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Your ref: Docket No. 52-006
Our ref: DCP/NRC1702

May 13, 2004

SUBJECT: Transmittal of Revised Responses to AP1000 DSER Open Items

This letter transmits Westinghouse revised responses for Open Items in the AP1000 Design Safety Evaluation Report (DSER). A list of the revised DSER Open Item responses transmitted with this letter is Attachment 1. The non-proprietary responses are transmitted as Attachment 2.

Please contact me at 412-374-4728 if you have any questions concerning this submittal.

Very truly yours,

R. P. Vijuk, Manager
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/Attachments

1. List of the AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses transmitted with letter DCP/NRC1702
2. Non-Proprietary AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses

D063

DCP/NRC1702
Docket No. 52-006

May 13, 2004

Attachment 1

AP1000 Design Certification Review
Draft Safety Evaluation Report Open Item Non-Proprietary Responses

Table 1 **"List of Westinghouse's Responses to DSER Open Items Transmitted in DCP/NRC1702"**	
May 6, 2004 Security Telecon	

DCP/NRC1702
Docket No. 52-006

May 13, 2004

Attachment 2

AP1000 Design Certification Review
Draft Safety Evaluation Report Open Item Non-Proprietary Responses

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: May 6, 2004 Security Telecon

Original RAI Number(s): None

Summary of Issue:

During an NRC/Westinghouse conference call on May 6, 2004, the AP1000 DCD revisions shown below were agreed.

Westinghouse Response:

See DCD revisions below.

Design Control Document (DCD) Revision:

DCD Section 1.9 Item A-29 will be revised as follows:

A-29 Nuclear Power Plant Design for the Reduction of Vulnerability to Industrial Sabotage

Description

This item addresses potential methods to reduce vulnerability to sabotage. The NRC staff concluded that existing requirements dealing with plant physical security, controlled access to vital areas, screening for reliable personnel appear to be effective. This item was resolved with no new requirements.

AP1000 Response:

The passive systems in the AP1000 provided to mitigate the effects of potential accidents may have an inherent advantage when considering potential acts of sabotage compared to the active systems in operating plants. The AP1000 includes provisions for access control to the vital area. ~~The AP1000 has a smaller protected area than is typically the case in operating plants. This reduces the number of people who must be cleared into the protected area.~~ The provisions for security are discussed in the AP1000 Security Design Report and outlined in Section 13.6.

DCD Section 3.3 will be revised as follows:

3.3 Buildings

Design Description

The nuclear island structures include the containment (the steel containment vessel and the containment internal structure) 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 vessel 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 containment internal structure is reinforced concrete with structural modules used for some walls and floors. The shield building is reinforced concrete and, 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 shield building roof is a reinforced concrete structure containing an integral, steel lined passive containment cooling water storage tank. The auxiliary building is reinforced concrete and houses the safety-related mechanical and electrical equipment located outside the containment and shield buildings.

The portion of the annex building adjacent to the nuclear island is a structural steel and reinforced concrete seismic Category II structure and houses the technical support center, non-1E electrical equipment, and hot machine shop.
The radwaste building is a steel framed structure and houses the low level waste processing and storage.
The turbine building is a non-safety related structure that houses the main turbine generator and the power conversion cycle equipment and auxiliaries. There is no safety-related equipment in the turbine building. The turbine building is located on a separate foundation. The turbine building structure is adjacent to the nuclear island structures.

The diesel generator building is a non-safety related structure that houses the two standby diesel engine powered generators and the power conversion cycle equipment and auxiliaries. There is no safety-related equipment in the diesel generator building. The diesel generator building is located on a separate foundation at a distance from the nuclear island structures.

The plant gas system (PGS) provides hydrogen, carbon dioxide, and nitrogen gases to the plant systems as required. The component locations of the PGS are located either in the turbine building or the yard areas.

1. The physical arrangement of the nuclear island structures and the annex building is as described in the Design Description of this Section 3.3, and as shown on Figures 3.3-1 through 3.3-14. The physical arrangement of the radwaste building, the turbine building, and the diesel generator building is as described in the Design Description of this Section 3.3.

2. a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads, as specified in the Design Description, without loss of structural integrity and the safety-related functions. The design bases loads are those loads associated with:

   - Normal plant operation (including dead loads, live loads, lateral earth pressure loads, and equipment loads, including hydrodynamic loads, 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).

   b) Site grade level is located relative to floor elevation 100′-0″ per Table 3.3-5. Floor elevation 100′-0″ is defined as the elevation of the floor at design plant grade.

   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.

   f) The key dimensions of the nuclear island structures are as defined on Table 3.3-5.

   g) The containment vessel greater than 7 feet above the operating deck provides a heat transfer surface. A free volume exists inside the containment shell above the operating deck.

   h) The containment free volume below elevation 108′ provides containment floodup during a postulated loss-of-coolant accident.

3. Walls and floors of the nuclear island structures as defined on Table 3.3-1, except for designed openings and penetrations, provide shielding during normal operations.

4. Walls and floors of the annex building as defined on Table 3.3-1, except for designed openings and penetrations, provide shielding during normal operations.

5. a) Exterior walls and the basemat of the nuclear island have a water barrier up to site grade.

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

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.

6. a) The radiologically controlled area of the auxiliary building between floor elevations 66′-6″ and 82′-6″ contains adequate volume to contain the liquid volume of faulted liquid radwaste system (WLS) storage tanks. The available room volumes of the radiologically controlled area of the auxiliary building between floor elevations 66′-6″ and 82′-6″ exceeds the volume of the liquid radwaste storage tanks (WLS-MT-05A, MT-05B, MT-06A, MT-06B, MT-07A, MT-07B, MT-07C, MT-11).

b) The radwaste building packaged waste storage room has a volume greater than or equal to 1293 cubic feet.

7. a) Class 1E electrical cables, fiber optic cables associated with only one division, and raceways are identified according to applicable color-coded Class 1E divisions.

b) Class 1E divisional electrical cables and communication cables associated with only one division are routed in their respective divisional raceways.

c) Separation is maintained between Class 1E divisions 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.

e) Class 1E communication cables which interconnect two divisions are routed and separated such that the Protection and Safety Monitoring System voting logic is not defeated by the loss of any single raceway or fire area.

8. Equipment labeled as essential targets in Table 3.3-4 and located in rooms identified in Table 3.3-4 are protected from the dynamic effects of postulated pipe breaks.

9. The reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-5 between the bottom of the sump and the steel containment.

10. The shield building roof and the passive containment cooling system (PCS) storage tank support and retain the PCS water. The passive containment cooling system tank has a stainless steel liner which provides a barrier on the inside surfaces of the tank. Leak chase channels are provided over the tank boundary liner welds.

11. Deleted

12. The extended turbine generator axis intersects the shield building.

13. Separation is provided between the structural elements of the turbine, annex, and radwaste buildings and the nuclear island structure. This separation permits horizontal motion of the buildings in a safe shutdown earthquake without impact between structural elements of the buildings.

14. The walls, doors, ceiling, and floors in the main control room, central alarm station and the secondary alarm station are bullet resistant to a level 4 round.

15. Central alarm station and main control room are vital areas.

16. Security power supply system for alarm annunciator equipment and non-portable communications equipment is located within a vital area.

17. Vital areas are locked and alarmed with active intrusion detection systems that annunciate in the central and secondary alarm stations upon intrusion into a vital area.

18. The locks utilized for the protection of the vital areas are manipulative resistant.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.3-6 specifies the inspections, tests, analyses, and associated acceptance criteria for the buildings.

Table 3.3-1
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Containment Building Internal Structure				
Shield Wall between Reactor Vessel Cavity and RCDT Room	E-W wall parallel with column line 7	From 71'-6" to 83'-0"	3'-0"	Yes
West Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 83'-0" to 98'-0"	7'-6"	Yes
North Reactor Vessel Cavity Wall	E-W wall parallel with column line 7	From 83'-0" to 98'-0"	9'-0"	Yes
East Reactor Vessel Cavity Wall	N-S wall parallel with column line N	From 83'-0" to 98'-0"	7'-6"	Yes
West Refueling Cavity Wall	N-S wall parallel with column line N	From 98'-0" to 135'-3"	4'-0"	Yes
North Refueling Cavity Wall	E-W wall parallel with column line 7	From 98'-0" to 135'-3"	4'-0"	Yes
East Refueling Cavity Wall	N-S wall parallel with column line N	From 98'-0" to 135'-3"	4'-0"	Yes
South Refueling Cavity Wall	E-W wall parallel with column line 7	From 98'-0" to 135'-3"	4'-0"	Yes
South wall of west steam generator compartment	Not Applicable	From 103'-0" to 135'-3"	2'-6"	No
West wall of west steam generator compartment	Not Applicable	From 103'-0" to 135'-3"	2'-6"	No
North wall of west steam generator compartment/south wall of pressurizer compartment	Not Applicable	From 103'-0" to 135'-3" and 158'-0"	2'-6"	Yes
West wall of pressurizer compartment	Not Applicable	From 107'-2" to 169'-0"	2'-6"	Yes
North wall of pressurizer compartment	Not Applicable	From 107'-2" to 169'-0"	2'-6"	Yes
East wall of pressurizer compartment	Not Applicable	From 118'-6" to 169'-0"	2'-6"	Yes
North-east wall of in-containment refueling water storage tank	Parallel to column line N	From 103'-0" to 135'-3"	2'-6"	No
West wall of in-containment refueling water storage tank	Not applicable	From 103'-0" to 135'-3"	5/8" steel plate with stiffeners	No
South wall of east steam generator compartment	Not Applicable	From 87'-6" to 135'-3"	2'-6"	Yes

1. The column lines and floor elevations are identified and included on Figures 3.3-1 through 3.3-13.
2. These wall thicknesses have a construction tolerance of ± 1 inch, except for exterior walls below grade where the tolerance is +12 inches, - 1 inch.
3. For walls that are part of structural modules, the concrete thickness also includes the steel face plates.

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
East wall of east steam generator compartment	Not Applicable	From 94'-0" to 135'-3"	2'-6"	Yes
North wall of east steam generator compartment	Not Applicable	From 87'-6" to 135'-3"	2'-6"	Yes
Shield Building				
Shield Building Cylinder	Not Applicable	From 100'-0" to 265'-0"	3'-0"	Yes
Columns between air inlets	Not Applicable	From 265'-0" to 271'-6"	3'-0"	Yes
Tension Ring	Not Applicable	From 271'-6" to 275'-10"	3'-0"	Yes
Conical Roof	Not Applicable	From 275'-10" to 289'-0"	1'-6" cast-in-place concrete over 6" pre-cast concrete ribbed conical sections	Yes
PCS Tank External Cylindrical Wall	Not Applicable	From 298'-9" to 333'-9"	2'-0"	Yes
PCS Tank Internal Cylindrical Wall	Not Applicable	From 314'-4" to 334'-0"	1'-6"	Yes
PCS Tank Roof	Not Applicable	334'-0"	1'-3"	No
Auxiliary Building Walls/Floors				
Column Line 1 wall	From I to N	From 66'-6" to 100'-0"	3'-0"	No
Column Line 1 wall	From I to N	From 100'-0" to 180'-0"	2'-3"	Yes
Column Line 2 wall	From I to K-2	From 66'-6" to 135'-3"	2'-6"	Yes
Column Line 2 wall	From K-2 to L-2	From 66'-6" to 135'-3"	5'-0"	Yes
Column Line 2 wall	From L-2 to N	From 98'-0" to 135'-3"	2'-6"	Yes
Column Line 2 wall	From I to J-1	From 135'-3" to 153'-0"	2'-0"	Yes
Column Line 3 wall	From J-1 to J-2	From 66'-6" to 82'-6"	2'-6"	Yes
Column Line 3 wall	From J-1 to J-2	From 100'-0" to 135'-3"	2'-6"	Yes
Column Line 3 wall	From J-2 to K-2	From 66'-6" to 135'-3"	2'-6"	Yes
Column Line 3 wall	From K-2 to L-2	From 66'-6" to 94'-3"	2'-6"	Yes
Column Line 4 wall	From I to J-1	From 66'-6" to 153'-0"	2'-6"	Yes
Column Line 4 wall	From J-1 to J-2	From 66'-6" to 92'-6"	2'-6"	Yes

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Column Line 4 wall	From J-1 to J-2	From 100'-0" to 135'-3"	2'-6"	Yes
Column Line 4 wall	From J-2 to K-2	From 66'-6" to 135'-3"	2'-6"	Yes
Column Line 4 wall	From I to intersection with shield building wall	From 135'-3" to 180'-0"	2'-0"	Yes
Column Line 5 wall	From I to J-1	From 66'-6" to 160'-6"	2'-0"	Yes
Column Line 7.1 wall	From I to J-1	From 66'-6" to 82'-6"	2'-0"	Yes
Column Line 7.2 wall	From I to J-1	From 66'-6" to 100'-0"	2'-0"	Yes
Column Line 7.3 wall	From I to K	From 66'-6" to 100'-0"	3'-0"	Yes
Column Line 7.3 wall	From I to K	From 100'-0" to 160'-6"	2'-0"	No
Column Line 11 wall	From I to Q	From 66'-6" to 100'-0"	3'-0"	No
Column Line 11 wall	From I to Q	From 100'-0" to 117'-6"	2'-0"	Yes
Column Line 11 wall	From I to L	From 117'-6" to 153'-0"	2'-0"	Yes
Column Line 11 wall	From L to M	From 117'-6" to 135'-3"	4'-0"	Yes
Column Line 11 wall	From M to P	From 117'-6" to 135'-3"	2'-0"	Yes
Column Line 11 wall	From P to Q	From 117'-6" to 135'-3"	4'-0"	Yes
Column Line 11 wall	From L to Q	From 135'-3" to 153'-0"	2'-0"	Yes
Column Line I wall	From 1 to 11	From 66'-6" to 100'-0"	3'-0"	No
Column Line I wall	From 1 to 4	From 100'-0" to 180'-0"	2'-0"	Yes
Column Line I wall	From 4 to 7.3	From 100'-0" to 160'-6"	2'-0"	No
Column Line I wall	From 7.3 to 11	From 100'-0" to 153'-0"	2'-0"	No
Column Line J-1 wall	From 1 to 2	From 82'-6" to 100'-0"	2'-0"	Yes
Column Line J-1 wall	From 2 to 4	From 66'-6" to 135'-3"	2'-6"	Yes
Column Line J-1 wall	From 2 to 4	From 135'-3" to 153'-0"	2'-0"	Yes
Column Line J-1 wall	From 4 to 5	From 66'-6" to 107'-2"	2'-0"	Yes
Column Line J-2 wall	From 2 to 4	From 66'-6" to 135'-3"	2'-6"	Yes
Column Line J-2 wall	From 4 to intersection with shield building wall	From 82'-6" to 107'-2"	2'-0"	Yes

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Column Line K-2 wall	From 2 to 4	From 66'-6" to 135'-3"	4'-9"	Yes
Column Line L-2 wall	From 2 to 4	From 66'-6" to 135'-3"	4'-0"	Yes
Column Line N wall	From 1 to 2	From 66'-6" to 119'-9"	3'-0"	No
Column Line N wall	From 1 to 2	From 119'-9" to 135'-3"	3'-0"	Yes
Column Line N wall	From 2 to 4	From 66'-6" to 98'-0"	3'-0"	No
Column Line N wall	From 2 to 4	From 98'-0" to 135'-3"	5'-6"	Yes
Column Line N wall	From 1 to 4	From 135'-3" to 180'-0"	2'-0"	Yes
Column Line J wall	From 7.3 to 11	From 66'-6" to 117'-6"	2'-0"	No
Column Line K wall	From 7.3 to 11	From 60'-6" to 135'-3"	2'-0"	Yes
Column Line L wall	From shield building wall to 11	From 60'-6" to 153'-0"	2'-0"	Yes
Column Line M wall	From shield building wall to 11	From 66'-6" to 153'-0"	2'-0"	Yes
Column Line P wall	From shield building wall to 11	From 66'-6" to 153'-0"	2'-0"	Yes
Column Line Q wall	From shield building wall to 11	From 66'-6" to 100'-0"	3'-0"	No
Column Line Q wall	From shield building wall to 11	From 100'-0" to 153'-0"	2'-0"	Yes
Labyrinth Wall between Col. Line 3 and 4 and J-1 to J-2	Not Applicable	From 82'-6" to 100'-0"	2'-0"	Yes
N-S Shield Wall (low wall)	Between K-2 and L-2 extending from column line 1 north	From 100'-0" to 107'-2"	2'-6"	Yes
N-S Shield Wall	Between K-2 and L-2 extending from column line 1 north	From 100'-0" to 125'-0"	2'-3"	Yes
E-W Shield Wall	Between 1 and 2 extending from column line N east	From 100'-0" to 125'-0"	2'-9"	Yes
Column Line 9.2 wall	From I to J and K to L	From 117'-6" to 135'-3"	2'-0"	Yes
Labyrinth Wall between Column Line 7.3 and 9.2 and J to K	Corner wall	From 117'-6" to 135'-3"	2'-0"	Yes
Auxiliary Area Basemat	From 1-11 and I-Q, excluding shield building	From 60'-6" to 66'-6"	6'-0"	No
Nuclear Island Basemat	Below shield building	From 60'-6" to containment vessel or 82'-6"	6'-0" to 22'-0" (varies)	No
Floor	From 1 to 2 and I to N	82'-6"	2'-0"	Yes

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Floor	From 2 to 5 and J-1 to J-2	82'-6"	0'-9"	Yes
Pipe Chase Floor	From 2 to 5 and J-1 to J-2	92'-6"	2'-0"	Yes
Floor	From 2 to 3 and J-2 to K-2	90'-3"	3'-0"	Yes
Floor	From 3 to 4 and J-2 to K-2	92'-6"	2'-0"	Yes
Floor	From 4 to 7.3 and I to J-1	82'-6"	2'-0"	Yes
Floor	From 1 to 2 and I to N	100'-0"	3'-0"	Yes
Floor	From 2 to 4 and K-2 to L-2	92'-8"	3'-2"	Yes
Floor	From I to J-2 and 4 to intersecting vertical wall before column line 5	107'-2"	2'-0"	Yes
Floor	From I to shield building wall and from intersecting vertical wall before column line 5 to column line 5	107'-2"	0'-9"	Yes
Floor	From 5 to 7.3 and I to shield building wall	100'-0"	2'-0"	Yes
Floor	From K to L and shield building wall to column line 10	100'-0"	0'-9"	Yes
Floor	From 1 to 1.6 and L-2 to N	125'-0"	3'-0"	Yes
Floor	From 1.6 to 2 and L-2 to N	117'-6"	2'-0"	Yes
Main Control Room Floor	From 9.2 to 11 and I to L	117'-6"	2'-0"	Yes
Floor	Bounded by shield bldg, 7.3, J, 9.2 and L	117'-6"	2'-0"	Yes
Floor	From 9.2 to 11 and L to Q	117'-6"	2'-0"	Yes
Floor	From 3 to 4 and J-2 to K-2	117'-6"	2'-0"	Yes
Floor	From 2 to 4 and I to J-1	153'-0"	1'-3"	Yes
Floor	From 1 to 4 and I to N	180'-0"	1'-3"	Yes
Floor	From 4 to short of column line 5 and from I to intersection with shield building wall	135'-5"	0'-9"	Yes

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Floor	From short of column line 5 to column line 5 and from I to intersection with shield building wall	133'-0"	0'-9"	Yes
Floor	From 5 to 7.3 and from I to intersection with shield building wall	135'-3"	0'-9"	Yes
Annex Building				
Column line 2 wall	From E to H	From 107'-2" to 135'-3"	19 3/4"	Yes
Column line 4 wall	From E to H	From 107'-2" to 162'-6" & 166'-0"	2'-0"	Yes
N-S Shield Wall between E and F	From 2 to 4	From 107'-2" to 135'-3"	1'-0"	Yes
Column line 4.1 wall	From E to H	From 107'-2" to 135'-3"	2'-0"	Yes
E-W Labyrinth Wall between column line 7.1 and 7.8 and G to H	Not Applicable	From 100'-0" to 112'-0"	2'-0"	
N-S Labyrinth Wall between column line 7.8 and 9 and G to H	Not Applicable	From 100'-0" to 112'-0"	2'-0"	
E-W Labyrinth Wall between column line 7.1 and 7.8 and G to H	Not Applicable	From 100'-0" to 112'-0"	2'-0"	Yes
N-S Labyrinth Wall between column line 7.8 and 9 and G to H	Not Applicable	From 100'-0" to 112'-0"	2'-0"	Yes
N-S Shield Wall on Column line. F	From 4.1 North	From 100'-0" to 117'-6"	1'-0"	Yes
Column Line 9 wall	From E to connecting wall between G and H	From 107'-2" to 117'-6"	2'-0"	Yes
Column Line E wall	From 9 to 13	From 100'-0" to 135'-3"	2'-0"	Yes
Column Line 13 wall	From E to I.1	From 100'-0" to 135'-3"	2'-0"	Yes
Column Line I.1 wall	From 11.09 to 13	From 100'-0" to 135'-3"	2'-0"	Yes
Corridor Wall between G and H	From 9 to 13	From 100'-0" to 135'-3"	1'-6"	Yes
Column Line 9 wall	From I to H	From 117'-6" to 158'-0"	2'-0"	Yes
Floor	2 to 4 from shield wall between E and F to column line H	135'-3"	0'-6"	Yes
Floor	From 4 to 4.1 and E to H	135'-3"	1'-0"	Yes
Floor	From 9 to 13 and E to I.1	117'-6"	0'-6"	Yes

Table 3.3-1 (cont.)
Definition of Wall Thicknesses for Nuclear Island Buildings and Annex Building[1]

Wall or Section Description	Column Lines	Floor Elevation or Elevation Range	Concrete Thickness[2][3]	Applicable Radiation Shielding Wall (Yes/No)
Floor	From 9 to 13 and E to I.1	135'-3"	0'-8"	Yes
Containment Filtration Rm A (North Wall)	Between column line E to H	From 135'-3" to 158'-0"	1'-0"	Yes
Containment Filtration Rm A (East wall)	Between column line E to F	From 135'-3" to 158'-0"	1'-0"	Yes
Containment Filtration Rm A (West wall)	Between column line G to H	From 135'-3" to 158'-0"	1'-0"	Yes
Containment Filtration Rm A (Floor)	Between column line E to H	135'-3"	1'-0"	Yes
Containment Filtration Rm B (Floor)	Between column line E to H	146'-3"	0'-6"	Yes
Containment Filtration Rm B (West wall)	Between column line G to H	From 146'-3" to 158'-0"	1'-0"	Yes
North wall (Room 50351)	N/A	100'-0" to top of wall	1'-4"	Yes
East Wall (Room 50351)	DR from 2R past 3R	100'-0" to top of wall	1'-4"	Yes
West wall (Room 50351)	DR from 2R past 3R	100'-0" to top of wall	1'-4"	Yes
East wall (Room 50352)	FR from 1R to 2R	100'-0" to top of wall	2'-0"	Yes
South wall (Room 50352)	1R from FR to DR	100'-0" to top of wall	2'-0"	Yes
West Wall (Room 50352)	DR from 1R to 2R	100'-0" to top of wall	2'-0"	Yes

Table 3.3-2
Nuclear Island Building Room Boundaries
Required to Have Flood Barrier Floors and Walls

Boundary/ Maximum Flood Level (inches)	Between Room Number to Room Number	
	Room with Postulated Flooding Source	Adjacent Room
Floor/36	12306	12211
Floor/3	12303	12203/12207
Floor/3	12313	12203/12207
Floor/1	12300	12201/12202/12207 12203/12204/12205
Floor/3	12312	12212
Wall/36	12306	12305
Floor/1	12401	12301/12302/12303 12312/12313
Wall/1	12401	12411/12412
Floor/36	12404	12304
Floor/4	12405	12305
Floor/36	12406	12306
Wall/36	12404	12401
Wall/1	12421	12452
Floor/3	12501	12401/12411/12412
Floor/3	12555	12421/12423/12422
Wall/36	12156/12158	12111/12112

Table 3.3-3
Class 1E Divisions in Nuclear Island Fire Areas

Fire Area Number	Class 1E Divisions			
	A	C	B	D
1200 AF 01	Yes	Yes	–	–
1200 AF 03	–	–	Yes	Yes
1201 AF 02	–	–	Yes	–
1201 AF 03	–	–	–	Yes
1201 AF 04	–	–	Yes	Yes
1201 AF 05	–	–	Yes	Yes
1201 AF 06	–	–	Yes	Yes
1202 AF 03	–	Yes	–	–
1202 AF 04	Yes	–	–	–
1204 AF 01	Yes	–	–	–
1220 AF 01	–	–	Yes	Yes
1220 AF 02	–	–	–	Yes
1230 AF 01	Yes	Yes	–	–
1230 AF 02	–	–	Yes	Yes
1240 AF 01	Yes	Yes	–	–
1242 AF 02	Yes		–	

Note: Dash (–) indicates not applicable.

Table 3.3-4
Nuclear Island 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 3.3-4 (cont.)
Nuclear Island 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, 20" 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, 20" 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

Table 3.3-5
Key Dimensions of Nuclear Island Building Features

Key Dimension	Reference Dimension (Figure 3.3-14)	Nominal Dimension	Tolerance
Distance between Outside Surface of walls at Column Line I & N when Measured at Column Line 1	X1	91 ft-0 in	+3 ft -1 ft
Distance from Outside Surface of wall at Column Line 1 to Column Line 7 when Measured at Column Line I	X2	138 ft-0 in	+3 ft -1 ft
Distance from Outside Surface of wall at Column Line 11 to Column Line 7 when Measured at Column Line I	X3	118 ft-0 in	+3 ft -1 ft
Distance between Outside Surface of walls at Column Line I & Q when Measured at Column Line 11	X4	117 ft-6 in	+3 ft -1 ft
Distance from Outside Surface of wall at Column Line Q to Column Line N when Measured at Column Line 11	X5	29 ft-0 in	+3 ft -1 ft
Distance between Outside Surface of shield building wall to shield building centerline when Measured on West Edge of Shield Building	X6	72 ft-6 in	+3 ft -1 ft
Distance between shield building centerline to Reactor Vessel centerline when Measured along Column Line N in North-South Direction	X7	7 ft-6 in	± 3 in
Distance from Bottom of Containment Sump to Top Surface of Embedded Containment Shell	–	2 ft-8 in	± 3 in
Distance from top of Basemat to Design Plant Grade	–	33 ft-6 in	± 1 ft
Distance of Design Plant Grade (Floor elevation 100'-0") relative to Site Grade	–	0 ft	± 3 ft-6 in
Distance from Design Plant Grade to Top Surface of Shield Building Roof	–	234 ft-0 in	± 1 ft

Table 3.3-6 Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1. The physical arrangement of the nuclear island structures and the annex building is as described in the Design Description of this Section 3.3 and Figures 3.3-1 through 3.3-14. The physical arrangement of the radwaste building, the turbine building, and the diesel generator building is as described in the Design Description of this Section 3.3.	An inspection of the nuclear island structures, the annex building, the radwaste building, the turbine building, and the diesel generator building will be performed.	The as-built nuclear island structures, the annex building, the radwaste building, the turbine building, and the diesel generator building conform with the physical arrangement as described in the Design Description of this Section 3.3 and Figures 3.3-1 through 3.3-14.
2.a) The nuclear island structures, including the critical sections listed in Table 3.3-7, are seismic Category I and are designed and constructed to withstand design basis loads as specified in the Design Description, without loss of structural integrity and the safety-related functions.	i) An inspection of the nuclear island structures will be performed. Deviations from the design due to as-built conditions will be analyzed for the design basis loads. ii) An inspection of the as-built concrete thickness will be performed.	i) A report exists which reconciles deviations during construction and concludes that the as-built nuclear island structures, including the critical sections, conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions. ii) A report exists that concludes that the as-built concrete thicknesses conform with the building sections defined on Table 3.3-1.
2.b) Site grade level is located relative to floor elevation 100'-0" per Table 3.3-5.	Inspection of the as-built site grade will be conducted.	Site grade is consistent with design plant grade within the dimension defined on Table 3.3-5.
2.c) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC.[2]	See Tier 1 Material, Subsection 2.2.1, Containment System.	See Tier 1 Material, Subsection 2.2.1, Containment System.

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

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
2.d) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure.	See Tier 1 Material, Subsection 2.2.1, Containment System.	See Tier 1 Material, Subsection 2.2.1, Containment System.
2.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 Tier 1 Material, Subsection 2.2.1, Containment System.	See Tier 1 Material, Subsection 2.2.1, Containment System.
2.f) The key dimensions of nuclear island structures are defined on Table 3.3-5.	An inspection will be performed of the as-built configuration of the nuclear island structures.	A report exists and concludes that the key dimensions of the as-built nuclear island structures are consistent with the dimensions defined on Table 3.3-5.
2.g) The containment vessel greater than 7 feet above the operating deck provides a heat transfer surface. A free volume exists inside the containment shell above the operating deck.	The maximum containment vessel inside height from the operating deck is measured and the inner radius below the spring line is measured at two orthogonal radial directions at one elevation.	The containment vessel maximum inside height from the operating deck is 146'-7" (with tolerance of +12", -6"), and the inside diameter is 130 feet nominal (with tolerance of +12", -6").
2.h) The free volume in the containment allows for floodup to support long-term core cooling for postulated loss-of-coolant accidents.	An inspection will be performed of the as-built containment structures and equipment. The portions of the containment included in this inspection are the volumes that flood with a loss-of-coolant accident in passive core cooling system valve/equipment room B (11207). The in-containment refueling water storage tank volume is excluded from this inspection.	A report exists and concludes that the floodup volume of this portion of the containment is less than 73,500 ft^3 to an elevation of 108'.
3. Walls and floors of the nuclear island structures as defined on Table 3.3-1 except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built nuclear island structures wall and floor thicknesses will be performed.	A report exists and concludes that the shield walls and floors of the nuclear island structures as defined on Table 3.3-1 except for designed openings or penetrations are consistent with the concrete wall thicknesses provided in Table 3.3-1.

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4. Walls and floors of the annex building as defined on Table 3.3-1 except for designed openings or penetrations provide shielding during normal operations.	Inspection of the as-built annex building wall and floor thicknesses will be performed.	A report exists and concludes that the shield walls and floors of the annex building as defined on Table 3.3-1 except for designed openings or penetrations are consistent with the minimum concrete wall thicknesses provided in Table 3.3-1.
5.a) Exterior walls and the basemat of the nuclear island have a water barrier up to site grade.	An inspection of the as-built exterior walls and the basemat of the nuclear island up to floor elevation 100'-0", for application of water barrier will be performed during construction before the walls are poured.	A report exists that confirms that a water barrier exists on the nuclear island exterior walls up to site grade.
5.b) The boundaries between rooms identified in Table 3.3-2 of the auxiliary building are designed to prevent flooding of rooms that contain safety-related equipment.	An inspection of the auxiliary building rooms will be performed.	A report exists that confirms floors and walls as identified on Table 3.3-2 have provisions to prevent flooding between rooms up to the maximum flood levels for each room defined in Table 3.3-2.
5.c) The boundaries between the following rooms, which contain safety-related equipment – PXS valve/accumulator room A (11205), PXS valve/accumulator room B (11207), and CVS room (11209) – are designed to prevent flooding between these rooms.	An inspection of the boundaries between the following rooms which contain safety-related equipment – PXS Valve/ Accumulator Room A (11205), PXS Valve/Accumulator Room B (11207), and CVS Room (11209) – will be performed.	A report exists that confirms that flooding of the PXS Valve/ Accumulator Room A (11205), and the PXS/Accumulator Room B (11207) is prevented to a maximum flood level of 110 feet, and of the CVS room (11209) to a maximum flood level of 109'-10".
6.a) The available room volumes of the radiologically controlled area of the auxiliary building between floor elevations 66'-6" and 82'-6" exceed the volume of the liquid radwaste storage tanks (WLS-MT-05A, MT-05B, MT-06A, MT-06B, MT-07A, MT-07B, MT-07C, MT-11).	An inspection will be performed of the as-built radiologically controlled area of the auxiliary building between floor elevations 66'-6" and 82'-6" to define volume.	A report exists and concludes that the as-built available room volumes of the radiologically controlled area of the auxiliary building between floor elevations 66'-6" and 82'-6" exceed the volume of the liquid radwaste storage tanks (WLS-MT-05A, MT-05B, MT-06A, MT-06B, MT-07A, MT-07B, MT-07C, MT-11).

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
6.b) The radwaste building package waste storage room has a volume greater than or equal to 1293 cubic feet.	An inspection of the radwaste building packaged waste storage room (50352) is performed.	The volume of the radwaste building packaged waste storage room (50352) is greater than or equal to 1293 cubic feet.
7.a) Class 1E electrical cables, communication cables associated with only one division, and raceways are identified according to applicable color-coded Class 1E divisions.	Inspections of the as-built Class 1E cables and raceways will be conducted.	Class 1E electrical cables, communication cables associated with only one division, and raceways are identified by the appropriate color code.
7.b) Class 1E divisional electrical cables and communication cables associated with only one division are routed in their respective divisional raceways.	Inspections of the as-built Class 1E divisional cables and raceways will be conducted.	Class 1E electrical cables and communication cables associated with only one division are routed in raceways assigned to the same division. There are no other safety division electrical cables in a raceway assigned to a different division.
7.c) Separation is maintained between Class 1E divisions in accordance with the fire areas as identified in Table 3.3-3.	i) Inspections of the as-built Class 1E division electrical cables, communication cables associated with only one division, and raceways located in the fire areas identified in Table 3.3-3 will be conducted. ii) Inspections of the as-built fire barriers between the fire areas identified in Table 3.3-3 will be conducted.	i) Results of the inspection will confirm that the separation between Class 1E divisions is consistent with Table 3.3-3. ii) Results of the inspection will confirm that fire barriers exist between Class 1E divisions consistent with the fire areas identified in Table 3.3-3.

7.d) Physical separation is maintained between Class 1E divisions and between Class 1E divisions and non-Class 1E cables.	Inspections of the as-built Class 1E raceways will be performed to confirm that the separation between Class 1E raceways of different divisions and between Class 1E raceways and non-Class 1E raceways is consistent with the following: – Within the main control room and remote shutdown room, the minimum vertical separation is 3 inches and the minimum horizontal separation is 1 inch. – Within other plant areas (limited hazard areas), the minimum separation is defined by one of the following: 1) The minimum vertical separation is 5 feet and the minimum horizontal separation is 3 feet. 2) The minimum vertical separation is 12 inches and the minimum horizontal separation is 6 inches for raceways containing only instrumentation and control and low-voltage power cables <2/0 AWG. 3) For configurations that involve exclusively limited energy content cables (instrumentation and control), the minimum vertical separation is 3 inches and the minimum horizontal separation is 1 inch.	Results of the inspection will confirm that the separation between Class 1E raceways of different divisions and between Class 1E raceways and non-Class 1E raceways is consistent with the followings: – Within the main control room and remote shutdown room, the vertical separation is 3 inches or more and the horizontal separation is 1 inch or more. – Within other plant areas (limited hazard areas), the separation meets one of the following: 1) The vertical separation is 5 feet or more and the horizontal separation is 3 feet or more except. 2) The minimum vertical separation is 12 inches and the minimum horizontal separation is 6 inches for raceways containing only instrumentation and control and low-voltage power cables <2/0 AWG. 3) For configurations that involve exclusively limited energy content cables (instrumentation and control), the minimum vertical separation is 3 inches and the minimum horizontal separation is 1 inch.

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	4) For configurations involving an enclosed raceway and an open raceway, the minimum vertical separation is 1 inch if the enclosed raceway is below the open raceway. 5) For configuration involving enclosed raceways, the minimum separation is 1 inch in both horizontal and vertical directions. – Where minimum separation distances are not maintained, the circuits are run in enclosed raceways or barriers are provided. – Separation distances less than those specified above and not run in enclosed raceways or provided with barriers are based on analysis – Non-Class 1E wiring that is not separated from Class 1E or associated wiring by the minimum separation distance or by a barrier or analyzed is considered as associated circuits and subject to Class 1E requirements.	4) For configurations that involve an enclosed raceway and an open raceway, the minimum vertical separation is 1 inch if the enclosed raceway is below the raceway. 5) For configurations that involve enclosed raceways, the minimum vertical and horizontal separation is 1 inch. – Where minimum separation distances are not met, the circuits are run in enclosed raceways or barriers are provided. – A report exists and concludes that separation distances less than those specified above and not provided with enclosed raceways or barriers have been analyzed. – Non-Class 1E wiring that is not separated from Class 1E or associated wiring by the minimum separation distance or by a barrier or analyzed is treated as Class 1E wiring.
7.e) Class 1E communication cables which interconnect two divisions are routed and separated such that the Protection and Safety Monitoring System voting logic is not defeated by the loss of any single raceway or fire area.	Inspections of the as-built Class 1E communication cables will be conducted.	Class 1E communication cables which interconnect two divisions are routed and separated such that the Protection and Safety Monitoring System voting logic is not defeated by the loss of any single raceway or fire area.

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
8. Equipment labeled as essential targets in Table 3.3-4 and located in rooms identified in Table 3.3-4 are protected from the dynamic effects of postulated pipe breaks.	An inspection will be performed of the as-built high energy pipe break pipe whip restraints features for systems located in rooms identified in Table 3.3-4.	An as-built Pipe Rupture Hazard Analysis Report exists and concludes that equipment labeled as essential targets in Table 3.3-4 and located in rooms identified in Table 3.3-4 can withstand the effects of postulated pipe rupture without loss of required safety function.
9. The reactor cavity sump has a minimum concrete thickness as shown in Table 3.3-5 between the bottom of the sump and the steel containment.	An inspection of the as-built containment building internal structures will be performed.	A report exists and concludes that the reactor cavity sump has a minimum concrete thickness as shown on Table 3.3-5 between the bottom of the sump and the steel containment.
10. The shield building roof and PCS storage tank support and retain the PCS water sources. The PCS storage tank has a stainless steel liner which provides a barrier on the inside surfaces of the tank. Leak chase channels are provided on the tank boundary liner welds.	i) A test will be performed to measure the leakage from the PCS storage tank based on measuring the water flow out of the leak chase collection system. ii) An inspection of the PCS storage tank exterior tank boundary and shield building tension ring will be performed before and after filling of the PCS storage tank to the overflow level. The vertical elevation of the shield building roof will be measured at a location at the outer radius of the roof (tension ring) and at a location on the same azimuth at the outer radius of the PCS water storage tank before and after filling the PCS storage tank.	i) A report exists and concludes that total water flow from the leak chase collection system does not exceed 10 gal/hr. ii) A report exists and concludes that there is no visible water leakage from the PCS storage tank and that inspection and measurement of the structure before and after filling of the tank shows structural behavior under normal loads to be acceptable.
11. Deleted		
12. The extended turbine generator axis intersects the shield building.	An inspection of the as-built turbine generator will be performed.	The extended axis of the turbine generator intersects the shield building.

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
13. Separation is provided between the structural elements of the turbine, annex and radwaste buildings and the nuclear island structure. This separation permits horizontal motion of the buildings in the safe shutdown earthquake without impact between structural elements of the buildings.	An inspection of the separation of the nuclear island from the annex, radwaste and turbine building structures will be performed. The inspection will verify the specified horizontal clearance between structural elements of the adjacent buildings, consisting of the reinforced concrete walls and slabs, structural steel columns and floor beams.	The minimum horizontal clearance above floor elevation 100′-0″ between the structural elements of the annex and radwaste buildings and the nuclear island is 4 inches. The minimum horizontal clearance above floor elevation 100′-0″ between the structural elements of the turbine building and the nuclear island is 12 inches.
14. The walls, doors, ceiling, and floors in the main control room, central alarm station and the secondary alarm station are bullet resistant to a level 4 round.	Type test, analysis, or a combination of type test and analysis will be performed for the walls, doors, ceilings, and floors in the main control room, central alarm station and the secondary alarm station.	A report exists and concludes that the walls, doors, ceilings, and floors in the main control room, central alarm station and the secondary alarm station are bullet resistant to a level 4 round.
15. Central alarm station and main control room are vital areas.	An inspection of the as-built central alarm station and main control room will be performed.	Access to the central alarm station and main control room is through an activated intrusion alarm system and at least two security hardened barriers.
16. Security power supply system for alarm annunciator equipment and non-portable communications equipment is located within a vital area.	An inspection of the as-built location of the security power supply for alarm annunciator equipment and non-portable communications equipment will be performed.	Access to the security power supply for alarm annunciator equipment and non-portable communications equipment is through an activated intrusion alarm system and at least two security hardened barriers.
17. Vital areas are locked and alarmed with active intrusion detection systems that annunciate in the central and secondary alarm stations upon intrusion into a vital area.	An inspection of the as-built vital areas, central and secondary alarm stations are performed.	Vital areas are locked and alarmed with active intrusion detection systems that annunciate in the central and secondary alarm stations upon intrusion into a vital area.

Table 3.3-6 (cont.) Inspections, Tests, Analyses, and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
18. The locks utilized for the protection of the vital areas are manipulative resistant.	Type test, analysis, or a combination of type test and analysis will be performed for the locks used in the protection of the vital areas.	A report exists and concludes that the locks utilized for the protection of the vital areas are manipulative resistant.

Table 3.3-7 Nuclear Island Critical Structural Sections
Containment Internal Structures
South west wall of the refueling cavity
South wall of the west steam generator cavity
North east wall of the in-containment refueling water storage tank
In-containment refueling water storage tank steel wall
Column supporting the operating floor
Auxiliary and Shield Building
South wall of auxiliary building (column line 1), elevation 66'-6" to elevation 180'-0"
Interior wall of auxiliary building (column line 7.3), elevation 66'-6" to elevation 160'-6"
West wall of main control room in auxiliary building (column line L), elevation 117'-6" to elevation 153'-0"
North wall of MSIV east compartment (column line 11 between lines P and Q), elevation 117'-6" to elevation 153'-0"
Shield building cylinder, elevation 160'-6" to elevation 200"-0"
Roof slab at elevation 180'-0" adjacent to shield building cylinder
Floor slab on metal decking at elevation 135'-3"
2'-0" slab in auxiliary building (tagging room ceiling) at elevation 135'-3"
Finned floor in the main control room at elevation 135'-3"
Shield building roof, exterior wall of the PCS water storage tank
Shield building roof, tension ring and columns between air inlets, elevation 265'-0" to elevation 275'-10"
Divider wall between the spent fuel pool and the fuel transfer canal
Nuclear Island Basemat Below Auxiliary Building
Bay between reference column lines 9.1 and 11, and K and L
Bay between reference column lines 1 and 2 and K-2 and N

DCD Chapter 13 will be revised as follows:

CHAPTER 13

CONDUCT OF OPERATIONS

This chapter provides information relating to the preparations and plans for operation of the AP1000. Its purpose is to provide reasonable assurance that the Combined License applicant can establish and maintain a staff of sufficient size and technical competence and that operating plans provide reasonable assurance of adequate protection of the public health and safety.

13.1 Organizational Structure of Applicant

This section is the responsibility of the Combined License applicant. The organizational structure must be consistent with the human system interface design assumptions. See Section 1.8 and Chapter 18 for interface requirements pertaining to organizational structure.

13.1.1 Combined License Information Item

Combined License applicants referencing the AP1000 certified design will address adequacy of the organizational structure.

13.2 Training

Training programs are the responsibility of the Combined License applicant.
Chapter 18, Section 18.10 references WCAP 14655, "Designer's Input for the Training of the Human Factors Engineering Verification and Validation Personnel" that provides input for the Combined License applicant. This document describes input from the designer on the training of the operations personnel who participate as subjects in the human factors engineering (HFE) verification and validation. The WCAP also describes how training insights are passed from the designer to the Combined License applicant.

13.2.1 Combined License Information Item

Combined License applicants referencing the AP1000 certified design will develop and implement training programs for plant personnel. This includes the training program for the operations personnel who participate as subjects in the human factors engineering verification and validation. These Combined License applicant training programs will address the scope of licensing examinations as well as new training requirements.

13.3 Emergency Planning

Emergency planning is the responsibility of the Combined License applicant. See subsection 1.2.5 for the locations of the technical support center, the operational support center and the decontamination facilities. See Section 9.4 for a description of the HVAC systems for the main control room/technical support center and the annex building. See Section 18.8 for the high level requirements for the technical support center and the operational support center. See Section 7.5 for identification of plant variables that are provided for interface to the emergency planning areas. Communication interfaces among the main control room, the technical support center and the emergency planning

centers are the responsibility of the Combined License applicant.
Staffing of the emergency operations facility occurs consistent with current operating practice and with revision 1 of NUREG-0654/FEMA-REP-1.

13.3.1 Combined License Information Item

Combined License applicants referencing the AP1000 certified design will address emergency planning including post-72 hour actions and its communication interface.
Combined License applicants referencing the AP1000 certified design will address the activation of the emergency operations facility consistent with current operating practice and NUREG-0654/FEMA-REP-1.

13.4 Operational Review

This section is the responsibility of the Combined License applicant.

13.4.1 Combined License Information Item

Combined License applicants referencing the AP1000 certified design will address each operational review.

13.5 Plant Procedures

Plant procedures are the responsibility of the Combined License applicant. References to applicable combined license information are included in Section 1.8. This includes, for example, reference to guidelines on inservice inspection in Chapters 3 and 6, and initial testing in Chapter 14. Operational experience and the resolution of generic issues to be considered in the preparation of plant procedures are outlined in Section 1.9. The Combined License applicant will establish procedures to perform rod control system surveillance tests specified in WCAP-13864, Revision 1 (Reference 7), at the beginning of each fuel cycle. The Combined License applicant will ensure that all portions of the safety-related logic circuitry are adequately covered in the surveillance procedures as described in Generic Letter 96-01 (Reference 8).

Reference 1 provides input to the Combined License applicant for the development of plant operating procedures, including information on the development and design of the AP600 emergency response guidelines and emergency operating procedures. Also included in Reference 1 is information on the computerized procedure system, which is the human system interface that allows the operators to execute the plant procedures. From an operational viewpoint, in particular with regards to plant procedures, the AP1000 is the same as the AP600. This allows the use of a common guide such as Reference 1.

The computerized procedure system is not part of the AP1000 design scope that the Nuclear Regulatory Commission is being asked to approve. The acceptability of the computerized procedure system, and its backup, for application to the AP1000 design will be determined during the implementation of the AP1000 verification and validation program (see DCD Section 18.8) and reviewed as part of an application for a combined license.
The Combined License applicant is responsible for the development of plant specific refueling plans (DCD Appendix 19E provides input for refueling plans).

Outage plans, which are the responsibility of the Combined License applicant, should as a minimum address the following elements:

- An outage philosophy, which includes safety as a primary consideration in outage planning and implementation,
- Separate organizations responsible for scheduling and overseeing the outage; provisions for an independent safety review team that would be assigned to perform final review and grant approval for outage activities,
- Control procedures, which address both the initial outage plan and all safety-significant changes to schedule,
- Provisions to ensure that all activities receive adequate resources,
- Provisions to ensure defense-in-depth during shutdown and ensure that margins are not reduced; an alternate or backup system must be available if a safety system or a defense-in-depth system is removed from service, and
- Provisions to ensure that all personnel involved in outage activities are adequately trained; this should include operator simulator training to the extent practicable; other plant personnel, including temporary personnel, should receive training commensurate with the outage tasks they will be performing.

If freeze seals are to be used, the Combined License applicant must develop plant-specific guidelines to reduce the potential for loss of RCS boundary and inventory when they are in use.

13.5.1 Combined License Information Item

Combined License applicants referencing the AP1000 certified design will address plant procedures including the following:

- Normal operation
- Abnormal operation
- Emergency operation
- Refueling and outage planning
- Alarm response
- Maintenance, inspection, test and surveillance
- Administrative
- Operation of post-72 hour equipment

13.6 Security

13.6.1 Preliminary Planning

As a result of the events of September 11, 2001, the NRC issued orders to power reactor licensees titled "Interim Compensatory Measures for High Threat Environment" (Reference 4). On April 29, 2003, the NRC also issued a revised "Design Basis Threat for Radiological Sabotage for Operating Power Reactors" (Reference 5). An assessment of the impact of References 4 and 5 is provided in the AP1000 Security Assessment (Reference 6) that has been submitted under separate cover in accordance

with 10 CFR 2.790(d), Rules of Practice. The AP1000 Security Assessment Document provides an assessment of how References 4 and 5 are addressed in the AP1000 design, and identifies the applicable requirements in References 4 and 5 that are addressed by the Combined License applicant for an AP1000.

13.6.2 Security Plan

The comprehensive physical security program is the responsibility of the Combined License applicant and will be addressed in the security plan, contingency plan, and guard training plan provided by the Combined License applicant.

13.6.3 Plant Protection System

13.6.3.1 Introduction

A physical protection system and security organization is provided to protect the AP1000 from radiological sabotage, as required by 10 CFR 73.55. To achieve this objective, the physical protection system:

- Includes a security organization
- Locates vital equipment within vital areas
- Controls points of personnel, vehicle, and material access into the vital areas
- Annunciates alarms in a continuously manned central alarm station and at least one other continuously manned alarm station that is physically separated from the central alarm station
- Provides for continuous communications between the security officers and the continuously manned alarm stations
- Provides for testing and maintenance of the alarms, communications, and physical barriers
- Responds to threats of radiological sabotage in accordance with a developed contingency plan

13.6.4 Physical Security Organization

The description of the site-specific physical security organization is the responsibility of the Combined License applicant. The size and capabilities of the physical security organization's armed response team are established by a vulnerability analysis and protective strategy development prepared by the Combined License applicant.

13.6.5 Physical Barriers

13.6.5.1Protected Area

The definition of the protected area is the responsibility of the Combined License applicant.

13.6.5.2Vital Areas

Vital equipment is located within designated vital areas. The AP1000 vital areas are encompassed by the boundary formed by the shield building, a reinforced concrete and steel structure surrounding containment, and by portions of the reinforced concrete perimeter and interior walls of the auxiliary and annex buildings. Access points to vital areas are locked and alarmed with active intrusion detection systems. The vital areas and a listing of the vital equipment are provided in Reference 6.

13.6.5.3Bullet-Resisting Barriers

The doors, walls, floor, and ceiling of the main control room and the continuously manned alarm stations are designed to meet the bullet-resisting criteria of UL-752, High Power Rifle Rating, including resistance to a level 4 round. The Combined License applicant is responsible for the detail design and bullet resistance of the structure that isolates the individual responsible for the last access control function for admission to the protected area.

13.6.5.4Vehicle Barrier System

The Combined License Applicant is responsible for the definition, location, and the detail design of the AP1000 Vehicle Barrier System.

13.6.6 Access Requirements

The Combined License applicant is responsible for the following access control features:

- Positive control features are implemented to provide authorization for personnel and vehicles entering the vital areas.
- Means for positive identification of authorized personnel entering the protected and vital areas.
- Means for searching individuals, packages, and materials for firearms, explosives, and incendiary devices. This may be accomplished using detection devices such as metal detectors, explosive detectors, and x-ray machines.

The AP1000 design certification scope includes:

- Access portals entering the vital areas are identified and unmanned portals are provided with alarm annunciation in the continuously manned alarm stations.
- Vital area ingress and egress are designed to interface with other plant requirements and not impair plant operations during emergency conditions.

13.6.7 Detection Aids

The design of the detection aids is the responsibility of the Combined License applicant.

13.6.8 Security Lighting

The design of the AP1000 security lighting is the responsibility of the Combined License applicant.

13.6.9 Security Power Supply System

Security equipment that supports critical monitoring functions, such as intrusion detection, alarm assessment, and the security communication system, can receive power from the security-dedicated uninterruptible power supply (UPS) system. Switchover to the uninterruptible power supply system is automatic and does not cause false alarms on annunciation modules. The uninterruptible power supply system is capable of sustaining operation for a minimum of 24 hours. The location of the security power supply system is specified in Reference 6. The final design of the security power supply system is the responsibility of the Combined License applicant.

13.6.10 Communications

The final design of the security communication system will be addressed by the Combined License applicant. Two two-way communications paths are provided between the control room and the alarm stations within the AP1000. A single act of sabotage cannot sever both communication paths. Security force members with responsibilities to respond to acts of sabotage have the capability for continuous two-way communication with the alarm stations, and with each other. The centralized communication equipment is located in a vital area so that it will remain operable during a radiological sabotage event.
Non-portable security communications equipment can be fed from the security power supply system so that it remains operable in the event of the loss of normal power.

13.6.11 Testing and Maintenance

The Combined License applicant will address testing and maintenance aspects of the plant security system.

13.6.12 Response Requirements

The Combined License applicant will address response requirements of the plant security program.

13.6.13 Combined License Information Item

13.6.13.1 Security Plans, Organization, and Testing

Combined License applicants referencing the AP1000 certified design will address site-specific information related to the security, contingency, and guard training plans. Those plans will include descriptions of the tests planned to show operational status, maintenance of the plant security system, the security organization, communication, and response requirements.

The Combined License applicant will develop the comprehensive physical security program which includes the security plan, contingency plan, and guard training plan. Each COL applicant will describe in its physical security

plan how the requirements of 10 CFR Part 26 will be met. At least 60 days before loading fuel, the Combined License applicant will confirm that the security systems and programs described in its physical security plan, safeguards contingency plan, and training and qualification plan have achieved operational status and are available for the staff's inspection. Operational status means that the security systems and programs are functioning. The determination that operational status has been achieved will be based on tests conducted under realistic operating conditions of sufficient duration to demonstrate that:

- the equipment is properly operating;
- procedures have been developed, approved, and implemented; and
- personnel responsible for security operations and maintenance have been appropriately trained and have demonstrated their capability to perform their assigned duties and responsibilities.

13.6.13.2 Vital Equipment

Combined License applicants referencing the AP1000 certified design will verify that the as-built location of vital equipment is inside the vital areas identified in Reference 6.

13.6.13.3 Plant Security System

Combined License applicants referencing the AP1000 certified design will address site-specific information related to the design, maintenance, and testing of the plant security system, including definition of the protected area; definition and location of the site boundary fence; definition, location, and detail design of the vehicle barrier; definition of control points for personnel, vehicle, and material access into the protected areas; detection and alarm design features; security lighting; security power supply including the interface to the UPS system; and communication system.

13.6.13.4 Nuclear Material Control System

Combined License applicants referencing the AP1000 certified design will address specific material control measures as required by 10 CFR Part 70 and the guidance provided in Reference 9.

13.7 References

1. WCAP-14690, "Designer's Input To Procedure Development for the AP600," Revision 1, June 1997.

2. Not used.

3. Not used.

4. Interim Compensatory Measures for High Threat Environment, February 25, 2002.

5. Design Basis Threat for Radiological Sabotage for Operating Power Reactors, April 29, 2003.

6. AP1000 Security Assessment, Revision 1, March 2004.

7. WCAP-13864, "Rod Control System Evaluation Program," Revision 1-A, November 1994.

8. USNRC Generic Letter GL-96-01, "Testing of Safety-Related Logic Circuits," January 10, 1996.

9. ANSI N15.8, "Nuclear Material Control Systems for Nuclear Power Plants," 1974.

PRA Revision:

None