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

ATTENTION: T. R. QUAY

SUBJECT: DRAFT AP600 TIER 1 MATERIAL

Dear Mr. Quay:

Enclosed, per Joseph Sebrosky's phone request of 6/27/96, is a draft of Sections 1.0, 4.0 and 5.0 of the AP600 Tier 1 Certified Design Material. This information should be used to facilitate your review of the of the AP600 Pilot ITAAC Submittal of 6/4/96.

Please contact Susan V. Fanto on (412) 374-4028 if you have any questions concerning this transmittal.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/nja

Attachment

cc: J. Sebrosky, NRC
N. Liparulo, Westinghouse (w/o enclosure)

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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 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.

Defense-in-depth Systems are those nonsafety-related systems that:

1. Directly act to prevent unnecessary actuation of the safety-related passive systems EXCEPT:

    a. where a specific defense-in-depth function provides an insignificant or limited benefit, or

    b. where actuation of the passive safety-related system is not onerous (such as actuation of the passive containment cooling system)

2. Provide support functions (such as heat removal or electrical power) to the nonsafety-related systems captured by the criteria above.

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.

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

Division (for mechanical systems or equipment) is the designation applied to a specific set of safety-related components within a system.

Functional Arrangement (for a system) means the major components, interconnections between major components, and connections to other systems that collectively provide the service for which the system is intended.

Functional Arrangement (for a building) means the layout or configuration of building features (e.g., floors, ceilings, walls and doorways) and of the systems or components within, that provides the essential capabilities for which the building is intended.

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.

Safety-related is a classification applied to items relied upon to remain functional during or following a design basis event to provide a safety-related function. Safety-related also applies to documentation and services affecting a safety-related item.

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.

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.

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.

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 Description.

Implementation of ITAAC

The ITAAC 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 Inspections, Tests, or Analyses (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 Operating License for those ITAAC 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 (e.g., 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 (e.g., 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 other general illustration. For instrumentation and control (I&C) systems, figures 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 and List of Acronyms

The conventions presented in this Section are employed for Figures used in the Design Descriptions. The acronyms presented in this Section are used in the Certified Design Material. The figure legend and acronym list are provided for information only and are not part of the Certified Design Material.

VALVES

Valve	
Check Valve	
Relief Valve	

VALVE OPERATORS

Operator of Unspecified Type	
Motor Operator	
Solenoid Operator	
Hydraulic Operator	
Pneumatic Operator	
Squib Valve	

MECHANICAL EQUIPMENT

Centrifugal Pump	
Pump Type Not Specified	
Tank	
Filter	
Strainer	
Orifice	
Venturi	
Fan	
Heat Exchanger	
Vent	
Pipe Cap	

PUMP DRIVERS

Motor Drive 

DAMPERS

Manually Operated Damper 

Remotely Operated Damper 

ELECTRICAL EQUIPMENT

Battery 

Circuit Breaker 

Disconnect Switch 

Isolation 

Transformer 

MISCELLANEOUS

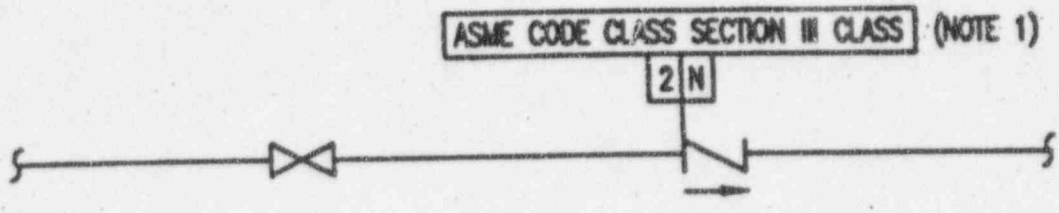
A system or component that is NOT part of a defined system

Containment

Containment With Penetration

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.



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

LIST OF ACRONYMS

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

ac	Alternating Current
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient Without Scram
BEACON	Best Estimate Analyzer for Core Operations - Nuclear
BOL	Beginning of Life
BOP	Balance of Plant
CCS	Component Cooling Water System
CFR	Code. of Federal Regulations
CHF	Critical Heat Flux
CIV	Containment Isolation Valve
CMT	Core Makeup Tank
CNS	Containment System
COL	Combined License
CRD	Control Rod Drive
CRDM	Control Rod Drive Mechanism
CVS	Chemical and Volume Control System
DAC	Design Acceptance Criteria
DAS	Diverse Actuation System
DBA	Design Basis Accident
dc	Direct Current
DDS	Data Display and Processing System
DNB	Departure from Nucleate Boiling
DNBR	Departure form Nucleate Boiling Ratio
DOS	Standby Diesel and Auxiliary Boiler Fuel Oil System
DPU	Distributed Processing Unit
D-RAP	Design Reliability Assurance Program
DVI	Direct Vessel Injection
ECS	Main AC Power System
EDS	Non Class 1E dc and UPS System
EFPD	Effective Full Power Days
EMI	Electromagnetic Interference
EOF	Emergency Offsite Facility
ERF	Emergency Response Facility
ESF	Emergency Safety Features
ESFAS	Engineering Safety Feature Actuation System

FID	Fixed Incore Detector
FHS	Fuel Handling and Refueling System
FPS	Fire Protection System
FWS	Main and Startup Feedwater System
HEPA	High Efficiency Particulate Air
HFE	Human Factors Engineering
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
I&C	Instrumentation and Control
IDS	Class 1E dc and UPS System
IIS	In-Core Instrumentation System
ILRT	Integrated Leak Rate Test
I/O	Input/Output
IRC	Inside Reactor Containment
IRWST	In Containment Refueling Water Storage Tank
ISI	Inservice Inspection
IST	Inservice Testing
ITAAC	Inspections, Tests, Analyses and Acceptance Criteria
LBB	Leak Before Break
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LPZ	Low Population Zone
MCC	Motor Control Center
MCR	Main Control Room
MHS	Mechanical Handling System
MMIS	Man-Machine Interface System
MOV	Motor Operated Valve
MPC	Maximum Permissible Concentration
MSIV	Main Steam Isolation Valve
MSLB	Main Steam Line Break
MSS	Main Steam System
MTC	Moderator Temperature Coefficient
MW	Megawatt
MEe	Megawatt Electric
MWt	Megawatt Thermal
N/A	Not Applicable
NDE	Non-Destructive Examination
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
ORC	Outside Reactor Containment

ORE	Occupational Radiation Exposure
OCS	Operation and Control Centers System
PCS	Passive Containment Cooling System
P&D	Piping and Instrument Diagram
PLS	Plant Control System
PMS	Protection and Safety Monitoring System
PRA	Probabilistic Risk Assessment
PRHR	Passive Residual Heat Removal
PSS	Primary Sampling System
PxS	Passive Core Cooling System
PWR	Pressurized Water Reactor
QA	Quality Assurance
RAP	Reliability Assurance Program
RAT	Reserve Auxiliary Transformer
RCDT	Reactor Coolant Drain Tank
RCS	Reactor Coolant System
RFI	Radio Frequency Interference
RMS	Radiation Monitoring System
RNS	Normal Residual Heat Removal System
RSW	Remote Shutdown Workstation
RXS	Reactor System
RV	Reactor Vessel
SFS	Spent Fuel Pit Cooling System
SGS	Steam Generator System
SSAR	Standard Safety Analysis Report
SSE	Safe Shutdown Earthquake
SWS	Service Water System Total Integrated Dose
TSC	Technical Support Center
UAT	Unit Auxiliary Transformer
UBC	Uniform Building Code
UPS	Uninterruptable Power Supply
VBS	Nuclear Island Nonradioactive Ventilation System
VES	Main Control Room Emergency Habitability System
VLS	Containment Hydrogen Control System
VWS	Central Chilled Water System
VXS	Annex/Auxiliary Non-Radioactive Ventilation System
VZS	Diesel Generator Building Ventilation System
ZOS	Onsite Standby Power System

4.0 INTERFACE

10 CFR 52.47 (a)(l)(vii) requires identification of the interface requirements to he met by those portions of the plant for which the application does not seek certification. 10 CFR 52.47 (a)(1)(viii) requires justification that these interfaces he verifiable through inspection, testing (either in the plant or elsewhere), or analysis. An applicant for a combined operating license (COL) that references the AP600 Certified Design must provide design features or characteristics that comply with the interface requirements for AP600 design and ITAAC for the site-specific portion of the facility design, in accordance with 10 CFR 52.79 (c).

AP600 is a plant design incorporating the entire nuclear island, the annex buildings and associated equipment, the diesel/generator building and associated equipment, the turbine generator building, the turbine/generator equipment and the radwaste facilities. As a result, no interfaces need to be identified between or among these portions of the plant.

There are no safety-related interfaces between the AP600 Certified Design and other portions of a facility having a combined license under 10 CFR Part 52.

There is one defense-in-depth interface which must be addressed by the COL applicant. In support of the Electrical Power System (Section 2.6), an adequate off-site power supply connection must be provided by the transmission system. This capability need not be automatic or safety-related.

The AP600 site parameters are described in Section 5.0.

5.0 SITE PARAMETERS

Design Description

The AP600 is designed for site parameters that envelope the conditions that will occur at most potential power plant sites in the United States. Table 5.0-1 identifies the key site parameters that are specified for the design of safety-related aspects of structures, systems and components.

Table 5.0-1 Site Parameters	
Air Temperature	Limits based on historical data excluding peaks of less than 2 hours duration. Maximum temperature of 115° dry bulb/80°F coincident wet bulb Minimum wet bulb 81°F (noncoincident) Minimum temperature of -40°F
Tornado Wind Speed	Maximum wind speed of 300 mph
Safe Shutdown Earthquake (SSE)	SSE free field peak ground acceleration of 0.30g with Regulatory Guide 1.60 response spectra
Precipitation Rain Snow/Ice	19.4 in./hr (6.3 in./5 min) Ground Snow Load of 75 pounds per square foot with exposure factor of 1.0 and importance factor of 1.2