HITACHI

GE Hitachi Nuclear Energy

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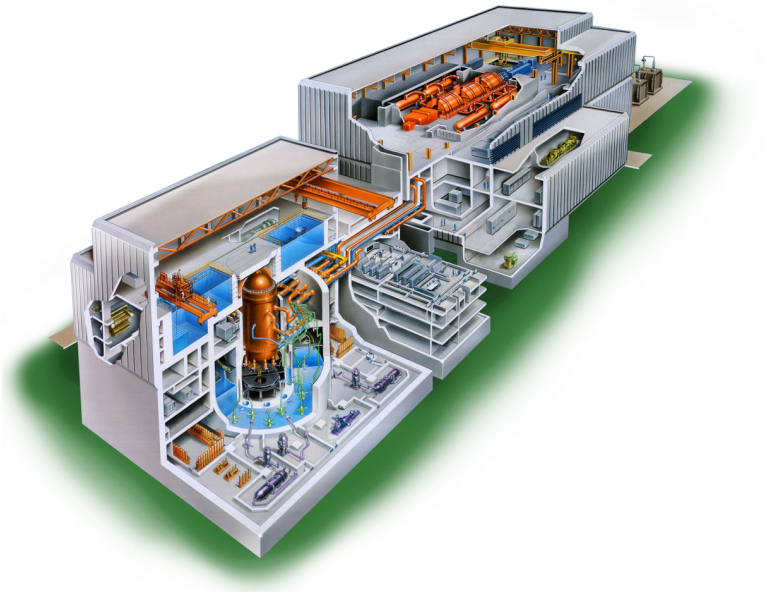
ABWR
Design Control Document



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List of Acronyms

AAC Alternate AC

ABS Absolute

ABWR Advanced Boiling Water Reactor

AC Alternating Current

ACI American Concrete Institute

ACU Air Conditioning Unit

ACWIA AC - Independent Water Addition

ACRS Advisory Committee on Reactor Safety

ACS Atmospheric Control System

ADS Automatic Depressurization System

AEOD Office of Analysis and Evaluation of Operational Data

AFIP Automatic Fixed In-Core Probe

AFPC Augmented Fuel Pool Cooling

AFW Auxiliary Feedwater

AIA Aircraft Impact Assessment

AISC American Institute of Steel Construction

ALARA As Low As Reasonably Achievable

ALF Automated Load Following

AMB Ambient

AMG Accident Management Guidelines

ANI Basic Fire Protection for Nuclear Power Plants

ANS American Nuclear Society

ANSI American National Standards Institute

AOO Anticipated Operational Occurrences

List of Acronyms Continued

API American Petroleum Institute

APR Automatic Power Regulator

APRM Average Power Range Monitor

APRS Automatic Power Regulator System

ARD Anti-Rotation Device

ARI Alternate Rod Insertion

ARMC Automated Rod Movement Control

ARM Area Radiation Monitoring System

ARS Acceleration Response Spectrum

ASD Adjustable Speed Drive

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

ASI Adverse System Interactions

ASL ASME American Society of Mechanical Engineers

ASTM American Society for Testing and Materials

ATIP Automatic Traversing Incore Probe

ATLM Automated Thermal Limit Monitor

ATWS Anticipated Transient Without Scram

AWS American Welding Society

AWWA American Water Works Association

B&PV Boiler and Pressure Vessel (ASME Code)

BAS Breathing Air System

BLDG Building

BOC Bottom of Core or Beginning of Cycle

BOP Balance of Plant

List of Acronyms Continued

BPU Bypass Unit

BPWS Banked Position Withdrawal Sequence

BTP Branch Technical Position

BWR Boiling Water Reactor

BWROG BWR Owners' Group

BWRT Backwash Receiving Tank

C/B Control Building

CBA Control Building Annex

C/C Cooling Coil

CACS Containment Atmospheric Cleanup System

CAM Containment Atmospheric Monitoring System

CAP Cargo Access Portal

CAS Central Alarm Station

CAV Cumulative Absolute Velocity

CCDF Complimentary Cumulative Distibution Failure

CCI Core-Concrete Interaction

CCF Common Cause Failure

CCFP Conditional Containment Failure Probability

CCS Condensate Cleanup System

CCS Containment Cooling System

CCW Closed Cooling Water

CDF Core Damage Frequency

CDRL Core Damage Radiation Level

CERT Constant Extension Rate Test

List of Acronyms Continued

CET Containment Event Tree

CF&CAE Condensate Feedwater and Condensate Air Extraction

CFM Core Flow Measurement

CFR Code of Federal Regulation

CFS Condensate and Feedwater System

CGCS Combustible Gas Control System

CH Chugging

CHRA Control Room Habitability Area

CHRS Containment Heat Removal System

CID Control Interface Diagram

CIS Containment Isolation System

CIV Combined Intermediate Valve or Containment Isolation Valve

CLOC Closed Loop Outside Containment

CMM Control Room Multiplexing Unit

CMP Configuration Management Plan

CMPF Common Mode Probabilistic Failure

CMU Control Room Multiplexing Unit

CO Condensation Oscillation

COL Combined Operating License

COPS Containment Overpressure Protection System

CP Construction Permit

CPDP Core Plate Differential Pressure

CP/ML Construction Permit/Manufacturing License

CPR Critical Power Ratio

List of Acronyms Continued

CPS Condensate Purification System

CPU Central Processing Unit

CRC Cyclic Redundancy Checking

CRD Control Rod Drive

CRDH Control Rod Drive Hydraulic

CRGT Control Rod Guide Tube

CRT Cathode Ray Tube

CS Containment Spray

CS Control Switch

CST Condensate Storage Tank

CTG Combustion Turbine Generator

CUW Reactor Water Cleanup System

CV Control Valve

CVCF Constant Voltage Constant Frequency

CWS Circulating Water System

D-RAP Design Reliability Assurance Program

D/F Diaphragm Floor

D/S Dryer/Separator

DAC Design Acceptance Criteria

DAW Dry Active Waste

DBA Design Basis Accident

DBE Design Basis Event

DC Design Certification or Direct Current

DCH Direct Containment Heating

List of Acronyms Continued

DCS Drywell Cooling System

DCV Drywell Connecting Vent

DEGB Double-Ended Guillotine Break

DEPSS Drywell Equipment and Pipe Support Structure

D/G Diesel Generator

DG Diesel Generator

DIV Division

DMC Digital Measurement and Control

DOD United States Department of Defense

DOE United States Department of Energy

DOF Degree of Freedom

DOI Dedicated Operator Interface

DOP Dioctyl Phthalate Smoke

DQR Dynamic Qualification Report

DRF Design Record File

DTM Digital Trip Module

DTS Drain Transfer System

DW Drywell

DWC Drywell Cooling

DWM Demineralized Water Makeup

E/B Electrical Building

E/C Erosion/Corrosion

EAB Exclusion Area Boundary

EBVS Electrical Building Ventilation System

List of Acronyms Continued

ECCS Emergency Core Cooling System

ECP Electrochemical Potential or Engineering Computer Program

EDG Emergency Diesel Generator

EDM Electrodischarge Machining

EHC Electrohydraulic Control

EMC Electromagnetic Compatibility

EMI Electromagnetic Interference

EMS Essential Multiplexing System

EOEC End of Equilibrium Cycle

EOF Emergency Operations Facility

EPD Electric Power Distribution

EPFM Elastic-Plastic Fracture Mechanics

EPG Emergency Procedure Guideline

EPRI Electrical Power Research Institute

EPZ Emergency Planning Zone

EQD Enviromental Qualification Document

ESD Electrostatic Discharge

ESF Engineered Safety Feature

ESFAS Engineered Safety Features Actuation System

ESS Extraction Steam System

ESW Essential Service Water

ETA Event Tree Analysis

ETS Emergency Trip System

F/D Filter-Demineralizer

List of Acronyms Continued

FATT Fracture Appearance Transition Temperature

FCS Feedwater Control System

FCS Flammability Control System

FCU Fan Coil Unit

FCV Flow Control Valve

FDA Final Design Approval

FDSA Filled Drum Stock Area

FDWC Feedwater Control

FHA Fuel Handling Accident

FHB Fuel Handling Building

FIV Flow-Induced Vibration

FIVE Fire Induced Vulnerability Evaluation

FMCRD Fine Motion Control Rod Drive

FMDC Fine Motion Driver Cabinet

FMEA Failure Mode and Effects Analysis

FN Ferrite Number

FPC Fuel Pool Cooling and Cleanup

FPS Fire Protection System

FPS Freeze Protection System

FTDC Fault-Tolerant Digital Controller

FW Feedwater

FWHD Feedwater Heater and Drain System

FWLB Feedwater Line Break

GCS Generator Cooling System

List of Acronyms Continued

GDC General Design Criterion

GE General Electric

GEH General Electric Hitachi

GEN Generator

GERIS GE Reactor Vessel Inspection System

GESSAR General Electric Standard Safety Analysis Report

GETAB General Electric Thermal Analysis Basis

GL Grade Level or Generic Letter

GND Ground

GSC Gland Seal Condenser

GSOS Generator Sealing Oil System

GTO Gate-Turn-Off

GWM Gaseous Waste Management

HAZ Heat-Affected Zone

HBS House Boiler System

HCLPF High Confidence Low Probability of Failure

HCSR Heating Steam Condensate Receiver

HCU Hydraulic Control Unit

HCW High Conductivity Waste

HECW HVAC Emergency Cooling Water

HELB High-Energy Line Break

HELSA High-Energy Line-Separation Analysis

HEM Homogeneous Equilibrium Model

HEP Human Error Probability

List of Acronyms Continued

HEPA High Energy Particulate Air

HFE Human Factors Engineering

HFT Hot Functional Test

HGCS Hydrogen Gas Cooling System

HI Hydrogen Iodide

HIC High Integrity Containers

HNCW HVAC Normal Cooling Water

HP High Pressure

HPCF High Pressure Core Flooder

HPCI High Pressure Core Injection

HPME High Pressure Melt Ejection

HPIN High Pressure Nitrogen Gas Supply

HSCWRS Heating Steam and Condensate Water Return System

HSD Hot Shower Drain

HSI Human-System Interfaces

HSSS Hardware/Software System Specification

HTF High Temperature Failure

HTO Tritiated Oxide

HVAC Heating, Ventilating, and Air Conditioning

HVG High Valve Gate

HVT Horizontal Vent Test

HWC Hydrogen Water Chemistry

HWH Hot Water Heating System

HX Heat Exchanger

List of Acronyms Continued

I&C Instrumentation and Control

IAS Instrument Air System

IASCC Irradiation Assisted Stress Corrosion Cracking

IBA Intermediate Break Accident

IBD Interlocking Block Diagram

ICC Inadequate Core Cooling

ICD Interface Control Diagram

ICEA Insulated Cable Engineer Association

ICGT In-Core Guide Tube

ICM Incore Monitoring

ICS Integrated Control System

IDCOR Industry Degraded Core Rulemaking

IE Inspection and Enforcement

IED Instrument Electrical Diagram

IEEE Institute of Electrical and Electronics Engineers

IGSCC Intergranular Stress Corrosion Cracking

ILRT Integrated Leak Rate Test

IN Information Notice

INPO Institute of Nuclear Power Operations

INST Instrumentation

IORV Inadvertently Open Relief Valves

IOT Infrequent Operational Transients

ISA Instrument Society of America

ISI In-Service Inspection

List of Acronyms Continued

ISLOCA Intersystem Loss-of-Coolant Accident

ISMA Independent Support Motion Response Spectrum Analysis

IST Inservice Testing

ITAAC Inspection, Tests, Analyses, and Acceptance Criteria

ITP Initial Test Program

KAG Key Assumptions and Groundrules

L/D Lower Drywell

LBB Leak-Before-Break

LBHS Large Bore Hydraulic Snubber

LCO Limiting Condition for Operation

LCP Local Control Panels

LCW Low Conductivity Waste

LD Load Driver

LDF Lower Drywell Flooder

LDS Leak Detection and Isolation System

LDW Lower Drywell

LDWI Lower Drywell Injection

LER Licensing Event Report

LERE Licensing Event Report Evaluation

LFCV Low Flow Control Valve

LOCA Loss-of-Coolant Accident

LOOP Loss of Offsite Power

LOPP Loss of Preferred Power

LP Low Pressure

List of Acronyms Continued

LPFL Low Pressure Flooder

LPRM Local Power Range Monitor

LPSP Low Power Set Point

LPZ Low Population Zone

LRB Licensing Review Bases

LRMS Liquid Radwaste Management System

LSPS Lighting and Servicing Power Supply

LTA Lead Test Assemblies

LVDT Linear Variable Differential Transformers

LWL Low Water Level

LWR Light Water Reactor

M/C Metal-Clad

MAAP Modular Accident Analysis Program

MAPLHGR Maximum Average Planar Linear Heat Generation Rate

MBA Misplaced Bundle Accident

MCAE Main Control Area Envelope

MCC Motor Control Center

MCES Main Condenser Evacuation System

MCPR Minimal Critical Power Ratio

MCR Main Control Room

MCU Multiplexer Control Unit

MEB NRC Mechanical Engineering Branch

MG Motor Generator

MIL United States Military Standard

List of Acronyms Continued

MMI Man-Machine Interface

MOFB Mis-oriented Fuel Bundle

MOV Motor-Operated Valve

MPC Maximum Permissible Concentration

MPCWLL Maximum Primary Containment Water Level Limit

MPL Master Parts List

MPT Main Power Transformer

MRBM Multi-Channel Rod Block Monitor

MS Multiplexing System

MSF Main Steam Flow

MSL Main Steamline

MSIV Main Steamline Isolation Valve

MSR Moisture Separator/Reheater

MSV Mean Square Voltage

MTBF Mean Time Between Failure

MTSV Main Turbine Stop Valve

MT Main Turbine

MTTR Mean Time to Repair

MUWC Makeup Water Condensate

MUWP Makeup Water Purified

MVA Million Volt Amps

MWP Makeup Water Preparation

MWS Makeup Water System

MUX Multiplexing System

List of Acronyms Continued

NBR Nuclear Boiler Rated

NBS Nuclear Boiler System

NCLL Normal Combustible Loading Limit

NDE Nondestructive Examination

NDTT Nil Ductility Transition Temperature

NELS Non-Class 1E Emergency Lighting Subsystems

NEMA National Electrical Manufactures Association

NEMS Non-Essential Multiplexing System

NFPA National Fire Protection Association

NG Nuclear Grade

NMS Neutron Monitoring System

NPAR Nuclear Plant Aging Research

NPSH Net Positive Suction Head

NRC Nuclear Regulatory Commission

NRHX Non-Regenerative Heat Exchanger

NRR NRC Office of Nuclear Reactor Regulation

NSAC Nuclear Safety Analysis Corporation

NSD Non-Radioactive Storm Drain

NSLS Non-Class 1E Standby Lighting Subsystems

NSOA Nuclear Safety Operational Analysis

NSS Nuclear Safety Systems

NSSS Nuclear Steam Supply System

O-RAP Operational Reliability Assurance Program

ODYN One Dimensional Dynamic Model

List of Acronyms Continued

OGS Off Gas System

OIS Oxygen Injection System

OLMCPR Operating Limit Minimum Critical Power Ratio

OL Operating License

OLU Output Logic Unit

OPRM Oscillating Power Range Monitor

ORAP Operational Reliabilty Assurance Program

OSC Operational Support Center

OST Oil Storage and Transfer

P/C Power Center

P&ID Piping and Instrumentation Diagram

PaA Pascal Absolute

PaG Pascal Gage

PAMS Post Accident Monitoring System

PASS Post-Accident Sampling System

PBX Private Branch Exchange

PCB Primary Containment Boundary

PCHS Power Cycle Heat Sink

PCP Process Control Program

PCS Power Conversion Systems

PCS Process Computer System

PCS Process Control Systems

PCT Peak Cladding Temperature

PCV Primary Containment Vessel

List of Acronyms Continued

PCW Plant Chilled Water

PDC Principal Design Criteria

PDDP Pump Deck Differential Pressure

PFD Process Flow Diagram

PG Power Generation

PGA Peak Ground Acceleration

PGC Power Generation Control Subsystem

PHCS Power Cycle Heat Sink

PIP Plant Investment Protection

PMCS Performance Monitoring and Control Subsystem

PMF Probable Maximum Flood

PMG Plant Main Generator

POC Product of Combustion

POP Peak Overpressure

PORV Power Operated Relief Valve

PQL Product Quality Checklist

PRA Peak Recording Accelerographs

PRA Probabilistic Risk Assessment

PRDF Pressure Regulator Downscale Failure

PRM Process Radiation Monitoring

PRS Pressure Relief System

PRV Pressure Isloation Valve

PS Pipe Space

PSD Power Spectral Density

List of Acronyms Continued

PSI Pre-Service Inspection

PSS Process Sampling System

PWR Pressurized Water Reactor

PSW Potable and Sanitary Water

QA Quality Assurance

R/B Reactor Building

RACC Rod Action Control Cabinet

RAI Request for Additional Information

RAP Reliability Assurance Program

RAPI Rod Action and Position Information

RAT Reserve Auxiliary Transformer

RBCC Rod Brake Controller Cabinet

RBCCW Reactor Building Closed Cooling Water

RBVS Reactor Building Ventilation System

RBVSRM Reactor Building Ventilation System Radiation Monitoring

RCC Remote Communication Cabinet

RCCW Reactor Component Cooling Water

RCCV Reinforced Concrete Containment Vessel

RCIC Reactor Core Isolation Cooling

RCIS Rod Control and Information System

RCM Reactor Coolant Makeup System

RCP Reactor Coolant Pump

RCPB Reactor Coolant Pressure Boundary

RCS Reactor Coolant System

List of Acronyms Continued

RDA Rod Drop Accident

RDTS Radioactive Drain Transfer System

RECHAR Recombiner and Ambient Temperature Charcoal Absorption

RFCS Recirculation Flow Control System

RFI Radio Frequency Interference

RFP Reactor Feedwater Pump

RG Regulatory Guide

RHR Residual Heat Removal

RHX Regenerative Heat Exchanger

RIC Reactor Island Complex

RICSIL GE Rapid Communication Service Information Letter

RIP Reactor Internal Pump

RM Recirculation Motor

RMC Recirculation Motor Cooling

RMHX Recirculation Motor Heat Exchanger

RMISS Recirculation Motor Inflatable Shaft Seal

RMP Recirculation Motor Purge

RMU Remote Multiplexing Unit

RO Reverse Osmosis

RPS Reactor Protection System

RPT Recirculation Pump Trip

RPV Reactor Pressure Vessel

RRPS Reference Rod Pull Sequence

RRS Reactor Recirculation System

List of Acronyms Continued

RSM Rod Server Module

RSS Remote Shutdown System

RSW Reactor Service Water

RSW Reactor Shield Wall

RW/B Radwaste Building

RWC PS Radioactive Waste Control Panel System

RWE Rod Withdrawal Error

RWM Rod Worth Minimizer

RWP Radiation Work Permit

RWST Refueling Water Storage Tank

RVSS Reactor Vessel Support Structure

S/B Service Building

S/DRSRO Single/Dual Rod Sequence Restriction Override

S/P Suppression Pool

S&PC Steam and Power Conversion

SACF Single Active Component Failure

SAM Sampling System

SAMDA Severe Accident Mitigation Design Alternatives

SAS Service Air System

SB&PC Steam Bypass and Pressure Control

SBO Station Blackout

SBWR Simplified Boiling Water Reactor

SC Shutdown Cooling

SCB Secondary Containment Boundary

List of Acronyms Continued

SCG Startup Coordinating Group

SCF Single Component Failure

SCRAM Reactor Trip (Safety Control Rod Axe Man)

SCRRI Selected Control Rod Run-In

SD Storm Drain

SDC Safety Design Criteria or Shutdown Cooling

SECY Office of the Secretary of the Commission

SELS Class 1E Associated Emergency Lighting System

SEP Standby Electrical Power

SER Safety Evaluation Report

SGTS Standby Gas Treatment System

SIL GE Service Information Letter

SIT Structural Integrity Test

SJAE Steam Jet Air Ejector

SLCS Standby Liquid Control System

SLD Single Line Diagram

SLMCPR Safety Limit Minimum Critical Power Ratio

SLU Safety System Logic Unit

SMA Seismic Margins Analysis

SMDM Stepping Motor Driver Modules

SMP Software Management Plan

SMS Seismic Monitoring System

SOE Single Operator Error

SORV Stuck Open Relief Valve

List of Acronyms Continued

SOT System Operational Transients

SPC Suppression Pool Cooling

SPCU Suppression Pool Cleanup

SPDS Safety Parameter Display System

SPTM Suppression Pool Temperature Monitoring

SR Surveillance Requirements

SREE Safety-Related Electrical Equipment

SRMS Solid Radwaste Management System

SRNM Startup Range Neutron Monitor

SROA Safety-Related Operator Action

SRP Standard Review Plan

SRSS Square-Root-of-the-Sum-of-the-Squares

SRV Safety Relief Valve

SSAR Standard Safety Analysis Report

SSAS Station Service Air System

SSC Structures, Systems and Components

SSPC Steel Structures Painting Council

SSPV Scram Solenoid Pilot Valve

SSE Safe Shutdown Earthquake

SSI Soil-Structure Interaction

SSLC Safety System Logic and Control

SSLS Class 1E Associated Standby Lighting Subsystem

SSW Station Service Water

S&PC Steam and Power Conversion

List of Acronyms Continued

STC	Surveillance Test Controller
STPT	Simulated Thermal Power Trip
STR/AP	Scram Time Test Recording/Analysis Panel
STS	Sewage Treatment System
STTP	Scram Time Test Panel
SW	Switch
SWC	Surge Withstand Capability
SWSA	Solid Waste Storage Area
T/B	Turbine Building
T-G	Turbine Generator
T&M	Test and Maintenance
TOC	Top of Core
TAF	Top of Active Fuel
TASS	Turbine Auxiliary Steam System
TB	Turbine Bypass
TBCE	Turbine Building Compartment Exhaust
TBCWS	Turbine Building Cooling Water System
TBE	Turbine Building Exhaust
TBLOE	Turbine Building Lube Oil Area Exhaust
TBS	Turbine Building Supply
TBS	Turbine Bypass System
TBVS	Turbine Building Ventilation System
TCF	Total Core Flow
TCS	Turbine Control System

List of Acronyms Continued

TCV Turbine Control Valve

TCW Turbine Building Cooling Water

TD Tornado Damper

TDH Total Developed Head

TGSS Turbine Gland Sealing System

THA Time-History Accelerographs

TIP Traversing Incore Probe or Traversing Ion Chamber

TIU Technician Interface Unit

TLU Trip Logic Unit

TMI Three Mile Island

TMSL Typical Mean Sea Level

TN Transmission Network

TRS Test Response Spectra

TS Technical Specification

TSC Technical Support Center

TSI Turbine Supervisory Instrument

TSV Turbine Stop Valve

TSW Turbine Service Water

TVAPS Time Varying Axial Power Shape

U/D Upper Drywell

UAT Unit Auxiliary Transformers

UBC Uniform Building Code

UD Upper Drywell

UHS Ultimate Heat Sink

List of Acronyms Continued

UL	Underwriters Laboratory
UPS	Uninterruptible Power Source
URD	Utility Requirements Document
URS	Ultimate Rupture Strength
USE	Upper Shelf Energy
USMA	Uniform Support Motion Response Spectrum Analysis
USNRC	United States Nuclear Regulatory Commission
V&V	Verification and Validation
VAC	Volts Alternating Current
VAP	Vehicle Access Portal
VDC	Volts Direct Current
VDU	Video Display Unit
VLC	Vent Line Clearing
VWO	Valves-Wide-Open
WDSC	Wetwell and Drywell Spray Cooling (Mode of RHR)
WDVB	Wetwell-to-Drywell Vacuum Breaker
WDVBS	Wetwell-to-Drywell Vacuum Breaker System
WRL	Wide Range Level
WW	Wetwell
ZIS	Zinc Injection System
ZSI	Zone Selective Interlocks

Introduction for Design Control Document

1.0 Purpose of the DCD

The Design Control Document (DCD) contains information from various documents comprising the design certification application for the Advanced Boiling Water Reactor (ABWR) standard design. The purpose of the DCD is to provide, in a single document, design-related information to be incorporated by reference in the design certification rule for the ABWR standard design.

This Introduction describes the purpose, contents, and uses of the DCD, and is consistent with the design certification rule. However, this Introduction is not incorporated into the design certification rule and does not constitute a legal requirement. Licensing decisions shall be based upon the legal requirements in the design certification rule and 10 CFR Part 52. Additional guidance is provided in the Statement of Consideration for the design certification rule and 10 CFR Part 52.

2.0 Contents of the DCD

This document contains the DCD Introduction, the Certified Design Material (i.e., Tier 1), and the approved safety analysis material (i.e., Tier 2). Each is summarized below.

The Introduction describes the purpose, contents and uses of the DCD.

The Certified Design Material (Tier 1) for the ABWR includes the following information: (1) Definitions and General Provisions; (2) Design Descriptions; (3) Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC); (4) Significant Interface Requirements for interfaces of systems that are wholly or partially outside the scope of the ABWR standard design; and (5) Significant Site Parameters for the ABWR standard design plant. For ease of reference, Tier 1 includes a Table of Contents.

The approved safety analysis material (Tier 2) includes, to the extent applicable for the ABWR standard design, the following information: (1) the information required for a final safety analysis report under 10 CFR 50.34(b); and (2) other relevant information identified in 10 CFR 52.47(a), such as information related to the Three Mile Island requirements under 10 CFR 50.34(f); technical resolutions of the Unresolved Safety Issues and medium and high priority Generic Safety Issues;the results of an assessment of aircraft impact according to requirements in 10CFR 52.59(a) and 10 CFR 50.150; and important features identified from the assessments for the ABWR design. For ease of reference, Tier 2 contains a general Table of Contents at the beginning, as well as a detailed Table of Contents before each chapter.

The Design Descriptions, Interface Requirements, and Site Parameters in Tier 1 are derived entirely from the provisions of Tier 2, but may be more general than the provisions in Tier 2. Therefore, compliance with the more detailed Tier 2 material

provides a sufficient method, but not the only acceptable method, for complying with the more general design provisions in Tier 1. The methods specified in Tier 2 shall be followed unless a change is made in accordance with the change processes specified in the design certification rule for the ABWR.

3.0 Uses of the DCD

3.1 In General

The design certification rule for the ABWR can be referenced in an application for a combined license (COL) under 10 CFR Part 52, and in the subsequently issued COL. Because the DCD is incorporated by reference in the design certification rule for the ABWR, the provisions of the DCD are effective with respect to an application or license that references that rule, with certain exceptions as provided in the rule and described in Sections 3.2, 3.3 and 3.4 below.

The DCD describes structures, systems, and components (including any associated programmatic provisions) within the scope of the ABWR standard design, and the requirements governing the interfaces between the ABWR standard design and the plant-specific design. An application for a COL that references the design certification rule for the ABWR must provide a plant-specific safety analysis report (SAR) which shall include information about the part of the plant that is outside the scope of the ABWR standard design or which is otherwise required by a relevant provision of 10 CFR Part 52, but is not included in the DCD (see Section 3.6 below). Together, the DCD and plant-specific SAR will provide the technically relevant information required for a COL, or for an application for a COL, that references the design certification rule for the ABWR.

3.2 Uses of the Certified Design Material

The following provisions describe the scope and uses of Tier 1 material:

Design Descriptions -The Design Descriptions pertain only to the design of structures, systems, and components of an ABWR standard plant and not to its operation, maintenance and administration. In the event of an inconsistency between the Design Descriptions and the Tier 2 material, the Design Descriptions shall govern.

ITAAC - An applicant or holder of a COL shall perform and demonstrate conformance with the ITAAC prior to fuel load. An applicant for a COL may proceed at its own risk with design and procurement activities, and a holder of a COL may proceed at its own risk with design, procurement, construction and preoperational activities, even though the NRC Staff may not yet have agreed that any particular ITAAC have been satisfied. In the event of a noncompliance with an ITAAC, the applicant or holder of a COL shall either take corrective actions to successfully complete the ITAAC or request a change in the ITAAC in accordance with the change processes specified in the design certification rule for the ABWR.

Interface Requirements - The Tier 1 Interface Requirements identify the significant criteria for interfaces between systems within the scope of the ABWR standard design and other systems that are wholly or partially outside the scope of the ABWR standard design. The Tier 1 Interface Requirements define the significant attributes and performance characteristics that the out-of-scope portion of the plant must have in order to support the certified design. The plant-specific SAR shall contain provisions which implement the Interface Requirements in accordance with 10CFR 52.79(b). Additionally, the plant-specific application for COL shall contain additional ITAAC corresponding to these implementing provisions. In the event of an inconsistency between the Tier 1 Interface Requirements and the Tier 2 material, the Tier 1 Interface Requirements shall govern.

Site Parameters - The Tier 1 Site Parameters identify the significant design values for site-related information used for the ABWR standard design plant. Detailed design activities for structures, systems, and components within the scope of the ABWR standard design shall be performed with reference to the Site Parameters. For cases where a site-specific characteristic is not bounded by a Site Parameter, the COL applicant may request a change in the Site Parameters in accordance with the change processes in the design certification rule for the ABWR. Design activities for structures, systems, and components outside the scope of the ABWR standard design may be performed using site-specific design basis parameters. In the event of an inconsistency between the Tier 1 Site Parameters and the Tier 2 material, the Tier 1 Site Parameters shall govern.

3.3 Uses of the Approved Safety Analysis Material

The following provisions describe the scope and uses of Tier 2 material:

Effect of Tier 2 - All of the information in Tier 2 is approved by the NRC, is applicable (except as described below with respect to COL License Information items and Conceptual Designs) to a license application or license that references the ABWR design certification rule, and is among the "matters resolved" under 10 CFR52.63(a)(4). Compliance with Tier 2 material is a sufficient but not a necessary method for complying with Tier 1 material. The methods specified in Tier 2 shall be followed unless a change is made in accordance with the change processes specified in the design certification rule for the ABWR.

COL License Information Items - Tier 2 identifies certain matters that need to be addressed by an applicant or licensee that references the design certification for the ABWR. These matters are designated as "COL License Information."

The purpose of the COL License Information items is to identify the type of information that must be addressed in plant-specific SARs that reference the design certification rule for the ABWR. These COL License Information items do not establish requirements; rather they identify an acceptable set of information, but not the only acceptable set of information, for inclusion in a plant-specific SAR. An applicant may deviate from or omit these COL License Information items, provided that the deviation or omission is identified and justified in the plant-specific SAR. After issuance of a license, the COL License Information items have no further effect to that licensee; instead, the corresponding provisions in the plant-specific SAR are applicable.

- Conceptual Designs - Conceptual designs for those portions of the plant which are outside the scope of the ABWR standard design are described in various places throughout Tier 2 (see, for example, the conceptual designs referenced in Tier 2 Section 1.1.2). As provided by 10 CFR 52.47(a)(1)(ix), these conceptual designs are not a part of the design certification for the ABWR and are not applicable to a COL, nor to an application for a COL, that references the design certification rule for the ABWR.

3.4 Use of ITAAC During Operation

In accordance with 10 CFR 52.103(g), the Commission must find that the acceptance criteria in the ITAAC are met prior to operation. After the NRC has issued its finding in accordance with 10 CFR 52.103(g), the ITAAC do not, by virtue of their inclusion in the DCD, constitute regulatory requirements for the COL holder or for renewals of the COL. However, subsequent modifications must comply with Tier 1 Design Descriptions, unless changes are made in the Tier 1 Design Descriptions in accordance with the change processes in the design certification rule for the ABWR.

3.5 Plant-Specific Changes to Certain Designated Material in Tier 2 (Tier 2*)

Certain information within sections of Tier 2 identified in Table 1 is designated with brackets, italicized text, and an asterisk (or similar symbol). A plant-specific change to any of this designated information shall require NRC Staff approval prior to implementing the change. A request for departure from Tier 2 * will be treated as a request for license amendment under 10

CFR 50.90 and 50.92. The requirement for prior NRC Staff approval will expire for some of the designated information, as indicated in Table 1, when the plant first achieves 100% power.

3.6 Proprietary and Safeguards Information

The proprietary and safeguards information referenced in the DCD must be included as part of an application for a COL.

3.7 References in Tier 2 to the Standard Safety Analysis Report

To enable Tier 2 to have the same section numbering system as the Standard Safety Analysis Report (SSAR) for the ABWR, the SSAR section numbers were used in preparing Tier 2. In some instances, sections or information from the SSAR, such as details of the probabilistic risk assessment, were deliberately not incorporated in the DCD. Tier 2 references or cross-references to those sections in the SSAR shall not be construed as incorporating these sections, or the information therein, in Tier 2.

3.8 Severe Accident Issues

A proposed plant-specific departure from Tier 2, under Section B.5 of the change process in the design certification rule, affecting resolution of a severe accident issue involves an unreviewed safety question if:

(1) there is a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible; or

(2) there is a substantial increase in the consequences to the public of a particular severe accident previously reviewed

Table 1 Designated Tier 2 Material Which May Not be Changed Without Prior NRC Staff Approval

Designated Reference(1)	Designated Material	Expiration(2)
Table 2	ASME Boiler and Pressure Vessel Code, Section III, Division 2, Subsection CC/ACI 359 and Division 1, Subsection NE	First Full Power
Tables 3 and 4	ANSI/AISC N-690 and ACI 349	First Full Power
Table 5	Motor-Operated Valves	First Full Power
Table 6	Equipment Seismic Qualification Methods	First Full Power
Table 7	Piping Design Acceptance Criteria	First Full Power
Table 8	Fuel System: Design Criteria and First Cycle Design and Methods	See Table 8
Table 9	Instrument Setpoint Methodology; Regulatory Guide 1.105	First Full Power
Table 10	EMS Performance Specifications and Architecture	First Full Power
Table 11	SSLC Hardware and Software Qualification	First Full Power
Tier 2, Subsections 7.1.1.2, 7.1.2.1.6, Table 1.8-21	Self-test System Design Testing Features and Commitments	First Full Power
Tier 2, Appendix 18E and Table 1.8-21	HFE Design and Implementation Process	First Full Power

(1) Tables 1 through 11 identify those Tier 2 sections, tables, and figures which, in whole or part, contain Tier 2* information. Within the identified sections and tables, the part which is Tier 2* is designated by means of italicized print, brackets, and an asterisk (or similar symbol). The identified figures are designated as Tier 2* in their entirety (although only the titles of the figures are italicized, bracketed, and asterisked).

In some cases, the designated Tier 2* information contains references to other sections, tables, or figures in Tier 2. A referenced section, table, or figure itself is not Tier 2*, unless the referenced section, table, or figure is designated somewhere in Tables 1 through 11.

In some cases, the designated Tier 2* information contains references to external documents. The applicable provisions within the external documents shall be treated as Tier 2*. The particular edition or revision of the external reference is identified with the external reference itself. If the reference does not identify a particular edition or revision, the applicable provisions of the edition or revision identified in Tier 2 Table 1.8-19, 1.8-20, or 1.8-21 shall be treated as Tier 2*.

(2) The requirement for prior NRC Staff approval expires as noted.

Table 2 ASME Code for Concrete Containment and Buckling Analysis of Drywell Head

	Tier 2 Sections(2)	Tier 2 Tables (2)
ASME III, Division 2, Subsection CC/ACI 359 Code Edition for Concrete Containment ASME III, Division 1, Subsection NE Code Edition for Buckling Analysis for Drywell Head	3.8.1.2.2, 3H.1.4.1.1 3.8.2.4.1.4., 3.8.2.2.3	3.8-4, 1.8-21 1.8-21

(1) See Tier 2, Subsection 3.8.1.1.1.

(2) The applicable portions of these sections and tables are italicized on the sections and tablesthemselves. See Note (1) of Table 1.

Table 3 ACI-349 Code for Concrete Structures and Foundations

	Tier 2 Sections(2)	Tier 2 Tables(2)
Concrete Internal Structures of Containment Other Seismic Category I Structures Concrete Foundations	3.8.3.5.2, 3H.1.4.1.1 3.8.4.2.1, 3.8.4.2.2, 3.8.4.2.3, 3.8.4.4.1, 3.8.4.5.1.2, 3.8.4.5.2, 3.8.4.5.3, 3H.2.4.1, 3H.3.4.1 3.8.1.2.2, 3.8.5.2, 3.8.4.2.1	3.8-4, 3.8-10, 1.8-21 3.8-10, 1.8-21 3.8-10, 1.8-21

(1) See Tier 2, Subsection 3.8.3.2.

(2) The applicable portions of these sections and tables are italicized on the sections and tablesthemselves. See Note (1) of Table 1.

Table 4 Standard ANSI/AISC N690 for Seismic Category I Structures

	Tier 2 Sections (2)	Tier 2 Tables(2)
Internal Structures of Containment Other Seismic Category I Structures	3.8.3.5.1, 3.8.3.5.2, 3H.1.4.1.1 3.8.4.2.1, 3.8.4.2.2, 3.8.4.2.3, 3.8.4.4.1, 3.8.4.5.1.2, 3.8.4.5.2, 3.8.4.5.3, 3H.2.4.1, 3H.3.4.1	3.8-4, 3.8-9, 1.8-19, 1.8-21 3.8-9, 1.8-19, 1.8-21

(1) See Tier 2, Subsection 3.8.3.2.

(2) The applicable portions of these sections and tables are italicized on the sections and tablesthemselves. See Note (1) of Table 1.

Table 5 Design, Qualification, and Preoperational Testing for MOVs

	Tier 2 Sections(2)	Tier 2 Tables(2)
Design and Qualifications	3.9.6.2.2(1) 3.9.6.2.2(2)	
Preoperational Testing Prototype Qualification Testing	3.9.6.2.2(1)	

(1) See Tier 2, Subsection 3.9.6.2.2.

(2) The applicable portions of these sections and tables are italicized on the sections and tables themselves. See Note (1) of Table 1.

Table 6 Equipment Seismic Qualification Methods

	Tier 2 Sections (2)	Tier 2 Tables(2)
Standards and Regulatory Guides	3.10.1.3	1.8-20, 1.8-21
Experience Data	3.10.1.1, 3K.7(3)	
Tests and Analyses	3.9.2.2.1, 3.10.1.1, 3K.1, 3K.7, 3K.8	
Pump and Valve Operability	3.9.3.2.3.1.4, 3.9.3.2.1.1, 3.9.3.2.5.1.2	3.9-2
Testing Condition	3K.1, 3K.2(a)	
Test Input Motion	3.9.2.2.1, 3K.3(b), 3K.9, 3K.10	
Multi-Frequency Input Motion	3.9.3.2.3.1.4, 3K.3(a), 3K.5	1.8-20
Biaxial Test Input Motion	3K.1, 3K.4	
Dynamic Coupling of Systems	3.9.2.2.1, 3.10.1.1	
Test Loads	3.9.3.2.1.1, 3.9.3.2.3.1.4, 3.9.3.2.5.1.2	3.9-2
Damping	3K.6	
Qualification of Relays	3.10.2.1	
Multiple Commitments	3.9.8 (Ref. 3.9-6), 3.11.7 (Ref. 3.11-2)	

(1) See Tier 2, Subsection 3.9.1.7. The change restriction noted in this subsection applies to the delineated commitments only in their application to piping design.

(2) The applicable portions of these sections, tables and figures are italicized on the sections, tables and figures themselves. See Note (1) of Table 1.

(3) Tables 1.8-21 and 3.2-3 are applicable to a commitment involving the ASME Code, Section III, and Tables 5.2-1 and 1.8-21 are applicable to a commitment involving the ASME Code, Section III, Code Cases.

Table 7 Piping Design Acceptance Criteria

	Tier 2 Sections(2)	Tier 2 Tables and Figures(2) (3)
ASME III Code Edition and Code Cases	3.9.3.4.1	Tables 1.8-21, 3.2-3, 5.2-1
Response Spectrum Method and Low and high Frequency Modes	3.7.3.6, 3.7.3.7.1, 3.7.3.7.2, 3.7.3.8.1.6	Table 1.8-20
Interdependent Support Motion and Damping Code Case	3.7.2.1.4, 3.7.3.8.1.10, 3.7.3.8.1.7	
Time History Methods	3.7.3.1	
Small-Bore Piping Method	3.7.3.8.1.9	
Non-Seismic/Seismic Piping Transition/Interaction	3.7.3.13	
Mainsteam Leakage Path	3.2.5.3	
Dynamic Piping Model	3.7.3.3.1.2	
Modeling of Piping Supports	3.7.3.3.1.6	
Amplified Response Spectra	3.7.3.3.1.8	
Piping Benchmark Program	3.9.1.2, 3.9.8 (Ref. 3.9-11)	
Branch Line Decoupling	3.7.3.3.1.3, 3.7.3.8.1.9	
Design Transients	3.9.3.1	
Environmental Effects on Carbon Steel Piping	3.9.3.1.1.7, 3.9.8 (Ref. 3.9-9)	
Fatigue Evaluation of ASME Code Class 2 and 3 Piping	3.9.3.1	
Fatigue Evaluation of SRV Discharge Piping	3.9.3.1	
Thermal Oscillations	3.9.3.1	Figures 5.4-10 (note 32) , 6.3-7 (note 29)
Thermal Stratisification	3.9.3.1	
Safety-Relief Valve Design, Installation and Testing	1A.2.9	
Functional Capability		Table 3.9-2
Seismic Anchor Motion	3.9.8 (Ref. 3.9-7)	Table 3.9-1
Earthquake Cycles	3.7.3.8.1.8, 3.9.3.1.1.9	Table 1.8-21
Modal Damping	3.7.3.2	
Minimum Temperature for Thermal Analyses	3.7.3.8.1.7, 3.9.3.1	

Table 7 Piping Design Acceptance Criteria (Continued)

Commitment	Tier 2 Sections(2)	Tier 2 Tables and Figures(2) (3)
Intersystem LOCA	3.9.3.1	
Pipe Support Jurisdictional Boundaries	3.9.3.4.1	
Pipe Support Baseplate and Anchor Bolt Design	3.9.3.4	
Use of Energy Absorbers and Limit Stops	3.7.3.3.1.7, 3.9.3.4.1(6)(a)	Table 1.8-20
Use of Snubbers	3.9.3.4.1	
Decoupled Branch Pipe - Displacement Criteria	3.7.3.3.1.4	
Seismic Self-Weight Excitation	3.7.3.3.4	
Supplementary Steel	3.9.3.4	
Friction Forces	3.7.3.3.4	
Gaps Between Pipe and Supports	3.7.3.3.4	
Instrumentation Line Support Criteria	3.7.3.8.1.9, 3.9.3.4.1	
Pipe Defection Limits	3.9.3.4.1	
Pipe-Mounted Equipment Allowable Loads	3.9.3.1.21	
As-Built Piping Verification	3.9.3.1.20, 3.9.8 (Ref. 3.9-10)	
Pipe Interferences	3.9.3.1.22	
Postulated Break and Crack Location and Configuration	3.6.2.1.4.1 through 3.6.2.1.4.5, 3.6.2.1.5.2, 3.6.2.1.5.3	
Dynamic Analysis for Postulated Break	3.6.2.3.1, 3.6.2.3.2	

(1) See Tier 2, Subsection 3.9.1.7. The change restriction noted in this subsection applies to the delineated commitments only in their application to piping design.

(2) The applicable portions of these sections, tables and figures are italicized on the sections, tables and figures themselves. See Note (1) of Table 1.

(3) Tables 1.8-21 and 3.2-3 are applicable to a commitment involving the ASME Code, Section III, and Tables 5.2-1 and 1.8-21 are applicable to a commitment involving the ASME Code, Section III, Code Cases.

Table 8 Fuel System Design Criteria and First Cycle Design and Methods

	Tier 2 Sections (2)	Tier 2 Tables and Figures(2)	Expiration(3)
Fuel System Design	4.2.2.1, 4.2.5 (Reference 4.2-1)	Figures 4.2-1, 4.2-2	First Full Power
Fuel Assembly Design	4.2.2, 4.2.5 (Reference 4.2-1)	Figure 4.3-1	First Full Power
Nuclear Design	4.3.2.1	Table 1.8-19	First Full Power
Fuel Evaluation Methods and Results	4.2.3 (References 4.2-2, 4.2-3)		None
Equilibrium Cycle and Control Rod Patterns	4A.1, 4A.2, 4A.3		First Full Power
Fuel Licensing Acceptance Criteria and Fuel	4.2, App. 4B		None
Burnup Limits	App. 4C	Table 1.8-19, Table 1.8-21	
Control Rod Licensing Acceptance Criteria			First Full Power

(2) The applicable portions of these sections, tables and figures are italicized on the sections, tables, and figures themselves. See Note (1) of Table 1.

(3) The requirement for prior NRC Staff approval expires as noted.

Table 9 Instrument Setpoint Methodology (1)

Commitment Tier 2 Tables(2)	Tier 2 Sections(2)	Tier 2 Tables(2)
Instrument Setpoint Methodology	7.1.2.10.9, 7.2.2.2.1(6), 7.3.2.1.2(3)(f), 7.3.4.(Ref. 7.3-2), 7.4.2.3.2(3)(f), 7.6.2.1.2(3)(f), 7.6.2.6.2(3)(f)	1.8-20

Notes:

(1) See Tier 2, Subsection 7.1.2.10.9.

(2) The applicable portions of these sections and tables are italicized on the sections and tables themselves. See Note (1) of Table 1.

Table 10 EMS Performance Specifications and Architecture

	Tier 2 Sections (2)	Tier 2 Tables (2)
EMS Performance Specifications and Architecture	App. 7A (except Section 7A.4), App. 7B, App. 7C (except Section 7C.4), 20.3.8 (Q420.92)	1.8-20, 1.8-21

(1) See Tier 2, Section 7A.1(1).

(2) The applicable portions of these sections and tables are italicized on the sections and tables themselves. See Note (1) of Table 1.

Table 11 SSLC Hardware and Software Qualification

	Tier 2 Sections (2)	Tier 2 Tables (2)
SSLC Hardware and Software Qualification	7A.2(4), 7A.2(10), 7A.2 (11), 7A.5(1), 7B.1, 7B.2, 7B.3, 7C.2(h), 20.3.8 (Q420.69), 20.3.8 (Q420.92)	1.8-21

(1) See Tier 2, Section 7A.1(2).

(2) The applicable portions of these sections and tables are italicized on the sections and tables themselves. See Note (1) of Table 1.