

NEDO-33201
Section 4
From Revision 2 to Revision 3 Change List

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	N/A	The change lists for NEDO-33201 Revision 3 Section 4 are documented separately for each subsections as follows.

NEDO-33201
Section 4.0
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	S4.0.1, 1 st para., last sentence	Changed “Sections” to “Subsections”. Deleted “typical” for clarification.
2.	S4.0.3, 1 st bullet	Rewritten to document the process for ESBWR PRA Rev. 3 update.
3.	S4.0.3, 2 nd bullet	Added “when applicable” for clarity.
4.	S4.0.3, 3 rd bullet	Deleted “typical” for clarification.
5.	S4.0.3, 6 th and 9 th bullets	Deleted the reference to Revision 2 PRA.
6.	S4.0.3, 10 th bullet	Added a new groundrule to describe the relationship between system model section and other NEDO-33201 sections.
7.	T4.0-1	Moved to the end of the section and deleted “Section” in the “Section #” column (no technical change).

NEDO-33201
Section 4.1
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.1.1	Description revised to reflect updated SRV vs SV naming convention
2.	S4.1.1	Clarified when overpressure protection is required
3.	S4.1.2, 2 nd bullet	Clarified that manual depressurization only allows active low pressure make-up
4.	S4.1.3.1	Description revised to reflect updated SRV vs SV naming convention
5.	S4.1.6	Discussion of support system testing has been removed, not applicable to this section
6.	S4.1.7	Discussion of support system maintenance has been removed, not applicable to this section
7.	S4.1.11	Added key insight / assumption to discussion

NEDO-33201
Section 4.2
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.2.2, 3 rd bullet	Assumption clarified
2.	S4.2.2, 4 th bullet	Assumption revised to reflect the actual signals modeled
3.	S4.2.3, 2 nd – 4 th paras	Deleted because these paragraphs are repeated in S4.2.3.1
4.	S4.2.3.1	Under ICS Pool description, added reference to the Figure that shows the ICS/PCCS pool configuration
5.	S4.2.4.1	Descriptions of automatic actuation from MSIV signal have been consolidated and clarified
6.	S4.2.5	System interfaces have been updated and clarified
7.	S4.2.11	Insights revised to be consistent with the system as modeled
8.	S4.2.11	Added key insight / assumption to discussion
9.	F4.2-1	Updated to reflect revised system design

NEDO-33201
Section 4.3
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1	S4.3.1, 2 nd and 3 rd paras.	Spelled out CRD first use in Section and added parentheses for acronym. No technical change.
2	S4.3.2, Assumptions	Corrected grammar and added or modified assumptions to more accurately portray what was assumed in the system model. No technical change.
3	S4.3.3, 1 st . para.	Corrected typo “ro-d”. No technical change.
4	S4.3.3.1,	Corrected typo: F064 valve number used twice; second time should be F065. No technical change.
5	S.4.3.9.3	Corrected typo “C” and rewrote to account for the fact that both Type A and Type C human errors are included in the table. No technical change.
6	S4.3.9.4	Added clarification indicating that the special events refer to the model rather than the system. No technical change.
7	S4.3.3; S4.3.3.1; S4.3.9	Removed instances of information redundant to other subsections. No technical change.
8	S4.3.3.2; S4.3.4; S4.3.4.2; S4.3.4.3; S4.3.5; S4.3.6; S4.3.7; S4.3.9.4	Changed text to consistently apply current nomenclature and acronyms RPV and HP. No technical change.
9	S4.3.9.1; S4.3.9.2;	Changed TOP names to more accurately represent the success criteria, and made conforming changes throughout the section. No technical change.
10	S4.3.3.1, 2 nd and 4 th paras.	Reworded for clarification. No technical change
11	S4.3.11	Added a statement to provide a reference to Section 11.3.1.15. Not a technical change.
12	S4.3.2, S4.3.9.1, T4.3-6, T4.3-8	Added SI units. Not a technical change.
13	S4.3.10	Added reference to the revised fault tree presented in Section 22. Not a technical change.

NEDO-33201
Section 4.4
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.4.1, 1 st – 2 nd para.	Clarifications/modifications added to reflect DCD 9.3.5.2
2.	S4.4.2, 3 rd - 4 th bullet	Assumption added to support GDCS PRA model
3.	S4.4.2, 5 th bullet	Clarification added reflect assumed limits of PRA model
4.	S4.4.3.1	Changes added for clarification
5.	S4.4.3.2	Modified to reflect wording in DCD Section 9.3.5.2
6.	S4.4.5	Provided reference to Table 4.4-2a
7.	S4.4.7	Provided reference to Table 4.4-3
8.	S4.4.9.1	Provided reference to Table 4.4-6
9.	S4.4.9.3	Removed human event for manual opening of locked closed valve to reflect fault tree
10	S4.4.10	Reworded for consistency with other Section 4 sections
11	S4.4.11	Updated to include reference importance measures in Section 5, to Section 11 sensitivities, Section 12 fire analysis, and Section 13 flooding analysis reflect revised system design
12	T4.4-1	Clarifications/modifications added to reflect DCD 9.3.5.2
13	T4.4-3	Clarifications/modifications added to reflect DCD 9.3.5.2
14	T4.4-5	Removed human event for manual opening of locked closed valve to reflect fault tree
15	T4.4-6	Modification to Top Event descriptions for consistency with fault tree
16		

NEDO-33201
Section 4.5
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.5.1	<p>The functional descriptions for Q-DCIS, and N-DCIS, have been updated to more closely reconcile the PRA models with the DCD descriptions. This change does not involve any changes to the logic models in files C62.CAF, C63.CAF, C72.CAF used during quantification.</p> <p>However, it should be noted that all the tables and figures in this section have been updated to display the “simplified” I&C model that was actually used, in the generation of PRA results for NEDO-33201 Rev. 2. The prior NEDO version displayed a more detailed model that was not used for generating results.</p>
2.	S4.5.2	<p>Listed additional assumptions that were used in the PRA models, but not listed. In addition, provided detail for clarity for several assumptions.</p> <ol style="list-style-type: none"> a. Added clarification to assumptions #3, #4 and #5 b. Added detail regarding the use of redundant logic processor in assumption #6. c. Added assumption #10 for excluding DPS MSIV logic d. Added assumption #11 for excluding additional HVAC dependencies e. Added assumption #12 explaining the simplified treatment for the NMS.. f. Added assumptions #13 and #14. This assumptions list the values that were assumed for common cause failure, and spurious common cause software.
3.	S4.5.3	Added paragraph stating that limitations of the simplified PRA models that were used to generate results.
4.	S4.5.3	Update the reference listed in this section.
5.	S4.5.3.1	For clarity, updated section to provide more detailed description of Q-DCIS and N-DCIS to more closely reconcile the PRA models with information in DCD. Included more explicit list of components considered in the PRA model development.
6.	S4.5.3.2	For clarity, updated section to provide more detailed description of system operation for Q-DCIS and N-DCIS to more closely reconcile the PRA models with information in DCD.

NEDO-33201
Section 4.5
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
7.	S4.5.3.3	Updated and corrected location of components based on new DCD information.
8.	S4.5.4.1	Added information for the different control system platforms considered in the PRA models, and listed limitations for simplified models.
9.	S4.5.4.1	Deleted names of components since this information is not current.
10	S4.5.4.2	Deleted listing of operator actions since the information was outdated. Provided a reference to Section 6 (human reliability analysis).
11	S4.5.4.3	Minor clarification for types of safety actuations considered in the PRA.
12	S4.5.5	Update list of tables discussed in this section (interfaces).
13	S4.5.6	Added summary discussion on general types of testing performed for I&C systems.
14	S4.5.8	Updated list of tables discussed in this section (common cause failure).
15	S4.5.9	Updated list of figures considered in the development of fault trees and updated list of fault tree figures (updated to show simplified models).
16	S4.5.9.1	Updated list of tables discussed in this section (fault tree top events).
17	S4.5.9.2	Provided description of the simplified models used to generate results and included a reference to the section addressing the risk impact of changes (Section 22)
18	S4.5.9.3	Provided additional detail regarding the display information available to operators.
19	S4.5.10	Updated list of tables discussed in this section (fault tree basic events, and top event results).
20	S4.5.11	Added clarification for insights based on team review of results. In addition, provided a reference to Sections 7 and 11 (Core Damage Frequency results and sensitivities)
21	T4.5-2a	Updated table for clarification. N-DCIS controllers are either dual or triple redundant processing system with power from multiple non-safety-related trains (not divisions).
22	T4.5-2b	For clarity, replaced Table 4.5-2b (transfers for merged I&C models) with Tables 4.5-2b1 through 4.5-2b4 (simplified I&C models). The PRA model includes all instrumentation and control systems in four primary super systems (C62, C63, C71, C72). It should be noted

NEDO-33201
Section 4.5
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Item	Location	Description of Change
		that NMS, SSLC/ATWS are included in the system files listed above to reduce the number of models, and system notebooks.
23	T4.5-4	For clarity, replace Table 4.5-4 (CCF events for merged I&C models) with Tables 4.5-4a through 4.5-4d (simplified I&C models).
24	T4.5-5	Deleted table and provided reference to Human Reliability Analysis in Section 6 in NEDO-33201.
25	T4.5-6	For clarity, replaced Table 4.5-6 (top events for merged I&C models) with Tables 4.5-6a through 4.5-6d (simplified I&C models).
26	T4.5-7	For clarity, replaced Table 4.5-7 (basic events for merged I&C models) with Tables 4.5-7a through 4.5-7d. (simplified I&C models)
27	T4.5-8	For clarity, replaced Table 4.5-8 (cutsets for individual top events) with Tables 4.5-8a through 4.5-8d (cutsets for individual top events in simplified I&C models)
28	F4.5-3	For clarity, replaced Figure 4.5-3 (merged I&C models) with separate for each PRA system (Figures 4.5-3a through 4.5-3d).

NEDO-33201
Section 4.6
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.6.1, 2 nd – 4 th para.	Clarification of functions
2.	S4.6.2, 3 rd - 4 th bullet	Assumption added to support GDCS PRA model
3.	S4.6.3	Editorial changes provided for clarification
4.	S4.6.3.1	Modified to reflect wording in DCD Section 6.3.2.7.2
5.	S4.6.3.2	Modified to reflect wording in DCD Section 6.3.2.7.2
6.	S4.6.4.1	Changes made to accurately identify the actuation signals
7.	S4.6.4.2	Changes made to accurately identify the actuation signals
8.	S4.6.5	Added reference to Table 4.6-2a and 4.6-2b
9.	S4.6.6	Changes made to reflect no T&M activities
10	S4.6.8	Reference to Section 5 added to support CCF analysis of GDCS
11	S4.6.9.1	Bullets updated for clarification and consistency
12	S4.6.9.2	Reference provided for deluge fault tree in Section 8A
13	S4.6.9.3	Additional clarification in support of valve mispositioning case for GDCS
14	S4.6.10	Modified to reflect more consistent wording in other Section 4 sections
15	S4.6.11	Updated to include reference importance measures in Section 5 and to Section 11 sensitivities reflect revised system design
16	T4.6-1	Details added to support GDCS controls
17	T4.6-3	Modification to table included to provide consistency with other sections in Section 4
18	T4.6-5	Correction to basic event name
19	T4.6-6	Modification to Top Event descriptions for consistency with fault tree
20		

NEDO-33201
Section 4.7
Changes from Revision 2 to Revision 3

<p>Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.</p>		
Item	Location	Description of Change
1	Section 4.7.2 Assumptions 3 & 4	Editorial changes to reword/clarify assumptions.
2	Section 4.7.2 Assumptions 9	Changed assumption from ‘no dependency is modeled’ to signal dependency is accounted for in NDCIS.
3	Section 4.7.2 Assumptions 12	Assumption added to clarify out of service treatment for components.
4	Section 4.7.3.3	Component location section updated to include specific locations for some components.
5	4.7.11 PRA Insights	Insights section re-written. Manual valve failure rates were corrected in the model and changed the top cutsets for several of the modeled functions. This section was re-written to reflect the updated results.
6	4.7.11 PRA Insights	Added discussion of key insights & assumptions for system specific items that are key to the entire integrated model.
7	Table 4.7-2b	Clarified transfer description to identify N-DCIS as signal source.

NEDO-33201
Section 4.8
Reactor Water Cleanup/Shutdown Cooling System
Changes from Revision 2 to Revision 3

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Item	Location	Description of Change
1	Section 4.8.1 Introduction	Bullet added to include shutdown cooling function.
2	Section 4.8.2 Assumptions 3	Assumption re-written to clarify use of split fractions.
3	Section 4.8.4.2 Manual Actuation	Wording changed to correctly describe manual operation of system.
4	Section 4.8.6 System Testing	Description of testing interval re-worded to more clearly explain test interval.
5	Section 4.8.9.2 Fault Tree Description	Description slightly changed to clarify modeling treatment.
6	Section 4.8.11 PRA Insights	Section re-written to be more specific and to expand on explanation of system insights.
7	Section 4.8.11 PRA Insights	Added comment to address key insights & assumptions
8	Table 4.8-2a	Corrected heat exchanger ID in table. The ones listed did not have supports.
9	Table 4.8-5	Human error events table updated to match cutsets below. Screening values are used in section 4 in model development. Details of the HRA events are in section 6.

NEDO-33201
Section 4.9
Condensate & Feedwater System, and Circulating Water System
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1	Section 4.9.1	Clarified introduction and added sentence to include Circ water system.
2	Section 4.9.2 Assumption 2	Updated assumption 2 to more clearly state how success criteria is modeled for feedwater, condensate, and turbine bypass.
3	Section 4.9.2 Assumptions 15-20	Re-worded assumptions to more clearly explain how split fractions are used in the model.
4	Section 4.9.4.1	Removed reference to DCD revision in text.
5	Section 4.9.6 System Testing	Added sentence to explain test interval for some components.
6	Section 4.9.9.2 Fault Tree Description	Edited section to correctly explain treatment of model and split fractions. They were treated differently in the individual system evaluation than in the integrated model quantification. One system arrangement is used in the integrated model to simplify quantification times.
7	Section 4.9.11 PRA Insights	Added details to insights section to provide more specific insights.
8	Section 4.9.11 PRA Insights	Added comment about key insights & assumptions.

NEDO-33201
Section 4.10
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	General	While the number of change bars seems to indicate substantive changes, the changes themselves are minor editorial and clarification items.
2.	S4.10.2	Revised assumptions to be more reflective of the modeling details, and corrected grammar and typos. No technical change.
3.	S4.10.2, S4.10.3	Deleted extraneous text where unimportant to the system model or understanding thereof. No technical change.
4.	S4.10.3.1, 2 nd para	Deleted text redundant to other sections. No technical change.
5.	S4.10.3.1, 5 th and 6 th paras	Reworded appropriately for grammar or information flow. No technical change.
6.	S4.10.3.2, 4 th para	Moved success criteria text to become first item in Section 4.10.2. No technical change.
7.	S.4.10.4.1, 1 st para	Deleted extraneous text where unimportant to the system model or understanding thereof. No technical change.
8.	S.4.10.4.2	Reworded appropriately for grammar or information flow. No technical change.
9.	S4.10.6, 1 st para	Removed redundant text and corrected grammar. No technical change.
10	S4.10.7, 2 nd para	Corrected grammar. No technical change.
11	S4.10.9.1	Remove redundant line. No technical change.
12	S4.10.9.2, 1 st ., 2 nd , 3 rd paras	Deleted extraneous text where unimportant to the system model or understanding thereof, and reworded for clarity.
13	S4.10.9.4	Removed extraneous text where unimportant to the system model or understanding thereof. No technical change.
14	S.4.10.10, 2 nd . para	Corrected typo. No technical change.
15	S.4.10.11	Corrected grammar and added references to the sensitivities performed for the system.

NEDO-33201
Section 4.10
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
16	T4.10-2b	Replaced instances of “shall” and “will” where no commitment or requirement is intended when describing the model. No technical change.
17	T.4.10-2b	Corrected typos and grammar. No technical change.
18	T.4.10-2b	Corrected grammar and typos. No technical change.
19	T.4.10-6	Clarified descriptions of top events to better correlate to text.

NEDO-33201
Section 4.11
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	S4.11.1	Removed redundant text and corrected grammar and format. No technical change.
2.	S4.11.2	Updated assumptions and modeling details. No technical change.
3.	S4.11.3.1, 2 nd 3 rd and 4 th paras., S4.11.7	Removed redundant text and corrected grammar. No technical change.
4.	S4.11.3.1, 2 nd 3 rd and 4 th paras.	Deleted extraneous text where unimportant to the system model or understanding thereof. No technical change.
5.	S4.11.3.2, 1 st and 3 rd paras., S4.11.6	Reworded appropriately for grammar or information flow. No technical change.
6.	S4.11	Replaced instances of “shall” and “will” where no commitment or requirement is intended when describing the model. No technical change.
7.	S4.11	Corrected typographical errors. No technical change.
8.	S4.11	Deleted references to R14. There is no such system. No technical change.
9.	S4.11.9.2	Clarified fault tree description section. No technical change.
10	S4.11.9.3	Expanded explanation of human interactions. No technical change.
11	S4.11.10	Reworded appropriately for grammar or information flow. No technical change.
12	S4.11.11	Expanded section and added references to applicable system sensitivity section. No technical change.
13	T4.11.7	Corrected typo. No technical change.
14	T4.11.7 and 4.11.8	Filled in descriptions that were inadvertently left blank. No technical change.
15	Tables	Inserted table headings where none existed. No technical change.

NEDO-33201
Section 4.12
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	4.12.1	Editorial change.
2.	4.12.2	Editorial change.
3.	4.12.4.1	Editorial change.
4.	4.12.6	Editorial change.
5.	4.12.8	Editorial change.
6.	4.12.9.1	Editorial change.
7.	4.12.9.2	Editorial change.
8.	4.12.9.4	Editorial change.
9.	4.12.9.3	Editorial change.
10	4.12.11	Editorial change. Added Section 11 for risk insight reference.
11	Table 4.12-2a	Editorial change.
12	Table 4.12-6	Editorial change.

NEDO-33201
Section 4.13
From Revision 2 to Revision 3 Change List

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Item	Location	Description of Change
1.	4.13.2	Editorial change. Enhanced assumptions description.
2.	4.13.3.1	Editorial change.
3.	4.13.3.2	Editorial change.
4.	4.13.3.3	Editorial change.
5.	4.13.6	Editorial change.
6.	4.13.7	Editorial change.
7.	4.13.9.2	Editorial change.
8.	4.13.10	Editorial change.
9.	4.13.11	Editorial change. Added Section 11 for insight reference.
10	Table 4.13-2a	Editorial change.

NEDO-33201
Section 4.14
Changes from Revision 2 to Revision 3

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Item	Location	Description of Change
1.	S4.14.1, 2 nd para.	Deleted “sources” in the second sentence.
2.	S4.14.1, 3 rd para., last sentence	Rewritten for clarity.
3.	S4.14.2, 2 nd Bullet	Deleted the reference to Revision 2 PRA models and replaced “UATs” with “Unit Auxiliary Transformers (UATs)” and “LOPP” with “the loss of preferred power (LOPP)”.
4.	S4.14.2, 3 rd Bullet	Deleted the reference to Revision 2 PRA models added the statement “This revision includes a simplified switchyard modeling”.
5.	S4.14.2, 6 th Bullet	Rewritten for clarity.
6.	S4.14.2, 8 th Bullet	Replaced “are power from” with “are powered from”.
7.	S4.14.2, 9 th Bullet	Deleted last sentence for clarity.
8.	S4.14.2, 10 th Bullet	Rewritten for clarity.
9.	S4.14.2, 11 th Bullet	Replaced “transfer from the alternate to normal power supply” with “transfer from the alternate power supply back to the normal power supply”.
10.	S4.14.2, 12 th Bullet	Replaced “Rev. 3” with “Tier 2 Section 8”.
11.	S4.14.2, 13 th Bullet	Rewritten for clarity.
12.	S4.14.2, 16 th Bullet	Replaced “super component, DG” with “The diesel generator (DG) super component”. Replaced “service water system (cooling medium)” with “cooling water system”. Deleted “and is therefore considered within the bounds of this study”.
13.	S4.14.2, 17 th Bullet	Replaced “Under Voltage (UV) relays” with “protective relays”. Deleted the reference to DCD Revision 3.
14.	S4.14.2, 20 th Bullet	Deleted “Due to the limitation of the CCF module of CAFTA”.
15.	S4.14.2, 21 st and 22 nd Bullets	Replaced “NDCIS” with “N-DCIS”.
16.	S4.14.2, 24 th Bullet	Replaced “Under Voltage (UV) relays” with “protective relays”.
17.	S4.14.3.1, 2 nd para.	Replaced “Alternate Reserve” with “Alternate Preferred”.

NEDO-33201
Section 4.14
Changes from Revision 2 to Revision 3

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Item	Location	Description of Change
18.	S4.14.3.1, 3 rd para.	Replaced “unit auxiliary transformers” with “UATs”.
19.	S4.14.3.1, 5 th para.	Replaced “motor loads larger than approximately 250 kW” with “large motor loads”.
20.	S4.14.3.2, 1 st and 2 nd para.	Replaced “unit auxiliary transformers” with “UATs”.
21.	S4.14.3.3, 4 th para.	Replaced “Control” with “Reactor”.
22.	S4.14.5, 6 th para., bullet (c)	Deleted the instrument and control power supply system because the system is deleted in DCD Revision 5.
23.	S4.14.6, 3 rd para, 1 st sentence	Replaced the semicolon with “and”.
24.	S4.14.7, 1 st para.	Editorial change.
25.	S4.14.7, 2 nd para.	Replaced “during operation” with “during plant operation”.
26.	S4.14.7, 3 rd para.	Added “at power” at the end of the sentence.
27.	S4.14.8, 1 st para.	Rewritten for clarity to provide linking to Section 5.3.
28.	S4.14.8, 2 nd para.	Replaced “MODs” with “the motor-operated disconnects (MODs)”.
29.	S4.14.8, 3 rd para.	Deleted “because of the limitation of the CAFTA CCF tool”.
30.	S4.14.9.1, 1 st and 2 nd para.	Editorial changes.
31.	S4.14.9.3, 1 st para.	Editorial changes.
32.	S4.14.10, last para.	Replaced “equations” with “and large release frequency cutest files” in the first sentence. Replaced “systems modeled” with “modeled systems” in the last sentence.
33.	S4.14.11, 3 rd para.	Deleted the last sentences.
34.	S4.14.11, 2 nd to last para.	Added discussion on system importance sensitivity study that provides a link to Section 11.
35.	S4.14.11, last para.	Added discussion on key insights and assumptions.

NEDO-33201
Section 4.14
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
36.	T4.14-1	Added details for entries related to “Basic Instrumentation and Control Required for Electric Power Distribution System”.
37.	T4.14-2b	Replaced “TRANSFORMER” with “TRANSFORMER” to correct the typo.
38.	T4.14-3	Editorial changes in the notes.
39.	T4.14-6	Replaced “TRANSFORMER” with “TRANSFORMER” to correct the typo. Deleted a supuplicate line for top R11-0000A1.
40.	T4.14-7	Replaced “CONSEQUENTIAL” with “CONSEQUENTIAL” to correct the typo.
41.	T4.14-8	Replaced “TRANSFORMER” with “TRANSFORMER” to correct the typo. Replaced “CONSEQUENTIAL” with “CONSEQUENTIAL” to correct the typo.

NEDO-33201
Section 4.15
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	S4.15.1, 2 nd to last sentence	Editorial change.
2.	S4.15.2, 2 nd Bullet	Deleted the reference to Revision 2 PRA models.
3.	S4.15.2, last Bullet	Added a new assumption on CCF groups.
4.	S4.15.3.1, 2 nd para., 3 rd to last sentence	Changed “DCIS” to “N-DCIS” for clarity.
5.	S4.15.3.3, 2 nd para.	Changed “120 V AC Power System” to “UPS system”.
6.	S4.15.4.1, 1 st para.	Changed “alternate source” to “alternate power sources”.
7.	S4.15.4.2, last sentence	Deleted the reference to Revision 2 PRA models.
8.	S4.15.5, 2 nd para.	Added “if normal AC power supply is lost” at the end of the sentence.
9.	S4.15.5, last para.	Editorial change.
10.	S4.15.7, 1 st para., last sentence	Deleted for clarity.
11.	S4.15.8, 1 st para. and last para.	Rewritten to provide a link to NEDO-33201 Section 5.
12.	S4.15.9.1, 1 st para.	Editorial change.
13.	S4.15.10, 4 th para., 1 st sentence	Replaced “core damage frequency equation” with “core damage frequency and large release frequency cutset files”.
14.	S4.15.11, last two para.	Added discussions to provide a link to NEDO-33201 Section 11 for sensitivity studies and to document the key insights and assumptions.

NEDO-33201
Section 4.16
Fire Protection System
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1	S 4.16.2 Assumption 4	Assumption 4 was edited and split into two assumptions. This assumption only deals with FPS equipment success criteria.
2	S 4.16.2 Assumption 5	Added assumption 5 for the success of a pump truck connection for pool make up
3	S 4.16.5 Interfaces	Underlined heading added for clarification. The 'Pump Truck' and 'Interfaces not listed' are part not part of the make up heading they were under.
4	S 4.16.9.1 Top Event Definitions	Added third top event to list and re-formatted descriptions for consistency.
5	T 4.16-2a	Corrected system acronym to N-DCIS for C62

NEDO-33201
Section 4.17
Changes from Revision 2 to Revision 3

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	S4.17.2, 3 rd Bullet	Changed “same assumption” to “ventilation assumption”.
2.	S4.17.2, 4 th Bullet	Deleted “for Rev. 2 philosophy”.
3.	S4.17.2, last two bullets	Added new assumptions on CCF groups and mispositioning errors.
4.	S4.17.3.1, 1 st para., last sentence	Added “to their loads” for clarity.
5.	S4.17.3.1, 2 nd para., last sentence	Replaced “diesel generator buses” with “the Plant Investment Protection (PIP) buses”.
6.	S4.17.3.3, 3 rd para.	Replaced “250V DC systems” with “250VDC and 125 VDC systems”.
7.	S4.17.5, 2 nd para.	Editorial changes.
8.	S4.17.6, last para.	Added to provide reference to Table 4.17-3.
9.	S4.17.7, last para.	Added to provide reference to Table 4.17-3.
10.	S4.17.8, 1 st and 2 nd para.	Rewritten to provide a link to Section 5.3.
11.	S4.17.9.1, 1 st para.	Replaced “(safety –related and nonsafety-related) divisional trains” with “DC buses”.
12.	S4.17.9.2, 2 nd para.	Deleted “for Rev. 2 philosophy”.
13.	S4.17.10, 4 th para.	Replaced “equations” with “and large release frequency cutset files”.
14.	S4.17.11, 1 st para., last sentence	Deleted for clarity.
15.	S4.17.11, 2 nd para., last sentence	Deleted “which are conservatively assumed” for clarity.
16.	S4.17.11, last two para.	Added discussions to provide a link to Section 11 for the system importance sensitivity study and to document the key insights and assumptions.
17.	T4.17-1	Added an alarm for “Circuit breaker position”.

NEDO-33201
Section 4.17
Changes from Revision 2 to Revision 3

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Item	Location	Description of Change
18.	T4.17-2a	Editorial changes.

NEDO-33201
Section 4.18
From Revision 2 to Revision 3 Change List

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	S4.18.2	Assumption 1 has been clarified, assumption 4 is augmented with train rotation frequency
2.	S4.18.3	Discussion added to clarify that PCCS is an integral part of the containment boundary
3.	S4.18.3.1	Clarified the Containment Isolation System discussion regarding the Level 2 treatment
4.	S4.18.3.1	Vent discussion revised to reflect alternate exhaust path
5.	S4.18.3.2	Clarified the discussion to include the Level 2 treatment
6.	S4.18.7	Revised for clarity
7.	S4.18.9	Revised for clarity
8.	S4.18.9.1	Revised for clarity
9.	S4.18.11	Added key insight / assumption to discussion
10	T4.18-2a	Dependencies clarified; C74 changed to C63 for consistency
11	T4.18-5	Human error probability updated to the value determined in NEDO-33201 Section 6

NEDO-33201
Section 4.19
From Revision 2 to Revision 3 Change List

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	S4.19.2	Assumptions 1, 3 and 6 clarified to indicate that cross-connect valves must function before 72 hours but human action is not required
2.	S4.19.3	Description added to emphasize that the PCCS condensers and piping are an integral part of containment and are designed to containment specifications
3.	S4.19.3.2	Requirement for cross-connect valves at 24 hours has been emphasized
4.	S4.19.3.3	Description added to emphasize that the PCCS condensers and piping are an integral part of containment and that no containment penetrations exist
5.	S4.19.4	Requirement for cross-connect valves at 24 hours has been emphasized
6.	S4.19.6	PCCS testing has been clarified
7.	S4.19.9.1, 2 nd bullet	Use of gate T15-U43-CROSSCONN is clarified
8.	S4.19.11	Added key insight / assumption to discussion

NEDO-33201
Section 4.20
From Revision 2 to Revision 3 Change List

Formatting & editorial changes have been made to improve consistency and readability. These changes include changing fonts in tables, removing excess spacing, correcting punctuation, & spelling, and correcting grammar. Acronyms have been spelled out where appropriate.

Item	Location	Description of Change
1.	Reference 4-1	Changed “26A6643AD” to “26A6642AD”.