

SYSTEM ENERGY RESOURCES, INC.

EARLY SITE PERMIT APPLICATION

for the

GRAND GULF NUCLEAR STATION SITE

PART 2

SITE SAFETY ANALYSIS REPORT

Revision 0

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE OF CONTENTS

1.0	INTRODUCTION AND GENERAL DESCRIPTION	1.1-1
1.1	Introduction	1.1-1
1.1.1	Site Ownership	1.1-1
1.1.2	The Applicant	1.1-2
1.1.3	References	1.1-2
1.2	General Site Description	1.2-1
1.3	Plant Parameters Envelope	1.3-1
1.3.1	Plant Parameters Envelope Approach	1.3-1
1.3.2	References	1.3-5
1.4	Conformance With Regulatory Requirements and Guidance	1.4-1
2.0	SITE CHARACTERISTICS	2.1-1
2.1	Geography and Demography	2.1-1
2.1.1	Site Location and Description	2.1-1
2.1.2	Exclusion Area Authority and Control.....	2.1-2
2.1.3	Population Distribution	2.1-6
2.1.4	References	2.1-11
2.2	Nearby Industrial, Military and Transportation Facilities and Routes	2.2-1
2.2.1	Locations and Routes	2.2-1
2.2.2	Descriptions	2.2-2
2.2.3	Evaluation of Potential Accidents	2.2-4
2.2.4	References	2.2-10
2.3	Meteorology	2.3-1
2.3.1	Regional Climatology	2.3-1
2.3.2	Local Meteorology	2.3-10
2.3.3	Onsite Meteorological Measurements Program	2.3-18
2.3.4	Short Term Diffusion Estimates.....	2.3-24
2.3.5	Long Term Diffusion Estimates	2.3-28
2.3.6	References	2.3-29
2.4	Hydrologic Engineering	2.4-1
2.4.1	Hydrologic Description	2.4-1
2.4.2	Floods	2.4-3

GGNS
 EARLY SITE PERMIT APPLICATION
 PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE OF CONTENTS (Continued)

2.4.3	Probable Maximum Flood (PMF) on Streams and Rivers	2.4-8
2.4.4	Potential Dam Failures, Seismically Induced	2.4-14
2.4.5	Probable Maximum Surge and Seiche Flooding	2.4-17
2.4.6	Probable Maximum Tsunami Flooding	2.4-17
2.4.7	Ice Effects	2.4-17
2.4.8	Cooling Water Canals and Reservoirs	2.4-18
2.4.9	Channel Diversions	2.4-18
2.4.10	Flooding Protection Requirements	2.4-19
2.4.11	Low Water Considerations	2.4-19
2.4.12	Ground Water	2.4-22
2.4.13	Accidental Releases of Liquid Effluents in Ground and Surface Waters	2.4-34
2.4.14	References	2.4-36
2.5	Geology, Seismology, and Geotechnical Engineering	2.5-1
2.5.1	Basic Data	2.5-2
2.5.2	Vibratory Ground Motion	2.5-45
2.5.3	Surface Faulting	2.5-68
2.5.4	Stability of Subsurface Materials and Foundations	2.5-72
2.5.5	Stability of Slopes	2.5-82
2.5.6	Embankments and Dams	2.5-83
2.5.7	References	2.5-83
3.0	SITE SAFETY ASSESSMENT	3.1-1
3.1	Non-Seismic Siting Criteria	3.1-1
3.1.1	Exclusion Area and Low Population Zone	3.1-1
3.1.2	Population Center Distance	3.1-1
3.1.3	Site Atmospheric Dispersion Characteristics and Dispersion Parameters	3.1-1
3.1.4	Physical Site Characteristics – Meteorology, Geology, Seismology, and Hydrology	3.1-2
3.1.5	Potential Off-site Hazards	3.1-6
3.1.6	Site Characteristics - Security Plans	3.1-8
3.1.7	Site Characteristics - Emergency Plans	3.1-9
3.1.8	Population Density	3.1-9

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

TABLE OF CONTENTS (Continued)

3.1.9	References.....	3.1-9
3.2	Gaseous Effluent Release Dose Consequences from Normal Operations.....	3.2-1
3.2.1	Exposure Pathway and Source Terms.....	3.2-1
3.2.2	Gaseous Pathway Dose Calculation Methodology	3.2-1
3.2.3	Radiation Dose to Members of the Public.....	3.2-2
3.2.4	References.....	3.2-2
3.3	Postulated Accidents And Accident Dose Consequences	3.3-1
3.3.1	Selection of Design Basis Accidents.....	3.3-1
3.3.2	Evaluation of Radiological Consequences.....	3.3-2
3.3.3	Source Terms.....	3.3-2
3.3.4	Postulated Accident Analyses.....	3.3-3
3.3.5	References.....	3.3-15
3.4	Geologic and Seismic Siting Factors	3.4-1
3.4.1	Geologic and Seismic Engineering Characteristics.....	3.4-1
3.4.2	References.....	3.4-2

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>
1.3-1	Plant Parameters Envelope (PPE)
1.3-2	Normal Operations Gaseous Release Source Term
1.3-3	Plant Parameters Definitions
1.4-1	Conformance With NRC Regulatory Guides And Guidance
2.1-1	Projected Population Distribution 0-10 Miles
2.1-2	Projected Population Distribution 10-50 Miles
2.1-3	Facilities and Institutions Within 5 Miles of the Site
2.1-4	Communities Within 50 Mile Radius (Population Over 1,000)
2.1-5	Projected Population Density Within a 30 Mile Radius of the Site
2.1-6	Population Distribution and Density for 2030 and 2070 (0-30 Miles from the Site)
2.1-7	Public Facilities and Institutions Within Approximately 10 Miles of the Site
2.2-1	Manufacturers in the Vicinity of the GGNS Site
2.2-2	Manufacturers Within a 50 Mile Radius of the GGNS Site
2.2-3	Types of Hazardous Materials Transported Through Claiborne County October 2001 – October 2002
2.2-4	Hazardous Material Transported on the Mississippi River in 2000 From the Ohio River to Baton Rouge, Louisiana River Mile 954 to River Mile 236
2.2-5	Chemicals Stored at GGNS Unit 1
2.2-6	Airports Within the Vicinity of GGNS
2.3-1	Resultant Wind Direction and Speed – Grand Gulf Site 1996-2001
2.3-2	Resultant Wind Direction and Speed, Vicksburg, MS 1997-2001
2.3-3	Wet and Dry Bulb Temperatures (Degrees Fahrenheit)
2.3-4	Relative Humidity at Vicksburg, MS for 4 Time Periods Per Day 1997-2001
2.3-5	Frequency of Tropical Cyclones (By Month) for the States of Florida, Alabama, Mississippi, Louisiana, and Texas
2.3-6	Tornadoes in Claiborne, Warren and Hinds Counties, Mississippi, and Tensas Parish, Louisiana
2.3-7	Thunderstorms and High Wind Events in Claiborne, Warren and Hinds Counties, Mississippi, and Tensas Parish, Louisiana
2.3-8	Hailstorms in Claiborne, Warren and Hinds Counties, Mississippi, and Tensas Parish, Louisiana
2.3-9	Mean Ventilation Rate By Month Jackson, Mississippi

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-10	Ice Storms in Claiborne, Warren and Hinds Counties, Mississippi, and Tensas Parish, Louisiana
2.3-11	Occurrence of Dust, Blowing Dust or Blowing Sand at Jackson, Mississippi 1955 through 1964 (10 years)
2.3-12	Number and Duration of Discrete Occurrences of Dust, Blowing Dust or Blowing Sand at Jackson, Mississippi 1955 through 1964 (10 years)
2.3-13	Monthly Summary of Occurrences of Dust, Blowing Dust or Blowing Sand at Jackson, Mississippi 1955 through 1964 (10 years)
2.3-14	Annual Summary of Occurrences of Dust, Blowing Dust or Blowing Sand at Jackson, Mississippi 1955 through 1964 (10 years)
2.3-15	Total Maximum Winter Precipitation Jackson, Mississippi
2.3-16	Hourly Meteorological Data Jackson, Mississippi Worst 1-Day – August 6, 1970
2.3-17	Daily Average Meteorological Data Jackson, Mississippi Daily Average – Worst 5 Consecutive Day Period
2.3-18	Daily Average Meteorological Data Jackson, Mississippi Worst 30 Consecutive Day Period
2.3-19	Percentage Frequency of Wind Direction and Speed (mph) During January, Vicksburg, MS
2.3-20	Percentage Frequency of Wind Direction and Speed (mph) During February, Vicksburg, MS
2.3-21	Percentage Frequency of Wind Direction and Speed (mph) During March, Vicksburg MS
2.3-22	Percentage Frequency of Wind Direction and Speed (mph) During April, Vicksburg MS
2.3-23	Percentage Frequency of Wind Direction and Speed (mph) During May, Vicksburg MS
2.3-24	Percentage Frequency of Wind Direction and Speed (mph) During June, Vicksburg MS
2.3-25	Percentage Frequency of Wind Direction and Speed (mph) During July, Vicksburg MS
2.3-26	Percentage Frequency of Wind Direction and Speed (mph) During August, Vicksburg MS
2.3-27	Percentage Frequency of Wind Direction and Speed (mph) During September, Vicksburg MS
2.3-28	Percentage Frequency of Wind Direction and Speed (mph) During October, Vicksburg MS

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-29	Percentage Frequency of Wind Direction and Speed (mph) During November, Vicksburg MS
2.3-30	Percentage Frequency of Wind Direction and Speed (mph) During December, Vicksburg MS
2.3-31	Percentage Frequency of Wind Direction and Speed (mph) During All Years, Vicksburg MS
2.3-32	Percentage Frequency of Wind Direction and Speed (mph) During January, GGNS Site
2.3-33	Percentage Frequency of Wind Direction and Speed (mph) During February, GGNS Site
2.3-34	Percentage Frequency of Wind Direction and Speed (mph) During March, GGNS Site
2.3-35	Percentage Frequency of Wind Direction and Speed (mph) During April, GGNS Site
2.3-36	Percentage Frequency of Wind Direction and Speed (mph) During May, GGNS Site
2.3-37	Percentage Frequency of Wind Direction and Speed (mph) During June, GGNS Site
2.3-38	Percentage Frequency of Wind Direction and Speed (mph) During July, GGNS Site
2.3-39	Percentage Frequency of Wind Direction and Speed (mph) During August, GGNS Site
2.3-40	Percentage Frequency of Wind Direction and Speed (mph) During September, GGNS Site
2.3-41	Percentage Frequency of Wind Direction and Speed (mph) During October, GGNS Site
2.3-42	Percentage Frequency of Wind Direction and Speed (mph) During November, GGNS Site
2.3-43	Percentage Frequency of Wind Direction and Speed (mph) During December, GGNS Site
2.3-44	Percentage Frequency of Wind Direction and Speed (mph) During All Years, GGNS Site
2.3-45	Maximum Number of Consecutive Hours With Wind From a Single Sector, Vicksburg, MS
2.3-46	Maximum Number of Consecutive Hours With Wind From 3 Adjacent Sectors, Vicksburg, MS

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-47	Maximum Number of Consecutive Hours With Wind From 5 Adjacent Sectors, Vicksburg, MS
2.3-48	Maximum Number of Consecutive Hours With Wind From a Single Sector, Grand Gulf Site
2.3-49	Maximum Number of Consecutive Hours With Wind From 3 Adjacent Sectors, Grand Gulf, MS
2.3-50	Maximum Number of Consecutive Hours With Wind From 5 Adjacent Sectors, Grand Gulf, MS
2.3-51	Comparison of Maximum Wind Persistence at Grand Gulf Site and Jackson, MS
2.3-52	Comparison of Maximum Wind Persistence at the Grand Gulf Site and Vicksburg, MS
2.3-53	Percentage Frequency of Wind Direction and Speed Municipal Airport, Jackson, Mississippi Length of Record – 10 Years Annual
2.3-54	Temperature Means and Extremes at Vicksburg, MS
2.3-55	Temperature Means and Extremes at Grand Gulf Site
2.3-56	Wet and Dry Bulb Temperatures (°F) for Cooling Equipment Design
2.3-57	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, January
2.3-58	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, February
2.3-59	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, March
2.3-60	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, April
2.3-61	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, May
2.3-62	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, June
2.3-63	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, July
2.3-64	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, August
2.3-65	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, September

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-66	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, October
2.3-67	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, November
2.3-68	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, December
2.3-69	Number of Observed Saturation Deficits (gm of Water/kg Dry Air) as a Function of Windspeed (mph) by Wind Direction Segment, Annual
2.3-70	Precipitation Data (inches of rain) at Grand Gulf Site
2.3-71	Precipitation Data (inches of rain) at Vicksburg, MS
2.3-72	Rainfall Frequency Distribution at Grand Gulf, 2000-2001 Number of Hours Per Month, Average Year
2.3-73	Rainfall Frequency Distribution at Vicksburg, MS Number of Hours Per Month, Average Year
2.3-74	Estimated Maximum Point Precipitation Amounts (Inches) for Selected Durations and Recurrence Intervals Grand Gulf, Mississippi Compared to Recent Experience at Vicksburg, Mississippi
2.3-75	Maximum Observed Short Period Precipitation (in.) Vicksburg, Mississippi
2.3-76	Total Hours of Snowfall, Vicksburg, Mississippi
2.3-77	Percent of Total Observations (By Month) of Indicated Wind Directions and Precipitation, Grand Gulf Site, 2001-2001
2.3-78	Average Hours of Fog and Haze at Vicksburg
2.3-79	Pasquill Stability Class Annual Frequency
2.3-80	Pasquill Stability Class Winter Frequency
2.3-81	Pasquill Stability Class Spring Frequency
2.3-82	Pasquill Stability Class Summer Frequency
2.3-83	Pasquill Stability Class Fall Frequency
2.3-84	Inversion Heights and Strengths, Jackson, Mississippi International Airport, January 1992-2000
2.3-85	Inversion Heights and Strengths, Jackson, Mississippi International Airport, February 1992-2000
2.3-86	Inversion Heights and Strengths, Jackson, Mississippi International Airport, March 1992-2000

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-87	Inversion Heights and Strengths, Jackson, Mississippi International Airport, April 1992-2000
2.3-88	Inversion Heights and Strengths, Jackson, Mississippi International Airport, May 1992-2000
2.3-89	Inversion Heights and Strengths, Jackson, Mississippi International Airport, June 1992-2000
2.3-90	Inversion Heights and Strengths, Jackson, Mississippi International Airport, July 1992-2000
2.3-91	Inversion Heights and Strengths, Jackson, Mississippi International Airport, August 1992-2000
2.3-92	Inversion Heights and Strengths, Jackson, Mississippi International Airport, September 1992-2000
2.3-93	Inversion Heights and Strengths, Jackson, Mississippi International Airport, October 1992-2000
2.3-94	Inversion Heights and Strengths, Jackson, Mississippi International Airport, November 1992-2000
2.3-95	Inversion Heights and Strengths, Jackson, Mississippi International Airport, December 1992-2000
2.3-96	Inversion Heights and Strengths, Jackson, Mississippi International Airport, Annual 1992-2000
2.3-97	Number of Inversion Occurrences During January at Jackson, Mississippi
2.3-98	Number of Inversion Occurrences During February at Jackson, Mississippi
2.3-99	Number of Inversion Occurrences During March at Jackson, Mississippi
2.3-100	Number of Inversion Occurrences During April at Jackson, Mississippi
2.3-101	Number of Inversion Occurrences During May at Jackson, Mississippi
2.3-102	Number of Inversion Occurrences During June at Jackson, Mississippi
2.3-103	Number of Inversion Occurrences During July at Jackson, Mississippi
2.3-104	Number of Inversion Occurrences During August at Jackson, Mississippi
2.3-105	Number of Inversion Occurrences During September at Jackson, Mississippi
2.3-106	Number of Inversion Occurrences During October at Jackson, Mississippi
2.3-107	Number of Inversion Occurrences During November at Jackson, Mississippi
2.3-108	Number of Inversion Occurrences During December at Jackson, Mississippi
2.3-109	Mean Number of Inversion Occurrences During 1955-1964 at Jackson, Mississippi

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-110	Percent of Hours with Inversion at Jackson, Mississippi
2.3-111	Number of Inversion Occurrences During January at Grand Gulf Site
2.3-112	Number of Inversion Occurrences During February at Grand Gulf Site
2.3-113	Number of Inversion Occurrences During March at Grand Gulf Site
2.3-114	Number of Inversion Occurrences During April at Grand Gulf Site
2.3-115	Number of Inversion Occurrences During May at Grand Gulf Site
2.3-116	Number of Inversion Occurrences During June at Grand Gulf Site
2.3-117	Number of Inversion Occurrences During July at Grand Gulf Site
2.3-118	Number of Inversion Occurrences During August at Grand Gulf Site
2.3-119	Number of Inversion Occurrences During September at Grand Gulf Site
2.3-120	Number of Inversion Occurrences During October at Grand Gulf Site
2.3-121	Number of Inversion Occurrences During November at Grand Gulf Site
2.3-122	Number of Inversion Occurrences During December at Grand Gulf Site
2.3-123	Number of Inversion Occurrences at Grand Gulf Site
2.3-124	Percent of Hours with Inversion at Grand Gulf Site
2.3-125	Mixing Heights at Jackson International Airport
2.3-126	Average Plume Lengths in Miles During 4 NDCT Operation
2.3-127	Average Plume Lengths in Miles During 4 LMDCT Unit Operation
2.3-128	Visible Plume Length Summary
2.3-129	Meteorological Equipment Specification and Performance Characteristics
2.3-130	Meteorological Equipment Specification and Performance Characteristics
2.3-131	Monthly Data Recovery Rate – Data from 1996 to 2001
2.3-132	1996 to 2000 Data (Averaged in Hours) Extremely Unstable, Stability Class A
2.3-133	1996 to 2000 Data (Averaged in Hours) Moderately Unstable, Stability Class B
2.3-134	1996 to 2000 Data (Averaged in Hours) Slightly Unstable, Stability Class C
2.3-135	1996 to 2000 Data (Averaged in Hours) Neutral, Stability Class D
2.3-136	1996 to 2000 Data (Averaged in Hours) Slightly Stable, Stability Class E
2.3-137	1996 to 2000 Data (Averaged in Hours) Moderately Stable, Stability Class F
2.3-138	1996 to 2000 Data (Averaged in Hours) Extremely Stable, Stability Class G

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.3-139	Exclusion Area Boundary Cumulative Frequency of Relative Concentration (X/Q) of Effluent at the Minimum Site Boundary Distance (841 M) 0-2 Hours
2.3-140	Cumulative Frequency of Relative Concentration (X/Q) of Effluent at the Low Population Zone (3219 M) 0-2 Hours
2.3-141	Exclusion Area Boundary Direction Dependent Sector Relative Concentration (X/Q) of Effluent at the Minimum Site Boundary Distance (841 M)
2.3-142	Low Population Zone Direction Dependent Sector Relative Concentration (X/Q) of Effluent at the LPZ (3219 M)
2.3-143	Annual Average X/Q and D/Q (Data Period 1996-2000)
2.3-144	Annual Average Relative Concentration, X/Q
2.3-145	Annual Average Relative Concentration, X/Q
2.3-146	Annual Average Relative Deposition, D/Q
2.4-1	Drainage Features of the Mississippi River Basin
2.4-2a	Surface Water Intakes on the Mississippi River, Mississippi
2.4-2b	Surface Water Intakes on the Mississippi River, Public Water Supply Systems, Louisiana
2.4-3a	1995 Water Use Totals, Mississippi Counties Surrounding Grand Gulf Site
2.4-3b	1995 Irrigation Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3c	1995 Livestock Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3d	1995 Mining Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3e	1995 Thermoelectric Power Water Use - All Fuel Types, Mississippi Counties Surrounding Grand Gulf Site
2.4-3f	1995 Industrial Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3g	1995 Domestic Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3h	1995 Commercial Water Use, Mississippi Counties Surrounding Grand Gulf Site
2.4-3i	1995 Public Supply, Mississippi Counties Surrounding Grand Gulf Site
2.4-4	Flood Discharges at Vicksburg, Mississippi During Six Highest Recent Floods
2.4-5	Maximum Observed Rainfall Values for Period of 24 Hours in Mississippi and Louisiana
2.4-6	Maximum Observed Streamflow Values in the Lower Mississippi River Basin
2.4-7	Probable Maximum Precipitation at Plant Site
2.4-8	Unit Hydrographs for Plant Site Drainage Basins

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.4-9	Precipitation Distribution for PMF Peak Determination
2.4-10	Maximum Daily Streamflow in the Mississippi River at Vicksburg (1932 – 1988)
2.4-11	Flood Stage-Discharge Frequency Relation for Mississippi River at Grand Gulf Site
2.4-12	Details of Culverts
2.4-13	Composite Manning's n Versus Water Depth for the Basin B Stream Channel
2.4-14	Wind Waves on Mississippi River Coincident with PMF of Mississippi River
2.4-15	Major Reservoirs in Mississippi River Basin
2.4-16	Water Quality Sampling Data For The Mississippi River At Vicksburg, MS
2.4-16a	Ranges Of Water Temperatures For Mississippi River At Vicksburg, Mississippi
2.4-17	Minimum Daily Streamflow Observed on the Mississippi River at Vicksburg, MS (USGS Station 07289000) 1932 to 1988
2.4-18	Instantaneous Low Flow in Mississippi River at Vicksburg, Mississippi 1962 to 1971
2.4-19	Low-Flow Values, CFS, for 1, 7, and 30 Days for Selected Return Periods for Mississippi River at Vicksburg, Mississippi
2.4-20	Geologic Formations of Claiborne, Copiah, Hinds, Jefferson, and Warren Counties, Mississippi
2.4-21	USGS Ground Water Levels - Vicksburg Well Completed in the Mississippi River Alluvial Aquifer Station No. 322310090530202
2.4-22	USGS Ground Water Levels – Port Gibson Well Completed in the Lower Catahoula Formation Station No. 315718090291501
2.4-23	Results of Chemical Analyses of Water Samples
2.4-24	GGNS Surface Water Discharge & Water Quality Data
2.4-25	Chemical Analysis of Water Samples, Three Potable Wells Located at the GGNS Site
2.4-26	Mississippi River and Radial Well Water Quality at GGNS
2.4-27	Public Supply and Industrial Wells Claiborne, Copiah, Hinds, Jefferson, and Warren Counties
2.4-28	Details of Public Supply and Industrial Wells in Port Gibson, MS
2.4-29	Water Wells Within a 4-Mile Radius of GGNS
2.4-30	Piezometer Inventory
2.4-31	Observation Well Inventory

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.4-32	Ground Water Levels in Monitoring Wells
2.4-33	Ground Water Level Data for On-Site Wells, 1996 - 2001
2.4-34	Permeability Test Results
2.4-35	Hydraulic Conductivities and Transmissivities of Terrace Deposits
2.4-36	GGNS Radiological Monitoring Program
2.4-37	Travel Time Analysis Parameters
2.5-1	Summary of Physiographic and Geologic Provinces
2.5-2	Process Model Showing Regional Responses to Basic Glacial/Interglacial Cycle in the Lower Mississippi Alluvial Valley (from Autin et al., 1991)
2.5-3	Comparison of Pleistocene Age Terrace Deposits of the Mississippi Alluvial Valley, as Described by Autin et al. (1991) and Fisk (1944)
2.5-4	Summary of Deformation Chronology from Trenches within the Saline River Source Zone
2.5-5	Summary of Liquefaction Event Ages from Ashley and Desha Counties, Arkansas
2.5-6	Calculation of Average Recurrence Intervals from Paleoliquefaction Data in the Saline River Source Zone
2.5-7	Summary of Static Soil Properties from Site Investigation Program
2.5-8a	Summary of Bechtel Seismic Sources
2.5-8b	Summary of Dames & Moore Seismic Sources
2.5-8c	Summary of Law Engineering Seismic Sources
2.5-8d	Summary of Rondout Seismic Sources
2.5-8e	Summary of Weston Seismic Sources
2.5-8f	Summary of Woodward-Clyde Seismic Sources
2.5-9	Coordinates of Points of Closest Approach for the Inferred Faults Associated with the 1811-1812 Earthquake Sequence
2.5-10	Summary of Published Magnitudes for the 1811-1812 Earthquake Sequence on the New Madrid Seismic Zone
2.5-11	Calculation of Seismic Moment and Moment Magnitude for Reelfoot Fault
2.5-12	Calculation of Reelfoot Fault Earthquake Recurrence Times Using Moment Rate Approach
2.5-13	Calculation of Characteristic Earthquake Recurrence Time Using Slip-Rate Method

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
2.5-14	Earthquakes within Approximately 320km of GGNS – 1985-2002
2.5-15	Median 10-5 Rock Seismic Hazard Results for the GGNS
2.5-16	Estimated Controlling Earthquakes for the GGNS ESP Site
2.5-17	Median Rock Response Spectra - $M_c = 6.33$, $D_c = 82$ km
2.5-18	Median Rock Response Spectra - $M_c = 7.64$, $D_c = 466$ km
2.5-19	Summary of Borings and CPT Soundings
2.5-20	Summary of Subsurface Geologic Units from Borings
2.5-21	Comparison Between ESP Site and UFSAR Boring SPT
2.5-22	Comparison Between ESP Site and UFSAR Shear Wave Velocity
2.5-23	Static Laboratory Testing Summary Sheet, Boring WLA B-1 Format Consistent to Other Tables
2.5-24	Static Laboratory Testing Summary, Boring WLA B-2, B-2A, B-3
2.5-25	Dynamic Soil Test Specimens and Properties
3.2-1	Gaseous Pathway Parameters
3.2-2	Gaseous Pathway Consumption Factors
3.2-3A	Annual Dose To A Maximally Exposed Individual From Gaseous Effluents
3.2-3B	Comparison Of Maximum Individual Dose To 10 CFR 50, Appendix I Criteria – Gaseous Pathway
3.2-4	Annual Population Doses - Gaseous Pathway
3.2-5	Comparison Of Maximum Individual Dose To 40 CFR 190 Criteria - Gaseous Pathway
3.2-6	Milk Production Between 10 And 50 Miles By Sector
3.2-7	Total Meat Production Between 0 And 50 Miles By Sector
3.2-8	Total Vegetable Production Between 0 And 50 Miles By Sector
3.2-9	Dose To Biota From Gaseous Effluents
3.3-1	Comparison of Reactor Types for Limiting Off-Site Dose Consequences
3.3-2	AP1000 Main Steam Line Break - Accident-Initiated Iodine Spike
3.3-3	AP1000 Main Steam Line Break - Pre-Existing Iodine Spike
3.3-4	ABWR Main Steam Line Break Outside Containment
3.3-5	ABWR Main Steam Line Break Outside Containment - Maximum Equilibrium Value for Full Power Operation

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF TABLES (Continued)

<u>Table No.</u>	<u>Title</u>
3.3-6	ABWR Main Steam Line Break Outside Containment - Pre-Existing Iodine Spike
3.3-7	AP1000 Locked Rotor Accident – Pre-Existing Iodine Spike
3.3-8	AP1000 Control Rod Ejection Accident - Pre-Existing Iodine Spike
3.3-9	AP1000 Steam Generator Tube Rupture - Accident-Initiated Iodine Spike
3.3-10	AP1000 Steam Generator Tube Rupture - Pre-Existing Iodine Spike
3.3-11	AP1000 Small Line Break Accident, 0 to 0.5 Hour Duration - Accident-Initiated Iodine Spike
3.3-12	ABWR Small Line Break Outside Containment - Activity Released to Environment
3.3-13	ABWR Small Line Break Outside Containment
3.3-14	AP1000 Design Basis Loss of Coolant Accident
3.3-15	ABWR LOCA Curies Released to Environment by Time Interval
3.3-16	ABWR Design Basis Loss of Coolant Accident
3.3-17	ACR-700 Design Basis Large LOCA - Curies Released to Environment by Interval
3.3-18	ACR-700 Large Loss of Coolant Accident
3.3-19	AP1000 Fuel Handling Accident - Curies Released to Environment
3.3-20	AP1000 Fuel Handling Accident
3.3-21	ABWR Fuel Handling Accident - Curies Released to Environment
3.3-22	ABWR Fuel Handling Accident

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>
1.2-1	Site Layout, Existing GGNS Facilities
2.1-1	GGNS Site Layout with Proposed New Facility Construction Areas
2.1-2	Site Layout
2.1-3	Projected 2002 Population Distribution, 0 – 10 Miles
2.1-4	Projected 2002 Population Distribution, 10 – 50 Miles
2.1-5	Transportation Routes in the Vicinity of the Site
2.1-6	Communities Over 1000 Population
2.2-1	General Area Map
2.2-2	Oil and Gas Line Map
2.2-3	Transportation Map
2.2-4	Port Claiborne Location
2.2-5	Air Route Map For GGNS Site Area
2.2-6	Transportation Map Area Highways – Mississippi
2.2-7	Industrial Facilities in GGNS Site Area
2.2-8	Location of Chemical Storage
2.3-1	GGNS Site Wind Rose, 1996-2001
2.3-2	GGNS Site Wind Rose, 1996
2.3-3	GGNS Site Wind Rose, 1997
2.3-4	GGNS Site Wind Rose, 1998
2.3-5	GGNS Site Wind Rose, 1999
2.3-6	GGNS Site Wind Rose, 2000
2.3-7	GGNS Site Wind Rose, 2001
2.3-8	Vicksburg Wind Rose, 1997-2001
2.3-9	Vicksburg Wind Rose, 1997
2.3-10	Vicksburg Wind Rose, 1998
2.3-11	Vicksburg Wind Rose, 1999
2.3-12	Vicksburg Wind Rose, 2000
2.3-13	Vicksburg Wind Rose, 2001
2.3-14	GGNS Site 2000 Hourly Temperatures (Degrees F)
2.3-15	GGNS Site 2001 Hourly Temperatures (Degrees F)

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.3-16	GGNS Site Maximum and Minimum Temperature for Revolving 96 Hour Periods
2.3-17	Annual Precipitation Wind Rose (Percent of Total Observations) Jackson, Mississippi
2.3-18	GGNS Site Precipitation Wind Rose, 2000-2001
2.3-19	Topographic Profiles
2.3-20	Topographic Profiles
2.3-21	Topographic Plan of Area Within 5 and 10 Miles of Plant
2.4-1	Surface Drainage Plan
2.4-2	Regional Topography
2.4-3	Lower Mississippi Region Hydrologic Boundary
2.4-3a	Mississippi River Levees and Navigation Cutoffs
2.4-4	Drainage Areas of the Mississippi Basin
2.4-5	Hydrographic Details of the Mississippi River at Grand Gulf
2.4-6	Water Surface Profiles for 1937 High Flow and 1993 Low Water Reference Plane
2.4-7	Hydrograph for the Mississippi River at Vicksburg, MS
2.4-8	Hydrograph for Mississippi River at Natchez, MS
2.4-9	Annual Maximum Instantaneous Peak Streamflow – Mississippi River USGS Station, Vicksburg, MS
2.4-10	Local Drainage Basins
2.4-11	Dimensionless Hydrograph for the Plant Site Drainage Basin
2.4-12	Basin A & B Hydrographs
2.4-13 Sh. 1	Plant Drainage Areas During PMP
2.4-13 Sh. 2	Plant Drainage Areas During PMP
2.4-14	Design-Project Flood for the Lower Mississippi River U.S. Corps of Engineers 1958
2.4-15	DPF Hydrographs for Mississippi River
2.4-16	Discharge – Frequency Relationship for Mississippi River Floods at Vicksburg
2.4-17	PMF Hydrographs for Mississippi River
2.4-18	Site Drainage Plan
2.4-19	Rating Curve for the Mississippi River at Grand Gulf Site
2.4-20 Sh. 1	Access Road Plan and Profile

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.4-20 Sh. 2	Access Road Plan and Profile
2.4-21	Cross Sections of Stream A
2.4-22	Riprap Gradation Curve
2.4-23	Culvert No. 1 Plan and Sections
2.4-24	Profile and Sections of Peripheral Drainage of Basin B
2.4-25	Boundaries of Water Surface at EL. 103 in the Site Region
2.4-26	Ground Surface Profile of Mississippi River Flood Plain
2.4-27	Major Reservoirs in the Mississippi Basin
2.4-28	Seismic Risk Map for the United States
2.4-28a	Seismic Zone Map of The United States
2.4-29	Design Project Flood Elevations from Cairo, Illinois to Head of Passes
2.4-30	Plan Showing Areas That May Be Submerged Due to a Flood Rising to El. 103 MSL at the Site
2.4-31	Instantaneous Low Flow in Mississippi River-Typical Gauge Record at Vicksburg, Miss. September 18, 19, 20 & 21, 1967
2.4-31a	Sole Source Aquifer Map
2.4-32	Low Flows in the Mississippi River at Vicksburg
2.4-33	Site Hydrologic Features (Normal Conditions)
2.4-34	Hydrograph of a Well Completed in the MS River Alluvial Aquifer, Vicksburg, MS
2.4-35	Hydrograph of a Well Completed in the Lower Catahoula Formation, Port Gibson, MS
2.4-36	Hydrogeologic Cross Section A-A'
2.4-37	Hydrogeologic Cross Section B-B'
2.4-38	County Well Location Grid
2.4-39 Sh 1	Hydrographs of Wells and Piezometers
2.4-39 Sh 2	Hydrographs of Wells and Piezometers
2.4-39 Sh 3	Hydrographs of Replacement Piezometers
2.4-39 Sh 4	Hydrographs of Wells and Piezometers
2.4-39 Sh 5	Hydrographs of Wells and Piezometers
2.4-40	Pumpout Test Ground Water Level Contours (Prepumping Static Levels) August 7, 1979

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.4-41	Hydrographs of Mississippi River, Gin Lake, and Hamilton Lake
2.4-42	Site Hydrologic Features Flood Conditions May 1973
2.4-43	Plant Site Well Plan
2.4-44 Sh 1	Hydrographs of Construction Observation Wells
2.4-44 Sh 2	Hydrographs of Construction Observation Wells
2.4-44 Sh 3	Hydrographs of Construction Observation Wells
2.4-44 Sh 4	Hydrographs of Construction Observation Wells
2.4-44 Sh 5	Hydrographs of Construction Observation Wells
2.4-45 Sh 1	Hydrographs of Replacement Observation Wells MW-3 and MW-4
2.4-45 Sh 2	Hydrographs of Replacement Observation Wells MW-5 and MW-6
2.4-46	Pumpout Test Ground Water Level Contours November 6, 1979
2.4-47	Pumpout Test Ground Water Level Contours (High River Level) December 10, 1979
2.4-48	Hydrographs of Mississippi River Wells 3 and 5 During Pump Test
2.4-49	Pumpout Test Ground Water Level Contours (Low River Level) November 17, 1978
2.4-50	Calculated Ground Water Level Contours (Lower River Level)
2.4-51	Hydrographs of Hamilton Lake and Observation Wells F-4 and F-6 During Pump Tests
2.4-52	Average Post-Construction Ground Water Elevations
2.4-53	DW-8A Water-Level Hydrograph and 6-Month Cumulative Precipitation 1987-1991
2.4-54	GGNS Ground Water Level and Rainfall Hydrographs – 2001
2.4-55	Calculated Ground Water Level Contours (Normal River Level)
2.5-1	Definition of Site Investigation Areas
2.5-2	Regional Physiographic Subprovinces within the Gulf Coastal Plain Province
2.5-3	Regional Geologic Provinces and Major Structural Features
2.5-4a	Geologic Map of Site Region (200-Mile Radius)
2.5-4b	Geologic Map Unit Descriptions for Geologic Map of Site Region
2.5-5	Distribution of Tectonic Features and Historical Seismicity in the Site Region
2.5-6	Geologic Section A-A' of Site Region

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.5-7	Major Cratonic Features of Central United States
2.5-8	Generalized Sequence of Major Geologic Events in Region
2.5-9a	Geologic Map of Site Vicinity (25-Mile Radius)
2.5-9b	Geologic Map Unit Descriptions for Geologic Map of Site Vicinity
2.5-10	Geologic Map of Site Area (5-Mile Radius)
2.5-11	Cross Section B-B' of Site Vicinity
2.5-12	Cross Section C-C' of Site Vicinity
2.5-13	Stratigraphic Column for the Gulf Coast Basin
2.5-14	Comparison of Terrace Models Along the Mississippi Alluvial Valley
2.5-15	Structure Contour Map of Top of the Glendon Limestone Formation
2.5-16a	Depth to Basement and Crustal Types, Gulf Coast Basin
2.5-16b	Geologic Section D-D'
2.5-17	Map Showing Location of Fort Payne, Alabama earthquake, April 29, 2003
2.5-18	Fault Sources of New Madrid Seismic Zone
2.5-19	Saline River Source Zone
2.5-20	Geologic Map in Vicinity of Saline River Showing Seismicity, Liquefaction, and Faults
2.5-21	Cross Section E - E'
2.5-22	Cross Section F - F'
2.5-23	Cross Sections Used to Infer Incision Rate and Uplift Rate
2.5-24	Trench Exposures of the Saline River Fault zone Near Monticello, Arkansas
2.5-25	Saline River Cut Bank Exposure Along the Saline River Lineament
2.5-26	Aerial Photograph of Liquefaction Features Near Montrose, Ashley County, Arkansas
2.5-27	Geologic Map of Site Location (0.6-Mile Radius)
2.5-28	Photo of Proposed Location of New Facility
2.5-29	Structure Contour Map of Top of Catahoula Formation
2.5-30	Cross Section I-I' of Site Location
2.5-31	Cross-Section J-J' of Site Location
2.5-32	Structure Contour Map of Top of Upland Complex Deposits
2.5-33	Photo of Possible Pleistocene Terrace in Site Area

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.5-34	Boring Summary Sheet, Boring 1
2.5-35	Boring Summary Sheet, Boring 2
2.5-36	Boring Summary Sheet, Boring 2a
2.5-37	Boring Summary Sheet, Boring 3
2.5-38	Location of Region Considered in Seismic Source Characterization
2.5-39	EPRI SOG Seismic Source Zones Bechtel Team
2.5-40	EPRI SOG Seismic Source Zones Dames & Moore Team
2.5-41	EPRI SOG Seismic Source Zones Law Engineering Testing Company Team
2.5-42	EPRI SOG Seismic Source Zones Rondout Associates Team
2.5-43	EPRI SOG Seismic Source Zones Weston Geophysical Corporation Team
2.5-44	EPRI SOG Seismic Source Zones Woodward Clyde Consultants Team
2.5-45	Logic Tree for New Madrid Seismic Zone
2.5-46	Logic Tree for Saline River Source Zone
2.5-47	Comparison of the Sensitivity of Estimates of Earthquake Occurrence Rates to Updating the EPRI Earthquake Catalog to 2001
2.5-48	GGNS Seismic Hazard Results for Sa(0.5 Hz) for Rock Site Conditions
2.5-49	GGNS Seismic Hazard Results for Sa(1 Hz) for Rock Site Conditions
2.5-50	GGNS Seismic Hazard Results for Sa(2.5 Hz) for Rock Site Conditions
2.5-51	GGNS Seismic Hazard Results for Sa(5 Hz) for Rock Site Conditions
2.5-52	GGNS Seismic Hazard Results for Sa(10 Hz) for Rock Site Conditions
2.5-53	GGNS Seismic Hazard Results for Sa(25 Hz) for Rock Site Conditions
2.5-54	GGNS Seismic Hazard Results for PGA for Rock Site Conditions
2.5-55	Illustration of the Sensitivity of the GGNS Median Seismic Hazard Results for Sa 1 Hz to Using a Reduced Number of Seismicity Options for the Original EPRI SOG Seismic Sources
2.5-56	Illustration of the Sensitivity of the GGNS Median Seismic Hazard Results for Sa 10 Hz to Using a Reduced Number of Seismicity Options for the Original EPRI SOG Seismic Sources
2.5-57	Deaggregation for Low Frequency (Sa(1-2.5Hz)) Ground Motions at the GGNS ESP Site
2.5-58	Deaggregation for High Frequency (Sa(5-10hz)) Ground Motions and at the GGNS ESP Site

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.5-59	Comparison of the GGNS 10-5 Median Uniform Hazard Response Spectrum and the Median Response Spectra Associated with the Controlling Earthquakes
2.5-60	Base Case Shear-Wave Velocity Profile and Suspension Log Measurements
2.5-61	Base Case Shear-Wave Velocity Profile Extended to a Depth of 1,000m
2.5-62	Cohesionless Soil Modulus Reduction and Damping Curves (EPRI, 1993) Adopted for the Site
2.5-63	Median 10-5 APE Hard Rock UHS and Corresponding Scaled 1 to 2 Hz and 5 to 10 Hz Spectra, Extended to 0.1 Hz for Site Response Analyses
2.5-64	Mean Transfer Functions Corresponding to 1 to 2 Hz and 5 to 10 Hz Scaled Spectra (Figure 2.5-63) and Envelop: Top of Loess
2.5-65	Hard Rock Outcrop UHS and Corresponding Soil Motions: Dash-Dotted, Top of Loess; Dashed, Top 50 ft of Material Removed
2.5-66	Mean Transfer Functions Corresponding to 1 to 2 Hz and 5 to 10 Hz Scaled Spectra (Figure 2.5-63) and Envelop: Top of 1,000 ft/sec Material, Depth 50 ft (Figure 2.5-60)
2.5-67	Horizontal Soil Design Ground Motion (Solid) as Envelop of Top of Loess Motion (Dash-Dotted) and Motion with Top 50 ft of Loess Removed (Dashed). NRC R.G. 1.60 Spectrum Scaled to 0.3G (Long Dashes)
2.5-68	Vertical Soil Design Motion Based on R.G. 1.60 V/h Ratios
2.5-69	Geologic Map of Site Location and Site Area
2.5-70	Site Exploration Locations
2.5-71	Boring Summary Sheet Boring WLA B-1
2.5-72	Boring Summary Sheet Boring WLA B-2
2.5-73	Boring Summary Sheet, Boring WLA B-2a
2.5-74	Boring Summary Sheet, Boring B-3
2.5-75	Geologic Section A - A'
2.5-76	Geologic Section B - B'
2.5-77	Geologic Section C - C'
2.5-78	Structure Contour Map of Contact Between Upland Complex Alluvium and Old Alluvium
2.5-79	Structure Contour Map of Contact Between Loess and Upland Complex Alluvium
2.5-80	Summary of P-S Velocity Profiles
2.5-81	Cone Penetrometer Test (CPT) Summary Logs

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

LIST OF FIGURES (Continued)

<u>Figure No.</u>	<u>Title</u>
2.5-82	Moisture Content of Geologic Units
2.5-83	Sieve Analyses Grain Size Plots
2.5-84	Comparison of Static Properties of Loess
2.5-85	Comparison of Static Properties of Upland Complex Alluvium
2.5-86	Comparison of Static Properties of Upland Complex Old Alluvium
2.5-87	Shear Modulus Reduction Curves for Loess
2.5-88	Damping Ratio Curves for Loess
2.5-89	Shear Modulus Reduction Curves for Loess at 4x Confining Stress
2.5-90	Damping Ratio Curves for Loess at 4x Confining Stress
2.5-91	Shear Modulus Reduction Curves for Upland Complex Alluvium and Old Alluvium
2.5-92	Damping Ratio Curves for Upland Complex Alluvium and Old Alluvium
2.5-93	Shear Modulus Reduction Curves for Upland Complex Alluvium at 4x Confining Stress
2.5-94	Damping Ratio Curves for Upland Complex Alluvium at 4x Confining Stress

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

ABBREVIATIONS AND ACRONYMS

Abbreviation / Acronym	Description
ABWR	Advanced Boiling Water Reactor
amsl	Above Mean Sea Level
BZ	Background Source Zone
Cal. Yr B.P.	Calendar Year Before Present
CEUS	Central and Eastern United States
CFR	Code of Federal Regulations
CH	Fat Clay
CL	Clay
CM	California Modified Sampler
COL	Combined (Construction and Operating) License
CPT	Cone Penetrometer Tests
CU	Consolidated Undrained
DPF	Design Project Flood
D/Q	Relative Deposition Coefficient
E	East
EAB	Exclusion Area Boundary
E-NE	East-Northeast
EPRI	Electric Power Research Institute
ER	Environmental Report
ESC	Energy Services Center
E-SE	East-Southeast
ESP	Early Site Permit
EST	Earth Science Team
GGNS	Grand Gulf Nuclear Station
GPS	Global Positioning System
GW	Sandy Gravel
HMR	Hydrometeorological Report
ISRM	International Society of Rock Mechanics
kips	Kilo-Pounds per Square Foot
ksf	kips per Square Foot
LANDSAT	Land Remote-Sensing Satellite
LL	Liquified Limit

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

ABBREVIATIONS AND ACRONYMS (Continued)

Abbreviation / Acronym	Description
LLNL	Lawrence Livermore National Laboratory
LMDCTs	Linear Mechanical Draft Cooling Towers
LOCA	Loss-of-Coolant Accident
LPZ	Low Population Zone
Ma	Million Years
MDEQ	Mississippi Department of Environmental Quality
ML	Silt
MP&L	Mississippi Power & Light Company
msl (or MSL)	Mean Sea Level
N	North
NCDC	National Climatic Data Center
NDCT	Natural Draft Cooling Tower
NE	Northeast
NEI	Nuclear Energy Institute
NHS	Normal Plant Heat Sink
NMSZ	New Madrid Seismic Zone
N-NE	North-Northeast
N-NW	North-Northwest
NOAA	National Oceanographic and Atmosphere Administration
NOTA	None of the Above
NRC	Nuclear Regulatory Commission
NW	Northwest
NWS	National Weather Service
ODCM	Offsite Dose Calculation Manual
OBE	Operating Basis Earthquake
P	Compression Wave
pcf	Pounds per Cubic Foot
PI	Plasticity Index
PL	Plastic Limit
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PPE	Plant Parameters Envelope

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

ABBREVIATIONS AND ACRONYMS (Continued)

Abbreviation / Acronym	Description
PSAR	Preliminary Safety Analysis Report
psf	Pounds per Square Foot
PSHA	Probabilistic Seismic Hazards Analysis
psi	Pounds per Square Inch
PSW	Plant Service Water
S	South
SAR	Safety Analysis Report
SC	Clayey Sand
SE	Southeast
SERI	System Energy Resources, Inc.
SH	Horizontal Shear Wave
SM	Silty Sand
SMEPA	South Mississippi Electric Power Association
SOG	Seismicity Owners Group
SP	Sand
SPT	Standard Penetration Test
SSAR	Site Safety Analysis Report
SSC	Structures, Systems and Components
S-SE	South-Southeast
SSE	Safe Shutdown Earthquake
S-SW	South-Southwest
SW	Gravelly Sand
SW	Southwest
Tc	Time of Concentration
Tm	Tertiary Stratigraphic Unit Designation
tsf	Tons per Square Foot
TSRC	Torsional Shear and Resonant Column
UCSC	Uniform Soil Classification System
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
USDOT	United States Department of Transportation
USCS	Uniform Soil Classification System

GGNS
EARLY SITE PERMIT APPLICATION
PART 2 – SITE SAFETY ANALYSIS REPORT

ABBREVIATIONS AND ACRONYMS (Continued)

Abbreviation / Acronym	Description
USGS	US Geological Survey
UTEXAS	University of Texas at Austin
UTM	Universal Transverse Mercator
W	West
WLA	William Lettis and Associates, Inc.
W-NW	West-Northwest
W-SW	West-Southwest
X/Q	Relative Concentration Coefficient (CHI/Q)