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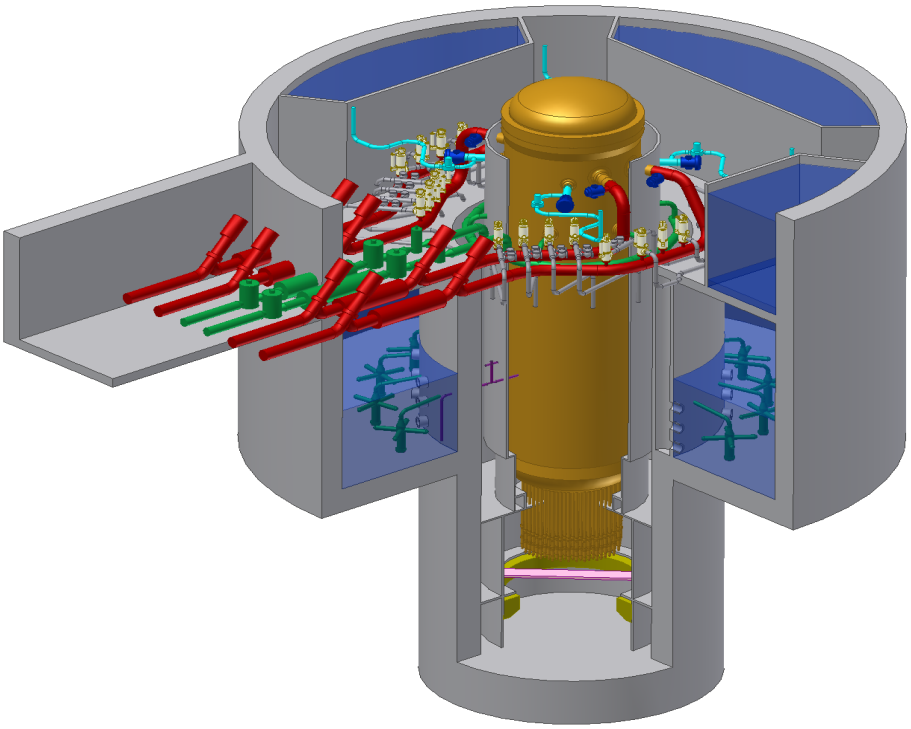

ESBWR Design Control Document

Tier 2

Chapter 2

Site Characteristics

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Global Abbreviations And Acronyms List

Term	Definition
10 CFR	Title 10, Code of Federal Regulations
A/D	Analog-to-Digital
AASHTO	American Association of Highway and Transportation Officials
AB	Auxiliary Boiler
ABS	Auxiliary Boiler System
ABWR	Advanced Boiling Water Reactor
ac / AC	Alternating Current
AC	Air Conditioning
ACF	Automatic Control Function
ACI	American Concrete Institute
ACS	Atmospheric Control System
AD	Administration Building
ADS	Automatic Depressurization System
AEC	Atomic Energy Commission
AFIP	Automated Fixed In-Core Probe
AGMA	American Gear Manufacturer's Association
AHS	Auxiliary Heat Sink
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AL	Analytical Limit
ALARA	As Low As Reasonably Achievable
ALWR	Advanced Light Water Reactor
ANS	American Nuclear Society
ANSI	American National Standards Institute
AOO	Anticipated Operational Occurrence
AOV	Air Operated Valve
API	American Petroleum Institute
APLHGR	Average Planar Linear Head Generation Rate
APRM	Average Power Range Monitor
APR	Automatic Power Regulator
APRS	Automatic Power Regulator System
ARI	Alternate Rod Insertion
ARMS	Area Radiation Monitoring System
ASA	American Standards Association
ASD	Adjustable Speed Drive
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
AST	Alternate Source Term
ASTM	American Society of Testing Methods

Term	Definition
AT	Unit Auxiliary Transformer
ATLM	Automated Thermal Limit Monitor
ATWS	Anticipated Transients Without Scram
AV	Allowable Value
AWS	American Welding Society
AWWA	American Water Works Association
B&PV	Boiler and Pressure Vessel
BAF	Bottom of Active Fuel
BHP	Brake Horse Power
BOP	Balance of Plant
BPU	Bypass Unit
BPWS	Banked Position Withdrawal Sequence
BRE	Battery Room Exhaust
BRL	Background Radiation Level
BTP	NRC Branch Technical Position
BTU	British Thermal Unit
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owners Group
CAV	Cumulative absolute velocity
C&FS	Condensate and Feedwater System
C&I	Control and Instrumentation
C/C	Cooling and Cleanup
CB	Control Building
CBHVAC	Control Building HVAC
CCI	Core-Concrete Interaction
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CIRC	Circulating Water System
CIS	Containment Inerting System
CIV	Combined Intermediate Valve
CLAVS	Clean Area Ventilation Subsystem of Reactor Building HVAC
CM	Cold Machine Shop
CMS	Containment Monitoring System
CMU	Control Room Multiplexing Unit
COL	Combined Operating License
COLR	Core Operating Limits Report
CONAVS	Controlled Area Ventilation Subsystem of Reactor Building HVAC
CPR	Critical Power Ratio
CPS	Condensate Purification System
CPU	Central Processing Unit

Term	Definition
CR	Control Rod
CRD	Control Rod Drive
CRDA	Control Rod Drop Accident
CRDH	Control Rod Drive Housing
CRDHS	Control Rod Drive Hydraulic System
CRGT	Control Rod Guide Tube
CRHA	Control Room Habitability Area
CRT	Cathode Ray Tube
CS&TS	Condensate Storage and Transfer System
CSDM	Cold Shutdown Margin
CS / CST	Condensate Storage Tank
CT	Main Cooling Tower
CTVCF	Constant Voltage Constant Frequency
CUF	Cumulative usage factor
CWS	Chilled Water System
D-RAP	Design Reliability Assurance Program
DAC	Design Acceptance Criteria
DAW	Dry Active Waste
DBA	Design Basis Accident
dc / DC	Direct Current
DCS	Drywell Cooling System
DCIS	Distributed Control and Information System
DEPSS	Drywell Equipment and Pipe Support Structure
DF	Decontamination Factor
D/F	Diaphragm Floor
DG	Diesel-Generator
DHR	Decay Heat Removal
DM&C	Digital Measurement and Control
DOF	Degree of freedom
DOI	Dedicated Operators Interface
DOT	Department of Transportation
dPT	Differential Pressure Transmitter
DPS	Diverse Protection System
DPV	Depressurization Valve
DR&T	Design Review and Testing
DS	Independent Spent Fuel Storage Installation
DTM	Digital Trip Module
DW	Drywell
EB	Electrical Building

Term	Definition
EBHV	Electrical Building HVAC
ECCS	Emergency Core Cooling System
EDO	Environmental Qualification Document
EFDS	Equipment and Floor Drainage System
EFPY	Effective full power years
EHC	Electrohydraulic Control (Pressure Regulator)
ENS	Emergency Notification System
EOC	Emergency Operations Center
EOC	End of Cycle
EOF	Emergency Operations Facility
EOP	Emergency Operating Procedures
EPDS	Electric Power Distribution System
EPG	Emergency Procedure Guidelines
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
ERICP	Emergency Rod Insertion Control Panel
ERIP	Emergency Rod Insertion Panel
ESF	Engineered Safety Feature
ETS	Emergency Trip System
FAC	Flow-Accelerated Corrosion
FAPCS	Fuel and Auxiliary Pools Cooling System
FATT	Fracture Appearance Transition Temperature
FB	Fuel Building
FBFPHV	Fuel Building Fuel Pool Area HVAC
FBGAHV	Fuel Building General Area HVAC
FBHV	Fuel Building HVAC
FCI	Fuel-Coolant Interaction
FCM	File Control Module
FCS	Flammability Control System
FCU	Fan Cooling Unit
FDDI	Fiber Distributed Data Interface
FFT	Fast Fourier Transform
FFWTR	Final Feedwater Temperature Reduction
FHA	Fire Hazards Analysis
FIV	Flow-Induced Vibration
FMCRD	Fine Motion Control Rod Drive
FMEA	Failure Modes and Effects Analysis
FPS	Fire Protection System
FO	Diesel Fuel Oil Storage Tank

Term	Definition
FOAKE	First-of-a-Kind Engineering
FPE	Fire Pump Enclosure
FTDC	Fault-Tolerant Digital Controller
FTS	Fuel Transfer System
FW	Feedwater
FWCS	Feedwater Control System
FWS	Fire Water Storage Tank
GCS	Generator Cooling System
GDC	General Design Criteria
GDCS	Gravity-Driven Cooling System
GE	General Electric Company
GE-NE	GE Nuclear Energy
GEN	Main Generator System
GETAB	General Electric Thermal Analysis Basis
GL	Generic Letter
GM	Geiger-Mueller Counter
GM-B	Beta-Sensitive GM Detector
GSIC	Gamma-Sensitive Ion Chamber
GSOS	Generator Sealing Oil System
GWSR	Ganged Withdrawal Sequence Restriction
HAZ	Heat-Affected Zone
HCU	Hydraulic Control Unit
HCW	High Conductivity Waste
HDVS	Heater Drain and Vent System
HEI	Heat Exchange Institute
HELB	High Energy Line Break
HEP	Human error probability
HEPA	High Efficiency Particulate Air/Absolute
HFE	Human Factors Engineering
HFF	Hollow Fiber Filter
HGCS	Hydrogen Gas Cooling System
HIC	High Integrity Container
HID	High Intensity Discharge
HIS	Hydraulic Institute Standards
HM	Hot Machine Shop & Storage
HMR	Hydrometeorology Report
HP	High Pressure
HPNSS	High Pressure Nitrogen Supply System
HPT	High-pressure turbine
HRA	Human Reliability Assessment

Term	Definition
HSI	Human-System Interface
HSSS	Hardware/Software System Specification
HVAC	Heating, Ventilation and Air Conditioning
HVS	High Velocity Separator
HWCS	Hydrogen Water Chemistry System
HWS	Hot Water System
HX	Heat Exchanger
I&C	Instrumentation and Control
I/O	Input/Output
IAS	Instrument Air System
IASCC	Irradiation Assisted Stress Corrosion Cracking
IBC	International Building Code
IC	Ion Chamber
IC	Isolation Condenser
ICD	Interface Control Diagram
ICS	Isolation Condenser System
IE	Inspection and Enforcement
IEB	Inspection and Enforcement Bulletin
IED	Instrument and Electrical Diagram
IEEE	Institute of Electrical and Electronic Engineers
IGSCC	Intergranular Stress Corrosion Cracking
IIS	Iron Injection System
ILRT	Integrated Leak Rate Test
IOP	Integrated Operating Procedure
IMC	Induction Motor Controller
IMCC	Induction Motor Controller Cabinet
IRM	Intermediate Range Monitor
ISA	Instrument Society of America
ISI	In-Service Inspection
ISLT	In-Service Leak Test
ISM	Independent Support Motion
ISMA	Independent Support Motion Response Spectrum Analysis
ISO	International Standards Organization
ITA	Inspections, Tests or Analyses
ITAAC	Inspections, Tests, Analyses and Acceptance Criteria
ITA	Initial Test Program
LAPP	Loss of Alternate Preferred Power
LCO	Limiting Conditions for Operation
LCW	Low Conductivity Waste
LD	Logic Diagram

Term	Definition
LDA	Lay down Area
LD&IS	Leak Detection and Isolation System
LERF	Large early release frequency
LFCV	Low Flow Control Valve
LHGR	Linear Heat Generation Rate
LLRT	Local Leak Rate Test
LMU	Local Multiplexer Unit
LO	Dirty/Clean Lube Oil Storage Tank
LOCA	Loss-of-Coolant-Accident
LOFW	Loss-of-feedwater
LOOP	Loss of Offsite Power
LOPP	Loss of Preferred Power
LP	Low Pressure
LPCI	Low Pressure Coolant Injection
LPCRD	Locking Piston Control Rod Drive
LPRM	Local Power Range Monitor
LPSP	Low Power Setpoint
LWMS	Liquid Waste Management System
MAAP	Modular Accident Analysis Program
MAPLHGR	Maximum Average Planar Linear Head Generation Rate
MAPRAT	Maximum Average Planar Ratio
MBB	Motor Built-In Brake
MCC	Motor Control Center
MCES	Main Condenser Evacuation System
MCPR	Minimum Critical Power Ratio
MCR	Main Control Room
MCRP	Main Control Room Panel
MELB	Moderate Energy Line Break
MLHGR	Maximum Linear Heat Generation Rate
MMI	Man-Machine Interface
MMIS	Man-Machine Interface Systems
MOV	Motor-Operated Valve
MPC	Maximum Permissible Concentration
MPL	Master Parts List
MS	Main Steam
MSIV	Main Steam Isolation Valve
MSL	Main Steamline
MSLB	Main Steamline Break
MSLBA	Main Steamline Break Accident

Term	Definition
MSR	Moisture Separator Reheater
MSV	Mean Square Voltage
MT	Main Transformer
MTTR	Mean Time To Repair
MWS	Makeup Water System
NBR	Nuclear Boiler Rated
NBS	Nuclear Boiler System
NCIG	Nuclear Construction Issues Group
N-DCIS	NonSafety-Related Distributed Control and Information System
NDE	Nondestructive Examination
NDRC	National Defense Research Committee
NDT	Nil Ductility Temperature
NFPA	National Fire Protection Association
NIST	National Institute of Standard Technology
NMS	Neutron Monitoring System
NOV	Nitrogen Operated Valve
NPHS	Normal Power Heat Sink
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
NRHX	Non-Regenerative Heat Exchanger
NS	Non-seismic
NSSS	Nuclear Steam Supply System
NT	Nitrogen Storage Tank
NTSP	Nominal Trip Setpoint
O&M	Operation and Maintenance
O-RAP	Operational Reliability Assurance Program
OBCV	Overboard Control Valve
OBE	Operating Basis Earthquake
OGS	Offgas System
OHLHS	Overhead Heavy Load Handling System
OIS	Oxygen Injection System
OLMCPR	Operating Limit Minimum Critical Power Ratio
OLU	Output Logic Unit
OOS	Out-of-service
ORNL	Oak Ridge National Laboratory
OSC	Operational Support Center
OSHA	Occupational Safety and Health Administration
OSI	Open Systems Interconnect
P&ID	Piping and Instrumentation Diagram

Term	Definition
PA/PL	Page/Party-Line
PABX	Private Automatic Branch (Telephone) Exchange
PAM	Post Accident Monitoring
PAR	Passive Autocatalytic Recombiner
PAS	Plant Automation System
PCC	Passive Containment Cooling
PCCS	Passive Containment Cooling System
PCT	Peak cladding temperature
PCV	Primary Containment Vessel
PFD	Process Flow Diagram
PGA	Peak Ground Acceleration
PGCS	Power Generation and Control Subsystem of Plant Automation System
PH	Pump House
PL	Parking Lot
PM	Preventive Maintenance
PMCS	Performance Monitoring and Control Subsystem of N-DCIS
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PQCL	Product Quality Check List
PRA	Probabilistic Risk Assessment
PRMS	Process Radiation Monitoring System
PRNM	Power Range Neutron Monitoring
PS	Plant Stack
PSD	Power Spectra Density
PSS	Process Sampling System
PSWS	Plant Service Water System
PT	Pressure Transmitter
PWR	Pressurized Water Reactor
QA	Quality Assurance
Q-DCIS	Safety-Related Distributed Control and Information System
RACS	Rod Action Control Subsystem
RAM	Reliability, Availability and Maintainability
RAPI	Rod Action and Position Information
RAT	Reserve Auxiliary Transformer
RB	Reactor Building
RBC	Rod Brake Controller
RBCC	Rod Brake Controller Cabinet
RBCWS	Reactor Building Chilled Water Subsystem
RBHV	Reactor Building HVAC

Term	Definition
RBS	Rod Block Setpoint
RBV	Reactor Building Vibration
RC&IS	Rod Control and Information System
RCC	Remote Communication Cabinet
RCCV	Reinforced Concrete Containment Vessel
RCCWS	Reactor Component Cooling Water System
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RDA	Rod Drop Accident
RDC	Resolver-to-Digital Converter
REPAVS	Refueling and Pool Area Ventilation Subsystem of Fuel Building HVAC
RFP	Reactor Feed Pump
RG	Regulatory Guide
RHR	residual heat removal (function)
RHX	Regenerative Heat Exchanger
RMS	Root Mean Square
RMS	Radiation Monitoring Subsystem
RMU	Remote Multiplexer Unit
RO	Reverse Osmosis
ROM	Read-only Memory
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RRPS	Reference Rod Pull Sequence
RSM	Rod Server Module
RSPC	Rod Server Processing Channel
RSS	Remote Shutdown System
RSSM	Reed Switch Sensor Module
RSW	Reactor Shield Wall
RTIF	Reactor Trip and Isolation Function(s)
RT_{NDT}	Reference Temperature of Nil-Ductility Transition
RTNSS	Regulatory Treatment of Non-Safety Systems
RTP	Reactor Thermal Power
RW	Radwaste Building
RWCU/SDC	Reactor Water Cleanup/Shutdown Cooling
RWE	Rod Withdrawal Error
RWM	Rod Worth Minimizer
SA	Severe Accident
SAR	Safety Analysis Report
SB	Service Building
S/C	Digital Gamma-Sensitive GM Detector

Term	Definition
SC	Suppression Chamber
S/D	Scintillation Detector
S/DRSRO	Single/Dual Rod Sequence Restriction Override
S/N	Signal-to-Noise
S/P	Suppression Pool
SAS	Service Air System
SB&PC	Steam Bypass and Pressure Control System
SBO	Station Blackout
SBWR	Simplified Boiling Water Reactor
SCEW	System Component Evaluation Work
SCRRI	Selected Control Rod Run-in
SDC	Shutdown Cooling
SDM	Shutdown Margin
SDS	System Design Specification
SER	Safety Evaluation Report
SF	Service Water Building
SFP	Spent fuel pool
SIL	Service Information Letter
SIT	Structural Integrity Test
SIU	Signal Interface Unit
SJAE	Steam Jet Air Ejector
SLC	Standby Liquid Control
SLCS	Standby Liquid Control System
SLMCPR	Safety Limit Minimum Critical Power Ratio
SMU	SSLC Multiplexing Unit
SOV	Solenoid Operated Valve
SP	Setpoint
SPC	Suppression Pool Cooling
SPDS	Safety Parameter Display System
SPTMS	Suppression Pool Temperature Monitoring Subsystem of Containment Monitoring System
SR	Surveillance Requirement
SRM	Source Range Monitor
SRNM	Startup Range Neutron Monitor
SRO	Senior Reactor Operator
SRP	Standard Review Plan
SRS	Software Requirements Specification
SRSRO	Single Rod Sequence Restriction Override
SRSS	Sum of the squares
SRV	Safety Relief Valve

Term	Definition
SRVDL	Safety relief valve discharge line
SSAR	Standard Safety Analysis Report
SSC(s)	Structure, System and Component(s)
SSE	Safe Shutdown Earthquake
SSLC	Safety System Logic and Control
SSPC	Steel Structures Painting Council
ST	Spare Transformer
STP	Sewage Treatment Plant
STRAP	Scram Time Recording and Analysis Panel
STRP	Scram Time Recording Panel
SV	Safety Valve
SWH	Static water head
SWMS	Solid Waste Management System
SY	Switch Yard
TAF	Top of Active Fuel
TASS	Turbine Auxiliary Steam System
TB	Turbine Building
TBCE	Turbine Building Compartment Exhaust
TBE	Turbine Building Exhaust
TBLOE	Turbine Building Lube Oil Area Exhaust
TBS	Turbine Bypass System
TBHV	Turbine Building HVAC
TBV	Turbine Bypass Valve
TC	Training Center
TCCWS	Turbine Component Cooling Water System
TCS	Turbine Control System
TCV	Turbine Control Valve
TDH	Total Developed Head
TEMA	Tubular Exchanger Manufacturers' Association
TFSP	Turbine first stage pressure
TG	Turbine Generator
TGSS	Turbine Gland Seal System
THA	Time-history accelerograph
TLOS	Turbine Lubricating Oil System
TLU	Trip Logic Unit
TMI	Three Mile Island
TMSS	Turbine Main Steam System
TRM	Technical Requirements Manual
TS	Technical Specification(s)
TSC	Technical Support Center

Term	Definition
TSI	Turbine Supervisory Instrument
TSV	Turbine Stop Valve
UBC	Uniform Building Code
UHS	ultimate heat sink
UL	Underwriter's Laboratories Inc.
UPS	Uninterruptible Power Supply
URD	Utility Requirements Document, Volume III, for Advanced Light Water Reactor Passive Plant
USE	Upper Shelf Energy
USM	Uniform Support Motion
USMA	Uniform support motion response spectrum analysis
USNRC	United States Nuclear Regulatory Commission
USS	United States Standard
UV	Ultraviolet
V&V	Verification and Validation
Vac / VAC	Volts Alternating Current
Vdc / VDC	Volts Direct Current
VDU	Video Display Unit
VW	Vent Wall
VWO	Valves Wide Open
WD	Wash Down Bays
WH	Warehouse
WS	Water Storage
WT	Water Treatment
WW	Wetwell
XMFR	Transformer
ZPA	Zero period acceleration

2. SITE CHARACTERISTICS

2.0 INTRODUCTION

This chapter defines the envelope of site-related parameters that the ESBWR Standard Plant is designed to accommodate. These parameters envelope most potential sites in the U.S. A list of the site envelope design parameters is given in Table 2.0-1.

Table 2.0-2 references the guidance in NUREG-0800 Standard Review Plan (SRP). Table 2.0-2 defines the limits imposed on the acceptance criteria in Section II of the various SRPs by (1) the envelope of site-related parameters that the ESBWR plant is designed to accommodate, and (2) the assumptions, both implicit and explicit, related to site parameters that were employed in the evaluation of the ESBWR design.

The requirements for site parameters for a standard design are contained in 10 CFR 52.47(a)(1)(iii). A design certification applicant provides postulated site parameters for the design, and an analysis and evaluation of the design in terms of such parameters. The following demonstrate that the standard design meets the above criteria.

The site parameters used in the ESBWR Standard Plant design are specified in both DCD Tier 1 and this chapter. The specified site parameters are the top-level bounding site parameters useful in the selection of a suitable site for a facility referencing the ESBWR certified design. Because they were used in bounding evaluations of the certified design, they define the envelope of site parameters used for the design that must be considered for a site. When the site characteristics fall within the site parameter values, a facility built on the site is in conformance with the design certification. Appropriate values for site parameters have been selected that make the design suitable for many sites. The site parameters specified in Tier 1 are the same as those presented in this chapter.

The analyses and evaluations of the design, considering the site parameters of Table 2.0-1, are contained in the various sections of the DCD Tier 2. For example, the safe shutdown earthquake parameters are used in structural and piping analyses in various sections of Chapter 3, atmospheric dispersion parameters are used in radiological analyses throughout Chapter 15, and the elevation parameter is used in the flooding analyses in Section 3.4.

Site parameters are specified for the following parameters:

- Maximum Ground Water Level
- Maximum Flood (or Tsunami) Level
- Precipitation (for roof design)
- Ambient Design Temperature
- Extreme Wind
- Tornado (maximum speed, pressure drop, missile spectra, etc.)
- Maximum Settlement Values for Seismic Category I Buildings
- Soil Properties (minimum static bearing capacity, minimum shear wave velocity, liquefaction potential, angle of internal friction)

- Seismology (SSE response spectra, using figures)
- Hazards in Site Vicinity
- Required Stability of Slopes
- Meteorological Dispersion (Values at Exclusion Area Boundary [EAB] and Low Population Zone [LPZ] at appropriate time intervals for short and long term)

The site parameters include a requirement that liquefaction not occur underneath Seismic Category I and II structures, systems, and components (SSCs) resulting from a site-specific SSE. In addition, although the ESBWR design is independent of a particular site and takes into consideration the 0.3g Regulatory Guide 1.60 spectra, the evaluation of each site for liquefaction potential under Seismic Category I and II SSCs uses the site-specific SSE with acceptance criteria demonstrating adequate margin for no liquefaction.

The design basis for protection against missiles is specified in the DCD Tier 2 Section 3.5, such that external missiles are adequately addressed in the design for buildings and structures, and the building/structure design is verified by appropriate ITAAC.

The site characteristics information for each site is addressed in the Combined License (COL) applicant's final safety analysis report (FSAR) in accordance with 10 CFR 52.79. See Subsection 2.0.1.1.

The guidance in NUREG-0800 identifies information needed for evaulation of a proposed site. See Subsection 2.0.1.2.

2.0.1 COL Unit-Specific Information

2.0.1.1 Site Characteristics Demonstration

A COL applicant referencing the ESBWR DCD demonstrates that site characteristics for a given site fall within the ESBWR DCD site parameter values per 10 CFR 52.79.

2.0.1.2 Standard Review Plan Conformance

A COL applicant will provide information in accordance with NRC guidance in NUREG-0800, Standard Review Plan (SRP) sections for site characteristics. See Table 2.0-2 for details. A COL applicant follows applicable NRC guidance for preparing the COL application, depending upon whether the applicant will reference an Early Site Permit or not.

2.0.2 References

2.0-1 GE Nuclear Energy, "ESBWR Certification Probabilistic Risk Assessment," NEDO-33201, Class I (Non-proprietary), Revision 1, September 2006.

2.0-2 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-02, 2002.

2.0-3 National Weather Source Publication Hydrometeorology Report No. 52 (HMR-52)

2.0-4 Electric Power Research Institute, "Advanced Light Water Reactor Utility Requirements Document," Revision 6, May 1997.

Table 2.0-1

Envelope of ESBWR Standard Plant Site Design Parameters (1)

Maximum Ground Water Level:	0.61 m (2 ft) below plant grade
Extreme Wind:	**Seismic Category I and II Structures** - 100-year Wind Speed (3-sec gust): 67.1 m/s (150 mph) - Exposure Category: D **Non-Seismic Standard Plant Structures** - Extreme wind 49.2 m/s (110 mph)
Maximum Flood (or Tsunami) Level: (2)	0.3 m (1 ft) below plant grade
Tornado:	- Maximum Tornado Wind Speed: (3) 147.5 m/s (330 mph) - Maximum Rotational Speed: 116.2 m/s (260 mph) - Translational Velocity: 31.3 m/s (70 mph) - Radius: 45.7 m (150 ft) - Maximum Pressure Differential: 16.6 kPa (2.4 psi) - Rate of Pressure Change: 11.7 kPa/s (1.7 psi/s) - Missile Spectra: (3) Spectra I of SRP 3.5.1.4, Rev 2 applied to full building height.
Precipitation (for Roof Design):	- Maximum Rainfall Rate: (4) 49.3 cm/hr (19.4 in/hr) - Maximum Short Term Rate: 15.7 cm (6.2 in) in 5 minutes - Maximum Roof Load: (5) 2873 Pa (60 lbf/ft^2)
Ambient Design Temperature: (6)	**2% Exceedance Values** - Maximum: 35.6°C (96°F) dry bulb 26.1°C (79°F) wet bulb (coincident) 27.2°C (81°F) wet bulb (non-coincident) - Minimum: -23.3°C (-10°F) **1% Exceedance Values** - Maximum: 37.8°C (100°F) dry bulb 26.1°C (79°F) wet bulb (coincident) 27.8°C (82°F) wet bulb (non-coincident) - Minimum: -23.3°C (-10°F) **0% Exceedance Values** - Maximum: 46.1°C (115°F) dry bulb 26.7°C (80°F) wet bulb (coincident) 29.4°C (85°F) wet bulb (non-coincident) - Minimum: -40°C (-40°F)
Soil Properties:	- Minimum Static Bearing Capacity: (7) ≥ 718 kPa (15000 lbf/ft^2) - Minimum Shear Wave Velocity: (8) 300 m/s (1000 ft/s) - Liquefaction Potential: None under footprint of Seismic Category I or II structures. - Angle of Internal Friction ≥ 30 degrees

Table 2.0-1

Envelope of ESBWR Standard Plant Site Design Parameters (continued)

Seismology:	- SSE Horizontal Ground Response Spectra: (9)	See Figure 2.0-1
	- SSE Vertical Ground Response Spectra: (9)	See Figure 2.0-2
Hazards in Site Vicinity:	- Site Proximity Missiles and Aircraft:	$\leq 10^{-7}$ per year
	- Toxic Gases:	None *
	- Volcanic Activity:	None
* Maximum toxic gas concentrations at the Main Control Room (MCR) and Technical Support Center (TSC) HVAC intakes:	< toxicity limits	
Required Stability of Slopes: (10)	- Factor of safety for static (non-seismic) loading	1.5
	- Factor of safety for dynamic (seismic) loading	1.1
Maximum Settlement Values for Seismic Category I Buildings (see Subsections 3G.1.5.5.4 and 3G.2.5.5.1)**:**		
Maximum Settlement at any corner of basemat	- Under Reactor/Fuel Building Mat	103 mm (4.0 inches)
	- Under Control Building	18 mm (0.7 inches)
Averaged Settlement at four corners of basemat	- Under Reactor/Fuel Building Mat	65 mm (2.6 inches)
	- Under Control Building	11 mm (0.4 inches)
Maximum Differential Settlement along the longest mat foundation dimension	- within Reactor/Fuel Building	77 mm (3.0 inches)
	- within Control Building	13 mm (0.5 inches)
Maximum Differential Displacement between Reactor/Fuel Buildings and Control Building		85 mm (3.3 inches)

Table 2.0-1

Envelope of ESBWR Standard Plant Site Design Parameters (continued)

Meteorological Dispersion (X/Q): (11)	EAB X/Q:		
	0-2 hours:	2.00E-03 s/m^3	
	LPZ X/Q:		
	0-8 hours:	1.90E-04 s/m^3	
	8-24 hours:	1.40E-04 s/m^3	
	1-4 days:	7.50E-05 s/m^3	
	4-30 days:	3.00E-05 s/m^3	
* First value is for unfiltered inleakage. Second value is for filtered air intake (emergency and normal)	Control Room X/Q: *		
	Reactor Building		
	0-2 hours:	1.90E-03 s/m^3	1.50E-03 s/m^3
	2-8 hours:	1.30E-03 s/m^3	1.10E-03 s/m^3
	8-24 hours:	5.90E-04 s/m^3	5.00E-04 s/m^3
	1-4 days:	5.00E-04 s/m^3	4.20E-04 s/m^3
	4-30 days	4.40E-04 s/m^3	3.80E-04 s/m^3
	Passive Containment Cooling System / Reactor Building Roof		
	0-2 hours:	3.40E-03 s/m^3	3.00E-03 s/m^3
	2-8 hours:	2.70E-03 s/m^3	2.50E-03 s/m^3
	8-24 hours:	1.40E-03 s/m^3	1.20E-03 s/m^3
	1-4 days:	1.10E-03 s/m^3	9.00E-04 s/m^3
	4-30 days	7.90E-04 s/m^3	7.00E-04 s/m^3
	Turbine Building		
	0-2 hours:	1.20E-03 s/m^3	1.20E-03 s/m^3
	2-8 hours:	9.80E-04 s/m^3	9.80E-04 s/m^3
	8-24 hours:	3.90E-04 s/m^3	3.90E-04 s/m^3
	1-4 days:	3.80E-04 s/m^3	3.80E-04 s/m^3
	4-30 days	3.20E-04 s/m^3	3.20E-04 s/m^3
Long Term Dispersion Estimates: (12)	X/Q:	2.0E-06 s/m^3	
	D/Q:	4.0E-09 m^{-2}	

Notes for Table 2.0-1:

(1) The design of the Radwaste Building uses a set of design parameters that are specified in Regulatory Guide 1.143, Table 2, Class RW IIa instead of the corresponding values given in this table.

(2) Probable maximum flood level (PMF), as defined in Table 1.2-6 of Volume III of Reference 2.0-4.

(3) Maximum speed selected is based on NRC Interim Position on Regulatory Guide 1.76. Concrete structures designed to resist Spectrum I missiles of SRP 3.5.1.4, Rev. 2, will also resist missiles postulated in Draft Guide DG-1143.

(4) Based on probable maximum precipitation (PMP) for one hour over 2.6 km^2 (one square mile) with a ratio of 5 minutes to one hour PMP of 0.32 as found in Reference 2.0-3. Roof scuppers are designed to handle the PMP. When used in combination with snow pack, the roof and drainage design is for 2873 Pa (60 lbf/ft^2) extreme load. See also Table 3G.1-2.

(5) Maximum design roof load accommodates snow load and probable maximum winter precipitation in References 2.0-2 and 2.0-3. See also Table 3G.1-2.

(6) Zero percent exceedance values are based on conservative estimates of historical high and low values for potential sites. One and two percent exceedance values were selected in order to bound the values presented in Reference 2.0-4 and available Early Site Permit applications.

(7) At foundation level of Seismic Category I structures. See Subsections 3G.1.5.5, 3G.2.5.5 and 3G.3.5.5 for minimum dynamic bearing capacity for the Reactor, Control and Fuel Buildings, respectively.

(8) This is the equivalent uniform shear wave velocity (V_{eq}) at seismic strains after the soil property uncertainties have been applied. V_{eq} is calculated to achieve the same wave traveling time over the depth equal to the embedment depth plus 2 times the largest foundation plan dimension below the foundation as follows:

$$V_{eq} = \frac{\sum d_i}{\sum \frac{d_i}{V_i}}$$

where d_i and V_i are the depth and shear wave velocity, respectively, of the ith layer. The ratio of the largest to the smallest shear wave velocity over the mat foundation width at the foundation level does not exceed 1.7.

(9) Safe Shutdown Earthquake (SSE) design ground response spectra are defined as free-field outcrop spectra at the foundation level (bottom of the base slab) of Seismic Category I structures.

(10) Values reported here are actually design criteria rather than site design parameters. They are included here because they do not appear elsewhere in the DCD.

(11) If a selected site has a X/Q value that exceeds the ESBWR reference site value, the COL applicant will address how the radiological consequences associated with the controlling design basis accident continue to meet the dose reference values provided in 10 CFR 50.34(a) and control room operator dose limits provided in General Design Criterion 19 using site-specific X/Q values.

(12) If a selected site has a X/Q value that exceeds the ESBWR reference site value, the release concentrations in Table 12.2-17 would be adjusted proportionate to the change in X/Q. In addition, for a site selected that exceeds the bounding X/Q or D/Q values, the COL applicant will address how the resulting annual average doses (Table 12.2-18b) continue to meet the dose reference values provided in 10 CFR 50 Appendix I using site-specific X/Q and D/Q values.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.1.1	Site Location and Description	None.	COL applicant to supply site-specific information in accordance with SRP 2.1.1.
2.1.2	Exclusion Area Authority and Control	None.	COL applicant to supply site-specific information in accordance with SRP 2.1.2.
2.1.3	Population Distribution	ESBWR PRA offsite consequence analysis in Reference 2.0-1 is based on a population density of 305 people per square kilometer (790 per square mile).	COL applicant to describe the population distribution in accordance with SRP 2.1.3.
2.2.1 – 2.2.2	Identification of Potential Hazards in Site Vicinity	No assumptions made regarding site-specific potential hazards.	COL applicant to identify and evaluate potential hazards in the site vicinity, in accordance with SRP 2.2.1 – 2.2.2. Potential hazards include manufacturing plants, chemical plants, refineries, storage facilities, mining and quarrying operations, military bases, missile sites, transportation routes (air, land and water), transportation facilities (docks, anchorages, airports), oil and gas pipelines, drilling operations and wells, and underground gas storage facilities. See also Subsection 9.4.1.6.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.2.3	Evaluation of Potential Accidents	None considered in vicinity of plant.	COL applicant to identify and evaluate potential accidents emanating from those potential hazards identified in SRP 2.2.1 – 2.2.2 above, that have a probability of occurrence > 10^{-7} per year which involve: (1) missiles more energetic than the tornado missile spectra, or (2) pressure effects in excess of the design basis tornado, or (3) explosions, or (4) fires, or (5) aircraft impacts, or (6) release of flammable vapor clouds, or (7) release of toxic chemicals.
2.3.1	Regional Climatology	Per Table 2.0-1.	COL applicant to determine basic speed of extreme wind for use in design of nonsafety-related structures that are not included as part of the ESBWR Standard Plant design. COL applicant to confirm or reanalyze in accordance with SRP 2.3.1.
2.3.2	Local Meteorology	None.	COL applicant to supply site-specific information in accordance with SRP 2.3.2.
2.3.3	Onsite Meteorological Measurements Programs	None.	COL applicant to supply site-specific information in accordance with the SRP 2.3.3.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.3.4	Short-Term Dispersion Estimates for Accidental Atmospheric Releases	Per Table 2.0-1. See also Chapter 15.	COL applicant to supply site-specific information in accordance with the SRP 2.3.4 to show that the site meteorological dispersion values as calculated in accordance with Regulatory Guides 1.145 and 1.194, and compared to dose values given in Chapter 15, result in doses less than stipulated in 10 CFR 50.34(a) and the applicable portions of SRP Sections 11 and 15.
2.3.5	Long-Term Diffusion Estimates	Per Table 2.0-1. See Subsection 12.2.2.1 for a discussion of the generation of these values.	COL applicant to supply site-specific information in accordance with the SRP 2.3.5.
2.4.1	Hydraulic Description Maximum Ground Water Level	Per Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.1.
2.4.2	Floods	Per Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.2.
2.4.3	Probable Maximum Flood on Streams and Rivers	Probable maximum flooding level on streams and rivers does not exceed the maximum flood level defined in Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.3.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.4.4	Potential Dam Failures Seismically Induced	Potential seismically induced dam failures do not cause flooding to exceed the maximum flood level defined in Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.4. COL applicant to demonstrate that failure of existing and potential upstream or downstream water control structures will not cause flooding to exceed 0.3 m (1 ft) below plant grade.
2.4.5	Probable Maximum Surge and Seiche Flooding	Probable maximum surge and seiche flooding level does not exceed the maximum flood level defined in Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.5.
2.4.6	Probable Maximum Tsunami Flooding	Probable maximum tsunami flooding level does not exceed the maximum flood level defined in Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.6.
2.4.7	Ice Effects	None.	COL applicant to supply site-specific information in accordance with SRP 2.4.7.
2.4.8	Cooling Water Canals and Reservoirs	None.	COL applicant to supply site-specific information in accordance with SRP 2.4.8.
2.4.9	Channel Diversions	None.	COL applicant to supply site-specific information in accordance with SRP 2.4.9.
2.4.10	Flooding Protection Requirements	None.	COL applicant to supply site-specific information in accordance with SRP 2.4.10.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.4.11	Cooling Water Supply	None.	COL applicant to supply site-specific information in accordance with SRP 2.4.11.
2.4.12	Groundwater	Per Table 2.0-1.	COL applicant to supply site-specific information in accordance with SRP 2.4.12.
2.4.13	Accidental Releases of Liquid Effluents in Ground and Surface Waters	None. DCD Tier 2 Subsection 15.3.16, "Liquid Containing Tank Failure," demonstrates that the ESBWR design precludes accidental releases of radioactive liquid effluent.	None. SRP 2.4.13 is not applicable to a site with an ESBWR.
2.4.14	Technical Specifications and Emergency Operation Requirements	None.	COL applicant to provide site-specific information in accordance with SRP 2.4.14.
2.5.1	Basic Geologic and Seismic Information	None.	COL applicant to provide site-specific information in accordance with SRP 2.5.1.
2.5.2	Vibratory Ground Motion	Per Table 2.0-1 (and Figures 2.0-1 and 2.0-2).	COL applicant to provide site-specific information in accordance with SRP 2.5.2 and confirm that it is enveloped by the ESBWR design response spectra referenced at the foundation level.
2.5.3	Surface Faulting	ESBWR design assumes no permanent ground deformation from tectonic or non-tectonic faulting.	COL applicant to provide site-specific information in accordance with SRP 2.5.3.

Table 2.0-2

Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

Subsection	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
2.5.4	Stability of Subsurface Materials and Foundations	Per Table 2.0-1.	COL applicant to provide site-specific information in accordance with SRP 2.5.4.
2.5.5	Stability of Slopes	Per Table 2.0-1.	COL applicant to provide site-specific information in accordance with SRP 2.5.5.

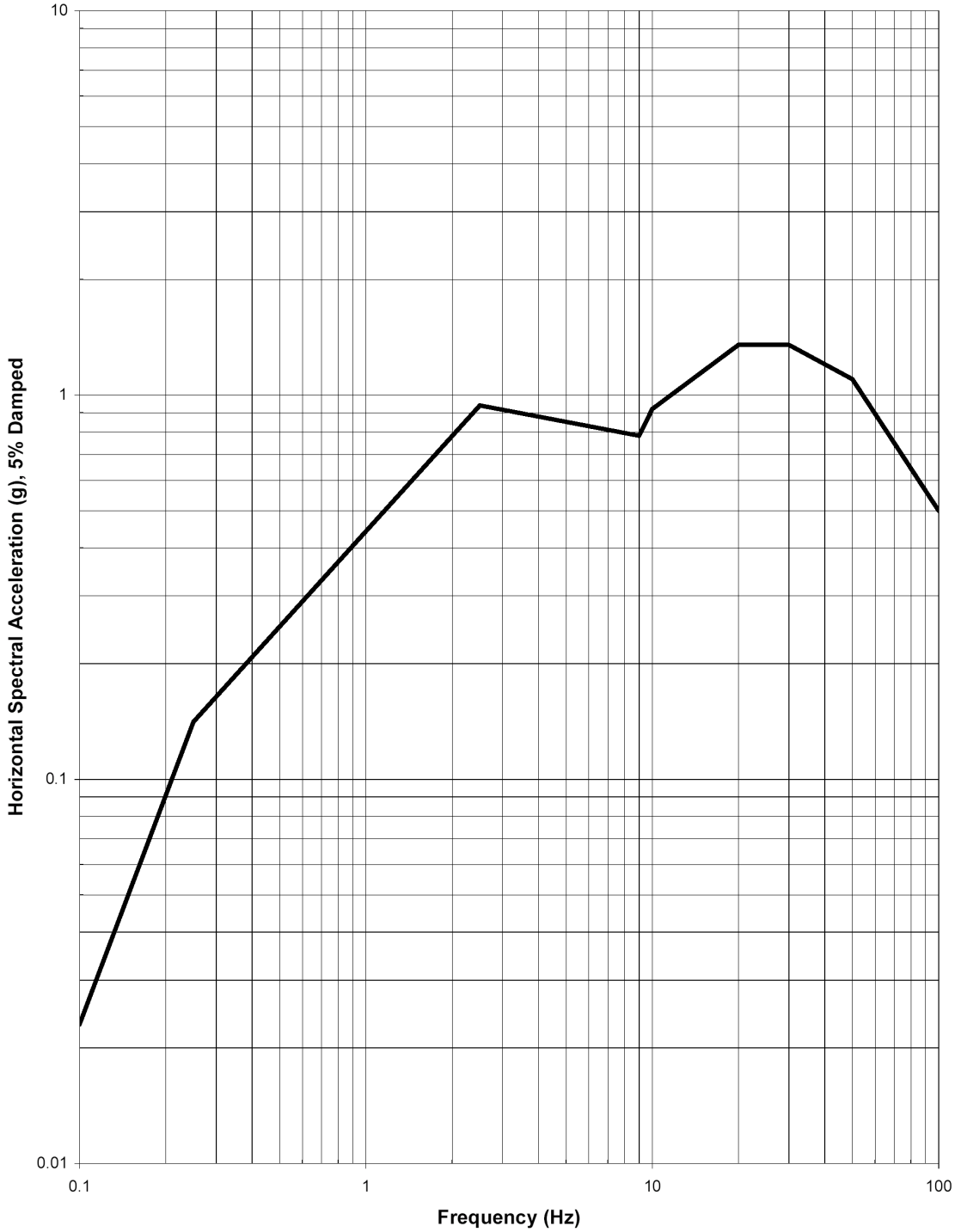

Figure 2.0-1. ESBWR Horizontal SSE Design Ground Spectra at Foundation Level

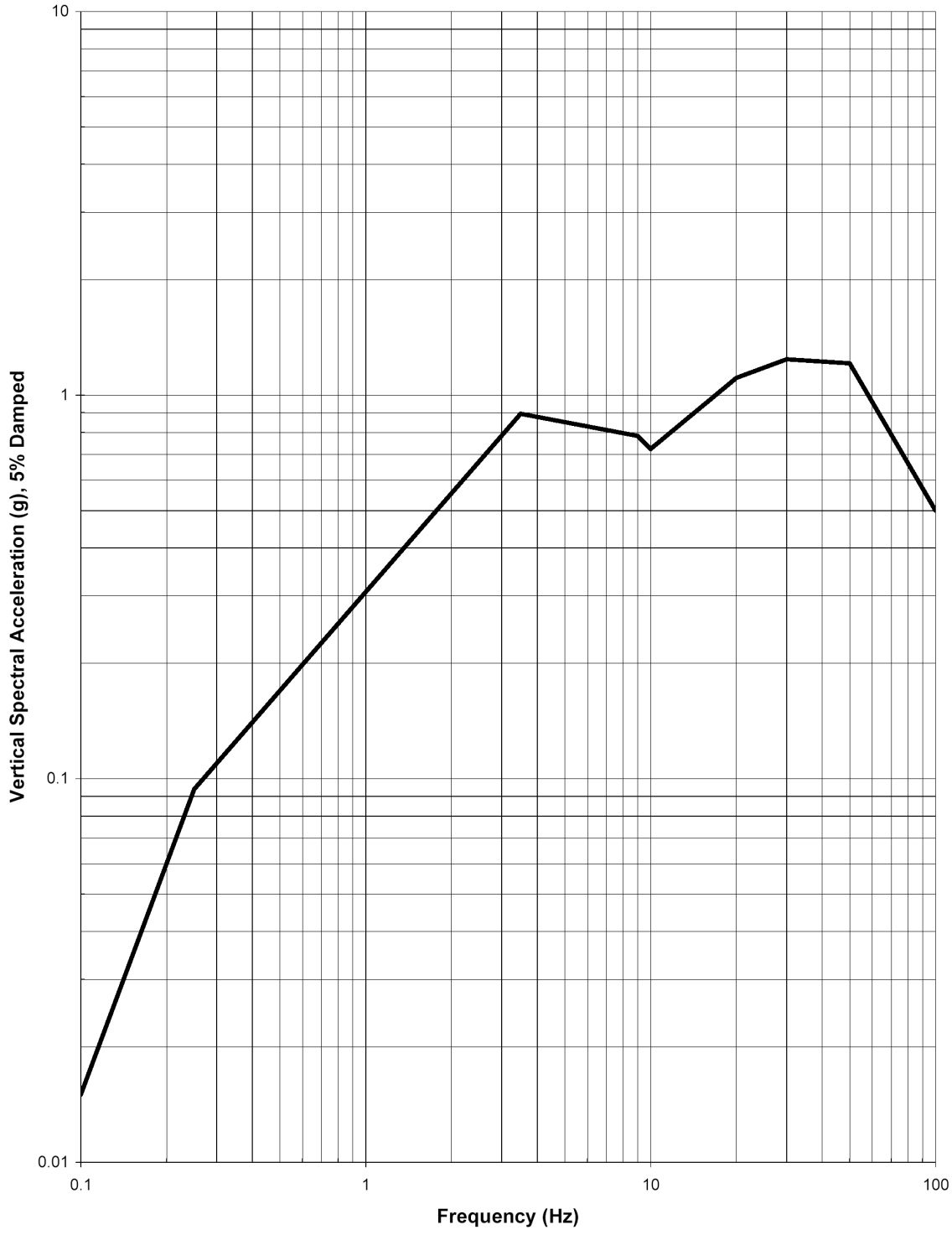

Figure 2.0-2. ESBWR Vertical SSE Design Ground Response Spectra at Foundation Level