1.0 Introduction

1.1 Definitions

The following definitions apply to terms used in the design descriptions and associated inspections, tests, analyses, and acceptance criteria (ITAAC).

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

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

As-built means the physical properties of a structure, system, or component following the completion of its installation or construction activities at its final location at the plant site. In cases where it is technically justifiable, determination of physical properties of the as-built structure, system, or component may be based on measurements, inspections, or tests that occur prior to installation, provided that subsequent fabrication, handling, installation, and testing does not alter the properties.

Column Line is the designation applied to a plant reference grid used to define the location of building walls and columns. Column lines may not represent the center line of walls and columns.

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

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

Design Plant Grade means the elevation of the soil around the nuclear island assumed in the design of the AP1000, i.e., floor elevation 100'-0".

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

Floor Elevation is the designation applied to name a floor. The actual elevation may vary due to floor slope and layout requirements.

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

Inspect or **Inspection** means visual observations, physical examinations, or reviews of records based on visual observation or physical examination that compare the structure, system, or component condition to one or more design commitments. Examples include walkdowns, configuration checks, measurements of dimensions, or nondestructive examinations.

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

$\mathbf{L_a}$ is the maximum allowable containment leakage as defined in 10 CFR 50 Appendix J.

Physical Arrangement (for a structure) means the arrangement of the building features (e.g., floors, ceilings, walls, and basemat) and of the structures, systems, and components within, which are described in the building design description.

Qualified for Harsh Environment means that equipment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of its safety function, for the time required to perform the safety function. These environmental conditions include applicable time-dependent temperature and pressure profiles, humidity, chemical effects, radiation, aging, submergence, and their synergistic effects which have a significant effect on the equipment performance. Equipment identified in the Design Description as being Qualified for Harsh Environment includes the:

a. equipment itself
b. sensors, switches and lubricants that are an integral part of the equipment
c. electrical components connected to the equipment (wiring, cabling and terminations)

Items b and c are Qualified for Harsh Environment only when they are necessary to support operation of the equipment to meet its safety-related function listed in the Design Description table and to the extent such equipment is located in a harsh environment during or following a design basis accident.

Sensor means a transmitter, resistance temperature detector, thermocouple or other transducer, plus associated cables, connectors, preamplifiers, reference junction boxes, or other signal processing equipment that is located in the immediate proximity of the sensor and subject to the same environmental conditions.

Site Grade means the as-built elevation of the soil to the west side of the nuclear island. Adjacent buildings are located on the other sides of the nuclear island.

Tag Number in the ITAACs represents the complete tag number or a portion of the tag number used to identify the actual hardware (or associated software). For instrumentation, the tag number identified in the ITAACs does not include the type of instrument (for example, the Containment Exhaust Fan A Flow Sensor, VFS-11A, does not include the designators FE [flow element] or FT [flow transmitter], which would appear on the actual hardware or in the associated software). This is because the designator VFS-11A and the equipment description are sufficient to uniquely identify the channel associated with the designated instrument function, and this method of identification eliminates the need to list every portion of the instrumentation channel required to perform the function. In most cases, the channel number includes physical hardware. There are, however, a few places where the channel number represents only a calculation in software. In those cases, the channel data can be displayed. In many instances, the word "sensor" is used in the equipment description to identify that the item is an instrument.

Test means the actuation, operation, or establishment of specified conditions to evaluate the performance or integrity of as-built structures, systems, or components, unless explicitly stated otherwise.

Transfer Open (Closed) means to move from a closed (open) position to an open (closed) position.

Type Test means a test on one or more sample components of the same type and manufacturer to qualify other components of the same type and manufacturer. A type test is not necessarily a test of the as-built structures, systems, or components.

UA of a heat exchanger means the product of the heat transfer coefficient and the surface area.

1.2 General Provisions

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

Treatment of Individual Items

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

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

When the term "operate," "operates," or "operation" is used with respect to an item discussed in the acceptance criteria, it refers to the actuation and running of the item. When the term "exist," "exists," or "existence" is used with respect to an item discussed in the acceptance criteria, it means that the item is present and meets the design commitment.

Implementation of ITAAC

The ITAACs are provided in tables with the following three-column format:

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria

Each design commitment in the left-hand column of the ITAAC tables has an associated ITA requirement specified in the middle column of the tables.

The identification of a separate ITA entry for each design commitment shall not be construed to require that separate inspections, tests, or analyses must be performed for each design commitment. Instead, the activities associated with more than one ITA entry may be combined, and a single inspection, test, or analysis may be sufficient to implement more than one ITA entry.

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

Many of the acceptance criteria include the words “A report exists and concludes that…” When these words are used, it indicates that the ITAAC for that design commitment will be met when it is confirmed that appropriate documentation exists and the documentation shows that the design commitment is met. Appropriate documentation can be a single document or a collection of documents that show that the stated acceptance criteria are met. Examples of appropriate documentation include design reports, test reports,

inspection reports, analysis reports, evaluation reports, design and manufacturing procedures, certified data sheets, commercial dedication procedures and records, quality assurance records, calculation notes, and equipment qualification data packages. For plants at sites which are qualified using the hard rock high frequency (HRHF) ground motion response spectra (GMRS), high frequency seismic screening and qualification testing required as a result of the evaluation of potential high frequency sensitive components is included in the equipment qualification data packages.

Many entries in the ITA column of the ITAAC tables include the words "Inspection will be performed for the existence of a report verifying…" When these words are used it indicates that the ITA is tests, type tests, analyses, or a combination of tests, type tests, and analyses and a report will be produced documenting the results. This report will be available to inspectors.

Many ITAAC are only a reference to another Tier 1 location, either a section, subsection, or ITAAC table entry (for example, "See Tier 1 Material…"). A reference to another ITAAC location is always in both the ITA and acceptance criteria columns for a design commitment. This reference is an indication that the ITA and acceptance criteria for that design commitment are satisfied when the referenced ITA are completed and the acceptance criteria for the referenced Tier 1 sections, subsections, or table entries are satisfied. If a complete Tier 1 section is referenced, this indicates that all the ITA and acceptance criteria in that section must be met before the referencing design commitment is satisfied.

Discussion of Matters Related to Operations

In some cases, the design descriptions in this document refer to matters that relate to operation, such as normal valve or breaker alignment during normal operation modes. Such discussions are provided solely to place the design description provisions in context (for example, to explain automatic features for opening or closing valves or breakers upon off-normal conditions). Such discussions shall not be construed as requiring operators during operation to take any particular action (for example, to maintain valves or breakers in a particular position during normal operation).

Interpretation of Figures

In many but not all cases, the design descriptions in Section 2 include one or more figures. The figures may represent a functional diagram, general structural representation, or another general illustration. For instrumentation and control (I&C) systems, figures may also represent aspects of the relevant logic of the system or part of the system. Unless specified explicitly, the figures are not indicative of the scale, location, dimensions, shape, or spatial relationships of as-built structures, systems, and components. In particular, the as-built attributes of structures, systems, and components may vary from the attributes depicted on the figures, provided that those safety functions discussed in the design description pertaining to the figure are not adversely affected.

Maximum Reactor Core Thermal Power

The initial rated reactor core thermal power for the AP1000 certified design is 3400 megawatts thermal (MWt).

1.3 Figure Legend

The conventions used in this section are for figures described in the design description. The figure legend is provided for information and is not part of the Tier 1 Material.

VALVES

Valve 

Check Valve 

Relief Valve 

VALVE OPERATORS

Operator Of Unspecified Type 

Motor Operator 

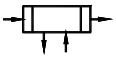
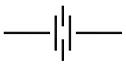
Solenoid Operator 

Pneumatic/Hydraulic Operator 

Pneumatic Operator 

Squib Valve 

MECHANICAL EQUIPMENT

Centrifugal Pump	
Pump Type Not Specified	
Tank	
Centrifugal Fan	
Axial Fan	
Heat Exchanger	
Vent	
Drain	
Pipe Cap	
Blind Flange	
Orifice	

DAMPERS

Gravity Or Manually Operated Damper 

Remotely Operated Damper 

ELECTRICAL EQUIPMENT

Battery 

Circuit Breaker 

Disconnect Switch 

Isolation 

Transformer 

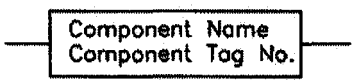
Fuse 

Heater 

Generator 

MISCELLANEOUS

A component that is part of the system functional arrangement shown on the figure and is included in the design commitments for the system.



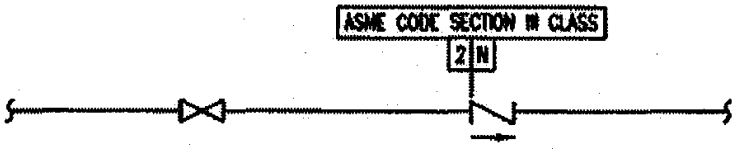
A component that is part of the system functional arrangement shown on the figure.

A system or component of another system that is not part of the system functional arrangement shown on the figure.

A functional connection to another system that is not part of the system functional arrangement shown on the figure.

ASME CODE CLASS BREAK

An ASME Code class break is identified by a single line to the designated location for the class break, as shown in the example below (see note 1).



NOTES:

1. The header, "ASME Code Section III Class," must appear at least once on each figure on which ASME class breaks are shown, but need not appear at every class break shown on a figure.
   N Indicates Non-ASME Code Section III

1.4 List of Acronyms and Abbreviations

The acronyms presented in this section are used in the Tier 1 Material. The acronyms are provided for information and are not part of the Tier 1 Material.

ac	Alternating Current
AC	Acceptance Criteria
ACC	Accumulator
ADS	Automatic Depressurization System
AHU	Air Handling Units
ASME	American Society of Mechanical Engineers
BTU	British Thermal Unit
CAS	Compressed Air System
CAV	Cumulative Absolute Velocity
CCS	Component Cooling Water System
CDM	Certified Design Material
CDS	Condensate System
CFR	Code of Federal Regulations
CIV	Containment Isolation Valve
CL	Cold Leg
CMT	Core Makeup Tank
CNS	Containment System
COL	Combined Operating License/Combined License
CRDM	Control Rod Drive Mechanism
CSA	Control Support Area
CST	Condensate Storage Tank
CVS	Chemical and Volume Control System
DAC	Design Acceptance Criteria
DAS	Diverse Actuation System
DBA	Design Basis Accident
dc	Direct Current
DC	Design Commitment
DDS	Data Display and Processing System
DOS	Standby Diesel Fuel Oil System
DPU	Distributed Processing Unit
D-RAP	Design Reliability Assurance Program
DTS	Demineralized Water Treatment System

List of Acronyms and Abbreviations (cont.)

DVI	Direct Vessel Injection
DWS	Demineralized Water Transfer and Storage System
ECS	Main ac Power System
EDS	Non-Class 1E dc and Uninterruptible Power Supply System
EFS	Communication System
EGS	Grounding and Lightening Protection System
ELS	Plant Lighting System
EMI	Electromagnetic Interference
ERF	Emergency Response Facility
ESD	Electrostatic Discharge
ESF	Emergency Safety Features
ESFAS	Engineering Safety Feature Actuation System
F	Fahrenheit
FHM	Fuel Handling Machine
FHS	Fuel Handling and Refueling System
FID	Fixed Incore Detector
FPS	Fire Protection System
ft	Feet
FTS	Fuel Transfer System
FWS	Main and Startup Feedwater System
gpm	Gallons per Minute
HEPA	High Efficiency Particulate Air
HFE	Human Factors Engineering
HL	Hot Leg
hr	Hour
HSI	Human-System Interface
HVAC	Heating, Ventilation, and Air Conditioning
HX	Heat Exchanger
Hz	Hertz
I&C	Instrumentation and Control
IDS	Class 1E dc and Uninterruptible Power Supply System
IIS	In-core Instrumentation System
ILRT	Integrated Leak Rate Test
IHP	Integrated Head Package
in	Inches

List of Acronyms and Abbreviations (cont.)

I/O	Input/Output
I&C	Instrumentation and Control
IRC	Inside Reactor Containment
IRWST	In-containment Refueling Water Storage Tank
ISI	Inservice Inspection
IST	Inservice Testing
ITA	Inspections, Tests, Analyses
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
LBB	Leak Before Break
LTOP	Low Temperature Overpressure Protection
MBtu	Million British Thermal Units
MCC	Motor Control Center
MCR	Main Control Room
MHS	Mechanical Handling System
MMIS	Man-machine Interface System
MOV	Motor-operated Valve
MSIV	Main Steam Isolation Valve
MSLB	Main Steam Line Break
MSS	Main Steam System
MTS	Main Turbine System
MW	Megawatt
MWe	Megawatt Electric
MWt	Megawatt Thermal
N/A	Not Applicable
NDE	Nondestructive Examination
NI	Nuclear Island
NSSS	Nuclear Steam Supply System
OCS	Operation and Control Centers System
ORC	Outside Reactor Containment
ORE	Occupational Radiation Exposure
OSA	Operational Sequence Analyses
OSC	Operations Support Center
PAR	Passive Autocatalytic Recombiner
PCCAWST	Passive Containment Cooling Ancillary Water Storage Tank

List of Acronyms and Abbreviations (cont.)

PCCWST	Passive Containment Cooling Water Storage Tank
PCS	Passive Containment Cooling System
P&ID	Piping and Instrument Diagram
PGS	Plant Gas System
pH	Potential of Hydrogen
PLS	Plant Control System
PMS	Protection and Safety Monitoring System
PORV	Power-operated Relief Valve
PRA	Probabilistic Risk Assessment
PRHR	Passive Residual Heat Removal
psia	Pounds per Square Inch Absolute
PSS	Primary Sampling System
PXS	Passive Core Cooling System
PWR	Pressurized Water Reactor
RAP	Reliability Assurance Program
RAT	Reserve Auxiliary Transformer
RCDT	Reactor Coolant Drain Tank
RCP	Reactor Coolant Pump
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RFI	Radio Frequency Interference
RM	Refueling Machine
RMS	Radiation Monitoring System
RNS	Normal Residual Heat Removal System
RPV	Reactor Pressure Vessel
RSR	Remote Shutdown Room
RSW	Remote Shutdown Workstation
RTD	Resistance Temperature Detector
RXS	Reactor System
RV	Reactor Vessel
scf	Standard Cubic Feet
scfm	Standard Cubic Feet per Minute
SFP	Spent Fuel Pool
SFS	Spent Fuel Pool Cooling System
SG	Steam Generator

List of Acronyms and Abbreviations (cont.)

SGS	Steam Generator System
SJS	Seismic Monitoring System
SMS	Special Monitoring System
SSAR	Standard Safety Analysis Report
SSCs	Structures, Systems, and Components
SSE	Safe Shutdown Earthquake
SWC	Surge Withstand Capability
SWS	Service Water System
TID	Total Integrated Dose
TSC	Technical Support Center
UAT	Unit Auxiliary Transformer
UBC	Uniform Building Code
UPS	Uninterruptible Power Supply
V	Volt
VAS	Radiologically Controlled Area Ventilation System
VBS	Nuclear Island Nonradioactive Ventilation System
VCS	Containment Recirculation Cooling System
VES	Main Control Room Emergency Habitability System
VFS	Containment Air Filtration System
VHS	Health Physics and Hot Machine Shop Areas
VLS	Containment Hydrogen Control System
VWS	Central Chilled Water System
VXS	Annex/Auxiliary Building Nonradioactive Ventilation System
VZS	Diesel Generator Building Ventilation System
WGS	Gaseous Radwaste System
WLS	Liquid Radwaste System
WSS	Solid Radwaste System
ZOS	Onsite Standby Power System