

ESBWR Certification
Probabilistic Risk Assessment
Section 4 Changes From Revision 1 to Revision 2

	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1.	S4.0.1, 1 st , 2 nd , 8 th , 10 th thru 12 th Bullets	Rewritten for consistency of revised titling scheme.
2.	S4.0.2, 2 nd para, last sent	Deleted to be consistent with Table 4.0-1.
3.	T4.0-1	Updated to reflect the system models used in Rev. 2. To address RAI 19.1-42, the table content has been Updated to clarify the system descriptions modeled in PRA.
4.	S4.0.3	Additional information provided for clarity with General Assumptions and Modeling Groundrules added.
5.	S4.0.4	Added a new subsection to replace Appendix 4.A
6.	S4A	Appendix A.4 is moved to section 4.04.
7.	S4.1 Title	Rewritten for consistency with titling scheme.
8.	S4.1.2, Title	Rewritten for consistency with titling scheme.
9.	S4.1.2, entire subsection	Rewritten for clarification with additional information provided in response to RAI 19.1-46D
10.	S4.1.3.1, 1 st para	Deleted the references to 200 mm inlets and 250 mm outlets since the SRV sizing is not finalized, plus this information is not necessary in the PRA documentation.
11.	S4.1.3.1, 2nd para, 3 rd sent	Deleted reference to the vacuum breakers since credit is not given to these vacuum breakers in the model, and this sentence is not appropriate.
12.	S4.1.3.1, 3 rd & 5 th para	Rewritten for clarity in response to RAI 19.1-46A/B.
13.	S4.1.3.2	Rewritten for clarity.
14.	S4.1.3.3, 1 st para, 2 nd sent	Rewritten for clarity with additional information provided in response to RAI 19.1-46E.
15.	S4.1.4	Rewritten for clarification
16.	S4.1.4.1, 1 st para	Additional information provided for clarity in response to RAI 19.1-46C.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
17.	S4.1.4.2	Rewritten for clarification with additional information provided
18.	S4.1.4.3	Rewritten for clarification with additional information provided
19.	S4.1.5	Rewritten for clarification with additional information provided
20.	S4.1.8	Rewritten for clarification with additional information provided
21.	S4.1.9.1	Change of table numbering.
22.	S4.1.9.2	Rewritten for clarification
23.	S4.1.9.3	Rewritten for clarification with additional information provided
24.	S4.1.9.4	Rewritten for clarification with additional information provided
25.	S4.1.11, Title	Rewritten for consistency with titling scheme.
26.	S4.1.11	Rewritten for clarification with additional information provided
27.	S4.1.1.	Deletion of Reference.
28.	T4.1-1	Additional information provided for clarity
29.	T4.1-2a & b	Additional information provided for clarity
30.	T4.1-3	Additional information provided for clarity
31.	T4.1-4	Revised Table of common cause failures to reflect models used.
32.	T4.1-5	Revised Table of Human Actions to reflect models used.
33.	T4.1-6	Revised Table of System Top Events to reflect models used.
34.	T4.1-7	Revised Table of Basic Events to reflect models used.
35.	T4.1-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
36.	F4.1-2	Additional fault tree added for clarity
37.	S.4.2.2	Rewritten for clarification with additional information provided
38.	S.4.2.3	Rewritten for clarification with additional information provided
39.	S4.2.3.1	Rewritten for clarification with additional information provided
40.	S4.2.3.2,	Rewritten for clarity

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
41.	S4.2.4.1	Rewritten for clarification with additional information provided.
42.	S4.2.4.2	Additional information provided for clarity in response to RAI 19.1-47 (B)
43.	S4.2.4.3	Additional information provided for clarity in response to RAI 19.1-47 (B)
44.	S4.2.5, 1 st & 3 rd para	Rewritten for clarification with additional information provided.
45.	S4.2.9.1	Rewritten for clarification with additional information provided.
46.	S4.2.9.4	Additional information provided for clarity.
47.	S4.2.11	Rewritten for clarification with additional information provided.
48.	T4.2-2a	Added table to reflect no system dependencies for ICS.
49.	T4.2-2b	Added transfer gates for ICS.
50.	T4.2-3 5	Additional information in “Type” column to provide for clarity.
51.	T4.2-5	Additional information provided for clarity to exhibit Common Cause Failures in response to RAI 19.1-47 (D, E, F).
52.	T4.2-6	Replaced table to reflect updated top events.
53.	T4.2-7	Replaced table to reflect updated basic events.
54.	T4.2-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
55.	F4.2-1 & 4.2-2	Additional information provided for clarity
56.	F4.2-3	Additional Fault Trees provided for clarity.
57.	S4.3.2	Rewritten for clarification with additional information provided.
58.	S4.3.3.1	Additional information provided for clarity for response to RAI 19.1-48(F).
59.	S4.3.3.2	Rewritten for clarification with additional information provided in response to RAI 19.1-48 (H).
60.	S4.3.3.3	Rewritten for clarification with additional information provided.
61.	S4.3.4.1	Rewritten for clarification with additional information provided.
62.	S4.3.4.2	Rewritten for clarification with additional information provided.
63.	S4.3.4.3	Added section for consistency and added additional information.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
64.	S4.3.5	Rewritten for clarification with additional information provided.
65.	S4.3.6	Rewritten for clarification with additional information provided.
66.	S4.3.7	Rewritten for clarification with additional information provided.
67.	S4.3.8	Rewritten for clarification with additional information provided.
68.	S4.3.9	Rewritten for clarification with additional information provided.
69.	S4.3.9.1	Rewritten for clarification with additional information provided.
70.	S4.3.9.2	Rewritten for clarification with additional information provided.
71.	S4.3.9.3	Rewritten for clarification with additional information provided.
72.	S4.3.9.4	Rewritten for clarification with additional information provided.
73.	S4.3.10	Rewritten for clarification with additional information provided.
74.	T4.3-1	Rewritten for clarification with additional information provided.
75.	T4.3-2a	Additional information provided for clarity in response RAI.1-48 (D).
76.	T4.3-2b	Additional information provided for clarity.
77.	T4.3-3	Additional information provided for clarity.
78.	T4.3-4	Additional information provided for clarity.
79.	T4.3-5	Rewritten for clarification with additional information provided.
80.	T4.3-6	Additional information provided for clarity.
81.	T4.3-7	Additional information provided for clarity.
82.	T4.3-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
83.	F4.3-1	Additional information provided for clarity
84.	F4.3-2	Additional Fault Trees provided for clarity.
85.	S4.4.3	Rewritten for clarification with additional information provided.
86.	S4.4.3.1	Rewritten for clarification with additional information provided.
87.	S4.4.3.2	Rewritten for clarification with additional information provided.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
88.	S4.4.3.3	Rewritten for clarification with additional information provided.
89.	S4.4.4.2	Rewritten for clarification with additional information provided.
90.	S4.4.4.1	Rewritten for clarification with additional information provided.
91.	S4.4.5	Rewritten for clarification with additional information provided.
92.	S4.4.6	Rewritten for clarification with additional information provided in response to RAI 19.1-49(J).
93.	S4.4.7	Deletion of information in response to RAI 19.1-49 (C).
94.	S4.4.8	Rewritten for clarification with additional information provided.
95.	S4.4.9	Rewritten for clarification with additional information provided.
96.	S4.4.9.1	Rewritten for clarification with additional information provided.
97.	S4.4.9.2	Rewritten for clarification with additional information provided
98.	S4.4.9.3	Rewritten for clarification with additional information provided
99.	S4.4.9.4	Deletion of information no longer needed.
100.	S4.4.11,	Rewritten for clarification with additional information provided.
101.	T4.4-1	Rewritten to reflect new fault tree model.
102.	T4.4-2a	Rewritten to reflect new fault tree model.
103.	T4.4-2b	Rewritten to reflect new fault tree model.
104.	T4.4-3	Updated to include new requirements in response to RAI 19.1-49 (J) and (D)
105.	T4.4-4	Additional information to reflect new fault tree model in response to RAI 19.1-49(I) and RAI 19.1-49 (G).
106.	T4.4-5	Updated with current listing of Common Cause Failures including Squib Valves and Check Valves.
107.	T4.4-6	Additional information to reflect new fault tree model.
108.	T4.4-7	Additional information to reflect new fault tree model.
109.	T4.4-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
110.	F4.4-1	Additional information provided for clarification.
111.	F4.4-2	Updated to reflect new fault tree model in response to RAI 19.1-49 (F) & (H).
112.	S4.5.1	Additional information provided for clarification.
113.	S4.5.2	Rewritten with additional information provided for clarification.
114.	S4.5.3	Additional information provided for clarification.
115.	S4.5.3.1	Rewritten with additional information provided for clarification.
116.	S4.5.3.2	Additional information provided for clarification.
117.	S4.5.3.3	Rewritten with additional information provided for clarification.
118.	S4.5.4.1	Additional information provided for clarification.
119.	S4.5.4.2	Additional information provided for clarification.
120.	S4.5.4.3	Additional information provided for clarification.
121.	S4.5.6	Additional information provided for clarification.
122.	S4.5.9	Additional information provided for clarification.
123.	S4.5.9.1	Additional information provided for clarification.
124.	S4.5.9.2	Additional information provided for clarification.
125.	S4.5.9.3	Additional information provided for clarification.
126.	S4.5.9.4	Additional information provided for clarification.
127.	S4.5.11	Rewritten with additional information provided for clarification.
128.	T4.5-2a	Rewritten with additional technical information provided for clarification.
129.	T4.5-2b	Additional technical information provided for clarification.
130.	T4.5-4, through T4.5-7	Additional technical information provided for clarification.
131.	T4.5-8	Additional information provided for clarity in response to RAI 19.1-43
132.	F4.5-1 & 4.5-2	Delete simplified diagram figures replaced with typical I&C logic.
133.	F4.5-3	Additional fault trees added for clarity.

	<p style="text-align: center;">Location</p> <p style="text-align: center;">(e.g., subsection with paragraph/sentence/item , table with column/row, or figure)</p>	<p style="text-align: center;">Description of Change</p>
134.	S4.6.2	All of the “Design Assumptions” are no longer assumptions, they are supported by the DCD in Response to RAI 19.1-50 (A) (B) (H).
135.	S4.6.2, Item 1	Added assumption concerning uncertainty associated with check valves in injection path and description of how this is dealt with in the model in response to RAI 19.1-50 (F).
136.	S4.6.2, Item 2	Discussions with the Design Engineer indicated there would be sufficient difference between the injection and equalization squib valves to minimize the potential for common cause failure; this is not stated in the current revision to the DCD so an assumption is made until such time as it is determined to be fact.
137.	S4.6.3	<p>Replaced size “150 mm” with functional “injection.</p> <p>Added criterion on GDCS pool as a result of MAAP runs indicating it is necessary for success.</p> <p>Added alternative success criterion</p>
138.	S4.6.3.1	Deleted reference to design assumptions as they are now fact, not assumptions.
139.	S4.6.3.1, 2 nd para	Deleted details not necessary for this discussion: “one 200 mm (8-inch nominal diameter” and “150 mm (6-inch)”.
140.	S4.6.3.1, 3 rd para	Deleted discussion on deluge as it is beyond the scope of this analysis: “A thermally actuated deluge valve (Valves F009 on Figure 4.6-1) is connected to each of the four GDCS 200 mm (8-inch) downcomer lines in order to provide a means to flood the lower drywell cavity in the event of a core melt sequence which causes failure of the lower vessel head and allows the molten debris to reach the cavity floor.”
141.	S4.6.3.2, 1 st para	Deleted details not necessary for this discussion: “150-second timers”
142.	S4.6.3.2	Deleted Success Criteria discussion from System Operation section as it provides more detail than is necessary with respect to System Operation.
143.	S4.6.3.3	Deleted “The GDCS pools are located within the drywell at an elevation significantly above the top of the active core. The suppression pool water level is a few feet above the active core.” It provided redundant component location information and information outside the scope of component location.
144.	S4.6.3.2	Deleted “The manual actuation circuit has four channels, one for each division. On the actuation circuitry for Type 2 valves (SP equalizing line valves), 30-minutes time delay logic is replicated to reproduce the sequence of the automatic actuation.” This information is either redundant to the following discussion or beyond the detail level necessary to describe this mode of actuation
145.	S4.6.4	Deleted manual actuation discussion because it is either redundant to the following discussion or beyond the detail level necessary to describe this mode of actuation.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
146.	S4.6.4.2	Deleted “Deluge squibs to flood drywell are interlocked with high-high Drywell pressure.” Deluge is beyond the scope of this document/discussion and the Level 1 model.
147.	S4.6.4, 5 th para, 4 th sent	Deleted - this information is either redundant to the following discussion or beyond the detail level necessary to describe this mode of actuation.
148.	S4.6.4, 6 th para	Deleted “B’ from Table designation as it was incorrect to revised format.
149.	S4.6.5	Replaced “interfaces with two support systems and shares components with the RPV water level instrumentation and the other systems using the suppression pool.
150.	S4.6.6, 1 st para	The design of the check valve has been altered such that this discussion is no longer valid.
151.	S4.6.6, 2 nd para	Editorial change for clarity.
152.	S4.6.8, 1 st bulleted item	Deleted “Orifices in injection and equalizing lines” as there are none in response to RAI 19.1-50 (H).
153.	S4.6.8, 3 rd bulleted item	Deleted “SP suction line strainers” and added “Check valves.”
154.	S4.6.8, 5 th and 6 th paras	Deleted - This information is neither accurate nor relevant.
155.	S4.6.9	Deleted verbiage as it serves no useful purpose.
156.	S4.6.9.1, 1 st and 2 nd paras	Editorial changes.
157.	S4.6.9.1, Bulleted items	Changes to reflect changes in success criteria.
158.	S4.6.8.1, Last para	Deleted redundant statement.
159.	S4.6.9.2	Assumptions now listed in section 4.6.2; Rewritten for clarity
160.	S4.6.9.2	Deleted due to format change.
161.	S4.6.9.3	Rewritten for clarity.
162.	S4.6.9.4	Added “Special Events” to be consistent with format; however, there are no special events in this system.
163.	S4.6.10	Deleted verbiage that added no value.
164.	S4.6.11	Updated section name and intent.
165.	S4.6.12	All references to be contained in Section 4.20 of this document.
166.	T4.6-1A	Deleted this table; assumption made concerning different type squib valves on injection and equalization lines; table adds no value.

	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
167.	T4.6-1B	Table, without alpha designation, consistent with format; 4.6-1A deleted. Table 4.6-1b is now Table 4.6-1.
168.	T4.6-2a	Updated system dependencies to reflect changes to design.
169.	T4.6-3	Updated to indicate no one-line maintenance to be performed in response to RAI 19.1-50 (E).
170.	T4.6.4	Test and Maintenance combined into one table and this table moved in position; therefore, this table number Updated to prevent empty space. Editorial change
171.	T4.6-2b	New table added, format change.
172.	T4.6-3	Test and Maintenance combined into one table; therefore, this table number was updated to prevent empty space.
173.	T4.6-4	Added new table in response to RAI 19.1-50 (G).
174.	T4.6-7	Additional information provided for clarity in response
175.	T4.6-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
176.	F4.6-1	Replaced simplified drawing with updated drawing.
177.	F4.6-2	Fault Trees to reflect the model update.
178.	S4.7	Title change to reflect new section on Fire Protection found in section 4.16
179.	S4.7.1, Last para	Changes to reflect new section for FPS (it was previously part of this section)
180.	S4.7.2, Assumptions	Assumption section updated entirely. Assumptions #5 &6 are in response to RAI 19.1-52 (A) Assumption 11 is part of response to RAI 19.1-52 (C) Assumption 10 is part of response to RAI 19.1-52 (E)
181.	S4.7.3.1	Hardware Configuration section updated based on extensive design changes in system. Changes include adding parallel valves/lines for suppression pool suction, LPI injection, and suppression pool return lines.
182.	S4.7.3.2	System Operation section updated to add detail and make editorial changes
183.	S4.7.4	Automatic and Manual Control section updated entirely to clarify system actuation (both automatic and manual).
184.	S4.7.5	System Interfaces section changed based on updated design.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
185.	S4.7.6 System Testing	System Testing section updated to clarify treatment and in response to RAI 19.1-52 (E)
186.	S4.7.7 System Maintenance	Change due to maintenance events being added to the model. Assumption is made in previous section with regard to testing intervals. Section update should provide details related to RAI # 19.1-52 (E).
187.	S4.7.9.1, bulleted item	Top Event Definitions changed due to Event Tree changes in top logic naming scheme.
188.	S4.7.9.2, 2 nd para	Fault Tree Descriptions changed to explain modeling philosophy of system
189.	S4.7.11	PRA Insights section updated to give detail of quantification results
190.	T4.7-1a	Table updated to reflect change in valve type (ACV to NMO)
191.	T4.7-2a	Table updated based on design changes and to add relevant dependencies
192.	T4.7-2b	Table updated to add relevant dependencies
193.	T4.7-3	Table updated to list maintenance events added to logic and assumed testing intervals. Table provides response to RAI # 19.1-52 (D)&(E).
194.	T4.7-4	CCF table updated to reflect extensive changes in CCF treatment for FAPCS
195.	T4.7-6	Table added to show top logic and success criteria associated with each top.
196.	T4.7-7	Table updated to reflect model/basic event changes. Line in table also provides response to RAI # 19.1-52 (F)
197.	T4.7-8b	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
198.	F4.7-1a	Simplified diagram redone due to extensive system design changes from previous revision
199.	F4.7-1b	Simplified diagram redone due to component (RCCWS) id changes from previous revision
200.	F4.7-2	Fault tree figure updated to reflect current model
201.	T4.7-8	Additional information provided for clarity in response to RAI 19.1-43
202.	S4.8.1 bulleted items	Rewritten in response to RAI 19.1-53(A)
203.	S4.8.2	Additional information provided for clarity in response to RAI 19.1-53 (C).
204.	S4.8.3.1	Rewritten for clarity with additional information provided.

	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
205.	S4.8.3.2	In Response to RAI 19.1-53(A), updated section to clarify that RWCU/SDC is used for decay heat.
206.	S4.8.4	Rewritten for clarity with additional information provided.
207.	S4.8.4.1	Section rewritten for consistency with standard PRA format.
208.	S4.8.4.2	Section rewritten for consistency with standard PRA format.
209.	S4.8.4.3	Section rewritten for consistency with standard PRA format.
210.	S4.8.5, 1 st para 2 nd sent	Added sentence to refer to new table for system transfers.
211.	S4.8.5, 2 nd para	Updated to show that the containment isolation valves outside containment use instrument air.
212.	S4.8.6	Section replaced to clarify assumption on system testing.
213.	S4.8.7	Subsection replaced because maintenance unavailability has been added to the model.
214.	S4.8.8	Rewritten for clarity with additional information provided in response to RAI 19.1-53 (D).
215.	S4.8.9.1	Rewritten for clarity with additional information provided
216.	S4.8.9.2	Additional information provided
217.	S4.8.9.3	Additional information provided to explain why human interactions have been included in the RWCU/SDCS model
218.	S4.8.9.4	Additional subsection to identify special events used in the latest revision of the model
219.	S4.8.10	Additional information provided for clarity.
220.	S4.8.11, 1 st para	Updated to show why human interactions are expected to be a dominant contributor to system failure.
221.	T4.8-1	Revised table to accurately show the most recent design information available.
222.	T4.8-2a	Revised table to show most recent model information. In response to RAI 19.1-53 (G). Flow control valves were added.
223.	T4.8-2b	Added new table to provide information on system transfers, which have been modeled.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
224.	T4.8-3	In response to RAI 19.1-53(F), Updated because maintenance valves (manual valves) are no longer included in the model explicitly. Added row to clarify that components that are not active on a quarterly basis are expected to be tested every two (2) years. Combined Testing Table and Maintenance Table into one table. Added new basic events for testing and maintenance that have been added to the model.
225.	T4.8-3 Notes	In further response to RAI 19.1-53 (F), added source of failure probabilities for unavailability due to maintenance or testing. Also, in response to RAI 19.1-53 (E).
226.	T4.8-4	In response to RAI 19.1-53 (D), table has been replaced with common cause events reflective consistent with the current model.
227.	T4.8-5, Title	Table number Updated consistent with the numbering scheme.
228.	T4.8-5	Added restoration errors to table because restoration errors are human error events
229.	T4.8-6	Table revised to show most recent model information.
230.	T4.8-7	In response to RAI 19.1-53(B), updated table to show basic events used in the current model.
231.	T4.8-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
232.	F4.8-1	Revised to be consistent with current model.
233.	F4.8-2, Sheets 1-89	Revision to be consistent with current model.
234.	S4.9.1 Title	Changed to reflect new titling scheme.
235.	S4.9.1	Rewritten for clarification with additional information provided.
236.	S4.9.2	Additional information provided in response to RAI 19.1-54(A), updated to reflect current model.
237.	S4.9.3.1	Revision to reflect current system fault tree modeling assumptions.
238.	S4.9.3.2, 5 th para	Revision for consistency with current design information.
239.	S4.9.4.1	Revision for consistency with current design information.
240.	S4.9.4.2	Additional information provided for clarity .
241.	S4.9.4.3	Revision for consistency.
242.	S4.9.5,	Rewritten for clarification with additional information provided.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
243.	S4.9.6	Rewritten for clarification with additional information provided.
244.	S4.9.7	Rewritten for clarification with additional information provided.
245.	S4.9.8	Rewritten for clarification with additional information provided.
246.	S4.9.9.1	Rewritten for clarification with additional information provided.
247.	S4.9.9.2	Rewritten for clarification with additional information provided.
248.	S4.9.9.3	Rewritten for clarification with additional information provided.
249.	S4.9.9.4	Rewritten for clarification with additional information provided.
250.	S4.9.10	Rewritten for clarification with additional information provided.
251.	S4.9.11	Rewritten for clarification with additional information provided.
252.	T4.9-1 thru 4.9-7	Additional information provided for clarity and in response to RAI 19.1-54 (B) (C) (D).
253.	T4.9-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
254.	F4.9-1 thru 4.9-6	Replaced for clarification with additional information provided.
255.	S4.10.1 Title	Changed to reflect new titling scheme.
256.	S4.10.1	Rewritten for clarification with additional information provided.
257.	S4.10.2	Additional information provided in response to RAI 9.1-55 (A), RAI 19.1-55 (B), RAI 19.1-55 (E).
258.	S4.10.2, Items 1 through 13	Additional information provided for clarity.
259.	S4.10.3.1	Rewritten for clarification with additional information provided.
260.	S4.10.3.2	Rewritten for clarification with additional information provided.
261.	S4.10.4	Rewritten for clarification with additional information provided.
262.	S4.10.4.1	Section added with information for clarification.
263.	S4.10.4.2	Section added with information for clarification.
264.	S4.10.4.3	Section added with information for clarification.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
265.	S4.10.5	Sentence added for reference.
266.	S4.10.6	Rewritten for clarification with additional information provided and in response to RAI 19.1-55 (F).
267.	S4.10.7	Rewritten for clarification with additional information provided.
268.	S4.10.9	Section deleted.
269.	S4.10.9.1	Rewritten for clarification with additional information provided.
270.	S4.10.9.2	Changed to reflect new titling scheme.
271.	S4.10.9.3	Rewritten for clarification with additional information provided.
272.	S4.10.9.4	Section added with information for clarification.
273.	S4.10.10	Rewritten for clarification with additional information provided.
274.	S4.10.11	Changed to reflect new titling scheme.
275.	S4.10.11	Rewritten for clarification with additional information provided.
276.	T4.10-1	Rewritten for clarification with technical information for clarity.
277.	T4.10-2a, & 2b	Table added for technical clarification.
278.	T4.10-3 through T4.10-8	Tables added for technical clarification.
279.	F4.10-1	In response to RAI 19.1-55 (G).
280.	F4.10-2	Additional information for technical clarification.
281.	T4.10-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
282.	S4.11.1	Rewritten for clarification with additional information provided.
283.	S4.11.2 title	Changed to reflect new titling scheme.
284.	S4.11.2, items 1 through 7	Rewritten for clarification with technical information for clarity. In response to RAI 19.1-56 (B), RAI 19.1-56 (A)
285.	S4.11.3.1	Rewritten for clarification with additional information provided.
286.	S4.11.3.2	Rewritten for clarification with additional information provided.
287.	S4.11.4	Rewritten for clarification with additional information provided.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
288.	S4.11.4.1	Section added with additional information provided.
289.	S4.11.4.2	Section added with additional information provided.
290.	S4.11.4.2	Section added with additional information provided.
291.	S4.11.4.3	Section added with additional information provided.
292.	S4.11.5	Rewritten for clarification with additional information provided.
293.	S4.11.7	Rewritten for clarification with additional information provided.
294.	S4.11.8	Rewritten for clarification with additional information provided.
295.	S4.11.9.1	Section added with additional information provided.
296.	S4.11.9.2	Section added with additional information provided.
297.	S4.11.9.3	Rewritten for clarification with additional information provided.
298.	S4.11.9.1	Section deleted.
299.	S4.11.9.2	Section deleted.
300.	S4.11.9.3	Section deleted.
301.	S4.11.10	Rewritten for clarification with additional information provided.
302.	S4.11.11	Rewritten for clarification with additional information provided.
303.	T4.11-1	Additional information provided for technical clarification.
304.	T4.11-2a	Additional information provided for technical clarification.
305.	T4.11-2b	Additional information provided for technical clarification.
306.	T4.11-3	Additional information provided for technical clarification also, in response to RAI 19.1-56 (C).
307.	T4.11-4	Additional information provided also, in response to RAI 19.1-56 (D)
308.	T4.11-5	Additional information provided for technical clarification.
309.	T4.11-6	Additional information provided for technical clarification.
310.	T4.11-7	Additional information provided for technical clarification.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
311.	T4.11-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
312.	F4.11-1 through 4.11-2	Added figures for additional technical clarification.
313.	S4.12 Title	Title Updated to match description sequence. This section also addresses RAI 19.1-57 comments.
314.	S4.12.1, 1 st para, 1 st & 2 nd lines	Rewritten for clarity .
315.	S4.12.1, 1 st para, last line	Rewritten for clarity.
316.	S4.12.2 Title	Title Updated for consistency.
317.	S4.12.2	Added assumptions.
318.	S4.12.3.1, 1 st , 2 nd and 3 rd paras	Editorial changes because generic test and maintenance data is used on this model.
319.	S4.12.3.2	Rewritten for clarity.
320.	S4.12.4.3	Title change for consistency.
321.	S4.12.4.3	Additional information provided for clarification.
322.	S4.12.5, 1 st para	Editorial change to include table numbering.
323.	S4.12.5, 2 nd para	Editorial change to match systems modeled.
324.	S4.12.6, 3 rd and 4 th para	Deleted to match modeling.
325.	S4.12.7	Additional information provided for clarification.
326.	S4.12.8	Additional information provided for clarification.
327.	S4.12.9	Additional information provided for clarification.
328.	S4.12.9.3	Additional information provided for clarification.
329.	S4.12.9.4	Editorial change, subsection added.
330.	S4.12.11	Title change for consistency.
331.	S4.12-11	Additional technical information provided for clarity.
332.	S4.12.12	Section deleted.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
333.	T4.12-1	Technical information added for clarification.
334.	T4.12-2a	Rewritten for clarification.
335.	T4.12-2b	Additional technical information provided for clarity.
336.	T4.12-3	Additional technical information provided for clarity.
337.	T4.12-4 & 5	Editorial change with technical information provided for clarity.
338.	T4.12-6 & 7	Additional technical information provided for clarity.
339.	T4.12-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
340.	S4.13	In response to RAI 19.1-58
341.	S4.13.1	Title change for consistency.
342.	S4.13.2	Title change for consistency.
343.	S4.13.2, items 1-8	Rewritten with additional information provided for clarification.
344.	S14.13.3.1	Additional information provided, in response to RAI 19.1-58.
345.	S14.13.3.2	Additional information provided for clarification.
346.	S14.13.4.1	Rewritten with additional information provided for clarification.
347.	S4.13.4.3	Title change for consistency and additional information provided for clarification.
348.	S4.13.5	Additional information provided.
349.	S4.13.6	Additional information provided in response to RAI 19.1-58 (E).
350.	S4.13.7 thru 4.13.9	Rewritten for clarity.
351.	S4.13.9	In response to RAI 9.1-58 (F) (G).
352.	S4.13.9.1	Additional information provided for clarification.
353.	S4.13.9.2	Rewritten with additional information provided for clarification.
354.	S4.13.9.3	Rewritten with additional information provided for clarification.
355.	S4.13.11	Title change for consistency.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
356.	S4.13.12	Section deleted. No replacement.
357.	T4.13-1	Rewritten with technical information.
358.	T4.13-2a	Technical information provided
359.	T4.13-2b	New technical information proved.
360.	T4-13-3	Rewritten with additional technical information provided.
361.	T4-13-4 through 7	Rewritten with technical information provided.
362.	T4.13-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
363.	F4.13-1 – F4.13-2	Additional technical information provided for technical clarification.
364.	S4.14 Title	Editorial change for consistency with new titling scheme.
365.	F4.14-1 through F4.14-3	Additional technical information provided.
366.	S4.14.1, Title	Editorial change for consistency with new titling scheme.
367.	S4.14.1, paras 1, 2 and 3	Updated to reflect the DCD Rev. 3 design.
368.	S4.14.1	In response to RAI 19.1-59(A): Statement is deleted for clarification. Refer to 4.13.4 for details. The isolation power centers supply AC power from nonsafety-related system to safety-related loads. Clarification has been documented in DCD Rev. 3 Section 8.1.5.2.1 (last paragraph on page 8.1-4).
369.	S4.14.1	In response to RAI 19.1-59(C): This paragraph has been deleted since the Instrument & Control Power Supply System is not credited in Rev. 2 PRA model.
370.	S4.14.2, Items (2) – (24)	Rewritten with new PRA model assumptions.
371.	S4.14.3.1, 1 st para	Rewritten for clarity.
372.	S4.14.3.1, 3 rd para	Rewritten for clarity .
373.	S4.14.3.1, 3 rd and 4 th bulleted items	Rewritten with DCD Rev 3 Chapter 8 figures (one-line diagrams).
374.	S4.14.3.1	Paragraph deleted for clarification.
375.	S4.14.3.1, 4 th para	Deleted to reflect DCD Rev. 3 design.
376.	S4.14.3.1, 5 th para	Change in response to RAI 19.1-59(B). PRA takes no credit for such plug-in connections.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
377.	S4.14.3.1, 6 th para	Changed to reflect DCD Rev. 3 design.
378.	S4.14.3.1, 7 th para	In response to RAI 19.1-59(C) Paragraph deleted to reflect DCD Rev. 3 design. The Instrument and Control Power Supply System is not credited in Rev 2 PRA model.
379.	S4.14.3.1, 8 th para	Changed to reflect DCD Rev. 3 design.
380.	S4.14.3.2, 1 st para	Changed to reflect DCD Rev 3 design.
381.	S4.14.3.2, 2 nd para	Changed to reflect DCD Rev 3 design.
382.	S4.14.3.2, 3 rd para	Changed to reflect DCD Rev 3 design.
383.	S4.14.3.3, 3 rd para	Rewritten for clarity.
384.	S4.14.4	Changed to reflect DCD Rev. 3 design.
385.	S4.14.4.1	New section added for consistency of standard formatting.
386.	S4.14.4.2	New section added for consistency of standard formatting.
387.	S4.14.4.3	New section added for consistency of standard formatting.
388.	S4.14.5	Changed to reflect DCD Rev. 3 design.
389.	S4.14.8	Rewritten with PRA Rev. 2 CCF model.
390.	S4.14.9.1	Rewritten to reflect the PRA Rev. 2 models.
391.	S4.14.9.2	Rewritten to reflect the PRA Rev. 2 models.
392.	S4.14.9.3	Rewritten to reflect the PRA Rev. 2 models.
393.	S4.14.9.4	New section added for consistency of standard formatting.
394.	S4.14.11	New section added for consistency of standard formatting.
395.	T4.14-1	Diesel generator alarms and indications are updated according to DCD Rev. 3
396.	T4.14-1	R10, R11, R12, The basic instrumentation and control requirements are updated.
397.	T4.14-2a	Updated per standard format. Updated with the Rev. 2 PRA model which is consistent with DCD Rev. 3.
398.	T4.14-2b	New table added to show the transfer gates.

	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
399.	T4.14-3	Updated per standard format.
400.	T4.14-3	In response to RAI 19-1.59(E): The estimate for the 230kV switchyard test & maintenance event is calculated with the 116 hours per EPRI URD generic maintenance duration with no operability limit (Table A2-3 on page A.A-27).
401.	T4.14-4	In response to RAI 19-1.59(D): CCF events have been updated with new models. The RCCWS CCF Events are removed from this section.
402.	T4.14-5	Human errors are modeled for DGs.
403.	T4.14-6	Rewritten with new system top events.
404.	T4.14-7	Rewritten with Rev. 2 PRA model basic events.
405.	T4.14-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
406.	F4.14-1	Figures are updated with the DCD Rev. 3 figures on AC power system design.
407.	F4.14-2 and 3	Figures added for Diesel Generator supporting system simplified diagrams
408.	F4.14-4 through 7	Moved from Appendix 4.B and updated with Rev. 2 AC power system fault trees.
409.	T4.15.1 title	Title Updated due to revised styling scheme.
410.	T4.15.1, 1 st para, 1 st sent.	Added the acronym for the UPS system.
411.	S4.15.2 Title	Title change to reflect the revised styling scheme.
412.	S4.15.2, 2 nd & 3 rd items	Added to reflect the new model assumptions.
413.	S4.15.3.1, 2 nd para	Rewritten to reflect the current UPS system design.
414.	S4.15.3.1, 3 rd para	Rewritten to reflect the current UPS system design. The change addresses RAI 19.1-60(b)
415.	S4.15.3.1, 4 th para	This statement is deleted since the modularized UPS is not credited in the PRA Rev. 2 model. This change addresses RAI 19.1-60(c)
416.	S4.15.3.2, 3 rd para	Deleted to reflect the current UPS system design.
417.	S4.15.3.3, Title	Rewritten due to the updated standard format.
418.	S4.15.3.3, 1 st para	Rewritten to be consistent with the acronym definition.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
419.	S4.15.3.3, 2 nd para	Rewritten for clarity.
420.	S4.15.5, 1 st para, 1 st sent	Updated to be consistent with the acronym definition.
421.	S4.15.5, 1 st para 2 nd sent	Deleted to reflect the current UPS system design.
422.	S4.15.6, 1 st para	Rewritten for clarity.
423.	S4.15.7, 2 nd para	Rewritten for clarity.
424.	S4.15.8	Rewritten due to the updated standard format.
425.	S4.15.8, 1 st para	Common Cause Failures (CCF) are modeled according to the Section 5.3 guidance with few exceptions that are justified.
426.	S4.15.9.1, 2 nd para	Updated to be consistent with the new UPS system model.
427.	S4.15.9.1, 2 nd bulleted item	Updated to be consistent with the new UPS system model.
428.	S4.15.9.1, 1 st para	Rewritten for clarity.
429.	S4.15.9.1, 4 th bulleted item	Updated to be consistent with the new UPS system model.
430.	S4.15.9.2	Updated to be consistent with the new UPS system model.
431.	S4.15.9.4	Updated to be consistent with the new UPS system model.
432.	S4.15.11	Added new section for PRA insights.
433.	S4.15.12	References are moved to section 4.20.
434.	T4.15-1	Editorial changes.
435.	T4.15-2a	System dependency matrix tables are updated to reflect the current UPS system design.
436.	T4.15-2b	Added the transfer gate table for more information.
437.	T4.15-3	Rewritten due to the revised styling scheme.
438.	T4.15-4	Updated to reflect modeled CCF events. The CCF table is Updated to T4.15-4 due to new styling scheme.
439.	T4.15-6	Table 4.15-5 is Updated to be the table for modeled human error events per new styling scheme.
440.	T4.15-7	Basic event table has been updated in Table 4.15-7. This change addresses RAI 19.1-60(a)

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
441.	T4.15-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
442.	F5.15-1	Updated to reflect the DCD Rev 3 design change.
443.	F4.15-2	All fault trees have been updated to be consistent with system design.
444.	S4.16	This subsection was previously blank and is being updated in response to RAI 19.1-51
445.	T4.16-8	Additional information provided for clarity in response to RAI 19.1-43
446.	S4.17.1 Title	Editorial change for consistency with new titling scheme.
447.	S.4.17.1, 1 st and 2 nd para	Updated to reflect the new DCD Rev. 3 design.
448.	S.4.17.2	Rewritten with the standard format.
449.	S.4.17.2	Deleted since the plug-in power source is not credited.
450.	S4.17.2, Item (3)	Change in response to RAI 19.1-61(A). The battery room ventilation is not required per new design in DCD Rev 3.
451.	S4.17.2 Item (4)	Added assumption.
452.	S4.17.2, Item (5)	Added assumption.
453.	S4.17.3.1, 1 st para	Rewritten for clarification
454.	S4.17.3.1, 2 nd para	Rewritten to reflect the new DCD Rev. 3 design.
455.	S4.17.3.1, 3 rd para	Rewritten for clarity
456.	S4.17.3.3 Title	Rewritten for clarity
457.	S4.17.3.3, 1 st para	Rewritten for clarity
458.	S4.17.3.3, 3 rd para	Rewritten to reflect the design change in DCD Rev 3.
459.	S4.17.5, 2 nd para	Rewritten to reflect the design change in DCD Rev 3.
460.	S4.17.5	A paragraph has been deleted in response to RAI 19.1-61(B).
461.	S4.17.5, 3 rd para	Added a new transfer gate table for clarification.
462.	S4.17.6, 1 st para	Rewritten to reflect the standard format.
463.	S4.17.8	Updated to reflect new CCF model.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
464.	S4.17.9.1, 1st para	Rewritten for clarity.
465.	S4.17.9.1, 2 nd para	Rewritten for clarity.
466.	S4.17.9.1, 3 rd para	Added new discussion on system top events
467.	S4.17.9.1, 4 th para	Rewritten per standard format.
468.	S4.17.9. 1 st para	Rewritten for clarity.
469.	S4.17.9.2, 2 nd para	Rewritten for clarity.
470.	S4.17.11	Rewritten to reflect format consistency.
471.	S4.17.12	Rewritten per standard styling.
472.	T4.17-2a	Rewritten per standard styling format.
473.	T4.17-2b	Table added to reflect new transfer gates.
474.	T4.17-3	Editorial changes.
475.	T4.17-4	Updated with new Rev. 2 system model.
476.	T4.17-5	Rewritten for clarity.
477.	T4.17-6	Additional information provided to Table 4.17-6.
478.	T4.17-7	Additional information provided to System Basic Events
479.	T4.17-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
480.	F4.17-1	Updated with DCD Rev 3 figure
481.	F4.17-2	Rewritten with new system model fault trees.
482.	S4.18	Rewritten for consistency with new titling scheme.
483.	S4.18.1	Rewritten for clarification with additional information provided.
484.	S4.18.1 Item (7)	In response to RAI 19.1-66G.
485.	S4.18.2	Editorial change for consistency with new titling scheme.
486.	S4.18.2, Items 1 thru 6	Rewritten with additional information added for clarification
487.	S4.18.2 Item 7	In response to RAI 19.1-66G.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
488.	S4.18.2 Item 8	In response to RAI 19.1-66H
489.	S4.18.3.1, 3 rd para	In response to RAI 19.1-66A
490.	S4.18.3.1, 7 th para	In response to RAI 19.1-66C
491.	S4.18.3.1 8 th para	In response to RAI 19.1-66C.
492.	S4.18.3.2, 3 rd para	In response to RAI 19.0.0-07 for clarification.
493.	S4.18.4	Information located in Table 4.18-1.
494.	S4.18.4.1	New section added.
495.	S4.18.4.2	New section added.
496.	S4.18.4.3	New section added.
497.	S4.18.6	Rewritten with additional information added for clarification.
498.	S4.18.8	Additional information added for clarification.
499.	S4.18.9	Additional information added for clarification.
500.	S4.18.9.1	Rewritten with new top gate information.
501.	S4.18.9.2	Editorial change for consistency with new titling scheme.
502.	S4.18.9.2	Section replaced with fault tree.
503.	S4.18.9.3	Rewritten with additional information provided for clarification.
504.	S4.18.9.4	New section added.
505.	S4.18.11	Rewritten for consistency with new titling scheme.
506.	S4.18.11	Rewritten with additional information provided for clarification.
507.	S4.18.12	Section deleted. No replacement.
508.	T4.18-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
509.	T4.18-1	Technical detail deleted, no longer needed.
510.	T4.18-2a	Rewritten with additional technical information provided.
511.	T4.18-2b - T4.18-8	New tables added for technical clarification.

	Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)	Description of Change
512.	F4.18-2	Figures added for additional technical clarification.
513.	S.4.19.1, 1 st para 2 nd line	This is a new component in accordance with a design change. Replaced entire section.
514.	S4.19.2	Assumptions replaced
515.	S4.19.3	System Description updated
516.	S4.19.3.1, 1 st subsection	Rewritten to reflect updated design
517.	S4.19.3.1, 2 nd subsection	Technical change to include both inner and outer pools
518.	S4.19.3.2	Rewritten to be consistent with new thermal-hydraulic analysis
519.	S4.19.3.2	Updated system operation section in response to RAI 19.1-67 (D)
520.	S4.19.3.3	Technical change to display a new feature in the PRA
521.	S4.19.4	Added reference to Table 4.19-1.
522.	S4.19.4.1 S4.19.4.2 S4.19.4.3	Added sections on actuation
523.	S4.19.5	Updated section in response to RAI 19.1-67 C and new TH analysis
524.	S4.19.7	Technical change to show new success criteria. Included response to RAI 19.1-67 A. Added reference to new table.
525.	S4.19.8	Rewrote section based on inlet filters. Added reference to table.
526.	S4.19.9.1	Revamp of top events. Include cross-connect valve function
527.	S4.19.9.3	New section added on human interactions
528.	S4.19.11	New section added on PRA insights
529.	T4.19-1	Added table to reflect instrumentation and alarms
530.	T4.19-2a	New table for system dependencies
531.	T4.19-2b	New table for transfer gates
532.	T4.19-3	New table for test and maintenance
533.	T4.19-4	New table for common cause failures

	<p style="text-align: center;">Location (e.g., subsection with paragraph/sentence/item , table with column/row, or figure)</p>	<p style="text-align: center;">Description of Change</p>
534.	T4.19-5	New table for reflect there are no human errors in the PCCS
535.	T4.19-7	New table for basic events
536.	T4.19-8	New Table of Cutsets from the system quantification in response to RAI 19.1-43.
537.	F4.19-1	Added new simplified diagram of PCCS
538.	F4.19-2	Added schematic of ICS/PCCS pools and interconnections
539.	F4.19-3	Added new fault trees
540.	S4.20	Rewritten reference to reflect chapter content.