From: "Davis, James T." <JTDAVIS@southernco.com>
To: "Christian Araguas" <CJA2@nrc.gov>
Date: 10/31/2007 4:00:45 PM
Subject: ACRS Meeting 110107a.ppt

Christian,

Draft slides for ACRS presentation.

Jim

<<ACRS Meeting 110107a.ppt>>

Hearing Identifier: Vogtle_Non_Public
Email Number: 7472

Mail Envelope Properties (472A0CED.HQGWDO01.TWGWPO04.200.2000017.1.D3583.1)

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From: "Davis, James T." <JTDAVIS@southernco.com>

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Options
Priority: Standard
Reply Requested: No
Return Notification: None
None

Concealed Subject: No
Security: Standard

Southern Nuclear

Vogtle ESP Application

Presentation to the ACRS Committee

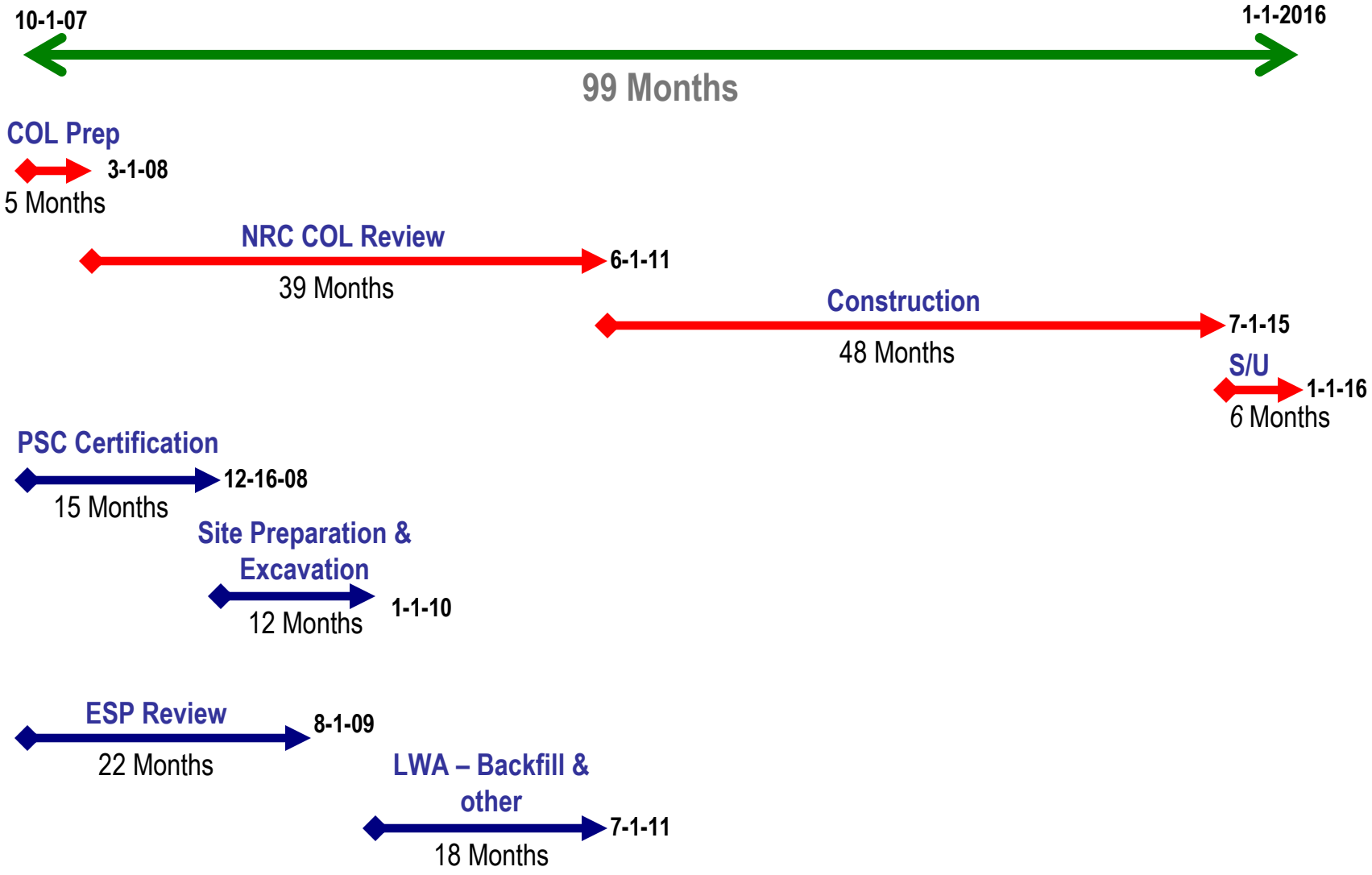
November 1, 2007

Introduction

SOUTHERN COMPANY
Energy to Serve Your World™

Chuck Pierce
Vogtle Deployment
Licensing Manager

Vogtle 3&4 Schedule



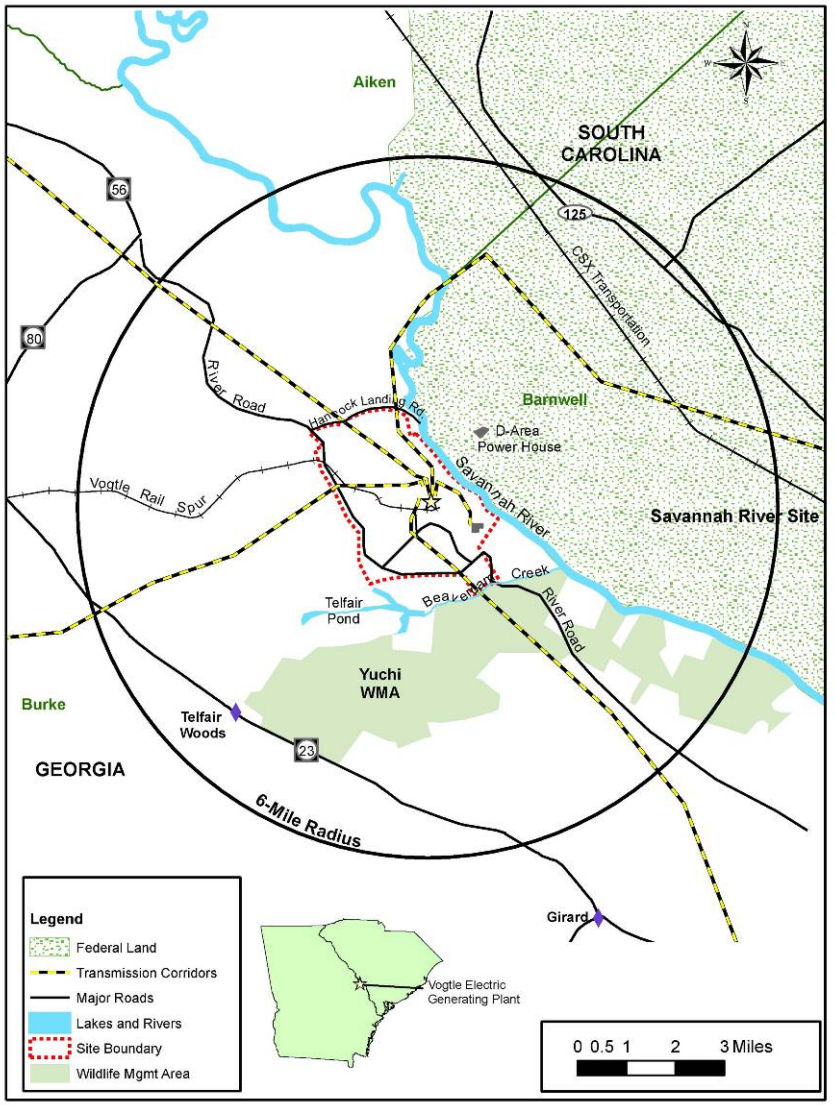
Early Site Permit - Overview

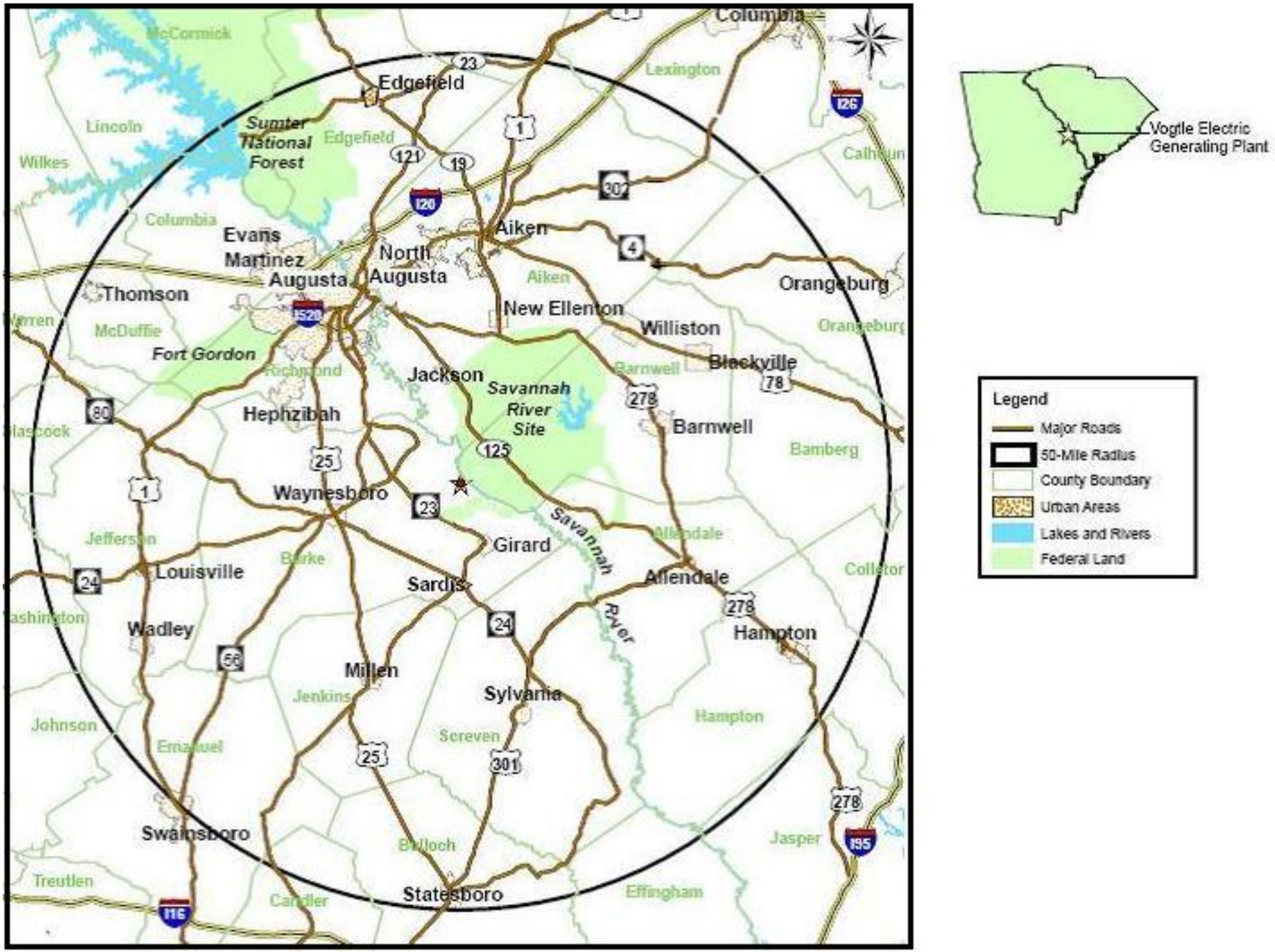
SOUTHERN COMPANY
Energy to Serve Your World™

Jim Davis
ESP Project Engineer

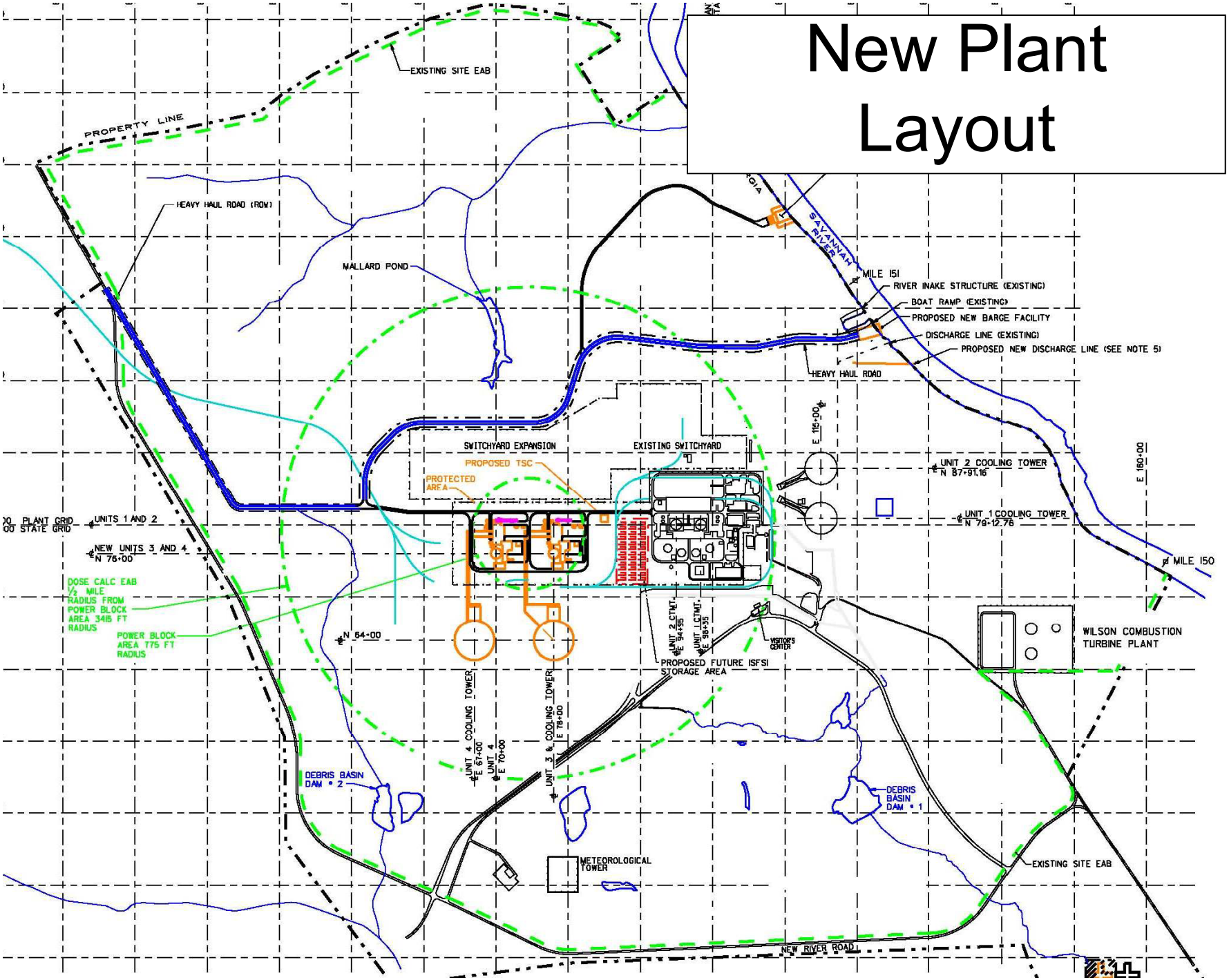
Location

The 3,169-acre VEGP site is located on a Coastal Plain bluff on the southwest side of the Savannah River in eastern Burke County Georgia. The site is directly across the river from the Department of Energy's Savannah River Site (Barnwell County, South Carolina). It is about 150 river miles from the mouth of the Savannah River and approximately and 26 miles southeast of Augusta, Georgia.




Columbia
McCormick
Lexington
Edgefield
Lincoln
Sumter National Forest
Edgefield
Wilkes
Calhoun
Columbia
Evans
Martinez
Augusta
North Augusta
Aiken
Aiken
Orangeburg
Thomson
New Ellenton
Williston
Warren
McDuffie
Orangeburg
Fort Gordon
Richmond
Jackson
Savannah River Site
Barnwell
Blackville
Hephzibah
Barnwell
Glascock
Bamberg
Waynesboro
Jefferson
Burke
Girard
Savannah River
Allendale
Louisville
Sardis
Allendale
Colleton
Washington
Wadley
Millen
Sylvania
Hampton
Jenkins
Johnson
Screven
Hampton
Emanuel
Swainsboro
Bulloch
Jasper
Treutlen
Statesboro
Candler
Effingham
Vogtle Electric Generating Plant
Legend
Major Roads
50-Mile Radius
County Boundary
Urban Areas
Lakes and Rivers
Federal Land

New Plant Layout



Application Development

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Guidance

- 10 CFR Part 52, Subpart A
- RS-002, Processing Applications for Early Site Permits
- AP1000 Site Interface Requirements

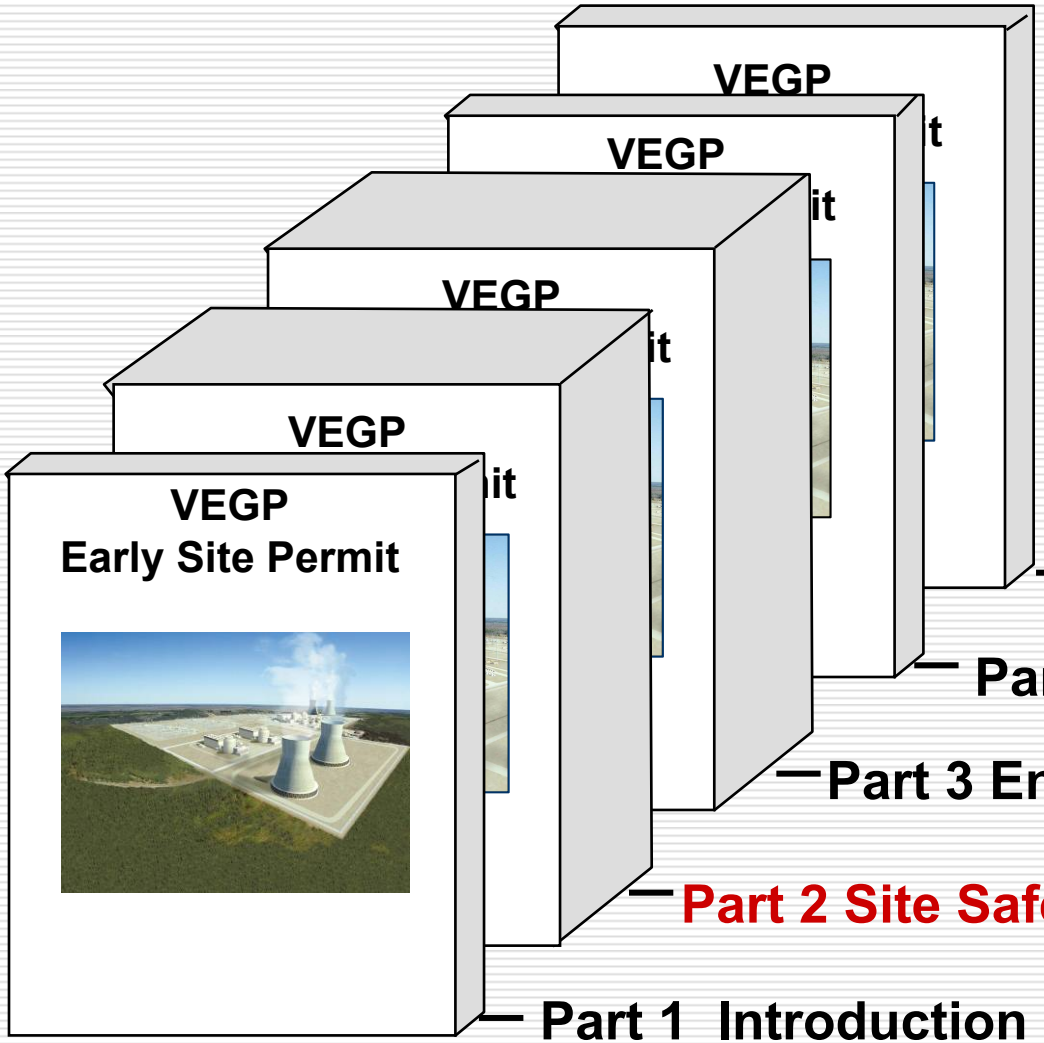
Data Sources

- Unit 1&2 and SRS data
- Site Specific Studies and Tests
- Conceptual Design and Analysis

VEGP ESP Level of Detail

Example	Other ESPs	VEGP ESP
Reactor Type Power Output	Options Listed	Two AP1000's at 1117 MWe Each
Plant Layout Cooling Water Design Intake Design	General Information Provided	Detailed Design and Layouts Provided
Water Consumption And Discharge Flow	Envelope Approach	Plant-Specific Numbers Provided
Normal Effluents and Accident Doses	Envelope Approach	Plant-Specific Numbers Provided
Emergency Plan	Major Features	Complete & Integrated Plan

ESP Overview



Part 5 Emergency Plan

Part 4 Redress Plan

Part 3 Environmental Report

Part 2 Site Safety Analysis Report (SSAR)

Part 1 Introduction

Application Submittal - LWA

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- Revision 0, August 2006
  - Initial Submittal contained LWA-1 request
    - Construction preparation activities
    - Including excavation of power block
- Revision 2, Supplement 1, August 2007
  - Included LWA-2 request to include backfill and all associated work on Nuclear Island basemat necessary to support first concrete placement at receipt of COL

Part 2 Site Safety Analysis Report

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Chapter numbering follows FSAR format:

- Chapter 1 Introduction and General Description
- Chapter 2 Site Characteristics
- Chapter 3 Aircraft hazards
- Chapter 11 Liquid & Gaseous Releases
- Chapter 13 Emergency Planning & Security
- Chapter 15 Accident Analyses
- Chapter 17 Quality Assurance

NRC Site Technical Visits

Subject	Date
Pre-Application Subsurface Investigation	10/2005
Quality Assurance (corporate)	08/2006
Emergency Planning	10/2006
Hazards and Security	11/2006
Meteorology	12/2006
Hydrology and Geology	01/2007

ESP Requests for Additional Information (RAIs)

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Section	Subject	RAIs
2.1	Geography and Demography	12
2.2	Potential Hazards	18
2.3	Meteorology	16
2.4	Hydrology	10
2.5	Geology and Seismic	64
3.5.1.6	Aircraft Hazards	1
11	Liquid and Gaseous Releases	16
13	Emergency Planning	48
15	Accident Analysis	1
17	Quality Assurance	3
	Total RAIs	**189**

ESP SER Open Items

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Section	Subject	OIs
2.3	Meteorology	1
2.4	Hydrology	4
2.5	Geology and Seismic	22
13	Emergency Planning	13
	Total	**40**

Responses provided	40
Additional data scheduled	13

Significant Issue - SER Open Items

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Hydrology

2.4-1 Resolve issue on source of safety-related water use and the proposed permit condition.

Seismic

2.5-1 Resolve issue concerning need to update EPRI Dames and Moore Team M_{max} values.

2.5-3 Resolve issue concerning need to update ETSZ M_{max} values.

Chapter 2 Site Characteristics

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Topics:

- 2.1 Geography and Demography
- 2.2 Potential Hazards
- 2.3 Meteorology
- 2.4 Hydrology
- 2.5 Geology and Seismic

SSAR 2.1 Geography and Demography

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Topics:

- Site boundaries for release limits
- Exclusion Area Boundary control
- Population distribution

No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.

SSAR 2.2 Potential Hazards

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Topics:

- Industrial & mining facilities (gas lines)
- Transportation routes (airports, roads, rails, water)
- Military facilities
- VEGP 1&2
- Plant Wilson

No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.

SSAR 2.3 Meteorology

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Topics:

- Regional and local weather
- Presents 5 years of onsite data
- Site-specific diffusion estimates

One OI – response provided requested information

SSAR 2.4 Hydrologic Engineering

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Topics:

- Potential for floods, dam failures, storm surges, ice effects, etc.
- Low water events
- Groundwater impacts
- Accidental releases of liquids

Responded to four open items and are developing a new model to address post construction impacts to groundwater.

SSAR 2.5 Geology and Seismic

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Tom McCallum
Site Development
Project Engineer

SSAR 2.5 Geology and Seismic

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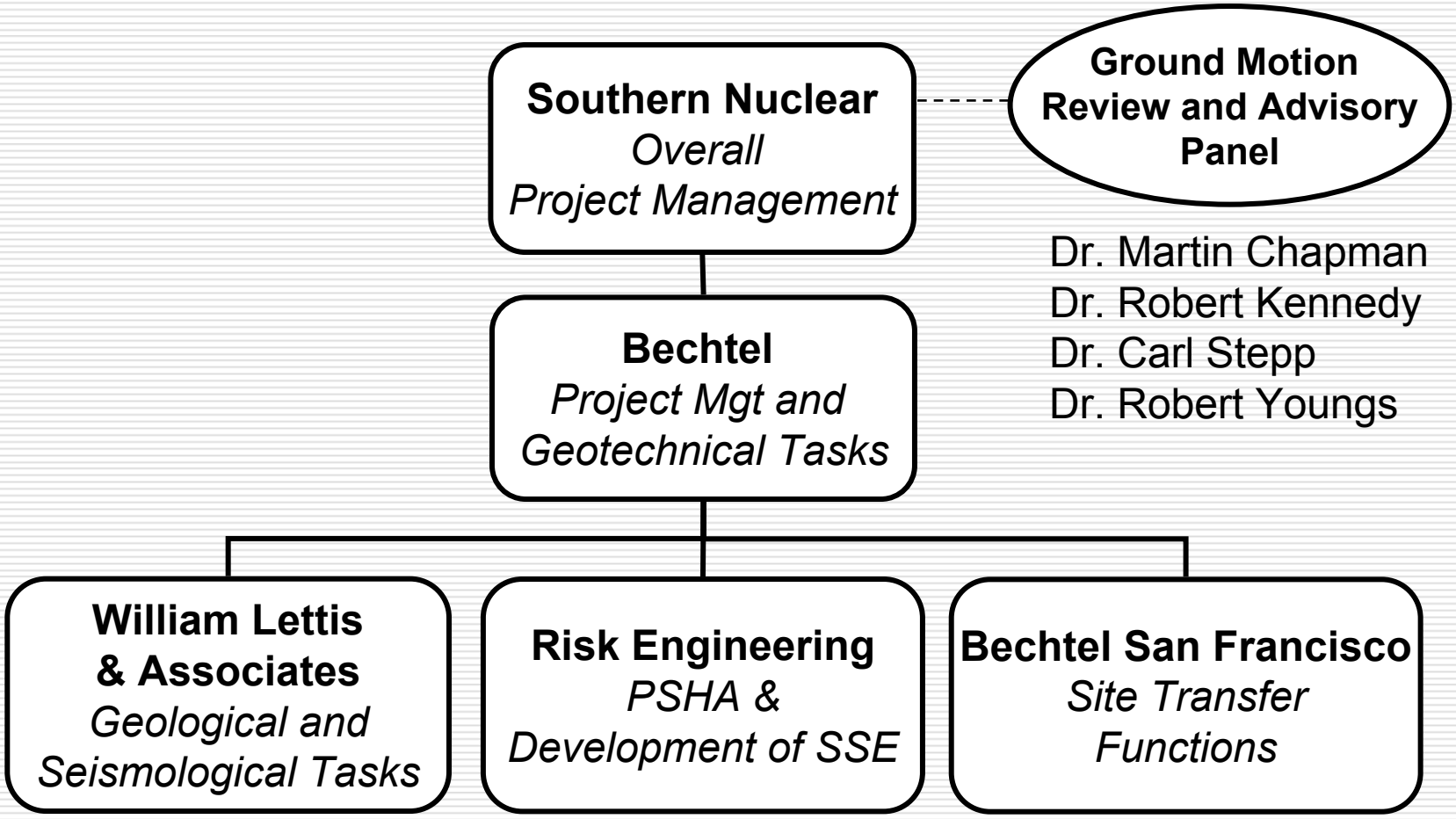
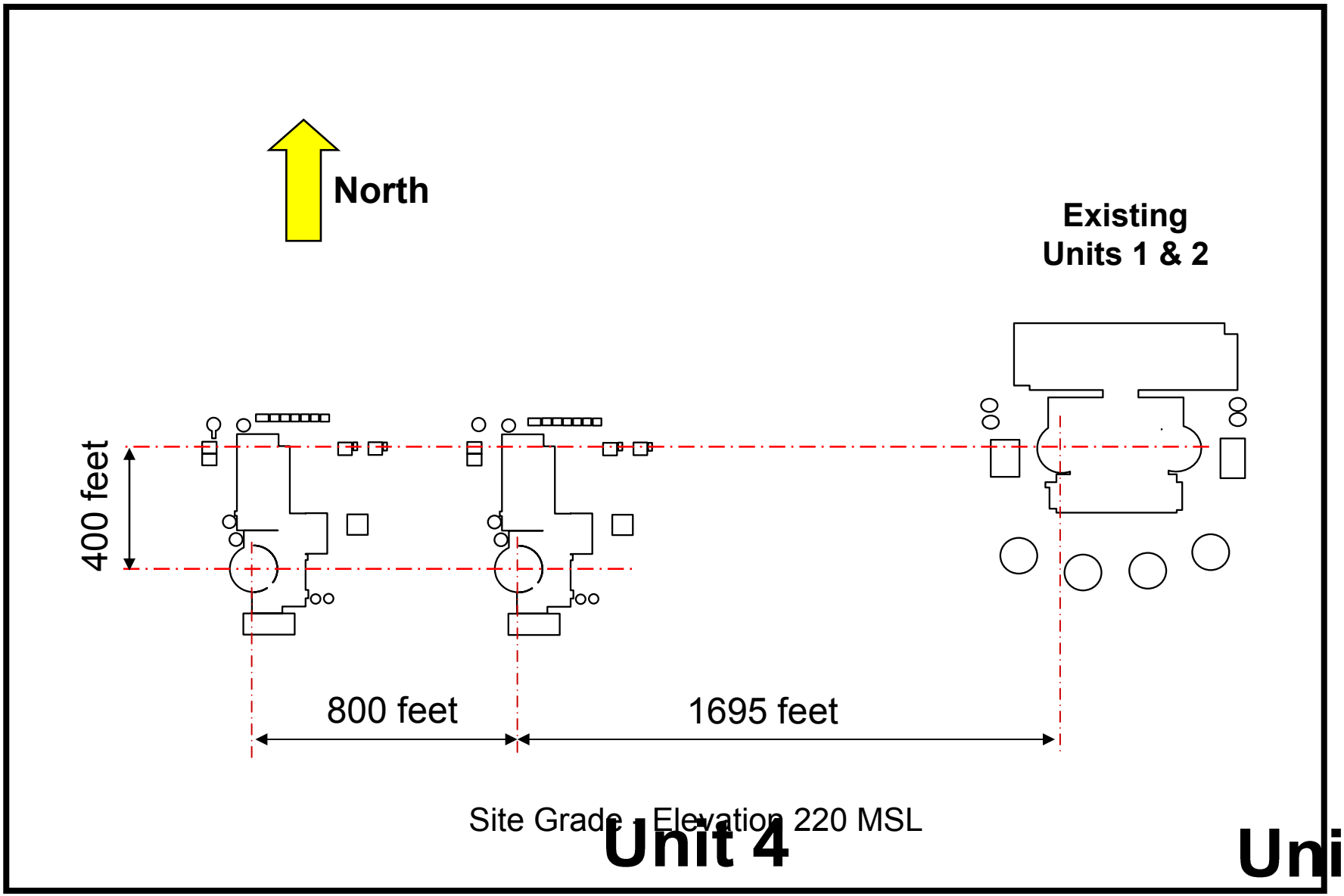
Topics:

- 2.5.1 Site and Regional Geology
- 2.5.2 Seismic Evaluation
- 2.5.3 Surface Faulting
- 2.5.4 Stability of Subsurface Materials
- 2.5.5 Stability of Slopes
- 2.5.6 Embankments and Dams
- 2.5A Soil Boring Report
- 2.5B Seismic Reflection Survey

Responded to 22 open items and are completing additional testing and data gathering to support resolution of 13 OIs.

Seismic Program Organization




North
Existing
Units 1 & 2
400 feet
800 feet
1695 feet
Site Grade - Elevation 220 MSL
Unit 4
Unit 3

Site Layout

Evaluation of Tectonic Features

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- Literature review
- Contact local researchers
- Air photo interpretation
- Aerial reconnaissance
- Field reconnaissance
- Review of seismicity
- Seismic reflection profiles at Vogtle
- Geomorphic analysis of river terraces

Summary

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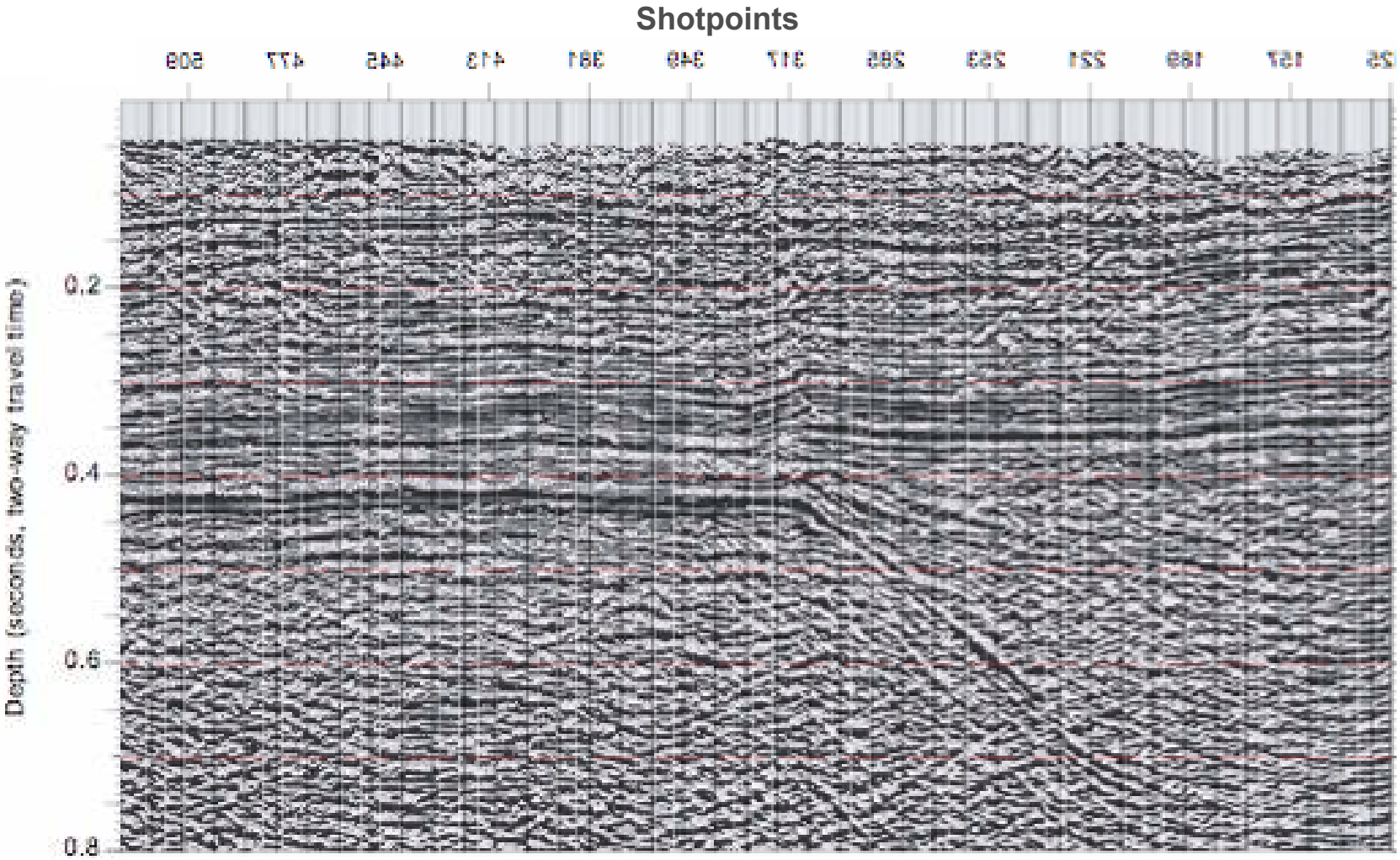
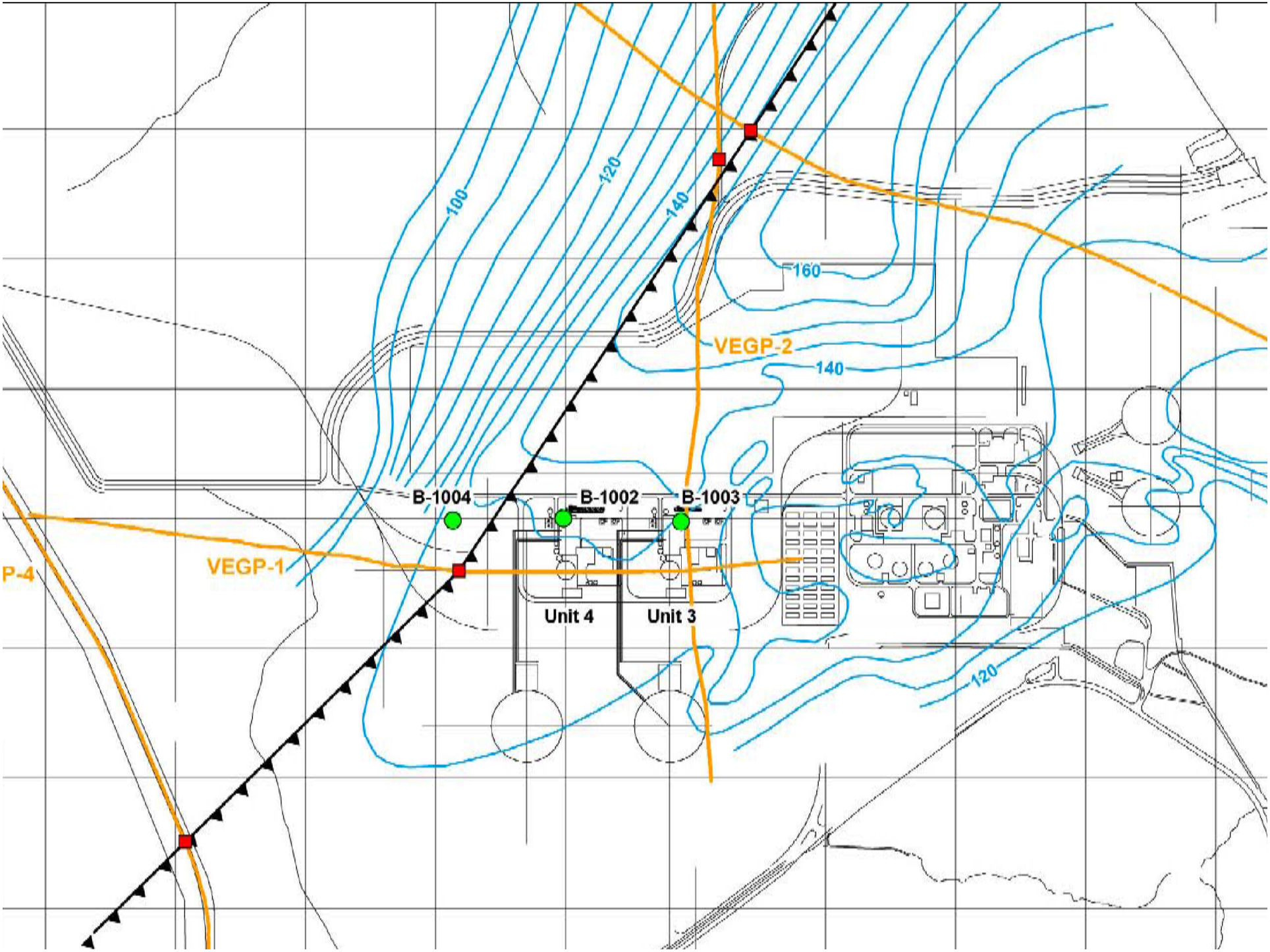
- None of the tectonic features within the Site Vicinity (25 miles) or Site Area (5 miles) are capable tectonic sources

- Non-tectonic deformation and related features can be mitigated by removal of strata overlying Blue Bluff Marl



Pen Branch Fault Image from Reflection Line 4

Looking Northeast


100
120
140
160
140
120
VEGP-2
VEGP-1
P-4
B-1004
B-1002
B-1003
Unit 4
Unit 3

Seismic Ground Motion

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- PSHA Updated per RG 1.165
- Assessed effects of additional seismicity, 1985 through mid-2005
- Updated EPRI-SOG seismic sources to account for new source information
- Used updated EPRI-SOG ground motion models (EPRI 2004)

Calculation of Soil Hazard

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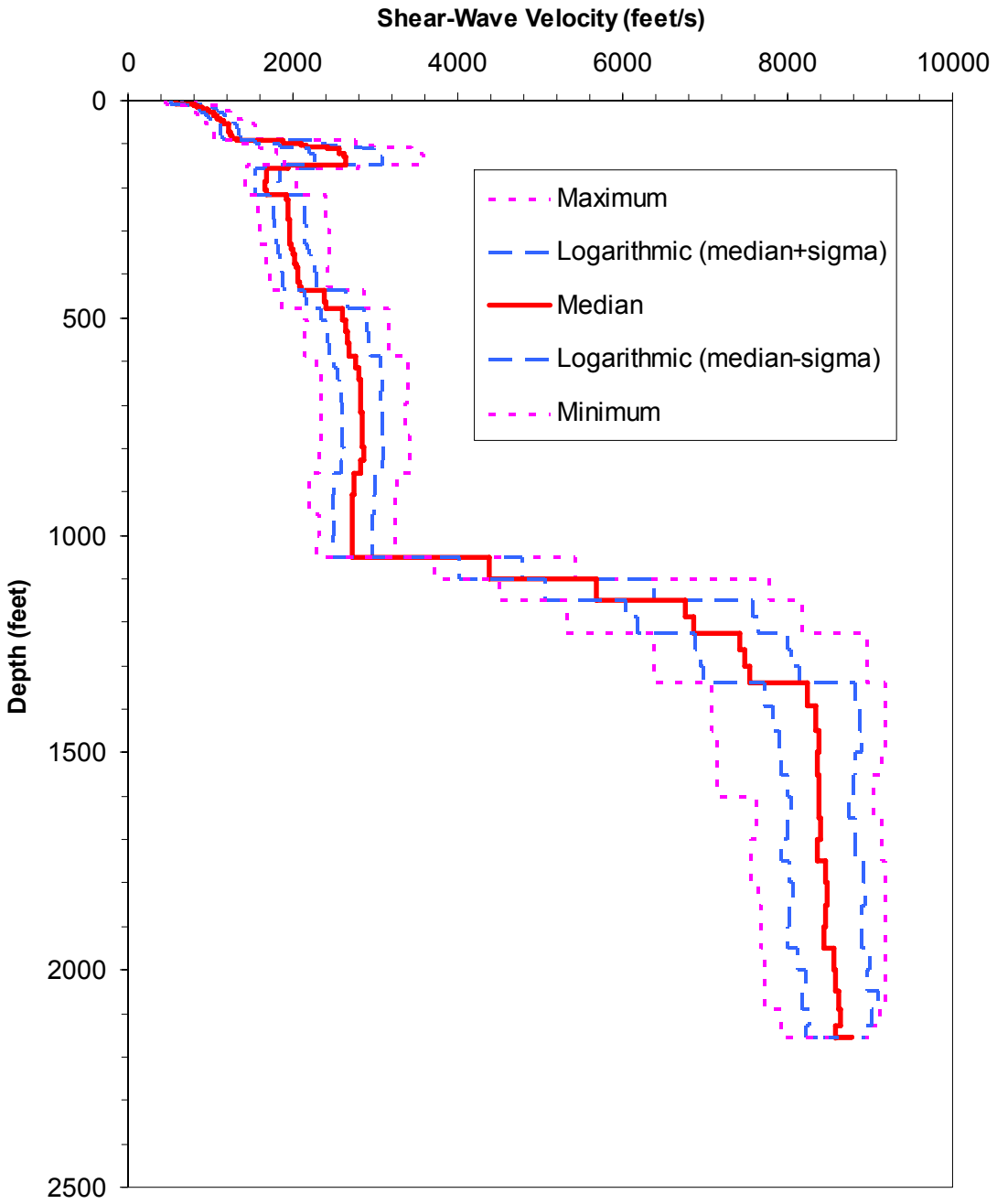
- Developed soil profile with properties
- Determined soil amplitudes for multiple rock input amplitudes (frequencies from 100 Hz to 0.1 Hz) (1D SHAKE analysis) using M and R from deaggregation (high- and low-frequency spectra)
- Combined rock hazard with site amplification (including uncertainties in input motion and soil properties) to obtain soil UHS for multiple mean annual frequencies of exceedance (NUREG/CR-6728 Approach 2A)



Soil-Rock Shear Wave Velocity Calculated from the 60 Shear-Wave Velocity Profiles

From SAR Figure 2.5.2-34

Development of Vogtle SSE

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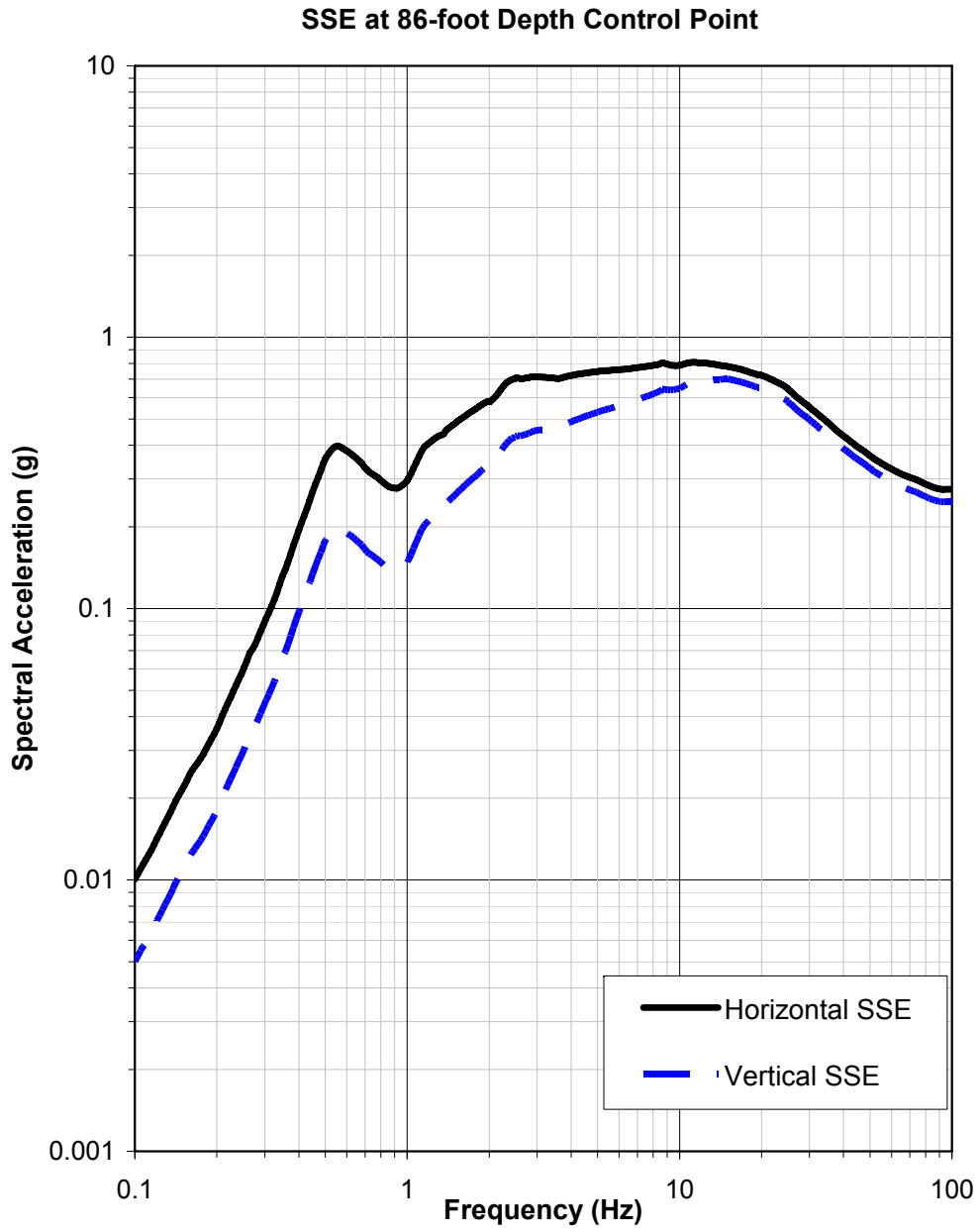
- SSE developed following performance-based procedures (ASCE 43-05)
- Define SSE (GMRS) @ ground surface at hypothetical outcrop of highest competent in-situ material (top of Blue Bluff Marl at ~86'depth)
- Vertical SSE = V/H x Horiz. SSE



Vogtle ESP SSE (GMRS) at top of Blue Bluff Marl (86-foot Depth)

From SAR Figure 2.5.2-44

Subsurface Profile

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- **Upper sands (Barnwell Group):**
  - Very loose to very dense sands
  - Average thickness of about 90 ft
  - Ground water elevation is 165 ft (55-60 ft below grade)
- **Blue Bluff Marl - (Lisbon Formation):**
  - Very hard, slightly sandy, cemented, calcareous silt/clay
  - Average thickness of 76 ft
- **Lower sands (coastal plain deposits):**
  - Dense sands
  - Thickness of 900 ft
- **Dunbarton Basin bedrock:**
  - Triassic sandstone
  - 1,049 ft below grade at B-1003

Construction Excavation

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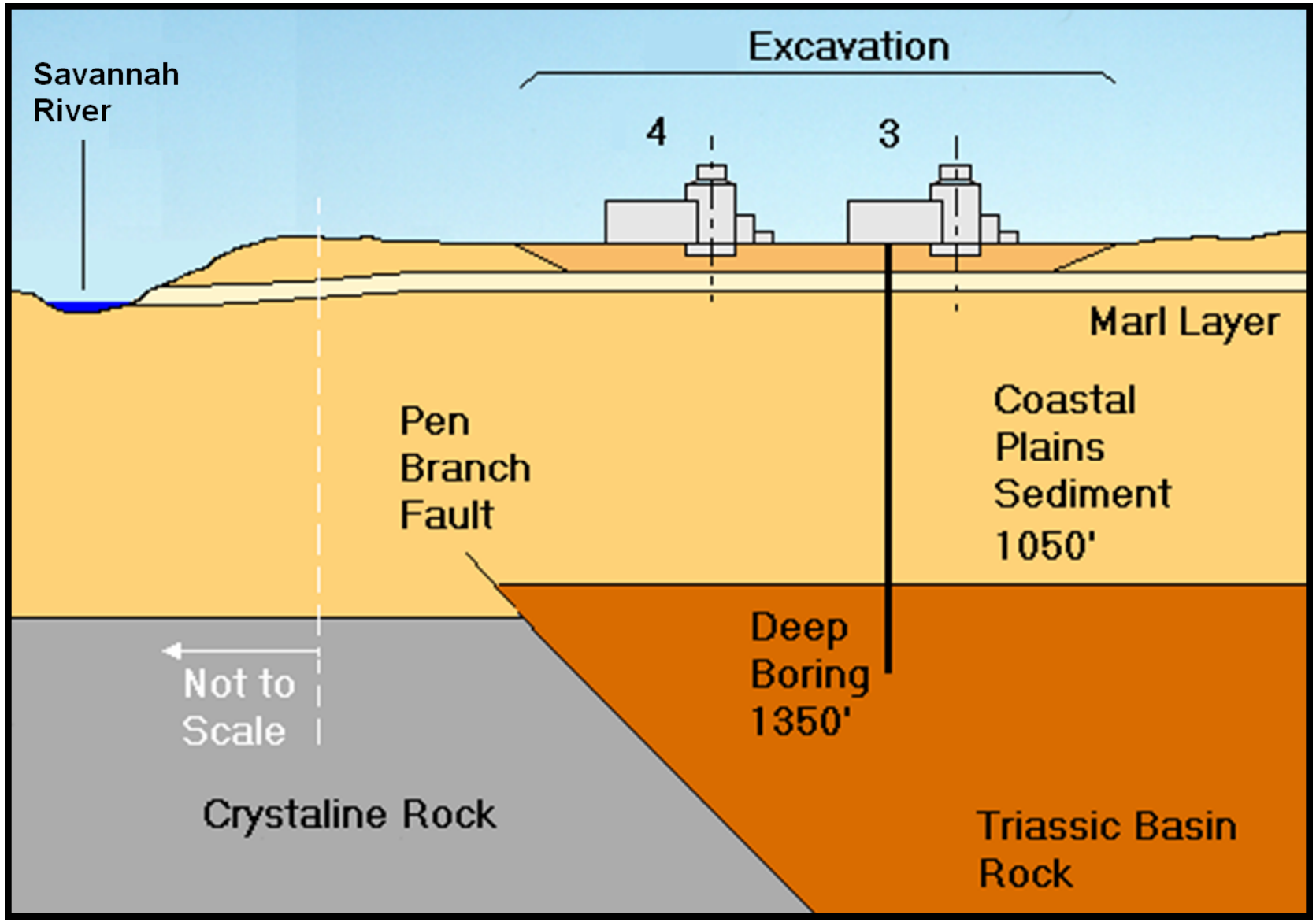
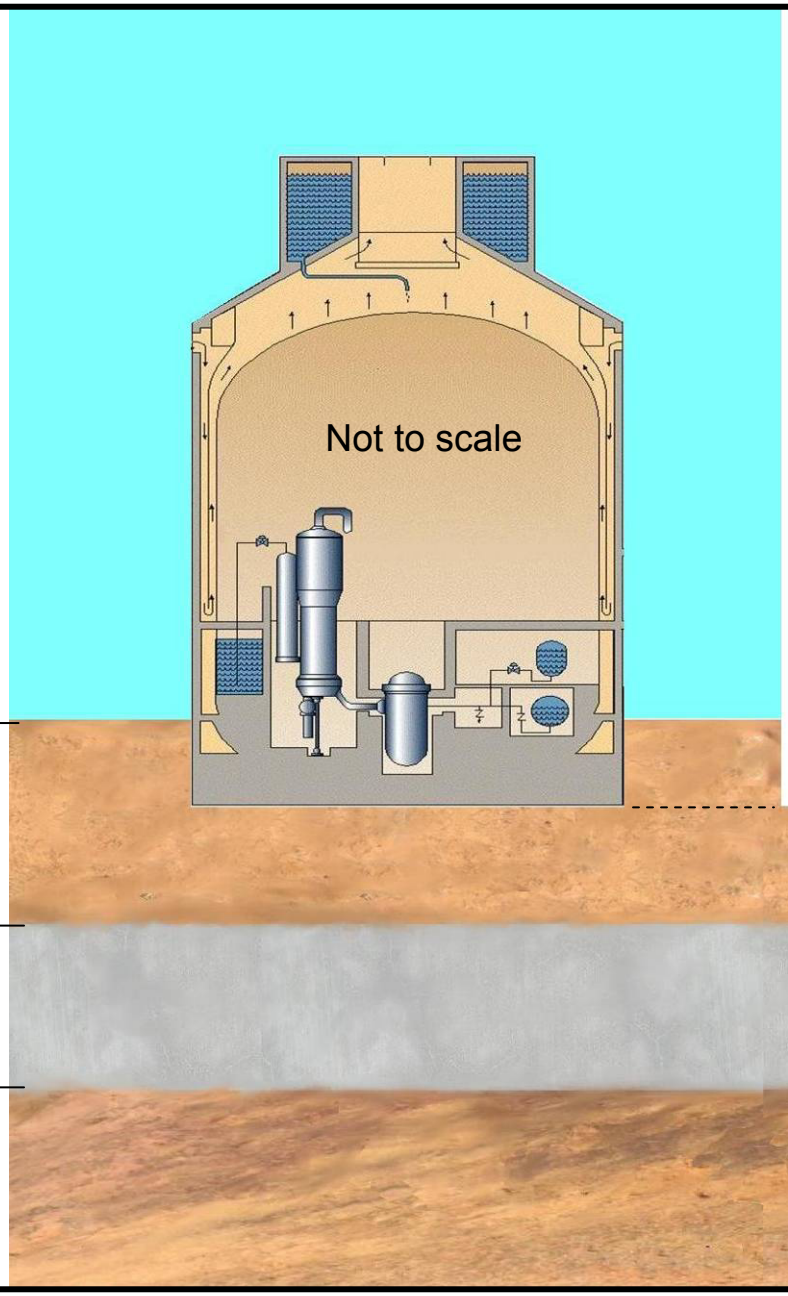
The Upper Sands - Barnwell Group

- Have highly variable density along the depth and from borehole to borehole
- A shell-rich, very porous material was encountered at the bottom of the Barnwell Group/top of Blue Bluff Marl that caused drilling fluid losses
- These soils were completely removed and replaced with compacted granular fill for construction of existing units.
- For these reasons, these soils will be removed



Site Soil/Rock Profile with Backfill

Vogtle Site-Specific Model for AP1000 Nuclear Island



Vogtle input motion SSE at hypothetical outcrop at 40' depth for control point seismic input for site-specific SSI analysis of AP1000 nuclear island. This is a Foundation Input Response Spectra (FIRS)

Vogtle ESP SSE defined at the free ground surface of a hypothetical outcrop of the highest competent in-situ layer (top of Blue Bluff Marl at depth of 86'). This is the Site-Specific Ground Motion Response Spectrum (GMRS)

Early Site Permit - Overview

SOUTHERN COMPANY
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Jim Davis
ESP Project Engineer

SSAR 3 Design

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Topics:

- 3.5.1.6 - Aircraft Hazards

No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.

SSAR 11 Liquid & Gaseous Releases

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Topics: To be added

- **11.2.3 Liquid Radioactive Releases**
- **11.3.3 Gaseous Radioactive Releases**

No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.

SSAR 13 Programs & Part 5 EP

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Topics:

- Emergency Planning (refers to Part 5)
- Industrial Security

Responded to 13 EP open items providing information requested.

Emergency Plan Approach

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- Complete and Integrated Emergency Plan
- Modified existing emergency plan to include new units
- EP ITAAC
- Performed new evacuation time estimate study
- Used existing EPZ's
- Incorporated common TSC for all units
- Used existing EOF

SSAR 15 Accident Analysis

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Topics:

- Requires review of AP1000 accidents with site specific parameters for offsite dose evaluations

  No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.

SSAR 17 Quality Assurance

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Topics:

- Must describe the QA controls applied to the ESP process

  No outstanding open items (OIs) or request for additional information (RAIs) associated with SER.