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**Subject: Partial GEH Response to NRC Request for Additional Information
Letter No. 126 Related to ESBWR Design Certification Application**

The purpose of this submittal is to provide responses to select U.S. Nuclear Regulatory Commission (NRC) Requests for Additional Information (RAIs) contained in NRC Letter No. 126, dated December 20, 2007 (Reference 1). Due to the number of RAIs contained in Reference 1, GE Hitachi Nuclear Energy (GEH) will be providing several submittals to address RAIs contained in that letter.

This submittal contains changes to the applicable Design Control Document (DCD) Tier 1 / Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) sections based on GEH's review of the select NRC RAIs as listed in Enclosure 1 of this response. Enclosure 2 contains a DCD change list that provides the location and description of the change, and markups of the DCD Tier 1 / ITAAC sections that will be incorporated in DCD Revision 5.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

James C. Kinsey
Vice President, ESBWR Licensing

Reference:

1. MFN 07-718, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application*, December 20, 2007.

Enclosures:

1. List of RAI Responses to NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application
2. DCD Change List and DCD Tier 1 / ITAAC Markups

cc: AE Cabbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0080-4821

Enclosure 1

MFN 08-086

**List of RAI Responses to NRC Request for Additional
Information Letter No. 126 Related to ESBWR Design
Certification Application**

LIST OF RAI RESPONSES

RAI No.'s

14.3-164
14.3-167
14.3-169
14.3-183
14.3-198
14.8-215
14.3-256
14.3-258
14.3-266
14.3-273
14.3-274
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14.3-298
14.3-299
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14.3-307
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14.3-323
14.3-334
14.3-335

RAI No.'s

14.3-346
14.3-349
14.3-352
14.3-357
14.3-380

Enclosure 2

MFN 08-086

**DCD Change List
And
DCD Tier 1 / ITAAC Markups**

DCD Tier 1, RAI 14.3-164, Change List

Item	Location	Description of Change
1.	T2.2.3-1	Change title of Table 2.2.3-1 from Feedwater Control Modes to "FWCS Functional Arrangement".

Table 2.2.3-1

~~Feedwater Control Modes~~ FWCS Functional Arrangement

FWCS is nonsafety-related.

FWCS is a triple-redundant, fault tolerant digital controller (FTDC)

DCD, Tier 1 RAI 14.3-167 Change List

Item	Location	Description of Change
1.	Table 2.2.7-2, Item 11	Change entry 11 in the initiator column of table 2.2.7-2 to read: “RPV reactor level low high (Level 8)” from “RPV reactor level low (Level 8).

Table 2.2.7-2

RPS Automatic Functions, Initiators, and Associated Interfacing Systems

Function	Initiator	Interfacing System
Reactor scram	NMS PRNM trip condition	NMS
	NMS SRNM trip condition	NMS
	CRD charging header pressure low	CRDS
	Turbine stop valve closed position	-
	Turbine control valve control oil pressure low	-
	Condenser pressure high	-
	Power Generation Bus Loss	-
	MSIV closed position	NBS
	Reactor Pressure high	NBS
	RPV reactor level low (Level 3)	NBS
	RPV reactor level low -high (Level 8)	NBS
	Drywell pressure high	CMS
	Suppression pool average temperature high	CMS

DCD Tier 1 RAI 14.3-169 Change List

Item	Location	Description of Change
1.	SS 2.2.2	<p>Change Control Rod Drive System Functional Requirement 13 from: "Conformance with IEEE Std. 603 requirements by the safety-related control system structures, systems, and components defined in Tables 2.2.2-1, 2.2.2-6, and 2.2.2-7, is addressed in Subsection 2.2.15." to:</p> <p>(13) Conformance with IEEE Std. 603 requirements by the safety-related control system structures, systems, and components defined in Tier 1 Tables 2.2.2-1 and 2.2.2-6 is addressed in Subsection 2.2.15. (RAI 14.3-169)</p>

2.2.2 Control Rod Drive System

Design Description

The control rod drive (CRD) system, manually and automatically upon command from the RPS, DPS, and RC&IS, executes rapid control rod (CR) insertion (scram), performs fine CR positioning (reactivity control), detects CR separation (prevent rod drop accident), limits the rate of CR ejection due to a break in the CR pressure boundary (prevent fuel damage), and supplies high pressure makeup water to the reactor during events in which the feedwater system is unable to maintain reactor water level.

Functional Arrangement

- (1) CRD system functional arrangement comprises three major functional groups: fine motion control rod drive (FMCRD), hydraulic control unit (HCU), and CRD hydraulic subsystem (CRDHS), as defined in Table 2.2.2-1 and shown in Figure 2.2.2-1.

Functional Requirements

- (2) The components and piping defined in Table 2.2.2-5 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.
- (3) Pressure boundary welds in components and piping defined in Table 2.2.2-5 as ASME Code Section III meet ASME Code Section III requirements.
- (4) The components and piping defined in Table 2.2.2-5 as ASME Code Section III retain their pressure boundary integrity at rated pressures.
- (5) The Seismic Category I equipment defined in Table 2.2.2-1 can withstand seismic design basis loads without loss of structural integrity and safety function.
- (6) The FMCRD is capable of positioning CR incrementally and continuously over its entire range.
- (7) Valves defined in Table 2.2.2-5 and 2.2.2-6 as having an active safety-related function open, close, or both open and close under differential pressure, fluid flow, and temperature conditions.
- (8) For the high pressure makeup mode of operation, the minimum flow supplied to the reactor is 3920 l/min (1036 gpm) with both CRD pumps operating and 1960 l/min (518 gpm) with one pump operating with reactor pressure less than or equal to 8.62 MpaG (1250 psig).
- (9) CRD system automatic functions, initiators, and associated interfacing systems are defined in Table 2.2.2-3.
- (10) CRD system controls and interlocks are defined in Table 2.2.2-4.
- (11) CRD system minimum inventory of alarms, displays, controls, and status indications in the main control room are addressed in Section 3.3.
- (12) CRD maximum allowable scram times for vessel bottom pressures below 7.481 MPa gauge (1085 psig) are defined in Table 2.2.2-2.

- (13) Conformance with IEEE Std. 603 requirements by the safety-related control system structures, systems, and components defined in Tier 1 Tables 2.2.2-1, and 2.2.2-6, and 2.2.2-7, is addressed in Subsection 2.2.15.
- (14) The equipment qualification of CRDS components defined in Tables 2.2.2-1, 2.2.2-6, and 2.2.2-6, is addressed in Section 3.8.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.2.2-7 defines the inspections, tests, and/or analyses, together with associated acceptance criteria for the CRD system.

DCD Tier 1, RAI 14.3-183 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2 new para (28)	Added "(28) Vacuum breakers are provided on SRV discharge lines to reduce the post-discharge reflood height of water in the discharge lines," in response to RAI 14.3-183
2	T2.1.2-3, new Item 28	Added "ITAAC 17 from Rev. 3 that was deleted in Rev. 4," in response to RAI 14.3-183.

- (23) The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.
- (24) When actuated by an initiator, the booster assembly opens each DPV in less than or equal to the design opening time and design conditions.
- (25) Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV.
- (26) The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.
- (27) The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.
- (28) Vacuum breakers are provided on SRV discharge lines to reduce the post-discharge reflood height of water in the discharge lines.

Refer to Subsection 2.2.15 for "Instrumentation and Controls Compliance with IEEE Standard 603."

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.1.2-3 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria for the NBS.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
24. When actuated by an initiator, the booster assembly opens each DPV in less than or equal to the design opening time and design conditions.	Type testing will be performed on the booster assemblies during factory tests to confirm that they are capable of opening the valve. Tests and analyses will be performed to demonstrate that the booster opens each DPV within the design opening time and design conditions. Type testing and analyses (as needed) will verify minimum and maximum capacity at vessel pressure.	Report(s) document that tests and analyses conclude that each DPV opens when actuated by the booster assembly in less than or equal to 0.45 seconds with an inlet pressure of 6.89 Mpa gauge (1000 psig) or greater.
25. Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV.	Analyses and type tests (at a test facility) will be performed.	Test reports and analyses exist and conclude that the DPV flow capacity is greater than or equal to [239 kg/s (527 lbm/s) at an inlet pressure of 7.48 Mpa gauge (1085 psig)].
26. The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.	See Tier 1 Section 3.8.	See Tier 1 Section 3.8.
27. The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.
28. Vacuum breakers are provided on SRV discharge lines to reduce the post-discharge reflood height of water in the discharge lines.	An inspection will be performed to confirm that the vacuum breakers are installed.	Inspection report(s) document that the vacuum breakers are installed on the SRV discharge lines. An analysis exists that demonstrates that the vacuum breaker capacity and setpoint limit the water column in the discharge line.

DCD Tier 1 RAI 14.3-198 Change List

Item	Location	Description of Change
1.	Table 2.2.4-6, ITAAC # 10a and 10b	Revised wording to include “designed, fabricated, installed, and inspected” in response to RAI 14.3-198.

Table 2.2.4-6

ITAAC For The Standby Liquid Control System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>10. ASME Code Section III</p> <p>a. The components identified in Table 2.2.4-4 as ASME Code Section III are <u>designed, fabricated, installed, and inspected</u> and constructed in accordance with ASME Code Section III requirements.</p> <p>b. The piping identified in Table 2.2.4-4 as ASME Code Section III is <u>designed, and constructed</u> designed, fabricated, installed, and inspected in accordance with ASME Code Section III requirements.</p>	<p>a. Inspection will be conducted of the as-built components as documented in the ASME design reports.</p> <p>b. Inspection will be conducted of the as-built components as documented in the ASME design reports.</p>	<p>a. Report(s) document that the ASME Code Section III design reports exist for the as-built components identified in Table 2.2.4-4 as ASME Code Section III.</p> <p>b. Report(s) document that the ASME code Section III design reports exist for the as-built piping identified in Table 2.2.4-4 as ASME Code Section III.</p>
<p>11. Pressure boundary welds</p> <p>a. Pressure boundary welds in components identified in Table 2.2.4-4 as ASME Code Section III meet ASME Code Section III requirements.</p> <p>b. Pressure boundary welds in piping identified in Table 2.2.4-4 as ASME Code Section III meet ASME Code Section III requirements.</p>	<p>a. Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.</p> <p>b. Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.</p>	<p>a. Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.</p> <p>b. Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.</p>

DCD Tier 1 RAI 14.3-215 Change List

Item	Location	Description of Change
1.	T2.2.4-4	Revised Table 2.2.4-4 to include all ASME Class 1,2, and 3 components.

Table 2.2.4-4
SLC System Mechanical Equipment

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Nitrogen Supply Line Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Nitrogen Supply Line Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Nitrogen Supply Isolation Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>
Train B Nitrogen Supply Isolation Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
Train A Accumulator Relief Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
<u>Train A Accumulator</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>
Train B Accumulator Relief Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
Train A Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator Vent line flow restricting orifice</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	-	-	<u>N</u>
Train B Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train B Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator Vent line flow restricting orifice</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	-	-	<u>N</u>
Train A Accumulator Solution Fill Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Accumulator Solution Fill Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Isolation valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Shut-off valve	V3	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Accumulator Shut-off valve	V4	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train B Accumulator Isolation valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Accumulator Shut-off valve	V1	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train B Accumulator Shut-off valve	V2	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train A Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train A Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train B Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train B Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Accumulator Injection Test/Vent Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train B Accumulator Injection Test/Vent Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train A Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train A Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train B Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train B Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train A Vessel Isolation Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train B Vessel Isolation Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Main Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Main Mixing Pump Discharge Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Poison Solution Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Poison Solution Batch Mixing Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
<u>Train A piping from the locked open valve closest to the reactor vessel through the first NS class break</u>	=	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	=	<u>N</u>
<u>Train B piping from the locked open valve closest to the reactor vessel through the first NS class break</u>	=	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	=	<u>N</u>

DCD Tier 1 RAI 14.3-256 Change List

Item No.	Location	Description of Change
1.	T2.2.5-4, item 4	Corrected typographical error. Design Commitment 4 was erroneously labeled as pertaining to SLC. Table 2.2.5-4 relates to the Neutron Monitoring System. Design Commitment 4 was changed from "SLC" to "NMS"

Table 2.2.5-4

ITAAC For The Neutron Monitoring System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. NMS functional arrangement is defined in Table 2.2.5-1.	Inspection(s), test(s), and/or type test(s) will be performed on the as-built configuration as described in Table 2.2.5-1.	Inspection, test, and/or type test report(s) document(s) that the system conforms to the functional arrangement as described in Table 2.2.5-1.
2. NMS automatic functions, initiators, and associated interfacing systems are defined in Table 2.2.5-2.	See Subsection 2.2.15.	See Subsection 2.2.15.
3. NMS controls, interlocks, and bypasses are defined in Table 2.2.5-3.	See Subsection 2.2.15.	See Subsection 2.2.15.
4. The SLC NMS system minimum inventory of alarms, displays, and status indications in the main control room (MCR) are addressed in Section 3.3.	See Section 3.3.	See Section 3.3.
5. Conformance with IEEE Std. 603 requirements by the safety-related control system structures, systems, and components defined in Table 2.2.5-1 is addressed in Subsection 2.2.15.	See Subsection 2.2.15.	See Subsection 2.2.15.
6. The equipment qualification of NMS components defined in Table 2.2.5-1 is addressed in Section 3.8.	See Section 3.8.	See Section 3.8.

DCD Tier 1 RAI 14.3-258 Change List

Item No.	Location	Description of Change
1.	T2.2.7-1	<p>The following two statements were added to the RPS Functional Arrangement:</p> <p>The primary function of the RPS is to achieve reactor shutdown before fuel damage occurs.</p> <p>The automatic and manual scram initiation logic systems are independent of each other.</p>

Table 2.2.7-1

RPS Functional Arrangement

The RPS comprises four redundant safety-related, Seismic Category I, divisions of sensor channels, trip logics and trip actuators.

The RPS comprises two divisions of manual scram controls and scram logic circuitry.

The primary function of the RPS is to achieve reactor shutdown before fuel damage occurs.

The automatic and manual scram initiation logic systems are independent of each other.

RPS logic is designed to provide a trip initiation by requiring a coincident trip of at least two divisions to cause the trip output.

RPS trip actuator load drivers interrupt circuit power to scram pilot solenoids and scram air header dump valves.

RPS is fail-safe such that on loss of redundant divisional electrical power supplies the load drivers of that division change to the tripped state.

Redundant safety-related power supplies are provided for each division.

DCD Tier 1, RAI 14.3-266, Change List

Item	Location	Description of Change
1.	T2.2.15-2, Item 2a, ITA column	<p>Change Item 2a, ITA column from:</p> <p>a. Inspection of the simplified logic diagrams (SLDs) for the Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1 verifies that the design shows (a) “seal-in” features that are provided to enable system-level safety-related functions to go to completion, and (b) “manual reset” features that are provided to require deliberate operation action to return the safety-related systems to normal. {{DAC}}</p> <p>To:</p> <p>a. Inspection of the current revision of the simplified logic diagrams (SLDs) for the Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1 verifies that the design shows (a) “seal-in” features that are provided to enable system-level safety-related functions to go to completion, and (b) “manual reset” features that are provided to require deliberate operation action to return the safety-related systems to normal. {{DAC}}</p>
2.	T2.2.15-2, Item 2a, AC column	<p>Change Item 2a, AC column from:</p> <p>Inspection report(s) conclude(s) that the SLDs show (a) “seal-in” features, and (b) “manual reset” features. {{DAC}}</p> <p>To:</p> <p>Inspection report(s) conclude(s) that the current revision of the SLDs show (a) “seal-in” features, and (b) “manual reset” features. {{DAC}}</p>
3.	T2.2.15-2, Item 4a, ITA column	<p>Changed Item 4a, ITA column from:</p> <p>a. Inspection(s) of SLDs of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 will be performed to verify that both the automatic and manual circuitry have the capability to have the safety-related systems’ equipment tested and calibrated while retaining the safety-related systems’ capability to accomplish their safety-related functions. {{DAC}}</p> <p>To:</p> <p>a. Inspection(s) of the current revision of the SLDs of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 will be performed to verify that both the automatic and manual circuitry have the capability to have the safety-related systems’ equipment tested and calibrated while retaining the safety-related systems’ capability to accomplish their safety-related functions. {{DAC}}</p>

DCD Tier 1, RAI 14.3-266, Change List

Item	Location	Description of Change
4.	T2.2.15-2, Item 4a, AC column	<p>Changed Item 4a, AC column from:</p> <p>a. Inspection report(s) conclude(s) that the SLDs of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 have the capability to have the safety-related systems' equipment tested and calibrated while retaining the safety-related systems' capability to accomplish their safety-related functions. {{DAC}}</p> <p>To:</p> <p>a. Inspection report(s) conclude(s) that the current revision of the SLDs of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 have the capability to have the safety-related systems' equipment tested and calibrated while retaining the safety-related systems' capability to accomplish their safety-related functions. {{DAC}}</p>
5.	T2.2.15-2, Item 6a, ITA column	<p>Changed Item 6a, ITA column from:</p> <p>a. Inspection(s) will be performed of the SLDs for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 to verify that the design automatically initiates and controls the required safety-related functions. {{DAC}}</p> <p>To:</p> <p>a. Inspection(s) will be performed of the current revision of the SLDs for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 to verify that the design automatically initiates and controls the required safety-related functions. {{DAC}}</p>
6.	T2.2.15-2, Item 6a, AC column	<p>Changed Item 6a, AC column from:</p> <p>a. Inspection report(s) conclude(s) that the SLDs for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 show(s) that the design automatically initiates and controls the required safety-related functions. {{DAC}}</p> <p>To:</p> <p>a. Inspection report(s) conclude(s) that the current revision of the SLDs for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 show(s) that the design automatically initiates and controls the required safety-related functions. {{DAC}}</p>

DCD Tier 1, RAI 14.3-266, Change List

Item	Location	Description of Change
7.	T2.2.15-2, Item 7a, ITA column	<p>Changed Item 7a, ITA column from:</p> <p>a. Inspection(s) will be performed of the SLDs for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 to verify that they have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p> <p>To:</p> <p>a. Inspection(s) will be performed of the current revision of the SLDs for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 to verify that they have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p>
8.	T2.2.15-2, Item 7a, AC column	<p>Changed Item 7a, AC column from:</p> <p>a. Inspection report(s) conclude(s) that the SLDs for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p> <p>To:</p> <p>a. Inspection report(s) conclude(s) that the current revision of the SLDs for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p>
9.	T2.2.15-2, Item 8a, ITA column	<p>Change Item 8a, ITA column from:</p> <p>a. Inspections(s) will be performed of the SLDs for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 to verify that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p> <p>To:</p> <p>a. Inspections(s) will be performed of the current revision of the SLDs for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 to verify that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p>

DCD Tier 1, RAI 14.3-266, Change List

Item	Location	Description of Change
10.	T2.2.15-2, Item 8a, AC column	<p>Changed Item 8a, AC column from:</p> <p>a. Inspection report(s) conclude that the current revision of the SLDs for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 show that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p> <p>To:</p> <p>a. Inspection report(s) conclude that the current revision of the SLDs for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 show that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p>
11.	T2.2.15-2, Item 9a, ITA column	<p>Changed Item 9a, ITA column from:</p> <p>a. Inspections(s) will be performed of the SLDs for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 to verify that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p> <p>To:</p> <p>a. Inspections(s) will be performed of the current revision of the SLDs for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 to verify that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p>
12.	T2.2.15-2, Item 9a, AC column	<p>Changed Item 9a, AC column from:</p> <p>a. Inspection report(s) conclude(s) that the SLDs for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 show that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p> <p>To:</p> <p>a. Inspection report(s) conclude(s) that the current revision of the SLDs for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 show that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p>

Table 2.2.15-2

ITAAC For IEEE Std. 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>2. Criteria 5.2 and 7.3, Completion of Protective Actions:</p> <p>The Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1 are designed so that, (a) once initiated (automatically or manually), the intended sequences of safety-related functions of the execute features continue until completion, and (b) after completion, deliberate operator action is required to return the safety-related systems to normal.</p>	<p>Criteria 5.2 and 7.3, Completion of Protective Actions:</p> <p>a. Inspection of the <u>current revision of the</u> simplified logic diagrams (SLDs) for the Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1 verifies that the design shows (a) “seal-in” features that are provided to enable system-level safety-related functions to go to completion, and (b) “manual reset” features that are provided to require deliberate operation action to return the safety-related systems to normal. {{DAC}}</p> <p>b. Test(s) for the Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1 will be performed to show that (a) once initiated (automatically or manually), the intended sequences of safety-related functions of the “execute features” continue until completion, and (b) after completion, deliberate operator action is required to return the safety-related systems to normal.</p>	<p>Criteria 5.2 and 7.3, Completion of Protective Actions:</p> <p>a. Inspection report(s) conclude(s) that the <u>current revision of the SLDs</u> show (a) “seal-in” features, and (b) “manual reset” features. {{DAC}}</p> <p>b. Test report(s) conclude(s) that for the Criteria 5.2 and 7.3 systems listed in Table 2.2.15-1, (a) once initiated (automatically and manually), the intended sequences of safety-related functions of the “execute features” continue until completion, and (b) after completion, deliberate operator action is required to return the safety-related systems to normal.</p>

Table 2.2.15-2

ITAAC For IEEE Std. 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>4. Criteria 5.7 and 6.5, Capability for Test and Calibration:</p> <p>The Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 have the capability to have their equipment tested and calibrated while retaining their capability to accomplish their safety-related functions.</p>	<p>Criteria 5.7 and 6.5, Capability for Test and Calibration:</p> <p>a. Inspection(s) of the <u>current revision of the SLDs</u> of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 will be performed to verify that both the automatic and manual circuitry have the capability to have the safety-related systems' equipment tested and calibrated while retaining the safety-related systems' capability to accomplish their safety-related functions. {{DAC}}</p> <p>b. Test(s) of Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 will be performed to demonstrate that the design allows for tripping or bypass of individual functions in each safety-related system channel.</p> <p>c. Test(s) of Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1, will be performed to demonstrate that the digital computer-based I&C systems' self-test features confirm computer system operation on system initiation.</p>	<p>Criteria 5.7 and 6.5, Capability for Test and Calibration:</p> <p>a. Inspection report(s) conclude(s) that the <u>current revision of the SLDs</u> of the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1 have the capability to have the safety-related systems' equipment tested and calibrated while retaining the safety-related systems' capability to accomplish their safety-related functions. {{DAC}}</p> <p>b. Test report(s) conclude(s) that for the Criterion 5.7 and 6.5 systems listed in Table 2.2.15-1 individual functions in each safety-related system channel can be tripped or bypassed.</p> <p>c. Test report(s) conclude(s) that for the Criteria 5.7 and 6.5 systems listed in Table 2.2.15-1, the digital computer-based I&C systems' self-test features confirm computer system operation on system initiation.</p>

**Table 2.2.15-2
ITAAC For IEEE Std. 603 Compliance Confirmation**

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>5. Criterion 5.9, Control of Access: The design of the Criterion 5.9 systems listed in Table 2.2.15-1 have features that permit administrative control of access to safety-related system equipment.</p>	<p>Criterion 5.9, Control of Access: Inspection of system design specification(s) for the Criterion 5.9 systems listed in Table 2.2.15-1 will be performed to confirm that access control features are specified for safety-related systems equipment. {{DAC}}</p>	<p>Criterion 5.9, Control of Access: Inspection report(s) conclude(s) that within the system design specification(s) of the Criterion 5.9 systems listed in Table 2.2.15-1, access control features are specified for safety-related systems equipment. {{DAC}}</p>
<p>6. Criteria 6.1 and 7.1, Automatic Control: The Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 provide the means to automatically initiate and control the required safety-related functions.</p>	<p>Criteria 6.1 and 7.1, Automatic Control: a. Inspection(s) will be performed of the <u>current revision of the SLDs</u> for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 to verify that the design automatically initiates and controls the required safety-related functions. {{DAC}} b. Test(s) will be performed to demonstrate that the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 automatically initiate and control the required safety-related functions.</p>	<p>Criteria 6.1 and 7.1, Automatic Control: a. Inspection report(s) conclude(s) that the <u>current revision of the SLDs</u> for the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 show(s) that the design automatically initiates and controls the required safety-related functions. {{DAC}} b. Test report(s) conclude(s) that the Criteria 6.1 and 7.1 systems listed in Table 2.2.15-1 automatically initiate and control the required safety-related functions.</p>

Table 2.2.15-2

ITAAC For IEEE Std. 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>7. Criteria 6.2 and 7.2, Manual Control:</p> <p>The Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have features in the main control room to manually initiate and control the automatically initiated safety-related functions at the division level.</p>	<p>Criteria 6.2 and 7.2, Manual Control:</p> <p>a. Inspection(s) will be performed of the <u>current revision of the SLDs</u> for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 to verify that they have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p> <p>b. Test(s) will be performed to demonstrate that the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have main control room features that manually initiate and control automatically initiated safety-related functions at the division level.</p>	<p>Criteria 6.2 and 7.2, Manual Control:</p> <p>a. Inspection report(s) conclude(s) that the <u>current revision of the SLDs</u> for the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have main control room features that are capable of manually initiating and controlling automatically initiated safety-related functions at the division level. {{DAC}}</p> <p>b. Test report(s) conclude(s) that the Criteria 6.2 and 7.2 systems listed in Table 2.2.15-1 have main control room features that manually initiate and control automatically initiated safety-related functions at the division level exist(s).</p>

Table 2.2.15-2

ITAAC For IEEE Std. 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>8. Criteria 6.6 and 7.4, Operating Bypasses:</p> <p>The Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 automatically (1) prevent the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) remove activated operating bypass(es), if the plant conditions change so that an activated operating bypass is no longer permissible.</p>	<p>Criteria 6.6 and 7.4, Operating Bypasses:</p> <p>a. Inspections(s) will be performed of the <u>current revision of the SLDs</u> for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 to verify that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p> <p>b. Test(s) will be performed to demonstrate that the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 automatically (1) prevent the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) remove activated operating bypass(es), if the plant conditions change so that an activated operating bypass is no longer permissible.</p>	<p>Criteria 6.6 and 7.4, Operating Bypasses:</p> <p>a. Inspection report(s) conclude that the <u>current revision of the SLDs</u> for the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 show that the systems are capable of automatically (1) preventing the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) removing activated operating bypasses, if the plant conditions change so that an activated operating bypass is no longer permissible. {{DAC}}</p> <p>b. Test report(s) conclude(s) that the Criterion 6.6 and 7.4 systems listed in Table 2.2.15-1 automatically (1) prevent the activation of an operating bypass, whenever the applicable permissive conditions for an operating bypass are not met, and (2) remove activated operating bypass(es), if the plant conditions change so that an activated operating bypass is no longer permissible.</p>

Table 2.2.15-2

ITAAC For IEEE Std. 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>9. Criteria 6.7 and 7.5, Maintenance Bypasses:</p> <p>The Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 are capable of performing their safety-related functions, when one division is in maintenance bypass.</p>	<p>Criteria 6.7 and 7.5, Maintenance Bypasses:</p> <p>a. Inspections(s) will be performed of the <u>current revision of the SLDs</u> for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 to verify that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p> <p>b. Test(s) will be performed to demonstrate that the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 perform their safety-related functions, when one division is in maintenance bypass.</p>	<p>Criteria 6.7 and 7.5, Maintenance Bypasses:</p> <p>a. Inspection report(s) conclude(s) that the <u>current revision of the SLDs</u> for the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 show that the safety-related systems are capable of performing their safety-related functions, when one division is in maintenance bypass. {{DAC}}</p> <p>b. Test report(s) conclude(s) that the Criterion 6.7 and 7.5 systems listed in Table 2.2.15-1 perform their safety-related functions, when one division is in maintenance bypass.</p>
<p>10. Criterion 6.8, Setpoint:</p> <p>For the Criterion 6.8 systems listed in Table 2.2.15-1, setpoints for safety-related functions are defined, determined and implemented based on a defined setpoint methodology.</p>	<p>Criterion 6.8, Setpoint:</p> <p>Inspection(s), test(s), and/or analysis(es) for the Criterion 6.8 systems listed in Table 2.2.15-1 will be performed to verify that the setpoints for safety-related functions are defined, determined and implemented based on a defined setpoint methodology.</p>	<p>Criterion 6.8, Setpoint:</p> <p>Inspection(s), test(s), or analysis(es) report(s) for the Criterion 6.8 systems listed in Table 2.2.15-1 conclude(s) that the safety-related systems' setpoints for safety-related functions are defined, determined and implemented based on a defined setpoint methodology.</p>

DCD Tier 1 RAI 14.3-273 Change List

Item No.	Location	Description of Change
1.	S 3.4	Section 3.4 changed from: The ESBWR Standard Plant is designed to maintain radiation exposures to plant personnel as low as reasonably achievable (ALARA). To: The ESBWR Standard Plant is designed to maintain radiation exposures to plant personnel As Low As Reasonable Achievable (ALARA).

3.4 RADIATION PROTECTION

Design Description

The ESBWR Standard Plant is designed to maintain radiation exposures to plant personnel As Low As Reasonably Achievable (ALARA). Radiation protection is provided by application of the design and radiation control principles:

- (1) Plant design provides for containment of airborne radioactive materials, and the ventilation system ensures that concentrations of airborne radionuclides are maintained at levels consistent with personnel access needs.
- (2) Area radiation monitoring provides local alarms (visual alarms in high noise areas) with variable alarm setpoints and readout/alarm capability.
- (3) The plant design provides radiation shielding for rooms, corridors and operating areas commensurate with their occupancy requirements.

Inspections, Tests, Analyses and Acceptance Criteria

Table 3.4-1 provides definitions of the inspections, test and/or analyses, together with associated acceptance criteria for ventilation and airborne monitoring and shielding.

DCD Tier 1, RAI 14.3-274, Change List

Item	Location	Description of Change
1.	Abbreviations and Acronyms List, Page xiv	For DICS acronym, the word "instrumentation" will be capitalized.

Abbreviations And Acronyms List

DGVS	Diesel Generators HVAC Subsystem
DICS	Diverse Instrumentation and Control System
DOI	Dedicated Operators Interface
DOT	Department of Transportation
DPS	Diverse Protection System
DW	Drywell
E50	Gravity Driven Cooling System
EAB	Exclusion Area Boundary
EB	Electrical Building
EBVS	Electrical Building HVAC System
ECCS	Emergency Core Cooling System
EERVS	Electric and Electronic Rooms HVAC Subsystem
EFDS	Equipment and Floor Drainage System
EFU	Emergency Filter Unit
EL	Elevation
EMI	Electromagnetic Interference
EOF	Emergency Operations Facility
EPEN	Electrical Penetration
ERICP	Emergency Rod Insertion Control Panel
ERIP	Emergency Rod Insertion Panel
ESF	Engineered Safety Feature
ETS	Emergency Trip System

DCD Tier 1, RAI 14.3-277, Change List

Item	Location	Description of Change
1.	S1.1.1	<p>The following ASME Code Report definition is added:</p> <p>ASME Code Report means a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. Each such ASME Code report is final, and when required is certified in accordance with the Code.</p>

1. INTRODUCTION

This document provides the Tier 1 material of the ESBWR Design Control Document (DCD).

1.1 DEFINITIONS AND GENERAL PROVISIONS

1.1.1 Definitions

The definitions below apply to terms which may be used in the Design Descriptions and associated Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

Acceptance Criteria means the performance, physical condition, or analysis results for a structure, system, or component that demonstrates a design commitment is met.

Analysis means a calculation, mathematical computation, or engineering or technical evaluation. Engineering or technical evaluations could include, but are not limited to, comparisons with operating experience or design of similar structures, systems, or components.

As-built means the physical properties of the structure, system or component, following the completion of its installation or construction activities at its final location at the plant site.

ASME Code Report means a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. Each such ASME Code report is final, and when required is certified in accordance with the Code.

Cold shutdown means a *safe shutdown* with the average reactor coolant temperature $\leq 93.3^{\circ}\text{C}$ (200°F).

Containment means the Primary Containment System, unless explicitly stated otherwise.

Design Commitment means that portion of the Design Description that is verified by ITAAC.

Design Description means that portion of the design that is certified.

Division (for electrical systems or equipment) is the designation applied to a given safety-related system or set of components that is physically, electrically, and functionally independent from other redundant sets of components.

Equipment Identification Number as used in Tier 1 means the designation on a Tier 1 figure and is not representative of an actual equipment number or tag number.

Equipment Qualification

For purposes of ITAAC:

Environmental Qualification: Type tests, or type tests and/or analyses, of the safety-related mechanical components and electrical equipment demonstrate qualification to applicable normal, abnormal and design basis accident conditions without loss of the safety-related function for the time needed to perform the safety-related function. These harsh environmental conditions, as applicable to the bounding design basis accident(s), are as follows: expected time-dependent temperature and pressure profiles, humidity, chemical effects, radiation, aging, submergence, and their synergistic effects which have a significant effect on equipment performance.

As used in the associated ITAAC, the term “safety-related electrical equipment” constitutes the equipment itself, connected instrumentation and controls, connected electrical components (such as cabling, wiring, and terminations), and the lubricants necessary to

DCD Tier 1, RAI 14.3-278, Change List

Item	Location	Description of Change
1.	S1.1.1	<p>The following "Report" definition is added:</p> <p>Report means, as used in the Acceptance Criteria, a document created by or for the licensee that verifies that the acceptance criteria of the subject ITAAC have been met and references the supporting documentation. Reports typically include but are not limited to: results of walkdowns, results of visual inspection, field measurements, reviews of design and construction documents.</p>

1. INTRODUCTION

This document provides the Tier 1 material of the ESBWR Design Control Document (DCD).

1.1 DEFINITIONS AND GENERAL PROVISIONS

1.1.1 Definitions

The definitions below apply to terms which may be used in the Design Descriptions and associated Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

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Analysis means a calculation, mathematical computation, or engineering or technical evaluation. Engineering or technical evaluations could include, but are not limited to, comparisons with operating experience or design of similar structures, systems, or components.

As-built means the physical properties of the structure, system or component, following the completion of its installation or construction activities at its final location at the plant site.

ASME Code Report means a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. Each such ASME Code report is final, and when required is certified in accordance with the Code.

Cold shutdown means a *safe shutdown* with the average reactor coolant temperature $\leq 93.3^{\circ}\text{C}$ (200°F).

Containment means the Primary Containment System, unless explicitly stated otherwise.

Design Commitment means that portion of the Design Description that is verified by ITAAC.

Design Description means that portion of the design that is certified.

Division (for electrical systems or equipment) is the designation applied to a given safety-related system or set of components that is physically, electrically, and functionally independent from other redundant sets of components.

Equipment Identification Number as used in Tier 1 means the designation on a Tier 1 figure and is not representative of an actual equipment number or tag number.

Equipment Qualification

For purposes of ITAAC:

Environmental Qualification: Type tests, or type tests and/or analyses, of the safety-related mechanical components and electrical equipment demonstrate qualification to applicable normal, abnormal and design basis accident conditions without loss of the safety-related function for the time needed to perform the safety-related function. These harsh environmental conditions, as applicable to the bounding design basis accident(s), are as follows: expected time-dependent temperature and pressure profiles, humidity, chemical effects, radiation, aging, submergence, and their synergistic effects which have a significant effect on equipment performance.

As used in the associated ITAAC, the term "safety-related electrical equipment" constitutes the equipment itself, connected instrumentation and controls, connected electrical components (such as cabling, wiring, and terminations), and the lubricants necessary to support performance of the safety-related functions of the safety-related electrical components identified as being subject to the environmental qualification requirements.

As used in this paragraph, "safety related mechanical components" refers to mechanical parts, subassemblies or assemblies that are categorized as Quality Group A, B or C. Mechanical components qualification also may be by type tests, analyses or a combination of tests and analyses of individual parts or subassemblies or of complete assemblies rather than by testing the individual parts or subassemblies separately.

Safety-related equipment located in a mild environment will be qualified for their environmental requirements through specifications and certifications to the environments; however, for a mild environment, only safety-related digital instrumentation and control equipment will be addressed by ITAAC in Tier 1, consistent with NRC guidance in NUREG-0800, Section 14.3. Additionally, EMI susceptibility and emissions qualification is performed by type testing for the safety-related digital instrumentation and control equipment and is not specifically addressed in an ITAAC. ITAAC address analyses of material data for safety-related mechanical equipment located in a harsh environment.

Seismic Qualification: Type tests, analyses, or a combination of type tests and analyses of the Seismic Category I mechanical and electrical equipment (including connected instrumentation and controls) may be used to demonstrate that the as-built equipment, including associated anchorage, is qualified to withstand design basis dynamic loads without loss of its safety-related function.

Exists, when used in Acceptance Criteria, means that the item is present and meets the design description.

Functional Arrangement/Physical Arrangement (for a Building) means the arrangement of the building features (e.g., floors, ceilings, walls, basemat and doorways) and of the structures, systems, or components within, as specified in the building Design Descriptions.

Functional Arrangement (for a System) means the physical arrangement of systems and components to provide the service for which the system is intended, and which is described in the system Design Description.

Hot shutdown means a *safe shutdown* with the average reactor coolant temperature $> 215.6^{\circ}\text{C}$ (420°F).

Hot standby means a subcritical or critical condition (1) with thermal power (including decay heat) $\leq 5\%$ of rated, (2) in which reactor temperatures and pressures are near normal operating conditions, and (3) from which normal power operation can readily be achieved.

Inspect or **Inspection** means visual observations, physical examinations, or review of records based on visual observation or physical examination that compare the structure, system, or component condition to one or more Design Commitments. Examples include, but are not limited to, walk-downs, configuration checks, measurements of dimensions, and non-destructive examinations.

Inspect for Retrievability of a display means to visually observe that the specified information appears on a monitor when summoned by the operator.

Operate means the actuation, control, running, and/or shutting down (*e.g.*, closing, turning off) of equipment.

Reactor Pressure Vessel Water (RPV) Level means the various levels used as reference points for instrumentation ranges. Figure 1.1.1-1 shows the relative location of the defined water levels and the overlap in the level measurement ranges.

Report means, as used in the Acceptance Criteria, a document created by or for the licensee that verifies that the acceptance criteria of the subject ITAAC have been met and references the supporting documentation. Reports typically include but are not limited to: results of walkdowns, results of visual inspections, field measurements, reviews of design and construction documents.

Safe shutdown (generic definition) is a shutdown with:

- (1) The reactivity of the reactor kept to a margin below criticality consistent with Technical Specifications;
- (2) The core decay heat being removed at a controlled rate sufficient to prevent core or reactor coolant system thermal design limits from being exceeded;
- (3) Components and systems necessary to maintain these conditions operating within their design limits; and
- (4) Components and systems, necessary to keep doses within prescribed limits, operating properly.

DCD Tier 1, RAI 14.3-279, Change List

Item	Location	Description of Change
1.	S1.1.1	<p>The definition of “Inspect” or “Inspection” is modified as follows:</p> <p>Inspect or Inspection means visual observations, physical examinations, or review of records based on visual observation or physical examination that compare the structure, system, or component condition to one or more Design Commitments. Examples include, but are not limited to, walk-downs, configuration checks, measurements of dimensions, and non-destructive examinations. Inspections also may include review of design and construction documents including drawings, calculations, analyses, test procedures and results, certificates of compliance, purchase records, and other documents that may verify that the acceptance criteria of a particular ITAAC are met.</p>

1. INTRODUCTION

This document provides the Tier 1 material of the ESBWR Design Control Document (DCD).

1.1 DEFINITIONS AND GENERAL PROVISIONS

1.1.1 Definitions

The definitions below apply to terms which may be used in the Design Descriptions and associated Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

Acceptance Criteria means the performance, physical condition, or analysis results for a structure, system, or component that demonstrates a design commitment is met.

Analysis means a calculation, mathematical computation, or engineering or technical evaluation. Engineering or technical evaluations could include, but are not limited to, comparisons with operating experience or design of similar structures, systems, or components.

As-built means the physical properties of the structure, system or component, following the completion of its installation or construction activities at its final location at the plant site.

ASME Code Report means a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. Each such ASME Code report is final, and when required is certified in accordance with the Code.

Cold shutdown means a *safe shutdown* with the average reactor coolant temperature $\leq 93.3^{\circ}\text{C}$ (200°F).

Containment means the Primary Containment System, unless explicitly stated otherwise.

Design Commitment means that portion of the Design Description that is verified by ITAAC.

Design Description means that portion of the design that is certified.

Division (for electrical systems or equipment) is the designation applied to a given safety-related system or set of components that is physically, electrically, and functionally independent from other redundant sets of components.

Equipment Identification Number as used in Tier 1 means the designation on a Tier 1 figure and is not representative of an actual equipment number or tag number.

Equipment Qualification

For purposes of ITAAC:

Environmental Qualification: Type tests, or type tests and/or analyses, of the safety-related mechanical components and electrical equipment demonstrate qualification to applicable normal, abnormal and design basis accident conditions without loss of the safety-related function for the time needed to perform the safety-related function. These harsh environmental conditions, as applicable to the bounding design basis accident(s), are as follows: expected time-dependent temperature and pressure profiles, humidity, chemical effects, radiation, aging, submergence, and their synergistic effects which have a significant effect on equipment performance.

As used in the associated ITAAC, the term “safety-related electrical equipment” constitutes the equipment itself, connected instrumentation and controls, connected electrical components (such as cabling, wiring, and terminations), and the lubricants necessary to support performance of the safety-related functions of the safety-related electrical components identified as being subject to the environmental qualification requirements.

As used in this paragraph, “safety related mechanical components” refers to mechanical parts, subassemblies or assemblies that are categorized as Quality Group A, B or C. Mechanical components qualification also may be by type tests, analyses or a combination of tests and analyses of individual parts or subassemblies or of complete assemblies rather than by testing the individual parts or subassemblies separately.

Safety-related equipment located in a mild environment will be qualified for their environmental requirements through specifications and certifications to the environments; however, for a mild environment, only safety-related digital instrumentation and control equipment will be addressed by ITAAC in Tier 1, consistent with NRC guidance in NUREG-0800, Section 14.3. Additionally, EMI susceptibility and emissions qualification is performed by type testing for the safety-related digital instrumentation and control equipment and is not specifically addressed in an ITAAC. ITAAC address analyses of material data for safety-related mechanical equipment located in a harsh environment.

Seismic Qualification: Type tests, analyses, or a combination of type tests and analyses of the Seismic Category I mechanical and electrical equipment (including connected instrumentation and controls) may be used to demonstrate that the as-built equipment, including associated anchorage, is qualified to withstand design basis dynamic loads without loss of its safety-related function.

Exists, when used in Acceptance Criteria, means that the item is present and meets the design description.

Functional Arrangement/Physical Arrangement (for a Building) means the arrangement of the building features (e.g., floors, ceilings, walls, basemat and doorways) and of the structures, systems, or components within, as specified in the building Design Descriptions.

Functional Arrangement (for a System) means the physical arrangement of systems and components to provide the service for which the system is intended, and which is described in the system Design Description.

Hot shutdown means a *safe shutdown* with the average reactor coolant temperature $> 215.6^{\circ}\text{C}$ (420°F).

Hot standby means a subcritical or critical condition (1) with thermal power (including decay heat) $\leq 5\%$ of rated, (2) in which reactor temperatures and pressures are near normal operating conditions, and (3) from which normal power operation can readily be achieved.

Inspect or **Inspection** means visual observations, physical examinations, or review of records based on visual observation or physical examination that compare the structure, system, or component condition to one or more Design Commitments. Examples include, but are not limited to, walk-downs, configuration checks, measurements of dimensions, and non-destructive examinations. Inspections also may include review of design and construction documents including drawings, calculations, analyses, test procedures and results, certificates of

compliance, purchase records, and other documents that may verify that the acceptance criteria of a particular ITAAC are met.

Inspect for Retrievability of a display means to visually observe that the specified information appears on a monitor when summoned by the operator.

Operate means the actuation, control, running, and/or shutting down (e.g., closing, turning off) of equipment.

Reactor Pressure Vessel Water (RPV) Level means the various levels used as reference points for instrumentation ranges. Figure 1.1.1-1 shows the relative location of the defined water levels and the overlap in the level measurement ranges.

Report means, as used in the Acceptance Criteria, a document created by or for the licensee that verifies that the acceptance criteria of the subject ITAAC have been met and references the supporting documentation. Reports typically include but are not limited to: results of walkdowns, results of visual inspections, field measurements, reviews of design and construction documents.

Safe shutdown (generic definition) is a shutdown with:

- (1) The reactivity of the reactor kept to a margin below criticality consistent with Technical Specifications;
- (2) The core decay heat being removed at a controlled rate sufficient to prevent core or reactor coolant system thermal design limits from being exceeded;
- (3) Components and systems necessary to maintain these conditions operating within their design limits; and
- (4) Components and systems, necessary to keep doses within prescribed limits, operating properly.

DCD Tier 1, RAI 14.3-280, Change List

Item	Location	Description of Change
1.	S1.1.2.1	<p>The first paragraph has been modified as follows:</p> <p>The absence of any discussion or depiction of an item in the Design Description or accompanying figures shall not be construed as prohibiting a licensee from utilizing such an item, unless it would prevent an item from performing its safety functions, <u>or impairing the performance of those safety functions</u>, as discussed or depicted in the Design Description or accompanying figures</p>

1.1.2 General Provisions

The following general provisions are applicable to the design descriptions and associated ITAAC.

1.1.2.1 Treatment of Individual Items

The absence of any discussion or depiction of an item in the Design Description or accompanying figures shall not be construed as prohibiting a licensee from utilizing such an item, unless it would prevent an item from performing its safety functions, or impairing the performance of those safety functions, as discussed or depicted in the Design Description or accompanying figures.

If an inspection, test, or analyses requirement does not specify the temperature or other conditions under which a test must be run, then the test conditions are not constrained.

When the term “operate,” “operates” or “operation” is used with respect to an item discussed in the Acceptance Criteria, it refers to the actuation and running of the item. When the term “exist,” “exists” or “existence” is used with respect to an item discussed in the Acceptance Criteria, it means that the item is present and meets the Design Description.

1.1.2.2 Implementation of ITAAC

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) are provided in tables with the following three-column format:

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
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Each Design Commitment in the left-hand column of the ITAAC tables has an associated requirement for Inspections, Tests or Analyses (ITA) specified in the middle column of the tables. The identification of a separate ITA entry for each Design Commitment shall not be construed to require that separate inspections, tests, or analyses must be performed for each Design Commitment. Instead, the activities associated with more than one ITA entry may be combined, and a single inspection, test, or analysis may be sufficient to implement more than one ITA entry.

An ITA may be performed by the licensee of the plant or by its authorized vendors, contractors, or consultants. Furthermore, an ITA may be performed by more than a single individual or group, may be implemented through discrete activities separated by time, and may be performed at any time prior to fuel load (including before issuance of the Combined Operating License for those ITAAC that do not require as-installed equipment). Additionally, ITA may be performed as part of the activities that are required to be performed under 10 CFR 50 (including, for example, the Quality Assurance (QA) program required under Appendix B to Part 50). Therefore, an ITA need not be performed as a separate or discrete activity.

Many of the Acceptance Criteria include the words “A report exists and concludes that” This concept indicates that the ITAAC for that Design Commitment will be met when it is confirmed that appropriate documentation exists and the documentation shows that the Design Commitment is met. Appropriate documentation may be a single document or a collection of documents that show that the stated Acceptance Criteria are met. Examples of appropriate documentation include design reports, test reports, inspection reports, analysis reports, evaluation reports, design

DCD Tier 1, RAI 14.3-286 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, para (13)	Clarified by replacing “each” with “its associated,” to meet the intent of the request in RAI 14.3-286.
2	T2.1.2-3, Item (13)	Clarified the DC by replacing “each” with “its associated,” to meet the intent of the request in RAI 14.3-286.

- b. The MSIVs close upon any of the following conditions:
 - i. Main Condenser Vacuum Low (Run mode)
 - ii. Turbine Area Ambient Temperature High
 - iii. MSL Tunnel Ambient Temperature High
 - iv. MSL Flow Rate High
 - v. Turbine Inlet Pressure Low
 - vi. Reactor Water Level Low
- (9) Repositional valves (not including the DPVs (squib-activated valves)) designated in Table 2.1.2-2 as having an active safety-related function open, close, or both open and also close under design differential pressure, fluid flow, and temperature conditions.
- (10) The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
- (11) Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under design system pressure, fluid flow, and temperature conditions.
- (12) The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.
- (13) Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through ~~each~~ its associated MSL.
- (14) The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.
- (15) The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.
- (16) When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.
- (17) The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.
- (18) The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.
- (19) The steam discharge capacity of each SRV satisfies the overpressure protection analysis.
- (20) The opening pressure for the SVs satisfies the overpressure protection analysis.
- (21) The opening time for the SVs from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.
- (22) The steam discharge capacity of each SV satisfies the overpressure protection analysis.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
10. The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.	Tests will be conducted on the as-built valve(s).	Report(s) document that the pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) when either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
11. Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under design system pressure, fluid flow, and temperature conditions.	Tests of installed valves for opening, closing, or both opening and also closing, will be conducted under system preoperational pressure, fluid flow, and temperature conditions.	Report(s) document that, based on the direction of the differential pressure across the valve, each CV opens, closes, or both opens and also closes, depending upon the valve's safety functions.
12. The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.	Inspection of the as-built MSL flow restrictor will be performed and measurements taken.	Report(s) document that the throat diameter of each MSL flow restrictor is less than or equal to 355 mm (14 in.).
13. Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each its associated MSL.	Inspections of the as-built installation of the MSL flow restrictor will be conducted to verify that it provides for two instrument connections.	Report(s) document that the as-built MSL flow restrictor provides for two instrument connections.
14. The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.	Analyses/calculations will be performed using the as-built dimensions of the steamlines to determine the combined steam line volume. The calculational results will be documented in a report.	Report(s) document that the combined steamline volume is greater than or equal to 135 m ³ (4767 ft ³).

DCD Tier 1, RAI 14.3-290 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2 paragraphs (18) and (21)	Added “measured” and made minor editorial clarification to meet the intent of the request in RAI 14.3-290
2	T2.1.2-3 Items (18) and (21)	Added “measured” to and clarified the DCs in response to RAI 14.3-290

- b. The MSIVs close upon any of the following conditions:
 - i. Main Condenser Vacuum Low (Run mode)
 - ii. Turbine Area Ambient Temperature High
 - iii. MSL Tunnel Ambient Temperature High
 - iv. MSL Flow Rate High
 - v. Turbine Inlet Pressure Low
 - vi. Reactor Water Level Low
- (9) Repositional valves (not including the DPVs (squib-activated valves)) designated in Table 2.1.2-2 as having an active safety-related function open, close, or both open and also close under design differential pressure, fluid flow, and temperature conditions.
- (10) The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
- (11) Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under design system pressure, fluid flow, and temperature conditions.
- (12) The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.
- (13) Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each MSL.
- (14) The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.
- (15) The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.
- (16) When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.
- (17) The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.
- (18) The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) is measured from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.
- (19) The steam discharge capacity of each SRV satisfies the overpressure protection analysis.
- (20) The opening pressure for the SVs satisfies the overpressure protection analysis.
- (21) The opening time for the SVs is measured from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.
- (22) The steam discharge capacity of each SV satisfies the overpressure protection analysis.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15. The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.	Tests of the as-built MSIV will be conducted under preoperational test conditions or type testing of an MSIV will be conducted in accordance with the design and purchase specifications to demonstrate that the MSIVs will fast close.	Report(s) document that testing demonstrates MSIVs are capable of fast closure in not less than 3 seconds and not more than 5 seconds.
16. When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.	Tests at preoperational conditions along with analysis will be performed on the as-built MSIVs to determine the leakage as adjusted to the specified design conditions.	Report(s) document that, when all MSIVs are closed, the combined leakage through the MSIVs for all four MSLs is less than or equal to a total combined leakage (corrected to standard conditions) of $\sim 0.0623 \text{ m}^3/\text{minute}$ ($\sim 2.2 \text{ ft}^3/\text{minute}$) for post-LOCA leakage.
17. The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.	Type test (at a facility) or setpoint test will be conducted in accordance with the ASME Code to certify the valve.	Report(s) document that testing/type testing verifies the mechanical lift nominal setpoint pressure of $8.366 \pm 0.251 \text{ MPa}$ gauge ($1213 \pm 36.39 \text{ psig}$).
18. The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) is measured from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.	Analysis and type tests (at a test facility) will be conducted in accordance with the ASME Code to ensure that the valves open within the design opening time.	Report(s) document that tests and analyses exist and conclude that opening time for the SRVs for the overpressure operation mode is less than or equal to 0.5 second.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
19. The steam discharge capacity of each SRV satisfies the overpressure protection analysis.	Type tests (at a facility) will be conducted in accordance with the ASME Code for relief valve certification.	Report(s) document that valve capacity stamping on each SRV records the certified capacity at rated setpoint of 138 kg/s (304 lbm/s) minimum.
20. The opening pressure for the SVs satisfies the overpressure protection analysis.	Type tests (at a facility) or setpoint tests will be conducted in accordance with the ASME Code to certify the valve.	Report(s) document that testing/type testing verifies the mechanical lift nominal setpoint pressure of 8.503 ± 0.255 MPa gauge (1233 ± 36.99 psig).
21. The opening time for the SVs is measured from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.	Analysis and type tests (at a test facility) will be conducted in accordance with the ASME Code to ensure that the valves open within the design opening time.	Report(s) document that tests and analyses exist and conclude that opening time for the SVs is less than or equal to 0.5 second.
22. The steam discharge capacity of each SV satisfies the overpressure protection analysis.	Type tests (at a facility) will be conducted in accordance with the ASME Code for relief valve certification.	Report(s) document that valve capacity stamping on each SV records the certified capacity at rated setpoint of 140.2 kg/s (309 lbm/s) minimum.
23. The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.	An analysis and/or type test will be performed to demonstrate the capacity of the relief-mode actuation for each SRV.	Test/analysis report(s) conclude that the relief-mode actuation has the capacity to lift the SRVs to the full open position one time with the drywell pressure at the drywell design pressure.

DCD Tier 1, RAI 14.3-291 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, paragraphs 19 and 22	Inserted "(i.e., is greater than or equal to that used in)" after "satisfies" in response to RAI 14.3-291.
2	T2.1.2-3, Items 19 and 22 DCs	Inserted "(i.e., is greater than or equal to that used in)" after "satisfies" in response to RAI 14.3-291.
3	S2.1.2, para 20	Inserted "(i.e., is less than or equal to that used in)" after "satisfies" in response to RAI 14.3-291.
4	T2.1.2-3, Item 20 DC	Inserted "(i.e., is less than or equal to that used in)" after "satisfies" in response to RAI 14.3-291.

- b. The MSIVs close upon any of the following conditions:
 - i. Main Condenser Vacuum Low (Run mode)
 - ii. Turbine Area Ambient Temperature High
 - iii. MSL Tunnel Ambient Temperature High
 - iv. MSL Flow Rate High
 - v. Turbine Inlet Pressure Low
 - vi. Reactor Water Level Low
- (9) Repositional valves (not including the DPVs (squib-activated valves)) designated in Table 2.1.2-2 as having an active safety-related function open, close, or both open and also close under design differential pressure, fluid flow, and temperature conditions.
- (10) The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
- (11) Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under design system pressure, fluid flow, and temperature conditions.
- (12) The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.
- (13) Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each MSL.
- (14) The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.
- (15) The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.
- (16) When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.
- (17) The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.
- (18) The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.
- (19) The steam discharge capacity of each SRV satisfies (i.e., is greater than or equal to that used in) the overpressure protection analysis.
- (20) The opening pressure for the SVs satisfies (i.e., is less than or equal to that used in) the overpressure protection analysis.
- (21) The opening time for the SVs from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.

- (22) The steam discharge capacity of each SV satisfies (i.e., is greater than or equal to that used in) the overpressure protection analysis.
- (23) The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.
- (24) When actuated by an initiator, the booster assembly opens each DPV in less than or equal to the design opening time and design conditions.
- (25) Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV.
- (26) The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.
- (27) The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.

Refer to Subsection 2.2.15 for "Instrumentation and Controls Compliance with IEEE Standard 603."

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.1.2-3 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria for the NBS.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
19. The steam discharge capacity of each SRV satisfies (i.e., is greater than or equal to that used in) the overpressure protection analysis.	Type tests (at a facility) will be conducted in accordance with the ASME Code for relief valve certification.	Report(s) document that valve capacity stamping on each SRV records the certified capacity at rated setpoint of 138 kg/s (304 lbm/s) minimum.
20. The opening pressure for the SVs satisfies (i.e., is less than or equal to that used in) the overpressure protection analysis.	Type tests (at a facility) or setpoint tests will be conducted in accordance with the ASME Code to certify the valve.	Report(s) document that testing/type testing verifies the mechanical lift nominal setpoint pressure of 8.503 ± 0.255 MPa gauge (1233 ± 36.99 psig).
21. The opening time for the SVs from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.	Analysis and type tests (at a test facility) will be conducted in accordance with the ASME Code to ensure that the valves open within the design opening time.	Report(s) document that tests and analyses exist and conclude that opening time for the SVs is less than or equal to 0.5 second.
22. The steam discharge capacity of each SV satisfies (i.e., is greater than or equal to that used in) the overpressure protection analysis.	Type tests (at a facility) will be conducted in accordance with the ASME Code for relief valve certification.	Report(s) document that valve capacity stamping on each SV records the certified capacity at rated setpoint of 140.2 kg/s (309 lbm/s) minimum.
23. The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.	An analysis and/or type test will be performed to demonstrate the capacity of the relief-mode actuation for each SRV.	Test/analysis report(s) conclude that the relief-mode actuation has the capacity to lift the SRVs to the full open position one time with the drywell pressure at the drywell design pressure.

DCD Tier 1, RAI 14.3-292 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, para. (24)	Replaced the last part of the sentence with “a time that is less than or equal to the design opening time under design basis conditions” in response to RAI 14.3-292.
2	T2.1.2-3, Item 24	Replaced the last part of the DC with “a time that is less than or equal to the design opening time under design basis conditions” in response to RAI 14.3-292.

- (23) The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.
- (24) When actuated by an initiator, the booster assembly opens each DPV in a time that is less than or equal to the design opening time under design basis conditions ~~less than or equal to the design opening time and design conditions.~~
- (25) Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV.
- (26) The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.
- (27) The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.

Refer to Subsection 2.2.15 for "Instrumentation and Controls Compliance with IEEE Standard 603."

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.1.2-3 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria for the NBS.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
24. When actuated by an initiator, the booster assembly opens each DPV in a time that is less than or equal to the design opening time under design basis conditions less than or equal to the design opening time and design conditions.	Type testing will be performed on the booster assemblies during factory tests to confirm that they are capable of opening the valve. Tests and analyses will be performed to demonstrate that the booster opens each DPV within the design opening time and design conditions. Type testing and analyses (as needed) will verify minimum and maximum capacity at vessel pressure.	Report(s) document that tests and analyses conclude that each DPV opens when actuated by the booster assembly in less than or equal to 0.45 seconds with an inlet pressure of 6.89 Mpa gauge (1000 psig) or greater.
25. Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV.	Analyses and type tests (at a test facility) will be performed.	Test reports and analyses exist and conclude that the DPV flow capacity is greater than or equal to [239 kg/s (527 lbm/s) at an inlet pressure of 7.48 Mpa gauge (1085 psig)].
26. The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.	See Tier 1 Section 3.8.	See Tier 1 Section 3.8.
27. The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.

DCD Tier 1, RAI 14.3-293 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, para (25)	Qualified “rapid depressurization” by inserting “(i.e., has a flow capacity that is greater than or equal to the design flow capacity under design basis conditions),” in response to RAI 14.3-293.
2	T2.1.2-3, Item 25, DC	Qualified “rapid depressurization” by inserting “(i.e., has a flow capacity that is greater than or equal to the design flow capacity under design basis conditions),” in response to RAI 14.3-293.

- (23) The relief-mode actuator (and safety-related appurtenances) can open each SRV with the drywell pressure at design pressure.
- (24) When actuated by an initiator, the booster assembly opens each DPV in less than or equal to the design opening time and design conditions.
- (25) Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV (i.e., has a flow capacity that is greater than or equal to the design flow capacity under design basis conditions).
- (26) The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.
- (27) The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.

Refer to Subsection 2.2.15 for "Instrumentation and Controls Compliance with IEEE Standard 603."

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.1.2-3 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria for the NBS.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
24. When actuated by an initiator, the booster assembly opens each DPV in less than or equal to the design opening time and design conditions.	Type testing will be performed on the booster assemblies during factory tests to confirm that they are capable of opening the valve. Tests and analyses will be performed to demonstrate that the booster opens each DPV within the design opening time and design conditions. Type testing and analyses (as needed) will verify minimum and maximum capacity at vessel pressure.	Report(s) document that tests and analyses conclude that each DPV opens when actuated by the booster assembly in less than or equal to 0.45 seconds with an inlet pressure of 6.89 Mpa gauge (1000 psig) or greater.
25. Each DPV minimum flow capacity is sufficient to support rapid depressurization of the RPV (i.e., has a flow capacity that is greater than or equal to the design flow capacity under design basis conditions).	Analyses and type tests (at a test facility) will be performed.	Test reports and analyses exist and conclude that the DPV flow capacity is greater than or equal to [239 kg/s (527 lbm/s) at an inlet pressure of 7.48 Mpa gauge (1085 psig)].
26. The equipment qualification of the NBS components is addressed in Tier 1, Section 3.8.	See Tier 1 Section 3.8.	See Tier 1 Section 3.8.
27. The containment isolation portions of the NBS are addressed in Tier 1, Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.	See Tier 1 Subsection 2.15.1.

DCD Tier 1, RAI 14.3-294 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	T2.1.2-3, Item 3 a)	In the ITA deleted the “a” from the “1a” in “Table 2.1.2-1a” in response to RAI 14.3-294.
2	T2.1.2-3, Item 5 a)	In the ITA deleted the “a” from the “1a” in “Table 2.1.2-1a” in response to RAI 14.3-294.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>1. The functional arrangement of the NBS System is as described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2 and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.</p>	<p>Inspection of the as-built system will be performed.</p>	<p>Report(s) document that the as-built NBS System conforms to the functional arrangement described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2 and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.</p>
<p>2. ASME Code Section III</p> <p>a) The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.</p> <p>b) The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.</p>	<p>Inspection will be conducted of the as-built components as documented in the ASME design reports.</p> <p>Inspection will be conducted of the as-built components as documented in the ASME design reports.</p>	<p>Report(s) document that the ASME Code Section III design reports exist for the as-built components identified in Table 2.1.2-1 as ASME Code Section III.</p> <p>Report(s) document that the ASME code Section III design reports exist for the as-built piping identified in Table 2.1.2-1 as ASME Code Section III.</p>
<p>3. Pressure Boundary Welds</p> <p>a) Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.</p>	<p>Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.</p>	<p>Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.</p>

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
b) Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
<p>4. Pressure Boundary Integrity</p> <p>a) The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at internal pressures that will be experienced during service.</p> <p>b) The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.</p>	<p>A hydrostatic test will be conducted on those code components of the NBS System required to be hydrostatically tested by the ASME Code</p> <p>A hydrostatic test will be conducted on those code components of the System required to be hydrostatically tested by the ASME Code.</p>	<p>Report(s) document that the results of the hydrostatic test of the ASME Code components of the NBS System conform to the requirements in the ASME Code, Section III.</p> <p>Report(s) document that the results of the hydrostatic test of the ASME Code components of the System conform with the requirements in the ASME Code, Section III.</p>
<p>5. Seismic Capability</p> <p>a) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.</p>	<p>i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.1.2-1a are located on the Nuclear Island.</p> <p>ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</p>	<p>Report(s) document that:</p> <p>i) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 is located on a seismic structure.</p> <p>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</p>

DCD Tier 1, RAI 14.3-295 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, para (4)a	Replaced “internal pressures that will be experienced during service” with “their design pressure,” in response to RAI 14.3-295.
2	T2.1.2-3, Item (4)a DC	Replaced “internal pressures that will be experienced during service” with “their design pressure,” in response to RAI 14.3-295.

2.1.2 Nuclear Boiler System

Design Description

The NBS generates steam from feedwater and transports steam from the RPV to the main turbine.

- (1) The functional arrangement of the NBS System is as described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.
- (2) ASME Code Section III
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.
- (3) Pressure Boundary Welds
 - a. Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
 - b. Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) Pressure Boundary Integrity
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure ~~internal pressures that will be experienced during service~~.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.
- (5) Seismic Capability
 - a. The Seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.
 - b. Each of the lines identified in Table 2.1.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.
- (6)
 - a. Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division
 - b. Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.
- (7) Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.
- (8) Instrumentation and Control
 - a. Control Room alarms, displays, and/or controls provided for the NBS System are defined in Table 2.1.2-2.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
b) Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
4. Pressure Boundary Integrity a) The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure internal pressures that will be experienced during service. b) The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.	A hydrostatic test will be conducted on those code components of the NBS System required to be hydrostatically tested by the ASME Code A hydrostatic test will be conducted on those code components of the System required to be hydrostatically tested by the ASME Code.	Report(s) document that the results of the hydrostatic test of the ASME Code components of the NBS System conform to the requirements in the ASME Code, Section III. Report(s) document that the results of the hydrostatic test of the ASME Code components of the System conform with the requirements in the ASME Code, Section III.
5. Seismic Capability a) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.	i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.1.2-1a are located on the Nuclear Island. ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.	Report(s) document that: i) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 is located on a seismic structure. ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

DCD Tier 1, RAI 14.3-298 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	T2.1.2-3, Item 5, ITA iii)	Replace the ITA with "Inspection will be performed to verify that the as-installed equipment including anchorage is bounded by the tested or analyzed conditions," to meet the intent of the request in RAI 14.3-298.
2	T2.1.2-3, Item 5, AC iii)	Replace the AC with "A report exists and concludes that the loading on the as-installed equipment including associated anchorage falls within the design basis seismic load conditions used for type testing or analysis," in response to RAI 14.3-298.

Table 2.1.2-3
ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>b) Each of the lines identified in Table 2.1.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</p>	<p>iii) Inspection will be performed to verify that the as-installed equipment including anchorage is bounded by the tested or analyzed conditions. Inspection will be performed for the existence of a report verifying that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</p>	<p>iii) A report exists and concludes that the loading on the as-installed equipment including associated anchorage falls within the design basis seismic load conditions used for type testing or analysis. A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.1.2-1 for which functional capability is required meets the requirements for functional capability.</p>
<p>6a). Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division.</p> <p>b) Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.</p>	<p>See Tier 1, Subsections 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>	<p>See Tier 1, Subsection 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>

DCD Tier 1, RAI 14.3-299 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2 and T2.1.2-3, through-out	Deleted the redundant "System" terms and made other associated editorial changes in response to RAI 14.3-299.

2.1.2 Nuclear Boiler System

Design Description

The Nuclear Boiler System (NBS) generates steam from feedwater and transports steam from the RPV to the main turbine.

- (1) The functional arrangement of the NBS ~~System~~ is as described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.
- (2) ASME Code Section III
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.
- (3) Pressure Boundary Welds
 - a. Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
 - b. Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) Pressure Boundary Integrity
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at internal pressures that will be experienced during service.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.
- (5) Seismic Capability
 - a. The Seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.
 - b. Each of the lines identified in Table 2.1.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.
- (6)
 - a. Each of the NBS ~~System~~-safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division
 - b. Separation is provided between NBS ~~System~~ safety-related divisions, and between safety-related divisions and nonsafety-related cable.
- (7) Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.
- (8) Instrumentation and Control
 - a. Control Room alarms, displays, and/or controls provided for the NBS ~~System~~ are defined in Table 2.1.2-2.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>1. The functional arrangement of the NBS System is as described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2 and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.</p>	<p>Inspection of the as-built system will be performed.</p>	<p>Report(s) document that the as-built NBS System conforms to the functional arrangement described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2 and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.</p>
<p>2. ASME Code Section III</p> <p>a) The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.</p> <p>b) The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.</p>	<p>Inspection will be conducted of the as-built components as documented in the ASME design reports.</p> <p>Inspection will be conducted of the as-built components as documented in the ASME design reports.</p>	<p>Report(s) document that the ASME Code Section III design reports exist for the as-built components identified in Table 2.1.2-1 as ASME Code Section III.</p> <p>Report(s) document that the ASME code Section III design reports exist for the as-built piping identified in Table 2.1.2-1 as ASME Code Section III.</p>
<p>3. Pressure Boundary Welds</p> <p>a) Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.</p>	<p>Pressure boundary welds in components identified in Table 2.1.2-1a as ASME Code Section III meet ASME Code Section III requirements.</p>	<p>Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.</p>

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
b) Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
<p>4. Pressure Boundary Integrity</p> <p>a) The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at internal pressures that will be experienced during service.</p> <p>b) The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.</p>	<p>A hydrostatic test will be conducted on those code components of the NBS System required to be hydrostatically tested by the ASME Code</p> <p>A hydrostatic test will be conducted on those code components of the System system required to be hydrostatically tested by the ASME Code.</p>	<p>Report(s) document that the results of the hydrostatic test of the ASME Code components of the NBS System conform to the requirements in the ASME Code, Section III.</p> <p>Report(s) document that the results of the hydrostatic test of the ASME Code components of the System system conform with the requirements in the ASME Code, Section III.</p>
<p>5. Seismic Capability</p> <p>a) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.</p>	<p>i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.1.2-1a are located on the Nuclear Island.</p> <p>ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</p>	<p>Report(s) document that:</p> <p>i) The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 is located on a seismic structure.</p> <p>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</p>

Table 2.1.2-3
ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>b) Each of the lines identified in Table 2.1.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</p>	<p>iii) Inspection will be performed for the existence of a report verifying that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</p>	<p>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.1.2-1 for which functional capability is required meets the requirements for functional capability.</p>
<p>6a). Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division.</p> <p>b) Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.</p>	<p>See Tier 1, Subsections 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>	<p>See Tier 1, Subsection 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>
<p>7. Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.</p>	<p>Inspections of the as-built NBS equipment trains will be performed.</p>	<p>Report(s) document that each mechanical train of NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains by structural and/or fire barriers.</p>

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>8. Instrumentation and Control</p> <p>a) Control Room alarms, displays, and/or controls provided for the NBS System are defined in Table 2.1.2-2.</p> <p>b) The MSIVs close upon any of the following conditions:</p> <ul style="list-style-type: none"> - Main Condenser Vacuum Low (Run mode) - Turbine Area Ambient Temperature High - MSL Tunnel Ambient Temperature High - MSL Flow Rate High - Turbine Inlet Pressure Low - Reactor Water Level Low 	<p>Inspections will be performed on the as-built Control Room alarms, displays, and/or controls for the NBS System.</p> <p>Valve closure tests will be performed on the as-built MSIVs using simulated signals.</p>	<p>Report(s) document that alarms, displays, and/or controls exist or can be retrieved in the Control Room as defined in Table 2.1.2-2.</p> <p>Report(s) document that the MSIVs close upon generation of any of the following simulated signals:</p> <ul style="list-style-type: none"> - Main Condenser Vacuum Low (Run mode) - Turbine Area Ambient Temperature High - MSL Tunnel Ambient Temperature High - MSL Flow Rate High - Turbine Inlet Pressure Low - Reactor Water Level Low
<p>9. Repositional valves (not including DPVs (squib-activated valves)) designated in Table 2.1.2-2 as having an active safety-related function to open, close, or both open and also close under design differential pressure, fluid flow, and temperature conditions.</p>	<p>Tests of installed valves will be performed for opening, closing, or both opening and also closing under system preoperational differential pressure, fluid flow, and temperature conditions.</p>	<p>Report(s) document that, upon receipt of the actuating signal, each valve opens, closes, or both opens and also closes, depending upon the valve's safety function.</p>

DCD Tier 1, RAI 14.3-300 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	S2.1.2, para (5)b.	Clarified to address each “Seismic Category I” line and “its safety-related function(s),” in response to RAI 14.3-300.
2	T2.1.2-3, Item 5.b)	Clarified the DC to address each “Seismic Category I” line and “its safety-related function(s),” in response to RAI 14.3-300.
3	T2.1.2-3, Item 5.b)	Clarified the AC to be consistent with the changes in the DC, in response to RAI 14.3-300.

2.1.2 Nuclear Boiler System

Design Description

The NBS generates steam from feedwater and transports steam from the RPV to the main turbine.

- (1) The functional arrangement of the NBS System is as described in the Design Description of this Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.
- (2) ASME Code Section III
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.
- (3) Pressure Boundary Welds
 - a. Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
 - b. Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) Pressure Boundary Integrity
 - a. The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at internal pressures that will be experienced during service.
 - b. The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.
- (5) Seismic Capability
 - a. The Seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.
 - b. Each ~~of the~~ Seismic Category I ~~lines~~-line, identified in Table 2.1.2-1, ~~for which functional capability is required~~ is designed to withstand combined normal and seismic design basis loads without a loss of its ~~functional capability~~ safety-related function(s).
- (6)
 - a. Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division
 - b. Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.
- (7) Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.
- (8) Instrumentation and Control
 - a. Control Room alarms, displays, and/or controls provided for the NBS System are defined in Table 2.1.2-2.

**Table 2.1.2-3
ITAAC For The Nuclear Boiler System**

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>b) Each of the Seismic Category I lines, identified in Table 2.1.2-1, for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its safety-related functional capability(s).</p>	<p>iii) Inspection will be performed for the existence of a report verifying that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</p>	<p>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p> <p>Report(s) document that a report exists and concludes that each of the as-built Seismic Category I lines, identified in Table 2.1.2-1, is designed to withstand combined normal and seismic design basis loads without a loss of its safety-related function(s) for which functional capability is required meets the requirements for functional capability.</p>
<p>6a). Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division.</p> <p>b) Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.</p>	<p>See Tier 1, Subsections 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>	<p>See Tier 1, Subsection 2.13.1, 2.13.3, or 2.13.5, as appropriate.</p> <p>See Tier 1, Subsection 2.2.15.</p>
<p>7. Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.</p>	<p>Inspections of the as-built NBS equipment trains will be performed.</p>	<p>Report(s) document that each mechanical train of NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains by structural and/or fire barriers.</p>

DCD Tier 1, RAI 14.3-307 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	T2.1.2-3, Item 12	Clarified the ITA to read "Inspections of the each as-built MSL flow restrictor throat diameter will be performed" in response to RAI 14.3-307.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
10. The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.	Tests will be conducted on the as-built valve(s).	Report(s) document that the pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) when either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
11. Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under design system pressure, fluid flow, and temperature conditions.	Tests of installed valves for opening, closing, or both opening and also closing, will be conducted under system preoperational pressure, fluid flow, and temperature conditions.	Report(s) document that, based on the direction of the differential pressure across the valve, each CV opens, closes, or both opens and also closes, depending upon the valve's safety functions.
12. The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.	Inspections of the each as-built MSL flow restrictor throat diameter will be performed and measurements taken .	Report(s) document that the throat diameter of each MSL flow restrictor is less than or equal to 355 mm (14 in.).
13. Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each MSL.	Inspections of the as-built installation of the MSL flow restrictor will be conducted to verify that it provides for two instrument connections.	Report(s) document that the as-built MSL flow restrictor provides for two instrument connections.
14. The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.	Analyses/calculations will be performed using the as-built dimensions of the steamlines to determine the combined steam line volume. The calculational results will be documented in a report.	Report(s) document that the combined steamline volume is greater than or equal to 135 m ³ (4767 ft ³).

DCD Tier 1, RAI 14.3-311 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	T2.1.2-3, Item 17	Clarified the DC by adding “, by lifting at its nominal setpoint pressure,” to be consistent with the AC, in response to RAI 14.3-311.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15. The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.	Tests of the as-built MSIV will be conducted under preoperational test conditions or type testing of an MSIV will be conducted in accordance with the design and purchase specifications to demonstrate that the MSIVs will fast close.	Report(s) document that testing demonstrates MSIVs are capable of fast closure in not less than 3 seconds and not more than 5 seconds.
16. When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.	Tests at preoperational conditions along with analysis will be performed on the as-built MSIVs to determine the leakage as adjusted to the specified design conditions.	Report(s) document that, when all MSIVs are closed, the combined leakage through the MSIVs for all four MSLs is less than or equal to a total combined leakage (corrected to standard conditions) of $\sim 0.0623 \text{ m}^3/\text{minute}$ ($\sim 2.2 \text{ ft}^3/\text{minute}$) for post-LOCA leakage.
17. The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis, by lifting at its nominal setpoint pressure.	Type test (at a facility) or setpoint test will be conducted in accordance with the ASME Code to certify the valve.	Report(s) document that testing/type testing verifies the mechanical lift nominal setpoint pressure of $8.366 \pm 0.251 \text{ MPa}$ gauge ($1213 \pm 36.39 \text{ psig}$).
18. The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.	Analysis and type tests (at a test facility) will be conducted in accordance with the ASME Code to ensure that the valves open within the design opening time.	Report(s) document that tests and analyses exist and conclude that opening time for the SRVs for the overpressure operation mode is less than or equal to 0.5 second.

DCD Tier 1 RAI 14.3-315 and 14.3-316 Change List

Item	Location	Description of Change
1.	Table 2.11.6-1 item 1	Changed acceptance criteria wording to state that a report “exists and concludes” consistent with responses to RAI 14.3-315
2.	Table 2.11.6-1 item 5	Changed acceptance criteria wording to state that a report “exists and concludes” consistent with responses to RAI 14.3-316.

Table 2.11.1-1
Turbine Main Steam System ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The TMSS functional arrangement is as described in Subsection 2.11.1.	Inspections of the as-built system will be conducted.	A report exists and confirms <u>concludes</u> that the as-built TMSS conforms to the functional arrangement description in Subsection 2.11.1.
2. The ASME Code Section III components of the TMSS retain their pressure boundary integrity under internal pressures that will be experienced during service.	A hydrostatic test will be conducted on those Code components of the TMSS that are required to be hydrostatically tested by the ASME Code Section III.	A report exists and concludes that the results of the hydrostatic test of the TMSS ASME Code components satisfy the applicable requirements in the ASME Code, Section III.
3. Upon receipt of an MSIV closure signal, the SAIV(s) close(s) and required MSIV fission product leakage path TMSS drain valve(s) open(s).	Tests will be performed on the SAIV(s) and required MSIV fission product leakage path TMSS drain valve(s) using simulated MSIV closure signals.	A test report exists and concludes that the SAIV(s) close(s) and required MSIV fission product leakage path TMSS drain valve(s) open(s) following receipt of a simulated MSIV closure signal.
4. The SAIV(s) fail(s) closed and required MSIV fission product leakage path TMSS drain valve(s) fail(s) open on loss of electrical power to the valve actuating solenoid or on loss of pneumatic pressure.	A functional test will be performed on SAIV(s) and required MSIV fission product leakage path TMSS drain valve(s).	A test report exists and concludes that the SAIV(s) fail(s) closed and required MSIV fission product leakage path TMSS drain valve(s) fail(s) open on loss of electrical power to the valve actuating solenoid or on loss of pneumatic pressure.

Table 2.11.1-1

Turbine Main Steam System ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. TMSS piping, including the SAIV(s) from the seismic interface restraint to the main stop and main turbine bypass valves and the required MSIV fission product leakage path is classified as Seismic Category II.	An inspection will be performed to verify that a seismic analysis has been completed for the as-built TMSS piping and SAIV(s) and required MSIV fission product leakage path.	A report exists and demonstrates <u>concludes</u> that the as-built TMSS piping, SAIV(s), and required MSIV fission product leakage path meet Seismic Category II requirements.
6. The integrity of the as-built MSIV leakage path to the condenser (main steam piping, bypass piping, required drain piping, and main condenser) is not compromised by non-seismically designed systems, structures and components.	Inspections (e.g., walk down) of non-seismically designed systems, structures and components overhead, adjacent to, and attached to the MSIV leakage path (i.e., the main steam piping, bypass piping, required drain piping and main condenser) will be performed.	A report exists and concludes that the non-seismically designed systems, structures and components overhead, adjacent to, and attached to the MSIV leakage path to the condenser will not compromise the integrity of the main steam piping, bypass piping, required drain piping and main condenser.
7. The TMSS piping provides a nominal turbine inlet (throttle) pressure that is consistent with assumptions in Abnormal Event analyses.	Inspection and/or analysis of the as-built TMSS piping will be performed to confirm the nominal turbine inlet (throttle) pressure.	A report exists and concludes that the TMSS piping provides a nominal turbine inlet (throttle) pressure of [6.57 MPaG (953 psig)].

DCD Tier 1 RAI 14.3-320 Change List

Item	Location	Description of Change
1.	Acronyms	Changed TBS to Turbine Bypass System from Terminal Board Scram.

Abbreviations And Acronyms List

T62	Containment Monitoring System
TAF	Top of Active Fuel
TB	Turbine Building
TBD	To Be Determined
TBS	Terminal Board System Turbine Bypass System
TBV	Turbine Block Valve
TBVS	Turbine Building Ventilation System
TCCWS	Turbine Component Cooling Water System
TCV	Temperature Control Valve
TG	Turbine Generator
TGCS	Turbine Generator Control System
TGSS	Turbine Gland Seal/Sealing System
TLU	Trip Logic Unit
TMSS	Turbine Main Steam System
TSC	Technical Support Center
TSCVS	Technical Support Center HVAC Subsystem
TSV	Turbine Stop Valve
U50	Equipment and Floor Drain System
UAT	Unit Auxiliary Transformer
UHS	Ultimate Heat Sink
UL	Underwriter's Laboratories Inc.
UPS	Uninterruptible Power Supply
USNRC	United States Nuclear Regulatory Commission
V	Volt
VAC	Volts Alternating Current
VDC	Volts Direct Current
VDU	Video Display Unit
VW	Vertical Wall
WW	Wetwell

DCD Tier 1 RAI 14.3-323 Change List

Item	Location	Description of Change
1.	Acronyms	Changed MC to "Main Condenser" from "Motor Controllers". Deleted the single use of the motor controller acronym from Table 2.2.1-2.

Abbreviations And Acronyms List

LFCV	Low Flow Control Valve
LOCA	Loss-of-Coolant Accident
LOOP	Loss of Offsite Power
LOPP	Loss of Preferred Power
LP	Low Pressure
LPCI	Low Pressure Coolant Injection
LPRM	Local Power Range Monitor
LPSP	Low-Power Set Point
LPZ	Low-Population Zone
LWMS	Liquid Waste Management System
MC	Motor Controllers <u>Main Condenser</u>
MCC	Motor Control Center
MCES	Main Condenser Evacuation System
MCR	Main Control Room
MCRP	Main Control Room Panel
MFAP	Main Fire Alarm Panel
MMI	Man-Machine Interface
MMIS	Man Machine Interface System
MPEN	Penetration, Mechanical
MRBM	Multi-Channel Rod Block Monitor
MSIV	Main Steam Isolation Valve
MSL	Main Steam Line
MT	Main Turbine
MVP	Mechanical Vacuum Pump
MW	Megawatt
MWS	Makeup Water System
NA	Not Applicable
NBS	Nuclear Boiler System
NCA	Nuclear Compliance Archives
NDE	Nondestructive Examination
NFPA	National Fire Protection Association
NICWS	Nuclear Island Chilled Water Subsystem
NMS	Neutron Monitoring System
NPBS	Normal Power Heat Sink

Table 2.2.1-2
RC&IS Major Functional Groups

Major Functional Group	Functions
RWM	<p>Enforces absolute rod pattern restrictions, called the Ganged Withdrawal Sequence Restrictions (GWSR) when reactor power is below the low power setpoint (LPSP) and the RPS RMS is in either the STARTUP or RUN position.</p> <p>Supports shutdown margin testing</p>
ATLM	<p>Microprocessor-based subsystem of the RC&IS</p> <p>Enforces Operating Limit Minimum Critical Power Ratio (OLMCPR)</p> <p>Enforces the Operating Limit Minimum Linear Heat Generation Rate (OLMLHGR)</p> <p>Issues rod withdrawal block signals.</p>
Remote Communication Cabinets (RCCs)	<p>Houses the redundant microprocessor-based communication system that interfaces with the RAPI, MCC, and RBCC.</p>
Motor Controller Cabinets (MCCs)	<p>Houses the CRDS FMCRD motor controllers (MC).</p> <p>Interfaces with RCC, RBCC and Emergency Rod Insertion Panel (ERIP)</p>
Rod Brake Controller Cabinets (RBCCs)	<p>Operates the CRDS FMCRD holding brakes</p> <p>Interfaces with RCC.</p>
ERICP	<p>Located in CB. Relay-hardware based, nonsafety-related control system that alternatively commands scram follow, ARI, and SCRRI.</p>
ERIP	<p>Interface with the MCC FMCRD MCs.</p>
Scram Time Recording Panels (STRPs)	<p>Monitors the CRDS FMCRD position switch status</p> <p>Automatically records and time tags CRDS FMCRD scram timing position switch status changes</p> <p>Transmits recorded scram timing data to the scram time recording and analysis panel (STRAP)</p> <p>Communicates with the RAPI</p>

DCD Tier 1 RAI 14.3-334 Change List

Item No.	Location	Description of Change
1.	T2.15.1-2	Changed Acceptance Criteria 1 as follows: Inspection report(s) document that the as-built Containment System conforms with the functional arrangement as described in Subsection 2.15.1 and Figure 2.15.1-1.

Table 2.15.1-2

ITAAC For The Containment System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the Containment System (CS) is as described in Subsection 2.15.1 and as shown in Figure 2.15.1-1.	Inspections of the as-built system will be conducted.	Inspection report(s) document that the as-built Containment System conforms with the description <u>functional arrangement as described</u> in Subsection 2.15.1 and Figure 2.15.1-1.
2. The components and piping identified in Table 2.15.1-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements. The RCCV and its liners are designed to meet the requirements in Article CC-3000 of ASME Code, Section III, Division 2. The steel components of the RCCV are designed to meet the requirements in Article NE-3000 of ASME Code, Section III, Division 1.	Inspection(s) will be conducted of the as-built Containment System as documented in the Code Certified Stress Report.	Report(s) document that an ASME Code Section III stress report(s) exist for the as-built components identified in Table 2.15.1-1 as ASME Code Section III. For ASME Section III, Division 2 construction, stress reports demonstrate compliance to NCA-3350 through NCA-3380, and NCA-3454. For ASME Section III, Division 1 construction, stress reports demonstrate compliance to NCA-3350.
3. Pressure boundary welds in components and piping identified in Table 2.15.1-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection(s) of the as-built pressure boundary welds will be performed in accordance with ASME Code Section III.	A report exists and documents that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.

DCD Tier 1 RAI 14.3-335 Change List

Item No.	Location	Description of Change
1.	T2.15.1-2, Acceptance Criterion 6	Acceptance Criteria 6 as follows: Inspection report(s) document that each as-built electrical penetration contains cables of only one division or non-division contains nonsafety-related cables.

Table 2.15.1-2
ITAAC For The Containment System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6a. The equipment qualification of Containment Systems components is addressed in DCD Tier 1 Section 3.8.	See Tier 1 Section 3.8.	See Tier 1 Section 3.8.
b. The safety-related components identified in Table 2.15.1-1 are powered from their respective safety-related division.	See Tier 1 Section 2.13.	See Tier 1 Section 2.13.
c. Separate electrical penetrations are provided for circuits of each safety-related division and for nonsafety-related circuits.	Inspection of the as-built electrical containment penetrations will be performed.	Inspection report(s) document that each as-built electrical penetration contains cables of only one division or non- division contains nonsafety-related cables.
d. The circuits of each electrical penetration are of the same voltage class.	Inspections of the as-built containment electrical penetrations will be performed.	Inspection report(s) document that each as-built circuit of each electrical penetration is of the same voltage class.
7. The containment system provides a barrier against the release of fission products to the atmosphere.	Perform Type A, B and C leakrate tests in accordance with 10 CFR 50 Appendix J.	Test report(s) conclude that leak rates are less than the acceptance criterion established per 10CFR 50 Appendix J.

DCD Tier 1, RAI 14.3-346 Change List

Item	Location (e.g., subsection with paragraph/sentence/item, table with column/row, or figure)	Description of Change
1	T2.1.2-3, Item 18	DC is clarified by adding "is" before "from." AC modified by replacing "for the overpressure operation mode" with "(in the overpressure operation of self-actuated or mechanical lift mode), which is from when the pressure exceeds the valve set pressure to when the valve is fully open," to be technically consistent with requested change in RAI 14.3-346.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15. The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.	Tests of the as-built MSIV will be conducted under preoperational test conditions or type testing of an MSIV will be conducted in accordance with the design and purchase specifications to demonstrate that the MSIVs will fast close.	Report(s) document that testing demonstrates MSIVs are capable of fast closure in not less than 3 seconds and not more than 5 seconds.
16. When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.	Tests at preoperational conditions along with analysis will be performed on the as-built MSIVs to determine the leakage as adjusted to the specified design conditions.	Report(s) document that, when all MSIVs are closed, the combined leakage through the MSIVs for all four MSLs is less than or equal to a total combined leakage (corrected to standard conditions) of $\sim 0.0623 \text{ m}^3/\text{minute}$ ($\sim 2.2 \text{ ft}^3/\text{minute}$) for post-LOCA leakage.
17. The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.	Type test (at a facility) or setpoint test will be conducted in accordance with the ASME Code to certify the valve.	Report(s) document that testing/type testing verifies the mechanical lift nominal setpoint pressure of $8.366 \pm 0.251 \text{ MPa}$ gauge ($1213 \pm 36.39 \text{ psig}$).
18. The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) is from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.	Analysis and type tests (at a test facility) will be conducted in accordance with the ASME Code to ensure that the valves open within the design opening time.	Report(s) document that tests and analyses exist and conclude that opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode), which is from when the pressure exceeds the valve set pressure to when the valve is fully open, for the overpressure operation mode is less than or equal to 0.5 second.

DCD Tier 1 RAI 14.3-349 Change List

Item No.	Location	Description of Change
1.	T 2.2.2-7, Acceptance Criterion 1	Changed Acceptance Criterion 1 as follows: A report exists that documents the results of inspection(s), test(s), and type test(s) that confirm the as-built CRD system conforms with the functional arrangement defined in Table 2.2.2-1 and as shown in Figure 2.2.2-1.

Table 2.2.2-7

ITAAC For Control Rod Drive System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>1. CRD system functional arrangement comprises three major functional groups: fine motion control rod drive (FMCRD), hydraulic control unit (HCU), and CRD hydraulic subsystem (CRDHS), as defined in Table 2.2.2-1 and shown in Figure 2.2.2-1.</p>	<p>Inspection(s), test(s), and type test(s) of the as-built system will be conducted.</p>	<p>Inspection report(s) document that the as-built CRD system conforms to <u>A report exists that documents the results of inspection(s), test(s), and type test(s) that confirm the as-built CRD system conforms with the functional arrangement defined in Table 2.2.2-1 and as shown in Figure 2.2.2-1.</u></p>

DCD Tier 1 RAI 14.3-352 Change List

Item	Location	Description of Change
1.	T2.2.4-4	Revised Table 2.2.4-4 throughout to include the functional capability of each item listed on the Table.

Table 2.2.4-4
SLC System Mechanical Equipment

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Nitrogen Supply Line Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Nitrogen Supply Line Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Nitrogen Supply Isolation Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>
Train B Nitrogen Supply Isolation Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
Train A Accumulator Relief Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
<u>Train A Accumulator</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>
Train B Accumulator Relief Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
Train A Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator Vent line flow restricting orifice</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	-	-	<u>N</u>
Train B Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train B Accumulator Vent Valve	-	Y	Y	N	<u>Active</u>	N	Y	Closed	N
<u>Train A Accumulator Vent line flow restricting orifice</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	-	-	<u>N</u>
Train A Accumulator Solution Fill Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Accumulator Solution Fill Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Isolation valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train A Accumulator Shut-off valve	V3	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Accumulator Shut-off valve	V4	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train B Accumulator Isolation valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Accumulator Shut-off valve	V1	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train B Accumulator Shut-off valve	V2	Y	Y	N	<u>Active</u>	N	Y	Fail-as-is	Y
Train A Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train A Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train B Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y
Train B Injection Squib Valve	-	Y	Y	Y	<u>Active</u>	Y	Y	Fail-as-is	Y

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Accumulator Injection Test/Vent Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train B Accumulator Injection Test/Vent Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train A Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train A Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train B Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train B Injection Check Valve	-	Y	Y	Y	<u>Active</u>	Y	N	-	N
Train A Vessel Isolation Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N
Train B Vessel Isolation Valve	-	Y	Y	Y	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
Train A Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Train B Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Main Mixing Pump Suction Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Main Mixing Pump Discharge Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Poison Solution Check Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N
Poison Solution Batch Mixing Isolation Valve	-	Y	Y	N	<u>Active</u>	N	N	-	N

Equipment Name (Description)	Equipment Identifier See Figure 2.2.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	<u>Functional Capability Required</u>	Containment Isolation Valve	Remotely Operated	Loss of Motive Power Position	MCR Alarms
<u>Train A piping from the locked open valve closest to the reactor vessel through the first NS class break</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>
<u>Train B piping from the locked open valve closest to the reactor vessel through the first NS class break</u>	-	<u>Y</u>	<u>Y</u>	<u>N</u>	<u>Passive</u>	<u>N</u>	<u>N</u>	-	<u>N</u>

DCD Tier 1 RAI 14.3-357 Change List

Item	Location	Description of Change
1.	Table 2.5.5-1, item #2	Revised the ITA for item #2 to state “inspections and analyses”.

Table 2.5.5-1		
ITAAC for Refueling Machine		
Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the RB refueling machine is as described in the Design Description of this Subsection 2.5.5.	Inspections of the as-built system will be performed.	Report(s) document that the as-built RB refueling machine conforms to the functional arrangement as described in the Design Description of the Subsection 2.5.5.
	Inspections and/or analyses of the as-built system will be performed.	Report(s) document that the as-built RB refueling machine can withstand seismic dynamic loads without loss of load carrying or structural integrity functions.
3. The RB refueling machine has an auxiliary hoist with sufficient load capability.	Load tests on the as-built auxiliary hoists will be conducted.	Report(s) document that a successful load test of each as-built auxiliary hoist has been performed.

DCD Tier 1 RAI 14.3-380 Change List

Item No.	Location	Description of Change
1.	T2.15-2, Design Commitment 8	In response to RAI 14.3-380: Changed Design Criteria for Table 2.15.1-2 as follows: The containment system pressure boundary retains its integrity when subject to a design pressure of 310 kPa guage (45 psig).
2.	T2.15-2, Design Commitment 8	In response to RAI 14.3-380: Changed acceptance criteria for Table 2.15.1-2 as follows: Test report documents that compliance with ASME Code Section III, Div. 2, CC 6000, Structural Integrity Test of Concrete Containments a pressure at or above 310 kPa guage (45 psig) does not affect containment integrity.

Table 2.15.1-2

ITAAC For The Containment System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>8. The containment system pressure boundary retains its integrity when subject to a design pressure of 310 kPa gauge (45 psig).</p>	<p>A Structural Integrity Test (SIT) of the containment structure is performed in accordance with Article CC-6000 of ASME Code Section III, Division 2 and Regulatory Guide 1.136, after completion of the containment construction. The first prototype containment structure will be instrumented to measure strains per ASME Code Section III, Division 2, CC-6370.</p>	<p>Test report documents that compliance with ASME Code Section III, Div. 2, CC-6000, Structural Integrity Test of Concrete Containments a pressure at or above 310 kpa gauge (45 psig) does not affect containment integrity.</p>
<p>9. The containment system provides the safety-related function of containment isolation for containment boundary integrity.</p>	<p>i) Tests will be performed to demonstrate that remote manual operated containment isolation valves reposition to the required post-accident position within the required response times.</p> <p>ii) Tests will be performed to demonstrate that remote manual operated containment isolation valves reposition to the required post-accident position using real or simulated containment isolation signals.</p>	<p>i) Report(s) document that the remotely operated containment isolation valves identified in Table 2.1.51-1 reposition to the required post-accident state within the required response times.</p> <p>ii) Report(s) document that the remote manual operated valves identified in Table 2.15.1-1 as having a containment isolation signal reposition to the required post-accident state after receiving a containment isolation signal.</p>