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DCP/NRC1167
NSD-NRC-97-5471
Docket No.: 52-003

December 4, 1997

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: RESPONSES TO STAFF REQUESTS REGARDING THE AP600 INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA (ITAAC) - BUILDING

Dear Mr. Quay:

Enclosed are three copies of Westinghouse's responses to RAIs 640.138 through 640.141, 640.148, 640.149, and 640.158 related to comments from the Civil and Geosciences Branch on Revision 3 of the AP600 Certified Design Material as requested in a letter from the staff dated October 3, 1997.

This submittal closes, from Westinghouse's perspective, open items 6004 through 6007, 6014, 6015, and 6058. As a result, the Westinghouse status column will be changed to "Closed" in the Open Item Tracking System (OITS). The NRC should review these responses and inform Westinghouse of the status of the open items to be designated in the "NRC Status" column of the OITS.

Please contact Mr. Eugene J. Piplica at (412) 374-5310 if you have any questions concerning this transmittal.

C L Haag for BAM

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

Enclosures

cc: J. M. Sebrosky, NRC (w/Enclosure)
J. N. Wilson, NRC (w/Enclosure)
N. J. Liparulo, Westinghouse (w/o Enclosure)

1/1

6004

Question 640.138

The information in this ITAAC related to protection from the dynamic effects of postulated pipe breaks might not be appropriate as a Tier 1 commitment, and may be accomplished as a SSAR (Tier 2) commitment. The staff suggests the following changes:

a. Delete Table 3.3-4 and add all of the detailed information under "Room Description," "Essential Target Description," and "Hazard Source" in that table to SSAR Table 3.6-3.

b. Revise Item 7 under "Design Description" to read as follows:

"Structures, systems, and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

c. Revise Item 7 in Table 3.3-5 to read as follows:

Design Commitment

"Structures, systems and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

Inspection, Tests, Analyses

"An inspection will be performed of the as-built high and moderate energy pipe break mitigation features."

Acceptance Criteria

"An as-built Pipe Rupture Hazard Analysis Report exists that includes documentation of the results of the high and moderate energy pipe break mitigation features, and concludes that structures, systems, and components required for safe shutdown can withstand the effects of postulated pipe rupture without loss of the required safety function."

Response:

a) The information contained in ITAAC Table 3.3-4 is based on a detailed review of interfaces between high energy line locations and equipment required for safe shutdown. Pipe mitigation features (pipe whip restraints) are only required at locations defined in ITAAC Table 3.3-4. Only these locations are required to be inspected for the presence of the pipe whip restraints. Therefore, ITAAC Table 3.3-4 will be retained. The contents of this ITAAC Table 3.3-4 will be substituted for the information currently contained in SSAR Table 3.6-3 per NRC request. Proposed markups are provided below.

b) Item 7 in the Design Description should not be changed per our response to a) above.

c) Table 3.3-5 will not be changed per response to item a) above.

SSAR Revision:

Replace Table 3.6-3 per the attached markup pages.

ITAAC Revision:

Table 3.3-5 (Item 7) will be corrected to change reference from Table 3.3-5 to 3.3-4 for the "Design Commitment, Inspections, Tests, Analyses" and "Acceptance Criteria" columns.

Table 3.6-3 (Sheet 1 of 2)

Replace This table with attached marked up Table Insert A

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
66'-6"	None		
82'-6"	11201	RCS Press. Spray - Terminal End	RCS-ADS valves: V004A, V004C, V014A, V014C
	11204		None
	11209		None
96'-6"	11204		None
	11209		None
100'-0" and 107'-2"	11209 Pipe chase	SGS Blowdown Piping - Terminal End	CVS Makeup, CVS Letdown, CVS Hydrogen Supply, and SGS steam generator blowdown piping
		CVS Makeup Piping - Terminal End	CVS Makeup valve V091
	11300		None
	11301		None
	11303/ 11304	RCS Makeup Piping - Intermediate Break	SGS sg blowdown and sg drain Piping, RCS pressurizer pressure and level instrumentation, and Pressurizer support steel
117'-6"	11400	SGS Start Up Feedwater Piping - Terminal end	None
	11401		RCS-ADS valves: V004A, V004C, V014A, V014C are protected from a break located in room 11403
	11402		Steam Generator supports are protected from a break located in room 11400
	11403	RCS Press Spray - Terminal End	None
		RCS Letdown - Intermediate Break	Raceways for Divisions A/C and B/D
		RCS Press Spray - Intermediate Break	RCS-ADS valves: V004A, V004C, V014A, V014C

Insert A 3.6-3 (Sheet 1 of 2)

Table 3.5-4
NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11201	Steam Generator Compartment-01	Automatic depressurization system (ADS) Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C	1) Reactor Coolant System (RCS)-Pressurizer Spray Line, 4" L110A: Terminal End Break at RCS Cold Leg 1A 2) RCS-Pressurizer Spray Line, 4" L106: Terminal End Break at RCS Cold Leg 1B
11209	Pipe Chase to CVS Equipment Room	CVS makeup, CVS letdown, CVS hydrogen supply, and SGS steam generator blowdown piping	1) Steam Generator System (SGS)-Blowdown Line, 4" L009A: Terminal End Break at Containment Penetration P27 2) SGS-Blowdown Line, 4" L009B: Terminal End Break at Containment Penetration P28 3) CVS-Makeup Line, 3" L056: Terminal End Break at In-Line Anchor
11303	Lower Pressurizer Compartment	SGS steam generator blowdown and steam generator drain piping. RCS pressurizer pressure and level instrumentation; pressurizer support steel	1) RCS-CVS Purification Line, 3" L112: Intermediate Break at Outlet to Valve CVS-V082
11400	Maintenance Floor Mezzanine	Steam generator supports	1) SGS-Startup Feedwater Line, 6" L005B: Terminal End Break at Containment Penetration P45
11401	Steam Generator 01 Compartment	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L106: Terminal End Break at In-Line Anchor
11403	Pressurizer Spray Valve Room	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L213: Intermediate Break at 4x2 Tee Connection to Auxiliary Spray Line 2) RCS CVS Letdown Line, 3" L111: Intermediate Break at Inlet to Valve CVS-V001

Table 3.6-3 (Sheet 2 of 2)

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
135'-3"	11503	RCS Press Spray - Terminal End	RCS-ADS valves: lower tier platform support steel
160'-6" and 153'-0"	11601	SGS Start Up Feedwater Piping - Terminal end SGS Main Feedwater Piping-Terminal End	RCS head vent piping SGS level instrumentation piping
	11602	SGS Main Feedwater Piping-Terminal End	SGS level instrumentation piping
	11603	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002B, 003B, 012B, & 013B Raceways and cables for Divisions A/C and B/D
	11703	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002A, 003A, 012A, & 013A Raceways and cables for Division A/C
	12244	CVS Makeup Piping - Terminal End	CVS Makeup valve V090

Replace this table with attached markedup Table Insert B

* See Figures 1.2-1 through 1.2-8, 1.2-10, and 1.2-11 for room numbers

640.138-5

Insert B

Table ~~3.3-4~~ 3.3-3 (cont.) (Sheet 2 of 2)

NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11503	Upper Pressurizer Compartment	ADS Stage 1, 2, and 3 valves, lower ucr platform support steel	1) RCS-Pressurizer Spray Line, 4" L215: Terminal End Break at Pressurizer Nozzle
11601	Steam Generator-01 Feed Water Nozzle Area	RCS head vent piping SGS level instrumentation piping	1) SGS-Startup Feedwater Line, 6" L005A: Terminal End Break at Steam Generator Loop 1 Nozzle 2) SGS-Main Feedwater Line, 16" L003A: Terminal End Break at Steam Generator Loop 1 Nozzle
11602	Steam Generator-02 Feedwater Nozzle Area	SGS level instrumentation piping	1) SGS-Main Feedwater line, 16" L003B: Terminal End Break at Steam Generator Loop 2 Nozzle
11603	Lower ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002B, RCS-V003B, RCS-V012B, and RCS-V013B) Raceways and cable for Divisions A/C and B/D	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010B: Terminal End Break at Inlet to Valve RCS V011B
11703	Upper ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002A, RCS-V003A, RCS-V012A, and RCS-V013A) Raceways and cables for Division A/C	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010A: Terminal End Break at Inlet to Valve RCS V011A
12244	Lower Annulus Valve Area	CVS Makeup valve – CVS-V090	1) CVS-Makeup Line, 3" L131: Terminal End at In-Line Anchor

Question 640.139

Design Description

a. To be consistent with the SSAR, the first sentence of the first paragraph should re[illegible] nuclear island (NI) structures include the containment building (the steel containment vessel and the containment internal structures), the shield building and auxiliary building."

b. Descriptions (such as construction materials and primary functions) should be provided for the containment internal structures, the shield building, and the auxiliary building.

c. The last phrase of Sentence 1.a should read "without loss of structural integrity and safety function."

d. A description should be provided for the PCCWS tank and the shield building roof structures.

e. In NRC letter, dated March 4, 1997 (RAI 640.5), the staff requested Westinghouse to provide key dimensions in the AP600 CDM. However, only the thickness of walls and floor slabs was given in CDM Table 3.3-1. Westinghouse should also provide SSAR Table 3.7.1-16, elevations as well as the distance between column lines, and between column lines and the edge of the foundation mat in the CDM (Tier 1).

f. Foot Note 1 in Table 3.3-1 states that the applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-20. However, only Figures 3.3-1 through 3.3-15 are provided in Tier 1. Clarification is needed.

g. Table 3.3-1 on Page 3.3-10. For modular walls (Walls 1 and 2, and M-2 Wall), nominal reinforcement is provided in the vertical direction but not in the horizontal direction. Clarification is needed for (1) what kind of reinforcement is used for modular walls, and (2) why no reinforcement is provided in the horizontal direction?

h. The code boundary should be defined in the Design Description and shown in the figures.

i. As documented in the Tier 1 information for the ABWR and System 80+ designs, the structural design basis loads should be clearly defined.

Response:

a) The first sentence of the first paragraph of ITAAC will be updated as requested. Proposed markups are provided below.

b) The design description as presented in conjunction with the detailed information presented in Tables 3.3-1 through 3.3-3 define the construction materials and the primary functions. Inclusion of additional description material is not warranted and could lead to potential confusion. Therefore, it is suggested that no additional changes should be included in the description section in this regard.

c) The last phrase of Sentence 1.a will be updated to include the term "structural integrity" as requested. Proposed markups are provided below.

d) The following sentence will be added to the shield building Design Description (1st paragraph of Section 3.3): "The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank." Proposed markups are provided below.

e) A clarification is required to adequately address this issue: There is no Table 3.7.1-16 defined in the AP600 SSAR. What is the appropriate table or figure containing the elevations to which the NRC is referencing?

Per our response to RAI 640.4, Table 1.2-1 has been added to the SSAR to clarify the AP600 Plant Elevations by level designations. These level designations are referenced in ITAAC Table 3.3-1 and Figures 3.3-1 through 3.3-15.

In addition, the overall NI building dimensions are currently defined on SSAR Figure 3.7.1-16

Since this information is fully defined in the SSAR, it is not clear as to the need to include such information in Tier 1. Therefore, no changes are required to SSAR or Tier 1 data.

f) Only Figures 3.3-1 through 3.3-15 are to be included as Tier 1 information. The reference to 3.3-20 was a typographical error. This will be corrected on Table 3.3-1 with the proposed markups provided below.

g) The modular walls defined in Table 3.3-1 (Page 3.3-10) use a 0.5 inch thick plate on each of the outside surfaces with concrete filled between these surfaces. The outside plates provide the reinforcement and act as the concrete form. No additional internal steel reinforcement is required. Reinforcement is provided in both the horizontal and the vertical directions however, only the vertical direction was considered as a critical section of the wall as far as reinforcement was concerned. The table lists only the critical sections and directions, therefore, the horizontal reinforcement was not required to be included in Tier 1 and no change is required.

h) The code boundaries for the containment vessel are defined in Section 2.2.1 and on Figure 2.2.1-1 for penetration locations. Therefore, no additional data should be included in Section 3.3 since Section 2.2.1 defines necessary Tier 1 information.

i) Add the following sentence to item 1.a): "The design basis loads are those loads associated with:

- Normal plant operation(including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effects of temperature and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles, and earthquake); and
- Internal events (including flood,pipe rupture, equipment failure, and equipment failure generated missiles)."

Also add following to Table 3.3-5 for Item 1.a) under Design Commitment, and Inspection, Tests, Analyses: "specified in the Design Description (Section 3.3 paragraph 1.a)"

SSAR Changes:

a) None
b) None
c) None
d) None
e) None

f) None
g) None
h) None
i) None

ITAAC Changes:

a) See changes to Section 3.3 (attached)
b) None
c) See changes to Section 3.3 (attached)
d) See change to Section 3.3 (attached)
e) None

f) See change to ITAAC Table 3.3-1, page 3.3-4
g) None
h) None
i) See change to ITAAC Section 3.3, page 3.3-1
See change to ITAAC Table 3.3-5

3.3 Buildings

Design Description

The Nuclear Island (NI) structures include the containment (the steel containment vessel and the containment internal structures) and the shield and auxiliary buildings. The containment, shield and auxiliary buildings are structurally integrated on a common basemat which is embedded below the finished plant grade level. The containment building is a cylindrical welded steel vessel with elliptical upper and lower heads, supported by embedding a lower segment between the containment internal structures concrete and the basemat concrete. The shield building, in conjunction with the internal structures of the containment building, provides shielding for the reactor coolant system and the other radioactive systems and components housed in the containment. The auxiliary building houses the safety-related mechanical and electrical equipment located outside the containment and shield buildings. The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank

The annex building houses personnel access, technical support center, non-1E electrical equipment, and hot machine shop. The radwaste building houses the low level waste processing and storage.

1. a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of structural integrity and safety function. (Insert GG below)

   b) The top of the NI basemat is located below the design plant grade level per Table 3.3-1.

   c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]

   d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.

   e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.

2. Selected walls of the NI buildings as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the NI buildings are defined on Table 3.3-1 except for designed openings or penetrations.

3. Selected walls of the annex building and the radwaste building as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the annex building and the radwaste building are defined on Table 3.3-1 except for designed openings or penetrations.

Insert GG:
The design basis loads are those loads associated with:
- Normal plant operation (including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effects of temperature and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles, and earthquake); and
- Internal events (including flood, pipe rupture, equipment failure, and equipment failure generated missiles)

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Table 3.3-1

Definition of Wall Locations and Thicknesses for NI Buildings, Annex and Radwaste Buildings(1)

Wall or Section Description	Applicable Column Lines	Applicable Elevation Level or Elevation Level Range	Concrete Thickness(2)(5)	Nominal Reinforcement Vertical (in^2/ft) (3)	Nominal Reinforcement Horizontal (in^2/ft) (3)	Applicable Radiation Shielding Wall (Yes/No)	Applicable Dimension(4)
Top of Basemat to Plant Grade Level (Auxiliary Building)	N/A	0 to 3	-	-	-	No	33'-6"
Bottom of Containment Sump to Top Surface of Embedded Containment Shell	N/A	Difference between Level 1 and 69'-6"	-	-	-	No	3'-0"
Containment Building (Internal Structures)							
Shield Wall between Reactor Vessel Cavity and RCDT Room	E-W wall parallel with column line 7	From 0 to 1.1	3'-0"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 1.1 to 2.3	9'-0"	-	-	Yes	-
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 2.3 to 3	4'-0"	-	-	Yes	-
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-

1. The applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-20.
2. These wall thicknesses have a construction tolerance of ± 1 inch.
3. These concrete reinforcement values represent the minimum reinforcement required for structural requirements except for designed openings, penetrations, sumps or elevator pits. These reinforcement values also apply for each face of the applicable wall unless specifically indicated on the table.
4. These applicable dimensions have a construction tolerance of ± 3 inches.
5. For walls that are part of structural modules, the concrete thickness also includes the steel face plates.

Note: Dash (-) indicates not applicable.

Table 3.3-5
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of safety function. (specified in the Design Description (Section 3.3 paragraph 1.a))	An inspection of the as-built concrete thickness and reinforcement cross-sectional area (density) (excluding designed openings or penetrations will be performed for the critical NI structural sections defined on Table 3.3-1. This inspection data will be reconciled with the applicable structural section data defined on Table 3.3-1 which represents the required concrete and reinforcement to withstand the design basis loads.	An inspection report exists that concludes that the as-built concrete and reinforcement quantities for the critical seismic Category I building sections defined on Table 3.3-1 were used during construction.
1.b) The top of the NI basemat is located below the design plant level per Table 3.3-1.	Inspection of the as-built nuclear island basemat structure will be conducted.	The top of the NI basemat is located below the design plant level consistent with the dimension defined on Table 3.3-1.
1.c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1 Containment System.
1.d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.
1.e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Question 640.140

a. AP600 ITAAC should commit to the basic configuration of the nuclear island structures as shown in Figure 3.3-1 and to inspect the as-built structures against this basic configuration.

b. Westinghouse should provide key dimensions (such as overall dimensions, the distance between column lines, the distance between the center of the reactor vessel and column lines, elevations, total embedment depth, etc.) as the acceptance criteria for verifying the as-built conditions.

c. What is the basis for acceptance criteria #9 (leak rate of 100 gal/hr or smaller for the PCCWS tank).

d. For verifying that the NI structures will withstand the structural design basis loads, Westinghouse should require the existence of a structural analysis report in the ITAAC, which concludes that the as-built NI structures will withstand the structural design basis loads. Also, a description of the contents of a structural analysis report must be provided in the SSAR (Tier 2).

Response:

a. A new ITAAC item 1.f) will be added to define the configuration of the nuclear island structure based on key structural dimensions included in a new ITAAC table. This table will include dimensions between selected key column lines and distances between column lines and inside wall surfaces at the 66'-6" level. Column line dimensions are based on SSAR Figures 3.7.2-12 (Sheet 1 of 12).

b. The embedment depth has already been included in Table 3.3-1. Key dimensions that define the overall NI building are defined in new ITAAC commitment 1.f) defined in response to item a) above.

c. The 100 gal/hr leak rate is based on the two following criteria:
   1) A tolerable leak rate that could be easily replaced under normal operating modes.
   2) This value was a measurable rate that could be detected using existing narrow range level transmitter over a 12 to 24 hour period. This same narrow range transmitter is planned to be used to determine the tank water level.

d. Westinghouse has already generated a design summary report that concludes that the NI structures will withstand the structural design basis loads. This report has been audited by the NRC on various occasions and will be included as Appendix 3H of SSAR. The concrete thicknesses and reinforcement quantities as defined on Table 3.3-1 when included in the as-built structure confirms the as-built structure will withstand the design basis loads. An outline of the Design Summary Report similar to that provided in RAI Response to 220.83 and referenced in Sections 3.8.3.4 and 3.8.4.4.1 can be included in SSAR as a table. The COL applicant will be responsible to provide the as-built structural analysis report.

SSAR Revision:

a) None
b) None
c) None
d) (TBD)

ITAAC Revision:

a) 1.f) The key features of the nuclear island structures is as defined on Table 3.3-5.

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.f) The key features of Nuclear Island Structures is as defined on Table 3.3-5.	An inspection will be performed of the as-built configuration of the Nuclear Island Structures for key featuresdefined on Table 3.3-5.	The as-built inspection report exists and concludes that the key features of the Nuclear Island Structures are consistent with the dimensions defined on Table 3.3-5.

(Note: References to the existing Table 3.3-5 must be updated to reflect the insertion of this new table.)

b) None

c) None

d) None

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
Reference Column Line	Reference Distance From Containment Centerline (ft-in North/South/East/West)	Nominal Inside Wall Surface Distances and Relationship to Reference Column Lines at Elevation Level 1 (ft-in)	Tolerance on Measured Distance (± in)
I	87 ft-6 in /East of Cont. CL.	X1 (Distance between Inside Surfaces Between Col Ln. I & N when Measured between Col 1 and 2)=84 ft-6 in	± 12 in
N	On Centerline		
J	69 ft-6 in /East of Cont. CL.	X2 (Distance between Inside Surfaces Between Col Ln. I & J when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
K	51 ft-6 in /East of Cont. CL.	X3 (Distance between Inside Surfaces Between Col Ln. J & K when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
L	26 ft-0 in /East of Cont. CL.	X4 (Distance between Inside Surfaces Between Col Ln. K & L when Measured between Col 7.3 and 11)= 23 ft-6 in	± 12 in
M	8 ft-0 in /East of Cont. CL.	X5 (Distance between Inside Surfaces Between Col Ln. L & M when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
P	10 ft-0in /West of Cont. CL.	X6 (Distance between Inside Surfaces Between Col Ln. M & P when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
Q	28 ft-0 in /West of Cont.CL.	X7 (Distance between Inside Surfaces Between Col Ln. P & Q when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
1	137 ft-0 in /South of Cont. CL	X8 (Distance between Inside Surfaces Between Col Ln. 1 & 2 when Measured at interface with Col. 11)=19 ft-0 in	± 12 in
2	115 ft-0 in /South of Cont. CL		
4	71 ft-0 in /South of Cont. CL	X9 (Distance between Inside Surfaces Between Col Ln. 1 & 4 when Measured at interface with Col. 11)=63 ft-0 in	± 12 in

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
7.3	45 ft-9 in /North of Cont. CL	X10 (Distance between Inside Surfaces Between Col Ln. 7.3 & 11 when Measured at interface with Col. 11)=67 ft-9 in	± 12 in
11	117 ft-0 in /North of Cont. CL		
7	On Centerline	X11 [Radial Distance from Center of Containment (Intersection of Col. Lines N and 7) to Outside Surface of Shield Building when Measured along Col. Lines 7 and N] = 72 ft-6 in	+ 15 in - 3 in

64-14-4

Question 640.141

In Table 2.3-5, the acceptance criterion refers to an as-built Pipe Rupture Hazards Analysis Report. However, a Pipe Rupture Hazards Analysis Report is not discussed in the SSAR. A pipe rupture hazards analysis is discussed in SSAR Section 3.6.2.5. It is recommended that the following statement be added to SSAR Section 3.6.4.1:

The as-built pipe rupture hazards analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

Response:

SSAR Section 3.6.4.1 will be modified as requested. Proposed markups are provided below.

SSAR Revision:

See markup of SSAR Section 3.6.4.1 (attached).

ITAAC Revision:

None

Bounding Analyses

Evaluations are provided for each different combination of material type, pipe size, pressure, and temperature. These evaluations are used to develop a set of curves of maximum faulted stress versus the corresponding normal stress that satisfy the criteria for leak-before-break. These curves are used in the design of the piping systems and will be used by the Combined License applicant to verify that the as-built piping satisfies the requirements for leak-before-break.

3.6.3.4 Documentation of Leak-before-Break Evaluations

The leak-before-break evaluation is used to support the elimination of dynamic effects of pipe breaks from the loading conditions for the piping analysis. An evaluation of leak-before-break using the as-built configuration of the piping system and supports is required as part of the Design Report of the as-built configuration required to meet ASME Code requirements. Appendix 3B contains a discussion of the bounding analysis methods for the leak-before-break evaluation.

The analysis methods, criteria, and loads used for evaluation of stress in piping systems are outlined in subsections 3.7.3 and 3.9.3. The seismic input bounds the soil design profiles outlined in subsection 3.7.1.4 and Appendicies 2A and 2B. The evaluation also bound soil profiles qualified using site specific evaluations as outlined in subsection 2.5.4.5.5

3.6.4 Combined License Information

3.6.4.1 Pipe Break Hazard Analysis

Combined License applicants referencing the AP600 certified design will complete the final pipe whip restraint design and address as built reconciliation of the pipe break hazards analysis in accordance with the criteria outlined in subsections 3.6.1.3.2 and 3.6.2.5. The as-built pipe rupture hazard analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

3.6.4.2 Leak-before-Break Evaluation

Combined License applicants referencing the AP600 certified design will address: 1) verification that the as-built stresses, diameter, wall thickness, material, welding process, pressure, and temperature in the piping excluded from consideration of the dynamic effects of pipe break are bounded by the leak-before-break bounding analysis; 2) a review of the Certified Material Test Reports or Certifications from the Material Manufacturer to verify that the ASME Code, Section III strength and Charpy toughness requirements are satisfied; and 3) complete the leak-before-break evaluation by comparing the results of the final piping stress analysis with the bounding analysis curves documented in Appendix 3B. The leak-before-break evaluation will be documented in a leak-before-break evaluation report.

Question 640.148

The qualifying comment on soft soil sites in ITAAC #10 needs to be clarified and incorporated into the Design Commitment, if appropriate.

Response:

Change the commitment per the following:

> The construction approach or sequence is dependent on the soil characteristics as defined below:
>
> For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.
>
> For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

SSAR Revision:

None

ITAAC Revision:

See change to Item 10 of the Design Description. No change to Table 3.3-5.

4. a) Exterior walls and the basemat of the NI have a water barrier up to plant elevation 100 ft (design plant grade).

   b) The boundaries between mechanical equipment rooms and the electrical and instrumentation and control (I&C) equipment rooms of the auxiliary building as identified in Table 3.3-2 are designed to prevent flooding of rooms that contain safety-related equipment up to the maximum flood level for each room defined in Table 3.3-2.

   c) The boundaries between the following rooms, which contain safety-related equipment – passive core cooling system (PXS) valve/accumulator room A (11205), PXS valve/accumulator room B (11207), and chemical and volume system (CVS) room (11209) – are designed to prevent flooding between these rooms.

5. The radiologically controlled area of the auxiliary building at the Level 1 elevation contains adequate volume to contain the liquid volume of faulted liquid radwaste system (WLS) storage tanks. The available volume of the radiologically controlled area of the auxiliary building at the Level 1 elevation exceeds the volume of the liquid radwaste storage tanks.

6. a) Class 1E cables and raceways are identified according to applicable color-coded Class 1E divisions.

   b) Class 1E divisional cables are routed in their respective divisional raceways.

   c) Separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables in accordance with the fire areas as identified in Table 3.3-3.

   d) Physical separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables.

7. Systems and components required for safe shutdown located in rooms identified in Table 3.3-4 are protected from the dynamic effects of postulated pipe breaks using pipe whip restraints.

8. The reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-1 between the bottom of the sump and the steel containment.

9. The shield building roof, passive containment cooling system (PCS) storage tank, and the fire water storage tank support and retain the PCS and fire water sources.

10. ~~The construction approach for soft soil sites includes two limits: i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.~~ **~~This commitment applies for only soft soil sites having unconsolidated deposits with shear wave velocities in the range from 1,000 to 2,000 feet per second.~~**

Replace with the paragraph below:

The construction approach or sequence is dependent on the soil characteristics as defined below:

For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.

For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

Question 640.149

Pages 3.3-31 and 3.3-32 are missing. Verify that no pages are missing from Revision 3 of the AP600 Tier I information.

Response:

We confirm that no pages are missing from Revision 3 of the AP600 Tier I information relative to pages 3.3-31 and 3.3-32. The subsequent pages were inadvertently mis-numbered. This section will be repaginated.

SSAR Revision:

None

ITAAC Revision:

Repaginate figure per above response.

Question 640.158

3.3 - Buildings

Table 3.3-5 contains ITAAC for the NI structures as well as for the annex and radwaste buildings. Therefore, Westinghouse should modify the sentence on page 3.3-3 to add the words "annex, radwaste, and" between the words "NI" and "buildings".

Response:

The sentence on page 3.3-3 will be updated as requested. Proposed markups are provided below.

SSAR Revision:

None

ITAAC Revision:

See change to pg. 3.3-3 (attached).

Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.3-5 specifies the inspections, tests, analyses, and associated acceptance criteria for the NI buildings.

Building, annex and radwaste

642.15E-2

Question 640.138

The information in this ITAAC related to protection from the dynamic effects of postulated pipe breaks might not be appropriate as a Tier 1 commitment, and may be accomplished as a SSAR (Tier 2) commitment. The staff suggests the following changes:

a. Delete Table 3.3-4 and add all of the detailed information under "Room Description," "Essential Target Description," and "Hazard Source" in that table to SSAR Table 3.6-3.

b. Revise Item 7 under "Design Description" to read as follows:

"Structures, systems, and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

c. Revise Item 7 in Table 3.3-5 to read as follows:

Design Commitment

"Structures, systems and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

Inspection, Tests, Analyses

"An inspection will be performed of the as-built high and moderate energy pipe break mitigation features."

Acceptance Criteria

"An as-built Pipe Rupture Hazard Analysis Report exists that includes documentation of the results of the high and moderate energy pipe break mitigation features, and concludes that structures, systems, and components required for safe shutdown can withstand the effects of postulated pipe rupture without loss of the required safety function."

Response:

a) The information contained in ITAAC Table 3.3-4 is based on a detailed review of interfaces between high energy line locations and equipment required for safe shutdown. Pipe mitigation features (pipe whip restraints) are only required at locations defined in ITAAC Table 3.3-4. Only these locations are required to be inspected for the presence of the pipe whip restraints. Therefore, ITAAC Table 3.3-4 will be retained. The contents of this ITAAC Table 3.3-4 will be substituted for the information currently contained in SSAR Table 3.6-3 per NRC request. Proposed markups are provided below.

b) Item 7 in the Design Description should not be changed per our response to a) above.

c) Table 3.3-5 will not be changed per response to item a) above.

SSAR Revision:

Replace Table 3.6-3 per the attached markup pages.

ITAAC Revision:

Table 3.3-5 (Item 7) will be corrected to change reference from Table 3.3-5 to 3.3-4 for the "Design Commitment, Inspections, Tests, Analyses" and "Acceptance Criteria" columns.

Table 3.6-3 (Sheet 1 of 2)

Replace This table with attached marked up Table Insert A

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
66'-6"	None		
82'-6"	11201	RCS Press. Spray - Terminal End	RCS-ADS valves: V004A, V004C, V014A, V014C
	11204		None
	11209		None
96'-6"	11204		None
	11209		None
100'-0" and 107'-2"	11209 Pipe chase	SGS Blowdown Piping - Terminal End	CVS Makeup, CVS Letdown, CVS Hydrogen Supply, and SGS steam generator blowdown piping
		CVS Makeup Piping - Terminal End	CVS Makeup valve V091
	11300		None
	11301		None
	11303/ 11304	RCS Makeup Piping - Intermediate Break	SGS sg blowdown and sg drain Piping, RCS pressurizer pressure and level instrumentation, and Pressurizer support steel
117'-6"	11400	SGS Start Up Feedwater Piping - Terminal end	None
	11401		RCS-ADS valves: V004A, V004C, V014A, V014C are protected from a break located in room 11403
	11402		Steam Generator supports are protected from a break located in room 11400
	11403	RCS Press Spray - Terminal End	None
		RCS Letdown - Intermediate Break	Raceways for Divisions A/C and B/D
		RCS Press Spray - Intermediate Break	RCS-ADS valves: V004A, V004C, V014A, V014C

Insert A 3.6-3 (Sheet 1 of 2)

Table 3.3-4
NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11201	Steam Generator Compartment-01	Automatic depressurization system (ADS) Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C	1) Reactor Coolant System (RCS)-Pressurizer Spray Line, 4" L110A: Terminal End Break at RCS Cold Leg 1A 2) RCS-Pressurizer Spray Line, 4" L106: Terminal End Break at RCS Cold Leg 1B
11209	Pipe Chase to CVS Equipment Room	CVS makeup, CVS letdown, CVS hydrogen supply, and SGS steam generator blowdown piping	1) Steam Generator System (SGS)-Blowdown Line, 4" L009A: Terminal End Break at Containment Penetration P27 2) SGS-Blowdown Line, 4" L009B: Terminal End Break at Containment Penetration P28 3) CVS-Makeup Line, 3" L056: Terminal End Break at In-Line Anchor
11303	Lower Pressurizer Compartment	SGS steam generator blowdown and steam generator drain piping. RCS pressurizer pressure and level instrumentation, pressurizer support steel	1) RCS-CVS Purification Line, 3" L112: Intermediate Break at Outlet to Valve CVS-V082
11400	Maintenance Pl/ · Mezzanine	Steam generator supports	1) SGS-Startup Feedwater Line, 6" L005B: Terminal End Break at Containment Penetration P45
11401	Steam Generator 01 Compartment	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L106: Terminal End Break at In-Line Anchor
11403	Pressurizer Spray Valve Room	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L213: Intermediate Break at 4x2 Tee Connection to Auxiliary Spray Line 2) RCS CVS Letdown Line, 3" L111: Intermediate Break at Inlet to Valve CVS-V001

Table 3.6-3 (Sheet 2 of 2)

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
135'-3"	11503	RCS Press Spray - Terminal End	RCS-ADS valves: lower tier platform support steel
160'-6" and 153'-0"	11601	SGS Start Up Feedwater Piping - Terminal end SGS Main Feedwater Piping- Terminal End	RCS head vent piping SGS level instrumentation piping
	11602	SGS Main Feedwater Piping- Terminal End	SGS level instrumentation piping
	11603	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002B, 003B, 012B, & 013B Raceways and cables for Divisions A/C and B/D
	11703	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002A, 003A, 012A, & 013A Raceways and cables for Division A/C
	12244	CVS Makeup Piping - Terminal End	CVS Makeup valve V090

Replace this table with attached markedup Table Insert B

* See Figures 1.2-1 through 1.2-8, 1.2-10, and 1.2-11 for room numbers

640.138-5

Insert B

3.6-3

Table ~~3.3-4~~ (cont.) (Sheet 2 of 2)

NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11503	Upper Pressurizer Compartment	ADS Stage 1, 2, and 3 valves, lower tier platform support steel	1) RCS-Pressurizer Spray Line, 4" L215: Terminal End Break at Pressurizer Nozzle
11601	Steam Generator-01 Feed Water Nozzle Area	RCS head vent piping SGS level instrumentation piping	1) SGS-Startup Feedwater Line, 6" L005A: Terminal End Break at Steam Generator Loop 1 Nozzle 2) SGS-Main Feedwater Line, 16" L003A: Terminal End Break at Steam Generator Loop 1 Nozzle
11602	Steam Generator-02 Feedwater Nozzle Area	SGS level instrumentation piping	1) SGS-Main Feedwater line, 16" L003B: Terminal End Break at Steam Generator Loop 2 Nozzle
11603	Lower ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002B, RCS-V003B, RCS-V012B, and RCS-V013B) Raceways and cable for Divisions A/C and B/D	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010B: Terminal End Break at Inlet to Valve RCS V011B
11703	Upper ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002A, RCS-V003A, RCS-V012A, and RCS-V013A) Raceways and cable: for Division A/C	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010A: Terminal End Break at Inlet to Valve RCS V011A
12244	Lower Annulus Valve Area	CVS Makeup valve – CVS-V090	1) CVS-Makeup Line, 3" L131: Terminal End at In-Line Anchor

Question 640.139

Design Description

a. To be consistent with the SSAR, the first sentence of the first paragraph should read "The nuclear island (NI) structures include the containment building (the steel containment vessel and the containment internal structures), the shield building and auxiliary building."

b. Descriptions (such as construction materials and primary functions) should be provided for the containment internal structures, the shield building, and the auxiliary building.

c. The last phrase of Sentence 1.a should read "without loss of structural integrity and safety function."

d. A description should be provided for the PCCWS tank and the shield building roof structures.

e. In NRC letter, dated March 4, 1997 (RAI 640.5), the staff requested Westinghouse to provide key dimensions in the AP600 CDM. However, only the thickness of walls and floor slabs was given in CDM Table 3.3-1. Westinghouse should also provide SSAR Table 3.7.1-16, elevations as well as the distance between column lines, and between column lines and the edge of the foundation mat in the CDM (Tier 1).

f. Foot Note 1 in Table 3.3-1 states that the applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-20. However, only Figures 3.3-1 through 3.3-15 are provided in Tier 1. Clarification is needed.

g. Table 3.3-1 on Page 3.3-10. For modular walls (Walls 1 and 2, and M-2 Wall), nominal reinforcement is provided in the vertical direction but not in the horizontal direction. Clarification is needed for (1) what kind of reinforcement is used for modular walls, and (2) why no reinforcement is provided in the horizontal direction?

h. The code boundary should be defined in the Design Description and shown in the figures.

i. As documented in the Tier 1 information for the ABWR and System 80+ designs, the structural design basis loads should be clearly defined.

Response:

a) The first sentence of the first paragraph of ITAAC will be updated as requested. Proposed markups are provided below.

b) The design description as presented in conjunction with the detailed information presented in Tables 3.3-1 through 3.3-3 define the construction materials and the primary functions. Inclusion of additional description material is not warranted and could lead to potential confusion. Therefore, it is suggested that no additional changes should be included in the description section in this regard.

c) The last phrase of Sentence 1.a will be updated to include the term "structural integrity" as requested. Proposed markups are provided below.

d) The following sentence will be added to the shield building Design Description (1st paragraph of Section 3.3): "The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank." Proposed markups are provided below.

e) A clarification is required to adequately address this issue: There is no Table 3.7.1-16 defined in the AP600 SSAR. What is the appropriate table or figure containing the elevations to which the NRC is referencing?

Per our response to RAI 640.4, Table 1.2-1 has been added to the SSAR to clarify the AP600 Plant Elevations by level designations. These level designations are referenced in ITAAC Table 3.3-1 and Figures 3.3-1 through 3.3-15.

In addition, the overall NI building dimensions are currently defined on SSAR Figure 3.7.1-16

Since this information is fully defined in the SSAR, it is not clear as to the need to include such information in Tier 1. Therefore, no changes are required to SSAR or Tier 1 data.

f) Only Figures 3.3-1 through 3.3-15 are to be included as Tier 1 information. The reference to 3.3-20 was a typographical error. This will be corrected on Table 3.3-1 with the proposed markups provided below.

g) The modular walls defined in Table 3.3-1 (Page 3.3-10) use a 0.5 inch thick plate on each of the outside surfaces with concrete filled between these surfaces. The outside plates provide the reinforcement and act as the concrete form. No additional internal steel reinforcement is required. Reinforcement is provided in both the horizontal and the vertical directions however, only the vertical direction was considered as a critical section of the wall as far as reinforcement was concerned. The table lists only the critical sections and directions, therefore, the horizontal reinforcement was not required to be included in Tier 1 and no change is required.

h) The code boundaries for the containment vessel are defined in Section 2.2.1 and on Figure 2.2.1-1 for penetration locations. Therefore, no additional data should be included in Section 3.3 since Section 2.2.1 defines necessary Tier 1 information.

i) Add the following sentence to item 1.a): "The design basis loads are those loads associated with:

- Normal plant operation(including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effect of temperature and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles, and earthquake); and
- Internal events (including flood,pipe rupture, equipment failure, and equipment failure generated missiles)."

Also add following to Table 3.3-5 for Item 1.a) under Design Commitment, and Inspection, Tests, Analyses: "specified in the Design Description (Section 3.3 paragraph 1.a)"

SSAR Changes:

a) None
b) None
c) None
d) None
e) None

f) None
g) None
h) None
i) None

ITAAC Changes:

a) See changes to Section 3.3 (attached)
b) None
c) See changes to Section 3.3 (attached)
d) See change to Section 3.3 (attached)
e) None

f) See change to ITAAC Table 3.3-1, page 3.3-4
g) None
h) None
i) See change to ITAAC Section 3.3, page 3.3-1
See change to ITAAC Table 3.3-5

3.3 Buildings

Design Description

The Nuclear Island (NI) structures include the containment (the steel containment vessel and the containment internal structures) and the shield and auxiliary buildings. The containment, shield and auxiliary buildings are structurally integrated on a common basemat which is embedded below the finished plant grade level. The containment building is a cylindrical welded steel vessel with elliptical upper and lower heads, supported by embedding a lower segment between the containment internal structures concrete and the basemat concrete. The shield building, in conjunction with the internal structures of the containment building, provides shielding for the reactor coolant system and the other radioactive systems and components housed in the containment. The auxiliary building houses the safety-related mechanical and electrical equipment located outside the containment and shield buildings. The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank. The annex building houses personnel access, technical support center, non-1E electrical equipment, and hot machine shop. The radwaste building houses the low level waste processing and storage.

1. a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of structural integrity and safety function. (Insert GG below)

   b) The top of the NI basemat is located below the design plant grade level per Table 3.3-1.

   c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]

   d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.

   e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.

2. Selected walls of the NI buildings as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the NI buildings are defined on Table 3.3-1 except for designed openings or penetrations.

3. Selected walls of the annex building and the radwaste building as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the annex building and the radwaste building are defined on Table 3.3-1 except for designed openings or penetrations.

Insert GG:
The design basis loads are those loads associated with:
- Normal plant operation (including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effects of temperatures and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles, and earthquake); and
- Internal events (including flood, pipe rupture, equipment failure, and equipment failure generated missiles)

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Table 3.3-1

Definition of Wall Locations and Thicknesses for NI Buildings, Annex and Radwaste Buildings[1]

Wall or Section Description	Applicable Column Lines	Applicable Elevation Level or Elev Level Range	Concrete Thickness[2][5]	Nominal Reinforcement Vertical (in^2/ft) [3]	Nominal Reinforcement Horizontal (in^2/ft) [3]	Applicable Radiation Shielding Wall (Yes/No)	Applicable Dimension[4]
Top of Basemat to Plant Grade Level (Auxiliary Building)	N/A	0 to 3	-	-	-	No	33'-6"
Bottom of Containment Sump to Top Surface of Embedded Containment Shell	N/A	Difference between Level 1 and 69'-6"	-	-	-	No	3'-0"
Containment Building (Internal Structures)							
Shield Wall between Reactor Vessel Cavity and RCDT Room	E-W wall parallel with column line 7	From 0 to 1.1	3'-0"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 1.1 to 2.3	9'-0"	-	-	Yes	
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 2.3 to 3	4'-0"	-	-	Yes	-
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-

1. The applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-26. 15
2. These wall thicknesses have a construction tolerance of ± 1 inch.
3. These concrete reinforcement values represent the minimum reinforcement required for structural requirements except for designed openings, penetrations, sumps or elevator pits. These reinforcement values also apply for each face of the applicable wall unless specifically indicated on the table.
4. These applicable dimensions have a construction tolerance of ± 3 inches.
5. For walls that are part of structural modules, the concrete thickness also includes the steel face plates.

Note: Dash (-) indicates not applicable.

Table 3.3-5
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of safety function. (specified in the Design Description (Section 3.3 paragraph 1.a))	An inspection of the as-built concrete thickness and reinforcement cross-sectional area (density) (excluding designed openings or penetrations will be performed for the critical NI structural sections defined on Table 3.3-1. This inspection data will be reconciled with the applicable structural section data defined on Table 3.3-1 which represents the required concrete and reinforcement to withstand the design basis loads.	An inspection report exists that concludes that the as-built concrete and reinforcement quantities for the critical seismic Category I building sections defined on Table 3.3-1 were used during construction.
1.b) The top of the NI basemat is located below the design plant level per Table 3.3-1.	Inspection of the as-built nuclear island basemat structure will be conducted.	The top of the NI basemat is located below the design plant level consistent with the dimension defined on Table 3.3-1.
1.c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.
1.d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.
1.e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Question 640.140

a. AP600 ITAAC should commit to the basic configuration of the nuclear island structures as shown in Figure 3.3-1 and to inspect the as-built structures against this basic configuration.

b. Westinghouse should provide key dimensions (such as overall dimensions, the distance between column lines, the distance between the center of the reactor vessel and column lines, elevations, total embedment depth, etc.) as the acceptance criteria for verifying the as-built conditions.

c. What is the basis for acceptance criteria #9 (leak rate of 100 gal/hr or smaller for the PCCWS tank).

d. For verifying that the NI structures will withstand the structural design basis loads, Westinghouse should require the existence of a structural analysis report in the ITAAC, which concludes that the as-built NI structures will withstand the structural design basis loads. Also, a description of the contents of a structural analysis report must be provided in the SSAR (Tier 2).

Response:

a. A new ITAAC item 1.f) will be added to define the configuration of the nuclear island structure based on key structural dimensions included in a new ITAAC table. This table will include dimensions between selected key column lines and distances between column lines and inside wall surfaces at the 66'-6" level. Column line dimensions are based on SSAR Figures 3.7.2-12 (Sheet 1 of 12).

b. The embedment depth has already been included in Table 3.3-1. Key dimensions that define the overall NI building are defined in new ITAAC commitment 1.f) defined in response to item a) above.

c. The 100 gal/hr leak rate is based on the two following criteria:
   1) A tolerable leak rate that could be easily replaced under normal operating modes.
   2) This value was a measurable rate that could be detected using existing narrow range level transmitter over a 12 to 24 hour period. This same narrow range transmitter is planned to be used to determine the tank water level.

d. Westinghouse has already generated a design summary report that concludes that the NI structures will withstand the structural design basis loads. This report has been audited by the NRC on various occasions and will be included as Appendix 3H of SSAR. The concrete thicknesses and reinforcement quantities as defined on Table 3.3-1 when included in the as-built structure confirms the as-built structure will withstand the design basis loads. An outline of the Design Summary Report similar to that provided in RAI Response to 220.83 and referenced in Sections 3.8.3.4 and 3.8.4.4.1 can be included in SSAR as a table. The COL applicant will be responsible to provide the as-built structural analysis report.

SSAR Revision:

a) None
b) None
c) None
d) (TBD)

ITAAC Revision:

a) 1.f) The key features of the nuclear island structures is as defined on Table 3.3-5.

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.f) The key features of Nuclear Island Structures is as defined on Table 3.3-5.	An inspection will be performed of the as-built configuration of the Nuclear Island Structures for key featuresdefined on Table 3.3-5.	The as-built inspection report exists and concludes that the key features of the Nuclear Island Structures are consistent with the dimensions defined on Table 3.3-5.

(Note: References to the existing Table 3.3-5 must be updated to reflect the insertion of this new table.)

b) None

c) None

d) None

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
Reference Column Line	Reference Distance From Containment Centerline (ft-in North/South/East/West)	Nominal Inside Wall Surface Distances and Relationship to Reference Column Lines at Elevation Level 1 (ft-in)	Tolerance on Measured Distance (± in)
I	87 ft-6 in /East of Cont. CL.	X1 (Distance between Inside Surfaces Between Col Ln. I & N when Measured between Col 1 and 2)=84 ft-6 in	± 12 in
N	On Centerline		
J	69 ft-6 in /East of Cont. CL.	X2 (Distance between Inside Surfaces Between Col Ln. I & J when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
K	51 ft-6 in /East of Cont. CL.	X3 (Distance between Inside Surfaces Between Col Ln. J & K when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
L	26 ft-0 in /East of Cont. CL.	X4 (Distance between Inside Surfaces Between Col Ln. K & L when Measured between Col 7.3 and 11)= 23 ft-6 in	± 12 in
M	8 ft-0 in /East of Cont. CL.	X5 (Distance between Inside Surfaces Between Col Ln. L & M when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
P	10 ft-0in /West of Cont. CL.	X6 (Distance between Inside Surfaces Between Col Ln. M & P when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
Q	28 ft-0 in /West of Cont.CL.	X7 (Distance between Inside Surfaces Between Col Ln. P & Q when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
1	137 ft-0 in /South of Cont. CL	X8 (Distance between Inside Surfaces Between Col Ln. 1 & 2 when Measured at interface with Col. 11)=19 ft-0 in	± 12 in
2	115 ft-0 in /South of Cont. CL		
4	71 ft-0 in /South of Cont. CL	X9 (Distance between Inside Surfaces Between Col Ln. 1 & 4 when Measured at interface with Col. 11)=63 ft-0 in	± 12 in

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
7.3	45 ft-9 in /North of Cont. CL	X10 (Distance between Inside Surfaces Between Col Ln. 7.3 & 11 when Measured at interface with Col. 11)=67 ft-9 in	± 12 in
11	117 ft-0 in /North of Cont. CL		
7	On Centerline	X11 [Radial Distance from Center of Containment (Intersection of Col. Lines N and 7) to Outside Surface of Shield Building when Measured along Col. Lines 7 and N] = 72 ft-6 in	+ 15 in - 3 in

64-142-4

Question 640.141

In Table 3.3-5, the acceptance criterion refers to an as-built Pipe Rupture Hazards Analysis Report. However, a Pipe Rupture Hazards Analysis Report is not discussed in the SSAR. A pipe rupture hazards analysis is discussed in SSAR Section 3.6.2.5. It is recommended that the following statement be added to SSAR Section 3.6.4.1:

The as-built pipe rupture hazards analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

Response:

SSAR Section 3.6.4.1 will be modified as requested. Proposed markups are provided below.

SSAR Revision:

See markup of SSAR Section 3.6.4.1 (attached).

ITAAC Revision:

None

Bounding Analyses

Evaluations are provided for each different combination of material type, pipe size, pressure, and temperature. These evaluations are used to develop a set of curves of maximum faulted stress versus the corresponding normal stress that satisfy the criteria for leak-before-break. These curves are used in the design of the piping systems and will be used by the Combined License applicant to verify that the as-built piping satisfies the requirements for leak-before-break.

3.6.3.4 Documentation of Leak-before-Break Evaluations

The leak-before-break evaluation is used to support the elimination of dynamic effects of pipe breaks from the loading conditions for the piping analysis. An evaluation of leak-before-break using the as-built configuration of the piping system and supports is required as part of the Design Report of the as-built configuration required to meet ASME Code requirements. Appendix 3B contains a discussion of the bounding analysis methods for the leak-before-break evaluation.

The analysis methods, criteria, and loads used for evaluation of stress in piping systems are outlined in subsections 3.7.3 and 3.9.3. The seismic input bounds the soil design profiles outlined in subsection 3.7.1.4 and Appendicies 2A and 2B. The evaluation also bound soil profiles qualified using site specific evaluations as outlined in subsection 2.5.4.5.5

3.6.4 Combined License Information

3.6.4.1 Pipe Break Hazard Analysis

Combined License applicants referencing the AP600 certified design will complete the final pipe whip restraint design and address as built reconciliation of the pipe break hazards analysis in accordance with the criteria outlined in subsections 3.6.1.3.2 and 3.6.2.5. The as-built pipe rupture hazard analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

3.6.4.2 Leak-before-Break Evaluation

Combined License applicants referencing the AP600 certified design will address: 1) verification that the as-built stresses, diameter, wall thickness, material, welding process, pressure, and temperature in the piping excluded from consideration of the dynamic effects of pipe break are bounded by the leak-before-break bounding analysis; 2) a review of the Certified Material Test Reports or Certifications from the Material Manufacturer to verify that the ASME Code, Section III strength and Charpy toughness requirements are satisfied; and 3) complete the leak-before-break evaluation by comparing the results of the final piping stress analysis with the bounding analysis curves documented in Appendix 3B. The leak-before-break evaluation will be documented in a leak-before-break evaluation report.

6410.141-1

Question 640.148

The qualifying comment on soft soil sites in ITAAC #10 needs to be clarified and incorporated into the Design Commitment, if appropriate.

Response:

Change the commitment per the following:

> The construction approach or sequence is dependent on the soil characteristics as defined below:
>
> For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.
>
> For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

SSAR Revision:

None

ITAAC Revision:

See change to Item 10 of the Design Description. No change to Table 3.3-5.

4. a) Exterior walls and the basemat of the NI have a water barrier up to plant elevation 100 ft (design plant grade).

   b) The boundaries between mechanical equipment rooms and the electrical and instrumentation and control (I&C) equipment rooms of the auxiliary building as identified in Table 3.3-2 are designed to prevent flooding of rooms that contain safety-related equipment up to the maximum flood level for each room defined in Table 3.3-2.

   c) The boundaries between the following rooms, which contain safety-related equipment – passive core cooling system (PXS) valve/accumulator room A (11205), PXS valve/accumulator room B (11207), and chemical and volume system (CVS) room (11209) – are designed to prevent flooding between these rooms.

5. The radiologically controlled area of the auxiliary building at the Level 1 elevation contains adequate volume to contain the liquid volume of faulted liquid radwaste system (WLS) storage tanks. The available volume of the radiologically controlled area of the auxiliary building at the Level 1 elevation exceeds the volume of the liquid radwaste storage tanks.

6. a) Class 1E cables and raceways are identified according to applicable color-coded Class 1E divisions.

   b) Class 1E divisional cables are routed in their respective divisional raceways.

   c) Separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables in accordance with the fire areas as identified in Table 3.3-3.

   d) Physical separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables.

7. Systems and components required for safe shutdown located in rooms identified in Table 3.3-4 are protected from the dynamic effects of postulated pipe breaks using pipe whip restraints.

8. The reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-1 between the bottom of the sump and the steel containment.

9. The shield building roof, passive containment cooling system (PCS) storage tank, and the fire water storage tank support and retain the PCS and fire water sources.

10. The construction approach for soft soil sites includes two limits: i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building. **This commitment applies for only soft soil sites having unconsolidated deposits with shear wave velocities in the range from 1,000 to 2,000 feet per second.**

Replace with paragraph below:

The construction approach or sequence is dependent on the soil characteristics as defined below:

For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.

For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

Question 640.149

Pages 3.3-31 and 3.3-32 are missing. Verify that no pages are missing from Revision 3 of the AP600 Tier 1 information.

Response:

We confirm that no pages are missing from Revision 3 of the AP600 Tier I information relative to pages 3.3-31 and 3.3-32. The subsequent pages were inadvertently mis-numbered. This section will be repaginated.

SSAR Revision:

None

ITAAC Revision:

Repaginate figure per above response.

Question 640.158

3.3 - Buildings

Table 3.3-5 contains ITAAC for the NI structures as well as for the annex and radwaste buildings. Therefore, Westinghouse should modify the sentence on page 3.3-3 to add the words "annex, radwaste, and" between the words "NI" and "buildings".

Response:

The sentence on page 3.3-3 will be updated as requested. Proposed markups are provided below.

SSAR Revision:

None

ITAAC Revision:

See change to pg. 3.3-3 (attached).

Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.3-5 specifies the inspections, tests, analyses, and associated acceptance criteria for the NI buildings.

Building, annex and radwaste

6.4C.15F 2

Question 640.138

The information in this ITAAC related to protection from the dynamic effects of postulated pipe breaks might not be appropriate as a Tier 1 commitment, and may be accomplished as a SSAR (Tier 2) commitment. The staff suggests the following changes:

a. Delete Table 3.3-4 and add all of the detailed information under "Room Description," "Essential Target Description," and "Hazard Source" in that table to SSAR Table 3.6-3.

b. Revise Item 7 under "Design Description" to read as follows:

"Structures, systems, and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

c. Revise Item 7 in Table 3.3-5 to read as follows:

Design Commitment

"Structures, systems and components required for safe shutdown are protected from the dynamic effects of postulated pipe breaks using pipe break mitigation features."

Inspection, Tests, Analyses

"An inspection will be performed of the as-built high and moderate energy pipe break mitigation features."

Acceptance Criteria

"An as-built Pipe Rupture Hazard Analysis Report exists that includes documentation of the results of the high and moderate energy pipe break mitigation features, and concludes that structures, systems, and components required for safe shutdown can withstand the effects of postulated pipe rupture without loss of the required safety function."

Response:

a) The information contained in ITAAC Table 3.3-4 is based on a detailed review of interfaces between high energy line locations and equipment required for safe shutdown. Pipe mitigation features (pipe whip restraints) are only required at locations defined in ITAAC Table 3.3-4. Only these locations are required to be inspected for the presence of the pipe whip restraints. Therefore, ITAAC Table 3.3-4 will be retained. The contents of this ITAAC Table 3.3-4 will be substituted for the information currently contained in SSAR Table 3.6-3 per NRC request. Proposed markups are provided below.

b) Item 7 in the Design Description should not be changed per our response to a) above.

c) Table 3.3-5 will not be changed per response to item a) above.

SSAR Revision:

Replace Table 3.6-3 per the attached markup pages.

ITAAC Revision:

Table 3.3-5 (Item 7) will be corrected to change reference from Table 3.3-5 to 3.3-4 for the "Design Commitment, Inspections, Tests, Analyses" and "Acceptance Criteria" columns.

Table 3.6-3 (Sheet 1 of 2)

Replace This table with attached marked up Table Insert A

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
66'-6"	None		
82'-6"	11201	RCS Press. Spray - Terminal End	RCS-ADS valves: V004A, V004C, V014A, V014C
	11204		None
	11209		None
96'-6"	11204		None
	11209		None
100'-0" and 107'-2"	11209 Pipe chase	SGS Blowdown Piping - Terminal End	CVS Makeup, CVS Letdown, CVS Hydrogen Supply, and SGS steam generator blowdown piping
		CVS Makeup Piping - Terminal End	CVS Makeup valve V091
	11300		None
	11301		None
	11303/ 11304	RCS Makeup Piping - Intermediate Break	SGS sg blowdown and sg drain Piping; RCS pressurizer pressure and level instrumentation, and Pressurizer support steel
117'-6"	11400	SGS Start Up Feedwater Piping - Terminal end	None
	11401		RCS-ADS valves: V004A, V004C, V014A, V014C are protected from a break located in room 11403
	11402		Steam Generator supports are protected from a break located in room 11400
	11403	RCS Press Spray - Terminal End	None
		RCS Letdown - Intermediate Break	Raceways for Divisions A/C and B/D
		RCS Press Spray - Intermediate Break	RCS-ADS valves: V004A, V004C, V014A, V014C

640.138-3

Insert A 3.6-3 (Sheet 1 of 2)

Table 3.5-4
NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11201	Steam Generator Compartment-01	Automatic depressurization system (ADS) Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C	1) Reactor Coolant System (RCS)-Pressurizer Spray Line, 4" L110A: Terminal End Break at RCS Cold Leg 1A 2) RCS-Pressurizer Spray Line, 4" L106: Terminal End Break at RCS Cold Leg 1B
11209	Pipe Chase to CVS Equipment Room	CVS makeup, CVS letdown, CVS hydrogen supply, and SGS steam generator blowdown piping	1) Steam Generator System (SGS)-Blowdown Line, 4" L009A: Terminal End Break at Containment Penetration P27 2) SGS-Blowdown Line, 4" L009B: Terminal End Break at Containment Penetration P28 3) CVS-Makeup Line, 3" L056: Terminal End Break at In-Line Anchor
11303	Lower Pressurizer Compartment	SGS steam generator blowdown and steam generator drain piping. RCS pressurizer pressure and level instrumentation; pressurizer support steel	1) RCS-CVS Purification Line, 3" L112: Intermediate Break at Outlet to Valve CVS-V082
11400	Maintenance Floor Mezzanine	Steam generator supports	1) SGS-Startup Feedwater Line, 6" L005B: Terminal End Break at Containment Penetration P45
11401	Steam Generator 01 Compartment	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L106: Terminal End Break at In-Line Anchor
11403	Pressurizer Spray Valve Room	ADS Stage 4 valves (RCS-V004A, RCS-V004C, RCS-V014A, and RCS-V014C)	1) RCS Pressurizer Spray Line, 4" L213: Intermediate Break at 4x2 Tee Connection to Auxiliary Spray Line 2) RCS CVS Letdown Line, 3" L111: Intermediate Break at Inlet to Valve CVS-V001

6HC.136-4

Table 3.6-3 (Sheet 2 of 2)

ROOMS WITH HIGH ENERGY PIPE BREAKS AND POTENTIAL ESSENTIAL TARGET INTERACTION

Elevation	Room Numbers*	High Energy Break Source	Essential Equipment Protected by Whip Restraints or Jet Shields
135'-3"	11503	RCS Press Spray - Terminal End	RCS-ADS valves: lower tier platform support steel
160'-6" and 153'-0"	11601	SGS Start Up Feedwater Piping - Terminal end SGS Main Feedwater Piping- Terminal End	RCS head vent piping SGS level instrumentation piping
	11602	SGS Main Feedwater Piping- Terminal End	SGS level instrumentation piping
	11603	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002B, 003B, 012B, & 013B Raceways and cables for Divisions A/C and B/D
	11703	RCS ADS Stage 1 Piping - Terminal End	RCS piping and ADS valves 002A, 003A, 012A, & 013A Raceways and cables for Division A/C
	12244	CVS Makeup Piping - Terminal End	CVS Makeup valve V090

Replace this table with attached marked up Table Insert B

* See Figures 1.2-1 through 1.2-8, 1.2-10, and 1.2-11 for room numbers

640.138-5

Insert B

3.3

Table ~~3.3-4~~ (cont.) (Sheet 2 of 2)

NI Rooms with Postulated High Energy Line Breaks/Essential Targets/Pipe Whip Restraints and Related Hazard Source

Room Number	Room Description	Essential Target Description	Hazard Source
11503	Upper Pressurizer Compartment	ADS Stage 1, 2, and 3 valves, lower tier platform support steel	1) RCS-Pressurizer Spray Line, 4" L215: Terminal End Break at Pressurizer Nozzle
11601	Steam Generator-01 Feed Water Nozzle Area	RCS head vent piping SGS level instrumentation piping	1) SGS-Startup Feedwater Line, 6" L005A: Terminal End Break at Steam Generator Loop 1 Nozzle 2) SGS-Main Feedwater Line, 16" L003A: Terminal End Break at Steam Generator Loop 1 Nozzle
11602	Steam Generator-02 Feedwater Nozzle Area	SGS level instrumentation piping	1) SGS-Main Feedwater line, 16" L003B: Terminal End Break at Steam Generator Loop 2 Nozzle
11603	Lower ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002B, RCS-V003B, RCS-V012B, and RCS-V013B) Raceways and cable for Divisions A/C and B/D	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010B: Terminal End Break at Inlet to Valve RCS V011B
11703	Upper ADS Valve Area	ADS Stage 2 and 3 valves (RCS-V002A, RCS-V003A, RCS-V012A, and RCS-V013A) Raceways and cables for Division A/C	1) RCS-Automatic Depressurization System Stage 1 Line, 4" L010A: Terminal End Break at Inlet to Valve RCS V011A
12244	Lower Annulus Valve Area	CVS Makeup valve – CVS-V090	1) CVS-Makeup Line, 3" L131: Terminal End at In-Line Anchor

Question 640.139

Design Description

a. To be consistent with the SSAR, the first sentence of the first paragraph should read "The nuclear island (NI) structures include the containment building (the steel containment vessel and the containment internal structures), the shield building and auxiliary building."

b. Descriptions (such as construction materials and primary functions) should be provided for the containment internal structures, the shield building, and the auxiliary building.

c. The last phrase of Sentence 1.a should read "without loss of structural integrity and safety function."

d. A description should be provided for the PCCWS tank and the shield building roof structures.

e. In NRC letter, dated March 4, 1997 (RAI 640.5), the staff requested Westinghouse to provide key dimensions in the AP600 CDM. However, only the thickness of walls and floor slabs was given in CDM Table 3.3-1. Westinghouse should also provide SSAR Table 3.7.1-16, elevations as well as the distance between column lines, and between column lines and the edge of the foundation mat in the CDM (Tier 1).

f. Foot Note 1 in Table 3.3-1 states that the applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-20. However, only Figures 3.3-1 through 3.3-15 are provided in Tier 1. Clarification is needed.

g. Table 3.3-1 on Page 3.3-10. For modular walls (Walls 1 and 2, and M-2 Wall), nominal reinforcement is provided in the vertical direction but not in the horizontal direction. Clarification is needed for (1) what kind of reinforcement is used for modular walls, and (2) why no reinforcement is provided in the horizontal direction?

h. The code boundary should be defined in the Design Description and shown in the figures.

i. As documented in the Tier 1 information for the ABWR and System 80+ designs, the structural design basis loads should be clearly defined.

Response:

a) The first sentence of the first paragraph of ITAAC will be updated as requested. Proposed markups are provided below.

b) The design description as presented in conjunction with the detailed information presented in Tables 3.3-1 through 3.3-3 define the construction materials and the primary functions. Inclusion of additional description material is not warranted and could lead to potential confusion. Therefore, it is suggested that no additional changes should be included in the description section in this regard.

c) The last phrase of Sentence 1.a will be updated to include the term "structural integrity" as requested. Proposed markups are provided below.

d) The following sentence will be added to the shield building Design Description (1st paragraph of Section 3.3): "The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank." Proposed markups are provided below.

e) A clarification is required to adequately address this issue: There is no Table 3.7.1-16 defined in the AP600 SSAR. What is the appropriate table or figure containing the elevations to which the NRC is referencing?

Per our response to RAI 640.4, Table 1.2-1 has been added to the SSAR to clarify the AP600 Plant Elevations by level designations. These level designations are referenced in ITAAC Table 3.3-1 and Figures 3.3-1 through 3.3-15.

In addition, the overall NI building dimensions are currently defined on SSAR Figure 3.7.1-16

Since this information is fully defined in the SSAR, it is not clear as to the need to include such information in Tier 1. Therefore, no changes are required to SSAR or Tier 1 data.

f) Only Figures 3.3-1 through 3.3-15 are to be included as Tier 1 information. The reference to 3.3-20 was a typographical error. This will be corrected on Table 3.3-1 with the proposed markups provided below.

g) The modular walls defined in Table 3.3-1 (Page 3.3-10) use a 0.5 inch thick plate on each of the outside surfaces with concrete filled between these surfaces. The outside plates provide the reinforcement and act as the concrete form. No additional internal steel reinforcement is required. Reinforcement is provided in both the horizontal and the vertical directions however, only the vertical direction was considered as a critical section of the wall as far as reinforcement was concerned. The table lists only the critical sections and directions, therefore, the horizontal reinforcement was not required to be included in Tier 1 and no change is required.

h) The code boundaries for the containment vessel are defined in Section 2.2.1 and on Figure 2.2.1-1 for penetration locations. Therefore, no additional data should be included in Section 3.3 since Section 2.2.1 defines necessary Tier 1 information.

i) Add the following sentence to item 1.a): "The design basis loads are those loads associated with:

- Normal plant operation(including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effects of temperature and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles, and earthquake); and
- Internal events (including flood,pipe rupture, equipment failure, and equipment failure generated missiles)."

Also add following to Table 3.3-5 for Item 1.a) under Design Commitment, and Inspection, Tests, Analyses: "specified in the Design Description (Section 3.3 paragraph 1.a)"

SSAR Changes:

a) None
b) None
c) None
d) None
e) None

f) None
g) None
h) None
i) None

ITAAC Changes:

a) See changes to Section 3.3 (attached)
b) None
c) See changes to Section 3.3 (attached)
d) See change to Section 3.3 (attached)
e) None

f) See change to ITAAC Table 3.3-1, page 3.3-4
g) None
h) None
i) See change to ITAAC Section 3.3, page 3.3-1
See change to ITAAC Table 3.3-5

3.3 Buildings

Design Description

The Nuclear Island (NI) structures include the containment (the steel containment vessel and the containment internal structures) and the shield and auxiliary buildings. The containment, shield and auxiliary buildings are structurally integrated on a common basemat which is embedded below the finished plant grade level. The containment building is a cylindrical welded steel vessel with elliptical upper and lower heads, supported by embedding a lower segment between the containment internal structures concrete and the basemat concrete. The shield building, in conjunction with the internal structures of the containment building, provides shielding for the reactor coolant system and the other radioactive systems and components housed in the containment. The auxiliary building houses the safety-related mechanical and electrical equipment located outside the containment and shield buildings. The shield building roof is reinforced concrete structure containing an integral, steel lined Passive Containment Cooling Water Storage (PCCWS) Tank. The annex building houses personnel access, technical support center, non-1E electrical equipment, and hot machine shop. The radwaste building houses the low level waste processing and storage.

1. a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of structural integrity and safety function. (Insert GG below)

   b) The top of the NI basemat is located below the design plant grade level per Table 3.3-1.

   c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]

   d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.

   e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.

2. Selected walls of the NI buildings as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the NI buildings are defined on Table 3.3-1 except for designed openings or penetrations.

3. Selected walls of the annex building and the radwaste building as defined on Table 3.3-1 provide shielding during normal operations. The shield wall thicknesses of the annex building and the radwaste building are defined on Table 3.3-1 except for designed openings or penetrations.

Insert GG:
The design basis loads are those loads associated with:
- Normal plant operation (including dead loads, live loads, lateral earth pressure loads, and equipment loads, including the effects of temperature and equipment vibration);
- External events (including rain, snow, flood, tornado, tornado generated missiles and earthquake); and
- Internal events (including flood, pipe rupture, equipment failure, and equipment failure generated missiles)

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Table 3.3-1

Definition of Wall Locations and Thicknesses for NI Buildings, Annex and Radwaste Buildings(1)

Wall or Section Description	Applicable Column Lines	Applicable Elevation Level or Elevation Level Range	Concrete Thickness(2)(5)	Nominal Reinforcement Vertical (in^2/ft) (3)	Nominal Reinforcement Horizontal (in^2/ft) (3)	Applicable Radiation Shielding Wall (Yes/No)	Applicable Dimension(4)
Top of Basemat to Plant Grade Level (Auxiliary Building)	N/A	0 to 3	-	-	-	No	33'-6"
Bottom of Containment Sump to Top Surface of Embedded Containment Shell	N/A	Difference between Level 1 and 69'-6"	-	-	-	No	3'-0"
Containment Building (Internal Structures)							
Shield Wall between Reactor Vessel Cavity and RCDT Room	E-W wall parallel with column line 7	From 0 to 1.1	3'-0"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 1.1 to 2.3	9'-0"	-	-	Yes	-
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 1.2 to 2.3	7'-6"	-	-	Yes	-
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 2.3 to 3	4'-0"	-	-	Yes	-
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 2.3 to 3	4'-0"	-	-	Yes	-

1. The applicable column lines, elevation levels, and NI basemat reinforcement are identified and included on Figures 3.3-1 through 3.3-~~20~~ 15.
2. These wall thicknesses have a construction tolerance of ± 1 inch.
3. These concrete reinforcement values represent the minimum reinforcement required for structural requirements except for designed openings, penetrations, sumps or elevator pits. These reinforcement values also apply for each face of the applicable wall unless specifically indicated on the table.
4. These applicable dimensions have a construction tolerance of ± 3 inches.
5. For walls that are part of structural modules, the concrete thickness also includes the steel face plates.

Note: Dash (-) indicates not applicable.

Table 3.3-5
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.a) The NI structures are seismic Category I and are designed to withstand design basis loads, which apply to the structure, without loss of safety function. (specified in the Design Description (Section 3.3 paragraph 1.a))	An inspection of the as-built concrete thickness and reinforcement cross-sectional area (density) (excluding designed openings or penetrations will be performed for the critical NI structural sections defined on Table 3.3-1. This inspection data will be reconciled with the applicable structural section data defined on Table 3.3-1 which represents the required concrete and reinforcement to withstand the design basis loads.	An inspection report exists that concludes that the as-ouilt concrete and reinforcement quantities for the critical seismic Category I building sections defined on Table 3.3-1 were used during construction.
1.b) The top of the NI basemat is located below the design plant level per Table 3.3-1.	Inspection of the as-built nuclear island basemat structure will be conducted.	The top of the NI basemat is located below the design plant level consistent with the dimension defined on Table 3.3-1.
1.c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[1]	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.
1.d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.
1.e) The containment and its penetrations maintain the containment leakage rate less than the maximum allowable leakage rate associated with the peak containment pressure for the design basis accident.	See Certified Design Material, Subsection 2.2.1, Containment System.	See Certified Design Material, Subsection 2.2.1, Containment System.

1. Containment isolation devices are addressed in subsection 2.2.1, Containment System.

Question 640.140

a. AP600 ITAAC should commit to the basic configuration of the nuclear island structures as shown in Figure 3.3-1 and to inspect the as-built structures against this basic configuration.

b. Westinghouse should provide key dimensions (such as overall dimensions, the distance between column lines, the distance between the center of the reactor vessel and column lines, elevations, total embedment depth, etc.) as the acceptance criteria for verifying the as-built conditions.

c. What is the basis for acceptance criteria #9 (leak rate of 100 gal/hr or smaller for the PCCWS tank).

d. For verifying that the NI structures will withstand the structural design basis loads, Westinghouse should require the existence of a structural analysis report in the ITAAC, which concludes that the as-built NI structures will withstand the structural design basis loads. Also, a description of the contents of a structural analysis report must be provided in the SSAR (Tier 2).

Response:

a. A new ITAAC item 1.f) will be added to define the configuration of the nuclear island structure based on key structural dimensions included in a new ITAAC table. This table will include dimensions between selected key column lines and distances between column lines and inside wall surfaces at the 66'-6" level. Column line dimensions are based on SSAR Figures 3.7.2-12 (Sheet 1 of 12).

b. The embedment depth has already been included in Table 3.3-1. Key dimensions that define the overall NI building are defined in new ITAAC commitment 1.f) defined in response to item a) above.

c. The 100 gal/hr leak rate is based on the two following criteria:
   1) A tolerable leak rate that could be easily replaced under normal operating modes.
   2) This value was a measurable rate that could be detected using existing narrow range level transmitter over a 12 to 24 hour period. This same narrow range transmitter is planned to be used to determine the tank water level.

d. Westinghouse has already generated a design summary report that concludes that the NI structures will withstand the structural design basis loads. This report has been audited by the NRC on various occasions and will be included as Appendix 3H of SSAR. The concrete thicknesses and reinforcement quantities as defined on Table 3.3-1 when included in the as-built structure confirms the as-built structure will withstand the design basis loads. An outline of the Design Summary Report similar to that provided in RAI Response to 220.83 and referenced in Sections 3.8.3.4 and 3.8.4.4.1 can be included in SSAR as a table. The COL applicant will be responsible to provide the as-built structural analysis report.

SSAR Revision:

a) None
b) None
c) None
d) (TBD)

ITAAC Revision:

a) 1.f) The key features of the nuclear island structures is as defined on Table 3.3-5.

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.f) The key features of Nuclear Island Structures is as defined on Table 3.3-5.	An inspection will be performed of the as-built configuration of the Nuclear Island Structures for key featuresdefined on Table 3.3-5.	The as-built inspection report exists and concludes that the key features of the Nuclear Island Structures are consistent with the dimensions defined on Table 3.3-5.

(Note: References to the existing Table 3.3-5 must be updated to reflect the insertion of this new table.)

b) None

c) None

d) None

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
Reference Column Line	Reference Distance From Containment Centerline (ft-in North/South/East/West)	Nominal Inside Wall Surface Distances and Relationship to Reference Column Lines at Elevation Level 1 (ft-in)	Tolerance on Measured Distance (± in)
I	87 ft-6 in /East of Cont. CL.	X1 (Distance between Inside Surfaces Between Col Ln. I & N when Measured between Col 1 and 2)=84 ft-6 in	± 12 in
N	On Centerline		
J	69 ft-6 in /East of Cont. CL.	X2 (Distance between Inside Surfaces Between Col Ln. I & J when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
K	51 ft-6 in /East of Cont. CL.	X3 (Distance between Inside Surfaces Between Col Ln. J & K when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
L	26 ft-0 in /East of Cont. CL.	X4 (Distance between Inside Surfaces Between Col Ln. K & L when Measured between Col 7.3 and 11)= 23 ft-6 in	± 12 in
M	8 ft-0 in /East of Cont. CL.	X5 (Distance between Inside Surfaces Between Col Ln. L & M when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
P	10 ft-0in /West of Cont. CL.	X6 (Distance between Inside Surfaces Between Col Ln. M & P when Measured between Col 7.3 and 11)= 16 ft-0 in	± 12 in
Q	28 ft-0 in /West of Cont.CL.	X7 (Distance between Inside Surfaces Between Col Ln. P & Q when Measured between Col 7.3 and 11)=15 ft-0 in	± 12 in
1	137 ft-0 in /South of Cont. CL	X8 (Distance between Inside Surfaces Between Col Ln. 1 & 2 when Measured at interface with Col. 11)=19 ft-0 in	± 12 in
2	115 ft-0 in /South of Cont. CL		
4	71 ft-0 in /South of Cont. CL	X9 (Distance between Inside Surfaces Between Col Ln. 1 & 4 when Measured at interface with Col. 11)=63 ft-0 in	± 12 in

640.14[illegible]3

Draft Table 3.3-5 Key Dimensions of NI Building Features Reference Column Lines are Defined Relative to Containment Centerline			
7.3	45 ft-9 in /North of Cont. CL	X10 (Distance between Inside Surfaces Between Col Ln. 7.3 & 11 when Measured at interface with Col. 11)=67 ft-9 in	± 12 in
11	117 ft-0 in /North of Cont. CL		
7	On Centerline	X11 [Radial Distance from Center of Containment (Intersection of Col. Lines N and 7) to Outside Surface of Shield Building when Measured along Col. Lines 7 and N] = 72 ft-6 in	+ 15 in - 3 in

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Question 640.141

In Table 3.3-5, the acceptance criterion refers to an as-built Pipe Rupture Hazards Analysis Report. However, a Pipe Rupture Hazards Analysis Report is not discussed in the SSAR. A pipe rupture hazards analysis is discussed in SSAR Section 3.6.2.5. It is recommended that the following statement be added to SSAR Section 3.6.4.1:

The as-built pipe rupture hazards analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

Response:

SSAR Section 3.6.4.1 will be modified as requested. Proposed markups are provided below.

SSAR Revision:

See markup of SSAR Section 3.6.4.1 (attached).

ITAAC Revision:

None

Bounding Analyses

Evaluations are provided for each different combination of material type, pipe size, pressure, and temperature. These evaluations are used to develop a set of curves of maximum faulted stress versus the corresponding normal stress that satisfy [illegible] for leak-before-break. These curves are used in the design of the piping syster [illegible] used by the Combined License applicant to verify that the as-built piping satisfi[illegible] nts for leak-before-break.

3.6.3.4 Documentation of Leak-before-Break Evaluations

The leak-before-break evaluation is used to support the elimination [illegible] mic effects of pipe breaks from the loading conditions for the piping analysis. An evaluation of leak-before-break using the as-built configuration of the piping system and supports is required as part of the Design Report of the as-built configuration required to meet ASME Code requirements. Appendix 3B contains a discussion of the bounding analysis methods for the leak-before-break evaluation.

The analysis methods, criteria, and loads used for evaluation of stress in piping systems are outlined in subsections 3.7.3 and 3.9.3. The seismic input bounds the soil design profiles outlined in subsection 3.7.1.4 and Appendicies 2A and 2B. The evaluation also bound soil profiles qualified using site specific evaluation [illegible] outlined in subsection 2.5.4.5.5

3.6.4 Combined License Information

3.6.4.1 Pipe Break Hazard Analysis

Combined License applicants referencing the AP600 certified design will complete the final pipe whip restraint design and addre[illegible] as built reconciliation of the pipe break hazards analysis in accordance with the criteria [illegible]tlined in subsections 3.6.1.3.2 and 3.6.2.5. The as-built pipe rupture hazard analysis will be documented in an as-built Pipe Rupture Hazards Analysis Report.

3.6.4.2 Leak-before-Break Evaluation

Combined License applicants referencing the AP600 certified design will address: 1) verification that the as-built stresses, diameter, wall thickness, material, welding process, pressure, and temperature in the piping excluded from consideration of the dynamic effects of pipe break are bounded by the leak-before-break bounding analysis; 2) a review of the Certified Material Test Reports or Certifications from the Material Manufacturer to verify that the ASME Code, Section III strength and Charpy toughness requirements are satisfied; and 3) complete the leak-before-break evaluation by comparing the results of the final piping stress analysis with the bounding analysis curves documented in Appendix 3B. The leak-before-break evaluation will be documented in a leak-before-break evaluation report.

Question 640.148

The qualifying comment on soft soil sites in ITAAC #10 needs to be clarified and incorporated into the Design Commitment, if appropriate.

Response:

Change the commitment per the following:

> The construction approach or sequence is dependent on the soil characteristics as defined below:
>
> For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.
>
> For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

SSAR Revision:

None

ITAAC Revision:

See change to Item 10 of the Design Description. No change to Table 3.3-5.

4. a) Exterior walls and the basemat of the NI have a water barrier up to plant elevation 100 ft (design plant grade).

   b) The boundaries between mechanical equipment rooms and the electrical and instrumentation and control (I&C) equipment rooms of the auxiliary building as identified in Table 3.3-2 are designed to prevent flooding of rooms that contain safety-related equipment up to the maximum flood level for each room defined in Table 3.3-2.

   c) The boundaries between the following rooms, which contain safety-related equipment – passive core cooling system (PXS) valve/accumulator room A (11205), PXS valve/accumulator room B (11207), and chemical and volume system (CVS) room (11209) – are designed to prevent flooding between these rooms.

5. The radiologically controlled area of the auxiliary building at the Level 1 elevation contains adequate volume to contain the liquid volume of faulted liquid radwaste system (WLS) storage tanks. The available volume of the radiologically controlled area of the auxiliary building at the Level 1 elevation exceeds the volume of the liquid radwaste storage tanks.

6. a) Class 1E cables and raceways are identified according to applicable color-coded Class 1E divisions.

   b) Class 1E divisional cables are routed in their respective divisional raceways.

   c) Separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables in accordance with the fire areas as identified in Table 3.3-3.

   d) Physical separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables.

7. Systems and components required for safe shutdown located in rooms identified in Table 3.3-4 are protected from the dynamic effects of postulated pipe breaks using pipe whip restraints.

8. The reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-1 between the bottom of the sump and the steel containment.

9. The shield building roof, passive containment cooling system (PCS) storage tank, and the fire water storage tank support and retain the PCS and fire water sources.

10. ~~The construction approach for soft soil sites includes two limits: i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.~~ **This commitment applies for only soft soil sites having unconsolidated deposits with shear wave velocities in the range from 1,000 to 2,000 feet per second.**

Replace with the paragraph below:

The construction approach or sequence is dependent on the soil characteristics as defined below:

For hard soil sites with unconsolidated deposits with shear wave velocities exceeding the 2000 feet per second criteria, a review of the construction approach is not required.

For soft soil sites with unconsolidated deposits with shear wave velocities in the range of 1000 to 2000 feet per second, the construction approach will include two limits i.) Shield building construction ahead of auxiliary building or ii.) Auxiliary building construction ahead of shield building.

Question 640.149

Pages 3.3-31 and 3.3-32 are missing. Verify that no pages are missing from Revision 3 of the AP600 Tier 1 information.

Response:

We confirm that no pages are missing from Revision 3 of the AP600 Tier I information relative to pages 3.3-31 and 3.3-32. The subsequent pages were inadvertently mis-numbered. This section will be repaginated.

SSAR Revision:

None

ITAAC Revision:

Repaginate figure per above response.

Question 640.158

3.3 - Buildings

Table 3.3-5 contains ITAAC for the NI structures as well as for the annex and radwaste buildings. Therefore, Westinghouse should modify the sentence on page 3.3-3 to add the words "annex, radwaste, and" between the words "NI" and "buildings".

Response:

The sentence on page 3.3-3 will be updated as requested. Proposed markups are provided below.

SSAR Revision:

None

ITAAC Revision:

See change to pg. 3.3-3 (attached).

Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.3-5 specifies the inspections, tests, analyses, and associated acceptance criteria for the NI buildings.

Building, annex and radwaste

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