## DCD Tier 2 Chapter 5 Revision 4 to Revision 5 Change List

### Tier 2 Section 5.1 Revision 4 to Revision 5 Change List

| Item | Location | Description of Change |
|---|---|---|
| 1. | Entire Chapter | Made editorial changes in numerous locations to remove excessive spacing, correct punctuation, delete repeated words, correct misspelling, and correct grammar. Made changes related to standardization of acronym list. |
| 2. | S5.1, last para. | Deleted the extraneous phrase “an engineered safety feature system for”. |
| 3. | F5.1-1 | Updated figure to incorporate design changes for the vessel internal structures including the shroud support leg and the core plate. Updated the table for Figure 5.1-1 to incorporate new values set from updated calculation. Whole numerical values set replaced for editing ease. |
| 4. | F5.1-2 | Revised figure due to feedwater penetration isolation design change that addresses RPV makeup flow for post-accident. Updated figure shows thermal sleeve and branch connection line as part of RCPB in accordance with this change. Branch connection was previously shown outside the RCPB as dashed-line connection only. The ESBWR does not use safety-related MOVs. A design change from MOV to NOV is made for two safety-related head vent isolation valves that form part of the RCPB. The figure is also updated to address design change improvement for containment release control. |
| 5. | F5.1-3 | Revised drawing to show 3 ICS valves as EH instead of NMO in response to RAI 5.4-32 S02. In-line vessel redrawn similar to F5.4-4b. |
| 6. | F5.1-4 | Revised figure to show design changes for intersystem crosstie (to FAPCS containment cooling line and from FAPCS suppression pool suction line), and intrasystem crossties (division to division) for RWCU/SDC that address Post-LOCA containment cooling. Also changed “dashed-in” feedwater system interconnection to reflect the feedwater isolation valves design change. |

**Tier 2 Section 5.2 Revision 4 to Revision 5 Change List**

| Item | Location | Description of Change |
|---|---|---|
| 1. | Entire Chapter | Made editorial changes in numerous locations to remove excessive spacing, correct punctuation, delete repeated words, correct misspelling, and correct grammar. Made changes related to standardization of acronym list. |
| 2. | S5.2.2, 6th para., 2nd bullet, 3rd dash | Deleted scram initiation signal assumption because it is not relevant to SRV/SV capacity determination. |
| 3. | S5.2.2.1, new para. | Added details on "Operating Experience" in response to RAI 5.2-20 S03. (relocated for editorial reasons) |
| 4. | S5.2.2.2.2, Description, 1st para. | Added additional information to clarify relief valve type used in the ESBWR design. |
| 5. | S5.2.2.3 | Added "Results of the overpressure protection evaluation are provided in Subsection 15.5.1. The system is designed to satisfy the requirements of Section III of the ASME Code." In response to RAI 16.2-119 S01. |
| 6. | S5.2.2.3.1 thru 5.2.2.3.4 | Relocated subsections to Chapter 15 in response to RAI 16.2-119 S01. Supersedes RAI 5.2-61 |
| 7. | S5.2.3.1.1 | RAI 19.1.0-4 S01 response commitment to eliminate the need for freeze seals. |
| 8. | S5.2.3.2.2, IASCC Considerations | Revised description detail in response to RAI 5.2-70. |
| 9. | S5.2.3.2.3, new last para. | Added additional detail in response to RAI 5.2-38 S02 & 5.2-38 S04.<br>Comment resolution divides response to RAI 5.2-38 Supplements –02 & –03, originally located under Subsection 5.2.3.4, into ferrite control portion and sensitization avoidance portion. This paragraph is the relocated portion covering ferrite control that is added to the end of Subsection 5.2.3.2.3 which addresses material compatibility with reactor coolant. The other portion is found in Subsection 5.2.3.4.1. |
| 10. | S5.2.3.3.1, 2nd para., 3rd bullet, 5th sent. | Error correction; replaced "104 J (77 ft.-lbf)" with "102 J (75 ft.-lbf)" to be consistent with Subsection 5.3.1.5. |
| 11. | S5.2.3.3.2, Regulatory Guide 1.50, 3rd para., 1st sent. | Added "and Appendix D, Article D-1000 as supplemented by Regulatory Guide 1.50" in response to RAI 10.3-4 S02. |

| Item | Location | Description of Change |
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| 12. | S5.2.3.4.1, Avoidance of Significant Sensitization, 3rd para. | Deleted last sentence in response to RAI 5.2-38 S02. (See also item 9 description) |
| 13. | S5.2.3.4.1, Cold-Worked Austenitic Stainless Steels, 2nd sent. | Revised sentence in response to RAI 5.2-71. |
| 14. | S5.2.3.4.2 | Added information in regards to "General Welding Controls" in response to RAI 5.2-71 |
| 15. | S5.2.3.4.2, Avoidance of Hot Cracking, 3rd para. | Added "average" and "for 308L and 16FN for 316L as" in description of austenitic SS ferrite percentage. |
| 16. | S5.2.4, new 2nd para. | Added COL item with respect to preservice and inservice inspection in response to RAI 5.2-62. Change made includes revisions as a result of the GEH-NRC telecons of May 08, 2008 and May 20, 2008. |
| 17. | S5.2.4, last para., 1st sent. | Revised sentence in response to RAI 5.2-63. |
| 18. | S5.2.4, last para., 2nd sent. | Replaced "program plans" with "programs" and "specified and Table 1.9-22" with "approved in 10 CFR 50.55a(b) 12 months before initial fuel load" in response to RAI 5.2-63. |
| 19. | S5.2.4, last para., last sent. | Replaced last sentence with "The requirements are described in Subsections 5.2.4.1 through 5.2.4.10." in response to RAI 5.2-63. |
| 20. | S5.2.4.1, Exclusions, last para. | Added additional information for clarification based on discussion of ISI program issues with NRC Staff regarding accessibility. Change made based DCWG meeting. |
| 21. | S5.2.4.2, new 2nd para. | Added COL item with respect to preservice and inservice inspection in response to RAI 5.2-62. Change made includes revisions as a result of the GEH-NRC telecons of May 08, 2008 and May 20, 2008. New text describes process requirement for providing access to perform examinations. |

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| 22. | S5.2.4.2, Bottom Head Welds, last sent. | Replaced "examination during the system leakage and system hydrostatic examinations" with "examinations. These welds are also accessible to perform the Code required VT-2 examinations during system leakage testing as required by ASME Code Section XI, IWB-2500-1." In response to RAI 5.2-68. |
| 23. | S5.2.4.2, Piping, Pumps, Valves, and Supports, 1st sent. | Replaced "Physical" with "The design and physical" and "and valves" with "valves, and supports" in response to RAI 3.9-179 and added "VT-1 and" for clarification. |
| 24. | S5.2.4.2, Piping, Pumps, Valves, and Supports, new 2nd sent. | Added additional information in response to RAI 3.9-179. |
| 25. | S5.2.4.3.1, 2nd para. | Revised to clarify the scope of preservice and inservice examinations. Change made based on DCWG meeting. |
| 26. | S5.2.4.3.2, Ultrasonic Examination of the Reactor Vessel, 1st para. | Added additional information to address use of UT examination method regarding the ISI program for ESBWR. Change made includes revisions as a result of the GEH-NRC telecons of May 08, 2008 and May 20, 2008. |
| 27. | S5.2.4.3.2, Ultrasonic Examination of the Reactor Vessel, 1st para., last sent. | Deleted last sentence regarding ISI program relief requests as part of resolution of accessibility for reactor vessel welds. Change made includes revisions as a result of the GEH-NRC telecons of May 08, 2008 and May 20, 2008. |
| 28. | S5.2.4.3.2, Surface Examination, new last sent. | Added specific regulatory prohibition on use of UT examination method. Change made based on DCWG meeting. |
| 29. | S5.2.4.3.2, Alternative Examination Techniques, last sent. | Deleted "(or later Edition/Addenda that is approved under 10 CFR 50.55a)" in response to NRC query, to resolve confusion over interpretation of which Code Edition/Addenda is used in the DCD. Change made based on DCWG meeting. |
| 30. | S5.2.4.3.4, 1st sent. | Added "ultrasonic" for clarity. Change made based on DCWG meeting. |
| 31. | S5.2.4.3.4, 2nd sent. | Added "(personnel, procedures, and equipment" and "as modified by 10 CFR 50.55a(b)(2)(xiv), (xv), (xvi) and (xxiv)" for clarity. Change made based on DCWG meeting. |

| Item | Location | Description of Change |
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| 32. | S5.2.4.3.4, last sent. | Deleted because qualification is as stated in the preceding two sentences of the paragraph. Change made based on DCWG meeting. |
| 33. | S5.2.4.5, 2nd para., 1st sent. | Replaced "IWB-3132.4" with "IWB-3132.3"and "IWB-2420" with "IWB-2420 (b) and (c)" in response to RAI 6.6-8. |
| 34. | S5.2.4.6, new 1st para. | Added additional information in response to RAI 5.2-65. |
| 35. | S5.2.4.7 | Added additional information for clarification regarding weld accessibility and Section XI examination requirements. Change made based on DCWG meeting. |
| 36. | S5.2.4.9, 1st sent. | Replaced "NB-5280" with "NB-5281" for specificity of Code citation of requirement. Change made based on DCWG meeting. |
| 37. | S5.2.4.9, new 2nd sent. | Added additional statement citing NB-5282 for specificity of Code examination requirements. Change made based on DCWG meeting. |
| 38. | S5.2.4.10, new 1st para. | This paragraph was relocated from Subsection 5.2.4.11. |
| 39. | S5.2.4.11, 1st para., 1st sent. | Replaced "…program plans…" with "…programs…" and "(see Subsection 5.2.6, 5.2-1-H for COL Information)" with "Edition and Addenda approved in 10 CFR 50.55a(b) 12 months before initial fuel load". This is a change that was supposed to be part of RAI 5.2-63 response, but was inadvertently omitted. |
| 40. | S5.2.4.11, 1st para., 2nd sent. | Corrected error: replaced "5.2.4.11" with "5.2.4.10". |
| 41. | S5.2.4.11, 1st para., new last sent. | Added additional details in response to RAI 5.2-64. |
| 42. | S5.2.4.11, 2nd para. | Moved paragraph to Subsection 5.2.4.10. |
| 43. | S5.2.5, 5th para., 4th bullet | Added "/High" due to feedwater isolation signals design change to protect RCPB. |
| 44. | S5.2.5, 5th para., new 10th bullet | Added "Feedwater Lines Differential Pressure monitoring" as part of feedwater penetration isolation design change. |
| 45. | S5.2.5, 5th para., new 11th thru 13th bullet | Added additional information to conform to the LD&IS description in Section 7.3 and safety-related radiation monitoring in Section 11.5. |

| Item | Location | Description of Change |
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| 46. | S5.2.5, 8th para., new 2nd & 3rd sent. | Added additional information from SDS regarding LD&IS functioning and added reference to containment penetration isolation valve tables in Section 6.2. |
| 47. | S5.2.5.1.1, 6th para., 1st sent. | Added "high drywell water level" to list of monitored parameters. |
| 48. | S5.2.5.2.1, Reactor Vessel Low/High Water Level Monitoring | Revised to add high water level isolation function as part of the feedwater penetration isolation design changes. |
| 49. | S5.2.5.2.1, Drywell Water Level Monitoring | Design change approves addition of sensor system for lower drywell water level detection and measurement as part of FWIV isolation logic auto-closure signals. |
| 50. | S5.2.5.2.1, Reactor Vessel Low/High Water Level Monitoring | Revised subparagraph to describe change to design logic to add a diverse and encompassing auto-isolation signal for LOCA and non-LOCA events that will assure the containment boundary is closed. |
| 51. | S5.2.5.2.2, Feedwater Lines Differential Pressure Monitoring | Added subparagraph describing the feedwater lines differential pressure monitoring due to feedwater penetration isolation design change. |
| 52. | S5.2.5.2.2, Main Steamline Tunnel Area Temperature Monitoring, 1st & 2nd para. | Revised last sentence in 1st paragraph to clarify that the main steam lines isolation on high tunnel ambient temperature is a specific LD&IS-MSIV function and does not control RWCU/SDC isolation as per LD&IS design specification. Deleted last sentence in 2nd paragraph, which is irrelevant to automatic isolation logic, and added new sentence to indicate a separate air temperature monitoring sensor set to support required RWCU/SDC process lines isolation through the SSLC/ESF logic. This meets committed separation between SSLC/ESF and LD&IS-MSIV functions as described in Chapter 7. |
| 53. | S5.2.5.2.2, Intersystem Leakage Monitoring, 2nd sent. | Replaced "the reactor building chiller, and the RCCWS air cooler" with "and the CRD pump heat exchanger as a correction per design specification. |
| 54. | S5.2.5.3, 2nd sent. | Replaced "…to alert the operator for…" with "…for operator alert to initiate…" in response to RAI 5.2-1 S03. |
| 55. | S5.2.5.3, last sent. | Added "automatic or manual" in response to RAI 5.2-1 S03. |
| 56. | S5.2.5.4, new last sent. | Added additional information in response to RAI 5.2-1 S03. |

| Item | Location | Description of Change |
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| 57. | S5.2.5.5, last para. | Added additional details in response to RAI 5.2-1 S03. |
| 58. | S5.2.5.8, 3rd para. | Added additional information in response to RAI 5.2-1 S03. |
| 59. | S5.2.5.8, 6th para. | Added additional information in response to RAI 5.2-1 S03. |
| 60. | S5.2.5.9, 1st para., | Revised 1st sentence to remove parenthetical statement and reinserted text as a separate sentence to clarify that listed parameters are typical examples of those used for leakage monitoring. |
| 61. | S5.2.5.9, 2nd para. | Added additional information in response to RAI 5.2-1 S03. |
| 62. | S5.2.6, 5.2-1-H, Title | Changed number to "5.2-1-A" and replaced "Plan" with "Description" in response to RAI 5.2-64. |
| 63. | S5.2.6, 5.2-1-H, 1st sent. | Corrected error: replaced "5.2.4.12" with "5.2.4.11". Preceded RAI 5.2-64 |
| 64. | S5.2.6, 5.2-1-H | Added additional information in response to RAI 5.2-64. |
| 65. | S5.2.6, new COL item 5.2-3-A | Added COL item with respect to preservice and inservice inspection in response to RAI 5.2-62. |
| 66. | S5.2.7, Item 5.2-9 | Deleted reference in response to RAI 16.2-119 S01. Supersedes RAI 5.2-61 |
| 67. | T5.2-1 | Added RPV under Code Case N-580-1 for applications to pressure retaining nozzles and stub tubes. |
| 68. | T5.2-1 | Deleted items N-632, N-634 and N-236-1 & N-457 in response to RAI 5.2-50 S02. |
| 69. | T5.2-1 | Replaced "N-307-2" with "N-307-3" in response to RAI 5.2-50 S02. |
| 70. | T5.2-2, Notes | Deleted Notes (1) & (2), renumbered Notes (3) & (4), and added new note (3) in response to RAI 16.2-34 S01. |
| 71. | T5.2-3 | Deleted table (moved to Chapter 15) in response to RAI 16.2-119 S01. |
| 72. | T5.2-4 | Revised table in response to RAI 5.2-36 S01, including results of GEH-NRC phone call conferences on Table 5.2-4. Final resolution was made in May 8, 2008 call. |
| 73. | T5.2-4, Reactor Pressure Vessel | Added additional information due to detail design. |
| 74. | T5.2-4, Notes | Added Note 4 to address alternate weld filler metals proposed by materiel supply vendors. |

| Item | Location | Description of Change |
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| 75. | T5.2-6, 1st column | Replaced "RWCU/SDC Flow High" with "RWCU/SDC Differential Mass Flow High" for correct parameter per LD&IS design specification. |
| 76. | T5.2-6 | Deleted monitored variables "HCW Drain Line Radiation High" and "LCW Drain Line Radiation High" due to design change. |
| 77. | T5.2-6, 1st column | Replaced "IC Pool Vent Radiation High" with "Isolation Condenser Vent Exhaust Radiation High" to be consistent with Subsection 5.2.5 header. |
| 78. | T5.2-6, 1st column | Replaced "Turbine Inlet Pressure Low" with "Main Steamline Pressure Low" to be consistent with Subsection 5.2.5 header. |
| 79. | T5.2-6, new last column | Added column for Feedwater Lines and note (1) and added rows for Reactor Water Level High, Feedwater Lines Differential Pressure High, Drywell Water Level High, and Reactor Water Level Low-Low due to feedwater penetration isolation design change and change of containment isolation signal logic. |
| 80. | T5.2-6 | Added notes (1) & (3) to specify feedwater isolation signals coincidence. |
| 81. | T5.2-6, Notes | Added note (2) for clarification. |
| 82. | T5.2-7, Headers | DCD Revision 4 error corrected to identify this table for leakage sources. |
| 83. | T5.2-7, 1st row | Replaced "RWCU/SDC Flow High" with "RWCU/SDC Differential Mass Flow High" for correct parameter per LD&IS specification. |
| 84. | T5.2-7, MSL or IC Steamline Flow High | Moved monitored variable "Isolation Condenser Steamline Flow High" into a separate row, as a separate system flow detection. |
| 85. | T5.2-7 | Added monitored variable "Isolation Condenser Condensate" per system design specification. |
| 86. | T5.2-7, Drywell Air Cooler Cond. Flow High, Misc. Leaks - I | Added "X" for Misc. Leaks. This is part of the system design specification. |
| 87. | T5.2-7, 1st column | Replaced "SRV Discharge Line Temperature High" with "SRV and SV Discharge Line Temperature High" for consistency. |

| Item | Location | Description of Change |
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| 88. | T5.2-7, Reactor Water Level Low (L1, L2) | Deleted “X” for Leakage Source “Feedwater Lines” on Inboard side against Reactor Water Level Low (L1, L2). |
| 89. | T5.2-7 | Added monitored variable “Feedwater Lines Differential Pressure” due to feedwater isolation logic design change. |
| 90. | T5.2-7 | Added monitored variables “Main Steamline Pressure Low” and “Main Condenser Vacuum Low.” These variables are a part of the existing system design specification. |
| 91. | T5.2-7 | Added new monitored variable “Drywell Water Level” as part of feedwater isolation logic design change. |
| 92. | F5.2-4a thru 5.2-4f | Replaced titles with “(Deleted)” per RAI 16.2-119 S01. Update per RAI 5.2-67 is superseded. |

**Tier 2 Section 5.3 Revision 4 to Revision 5 Change List**

| Item | Location | Description of Change |
|---|---|---|
| 1. | Entire Chapter | Made editorial changes in numerous locations to remove excessive spacing, correct punctuation, delete repeated words, correct misspelling, and correct grammar. Made changes related to standardization of acronym list. |
| 2. | S5.3.1, 1st sent. | Deleted "This Subsection is written in the format and meets the requirements of SRP 5.3.1 Draft Rev. 2." The SRP is an implied requirement and it is not necessary to repeat in this paragraph. |
| 3. | S5.3.1.2, 7th para., 1st sent. | Correction: replaced "Subsection NB-5320" with "NB-5300" to correctly reference both volumetric and surface examinations (NB-5320 applies only to radiography examinations). |
| 4. | S5.3.1.4, RG 1.31, 1st para., 2nd sent. | Replaced "Subsection 5.2.3.4.1" with "Subsection 5.2.3.4" due to movement of text in response to RAI 5.2-38 S02. |
| 5. | S5.3.1.4, RG 1.50, 3rd para., 2nd sent. | Added "and the welding procedures are qualified using the minimum preheat temperatures" to reflect requirements in the RPV procurement specification. |
| 6. | S5.3.1.4, RG 1.50, 3rd para. | Deleted to reflect requirements in the RPV procurement specification. |
| 7. | S5.3.1.5, Compliance w/ 10 CFR 50, Appendix G, 1st para. | Deleted last sentence and provided information regarding PT curve submittal requirements based on NRC discussion and guidance. |
| 8. | S5.3.1.5, Methods of Compliance, 2nd bullet, 1st para. | Editorial: replaced "Charpy-V" with "Charpy V-notch" (2 places). |
| 9. | S5.3.1.5, Methods of Compliance, 4th bullet | Editorial: replaced "Charpy-V" with "Charpy" (2 places) and corrected "ft-lb" to "ft-lbf" (2 places). |
| 10. | S5.3.1.6, 1st sent. | Added reference to Subsection 5.3.1.8 for clarity. |

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| 11. | S5.3.1.6, 2nd thru last sent. | Deleted last two sentences and added new 2nd and 3rd sentences to revise information provided in response to RAI 5.3-5 concerning the low temperature effect on material embrittlement. The change incorporates a bounding minimum full power operation temperature value based on the predicted characteristics of the natural circulation for ESBWR. The effect of the bounding temperature will be addressed in the pressure temperature limits for the ESBWR. This change is a change to the response to RAI 5.3-5. See DCD section for text of the revised response. |
| 12. | S5.3.1.6.1, new 5th sent. | Added information to reflect the requirements of four surveillance capsules of the RPV surveillance program specification. |
| 13. | S5.3.1.6.1, 5th sent. | Removed specific number of test specimens to provide flexibility in the requirements of the RPV surveillance program specification. |
| 14. | S5.3.1.6.1, 6th sent. | Removed specific number of test specimens to provide flexibility in the requirements of the RPV surveillance program specification." |
| 15. | S5.3.1.6.4, Title | Correction: replaced incorrect reference to "Appendix H.II" with "Appendix H.III". |
| 16. | S5.3.1.6.4, 1st para., 4th sent. | Added "(see Subsection 5.3.1.4)" for clarity. |
| 17. | S5.3.1.6.6 | Replaced title with "(Deleted)" and deleted the 1st paragraph because ASTM E 185-02 includes the requirements for fracture toughness test specimens as part of the RPV surveillance program specification. This requirement was not contained in the previous versions of ASTM E 185 and therefore additional fracture toughness measurement data was previously required. |
| 18. | S5.3.1.6.6 | Moved the Reactor Vessel Fasteners detail into new Subsection 5.3.1.7 since it does not belong with the surveillance subsection. |
| 19. | S5.3.1.7 | Renumbered subsection to 5.3.1.7.1 because the information is a continuation of the RPV Fasteners. |
| 20. | S5.3.1.7.1, 2nd para., last sent. | Editorial: replaced "Cv" with "Charpy" (2 places). |

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| 21. | S5.3.2, 1st sent. | Deleted "This subsection is written in the format and discusses the information presented in SRP 5.3.2 Draft Rev. 2." The SRP is an implied requirement and it is not necessary to repeat in this paragraph. |
| 22. | S5.3.2.1, 4th para., 1st sent. | Removed specific reference to main steam nozzle and replaced with a bounding statement. |
| 23. | S5.3.2.1, 4th para., last sent. | Corrected an error: replaced "Subsection NB-2320" with "NB-2330". |
| 24. | S5.3.2.1, Temperature Limits for ISI Hydrostatic and Leak Pressure Tests | Added "in accordance with technical specifications, see Subsection 5.3.1.5" in the 2nd sent and deleted the last sentence in response to RAI 5.3-7 S02. |
| 25. | S5.3.2.1, Operating Limits During Heatup, Cooldown and Core Operation | Added "in accordance with technical specifications, see Subsection 5.3.1.5" in the 2nd sentence in response to RAI 5.3-7 S02. |
| 26. | S5.3.2.1, Predicted Shift in Reference Temperature of Nil-Ductility Transition and Drop in Upper-Shelf Energy, 3rd para., 2nd sent. | Deleted "(1/4 T)" and "at the inside of the RPV" as reference to Table 5.3-4 is sufficient. |
| 27. | S5.3.3, 1st para., 1st sent. | Deleted "In accordance with SRP 5.3.3, Draft Revision 2" as the SRP is an implied requirement and it is not necessary to repeat in this paragraph. |
| 28. | S5.3.3, Operating Conditions | Replaced "described" with "considered" for clarification. |
| 29. | S5.3.3.2.1, Reactor Vessel, 3rd para., 2nd sent. | Correction: deleted "and bottom head drain" as this is a stainless steel nozzle that is not clad. |
| 30. | S5.3.3.2.1, Reactor Vessel, 4th para., 1st & 2nd sent. | Clarified weld processes by deletion of manual and automated applications of the welding process. |
| 31. | S5.3.3.2.1, Shroud Support | Replaced subtitle "Shroud Support" with "Support Legs" to reflect a design change that deleted the shroud support brackets and added support legs. |

| Item | Location | Description of Change |
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| 32. | S5.3.3.2.1, Support Legs, 1st para. | Replaced "shroud support brackets" and "shroud brackets" with support legs to reflect a design change that deleted the shroud support brackets and added support legs. |
| 33. | S5.3.3.2.1, Support Legs, 2nd sent. | Added "support ring" to reflect a design change that deleted the shroud support brackets and added support legs. |
| 34. | S5.3.3.2.2, Vessel Support, 1st sent. | Correction: deleted "block type" as the Code does not define the term "block type". |
| 35. | S5.3.3.2.2, Control Rod Drive Housing, 1st sent. | Deleted unnecessary detail "forged". |
| 36. | S5.3.3.2.2, In-Core Neutron Flux Monitor Housings, 1st para. | Deleted unnecessary detail "forged". |
| 37. | S5.3.3.2.2, Reactor Vessel Nozzles, 6th sent. | Added "core differential pressure nozzles" as it was not included in the original list. |
| 38. | S5.3.3.3, 1st para., 5th sent. | Replaced "The beltline region is a single forging…" with "The core beltline limiting forging is…" for clarity. |
| 39. | S5.3.3.3, Fabrication Methods, 2nd para., 1st sent. | Replaced "manual stick electrode" with "shielded metal arc" to correct nomenclature. |
| 40. | S5.3.4, 5.3-2-A | Deleted information that is already contained in Subsection 5.3.1.8 and revised 1st sentence to reference Subsection 5.3.1.8. |
| 41. | T5.3-1, 1st row | Replaced "region" with "limiting forging" for clarification. |
| 42. | T5.3-1 | Revised the initial reference temperature of nil-ductility transition requirements to be consistent with the RPV Specification. |
| 43. | T5.3-4 | Added fluence location requirements from Subsection 5.3.2.1 (2 places) for clarity. |
| 44. | F5.3-3 | Revised figure due to design changes that delete the shroud support brackets and modifies the core plate. |

**Tier 2 Section 5.4 Revision 4 to Revision 5 Change List**

| Item | Location | Description of Change |
|---|---|---|
| 1. | Entire Chapter | Made editorial changes in numerous locations to remove excessive spacing, correct punctuation, delete repeated words, correct misspelling, and correct grammar. Made changes related to standardization of acronym list. |
| 2. | S5.4.5, Title | Change title to "Nuclear Boiler System Isolation" due to design change.<br>The ESBWR design requirements for containment protection in postulated accident conditions, for RCPB protection, and for radiological release path leak tight integrity, necessitate rewriting the "Main Steamline Isolation System." This revision now includes requirements for both main steamline and feedwater line isolation. Evaluation previously based on a specific make/model of valve as the MSIV that meets regulatory and design requirements is replaced by an evaluation based on the design and functional performance criteria for both main steamline and for feedwater line isolation valves. The criteria cover the scope of design requirements and functions from those that support normal plant operation (e.g., startup, NBR power operation, shutdown) to those required for transient mitigation and accident response. The changes also include new automatic isolation signal requirements to support feedwater line isolation. |
| 3. | S5.4.5.1, Safety Design Bases | Revised subsection to include safety design bases of both main steamline and feedwater isolation system requirements. See also Change List Item 2 Description. |
| 4. | S5.4.5.1, Power Generation Design Bases | Revised subsection to include FWIVs power generation design bases for check valves and flow stop valves. See also Change List Item 2 Description. |
| 5. | S5.4.5.2, new | Added new main subsection "Main Steamlines Isolation". See also Change List Item 2 Description. |
| 6. | S5.4.5.2, Summary Description | Renumbered subsection to "5.4.5.2.1"; changed subtitle to "System Description"; and revised 1st paragraph to delete superfluous statements and unnecessary details regarding specific valve types, and added a statement defining MSIV functions due to design change. See also Change List Item 2 Description. |

| Item | Location | Description of Change |
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| 7. | S5.4.5.2, Detailed System Description | Replaced subtitle "Detailed System Description" with "Detailed Main Steam Isolation Valves Description" and made it Subsection 5.4.5.2.2.<br>Revised subsection to delete details on y-globe stop valve and added details on performance-based valve design criteria.<br>See also Change List Item 2 Description.<br>The response to RAI 6.2-120 S01, that addressed an actuator question specific to the y-globe MSIV, is superceded by the design changes outlined in Item #2 |
| 8. | S5.4.5.2, System Operation | Replaced subtitle "System Operation" with "Main Steam Isolation Operation" and made it Subsection 5.4.5.2.3.<br>Revised subsection to provide design requirements for MSIV function and isolation system design. See also Change List Item 2 Description. |
| 9. | S5.4.5.3, new | Added design description and criteria for feedwater portion of NBS that is patterned after main steamlines isolation system portion of NBS, and **renumbered remaining subsections.** See also Change List Item 2 Description. |
| 10. | S5.4.5.3.4, new | Added details on feedwater pump ASD controller circuit breakers added to the feedwater isolation design. See also Change List Item 2 Description. |
| 11. | S5.4.5.4, 1st para., new 3rd bullet | Added a restriction on MSIV orifice sizing to protect containment during initial RPV blow down and pressurization transient of a LOCA. See also Change List Item 2 Description. |
| 12. | S5.4.5.4, 4th para., last sent. | Replaced "Subsection 5.2.2" with "Subsection 15.5.1" because RAI 16.2-119 S01 response relocates the overpressure analysis to Chapter 15. |
| 13. | S5.4.5.4, 5th para. | Replaced the y-globe stop valve details with performance-based valve design requirements. See also Change List Item 2 Description. |
| 14. | S5.4.5.4, new 6th thru 9th para. | Added safety evaluation for feedwater isolation design comparable to that for main steamline isolation design. See also Change List Item 2 Description. |

| Item | Location | Description of Change |
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| 15. | S5.4.5.5, 1st para., 1st sent. | Added "and FWIVs" as part of NBS isolation design for verification of closing speed, and deletes "no flow" requirement that is specific to air-operated y-globe stop valve type and not appropriate for all valve-actuator combinations. |
| 16. | S5.4.5.5, 2nd para. | Revised paragraph for combined MSIV and FWIV pre-op testing requirements. See also Change List Item 2 Description. |
| 17. | S5.4.5.5, 3rd para. | Added feedwater isolation system valves to operational testing. See also Change List Item 2 Description. |
| 18. | S5.4.5.6 | Replaced the y-globe stop valve details with performance-based valve design requirements. Provides generic position sensing requirements not limited to a single valve type or manufacturer. See also Change List Item 2 Description. |
| 19. | S5.4.6, 1st para., 1st sent. | Removed "discussed in SRP 5.4.6 Draft Rev. 4, which has been used as a guide for this subsection" because the SRP is implied guidance. |
| 20. | S5.4.6, 1st para., 2nd sent. | Removed "SRP" because the SRP is implied guidance. |
| 21. | S5.4.6, 1st para., 3rd sent. | Removed "the SRP" because the SRP is implied guidance. |
| 22. | S5.4.6, 1st para., 3rd sent. | Replaced "54" with "55". ICS containment isolation is part of RCPB. GDC 54 is not applicable and the correct GDC is 55. |
| 23. | S5.4.6, 1st para., 5th bullet | Corrected reference to GDC 55. Deleted GDC 54 paraphrasing and inserted GDC 55 paraphrasing. GDC 54 is not applicable and the correct GDC is 55. |
| 24. | S5.4.6.1.1, Functions, last para., 1st sent. | Replaced "passively" with "automatically" based on crosstie design change to use valves instead of other passive line isolation. |
| 25. | S5.4.6.1.1, Functions, last para., 1st & 2nd sent. | Replaced "dryer/separator" with "equipment storage" due to the removal of chimney partitions for refueling. |
| 26. | S5.4.6.2.1, 1st para. | Replaced "the ICS schematic" with "Figure 5.1-3" for clarity. |

| Item | Location | Description of Change |
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| 27. | S5.4.6.2.2, 3rd para., 1st bullet | Added clarification on the basis for 135 tubes, and identified that the number 135 is approximate. Clarification is in support of analysis crediting ICS. Incorporates RAI 5.4-29 S01 response. |
| 28. | S5.4.6.2.2, 3rd para., 4th bullet | Added additional information in response to RAI 5.4-32 S02. |
| 29. | S5.4.6.2.2, 3rd para., 5th bullet | Replaced "nitrogen" with "electro-hydraulic" and "nitrogen motor" with "electro-hydraulic". Actuator type change made to resolve valve operability vs. accumulator size conflicts. |
| 30. | S5.4.6.2.2, 3rd para., 5th bullet, 2nd sent. | Replaced "ensure" with "assure an" for clarity regarding the "open flow path" statement. |
| 31. | S5.4.6.2.2, 3rd para., 5th bullet, 5th sent. | Replaced "start" with "place" for a more readable phrase. |
| 32. | S5.4.6.2.2, 3rd para., 7th bullet, new 4th sent. | Added additional information for clarification about the water volume of the in-line vessel. |
| 33. | S5.4.6.2.2, 3rd para., 8th bullet, 1st & 2nd sent. | Replaced "dryer/separator" with "equipment storage" due to the removal of chimney partitions for refueling. |
| 34. | S5.4.6.2.2, 3rd para., 8th bullet 3rd sent. | Revised sentence due to design change to replace passive isolation mechanism with an automatic valve. |
| 35. | S5.4.6.2.2, 3rd para., 8th bullet | Added additional information in response to RAI 14.3-146 in new last sentence. |
| 36. | S5.4.6.2.2, 4th para., 1st bullet | Deleted last sentence and added additional information due to design change that replaces 2 SOVs with 1 SOV and 1 RV. |
| 37. | S5.4.6.2.3, 2nd para | Pointer to Table 5.4-2 replaced with pointer to Tables 3.9-8 and Tables 6.2-23 through 6.2-30 because Table 5.4-2 was deleted. |
| 38. | S5.4.6.2.3, Isolation Condenser Operation, 2nd para. | Added additional information about operation of vent isolation valves. |
| 39. | S5.4.6.3, 6th para., 1st & 2nd sent. | Revised sentences to specify IC steamline flow restrictor and condensate drain IDs. |
| 40. | S5.4.6.4, Inspection, 3rd para., last sent. | Deleted sentence in response to RAI 5.4-20 S01. |
| 41. | S5.4.6.4, Testing, 1st para., 2nd sent. | Change sentence from past tense to present tense. |

| Item | Location | Description of Change |
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| 42. | S5.4.6.4, Testing, 3rd para. | Added "A valve operability test is also performed" for clarification of what occurs "during" the normal plant operation. |
| 43. | S5.4.6.4, Testing, 7th para. | Added "for condensate return valve operability testing" for clarification of what test procedure is described. |
| 44. | S5.4.6.4, Testing, 7th para., 1st bullet | Replaced "steam supply" with "condensate return line containment" for clarification of procedure. |
| 45. | S5.4.6.5, 2nd para., 3rd sent. | Inserted "any" between "from two" for clarity that four dPT signals are in any possible combination of two. |
| 46. | S5.4.7, RHR, 1st para., 1st sent. | Deleted 1st sentence because the SRP is implied guidance. |
| 47. | S5.4.8, 1st para., 1st sent. | Deleted "SRP 5.4.8 draft Revision 3, and" because the SRP is implied guidance. |
| 48. | S5.4.8, 1st para., new 7th bullet | Added reference to GDC 50 to incorporate Post-LOCA containment cooling design change. |
| 49. | S5.4.8, 2nd para., 5th bullet | Editorial change: deleted "and" at the end of the 5th bullet |
| 50. | S5.4.8, 2nd para., new 6th bullet | Added additional information in response to RAI 6.2-140 S01. A decision has been made to document the missing markups from MFN-08-332 in DCD Rev. 5 rather than meet a May 22, 2008 date for separate markups submittal. |
| 51. | S5.4.8.1.1, Power Generation Design Bases, 1st para., new 2nd bullet | Added additional information in response to RAI 5.4-60. |
| 52. | S5.4.8.1.2, System Components, Isolation Valves, new 2nd para. | Added statement describing diverse isolation capability of suction lines in the event of a pipe break outside of containment. Added in response to Probabilistic Risk Assessment. |
| 53. | S5.4.8.1.5, Isolation Valves, new last para. | Added statement describing diverse isolation capability of suction lines in the event of a pipe break outside of containment. Added in response to Probabilistic Risk Assessment. |
| 54. | S5.4.8.2, new 2nd para. | Added reference to Post-LOCA function in response to RAI 6.2-140 S01. Also see Change List Item 50. |

| Item | Location | Description of Change |
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| 55. | S5.4.8.2.1 | Added additional information describing the Post-LOCA function in response to RAI 6.2-140 S01. Also see Change List Item 50. |
| 56. | S5.4.8.2.2, new last para. | Added additional information in response to RAI 6.2-140 S01. Also see Change List Item 50. |
| 57. | S5.4.8.2.2, System Operation, 6th para. | Added additional information in response to RAI 5.4-59. |
| 58. | S5.4.8.2.2, Post-LOCA, Shutdown (With fuel failure) | Added additional information in regards to Post-LOCA Shutdown (with Fuel Failure) in response to RAI 6.2-140 S01. Also see Change List Item 50. |
| 59. | S5.4.9.1, Safety Design Basis, 1st bullet | Replaced "and depressurization valves (DPVs)" with "and SVs) due to design changes that define "SRV" and "SV" separately, and relocation of DPVs to mount all 8 on ICS steam supply stub lines. |
| 60. | S5.4.9.2, 1st para., last sent. | Correction that all NBS portion of feedwater piping system is low-alloy steel piping from the seismic restraint in the steam tunnel up to the RPV nozzle connection interface. Revised last sentence to indicate that the rest of the feedwater piping upstream of the seismic restraint is described in sections 10.3 and 10.4 |
| 61. | S5.4.9.2, 3rd para. | Redefined portions of NBS feedwater that is Q-Group A and Q-Group B |
| 62. | S5.4.9.2, 6th para., 2nd sent. | Replaced "depressurization valves" with "SVs"; DPVs relocated to ICS steam stublines. |
| 63. | S5.4.9.5, 2nd sent. | Deleted "excess"; unnecessary modifier. |
| 64. | S5.4.9.5 | Added additional information for auto-isolation logic function of the feedwater lines dP signals. |
| 65. | S5.4.12, 1st para., 1st sent. | Deleted 1st sentence because the SRP is implied guidance. |
| 66. | S5.4.12, 5th para., 1st sent. | Replaced "motor operated" with "nitrogen-operated" as part of conversion of safety-related valves. |
| 67. | S5.4.12.1, 2nd sent. | Replaced "motor operated" with "nitrogen-operated" as part of conversion of safety-related valves. |
| 68. | S5.4.12.2, 1st para., last sent. | Replaced "motor operated" with "nitrogen-operated" as part of conversion of safety-related valves. |

| Item | Location | Description of Change |
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| 69. | S5.4.12.2, 2nd para., new 2nd sent. | Added additional information as part of conversion of safety-related valves. Addresses equivalence with MOV requirements. |
| 70. | S5.4.13.2, Detailed Description, 4th para., 2nd sent. | Terminology change to use the generic description term "pyrotechnic" in place of the component/part-specific description term "squib". |
| 71. | S5.4.16, Item 5.4-1 | Replaced referenced reports with "(Deleted)". Not applicable to generic main steamline or feedwater line isolation design requirements. |
| 72. | T5.4-1 | Revised table to incorporate the generic main steamlines isolation system and feedwater lines isolation system requirements. See also Change List Item 2 Description. |
| 73. | T5.4-1, Condensate return valve stroke-open time | Added "≥ 7.5 seconds and" in response to RAI 15.3-32. |
| 74. | T5.4-1, ICS Performance Requirements | Added additional information in response to RAI 16.2-42 S01. |
| 75. | T5.4-2 | Deleted table since information is contained in Sections 3.9 & 6.2 under Tables 3.9-8 and Tables 6.2-23 through 6.2-30. |
| 76. | T5.4-3, new last row | Added information on the nonregenerative heat exchanger design requirements in support of the Post-LOCA containment cooling design change. |
| 77. | T5.4-4 | Editorial changes to line items throughout the table. |
| 78. | T.5.4-4, last row, 1st bullet | Replaced "6.89 MPa gauge (1000 psig) or greater" with "7,584 kPa-gage +/- 685 kPa (1,100 psig +/- 99 psi)". This change to the DCD Revision 5 addresses RAI 14.3-182 S01. (Note that a response to this RAI has not been previously submitted.) |
| 79. | F5.4-2 | Deleted figure. Not applicable to generic main steamline or feedwater line isolation design requirements. |
| 80. | F5.4-3 | Updated figure based on feedwater isolation design change. |
| 81. | F5.4-4b | Revised drawing to show 3 ICS valves as EH instead of NMO in response to RAI 5.4-32 S02. |