IMC 2519P
Appendix A

AP 1000 CONSTRUCTION SIGNIFICANCE DETERMINATION PROCESS - PILOT

1.0 APPLICABILITY

The construction significance determination process (SDP) in this Appendix is designed to provide a means by which NRC inspectors and management can assess the significance of findings identified at facilities for which a limited work authorization (LWA) and/or a combined license (COL) has been issued authorizing construction activities on a proposed AP 1000 commercial nuclear reactor.

2.0 ENTRY CONDITIONS

Each issue entering the SDP process must first be screened using IMC 0613P, Appendix B, “Issue Screening,” and IMC 0613P, Appendix E, “Examples of Minor Issues.”

In rare cases, the construction SDP guidance in this appendix may not be adequate to provide reasonable estimates of the significance of inspection findings within the established SDP timeliness goal of 90 days or less. In this case, the significance determination process using qualitative criteria described in Appendix M will be used.

3.0 DEFINITIONS

Within this SDP, the following definitions apply:

A. Performance Deficiency (PD). An issue that is the result of a licensee not meeting a requirement or standard where the cause was reasonably within the licensee’s ability to foresee and correct, and therefore should have been prevented. A performance deficiency can exist if a licensee fails to meet a self-imposed standard or a standard required by regulation, thus a performance deficiency may exist independently of whether a regulatory requirement was violated. Additional discussion can be found in Appendix B, 'Issue Screening,' of IMC 0613P.

B. Finding. A performance deficiency of more than minor significance. A finding may or may not be associated with regulatory non-compliance and, therefore, may or may not result in a violation.

C. Programmatic finding. A finding involving inadequate requirements intended to ensure a critical attribute of a construction or operational program is met.

D. Technical finding. A finding that is not a programmatic finding. Construction findings and ITAAC findings are examples of technical findings.

- ITAAC finding is a technical finding that is associated with a specific ITAAC and is material to the ITAAC acceptance criteria.

- Construction finding is a technical finding that is not associated with a specific ITAAC and/or is not material to the ITAAC acceptance criteria.

E. Program critical attribute – An element of a program that is established to ensure that a regulatory requirement is met. Program descriptions are contained in the final safety analysis report.

F. Work activities – Processes implemented during the construction of the facility in areas such as but not limited to structural, piping, electrical, and foundations.

4.0. AP 1000 CONSTRUCTION SIGNIFICANCE DETERMINATION PROCESS

The inspector will first determine the cornerstone affected as a result of the performance deficiency. If the finding affects the attributes of multiple construction cornerstones, the finding should be assigned to the cornerstone that is most related to the finding. The inspector should refer to the Construction Programmatic SDP flow diagram as the following steps are accomplished.

Step 1 Determine if the finding is related to a security construction or operational program.

a. If the finding is related to security either during construction (i.e., fitness-for duty, control of safeguards information) or after the operational security program has been implemented, go to the Baseline Security SDP in IMC 0609, Appendix E, Part 1.

b. If the finding is not related to a security program, then go to step 2.

Step 2 Determine if the finding is associated with an operational program after a license condition implementation milestone has occurred.

a. If the operational program implementation milestone has been reached, go to the appropriate ROP SDP in IMC 0609.

b. If the finding is not related to an operational program after the program implementation milestone has been met, go to Step 3.

Step 3 Determine the type of finding that has been identified.

a. If the finding is associated only with program requirements and there is no technical issue involved, it is a programmatic finding. Proceed to Step 4. If the finding is not a programmatic finding, it is a technical finding. Continue.

b. If the finding is associated with a specific ITAAC and is material to the ITAAC acceptance criteria, it is an ITAAC finding and it will be assigned to the cornerstone that best reflects the finding. Proceed to Step 6.

c. If the finding is not associated with a specific ITAAC and/or is not material to the ITAAC acceptance criteria, it is a construction finding and it will be assigned to the cornerstone that best reflects the finding. Proceed to Step 6.

Step 4 If the finding is associated with an operational program, it will be assigned to the Operational Programs cornerstone. If the finding is associated with a construction program, it will be assigned to the cornerstone that is most closely related to the respective construction program.

Determine if the finding is an omission of a program's critical attribute.

a. If the finding is an omission of a program's critical attribute, go to step 5.

b. If the finding is not an omission of a program's critical attribute, then the significance of the finding is GREEN.

Step 5 Determine if the omission of the program's critical attribute was identified by the NRC during a previous inspection of the respective program.

a. If the omission was identified by the NRC during a previous inspection and the licensee has had adequate time to address the issue, the significance of the finding is WHITE.

b. If the omission was not previously identified by the NRC or the licensee has not had adequate time to address the finding, then the significance of the finding is GREEN.

Step 6 If the technical finding also involves a repetitive, NRC-identified omission of a program critical attribute, then document a WHITE programmatic finding and continue to Step 7 to evaluate the significance of the technical finding. If the technical finding does not involve a repetitive, NRC-identified omission of a program critical attribute, then continue to Step 7 to evaluate the significance of the technical finding.

Step 7 Determine if the finding can be associated with a system or structure.

a. If the finding can be associated with a system or structure, proceed to Step 8.

b. If the finding cannot be associated with a system or structure, the significance of the finding is GREEN.

NOTE: Once the inspector gets to this step in the SDP, the finding has been determined to be a technical finding (i.e., a construction finding or an ITAAC finding). Construction findings and ITAAC findings will be assigned to a coordinate in the construction significance determination matrix based on the pre-determined risk of the involved system or structure (x-axis) and the row that applies to the quality of construction (y-axis) of the finding. The matrix, risk importance table, and associated guidance are provided below to assist inspectors in determining the significance of the technical finding that has been identified.

Step 8 Determine the appropriate matrix column to which the technical finding should be assigned using the risk importance table and its associated guidance.

a. If the risk importance of the system or structure involved with the finding is determined to be very low, the finding is assigned to the very low risk importance column in the construction SDP matrix.

b. If the risk importance of the system or structure involved with the finding is determined to be low, the finding is assigned to the low risk importance column of the construction SDP matrix.

c. If the risk importance of the system or structure involved with the finding is determined to be intermediate, the finding is assigned to the intermediate column of the construction SDP matrix.

d. If the risk importance of the system or structure involved with the finding is determined to be high, the finding is assigned to the high risk importance column of the SDP matrix.

Step 9 If the finding is associated with a system in the risk importance table, continue to Step 10. If the finding is not associated with a system in the risk importance table, proceed to Step 11.

Step 10 Determine the row to which the finding should be assigned based on the following:

a. Row 1: If left uncorrected, the finding could reasonably be expected to impair a design function of one train of the associated system (Note: if the finding could reasonably be expected to impair the design function of a single train system, it is assigned to Row 3).

b. Row 2: If left uncorrected, the finding could reasonably be expected to impair a design function of multiple trains, but not all trains of the associated system.

c. Row 3: If left uncorrected, the finding could reasonably be expected to impair a design function of all trains of the associated system.

Note 1: If the finding is associated with an ITAAC and the acceptance criteria stated in the license is conservative relative to the underlying design requirement, and data (e.g., a calculation) exists to support that the design function can be met under the circumstances, then the finding will be assigned to Row 1.

Note 2: If the finding represents a failure to meet a design standard or requirement (e.g. ASME) associated with work on a system train, it is assumed that the finding impairs the design function of that train.

Step 11 If the finding could impair the design function of a structure in the risk importance table, continue with the following steps. If the finding does not involve a system or structure listed in the low, intermediate, or high column in the risk importance table, the finding is GREEN.

a. Row 1: Findings associated with receipt and storage of materials used in the structure construction; Findings associated with structure construction that are subsequently dispositioned as use-as-is; Findings that do not impair the design function of the structure.

b. Row 2: Findings associated with sub-structures such that reasonable assurance is not provided that the sub-structure can meet its design function.

c. Row 3: Findings associated with structures such that reasonable assurance in not provided that the structure can meet its design function.

Step 12 If the NRC has identified that the finding is a repetitive significant condition adverse to quality, the finding will be assigned to the next highest row in the matrix.

Step 13 Determine the significance of the finding.

a. Findings in Row 1 have a significance of GREEN.

b. Findings in the very low risk importance column have a significance of GREEN.

c. Findings in Row 2 and the very low, low, and intermediate risk importance columns have a significance of GREEN.

c. Findings in Row 2 and the high risk importance column have a significance of WHITE.

d. Findings in Row 3 and the very low and low risk importance columns have a significance of GREEN.

e. Findings in Row 3 and the intermediate risk importance column have a significance of WHITE.

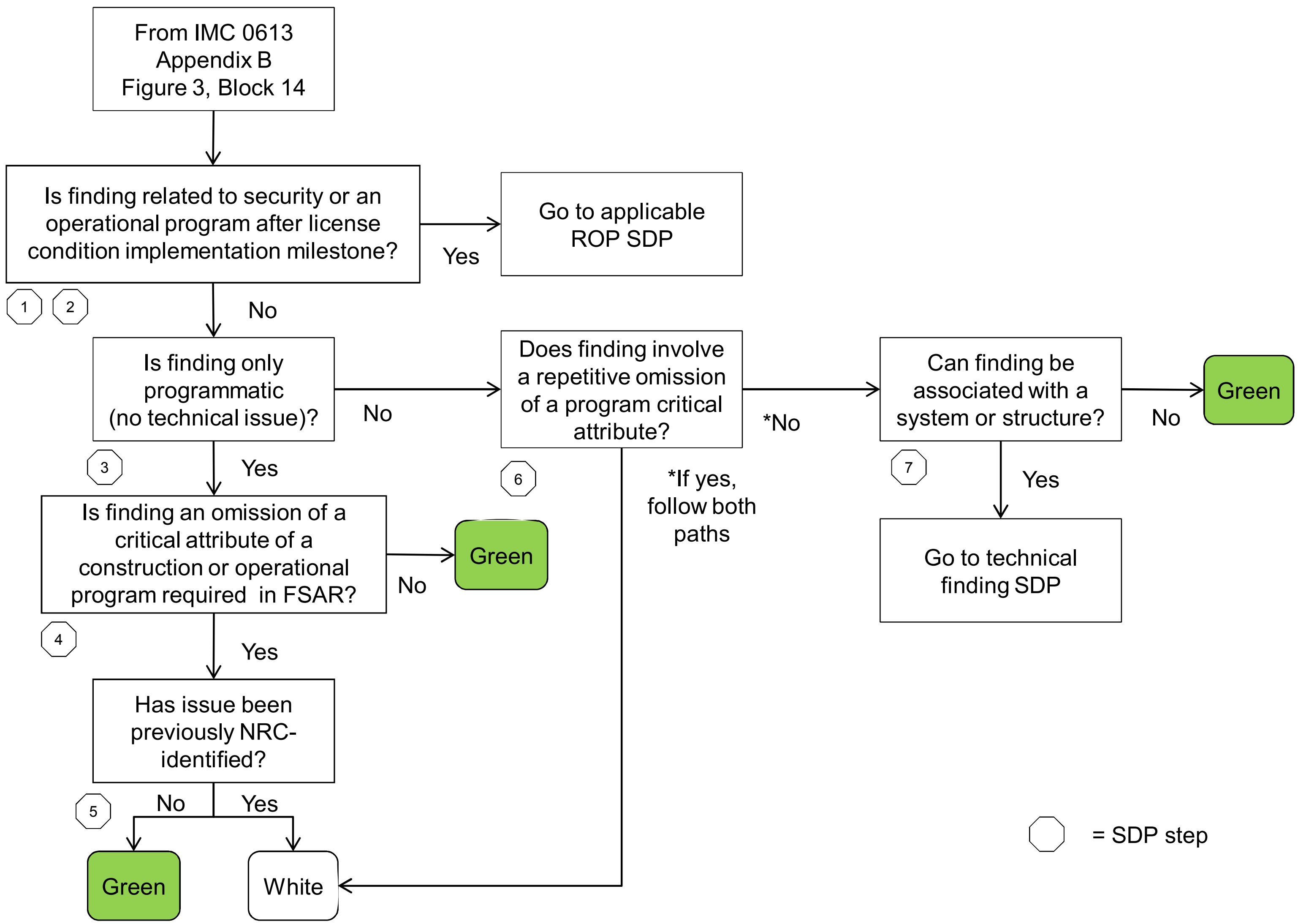
f. Findings in Row 3 and the high risk importance column have a significance of YELLOW.

g. Findings in Row 4 and the low risk importance column have a significance of WHITE.

h. Findings in Row 4 and the intermediate risk importance column have a significance of YELLOW.

i. Findings in Row 4 and the high risk importance column have a significance of RED.

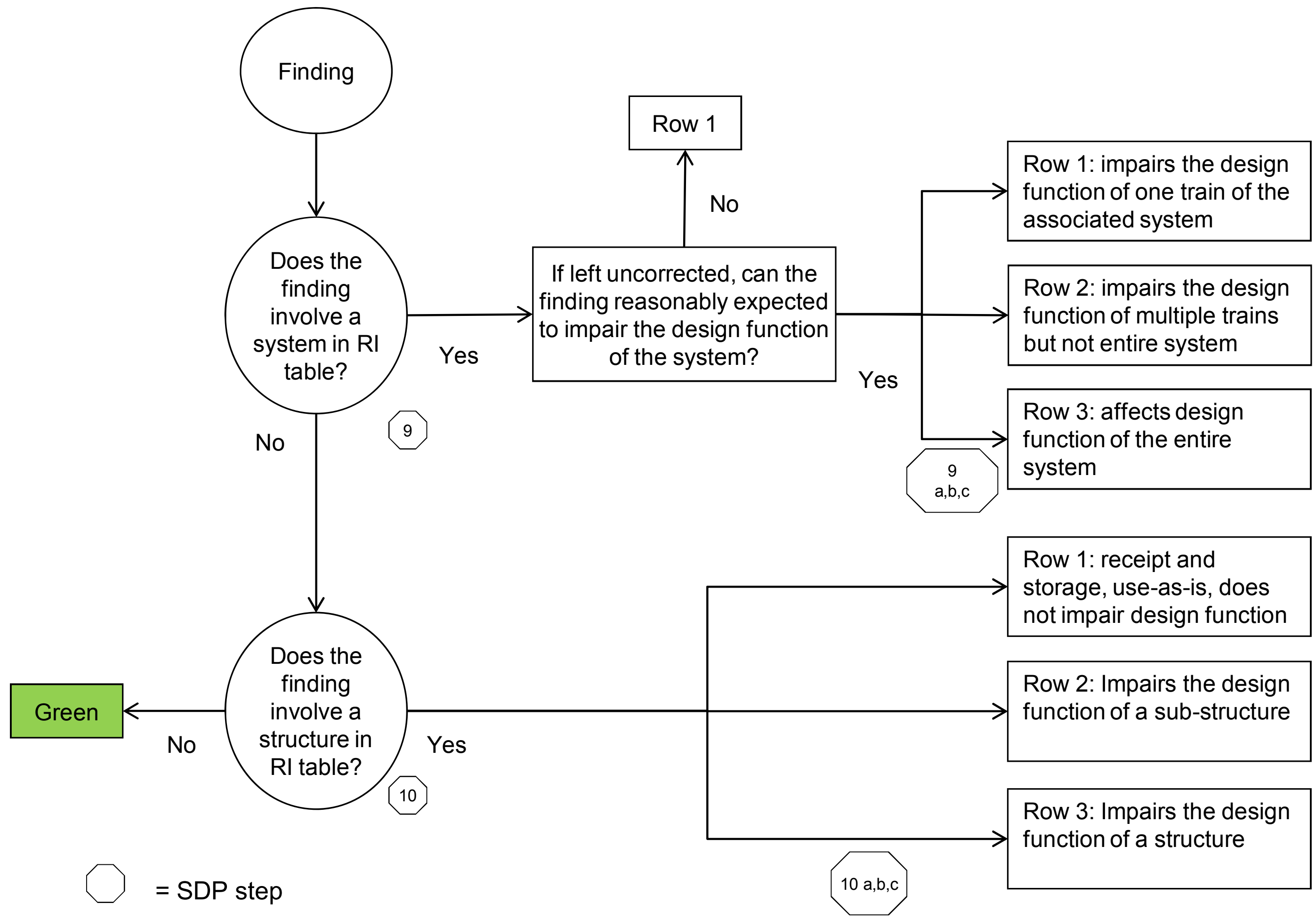
Construction Programmatic SDP



Construction Technical Finding SDP

		AP 1000 Construction Significance Determination Matrix			
Quality of Construction	Row 4				
	Row 3				
	Row 2				
	Row 1				
		Very Low	Low	Intermediate	High
		System/Structure Risk Importance			

Y – Axis Flow Diagram



RISK IMPORTANCE TABLE FOR AP1000

SYSTEMS			
VERY LOW	**LOW**	**INTERMEDIATE**	**HIGH**
ALL OTHER SYSTEMS: SFS, SGS, ETC…	PXS (ACC)	PXS (CMT)	PMS
	DAS	PXS (PRHR)	IDS
	ECS	PLS	PXS (IRWST)
	CNS (ISOLATION)	EDS	RCS
	PCS		PXS (Containment sump recirculation)
	RNS		
	CCS		
	SWS		
	VLS		
	PXS (IVR)		
	VBS (FANS)		
STRUCTURES			
VERY LOW	**LOW**	**INTERMEDIATE**	**HIGH**
ALL OTHER STRUCTURES: Turbine Building, EDG Building, Rad Waste Building, Yard, Site Grade, Non 1E Cable Raceways	ANNEX BUILDING	CONTAINMENT	CONTAINMENT STRUCTURAL SECTIONS LISTED IN AP1000 TIER 1, SECTION 3.3. TABLE 3.3-7
		SHIELD BUILDING	
		AUXILIARY BUILDING	
		NUCLEAR ISLAND BASEMAT	
		1E CABLE RACEWAYS	

Guidance

To ensure consistency, systems are listed using their official three letter designation from the AP1000 DCD, Tier 1, Introduction, page 1.4-1. Using this convention, the RCS includes the automatic depressurization system (ADS). Some systems were split into smaller segments:

PXS (ACC): Accumulators
PXS (CMT): Core makeup tanks
PXS (PRHR): Passive RHR
PXS (IRWST): In-containment refueling water storage tank
CNS (ISOLATION): Containment isolation valves
ECS (ANC DIESELS): Ancillary diesel generators
PXS (IVR): Features of the PXS related to in-vessel retention of molten core
VBS (FANS): Main control room and I&C rooms B/C ancillary fans

When spacing requirements are specified for more than one structure, the importance of the more important structure is used. For example, a finding related to inadequate spacing between the turbine building and the aux building would be placed in the intermediate column.

Systems were placed into columns based on their RAW values as determined by SPAR model calculations and input from Westinghouse PRA staff. The D-RAP list (DCD, Tier 1, Table 17.4-1) was reviewed to determine if additional placement criteria should be considered. Some systems were assigned a risk importance designation based on the following criteria:

1. System performs a post-72 hour safety function
2. System is safety significant during shutdown operations
3. System is important to LERF
4. System is important during a severe accident

Structures were assigned to risk importance columns based on the review of the equipment contained within them and the judgment that the risk importances should be comparable. Reactor coolant system (RCS) piping and components were assigned to the high risk significance column due to the role they play in maintaining pressure boundary and preventing coolant system leakage. The RCS includes the pressure boundary components and pipe segments that must meet ASME Section III requirements. They are identified by DCD Tier 1, Tables 2.1.2-1 and 2.1.2-2 respectively.

Restraints and supports (e.g., pipe hangers, snubbers, anchor bolts) will be considered part of the system to which they are attached.

Embedded plates will be considered part of the structure to which they are attached.

Sensors will be classified according to their DCD tag numbers. For example, the RCS hot leg 1 flow sensors have tags RCS-101A/B/C/D. They will be considered part of the RCS. It is recognized that some sensors may provide input to a function (e.g. trip, control) with higher or lower risk importance than the system where the sensor is physically located. These sensors may be moved to a different column based on a technical justification.

AP 1000 System Design Function Definitions

CCS	The component cooling water system (CCS) removes heat from various plant components and transfers this heat to the service water system (SWS) during normal modes of plant operation including power generation, shutdown and refueling. The CCS has two pumps and two heat exchangers. The CCS preserves containment integrity by isolation of the CCS lines penetrating the containment. The CCS provides the nonsafety-related functions of transferring heat from the normal residual heat removal system (RNS) during shutdown and the spent fuel pool cooling system during all modes of operation to the SWS.
CNS (ISOLATION)	The containment system (CNS) is the collection of boundaries that separates the containment atmosphere from the outside environment during design basis accidents. The CNS provides the safety-related function of containment isolation for containment boundary integrity and provides a barrier against the release of fission products to the atmosphere.
DAS	The diverse actuation system (DAS) initiates reactor trip, actuates selected functions, and provides plant information to the operator. The DAS provides the following nonsafety-related functions: a) The DAS provides an automatic reactor trip on low wide-range steam generator water level or on low pressurizer water level separate from the PMS. b) The DAS provides automatic actuation of selected functions, as identified in Table 2.5.1-1, separate from the PMS. c) The DAS provides manual initiation of reactor trip and selected functions, as identified in Table 2.5.1-2, separate from the PMS. These manual initiation functions are implemented in a manner that bypasses the control room multiplexers, if any; the PMS cabinets; and the signal processing equipment of the DAS. d) The DAS provides main control room (MCR) displays of selected plant parameters, as identified in Table 2.5.1-3, separate from the PMS.
ECS	The main ac power system (ECS) provides electrical ac power to nonsafety-related loads and non-Class 1E power to the Class 1E battery chargers and regulating transformers during normal and off-normal conditions. The ECS provides the following nonsafety-related functions: a) The ECS provides the capability for distributing non-Class 1E ac power from onsite sources (ZOS) to nonsafety-related loads listed in Table 2.6.1-2.

	b) The 6900 Vac circuit breakers in switchgear ECS-ES-1 and ECS-ES-2 open after receiving a signal from the onsite standby power system. c) Each standby diesel generator 6900 Vac circuit breaker closes after receiving a signal from the onsite standby power system. d) Each ancillary diesel generator unit is sized to supply power to long-term safety-related post-accident monitoring loads and control room lighting and ventilation through a regulating transformer; and for one passive containment cooling system (PCS) recirculation pump. e) The ECS provides two loss-of-voltage signals to the onsite standby power system (ZOS), one for each diesel-backed 6900 Vac switchgear bus. f) The ECS provides a reverse-power trip of the generator circuit breaker which is blocked for at least 15 seconds following a turbine trip.
EDS	The non-Class 1E dc and uninterruptible power supply system (EDS) provides dc and uninterruptible ac electrical power to nonsafety-related loads during normal and off-normal conditions. The EDS provides the following nonsafety-related functions: a) Each EDS load group 1, 2, 3, and 4 battery charger supplies the corresponding dc switchboard bus load while maintaining the corresponding battery charged. b) Each EDS load group 1, 2, 3, and 4 battery supplies the corresponding dc switchboard bus load for a period of 2 hours without recharging. c) Each EDS load group 1, 2, 3, and 4 inverter supplies the corresponding ac load.
IDS	The Class 1E dc and uninterruptible power supply system (IDS) provides dc and uninterruptible ac electrical power for safety-related equipment during normal and off-normal conditions. The IDS provides the following safety-related functions: a) The IDS provides electrical independence between the Class 1E divisions. b) The IDS provides electrical isolation between the non-Class 1E ac power system and the non-Class 1E lighting in the MCR. c) Each IDS 24-hour battery bank supplies a dc switchboard bus load for a period of 24 hours without recharging. d) Each IDS 72-hour battery bank supplies a dc switchboard bus load for a period of 72 hours without recharging. e) The IDS spare battery bank supplies a dc load equal to or greater

	than the most severe switchboard bus load for the required period without recharging. f) Each IDS 24-hour inverter supplies its ac load. g) Each IDS 72-hour inverter supplies its ac load. h) Each IDS 24-hour battery charger provides the protection and safety monitoring system (PMS) with two loss-of-ac input voltage signals. i) The IDS supplies an operating voltage at the terminals of the Class 1E motor-operated valves identified in Tier 1 Material subsections 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.2, and 2.3.6 that is greater than or equal to the minimum specified voltage. The IDS provides the following nonsafety-related functions: a) Each IDS 24-hour battery charger supplies a dc switchboard bus load while maintaining the corresponding battery charged. b) Each IDS 72-hour battery charger supplies a dc switchboard bus load while maintaining the corresponding battery charged. c) Each IDS regulating transformer supplies an ac load when powered from the 480 V motor control center (MCC). d) The IDS Divisions B and C regulating transformers supply their post-72 hour ac loads when powered from an ancillary diesel generator.
PCS	The passive containment cooling system (PCS) removes heat from the containment during design basis events. The PCS performs the following safety-related functions: a) The PCS delivers water from the PCCWST to the outside, top of the containment vessel. b) The PCS wets the outside surface of the containment vessel. The inside and outside of the containment vessel above the operating deck are coated with an inorganic zinc coating. c) The PCS provides air flow over the outside of the containment vessel by a natural circulation air flow path from the air inlets to the air discharge structure. d) The PCS drains the excess water from the outside of the containment vessel through the two upper annulus drains. e) The PCS provides a flow path for long-term water makeup to the passive containment cooling water storage tank (PCCWST). f) The PCS provides a flow path for long-term water makeup from the PCCWST to the spent fuel pool. The PCS performs the following nonsafety-related functions:

	a) The PCCAWST contains an inventory of cooling water sufficient for PCS containment cooling from hour 72 through day 7. b) The PCS delivers water from the PCCAWST to the PCCWST and spent fuel pool simultaneously. c) The PCCWST includes a water inventory for the fire protection system.
PLS	The plant control system (PLS) provides for automatic and manual control of nonsafety-related plant components during normal and emergency plant operations. The PLS has distributed controllers and operator controls interconnected by computer data links or data highways.
PMS	The protection and safety monitoring system (PMS) initiates reactor trip and actuation of engineered safety features in response to plant conditions monitored by process instrumentation and provides safety-related displays. The PMS has the equipment identified in Table 2.5.2-1. The PMS has four divisions of Reactor Trip and Engineered Safety Features Actuation, and two divisions of safety-related post-accident parameter displays. The functional arrangement of the PMS is depicted in Figure 2.5.2-1 and the component locations of the PMS are as shown in Table 2.5.2-9. The PMS provides the following safety-related functions: a) The PMS initiates an automatic reactor trip, as identified in Table 2.5.2-2, when plant process signals reach specified limits. b) The PMS initiates automatic actuation of engineered safety features, as identified in Table 2.5.2-3, when plant process signals reach specified limits. c) The PMS provides manual initiation of reactor trip and selected engineered safety features as identified in Table 2.5.2-4. The PMS provides the following nonsafety-related functions: a) The PMS provides process signals to the plant control system (PLS) through isolation devices. b) The PMS provides process signals to the data display and processing system (DDS) through isolation devices. c) Data communication between safety and nonsafety systems does not inhibit the performance of the safety function. d) The PMS ensures that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls.
PXS (ACC)	The passive core cooling system (PXS) provides emergency core cooling during design basis events.

	The PXS accumulators (ACC) sub-system provides the following safety-related function: The accumulators provide reactor coolant system (RCS) makeup, boration, and safety injection during design basis events.
PXS (CMT)	The passive core cooling system (PXS) provides emergency core cooling during design basis events. The PXS core make-up tanks (CMT) sub-system provides the following safety-related functions: The CMTs provide reactor coolant system (RCS) makeup, boration, and safety injection during design basis events.
PXS (Containment sump recirculation)	The passive core cooling system (PXS) provides emergency core cooling during design basis events. The PXS containment sump recirculation sub-system provides reactor coolant system (RCS) makeup, boration, and safety injection as well as pH adjustment of water flooding the containment following design basis accidents.
PXS (IRWST)	The passive core cooling system (PXS) provides emergency core cooling during design basis events. The in-containment refueling water storage tank (IRWST) sub-system provides reactor coolant system (RCS) makeup, boration, and safety injection during design basis events.
PXS (IVR)	The passive core cooling system (PXS) in-vessel retention (IVR) function provides the capability to cool the exterior of the reactor pressure vessel during severe accidents and to prevent the lower head from failing, thus retaining the molten debris within the vessel.
PXS (PRHR)	The passive core cooling system (PXS) provides emergency core cooling during design basis events. The passive residual heat removal (PRHR) sub-system heat exchanger provides core decay heat removal during design basis events.
RCS	The reactor coolant system (RCS) removes heat from the reactor core and transfers it to the secondary side of the steam generators for power generation. The RCS contains two vertical U-tube steam generators, four sealless reactor coolant pumps (RCPs), and one pressurizer. The RCS provides the following safety-related functions: a) The pressurizer safety valves provide overpressure protection in accordance with Section III of the ASME Boiler and Pressure Vessel Code. b) The reactor coolant pumps (RCPs) have a rotating inertia to provide RCS flow coastdown on loss of power to the pumps.

	c) Each RCP flywheel assembly can withstand a design overspeed condition. d) The RCS provides automatic depressurization during design basis events. e) The RCS provides emergency letdown during design basis events. The RCS provides the following nonsafety-related functions: a) The RCS provides circulation of coolant to remove heat from the core. b) The RCS provides the means to control system pressure. c) The pressurizer heaters trip after a signal is generated by the PMS.
RNS	The normal residual heat removal system (RNS) removes heat from the core and reactor coolant system (RCS) and provides RCS low temperature over-pressure (LTOP) protection at reduced RCS pressure and temperature conditions after shutdown. The RNS also provides a means for cooling the in-containment refueling water storage tank (IRWST) during normal plant operation. The RNS provides the following safety-related functions: a) The RNS preserves containment integrity by isolation of the RNS lines penetrating the containment. b) The RNS provides a flow path for long-term, post-accident makeup to the RCS. The RNS provides the following nonsafety-related functions: a) The RNS provides low temperature overpressure protection (LTOP) for the RCS during shutdown operations. b) The RNS provides heat removal from the reactor coolant during shutdown operations. c) The RNS provides low pressure makeup flow from the SFS cask loading pit to the RCS for scenarios following actuation of the automatic depressurization system (ADS). d) The RNS provides heat removal from the in-containment refueling water storage tank.
SWS	The service water system (SWS) transfers heat from the component cooling water heat exchangers to the atmosphere. The SWS operates during normal modes of plant operation, including startup, power operation (full and partial loads), cooldown, shutdown, and refueling. The SWS provides the nonsafety-related function of transferring heat from the component cooling water system (CCS) to

	the surrounding atmosphere to support plant shutdown and spent fuel pool cooling.
VBS (FANS)	The nuclear island nonradioactive ventilation system (VBS) serves the main control room (MCR), control support area (CSA), Class 1E dc equipment rooms, Class 1E instrumentation and control (I&C) rooms, Class 1E electrical penetration rooms, Class 1E battery rooms, remote shutdown room (RSR), reactor coolant pump trip switchgear rooms, adjacent corridors, and passive containment cooling system (PCS) valve room during normal plant operation. The VBS consists of the following independent subsystems: the main control room/control support area HVAC subsystem, the class 1E electrical room HVAC subsystem, and the passive containment cooling system valve room heating and ventilation subsystem. The VBS provides heating, ventilation, and cooling to the areas served when ac power is available. The system provides breathable air to the control room and maintains the main control room and control support area areas at a slightly positive pressure with respect to the adjacent rooms and outside environment during normal operations. The VBS monitors the main control room supply air for radioactive particulate and iodine concentrations and provides filtration of main control room/control support area air during conditions of abnormal (high) airborne radioactivity. In addition, the VBS isolates the HVAC penetrations in the main control room boundary on "high-high" particulate or iodine radioactivity in the main control room supply air duct or on a loss of ac power for more than 10 minutes. This action supports operation of the main control room emergency habitability system (VES). The VBS provides the safety-related function to isolate the pipes that penetrate the MCR pressure boundary. The VBS provides the following nonsafety-related functions: a) The VBS provides cooling to the MCR, CSA, RSR, and Class 1E electrical rooms. b) The VBS provides ventilation cooling to the Class 1E battery rooms. c) The VBS maintains MCR and CSA habitability when radioactivity is detected. d) The VBS provides ventilation cooling via the ancillary equipment in Table 2.7.1-3 to the MCR and the division B&C Class 1E I&C rooms.
VLS	The containment hydrogen control system (VLS) limits hydrogen gas concentration in containment during accidents.

	The VLS provides the non-safety related function to control the containment hydrogen concentration for beyond design basis accidents.

AP 1000 Structure Design Function Definitions

1E Cable Raceways	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.
Annex Building	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 control support area, non-1E electrical equipment, and hot machine shop. 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.
Auxiliary Building	The auxiliary building is reinforced concrete and houses the safety-related mechanical and electrical equipment located outside the containment and shield buildings. Design Description: a) 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. b) 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. c) 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 volume 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).

Containment	The containment (the steel containment vessel and the containment internal structure). 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. Design Description: a) The containment and its penetrations are designed and constructed to ASME Code Section III, Class MC. b) The containment and its penetrations retain their pressure boundary integrity associated with the design pressure. c) 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. d) 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. e) The containment free volume below elevation 108′ provides containment floodup during a postulated loss-of-coolant accident. f) 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.
Containment Structural Sections Listed in AP1000 Tier 1, Section 3.3. Table 3.3-7	See containment.
Nuclear Island Basemat	The nuclear island structures, consisting of the containment building, shield building, and auxiliary building are founded on a common 6-foot-thick, cast-in-place, reinforced concrete basemat foundation. The top of the foundation is at elevation 66′-6″. The basemat of the nuclear island have a water barrier up to site grade. From Tier 2 information: The analysis and design of the foundation for the nuclear island structures are according to ACI-349 with margins of structural safety as specified within it. The limiting conditions for the foundation medium, together with a comparison of actual capacity and estimated structure loads, are described in Section 2.5. The minimum required factors of safety

	against sliding, overturning, and flotation for the nuclear island structures are given in Table 3.8.5-1.
Shield Building	The shield building cylinder is a composite steel and concrete (SC) structure except for the portion surrounded by the auxiliary building, which is reinforced concrete (RC). 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 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.

Note: The following design functions apply to multiple structures and should be applied to structural findings when applicable.

1. The nuclear island structures include the containment (the steel containment vessel and the containment internal structure) and the shield and auxiliary buildings. 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 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).

2. 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.

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

4. 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.

5. 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.

6. Systems, structures, and components identified as essential targets are protected from the dynamic and environmental effects of postulated pipe ruptures.

System and Structure Matrix Row Assignment Definitions

Systems		
Row 1 – Minimal Significance	Row 2 – Moderate Significance	Row 3 – Substantial Significance
• If left uncorrected, the finding could reasonably be expected to impair a design function of one train of the associated system (Note: if the finding could reasonably be expected to impair the design function of a single train system, it is assigned to Row 3).	If left uncorrected, the finding could reasonably be expected to impair a design function of multiple trains, but not all trains of the associated system.	If left uncorrected, the finding could reasonably be expected to impair a design function of all trains of the associated system.
Structures		
Row 1 – Minimal Significance	Row 2 – Moderate Significance	Row 3 – Substantial Significance
• Findings associated with receipt and storage of materials used in the structure construction; • Findings associated with structure construction that are subsequently dispositioned as use-as-is; Findings that do not impair the design function of the structure. • Findings that do not impair the design function of a sub-structure or structure.	Findings associated with sub-structures such that reasonable assurance is not provided that the sub-structure can meet its design function.	Findings associated with structures such that reasonable assurance is not provided that the structure can meet its design function.

Attachment 1

Revision History - IMC 2519P, Appendix A

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	Xx/xx/xx	This manual chapter supports the Construction Reactor Oversight Process for significance determination of findings. The significance determination process detailed in the manual chapter is designed to characterize the significance of inspection findings for the NRC licensee performance assessment process using risk insights, as appropriate.	Yes	12/31/2011	