Tier 2 Chapter 5 Revision 3 to Revision 4 Change List

Item	Location	Description of Change
1.	S5.1, 3rd para.	Delete last sentence and replace with last sentence at the end of 5th paragraph. A physical description of the DPV component is placed in DCD Section 5.4, and Section 6.3 retains only functional association with ADS. This is in accordance with SRP 5.4 and SRP 6.3 guidance. Correct inaccuracies and for readability.
2.	S5.1, 4th para.	Revised "nuclear system" to "nuclear boiler system" or "NBS", and throughout Section. Introduce ICS primary AOO pressure increase mitigation function that is credited in Chapter 15 evaluations. This introduction provides a rational link to the statements regarding SRV activation to depressurize NBS in the next paragraph, and with the overpressure evaluation in Subsection 5.2.2 that concludes only 1 SRV (of 10) is required to perform the Code overpressure protection function.
3.	S5.1, 5th para.	Deleted generic “pressure relief system” and replaced with specific “SRV.” Added cross-reference to Section 6.3 for ADS. Text moved from DCD-T2 Section 6.3 for readability and to correct inaccuracies.
4.	S5.1, 6th para.	"Nuclear system" replaced with "RCPB" in two places to remove indefinite term and replace with specific and bounding term.
5.	S5.1, 8th para.	In fourth sentence, inserted phrase “forced-flow pump-driven” to distinguish between ESBWR and other BWR designs.
6.	F5.1-2	Updated Figure to match current design.

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Item	Location	Description of Change
7.	F5.1-3	Resolution per RAI 5.4-29_S01 to renumber figure and add two figures changed editorially to keep F5.1-3 as is and change F5.4-4 to Figures 5.4-4a and 5.4-4b. Figures 5.4-4a and 5.4-4b are directly pertinent to the system description provided in Subsection 5.4.6.
8.	F5.1-4	Replaced F with updated version. Removed pipe class and pipe sizes and simplified the legend. Not needed on simplified P&ID.
9.	S5.2.1.2, 2nd para.	Correction for first reference to "ASME Code" and other minor style corrections.
10.	S5.2.2, 2nd para.	Revised entire para. to clarify ASME Code design basis of ESBWR overpressure protection and provide corrected description of design features.
11.	S5.2.2, 4th para 1st bullet	Identified acronym "AOO" at first use.
12.	S5.2.2, 5th para. and generic to S5.2	Editorial correction -Added "and SV" to distinguish from "SRV" type valve. Correction made throughout Section text, and replaced terms such as "ADS-SRV" and "non-ADS SRV."
13.	S5.2.2, 6th para. 1st bullet.	Editorial corrections for consistent style. Added ASME Code reference for Service Level B criterion and changed "anticipated pressure" to "analyzed transient pressure."
14.	S5.2.2, 6th para. 2nd bullet	Editorial corrections for consistent style. Added ASME Code reference for Service Level C criterion.

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Item	Location	Description of Change
15.	S5.2.2, 7th para.	Revised to clarify – SRVs and SVs may have same or different rated capacities. Valve capacity is determined by ASME Code certification testing, and note specified by the ASME Code.
16.	S5.2.2.1, 1st para.	Replaced term "instructions" with more accurate term "procedures," and changed cross-reference to "Section 14.2" for consistency of style.
17.	S5.2.2.1, Safety Design Bases, 2nd bullet	Revised to identify that SRVs provide a design enhancement for vessel depressurization along with ICS and DPVs. Per the NBS design specification and BWR generic bases; depressurization is required to support the low-pressure ECCS functions for the spectra of LOCA with smaller break sizes having slow depressurization rates.
18.	S5.2.2.1, Safety Design Bases, 3rd bullet	Added new bullet to identify SV-specific basis for discharge of steam to drywell.
19.	S5.2.2.1, Power Gen Design Bases, all bullets	Edited for clarity – distinguishes between SRVs and SVs, replaces generic term "operation" with specific term "steam discharge." 2nd bullet added to specify SV discharge to drywell through rupture disks, and 3rd bullet clarified to indicate both SRVs and SVs reclose, replacing the term "operation" with more specific term "steam discharge".
20.	S5.2.2.1, ASME Code, 2nd para.	Added term "SV" to existing term "SRV" to include both value types in Code discussion.
21.	S5.2.2.1, ASME Code, 2nd para.	Deleted redundant para. referencing ADS, has no bearing on ASME Code discussion.

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Item	Location	Description of Change
22.	S5.2.2.1, ASME Code, 3rd para., all bullets	Clarify references to the ASME Code, adding "for Class 1 (Subsection NB)" to 1st bullet, adding "steam discharge" after nameplate in 2nd bullet and adding "ASME Code, Section III" after 'other' and rephrase per the Code to read "provide the integrated."
23.	S5.2.2.1, ASME Code, 4th para.	References to the ASME Code for Class 3 added to specify basis for discharge piping.
24.	S5.2.2.1, Safety/Relief Valve Capacity	Revised to clarify that SRV and SV combination covers AOOs and beyond AOO pressure increase events. Deleted redundant ASME Code title. Revised 2nd para. to read "The *combined* rated capacity …" Revised to replace "120% of the design pressure" with "the applicable limits."
25.	S5.2.2.2.1, 1st para.	Added new first sentence for ICS cross-reference. Added reference to F 5.2-2
26.	S5.2.2.2.1	Deleted last sentence (redundant statement)
27.	S5.2.2.2.2	Section extensively edited and revised. Redundant paragraph removed. Paragraph on related topics are combined. Provide separate treatment of SRVs and SVs, and distinguish NBS pressure relief design from ECCS function of the ADS logic. Included function of ICS as part of pressure relief capability as per ESBWR design documents, DCD commitments (Post TMI for pressure relief), and analyses. Revised opening time for actuation from 1.7s to 0.5s

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Item	Location	Description of Change
28.	S5.2.2.2.5	Table 5.2-4 is under review for RAI 5.2-36 S01 response. The Section statement is revised to indicate that the material spec listings are "typical' and that all materials used comply with Article NB-2000 of the ASME Code.
29.	S5.2.2.3.2 – Pressurization Events, 1st para.	A sentence is added, Second-to-last, to cross-reference to 15.2.2, wherein the response to AOOs is based on ICS performance rather than SRVs or SVs. Last sentence is clarified to indicate that evaluation of SRV performance to a MSIV full-closure event assumes no credit for ICS response.
30.	S5.2.2.3.2, Pressurization Events, 3rd para	Replaced acronym "TTNBPF" with full event title and added cross-reference to evaluation in Subsection 15.3.6. Deleted commitment statement for overpressure protection analysis performed at each refuel cycle per response to RAI 5.2-61. This item removed from Subsection 5.2.6 in Rev 3 of DCD.
31.	S5.2.2.3.2 – Evaluation Method	Corrected cross-reference from "Subsection 15.0.3.4" to "Reference 15.2-1".
32.	S5.2.2.3.2 – SRV Capacities	Minor edit in 1st paragraph. Deleted 2nd paragraph and revised following paragraph for clarity, and to separately identify SRVs from SVs. Add as a fourth para. the statement: " To demonstrate the margin for AOO pressurization events, an analysis model assuming only the capacity of a single SRV is evaluated below."
33.	S5.2.2.3.3 – Evaluation Results, Total SRV Capacity	Revised the para. to conform to a single SRV evaluation (RAI 16.2-119 Supplement 01 response). Deleted last para. in entirety.

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Item	Location	Description of Change
34.	S5.2.2.3.3, Statistical Evaluation of MSIVF Special Event	Deleted specific evaluation case results values and rewrote paragraph to discuss in terms of design bounding pressure value. Also specify which of six figures contains the pressure curve.
35.	S5.2.2.3.4 – System Reliability	Expanded discussion to cross-reference event evaluations in Subsection 15.2.4, 15.3.4 and 15.3.5. Added cross-references to failure event evaluations in Subsection 15.2.4.1, 15.3.13 and 15.3.15.
36.	S5.2.2.4, 1st and 2nd para.	Inserted "*and SVs*" after SRV
37.	S5.2.2.4, 2nd and 4th bullets	Replace "SRV" with "valve"
38.	S5.2.2.4, 5th bullet	Inserted "*and SVs*" after SRV in fifth bullet
39.	S5.2.2.5	Inserted "*and SVs*" after SRV
40.	S5.2.3, 1st para.	Deleted opening phrase "*As discussed in SRP 5.2.3 Draft R3,*" and capitalized "*This …*"
41.	S5.2.3.1, 2nd para.	Added "*Article NB-2000*" to specify Code material requirements.
42.	S5.2.3.2.2, Under Oxygen, 2nd para	Added cross-reference for HWCS to Subsection 9.3.9

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Item	Location	Description of Change
43.	S5.2.3.2.2, Electrochemical Corrosion Potential, 3rd sent.	Reworded for clarity
44.	S5.2.3.2.2, Main Steamline Radiation Level, 2nd sent	Reworded for clarity
45.	S5.2.3.2.2, Irradiation Assisted Stress Corrosion Cracking (IASCC) Considerations, 4th para, 3rd sent	Reworded for clarity
46.	S5.2.3.4.2, 2nd para	Additional information provided for clarity.
47.	S5.2.4, 2nd and 3rd para	Additional information provided for clarity.
48.	S5.2.4, 3rd para.	Revised statement on PSI/ISI program development to support COL and clarify
49.	S5.2.4.2, Bottom Head Welds	Corrected visual examination requirements.
50.	S5.2.4.3.1, 1st para	Delete COL item pointer.
51.	S5.2.4.3.1, 2nd para	Rewrote first sentence for clarity of scope of examinations.

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Item	Location	Description of Change
52.	S5.2.4.3.2, under Ultrasonic Examination of Reactor Vessel, 1st para	Deleted last sentence of first paragraph on relieve requests. This is generically covered under Subsection 5.2.4.10.
53.	S5.2.4.3.2 under Ultrasonic Examination of Reactor Vessel, 2nd para	Added alternative for nozzle inner radius examination.
54.	S5.2.4.3.2, under Alternative Examination Techniques	Inserted parenthetical clause to note that subsequent approved Editions/addenda may replace use of IWA-2240 1997/Addenda may requirements.
55.	S5.2.4.5, 1st and 2nd para	Added reference to IWA-3000 in first paragraph and added second paragraph to discuss flaws and relevant conditions acceptance for continued service to support COL.
56.	S5.2.4.7	Rewrote sentence on component list and component exemptions.
57.	S5.2.4.8	Added sentence identifying basics for Sect XI modifications.
58.	S5.2.4.9 through S5.2.4.12	Added new subsections to provide information in support of COL.
59.	S5.2.5, 1st para	Added COL item pointer.

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Item	Location	Description of Change
60.	S5.2.5, 6th para, 7th bullet	Inserted "*and SV*" after SRV
61.	S5.2.5, 6th para	Deleted bullet for "Valve Stem Packing Leakage Monitoring".
62.	S5.2.5, 7th para	Changed "design basis" to "safe shutdown" and added "(SSE)."
63.	S5.2.5, 8th para	Deleted "discrete, hard-wired" with respect to Level 1 backup trip. There is no hard-wired tip in the design.
64.	S5.2.5.1.1, 4th and 5th para; S5.2.5.2.1, 1st and 2nd para; and, S5.2.5.2.1 - Valve Stem Packing Leakage Monitoring	All other references to stem packing leaf-off monitoring removed from Subsection 5.2.5 as technical improvement change.
65.	S5.2.5.2.1, Safety/Relief Valve Leakage Monitoring	Inserted "*or SV*" after SRV in two places. After "*SRV discharge lines*" inserted "*or SV condensate drain lines*." Replaced *Nuclear Boiler System* with defined acronym *NBS*.
66.	S5.2.5.2.2, Visual Inspection of Accessible Plant Areas	Added "by inspection" after "leakage detected
67.	S5.2.5.4	Added clarification as part of response to RAI 5.2-1_S02 and 5.2-2_S02 regarding step-change leakage increase.

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Item	Location	Description of Change
68.	S5.2.5.5, 3rd para	Added clarification as part of response to RAI 5.2-1_S02 and 5.2-2_S02 regarding step-change leakage increase.
69.	S5.2.5.8, 3rd para	Corrected statement on detectors to add "step change" and clarity basis of 1gpm sensitivity made similar change throughout Subsection 5.7.5
70.	S5.2.5.9	Added "COL Information for Leak Detection" in new location per Writers Guide.
71.	S5.2.6	Updated COL information in response to RAI 5.2-4S02 (COL# 5.2-2-H) and corrected Subsection reference in 5.2-1-H.
72.	S5.2.7, Ref.5.2-9	Replaced reference in response to RAI 5.2-18-S01.
73.	F5.2-1	Replaced per design change
74.	F5.2-2	Updated and revised title per design change. Clarifies "SRVs" and "SVs" and shows the DPVs on stub tubes.
75.	T5.2-2	Deleted "SRV" from 3rd column header and added "SV" to 1st column header.
76.	F5.2-3	Figure update per design change to remove extraneous information and show rearrangement of quenchers for 10 SRVs only per design change
77.	F5.2-4a-thru-4f	Removed response to RAI 16.2-119_S01.
78.	T5.2-7	Deleted column for "Stem Packing Leakoff."

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Item	Location	Description of Change
79.	S5.3.1.5, 1st para	The commitment to a PTLR replaces a separate COL item for reporting fracture toughness in DCD-T2 Section 5.3, and resolves a conflict with the Technical Specifications section
80.	S5.3.1.5, Method of Compliance, 2nd bullet	Removed pointer for deleted COL item
81.	S5.3.1.5, Method of Compliance, 6th bullet	Deleted statement "in conjunction with the defect size of Subsection 5.3.1.5 (6)" not relevant to the ESBWR design, subsection referenced for defect size does not exist
82.	S5.3.1.6	Paragraph relocated from top of subsection 5.3.1.6.1 to be introduction to this subsection and COL information pointer added.
83.	S5.3.1.6.4, 1st para, 7th sent	Deleted pointer for COL item.
84.	S5.3.1.8	Paragraph relocated of subsection 5.3.4 COL 5.3-2-A for COL numbering system conformance.
85.	S.5.3.2.1, Temperature Limits for ISI Hydrostatic	Added commitment to a PTLR replaces a separate COL item for reporting fracture toughness in DCD-T2 Section 5.3, and resolves a conflict with the Technical Specifications section.
86.	S.5.3.2.1, Operating Limits During Heatup, Cooldown, and Core Operation	Deleted pointer for COL item.
87.	S5.3.2.2	Added cross-reference statement to Section 13.5 for procedures that implement and enforce p-t limits.

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Item	Location	Description of Change
88.	S5.3.3, under "Design"	Rewritten for clarity.
89.	S5.3.3, 3rd para	Reworded for clarity and to correct reference to following "paragraphs" not "subsections."
90.	S5.3.4, (COL 5.3-1-A)	COL Item deleted based on submittal of PTLR in accordance with Technical Specifications as noted in Subsections 5.3.1.5 and 5.3.2.1.
91.	S5.3.4, (COL 5.3-2-A)	COL item rephrased to clarify the applicant requirements and parts relocated to 5.3.1.8 with a new pointer added.
92.	S5.4.1.1	Deleted unnecessary statement "SRP 5.4.1.1, PUMP FLYWHEEL INTEGRITY (PWR),"
93.	S5.4.2, entire section	Deleted unnecessary statements "SRP 5.4.2.1,… "and SRP 5.4.2.2,…"
94.	S5.4.6	In first paragraph list of GDCs, delete #29 from the list per response to RAI 5.4-25 S01
95.	S5.4.6.1.1, 5th para	Under "Functions" a paragraph on pool capacity to support 72 hours is added per design specification (see also RAI 5.4-27), and restated passive design pools interconnection in the eighth bullet under "Detailed System Description."
96.	S5.4.6.1.1, 6th para under "General System Requirements"	Delete the values of temperature and pressure. Specific values, covered under RAI 5.4-51, not intended to be inserted into the DCD.
97.	S5.4.6.1.2, 2nd para	Corrects "containment" to "reactor" with respect to ICS response on reactor isolation.

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Item	Location	Description of Change
98.	S5.4.6.2.2, 1st para	Additional figure numbers added in response to RAI 5.4-29_S01 incorporates new figures into DCD-T2 for ICS.
99.	S5.4.6.2.2, 3rd para, 1st bullet	Added number of tubes and material specification of ICS per response to RAI 5.4-29_S01.
100.	S5.4.6.2.2, 3rd para, 8th bullet	Added statement on IC pools cross-connection to dryer/separator pool and reactor well to support 72 hours operability. Statement inserted as part of RAI 5.4-27 response.
101.	S5.4.6.2.3, Isolation Condenser Operation, 1st bullet	Rewritten to clarify and simplify statement about MSIV positions indication on separate steam lines.
102.	S5.4.6.2.3, Isolation Condenser Operation, 3rd para	Removed specific values of vessel elevation from text, clarified parenthetical statement and added reference to Figure 7.7-1,. And deleted reference to previous DCD revision.
103.	S5.4.6.4, 1st para Testing	Added reference to preoperational testing requirements for consistency with other subsections. Summarizes additional testing to be performed during initial startup.
104.	S5.4.6.4, 2nd para Testing	Inserted a commitment to perform regular capability testing of the IC heat exchangers per RAI 5.4-52 with S 01.
105.	S5.4.8, RWCU/SDC System	Added GDC 4 per Subsection 5.4.7

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Item	Location	Description of Change
106.	S5.4.8.1.1, Power Generation Design Bases	Paragraph inserted at end of subsection to address controls interlock is relocated from Subsection 5.4.8.2.5 per Chapter 15.3.12 inadvertent shutdown cooling AOO analysis
107.	S5.4.8.1.2, "Detailed System Description," 2nd para	Add new statement on water hammer considerations under "Detailed Design Description" 2nd paragraph
108.	S5.4.8.1.2, Pumps	Additional information added to be consistent with figure in Section 5.1, that pumps are "low" and "high" capacity in current design.
109.	S5.4.8.1.2, Piping	Rewritten for clarity with additional information provided. To identify Code class of overboard piping.
110.	S5.4.8.1.4, 1st para	Added cross-reference for consistency to cross-reference to Section 14.2 for pre-op testing.
111.	S5.4.8.1.5, Isolation Valves	Clarified that the "Hi RWCU/SDC flow" is a system differential mass flow rate.
112.	5.4.8.2.5, 3rd para	Relocated to S5.4.8.1.1, Power Generation Design Bases.
113.	5.4.9.1, entire section	Edited for format consistency with other "Design Bases' subsections.
114.	S5.4.9.2, 3rd para, 2nd, 2nd sent	Per RAI 14.3-133, revised portion of feedwater line outboard of seismic restraint to Seismic Category II.
115.	S5.4.9.4	Updated Cross Reference to Section 14.2 for consistency with other pre-op cross-references.

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Item	Location	Description of Change
116.	S5.4.11	Deleted unnecessary statement "As stated in SRP 5.4.11, this is a PWR topic."
117.	S5.4.12.2 and 5.4.12.3	Subsections added for clarification on reviewing NBS design specification.
118.	S5.4.13.1	Added Design Bases of the DPV, not previously covered in Section 6.3, from design functional specification and DPV final report.
119.	S5.4.13.2 and S5.4.13.3	Revised title and added depressurization valve (DPV) to subsection component discussion to conform to SRPs for Sections 5.4 and 6.3. Revised subsection to add design bases, safety evaluation, and tests and inspections discussions per the SRP format. Text is derived from the NBS design specification, and from GE and vendor documentation on the DPV including qualification report, functional performance spec, and purchase spec. Primary body of text is relocated from DCD T2 Section 6.3, which is a discussion of ECCS performance and not intended to discuss component design.
120.	S5.4.13.2	Deleted sentence stating DPVs located on MSLs. Design has determined these will not fit and all DPVs to be mounted on PPV stub tubs.
121.	S5.4.13.4	First three paragraphs relocated from DCD-T2 Subsection 6.3.2.8.4. fourth, through ninth paragraphs are taken from design documentation and qualification report
122.	S5.4.13.5	First and second paragraphs relocated from DCD-T2 subsection 6.3.2.8.5 and last paragraph taken from design documentation.

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Item	Location	Description of Change
123.	T5.4-1	Added rows and information to specify 4 trains of ICS, to specify nominal pipe diameters and to add details regarding IC design P&T and tubing transfer coefficient. All information based on original ICS design specifications and inserted per RAI 5.4-29_S01.
124.	T5.4-4	Whole table relocated from DCD-T2 Table 6.3-4 to support Subsection 5.4.13.
125.	F5.4-4a and F5.4-4b	Added in response to RAI 5.4-29_S01; adds new process flow diagram and table and sketch of ICS heat exchanger.
126.	F5.4-5	Relocated from DCD T2 Figure 6.3-5 and Updated from colorized figure to standardize and improve resolution.