cylindrical, Vertical	MTK-001A-N	Auxiliary Building
SWMS B-Spent Resin Storage Tank	Cylindrical, Vertical	MTK-001B-N	Auxiliary Building