ESBWR DCD Chapter 15

26A6642BP Revision 5 to Revision 6 Change List

Item	Location	Description of Change
1.	Entire Chapter	Global chapter editorial changes to correct misspelling and grammar, spell out or integrate acronyms where appropriate, and update references as needed and where required.
2.	S15.0.7, Ref. 15.0-6, 15.0-7, and note	Revised references and added note in response to RAI 4.2-28.
3.	S15.0.3.4.6	Updated to more-conservatively state that stable shutdown must be achieved for Safe Shutdown Fire.
4.	T15.0-2	Revise the name of the LOFWH event to include the FW Controller Failure
5.	T15.0-7	Revise the name of the LOFWH event to include the FW Controller Failure
6.	T15.0-8	Revise the name of the LOFWH event to include the FW Controller Failure
7.	T15.0-8	Deleted incorrect detail of MELCOR code version in response to RAI 21.6-92 S01.
8.	T15.1-3	Revise the name of the LOFWH event to include the FW Controller Failure
9.	T15.1-5, heading	Revised the NSOA heading in response to RAI 21.6-103
10.	T15.1-5 & Footnote 2	Revise Closure-of-1-TCV event to credit high neutron flux scram and automatic follow-up actions.
11.	T15.1-5	Add the FW Controller Failure event consistent with S15.3.1
12.	T15.1-6	Removed SRNM Period Rod Block to clarify that it is not required as the primary success path. The RWE-during-startup event credits the SRNM Period Scram.
13.	T15.1-6	Revise Closure-of-1-TCV event to credit high neutron flux scram
14.	T15.1-6	Add the FW Controller Failure event consistent with S15.3.1

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Item	Location	Description of Change
15.	T15.1-6	Clarification provided that the failure for manual withdrawal of in-sequence rods is assumed to be the SRNM short period block/scram.
16.	T15.1-7	Add the FW Controller Failure event consistent with S15.3.1
17.	T15.1-7	RWE-during-startup figures are consolidated to only credit the SRNM Period scram.
18.	F15.1-2	Clarify the subsystems / functions credited for the LOFWH event
19.	F15.1-3	Revise Closure-of-1-TCV event to credit high neutron flux scram and automatic follow-up actions.
20.	F15.1-11	"Sustained" added to clarify the L1 signal for GDCS
21.	F15.1-17b	Add new Figure for the FW Controller Failure event consistent with S15.3.1
22.	F15.1-24a	Removed SRNM Period Rod Block to clarify that it is not required as the primary success path
23.	F15.1-24b	Added RPS scram on high neutron flux for when SRNM short-period functions fail.
24.	F15.1-30, F15.1-31	The initiating signal for GDCS and ADS is clarified to be a sustained L1
25.	F15.1-34a	Updated Figures in response to RAI 21.6-103
26.	F15.1-34b	Updated Figures in response to RAI 21.6-103
27.	F15.1-34b	Corrected to eliminate the FW isolation signals from the containment isolation signals process.
28.	F15.1-34b, 35a, 35b, 37a, 37b, 38a, 38b, 39a, 39b, 45a, 45b	Clarification of initiating signals for GDCS, ADS, and SLCS is provided
29.	S15.2, new 3rd para.	Added paragraph in response to RAI 4.3-17.
30.	S15.2.1.1.1	"and/or" is changed to "or" to clarify that both failures could not happen for an AOO.

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Item	Location	Description of Change
31.	S15.2.1.1	LOFWH analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
32.	S15.2.1.1.1, 7th para., 4th to 5th sentences	SCRRI/SRI assumptions are updated in response to RAI 15.2-27. Subsequently, they were revised again for reanalysis due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
33.	S15.2.1.1.3	"Limiting SCRRI/SRI rod pattern" is deleted because as discussed in the response to RAI 15.2-27, the event with the SCRRI/SRI rod pattern that will be defined in the COLR will be analyzed.
34.	S15.2.2.1	Closure of One TCV analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. Credit is taken for the high flux scram.
35.	S15.2.2.1.3	All revised analyses in 15.2 and 15.3 assume the "bounding" steamline, therefore, the "historical" discussion is no longer applicable and is deleted.
36.	S15.2.2.2	LRWBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. SCRRI/SRI rod pattern is revised to optimize the results.
37.	15.2.2.2.3, 2nd para., new 3rd to 5th sent.	Sentences added to clarify that scram is not credited.
38.	S15.2.2.2.3, 5th para.	"Limiting SCRRI/SRI rod pattern" is deleted because as discussed in the response to RAI 15.2-27, the event with the SCRRI/SRI rod pattern that will be defined in the COLR will be analyzed.
39.	S15.2.2.3	LRHBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. All revised analyses in 15.2 and 15.3 assume the "bounding" steamline, therefore, the "historical" discussion is no longer applicable and is deleted.

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40.	S15.2.2.5.3, 2nd para., new 2nd and 3rd sentence	Added new sentences in response to RAI 15.2-41. Since this response, the analysis was reperformed out to a longer time per the NRC's recommendation; therefore, the added sentences are no longer applicable and were deleted.
41.	S15.2.3	Deleted first sentence because it contradicts the rest of S15.2.3
42.	S15.2.3.1.1	Discussion of "upscale rod block/scram" is deleted consistent with update in DCD Chapter 7 Rev 5. APRM high flux trip serves as backup.
43.	S15.2.3.1.3	Clarification that it is the *reactor period* that causes a rod block.
44.	S15.2.8, Ref. 15.2-2, 15.2-3 and note	Revised references and added note in response to RAI 4.2-28.
45.	T15.2-1	Steady state analyses are updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. Calculated steady-state values are updated accordingly. "Reference" values were also added to document values used in the figures.
46.	T15.2-1	Added units (s) to TSV or TCV delay time and to the High Flux Trip time constant
47.	T15.2-1	The TCV closure time is revised to credit the high flux scram.
48.	T15.2-1 and footnotes 5 and 6	The high flux trip setpoint as a function of FW temperature is added.
49.	T15.2-2 & T15.2-3	Tables updated in response to RAI 15.2-16 S01
50.	T15.2-4a	Analyses are updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. All revised analyses in 15.2 assume the "bounding" steamline, therefore, the "historical" discussion is no longer applicable and is deleted.

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Item	Location	Description of Change
51.	T15.2-5	SCRRI/SRI assumptions are updated in response to RAI 15.2-27. Subsequently, they were revised again for reanalysis due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
52.	T15.2-6	1TCVFC analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. Credit is taken for the high flux scram.
53.	T15.2-8	LRWBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
54.	T15.2-9	LRHBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
55.	T15.2-10	TTWBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
56.	T15.2-11	TTHBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
57.	T15.2-11, last row	Revised event in response to RAI 15.2-41.
58.	T15.2-17	IICI analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
59.	T15.2-20, 2nd row	Revised 2nd row in response to RAI 15.2-33.
60.	T15.2-23, 1st row	"SRNM – Neutron Flux High" is deleted from the table because it is not required in safety analyses.
61.	T15.2-23	Updated Actuation Time Delay (including footnote 4) and the RPS control logic delay for TSV and TCV in response to RAI 15.2-16 S01
62.	T15.2-23	In response to RAI 16.2-186, the naming of the Scram Accumulator Charging Water Header Pressure – Low-Low setpoint is clarified

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Item	Location	Description of Change
63.	T15.2-23 and footnote 12	The rest of the table is updated in response to RAI 21.6-103
64.	T15.2-23, last row	Changed “High” to “High-High” for clarification.
65.	T15.2-23, footnote 14	Note added to clarify “Initiating System” names.
66.	F15.2-1	LOFWH analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern
67.	F15.2-2	1TCVFC analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
68.	F15.2-4	LRWBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
69.	F15.2-5	LRHBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
70.	F15.2-6	TTWBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
71.	F15.2-7	TTHBP analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
72.	F15.2-9a	Core Flow in Figure updated to account for negative flow
73.	F15.2-10a	Core Flow in Figure updated to account for negative flow
74.	F15.2-11	IICI Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
75.	F15.2-15h	Core Flow in Figure updated to account for negative flow
76.	F15.2-17	Added figure in response to RAI 4.3-17.
77.	S15.3.1	Revise the name of the LOFWH event to include the FW Controller Failure

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Item	Location	Description of Change
78.	S15.3.1.1	Revised the discussion to clarify that there are 2 events considered: Loss-of-FW-Heating-with SCRRI/SRI Failure and FW Controller Failure.
79.	S15.3.1.2, 1st para., new 3rd sentence	Added sentence in response to RAI 15.3-35.
80.	S15.3.5.3.2	All revised analyses in 15.2 and 15.3 assume the "bounding" steamline, therefore, the "historical" discussion is no longer applicable and is deleted.
81.	S15.3.8.1, 3rd para.	Discussion of "upscale rod block/scram" is deleted consistent with update in DCD Chapter 7 Rev 5. APRM high flux trip serves as backup.
82.	S15.3.8.1, 4th para., 2nd sentence	Sentence revised for consistency with Subsection 15.2.3.1.1.
83.	S15.3.8	Revised RWE analyses based on revised core loading pattern. Clarification provided that the failure for manual withdrawal of in-sequence rods is assumed to be the SRNM short period block/scram. Discussion is added on the consequences of delayed SRNM response times.
84.	S15.3.13.2	Operator action revised in response to RAI 21.6-103
85.	S15.3.15	Stuck-Open Safety Relief Valve Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
86.	S15.3.15.2	Operator action revised in response to RAI 21.6-103
87.	S15.3.18, Ref. 15.3-4, 15.3-5 and note	Revised references and added note in response to RAI 4.2-28.
88.	T15.3-1a	Units for Max Simulated Thermal Power trip changed to "% NBR." For initial power operation of 100% (all Infrequent events in this table), this results in no difference in the values.
89.	T15.3-1a, 15.3.2	Values revised for "FW Controller Failure – Maximum Flow Demand" in response to RAI 15.2-50.

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Item	Location	Description of Change
90.	T15.3-1a	Analyses are updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern. "SRI" is added to the event title of LOFWH with SCRRI/*SRI* failure. All revised analyses in 15.3 assume the "bounding" steamline, therefore, footnote 5 was deleted.
91.	T15.3-1b	The Control RWE event during startup is revised due to the updated core loading pattern.
92.	T15.3-2	LOFWH with SCRRI/SRI Failure Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
93.	T15.3-3, 2nd through 6th rows	Revised times in response to RAI 15.2-50.
94.	T15.3-3, last row	Changed "Later" to ">20.0" in response to RAI 15.2-51.
95.	T15.3-6a	LRNBP is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
96.	T15.3-7	TTNBP is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
97.	T15.3-12	Stuck-Open SRV Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
98.	T15.3-13, line item III.C	Values revised to be consistent with the supporting analysis, which was revised to be consistent with a design change that increased CR EFU flow rate.
99.	T15.3-14, T15.3-15, & T15.3-16	Values revised to be consistent with supporting analysis, which was updated due to the development of a new GE14E core specific source term.
100.	T15.3-17	Line Item II.C revised to be consistent with a design change that increased CR EFU flow rate

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Item	Location	Description of Change
101.	T15.3-19	CR dose revised to be consistent with supporting analysis, which was updated to be consistent with a design change that increased CR EFU flow rate
102.	F15.3-1	LOFWH with SCRRI/SRI Failure Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
103.	F15.3-2a to F15.3-2g	Figures revised in response to RAI 15.2-50.
104.	F15.3-4a	Core Flow in Figure updated to account for negative flow
105.	F15.3-5	LRNBP is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
106.	F15.3-6	TTNBP is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
107.	F15.3-7a	The Control RWE event during startup is revised due to the updated core loading pattern.
108.	F15.3-9	Stuck-Open SRV Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
109.	S15.4.4.2.1, 2nd para., 1st sentence	"For dose consequences" was added to clarify what "bounding" refers to in the LOCA analysis.
110.	S15.4.4.2.1, 2nd para., 2nd sentence	Sentence revised for clarification during Revision 5 process, but was not incorporated.
111.	S15.4.4.2.3	Change made to clarify which EFUs are being referred to.
112.	S15.4.4.5.2, 2nd para., 2nd sentence	Value changed in response to RAI 6.2-165 S01
113.	S15.4.4.5.2.3, new 5th para.	Paragraph added in response to RAI 6.2-165 S01

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Item	Location	Description of Change
114.	S15.4.12	Reference added in response to RAI 6.2-165 S01
115.	T15.4-1, note	Note added in response to RAI 15.4-1 S02.
116.	T15.4-2	Entry III.B was changed to a pointer to the subsection of the DCD where the revised values for the normal CR intake flow is being implemented with a design change that increased CR EFU flow rate.
117.	T15.4-3,3a,4	Values revised to be consistent with supporting analysis, which was updated due to the development of a new source term.
118.	T15.4-5	The primary containment total leak rate and the reactor building mixing volume updated in response to RAI 6.2-165 S01
119.	T15.4-5	The Control Room EFU intake flow is revised …
120.	T15.4-6,6a,7, 7a,8,8a	All table entries were changed to be consistent with the supporting analysis that was updated
121.	T15.4-9	Values revised to be consistent with supporting analysis, which was updated due to the development of a new source term
122.	T15.4-11	Line Item III.C revised to be consistent with a design change that increased CR EFU flow rate.
123.	T15.4-12	Table revised in MFN 08-729.
124.	T15.4-13	Changed decimal place (editorial).
125.	T15.4-14	Line Item III.C revised to be consistent with a design change that increased CR EFU flow rate.
126.	T15.4-16	Row headers changed to be consistent with other dose results tables in Section 15.4
127.	T15.4-17	Line Item III.C revised to be consistent with a design change that increased CR EFU flow rate.
128.	T15.4-21	Line Item III.C revised to be consistent with a design change that increased CR EFU flow rate.
129.	T15.4-23	CR dose revised to be consistent with supporting analysis, which was updated for a design change that increased CR EFU flow rate. Row headers changed to be consistent with other dose results tables in Section 15.4

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Item	Location	Description of Change
130.	F15.4-4	Plot revised to be consistent with supporting analysis, which was updated to incorporate a new source term for a new GE14E specific source term.
131.	S15.5.1.3	Clarification made to note that SRVs and SVs are used to mitigate an ATWS event rather than "they are needed"
132.	S15.5.4.3.6	Clarification is added. ATWS stability case is revised due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
133.	S15.5.4.3.6, Loss of FW Heating	No operator action is required. Clarification is made to avoid any confusion.
134.	S15.5.5	Criteria for SBO is clarified that either hot or stable shutdown must be met.
135.	S15.5.5.3	SBO Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, updated core loading pattern, and revised location of the wide range lower tap.
136.	S15.5.6	Criteria for Safe Shutdown Fire is clarified that either stable shutdown must be met.
137.	S15.5.9, Ref. 15.5-3, 15.5-6 and note	Revised references and added note in response to RAI 4.2-28.
138.	T15.5-1b	MSIVF Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
139.	T15.5-2, rows 6-9, Bounding Value column	Updated bounding values as a result of ATWS analysis update due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
140.	T15.5-3, footnote 2	Sentence deleted for consistency with same deletion made in NEDO-33338 Rev 1.

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Item	Location	Description of Change
141.	T15.5-4c, Values and Time (s) columns	Updated 'Value' and "Time (s)'as a result of ATWS analysis update due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
142.	T15.5-4e, MSIV Closure SLC System Bounding Case column	Updated 'MSIV Closure SLC System Bounding Case' column as a result of ATWS analysis update due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
143.	T15.5-10b	SBO Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, updated core loading pattern, and revised location of the wide range lower tap.
144.	Figures 15.5-3a thru 15.5-3d	Updated figures as a result of ATWS analysis update due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
145.	F15.5-9	ATWS stability case is revised due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
146.	F15.5-10	SBO Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, updated core loading pattern, and revised location of the wide range lower tap.
147.	F15.5-11	MSIVF Analysis is updated due to new level-2 PC version of TRACG, updated TRACG channel loss coefficient, and updated core loading pattern.
148.	15A	The failure frequency of the SRVs and DPVs is updated based on the updates in DCD Chapter 7 as a result of RAI 7.1-139.
149.	15A.2, 2nd para., new 1st and 2nd sent.	Sentences added to clarify that the detailed design is not set by 15A analyses.

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Item	Location	Description of Change
150.	S15A.3.8.2, "Spurious Actuation Signal"	Paragraph revised to reflect the design changes implemented in Section 7.3.
151.	S15A.8.3.2, last para.	IORV frequencies revised to reflect the design changes implemented in Section 7.3.
152.	S15A.3.9.2.2	Subsection revised to reflect the design changes implemented in Section 7.3.
153.	S15A.3.9.2.2.1	Subsection deleted to reflect the design changes implemented in Section 7.3.
154.	S15A.3.9.1	Subsection revised to reflect the design changes implemented in Section 7.3.
155.	S15A.3.9.1	Subsection revised to reflect the design changes implemented in Section 7.3.
156.	S15A.3.9.2.2.2	Subsection revised to reflect the design changes implemented in Section 7.3.
157.	S15A.3.9.2.2.3	Subsection revised to reflect the design changes implemented in Section 7.3.
158.	S15A.3.9.2.2.4	Subsection revised to reflect the design changes implemented in Section 7.3.
159.	S15A.3.9.2.2.5	Subsection deleted to reflect the design changes implemented in Section 7.3.
160.	S15A.3.9.2.2.6	Subsection deleted to reflect the design changes implemented in Section 7.3.
161.	S15A.3.9.2.2.7	Subsection revised to reflect the design changes implemented in Section 7.3.
162.	S15A.3.9.3	Subsection revised to reflect the design changes implemented in Section 7.3.
163.	T15A-1	Table revised to reflect the design changes implemented in Section 7.3.
164.	T15A-2	Table revised to reflect the design changes implemented in Section 7.3.
165.	T15A-3	Table revised to reflect the design changes implemented in Section 7.3.

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166.	F15A-1a through F15A-2s	Figures revised to reflect the design changes implemented in Section 7.3.
167.	15B & T15B-1	Updated due to the development of a new source term
168.	15.D.6	Added "SRI" to event name to clarify that both SCRRI and SRI fail.
169.	15D	Appendix revised to be consistent with Rev 1 of NEDO-33338
170.		

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