# 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.

**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 AP600, 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.

$L_a$ 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.

**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.

**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 AP600 certified design is 1933 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 

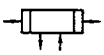
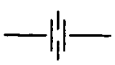

Solenoid Operator 


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.

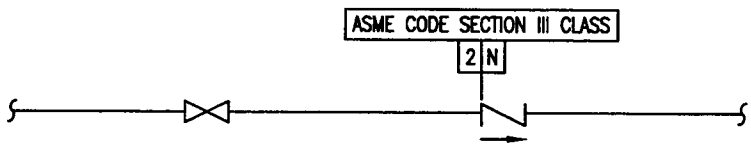

A component that is part of the system functional arrangement shown on the figure.


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 |
| CRDM | Control Rod Drive Mechanism |
| 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 and Auxiliary Boiler Fuel Oil System |
| DPU | Distributed Processing Unit |
| D-RAP | Design Reliability Assurance Program |
| DTS | Demineralized Water Treatment System |
| 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 |

**List of Acronyms and Abbreviations (cont.)**

| | |
|---|---|
| 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 |
| 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 |

**List of Acronyms and Abbreviations (cont.)**

| | |
|---|---|
| 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 |
| PCCAWS | Passive Containment Cooling Ancillary Water Storage Tank |
| PCWS | Passive Containment Cooling Water Storage |
| 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 |

**List of Acronyms and Abbreviations (cont.)**

| | |
|---|---|
| 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 |
| 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 |