2.0 System Based Design Description of ITAAC

2.1 Structures

2.1.1 Nuclear Island

Design Description

1.0 System Description

The Nuclear Island (NI) consists of the structures supported by the NI Common Basemat and the NI Common Basemat itself. The NI includes the Reactor Building (RB), Safeguard Buildings (SB) including the main steam and feedwater valve rooms (SB 1 and 4), Fuel Building (FB) including the Vent Stack, and the NI Foundation Common Basemat.

The NI foundation common basemat is a heavily reinforced concrete slab, approximately 360 ft x 360 ft x 10 ft thick, which supports NI structures including the RB, FB, and SBs. The NI foundation common basemat acts together with the Reactor Containment Building (RCB) to maintain an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to maintain containment design conditions important to safety so that they are not exceeded for as long as postulated accident conditions require.

Structures, systems and components (SSC) important to safety are designed and located to minimize the probability and effect of fires and explosions. This is done, in part, by compartmentalization of the plant into separate fire areas. Specifically, based on the hazards and the need for physical separation of SSC important to safety, the plant is segregated into separate fire areas by passive, fire-rated structural barriers (i.e., walls, floors, and ceilings).

A continuous structural barrier is formed around the RB, FB, and SB 2/3 structures as shown on Figure 2.1.1-2—Continuous Barrier - Plan View and Figure 2.1.1-3—Continuous Barrier - Elevation View. This barrier is designed to provide protection against design basis external hazards such as hurricanes and tornados, and certain beyond design basis events such as aircraft hazard and explosion pressure waves.

2.0 Arrangement

2.1 The basic configuration of the NI structures is as shown on Figure 2.1.1-1—U.S. EPR Building Layout Showing NI Structures Location, Figure 2.1.1-2, Figure 2.1.1-9—Reactor Building Elevation Section C-C, Figure 2.1.1-15—Safeguard Building 2 & 3 Plan Elevation +39 ft, and Figure 2.1.1-16—Safeguard Building 2 & 3 Plan Elevation +53 ft.

3.0 Mechanical Design Features

3.1 External hazard protection features of the NI structures include:

- A continuous external hazards barrier, as shown on Figure 2.1.1-2 and Figure 2.1.1-3;
- Decoupling of SB 2/3 and FB internal structures from their outer external hazards barrier walls, at their exterior walls along the entire wall length and the upper ceiling, and from the RSB above Elevation 0 ft 0 in., as shown on Figure 2.1.1-11—Fuel Building Plan Elevation +24 ft, Figure 2.1.1-12—Fuel Building Elevation Section A-A, Figure 2.1.1-15, and Figure 2.1.1-17—Safeguard Building 2 & 3 Elevation Section B-B.

3.2 The NI site grade level is located between 12 inches and 18 inches below the finish floor elevation at ground entrances.

3.3 The NI structures include radiation barriers for normal operation and post-accident radiation shielding as listed in Table 2.1.1-3—Radiation Barriers.

3.4 Deleted.

3.5 Deleted.

3.6 NI structural walls or floors having exterior penetrations located below grade elevation are protected against external flooding by watertight seals.

3.7 The NI structures have key dimensions and tolerances specified in Table 2.1.1-1—Key Dimensions of Nuclear Island Structures and Table 2.1.1-2—Key Dimensions of Nuclear Island.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.1.1-4 lists the NI ITAAC.

2.1.1.1 Reactor Building

Design Description

1.0 System Description

The RB consists of the Reactor Shield Building (RSB), the Reactor Containment Building (RCB) and the RCB internal structures. The RSB is a heavily reinforced Seismic Category I safety-related cylindrical concrete structure, with an outside diameter of approximately 186 ft by approximately 230 ft high, which completely encloses the RCB. The RSB is surrounded by SBs 1, 2, 3, and 4 and by the FB, which are Seismic Category I safety-related structures. The primary function of the RSB is to protect the RCB from missiles and loadings resulting from design basis external events such as hurricanes and tornados, and certain beyond design basis events such as aircraft hazard and explosion pressure waves. The RCB is a Seismic Category I safety-related cylindrical post-tensioned concrete structure, with an outside diameter of approximately 162 ft and a height of approximately 218 ft. It has an approximately 0.25 in. thick steel liner on its inside surface. The primary functions of the RCB are:

- To protect the safety-related SSC located within.
- To prevent the release of radiation during plant operations.
- To prevent the release of radiation and contamination in the event of accident conditions.
- To establish an essentially leak-tight barrier against the uncontrolled release of radioactivity.
- To accommodate the calculated pressure and temperature conditions resulting from any loss of coolant accident without exceeding the design leakage rate and with sufficient margin.

The Reactor Building Annulus (RBA) is the annular space between the RSB and the RCB. The annular space is approximately 5 ft, 11 in. wide between the faces of the concrete walls of the two buildings. The primary function of the RBA is to serve as an access area to allow the passage of personnel, piping, ventilation ducts, electrical cables, and other equipment between the RSB and the RCB.

The RCB design includes consideration for severe accident mitigation. Downward expansion of the lower head is limited by concrete support structures provided at the bottom of the reactor cavity. These structures preserve sufficient space for the outflow of core melt and the later formation of a molten pool in the reactor cavity. Installed barriers prevent water ingress into the core spreading area prior to the arrival of core melt, which could lead to steam explosion. Installed barriers prevent core melt relocation to the upper containment, which could lead to direct containment heating.

The containment is separated into two regions referred to as the two room containment. Separation is maintained by rupture foils, convection foils, and doors, which open to transform the two room containment into a one-room containment. Rupture foils and convection foils are part of the combustible gas control system (CGCS) and are addressed in Section 2.3.1. Doors used as separation barriers are designed to open or provide an opening to relieve pressure in support of the transformation, making them a “pressure relief device” for their respective compartments. The doors provide this pressure relief function by swinging open or by use of a pressure balance aperture (blowout panel) in the door.

2.0 Mechanical Design Features

2.1 Six rib support structures, provided at the bottom of the reactor cavity, as shown on Figure 2.1.1-9—Reactor Building Elevation Section C-C, limit lower reactor pressure vessel head deformation due to thermal expansion and creep during severe accident mitigation.

2.2 As shown on Figure 2.1.1-4—Reactor Building Plan Elevation -8 ft, a flooding barrier is provided to prevent ingress of water into the core melt spreading area. Penetrations within the core melt water ingression barrier are protected by watertight seals. Doors within the core melt water ingression barrier are watertight doors.

2.3 Core melt cannot relocate to the upper containment due to the existence of concrete barriers as shown on Figure 2.1.1-9.

2.4 The RB structures are Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions:

- Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads).
- Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, and missile impact loads).
- External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).

2.5 The RCB, including the liner plate and penetration assemblies, maintains its pressure boundary integrity at the design pressure.

2.6 The RCB is post-tensioned, pre-stressed concrete structure.

2.7 Internal hazard protection barriers separate the RBA from the SBs and the FB, and the RBA from the RCB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the RBA.

2.8 The RCB includes provisions for water flow to the in-containment refueling water storage tank (IRWST):

- As shown on Figure 2.1.1-4, RCB rooms which are adjacent to the IRWST contain wall openings to allow water flow into the IRWST.
- As shown on Figure 2.1.1-5—Reactor Building Plan Elevation +5 ft, RCB rooms which are directly above the IRWST, contain openings in the floor to allow water flow into the IRWST. The floor openings are protected by weirs and trash racks to provide a barrier against material transport into the IRWST.

2.9 RBA penetrations that contain high-energy lines, as listed in Table 2.1.1 7—RBA Penetrations that Contain High-Energy Pipelines, have guard pipes.

2.10 Safety-related equipment located in the RCB and RBA are either located above the internal flood level or are qualified for submergence.

2.11 The reactor pressure vessel, reactor coolant pumps, pressurizer, steam generators, and interconnecting RCS piping are insulated with reflective metallic insulation.

2.12 The RB structures have key dimensions and tolerances specified in Table 2.1.1-5.—Key Dimensions of Reactor Building Structures.

2.13 The RCB has a minimum containment free volume.

2.14 The RCB and RCB internal structures have a minimum containment heat sink surface area.

2.15 The integrated leak rate from the RCB does not exceed the maximum allowable leakage rate.

2.16 The location of the doors and blowout panels is as listed in Table 2.1.1-6(a)) —Pressure Relief Doors in the Reactor Containment Building.

2.17 Pressure relief doors in the RCB listed in Table 2.1.1-6(a) will withstand seismic design basis loads without a loss of the function listed in Table 2.1.1-6(a).

2.18 RCB doors and blowout panels provide pressure relief.

2.19 Blowout panels in RCB doors listed in Table 2.1.1-6(a) are provided with missile restraint.

2.20 RCB vent path areas provide pressure relief for the rooms listed in Table 2.1.1-6(b)—Vent Path Areas in Reactor Containment Building for Pressure Relief.

2.21 The RCB has a maximum volume of Microtherm insulation within the zone of influence.

2.22 The RCB has a concrete missile protection shield on top of the refueling canal wall provided for protection against a control rod ejection due to the postulated failure of the CRDM nozzle flange or pressure housing.

2.23 Coatings in the RCB are consistent with the GSI 191 DBA evaluation.

2.24 Fire protection features provide separation within the RBA.

2.25 Fire protection features provide separation within the RCB.

2.26 Thermal Properties of the RCB concrete mix design are as defined in the Construction Specification.

2.27 Deleted.

2.28 The RCB liner is designed in accordance with ASME Code Section III, Division 2 requirements.

2.29 As-built liner and penetration assemblies are reconciled with the design requirements.

2.30 The IRWST contains sufficient mass to compensate for water retention in the RCB and RB internal structures.

2.31 The penetration assemblies are designed in accordance with ASME Code Section III, Division 1, Subsection NE, Class MC and ASME Code Section III, Division 2 requirements.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.1.1-8 lists the RB ITAAC.

2.1.1.2 Safeguard Buildings

Design Description

1.0 System Description

The SBs are reinforced concrete, Seismic Category I, safety-related structures located around the perimeter of the RSB. The SBs are arranged to accommodate four safeguard divisions. SB 4 and 1 are located adjacent to the RSB as shown on Figure 2.1.1-2. SBs 2 and 3 are contained in a single structure separated by a common wall and are located adjacent to the RSB as shown on Figure 2.1.1-2. As shown on Figure 2.1.1-15 and Figure 2.1.1-17, SBs 2 and 3 are decoupled from the external hazards barrier by a gap between the SBs external walls and their uppermost ceilings. The SBs and the RSB share the reinforced concrete cylindrical shell from the basemat to elevation 0 ft, 0 in.; above this elevation the structures are physically separated by a seismic gap.

The SBs 2 and 3 structure has overall dimensions of approximately 92 ft out from the RSB wall by 180 ft long by 140 ft high. The SB 1 structure has overall dimensions of approximately 87 ft out from the RSB wall by 100 ft long by 115 ft high. The SB 4 structure has dimensions of approximately 87 ft out from the RSB wall by 100 ft long by 150 ft high.

The primary function of the SBs is to provide physical separation between redundant divisions of safeguard equipment. The main control room (MCR) and the technical support center (TSC) are located within SBs 2 and 3 as shown on Figure 2.1.1-16. The remote shutdown station (RSS), which is separate from the MCR, is located within SB 3 as shown on Figure 2.1.1-15. Also located in the SBs 1 and 4 are the reinforced concrete main steam and feedwater valve rooms.

2.0 Mechanical Design Features

2.1 The SB structures are Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions:

- Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads).
- Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, and missile impact loads).
- External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).

2.2 Internal hazard protection barriers separate each SB from the other SBs and the FB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the SB of hazard origination.

2.3 The SB structures have key dimensions and tolerances specified in Table 2.1.1-9.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.1.1-10 lists the SBs ITAAC.

2.1.1.3 Fuel Building

Design Description

1.0 System Description

The FB is a reinforced concrete, Seismic Category I, safety-related structure, which includes a steel Seismic Category I, safety-related vent stack. The FB extends approximately 58 ft out from the RSB wall and is approximately 160 ft long by 140 ft high. The FB is located adjacent to the RSB at 180 degrees as shown on Figure 2.1.1-2. As shown on Figure 2.1.1-11 and Figure 2.1.1-12, a portion of the FB is decoupled from the external hazards barrier by a gap between the FB external wall and its uppermost ceiling. The FB and the RSB share the reinforced concrete cylindrical shell from the basemat to elevation 0 ft 0 in.; above this elevation the structures are physically separated by a seismic gap. The primary function of the FB is to house new and spent fuel and to provide radiation protection during normal operation by shielding areas of higher radiation from areas of lower radiation. The vent stack is a steel structure approximately 12 ft 6 in. in diameter by 100 ft high located on the roof of the Fuel Building as shown on Figure 2.1.1-2.

2.0 Mechanical Design Features

2.1 The FB structure, including the vent stack, is Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions:

- Normal plant operation (including dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads).
- Internal events (including internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, and missile impact loads).
- External events (including wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).

2.2 Internal hazard protection barriers separate independent divisions within the FB and the FB from other NI structures so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the independent divisions within the FB of hazard origination.

2.3 The SFP has a minimum depth from the bottom of the SFP to the SFP operating floor.

2.4 The SFP includes no gates, openings, or drains below an elevation corresponding to the top of stored fuel assemblies.

2.5 The SFP includes no piping that extends below an elevation of 10 ft above the top of the stored fuel assemblies.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.1.1-11 lists the FB ITAAC.

Table 2.1.1-1—Key Dimensions of Nuclear Island Structures

Label	Section Descriptions	Region	Floor Elevation or Elevation Range	Key Dimension(1)(2)
F1	RB Foundation Basemat	Refer to Figure 2.1.1-9	Top of slab for the RB basemat is located at nominal RB floor Elevation -20 ft	10 ft - 9 15/16 in.
F2	SB Foundation Basemat	Refer to Figure 2.1.1-14, Figure 2.1.1-17, and Figure 2.1.1-19	Top of slab for the SB basemat is located at nominal SB floor Elevation -31 ft	9 ft - 10 1/8 in.
F3	FB Foundation Basemat	Refer to Figure 2.1.1-12	Top of slab for the FB basemat is located at nominal FB floor Elevation -31 ft	9 ft - 10 1/8 in.

1. The foundation basemat typical thickness does not apply in locations where the top of slab for rooms extend below nominal floor elevation -31 ft (such as tank rooms, sump rooms, elevator shafts and air shafts).

2. Concrete forming and placement tolerances for construction of the RCB shall conform to the requirements of ACI 359; however, where not specifically addressed in ACI 359 these tolerances shall conform to the requirements of ACI 349 and ACI 117. Concrete forming and placement tolerances for construction of other safety-related structures shall conform to the requirements of ACI 349 and ACI 117.

Table 2.1.1-2—Key Dimensions of Nuclear Island

Label	Section Descriptions	Region	Key Dimension	Tolerance
D1	Distance from North edge of SB 2/3 to South edge of FB foundation base slabs.	Refer to Figure 2.1.1-1	344 ft - 10 in.	+/- 12 in.
D2	Distance from West edge of SB 1 to East edge of SB 4 foundation base slabs.	Refer to Figure 2.1.1-1	362 ft - 6 in.	+/- 12 in.
D3	Distance from finish floor at +0 ft elevation to FB roof elevation.	Refer to Figure 2.1.1-12	111 ft - 7 in.	+/- 12 in.(1)
D4	Distance from finish floor at +0 ft elevation to top of FB foundation base slab.	Refer to Figure 2.1.1-12	31 ft - 6 in.	
D5	Distance from finish floor at +0 ft elevation to SB 1 roof elevation.	Refer to Figure 2.1.1-14	96 ft - 2 in.	+/- 12 in.(1)
D6	Distance from finish floor at +0 ft elevation to top of SB 1 foundation base slab.	Refer to Figure 2.1.1-14	31 ft - 6 in.	
D7	Distance from finish floor at +0 ft elevation to SB 2/3 roof elevation.	Refer to Figure 2.1.1-17	94 ft - 6 in.	+/- 12 in.(1)
D8	Distance from finish floor at +0 ft elevation to top of SB 2/3 foundation base slab.	Refer to Figure 2.1.1-17	31 ft - 6 in.	
D9	Distance from finish floor at +0 ft elevation to SB 4 roof elevation.	Refer to Figure 2.1.1-19	96 ft - 2 in.	+/- 12 in.(1)
D10	Distance from finish floor at +0 ft elevation to top of SB 4 foundation base slab.	Refer to Figure 2.1.1-19	31 ft - 6 in.	

1. Tolerance specified is for the total dimension from top of foundation to top of roof elevation. The key dimensions individually are permitted to utilize up to the total tolerance specified provided the combined total tolerance for the two key dimensions does not exceed the tolerance specified.

Table 2.1.1-3—Radiation Barriers
Sheet 1 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
SB 1 (4)	1UJH01 007	1UJH01 026		X		-31 ft	1.9
	1UJH01 001	1UJH01 025		X		-31 ft	1.9
	1UJH01 001	1UJH01 021	X	X		-31 ft	1.9
	1UJH01 010	UFA01 002		X		-31 ft	1.9
	1UJH01 011	UFA01 002	X	X		-31 ft	1.9
	1UJH05 013	UFA05 003	X	X		-16 ft	1.9
	1UJH05 013	1UJH01 026		X		-16 ft	1.9
	1UJH05 008	1UJH01 026		X		-16 ft	1.9
	1UJH05 005	1UJH05 025		X		-16 ft	1.9
	1UJH05 001	1UJH05 021	X	X		-16 ft	1.9
	1UJH10 001	–			X	+/- 0 ft	1.6
	1UJH10 004	–			X	+/- 0 ft	1.4

Table 2.1.1-3—Radiation Barriers
Sheet 2 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
SB 2 (4)	2UJH01 005	2UJH01 040	X	X		-31 ft	1.9
	2UJH01 005	2UJH01 020		X		-31 ft	1.9
	2UJH01 010	2UJH01 020		X		-31 ft	1.9
	2UJH01 011	2UJH01 024		X		-31 ft	1.9
	2UJH05 005	2UJH05 040		X		-16 ft	1.9
	2UJH05 006	2UJH05 020		X		-16 ft	1.9
	2UJH05 010	2UJH05 025		X		-16 ft	1.9
	2UJH10 002	–			X	+/- 0 ft	1.4
	2UJH10 005	–			X	+/- 0 ft	1.4
	2UJH10 006	–			X	+/- 0 ft	1.8
	2UJH10 007	–			X	+/- 0 ft	1.4
	2UJK31 034	–			X	+69 ft	1.64
	2UJK31 035	–			X	+69 ft	1.64

Table 2.1.1-3—Radiation Barriers
Sheet 3 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
SB 3 (4)	3UJH01 005	3UJH01 040	X	X		-31 ft	1.9
	3UJH01 005	3UJH01 020		X		-31 ft	1.9
	3UJH01 010	3UJH01 020		X		-31 ft	1.9
	3UJH01 011	3UJH01 024		X		-31 ft	1.9
	3UJH05 005	3UJH05 040		X		-16 ft	1.9
	3UJH05 006	3UJH05 020		X		-16 ft	1.9
	3UJH05 010	3UJH05 025		X		-16 ft	1.9
	3UJH10 002	–			X	+/- 0 ft	1.4
	3UJH10 005	–			X	+/- 0 ft	1.4
	3UJH10 006	–			X	+/- 0 ft	1.8
	3UJH10 007	–			X	+/- 0 ft	1.4
	3UJK31 034	–			X	+69 ft	1.64
	3UJK31 035	–			X	+69 ft	1.64

Table 2.1.1-3—Radiation Barriers
Sheet 4 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
SB 4 (4)	4UJH01 007	4UJH01 026		X		-31 ft	1.9
	4UJH01 001	4UJH01 025		X		-31 ft	1.9
	4UJH01 001	4UJH01 021	X	X		-31 ft	1.9
	4UJH01 010	UFA01 054		X		-31 ft	1.9
	4UJH01 011	UFA01 051	X	X		-31 ft	1.9
	4UJH05 013	UFA05 051	X			-16 ft	1.9
	4UJH05 006	4UJH05 026		X		-16 ft	1.9
	4UJH05 005	4UJH05 025		X		-16 ft	1.9
	4UJH05 005	4UJH05 021		X		-16 ft	1.9
	4UJH05 001	4UJH05 021	X	X		-16 ft	1.9
	4UJH10 002	–			X	+/- 0 ft	1.4
	4UJH10 004	–			X	+/- 0 ft	1.4

Table 2.1.1-3—Radiation Barriers
Sheet 5 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
FB	UFA10 015	UFA15 022		X		+12 ft	4.1
	UFA13 017	UFA15 022		X		+12 ft	4.5
	UFA13 057	UFA15 022		X		+12 ft	4.5
	UFA15 022	–			X	+12 ft	5.8
	UFA18 015	UFA19 021		X		+24 ft	3.4
	UFA18 062	UFA19 021		X		+24 ft	3.4
	UFA17 017	UFA15 022		X		+24 ft	4.5
	UFA18 062	UFA15 022		X		+24 ft	4.1
	UFA17 025	UFA15 022		X		+24 ft	4.5
	UFA17 057	UFA15 022		X		+24 ft	4.5
	UFA17 057(4)	UFA17 084		X		+24 ft	1.0
	UFA21 015	UFA19 021		X		+36 ft	3.4
	UFA21 099	UFA19 021		X		+36 ft	3.4
	UFA21 099	UFA15 022		X		+36 ft	4.0
	UFA21 017	UFA15 022		X		+36 ft	4.1
	UFA21 057	UFA15 022		X		+36 ft	4.5
	UFA21 084	UFA16 023		X		+36 ft	4.9
	UFA21 082	UFA16 023		X		+36 ft	4.9
	UFA23 015	UFA19 021		X		+49 ft	3.4
	UFA23 018	UFA19 021		X		+49 ft	3.4
	UFA23 014	UFA19 021		X		+49 ft	3.4
	UFA23 014	UFA15 022		X		+49 ft	4.1

Table 2.1.1-3—Radiation Barriers
Sheet 6 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
	UFA24 017	UFA15 022		X		+49 ft	4.1
	UFA24 085	–			X	+49 ft	1.3
	UFA29 090	–			X	+64 ft	1.3
NAB	UKA03 012	UKA03 020		X		-21 ft	2.3
	UKA03 093	UKA06 067		X		-11 ft	2.6
	UKA06 091	UKA06 066		X		-11 ft	2.6
	UKA06 063	UKA06 066		X		-11 ft	2.6
	UKA06 070	UKA06 067		X		-11 ft	2.6
	UKA06 036	UKA03 020	X	X		-11 ft	2.6
	UKA06 012	UKA03 020		X		-11 ft	2.3
	UKA10 096	UKA06 067		X		+/- 0 ft	2.6
	UKA10 096	UKA06 066		X		+/- 0 ft	2.6
	UKA10 036	UKA03 020		X		+/- 0 ft	2.6
	UKA10 012	UKA03 020		X		+/- 0 ft	2.3
	UKA10 036	UKA03 020		X		+12 ft	2.6
	UKA13 012	UKA03 020		X		+12 ft	2.3
	UKA25 012	UKA20 001		X		+50 ft	1.0

Table 2.1.1-3—Radiation Barriers
Sheet 7 of 7

NI Structure	From Room(s) [KKS]	To Room(s) [KKS]	Door (1)	Wall	Slab (2)	Elevation(s)	Minimum Thickness (ft)
RWB	UKS01 020	UKS01 065		X		-31 ft 6 in	2.8
	UKS03 063	UKS01 065		X		-21 ft 4 in	2.8
	UKS10 092	–			X	0 ft 0 in	2.2
	UKS10 093	–			X	0 ft 0 in	2.2
	UKS10 091	–			X	0 ft 0 in	2.2
	UKS10 058	–			X	0 ft 0 in	2.0
RCB (4)	NA(3)	RBA		X		(3)	3.0

1. Doors have the same radiation attenuation ability as the walls in which they are placed.
2. These are floor slabs.
3. This barrier is the entire RCB peripheral wall, which is adjacent to the RBA.
4. Barriers for response to accident missions.

Table 2.1.1-4—Nuclear Island ITAAC
Sheet 1 of 3

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The basic configuration of the NI structures is as shown on Figure 2.1.1-1, Figure 2.1.1-2, Figure 2.1.1-9, Figure 2.1.1-15, and Figure 2.1.1-16.	An inspection of the basic configuration of the as-built NI structures will be performed.	The basic configuration of the NI structures is as follows: ● The RCB peripheral wall and dome is within the RSB as shown on Figure 2.1.1-9. ● SBs 1 and 4 are adjacent to the RSB as shown on Figure 2.1.1-1 and Figure 2.1.1-2. ● SBs 2 and 3 are adjacent to the RSB as shown on Figure 2.1.1-1 and Figure 2.1.1-2. ● The FB is adjacent to the RSB as shown on Figure 2.1.1-1 and Figure 2.1.1-2. ● The RSB cylindrical wall is at least 1 ft 6 1/2 in. thicker above the point where this wall meets the FB and SB structures roofs as shown on Figure 2.1.1-9. ● The vent stack is located on top of the FB as shown on Figure 2.1.1-2. ● The main steam and feedwater valve rooms are located in SBs 1 and 4 as shown on Figure 2.1.1-2. ● The MCR, RSS, and TSC are located in the SBs 2 and 3, with the MCR and RSS separated, as shown on Figure 2.1.1-15 and Figure 2.1.1-16.

Table 2.1.1-4—Nuclear Island ITAAC
Sheet 2 of 3

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.1	External hazard protection features of the NI structures include: • A continuous external hazards barrier as shown on Figure 2.1.1-2 and Figure 2.1.1-3. • Decoupling of SB 2/3 and FB internal structures from their outer external hazards barrier walls, at their exterior walls along the entire wall length and the upper ceiling, and from the RSB above Elevation 0 ft, 0 in. as shown on Figure 2.1.1-11, Figure 2.1.1-12, Figure 2.1.1-15 and Figure 2.1.1-17.	An inspection will be performed to verify the as-built NI structures include: • A continuous external hazards barrier. • Decoupling of SB 2/3 and FB internal structures from their outer external hazards barrier walls, at their exterior walls along the entire wall length and the upper ceiling, and from the RSB above Elevation 0 ft, 0 in.	The NI structures have the following external hazard protection features: • The RB, SB 2/3, and the FB share a common boundary exterior surface at the SBs and FB structures roofs and walls to form a continuous external hazards barrier for the RB, SB 2/3 and FB structures shown on Figure 2.1.1-2 and Figure 2.1.1-3. • SB 2/3 and the FB internal structures are decoupled from the outer external hazards barrier by a minimum of 3 in. at the external SBs and FB walls along entire length and the upper ceiling, and from the RSB above Elevation 0 ft, 0 in. shown on Figure 2.1.1-11, Figure 2.1.1-12, Figure 2.1.1-15 and Figure 2.1.1-17.
3.2	The NI site grade level is located between 12 inches and 18 inches below finish floor elevation at ground entrances.	An inspection will be performed to verify the as-built NI site grade level is located below finish floor elevation at ground entrances.	The NI site grade level is located between 12 inches and 18 inches below finish floor elevation at ground entrances.
3.3	The NI structures include radiation barriers for normal operation and post-accident radiation shielding as listed in Table 2.1.1-3.	An inspection will be performed to verify the as-built NI structures include radiation barriers that provide normal operation and post-accident radiation shielding.	The NI structures radiation barriers, as listed in Table 2.1.1-3, meet the specified minimum thickness requirements. Installed doors meet or exceed the radiation attenuation capability of the wall within which they are installed.
3.4	Deleted.	Deleted.	Deleted.
3.5	Deleted.	Deleted.	Deleted.

Table 2.1.1-4—Nuclear Island ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.6	NI structural walls or floors having exterior penetrations located below grade elevation are protected against external flooding by watertight seals.	An inspection will be performed to verify as-built NI structural walls or floors having exterior penetrations located below grade elevation are protected against external flooding by watertight seals.	Watertight seals exist for exterior penetrations of NI structural walls and floors located below grade elevation.
3.7	The NI structures have key dimensions and tolerances specified in Table 2.1.1-1 and Table 2.1.1-2.	An inspection will be performed to verify key dimensions and tolerances of the as-built NI structures.	The NI structures conform to the key dimensions and tolerances specified in Table 2.1.1-1 and Table 2.1.1-2.

Table 2.1.1-5—Key Dimensions of Reactor Building Structures
Sheet 1 of 2

Label	Section Descriptions	Region	Floor Elevation or Elevation Range	Key Dimension (1)
S1	Slab Supporting Steam Generators and Reactor Coolant Pumps.	Refer to Figure 2.1.1-5	Nominal elevation +5 ft	6 ft - 6 ¾ in.
S2	Slab Supporting Steam Generators and Reactor Coolant Pumps.	Refer to Figure 2.1.1-5	Nominal elevation +5 ft	3 ft - 3 3/8 in.
W1	Steam Generator and Reactor Coolant Pump Typical Cavity Walls.	Refer to Figure 2.1.1-6	From nominal elevations +17 ft to +29 ft	3 ft - 11 1/4 in.
W2	Steam Generator and Reactor Coolant Pump Typical Cavity Walls.	Refer to Figure 2.1.1-6	From nominal elevations +17 ft to +29 ft	3 ft - 3 3/8 in.
S3	Slab Supporting Pressurizer.	Refer to Figure 2.1.1-7	Nominal elevation +49 ft	2 ft - 9 7/16 in.
S4	Slab Supporting Pressurizer.	Refer to Figure 2.1.1-7	Nominal elevation +49 ft	1 ft - 7 11/16 in.
W3	Pressurizer Typical Cavity Wall.	Refer to Figure 2.1.1-7	From nominal elevations +21 ft to +92 ft	2 ft - 7 ½ in.
S5	Operating floor area.	Refer to Figure 2.1.1-8	Nominal floor elevation +64 ft	2 ft - 7 ½ in.
S6	Operating floor area.	Refer to Figure 2.1.1-8	Nominal floor elevation +64 ft	3 ft - 3 3/8 in.
S7	Operating floor area.	Refer to Figure 2.1.1-8	Nominal floor elevation +64 ft	4 ft - 3 3/16 in.
W4	Steam Generator and Reactor Coolant Pump Typical Cavity Walls.	Refer to Figure 2.1.1-8	From nominal elevations +52 ft to +64 ft	3 ft - 3 3/8 in.
W5	Steam Generator and Reactor Coolant Pump Typical Cavity Walls.	Refer to Figure 2.1.1-8	From nominal elevations +52 ft to +64 ft	3 ft - 3 3/8 in.

Table 2.1.1-5—Key Dimensions of Reactor Building Structures
Sheet 2 of 2

Label	Section Descriptions	Region	Floor Elevation or Elevation Range	Key Dimension (1)
W6	RSB Wall above FB Roof Connection	Refer to Figure 2.1.1-9	The FB roof is at top of slab nominal elevation +112 ft	5 ft - 10 7/8 in.
W7	RSB Wall below FB Roof Connection	Refer to Figure 2.1.1-9	The FB roof is at top of slab nominal elevation +112 ft	4 ft - 3 3/16 in.
S8	FB Roof at RSB Wall Connection	Refer to Figure 2.1.1-9	The FB roof is at top of slab nominal elevation +112 ft	5 ft - 10 7/8 in.
W8	RSB Wall above SB 2/3 Roof Connection	Refer to Figure 2.1.1-9	The SB 2/3 roof is at top of slab nominal elevation +94 ft	5 ft - 10 7/8 in.
W9	RSB Wall below SB 2/3 Roof Connection	Refer to Figure 2.1.1-9	The SB 2/3 roof is at top of slab nominal elevation +94 ft	4 ft - 3 3/16 in.
S9	SB 2/3 Roof at RSB Wall Connection	Refer to Figure 2.1.1-9	The SB 2/3 roof is at top of slab nominal elevation +94 ft	5 ft - 10 7/8 in.
G1	RCB Wall to Foundation Gusset Connection.	Refer to Figure 2.1.1-9 and Figure 2.1.1-10	From bottom of RB foundation base slab to nominal elevation -8 ft	Varies as shown on Figure 2.1.1-10
W14	Typical Containment Wall	Refer to Figure 2.1.1-9	From nominal elevations -8 ft to +144 ft	4 ft – 3 3/16 in.
H1	Equipment Hatch Wall	Refer to Figure 2.1.1-9 and Figure 2.1.1-45	From nominal elevations +48 ft to +103 ft	7 ft – 11 3/16 in.
F6	RBIS Foundation Basemat - IRWST	Refer to Figure 2.1.1-9	Top of slab for the IRWST portion of the RBIS foundation basemat is at nominal elevation -21 ft	4 ft – 11 7/16 in.
F7	RBIS Foundation Basemat – Outer Ring	Refer to Figure 2.1.1-9	Top of slab for the outer ring portion of the RBIS foundation is at nominal elevation -8 ft	18 ft – 0 9/16 in.

1. Concrete forming and placement tolerances for construction of the RCB shall conform to the requirements of ACI 359; however, where not specifically addressed in ACI 359 these tolerances shall conform to the requirements of ACI 349 and ACI 117. Concrete forming and placement tolerances for construction of other safety-related structures shall conform to the requirements of ACI 349 and ACI 117.

Table 2.1.1-6(a)—Pressure Relief Doors in the Reactor Containment Building

RCB Elevation and Door No.	Vent Direction		Relief Pressure (psid)	Description	Function Pressure Relief	Seismic Category
	From Room	To Room				
-8 ft Door 4	-8 ft Room 7	-8 ft Room 2	≤ 1.74	Door, Blowout Panel	Open[1, 2]	I
-8 ft Door 7	-8 ft Room 16	-8 ft Room 13	≤ 1.74	Door, Blowout Panel	Open[1]	I
-8 ft Door 10	-8 ft Room 15	-8 ft Room 11	≤ 1.74	Door, Blowout Panel	Open[1]	I
-8 ft Door 11	-8 ft Room 14	-8 ft Room 9	≤ 1.74	Door, Blowout Panel	Open[1]	I
-8 ft Door 13	-8 ft Room 11	-8 ft Room 5	≤ 1.74	Door, Blowout Panel	Open[3]	I
-8 ft Door 14	-8 ft Room 9	-8 ft Room 5	≤ 1.74	Door, Blowout Panel	Open[3]	I
+5 ft Door 4	+5 ft Room 16	+5 ft Room 14	≤ 3.48	Door, Swing Open	Open[1, 2]	I
+5 ft Door 5	+5 ft Room 17	+5 ft Room 16	≤ 3.48	Door, Swing Open	Open[3]	I
+5 ft Door 13	+5 ft Room 21	+5 ft Room 15	≤ 3.48	Door, Swing Open	Open[1]	I
+5 ft Door 14	+5 ft Room 16	+5 ft Room 13	≤ 3.48	Door, Swing Open	Open[1, 2]	I
+29 ft Door 2	+29 ft Room18	+29 ft Room 15	≤ 3.48	Door, Swing Open	Open[2]	I
+45 ft Door 2	+45 ft Room 18	+45 ft Room 22	≤ 3.48	Door, Swing Open	Open[2]	I
+45 ft Door 15	+45 ft Room 22	+45 ft Room 13	≤ 1.74	Door, Blowout Panel	Open[2]	I

1. Door supports subcompartment pressure relief (subcompartment pressure greater than 5 psi).
2. Door supports pressure relief for LBLOCA pressurizer surge line breaks.
3. Door supports subcompartment pressure relief (subcompartment pressure less than or equal to 5 psi).

Table 2.1.1-6(b)—Vent Path Areas in Reactor Containment Building for Pressure Relief

Room Name	Function Pressure Relief	Total Vent Path Area (ft^2)
-8 ft Room 2	(1)	55.68
-8 ft Room 7	(1)	24.86
-8 ft Room 14	(1)	5.92
-8 ft Room 15	(1)	5.92
-8 ft Room 16	(1)	24.11
-8 ft Room 17	(1)	18.19
+5 ft Room 16	(1)	61.46
+5 ft Room 20	(1)	21.35
+5 ft Room 21	(1)	55.15
+5 ft Room 22	(1)	13.89
+45 ft Room 2	(1)	1123.09
+45 ft Room 3	(1)	1167.82
+45 ft Room 6	(1)	1167.82
+45 ft Room 7	(1)	1123.09
+64 ft Room 1	(1)	617.79
+64 ft Room 2	(1)	639.9
+64 ft Room 5	(1)	639.9
+64 ft Room 6	(1)	617.79
+64 ft Room 14	(1)	98.14
+79 ft Room 12	(1)	55.46
-8 ft Room 7 +5 ft Room 16 +29 ft Room 18 +45 ft Room 18 +45 ft Room 22	(2)	97.85

1. Supports subcompartment pressure relief (subcompartments pressure greater than 5 psi).

2. Supports pressure relief for LBLOCA pressurizer surge line breaks.

Table 2.1.1-7—RBA Penetrations that Contain High-Energy Pipelines

KKS	Penetration	Description
JEW	JMK10BQ001	Chemical & Volume Control System - Seal return
JEW	JMK10BQ004	Chemical & Volume Control System - Seal injection
KBA	JMK10BQ002	Chemical & Volume Control System - Charging
KBA	JMK10BQ003	Chemical & Volume Control System - Letdown
KPL	JMK60BQ005	Gaseous Waste Processing System
KPL	JMK60BQ006	Gaseous Waste Processing System
LAB	JMK60BQ109	Feedwater to SG1
LAB	JMK70BQ207	Feedwater to SG2
LAB	JMK80BQ306	Feedwater to SG3
LAB	JMK90BQ409	Feedwater to SG4
LBA	JMK10BQ110	Main Steam System - Main Steam 1
LBA	JMK20BQ208	Main Steam System - Main Steam 2
LBA	JMK30BQ307	Main Steam System - Main Steam 3
LBA	JMK40BQ410	Main Steam System - Main Steam 4
LCA	JMK10BQ304	Condensate System - Condensate to Blowdown Coolers
LCA	JMK10BQ305	Condensate System - Condensate from Blowdown Coolers
LCQ	JMK60BQ019	Steam Generator Blowdown System
LCQ	JMK60BQ205	Steam Generator Blowdown System

Table 2.1.1-8—Reactor Building ITAAC
Sheet 1 of 12

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	Six rib support structures are provided at the bottom of the reactor cavity, as shown on Figure 2.1.1-9, limit lower reactor pressure vessel head deformation due to thermal expansion and creep during severe accident mitigation.	An inspection will be performed to verify the as-built reactor vessel cavity contains six rib support structures at the bottom of the reactor cavity.	Six rib support structures are provided at the bottom of the reactor cavity as shown on Figure 2.1.1-9.
2.2	As shown on Figure 2.1.1-4, a flooding barrier is provided to prevent ingress of water into the core melt spreading area. Penetrations within the core melt water ingression barrier are protected by watertight seals. Doors within the core melt water ingression barrier are watertight doors.	An inspection will be performed to verify: ● As-built core melt water ingression barrier exists. ● As-built penetrations within the core melt water ingression barrier are protected by watertight seals. ● As-built doors within the core melt water ingression barrier are watertight doors.	The RCB provides a spreading area water ingression barrier as shown on Figure 2.1.1-4. Penetrations within the core melt water ingression barrier are protected by watertight seals. Doors within the core melt water ingression barrier are watertight doors.
2.3	Core melt cannot relocate to upper containment due to the existence of concrete barriers as shown on Figure 2.1.1-9.	An inspection will be performed to verify as-built concrete barriers exist.	Concrete barriers are located within the RCB as shown on Figure 2.1.1-9 to prevent core melt from locating to upper containment.

Table 2.1.1-8—Reactor Building ITAAC
Sheet 2 of 12

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.4	The RB structures are Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions: ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).	An inspection and analysis will be performed to verify the as-built RB structures will withstand design basis loads.	A report concludes that the RB structures will withstand the design basis loads, as specified below, without loss of structural integrity and safety-related functions: ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).
2.5	The RCB, including the liner plate and penetration assemblies, maintains its pressure boundary integrity at the design pressure.	A Structural Integrity Test of the RCB, including the liner plate and penetration assemblies, will be performed in accordance with the requirements for prototype containments of ASME Code Section III.	ASME Code Section III Data Report concludes that for the RCB, including the liner plate and penetration assemblies, the Structural Integrity Test results comply with ASME Code Section III, Division 2, CC-6400 requirements, including strain measurements, at a test pressure of 115% of the design pressure of 62.9 psig.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.6	The RCB is a post-tensioned, pre-stressed concrete structure.	a. An analysis of ASME Code Section III Design Reports for the RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies, will be performed. b. An inspection will be performed for the existence of ASME Code Section III Construction Report for the as-built RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies.	a. ASME Code Section III Design Report (NCA-3550) concludes that the design of the RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies, complies with ASME Code Section III, Division 2 requirements. b. ASME Code Section III Construction Report (NCA-3454) exists for the RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		c. An analysis of the RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies, using as-designed and as-built information and ASME Code Design Report (NCA-3550) will be performed.	c. ASME Code Data Report (NCA-8000) concludes that design reconciliation (NCA-3554) of the RCB post-tensioned, pre-stressed concrete structure, including the liner and penetration assemblies, with the Design Report (NCA-3550) has occurred. The report(s) document the results of the reconciliation analysis. ASME Code Section III Design Report (NCA-3550) concludes that design reconciliation (NCA-3554) has been completed in accordance with the ASME Code Section III for the as-built system. The report(s) document the results of the reconciliation analysis.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.7	Internal hazard protection barriers separate the RBA from the SBs and the FB, and the RBA from the RCB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the RBA.	a. An analysis will be performed to determine the internal hazard protection barriers separate the RBA from the SBs and the FB, and the RBA from the RCB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the RBA. b. An inspection will be performed to verify the as-built internal hazard protection barriers that separate the RBA from the SBs and FB, and the RBA from the RCB.	a. A report defines the internal hazard protection barriers separate the RBA from the SBs and the FB, and the RBA from the RCB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the RBA. b. Internal hazard protection barriers separate the RBA from the SBs and FB, and the RBA from the RCB.
2.8	The RCB includes provisions for water flow to the IRWST: ● As shown on Figure 2.1.1-4, RCB rooms which are adjacent to the IRWST contain wall openings to allow water flow into the IRWST. ● As shown on Figure 2.1.1-5, RCB rooms which are directly above the IRWST, contain openings in the floor to allow water flow into the IRWST. The floor openings are protected by weirs and trash racks to provide a barrier against material transport into the IRWST.	An inspection will be performed to verify the as-built RCB includes provisions for water flow to the IRWST.	The RCB includes the following provisions for water flow to the IRWST: ● As shown on Figure 2.1.1-4, the two rooms labeled Areas for MHSI, LHSI & SAHRS pipe penetrations contain wall openings to allow water flow into the IRWST. ● As shown on Figure 2.1.1-5, the RCB rooms, which are directly above the IRWST, contain openings in the floor to allow water flow into the IRWST. The floor openings are provided with weirs and trash racks to provide a barrier against material transport into the IRWST.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.9	RBA penetrations that contain high-energy lines, as listed in Table 2.1.1-7, have guard pipes.	An inspection will be performed to verify as-built RBA penetrations that contain high-energy lines have guard pipes.	RBA penetrations that contain high-energy lines, as listed in Table 2.1.1-7, have guard pipes.
2.10	Safety-related equipment located in the RCB and RBA are either located above the internal flood level or are qualified for submergence.	a. An inspection will be performed to verify as-built safety-related equipment located in the RCB are either located above the internal flood level or are qualified for submergence. b. An inspection will be performed to verify as-built safety-related equipment in the RBA are either located above the internal flood level or are qualified for submergence.	a. Safety-related equipment located in the RCB are either located above the internal flood level of -6 ft 2 in. or an EQDP concludes that the safety-related equipment is qualified for submergence. b. Safety-related equipment in the RBA are either located above the internal flood level of +0 ft or an EQDP concludes that the safety-related equipment is qualified for submergence.
2.11	The reactor pressure vessel, reactor coolant pumps, pressurizer, steam generators, and interconnecting RCS piping are insulated with reflective metallic insulation.	An inspection will be performed to verify the as-built reactor pressure vessel, reactor coolant pumps, pressurizer, steam generators, and interconnecting RCS piping, are insulated with reflective metallic insulation.	The reactor pressure vessel, reactor coolant pumps, pressurizer, steam generators, and interconnecting RCS piping are insulated with reflective metallic insulation.
2.12	The RB structures have key dimensions and tolerances specified in Table 2.1.1-5.	An inspection will be performed to verify key dimensions and tolerances of the as-built RB structures.	The RB structures conform to the key dimensions and tolerances specified in Table 2.1.1-5.
2.13	The RCB has a minimum containment free volume.	An inspection and analysis will be performed to verify the minimum as-built containment free volume.	The RCB minimum containment free volume is greater than or equal to 2.755×10^6 ft^3.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.14	The RCB and RCB internal structures have a minimum containment heat sink surface area.	An inspection and analysis will be performed to verify the minimum as-built containment heat sink surface area.	The RCB and RCB internal structures containment heat sink surface area is greater than or equal to 699,644.3 ft^2.
2.15	The integrated leak rate from the RCB does not exceed the maximum allowable leakage rate.	a. An analysis will be performed to define the RCB air mass. b. A Type A test will be performed in accordance with 10 CFR 50 Appendix J, Option B to measure the RCB overall integrated leak rate. c. A Type B test will be performed in accordance with 10 CFR 50 Appendix J, Option B to measure leak rates across each pressure containing or leakage-limiting boundary. A Type C test will be performed in accordance with 10 CFR 50 Appendix J, Option B to measure containment isolation valve leak rates.	a. A report defines the RCB air mass. b. The leak rate for the Type A test is less than or equal to 0.75 L_a of RCB air mass per day at a containment test pressure of 55 psig. c. The combined leak rate (Type B and Type C Tests) for all penetrations and valves is less than 0.60 L_a.
2.16	The location of the doors and blowout panels is as listed in Table 2.1.1-6(a).	An inspection of the location of the as-built doors and blowout panels will be performed.	The doors and blowout panels listed in Table 2.1.1-6(a) are located as listed in Table 2.1.1-6(a).

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.17	Pressure relief doors in the RCB listed in Table 2.1.1-6(a) will withstand seismic design basis loads without a loss of the function listed in Table 2.1.1-6(a).	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the pressure relief doors using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	a. A report concludes that the pressure relief doors in the RCB listed in Table 2.1.1-6(a) will withstand seismic design basis loads without a loss of the function listed in Table 2.1.1-6(a).
		b. An inspection will be performed of the as-built pressure relief doors to verify that the pressure relief doors, including anchorage, are installed per the approved design requirements.	b. The pressure relief doors identified in Table 2.1.1-6(a), including anchorage, are installed per the approved design requirements.
2.18	RCB doors and blowout panels listed in Table 2.1.1-6(a) provide pressure relief.	a. Type tests will be performed for the swing doors to demonstrate the ability of the doors to open.	a. The pressure at which the swing doors listed in Table 2.1.1-6(a) begins to open is less than or equal to 3.48 psid.
		b. Type tests will be performed to demonstrate the ability of the blowout panels to open.	b. The pressure at which the blowout panels listed in Table 2.1.1-6(a) open is less than or equal to 1.74 psid.
		c. An inspection will be performed to verify the vent direction of as-built doors.	c. The doors listed in Table 2.1.1-6(a) provide the vent direction as identified.
2.19	Blowout panels in RCB doors listed in Table 2.1.1-6(a) are provided with missile restraint.	a. An analysis will be performed to demonstrate that missile restraints in RCB doors are capable of performing the function.	a. An analysis concludes that the missile restraint in RCB doors is capable of performing the function.
		b. An inspection will be performed to verify as-built blowout panels in RCB doors are provided with missile restraint.	b. Blowout panels in RCB doors listed in Table 2.1.1-6(a) have a missile restraint.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.20	RCB vent path areas provide pressure relief for the rooms listed in Table 2.1.1-6(b).	An inspection will be performed to verify the as-built total vent path area in rooms requiring pressure relief.	The total vent path area is greater than or equal to the value listed in Table 2.1.1-6(b) for the corresponding room.
2.21	The RCB has a maximum volume of Microtherm insulation within the zone of influence.	a. An analysis will be performed to define the zone of influence inside the RCB. b. An inspection will be performed to verify the maximum volume of Microtherm insulation within the zone of influence.	a. A report defines the zone of influence inside the RCB. b. The equipment in the zone of influence will have less than or equal to 1 ft^3 of Microtherm insulation.
2.22	The RCB has a concrete missile protection shield on top of the refueling canal wall provided for protection against a control rod ejection due to the postulated failure of the CRDM nozzle flange or pressure housing.	An inspection and analysis will be performed to verify the as-built RCB concrete missile protection shield on top of the refueling canal wall provided for protection against a control rod ejection due to the postulated failure of the CRDM nozzle flange or pressure housing will withstand design basis loads without loss of structural integrity.	A report concludes that the RCB concrete missile protection shield on top of the refueling canal wall provided for protection against a control rod ejection due to the postulated failure of the CRDM nozzle flange or pressure housing will withstand the design basis loads without loss of structural integrity.
2.23	Coatings in the RCB are consistent with the GSI 191 DBA evaluation.	An inspection and analysis will be performed to verify the as-built coatings used in the RCB are consistent with the GSI 191 DBA evaluation.	A report concludes that the coatings used in the RCB are consistent with the safety injection suction strainer debris generation, debris transport, and downstream effects evaluations.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.24	Fire protection features provide separation within the RBA.	a. A fire protection and smoke effects analysis will be performed.	a. The fire protection and smoke effects analysis concludes that barriers, doors, dampers, and penetrations providing separation have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected.
		b. An inspection will be performed to verify the as-built configuration of barriers, doors, dampers, and penetrations within the RBA.	b. The configuration of fire barriers, doors, dampers and penetrations within the RBA conforms to the fire protection and smoke effects analysis.
2.25	Fire protection features provide separation within the RCB.	a. A fire protection and smoke effects analysis will be performed.	a. The fire protection and smoke effects analysis concludes that barriers, doors, dampers, and penetrations providing separation have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected.
		b. An inspection will be performed to verify the as-built configuration of barriers, doors, dampers, and penetrations within the RCB.	b. The configuration of fire barriers, doors, dampers and penetrations within the RCB conforms to the fire protection and smoke effects analysis.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.26	Thermal properties of the RCB concrete mix design are as defined in the Construction Specification.	a. An inspection will be performed to verify the existence of ASME Code Section III, Division 2 Construction Specification(s) defining the thermal properties of the RCB concrete mix design. b. Testing will be performed to verify the thermal properties of the RCB concrete mix design.	a. ASME Code Section III, Division 2, (CC-2230) test records exist for the RCB concrete mix design. b. ASME Code Section III, Division 2, (CC-2230) test records exist for the RCB concrete mix design and conclude that it meets the thermal properties specified.
2.27	Deleted.	Deleted.	Deleted.
2.28	The RCB liner is designed in accordance with ASME Code Section III, Division 2 requirements.	a. An analysis of ASME Code Section III Design Reports for the RCB liner will be performed. b. An inspection will be performed for the existence of ASME Code Section III Construction Report for the as-built RCB liner.	a. ASME Code Section III Design Report (NCA 3550) concludes that the design of the RCB liner complies with ASME Code Section III, Division 2 requirements. b. ASME Code Section III Construction Report (NCA 3454) exists for the RCB liner.
2.29	As-built liner and penetration assemblies are reconciled with the design requirements.	A reconciliation analysis of liner and penetration assemblies will be performed.	ASME Code Design Report(s) exist that meet the requirements of NCA-3550, conclude that the design reconciliation has been completed for as built liner and penetration assemblies, and document that the results of the reconciliation analysis comply with the requirements of ASME Code Section III.

Table 2.1.1-8—Reactor Building ITAAC
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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.30	The IRWST contains sufficient mass to compensate for water retention in the RCB and RB internal structures.	Inspections will be performed and dimensional deviations to the RCB and RB internal structures will be analyzed for impact on the IRWST water retention mass.	Reconciliation of the dimensional deviations to the RCB and RB internal structures concludes that the water retention is less than or equal to an amount of water that will ensure the net positive suction head available (NPSHA) of the ECCS pumps is always greater than the net positive suction head required (NPSHR).
2.31	The penetration assemblies are designed in accordance with ASME Code Section III, Division 1, Subsection NE, Class MC and ASME Code Section III, Division 2 requirements.	a. An analysis of ASME Code Section III Design Reports for the penetration assemblies will be performed.	a. ASME Code Section III Design Report (NCA 3550) concludes that the design of the penetration assemblies complies with ASME Code Section III, Division 1, Subsection NE, Class MC and ASME Code Section III, Division 2 requirements.
		b. An inspection will be performed for the existence of ASME Code Section III Construction Report for the as-built penetration assemblies.	b. ASME Code Section III Construction Report (NCA 3454) exists for the penetration assemblies.

Table 2.1.1-9—Key Dimensions of Safeguard Building Structures

Label	Section Descriptions	Region	Floor Elevation or Elevation Range	Key Dimension [1]
W10	External Walls Below Grade.	Refer to Figure 2.1.1-13 and Figure 2.1.1-18	From nominal elevations -31 ft to 0 ft	4 ft - 11 in.

1. Concrete forming and placement tolerances for construction shall conform to the requirements of ACI 349 and ACI 117.

Table 2.1.1-10—Safeguard Buildings ITAAC
Sheet 1 of 2

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The SB structures are Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions. ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).	An inspection and analysis will be performed to verify the as-built SB structures will withstand design basis loads.	A report concludes that the SB structures will withstand the design basis loads, as specified below, without loss of structural integrity or safety-related functions ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).

Table 2.1.1-10—Safeguard Buildings ITAAC
Sheet 2 of 2

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.2	Internal hazard protection barriers separate each SB from the other SBs and the FB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the SB of hazard origination.	a. An analysis will be performed to determine the internal hazard protection barriers separate each SB from the other SBs and the FB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the SB of hazard origination. b. An inspection will be performed to verify the as-built internal hazard protection barriers that separate each SB from the other SBs and the FB.	a. A report defines the internal hazard protection barriers separate each SB from the other SBs and the FB so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the SB of hazard origination. b. Internal hazard protection barriers separate each SB from the other SBs and the FB.
2.3	The SB structures have key dimensions and tolerances specified in Table 2.1.1-9.	An inspection will be performed to verify key dimensions and tolerances of the as-built SB structures.	The SB structures conform to the key dimensions and tolerances specified in Table 2.1.1-9.

Table 2.1.1-11—Fuel Building ITAAC
Sheet 1 of 2

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The FB structure, including the vent stack, is Seismic Category I and will withstand design basis loads, as specified below, without loss of structural integrity and safety-related functions: ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).	An inspection and analysis will be performed to verify the as-built FB structure, including the vent stack, will withstand design basis loads.	A report concludes that the FB structure, including the vent stack, will withstand the design basis loads, as specified below, without loss of structural integrity or safety-related functions: ● Normal plant operation (e.g., dead loads, live loads, lateral earth pressure loads, equipment loads, hydrostatic, hydrodynamic, and temperature loads). ● Internal events (e.g., internal flood loads, accident pressure loads, accident thermal loads, accident pipe reactions, and pipe break loads, including reaction loads, jet impingement loads, cubicle pressurization loads, and missile impact loads). ● External events (e.g., wind, extreme winds, rain, snow, flood, extreme winds-generated missiles and earthquake).

Table 2.1.1-11—Fuel Building ITAAC
Sheet 2 of 2

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.2	Internal hazard protection barriers separate independent divisions within the FB and the FB from other NI structures so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the independent divisions within the FB of hazard origination.	a. An analysis will be performed to determine the internal hazard protection barriers separate independent divisions within the FB and the FB from other NI structures so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the independent divisions within the FB of hazard origination. b. An inspection will be performed to verify the as-built internal hazard protection barriers that separate independent divisions within the FB and the FB from other NI structures.	a. A report defines the key dimensions of the internal hazard protection barriers separate independent divisions within the FB and the FB from other NI structures so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the independent divisions within the FB of hazard origination. b. Internal hazard protection barriers separate independent divisions within the FB and the FB from other NI structures.
2.3	The SFP has a minimum depth from the bottom of the SFP to the SFP operating floor.	An inspection will be performed to verify the as-built minimum depth from the bottom of the SFP to the SFP operating floor.	The SFP has a minimum depth of 47 ft, 2 in. as measured from the bottom of the SFP to the SFP operating floor.
2.4	The SFP includes no gates, openings, or drains below an elevation corresponding to the top of stored fuel assemblies.	An inspection will be performed to verify the as-built SFP includes no gates, openings, or drains below an elevation corresponding to the top of stored fuel assemblies.	The SFP includes no gates, openings, or drains below 16 ft, 6-11/16 in. as measured from the bottom of the SFP.
2.5	The SFP includes no piping that extends below an elevation of 10 ft above the top of the stored fuel assemblies.	An inspection will be performed to verify the as-built SFP includes no piping that extends below an elevation of 10 ft above the top of the stored fuel assemblies.	The SFP includes no piping that extends below 26 ft, 6-11/16 in. as measured from the bottom of the SFSP.

Next File