Vogtle PEmails

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To: Christian Araguas
Subject: ACRS Slides
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Southern Nuclear
Vogtle 3 & 4 ACRS Meeting
December 3-4, 2008

Agenda

- Introduction
- Early Site Permit (ESP) Overview
- ESP Open Items Overview
- Limited Work Authorization (LWA) Overview

Introduction

Chuck Pierce
Vogtle Deployment
Licensing Manager
Southern Nuclear

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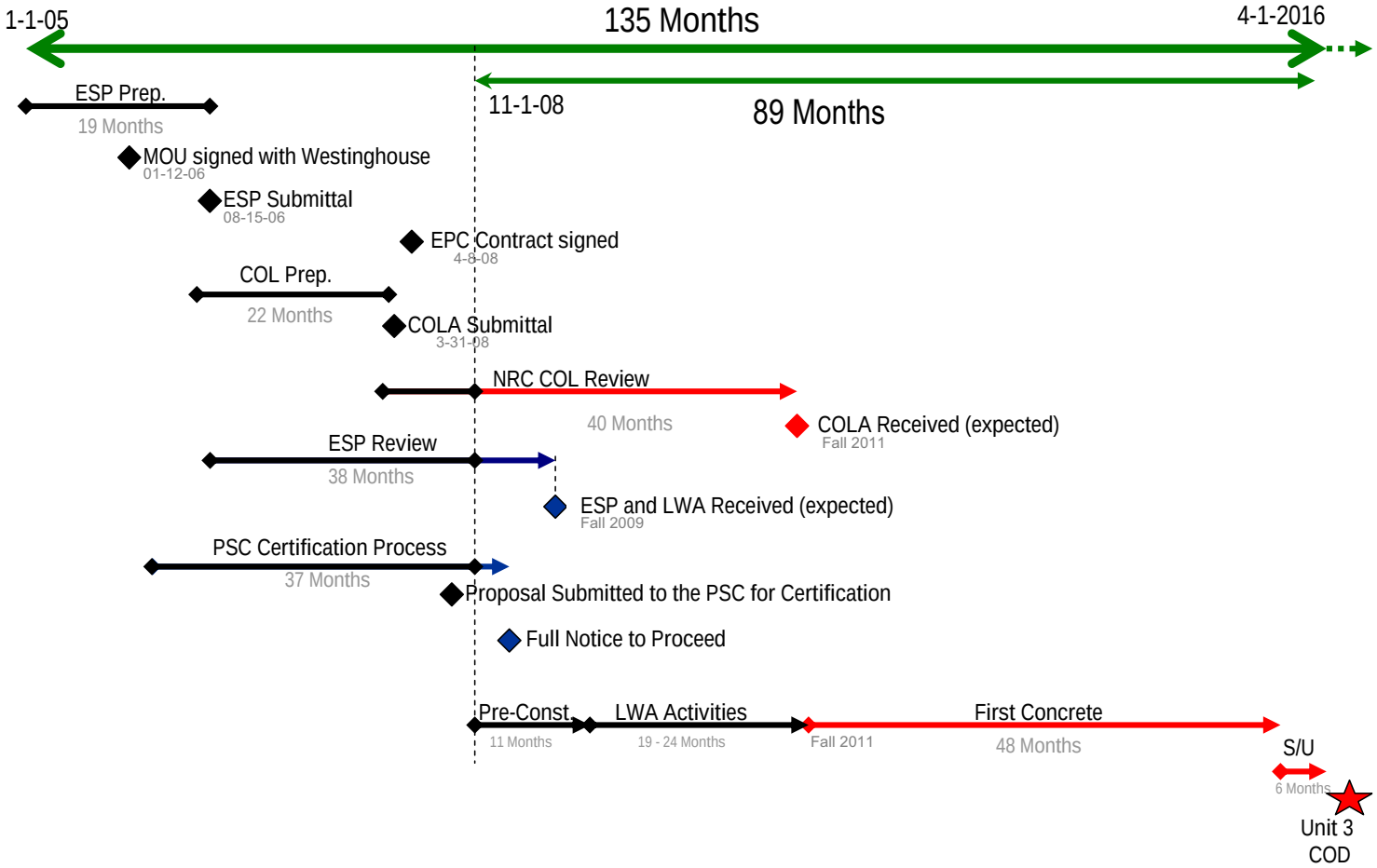
Vogtle 3&4 Schedule



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Early Site Permit (ESP) - Overview

Jim Davis
ESP Project Engineer
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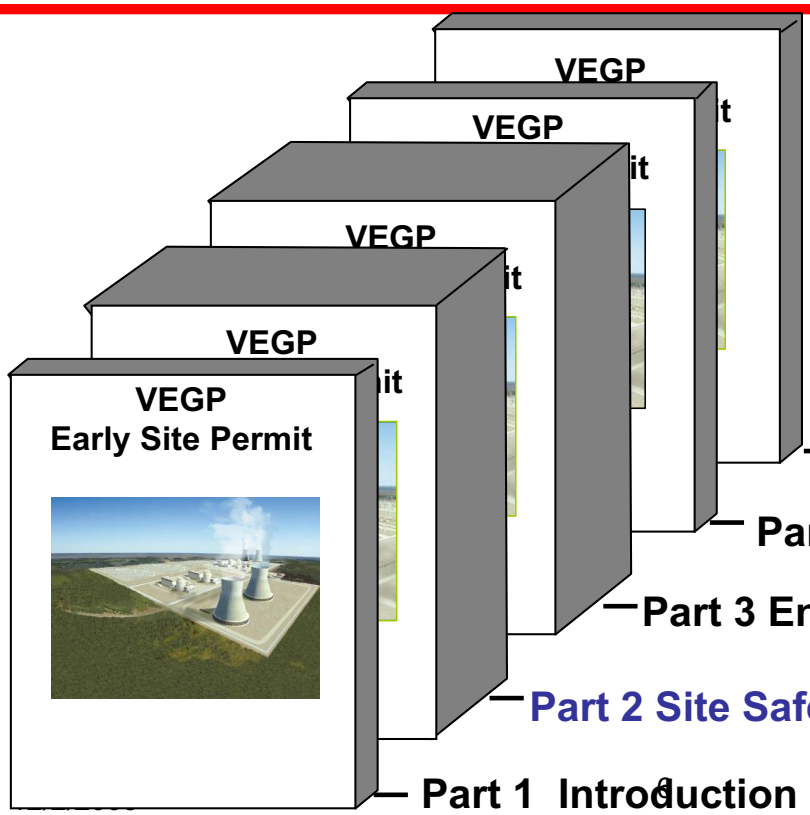
Early Site Permit (ESP) Contents



Part 5 Emergency Plan

Part 4 Redress Plan

Part 3 Environmental Report

Part 2 Site Safety Analysis Report (SSAR)

Part 1 Introduction

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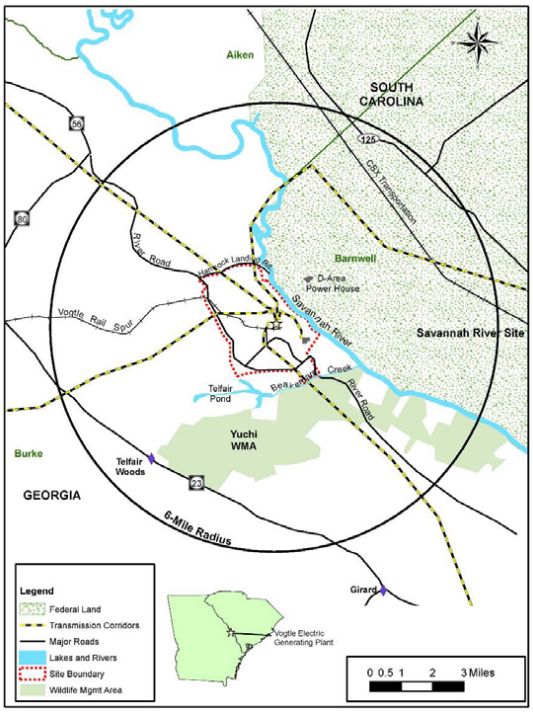
Part 2 Site Safety Analysis Report

Chapter numbering follows FSAR format:

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

Site 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 26 miles southeast of Augusta, Georgia.



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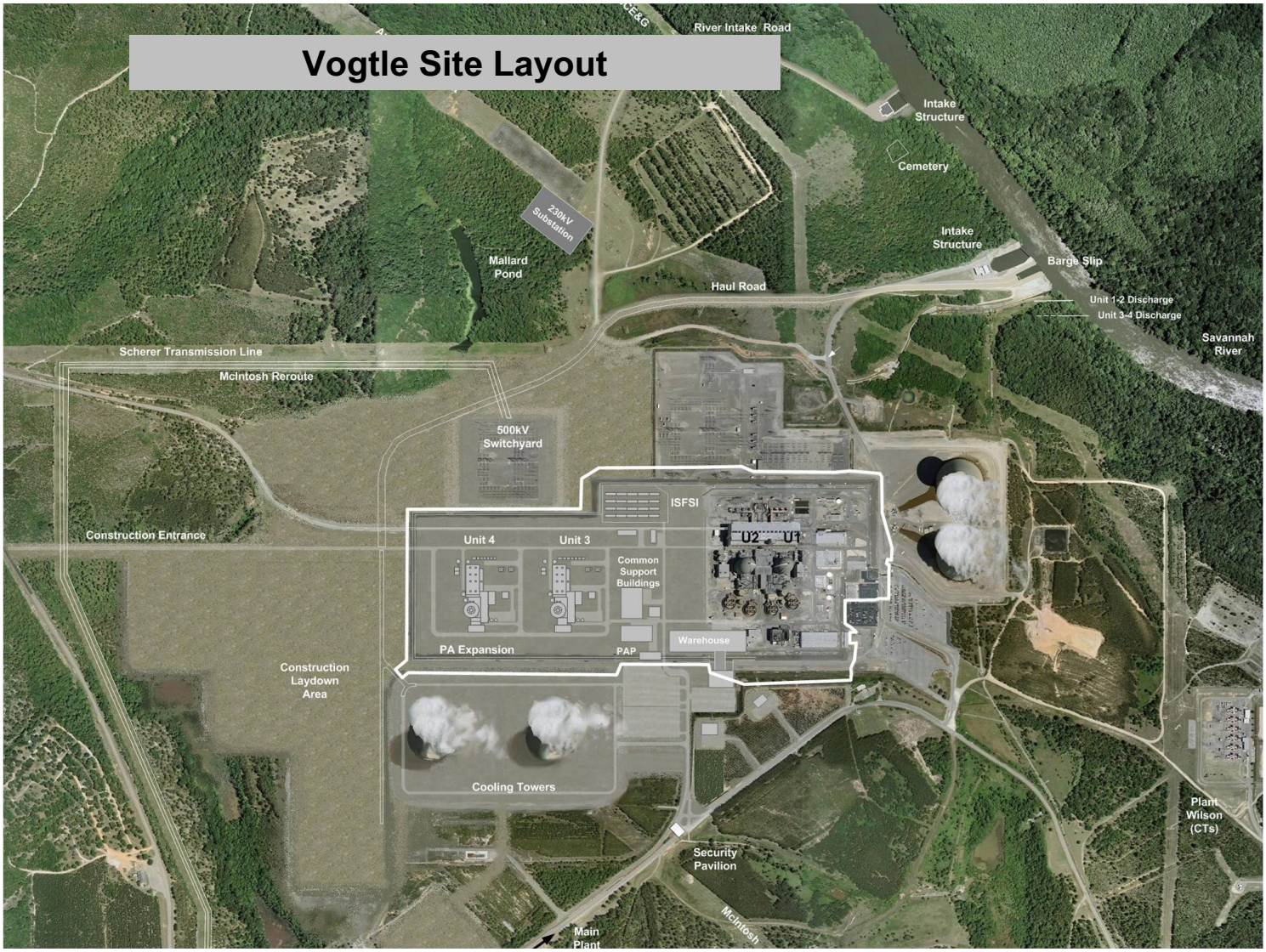
Columbia
McCormick
Lexington
Edgefield
Lincoln
Sumter National Forest
Edgefield
Wilkes
Calhoun
Columbia
Evans
Martinez
Augusta
North Augusta
Aiken
Aiken
Orangeburg
Thomson
New Ellenton
Williston
McDuffie
Fort Gordon
Richmond
Jackson
Savannah River Site
Barnwell
Blackville
Hephzibah
Barnwell
Bamberg
Waynesboro
Jefferson
Girard
Allendale
Burke
Louisville
Sardis
Allendale
Colleton
Wadley
Hampton
Millen
Jenkins
Sylvania
Hampton
Johnson
Emanuel
Screven
Swainsboro
Bulloch
Jasper
Treutlen
Candler
Statesboro
Effingham

Vogtle Electric Generating Plant
Legend
Major Roads
50-Mile Radius
County Boundary
Urban Areas
Lakes and Rivers
Federal Land

Vogtle Site Layout



ESP SER Open Items Review

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

SSAR 2.3 Meteorology

Open Item (1):

- Provided site specific temperature characteristics based on 100 year return period:
  - Maximum safety dry bulb temperature with coincident wet-bulb temperature
  - Maximum safety non-coincident wet-bulb temperature

SSAR 2.4 Hydrologic Engineering

Angelos Findikakis
Consultant
Bechtel

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SSAR 2.4 Hydrologic Engineering

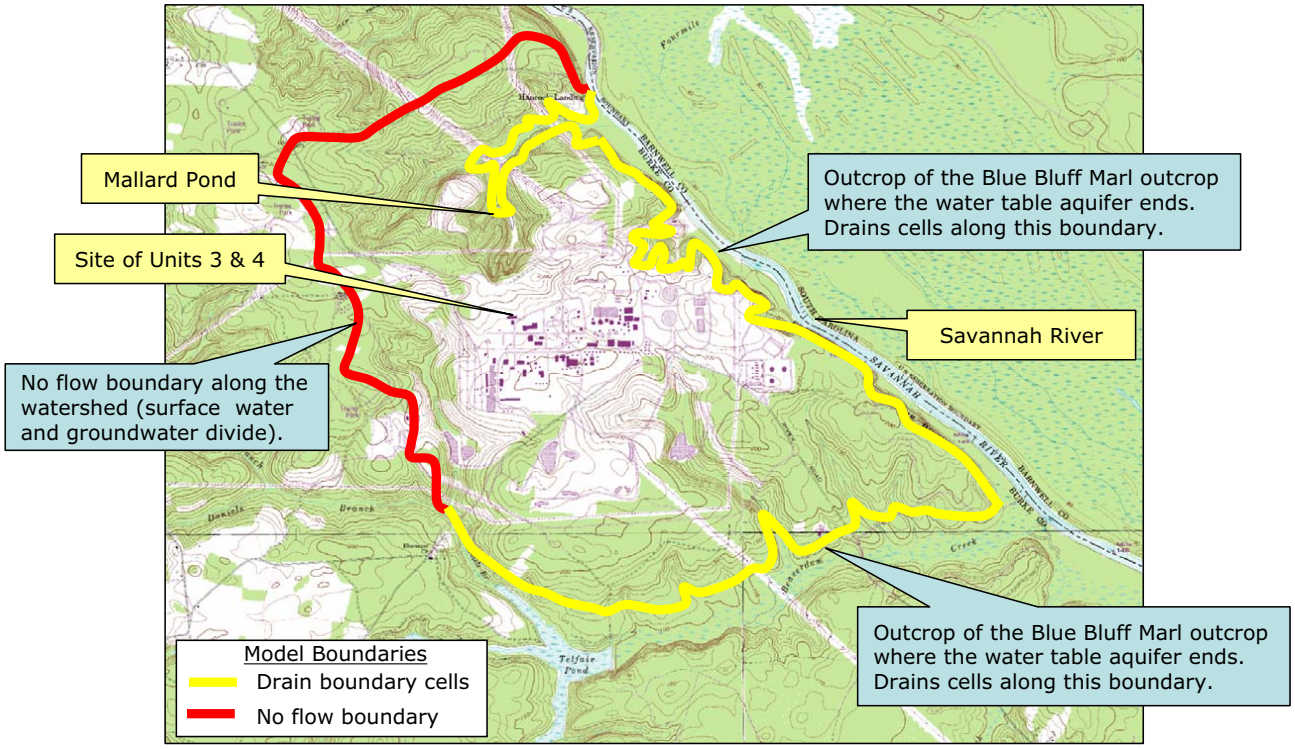
Open Items (4):

- Demonstrated adequate water resources for safety related purposes (1)
- Remaining open items addressed by an expanded ground water model (3)

The Groundwater Model

- Single-layer model of the water table aquifer
- Based on site-specific data
- Developed using Visual MODFLOW
- Calibrated using measured water levels
- Alternative plausible conceptual models
- Model for future conditions accounted for
    - Changes in materials (backfill)
    - Changes in recharge (site grading, buildings, etc)
- Predictions of future groundwater flow & pathways

Groundwater Model Domain



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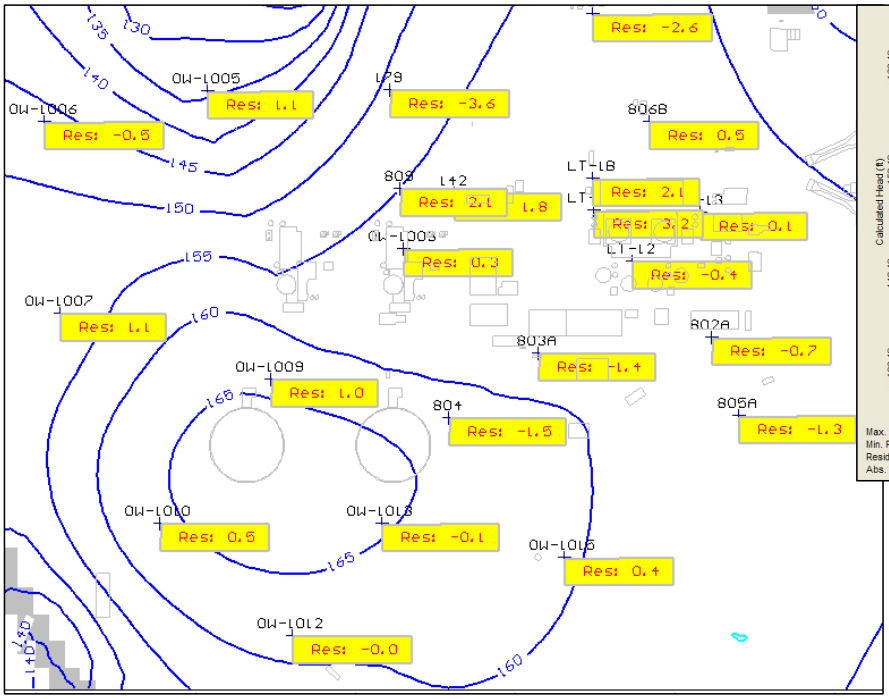
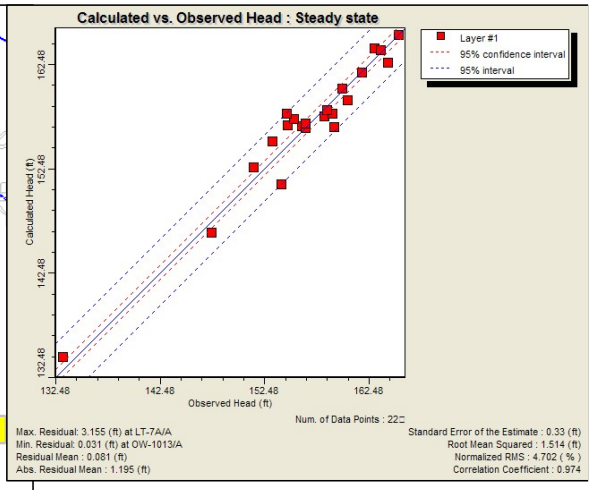
Model Calibration



Calibrated Head Residuals



Calibration Statistics

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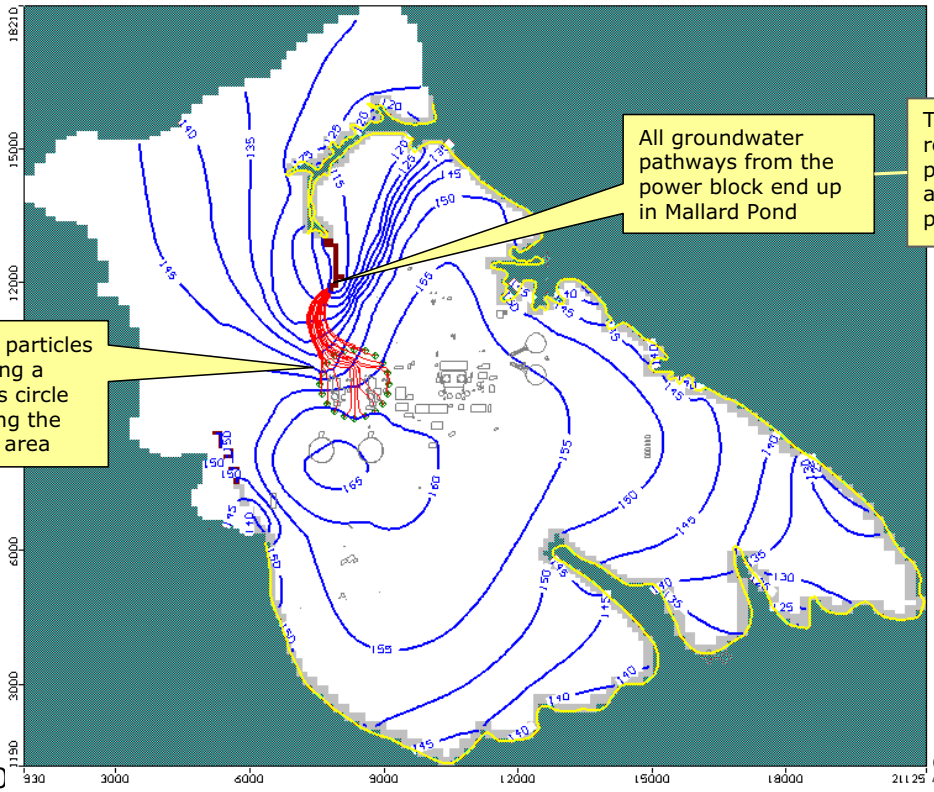
Simulation of Post-construction Groundwater Conditions



All groundwater pathways from the power block end up in Mallard Pond

The same conclusion was reached with other alternative plausible conceptual models and several combinations of parameter values

Pathways of particles released along a 775-ft radius circle encompassing the power block area

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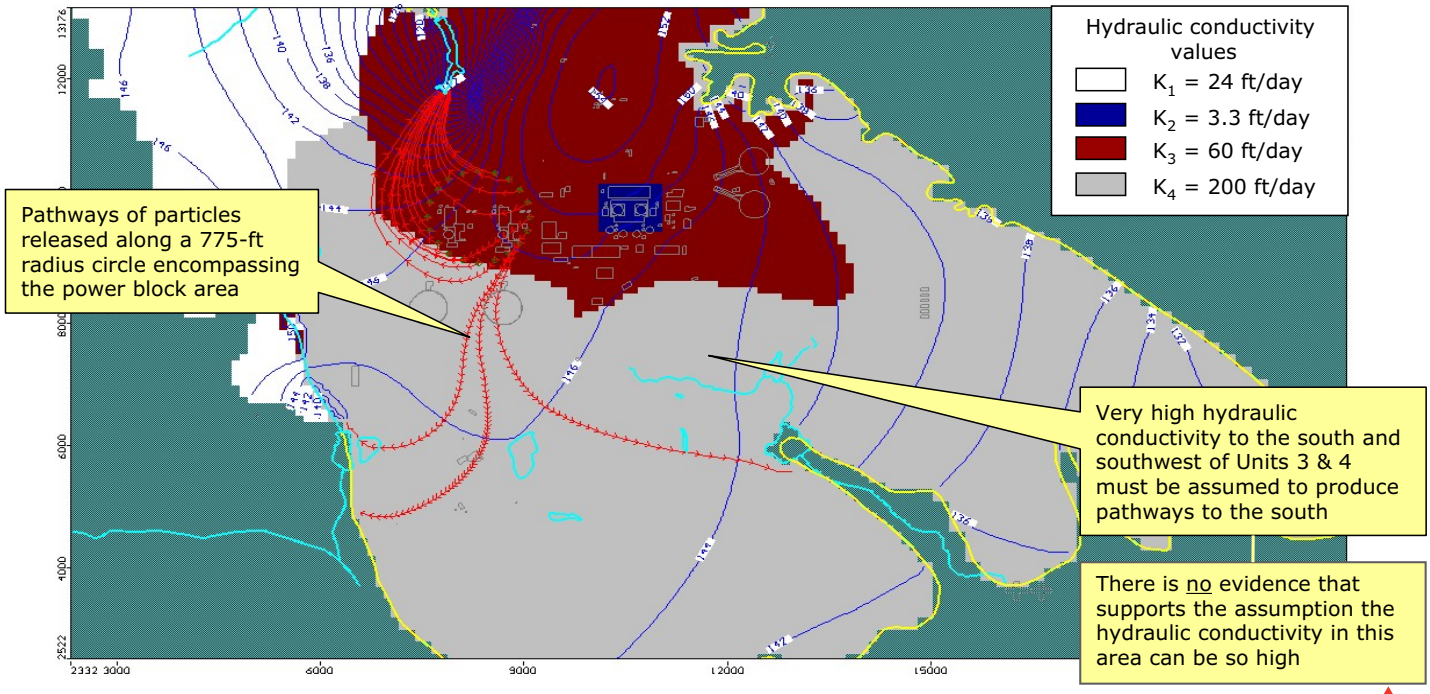
Extreme Assumptions Are Needed to Produce Pathways to the South



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SSAR 2.5 Geology and Seismic

Don Moore
Consulting Engineer
Southern Nuclear

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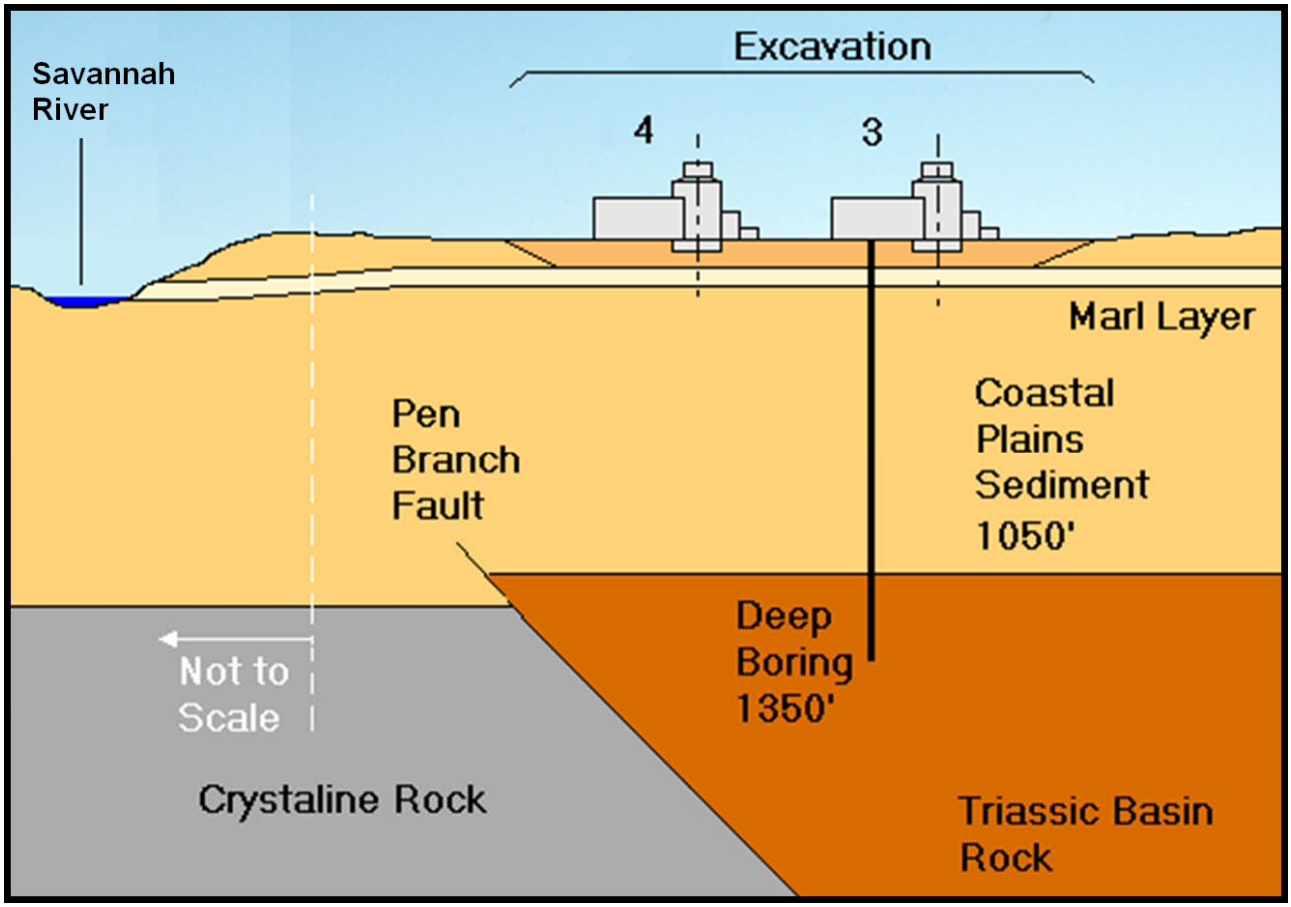
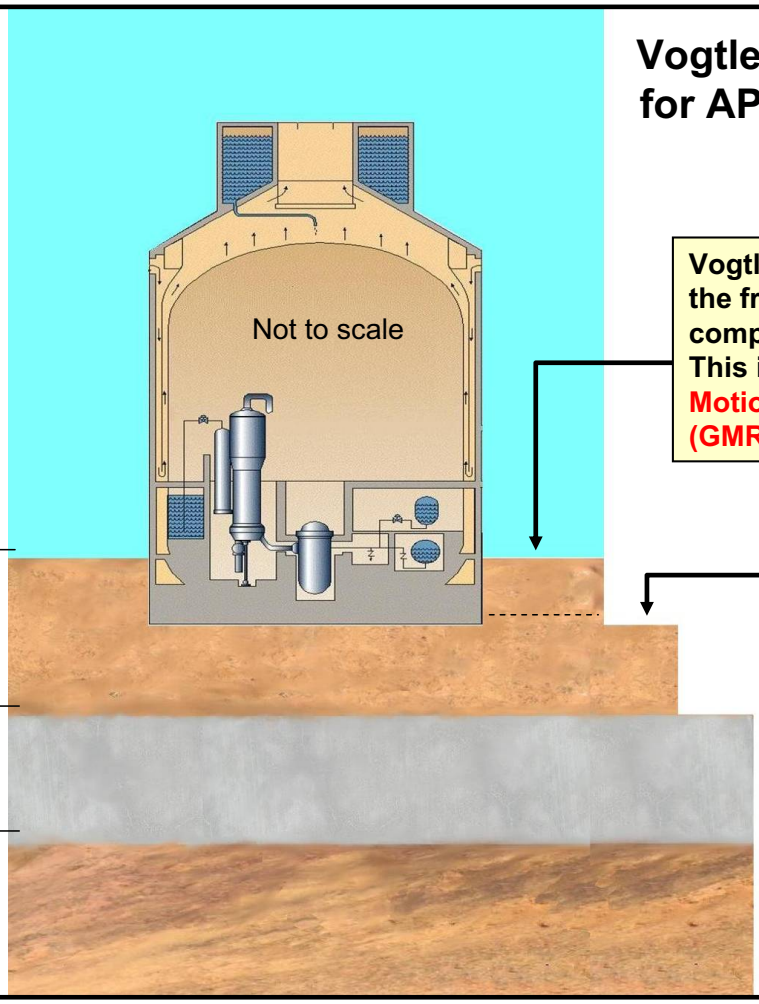


Site Soil/Rock Profile with Backfill

Vogtle Site-Specific Model for AP1000 Nuclear Island



Elevation 220

~86' Engineered Backfill

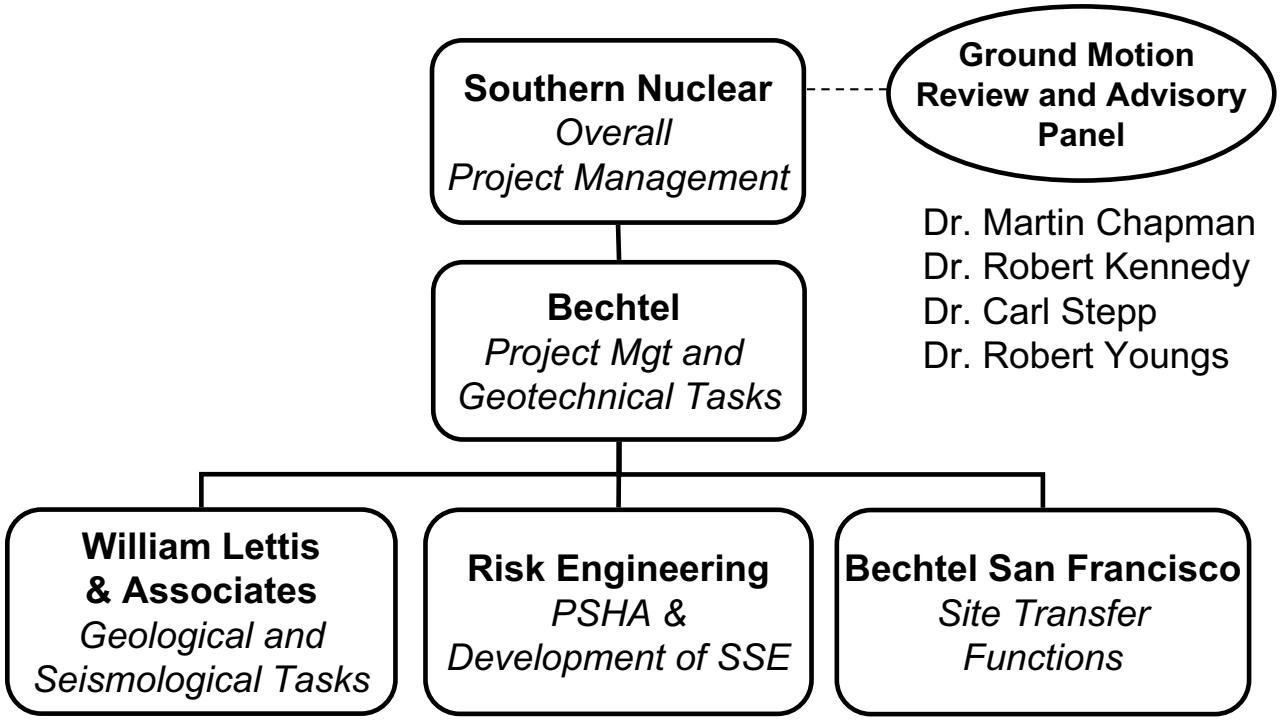
~63' Blue Bluff Marl

~900' Coastal Plain Sediments

Vogtle ESP/COL SSE defined at the free ground surface of competent structural backfill. This is the Site Specific Ground Motion Response Spectrum (GMRS)

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)

Seismic Program Organization



Open Items for 2.5.2: Seismic Source Characterization

Open Items (22):

- 2.5-1 Dames & Moore SSC
- 2.5-2 Inclusion of TIP Study (recent PSHA)
- 2.5-3 ETZS (recent assessments)
- 2.5-4 SSHAC Level 2 for Update of Charleston Seismic Source (UCSS)
- 2.5-5 For UCSS – large inland earthquakes?

<u>Applicant provided addition information to resolve.</u>

Open Items 2.5.2: Site Response Methodology for GMRS

- 2.5-6 Methodology for calculating soil UHRS
- 2.5-7 Adequacy of Equivalent-Linear Approach
- 2.5-8 Site data for NRC independent verification of GMRS
- 2.5-9 Methodology to obtain the Vertical GMRS (V/H)

<u>Applicant provided addition information to resolve.</u>

Open Item 2.5.3: Surface Faulting

- 2.5-10 Additional detail description of soil features as nontectonic

  <u>Applicant provided addition information to resolve.</u>

Open Items 2.5.4

Open Items 2.5-11, 2.5-12, 2.5-13, 2.5-14, 2.5-15, 2.5-16, 2.5-17, 2.5-18, 2.5-19, and 2.5-21

- Engineering properties of subsurface materials
- Initial SSAR evaluation based on very limited site specific data (ESP investigation phase) and adjacent Unit 1&2 data
- SSAR Rev 4 included substantial additional site specific data (COL investigation phase)

Open Items 2.5.4

Open Item 2.5-20 – Extension of EPRI curves for shear modulus and damping ratio beyond 1 percent cyclic shear strain

- Tables and Figures revised to reflect cyclic shear strain values that were used for modeling

Open Items 2.5.4

Open Item 2.5-21 – Liquefaction potential

- Additional data (COL investigation phase) used to more fully characterize the compacted backfill and underlying Blue Bluff Marl
- Additional laboratory test data
- Liquefaction analyses conducted using additional data

Open Items 2.5.4

Open Item 2.5-22 – Bearing capacity evaluation

- Static and dynamic bearing capacities evaluated using updated properties of compacted backfill
- Settlement and heave analyses conducted
- Two alternatives used to evaluate dynamic bearing capacity
- Dynamic capacity evaluated against site specific dynamic demand
- Bearing capacity evaluation indicated significant margin

SSAR 13 and Part 5 Emergency Planning

Ted Amundson
Consultant
EP Consulting

SOUTHERN COMPANY

SSAR 13 and Part 5 Emergency Planning

SER with Open Items (13) Resolution:

- EP ITAAC (6) - closed
- Emergency plan details (2) - closed
- Evacuation time estimate (ETE) (4) - closed
- EALs (1) – permit conditions

Permit conditions (7):

- EALs (6) 3 for each unit
- TSC location – reconcile with DCD location

Permit Condition Summary

Permit conditions (7 total numbers 2 – 8)

- EALs
  - 2 and 3 – Conform to endorsed version of NEI 07-01
  - 4 and 5 – Provide EALs based on design detail
  - 6 and 7 – Provide site specific EAL values
- License conditions in COL if not resolved in COL process
- TSC location
  - 8 – reconcile location of TSC as described in DCD versus common location for VEGP
- Expect resolution in COL process

LWA and Preconstruction Overview

Jim Davis
ESP Project Engineer
Southern Nuclear

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LWA and Preconstruction Overview

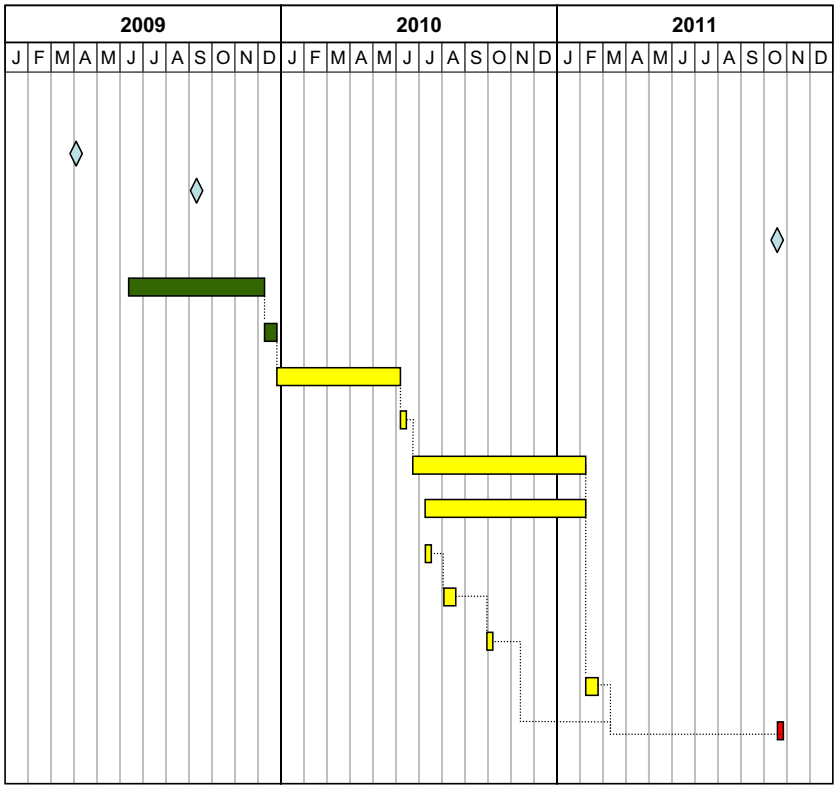
- LWA Schedule
- Pre-Construction Activities
- LWA Construction Activities

Application Submittal - LWA

- Initial LWA Request – ESP Revision 0, August 2006
- Updated LWA Request to new rule 10 CFR 50.10 - ESP Revision 3, November 2007

Vogtle Projected Construction Schedule
Activities Associated with LWA Request

Activity Description	Finish Date	Duration (weeks)
PSC Approval	4/2009	0
ESP Approval	9/2009	0
COL Approval	Fall 2011	0
Excavate power block	12/09	27
Perform geological mapping	12/09	3
Backfill to base of NI	6/10	24
Survey for MSE wall installation	6/09	1
Construct MSE wall to grade	2/11	30
Backfill to grade for Unit 3	2/11	30
Place first mudmat	7/10	1
Apply membrane to mudmat and wall	8/10	2
Place second mudmat	10/10	1
Apply waterproof membrane to wall	2/11	3
Place first concrete for Nuclear Island	Fall 2011	1



NOTES

All activities shown are for Unit 3. Unit 4 activities lag the Unit 3 activities and have a similar duration.

Schedule shown is based on LWA date of November 1, 2009 and COL date of June 30, 2011.

LEGEND

- Pre-Construction Scope
- LWA Scope
- COL Scope

Preconstruction Activities

Construction Does Not Include:

- Changes for temporary use of the land for public recreational purposes
- Site exploration
- Preparation of a site for construction of a facility
  - Clearing of the site
  - Grading
  - installation of drainage
  - Erosion and other environmental mitigation measures
  - Construction of temporary roads and borrow areas
- Erection of fences and other access control measures
- Excavation

Preconstruction Activities

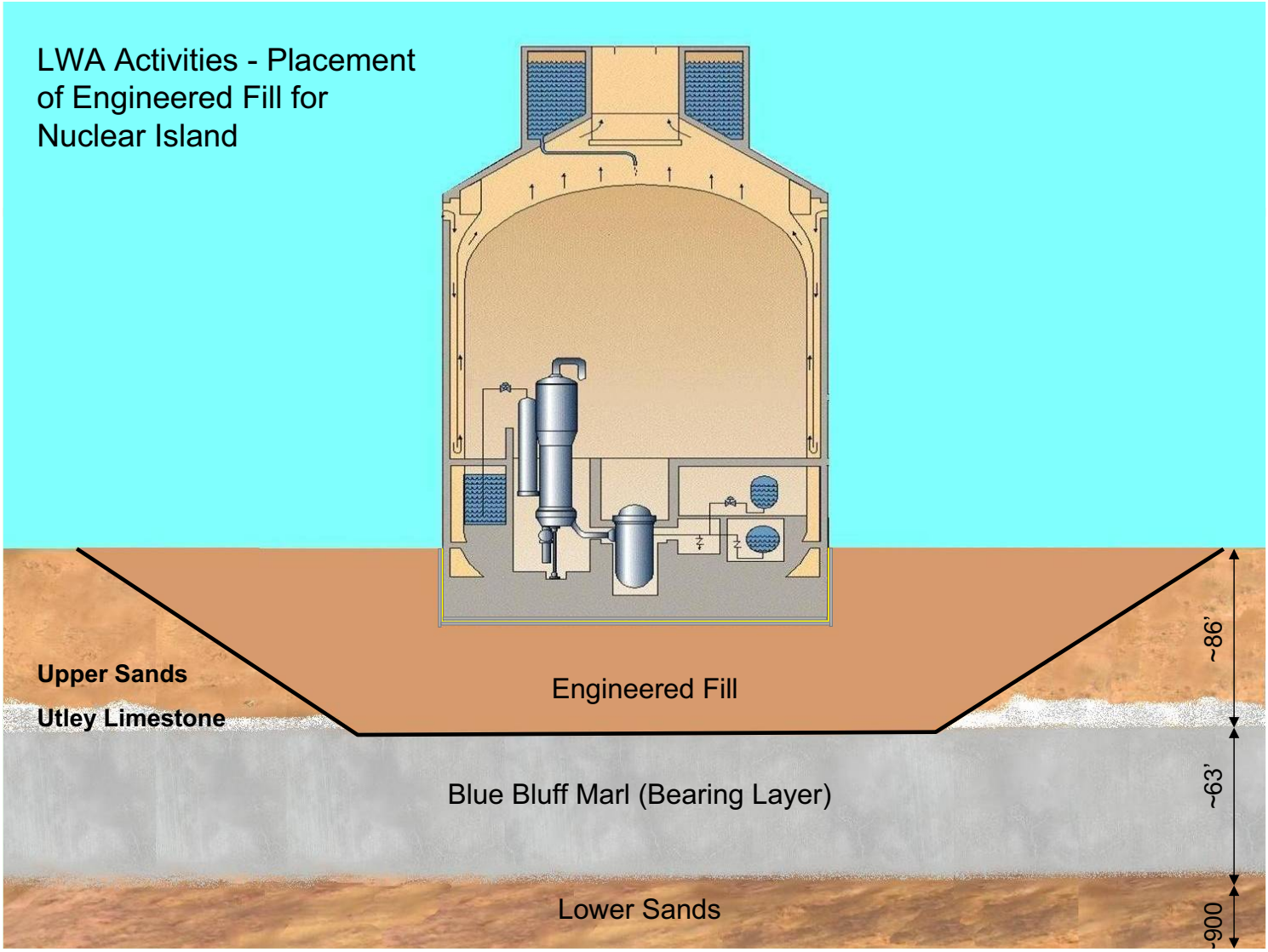
Construction Does Not Include (Continued):

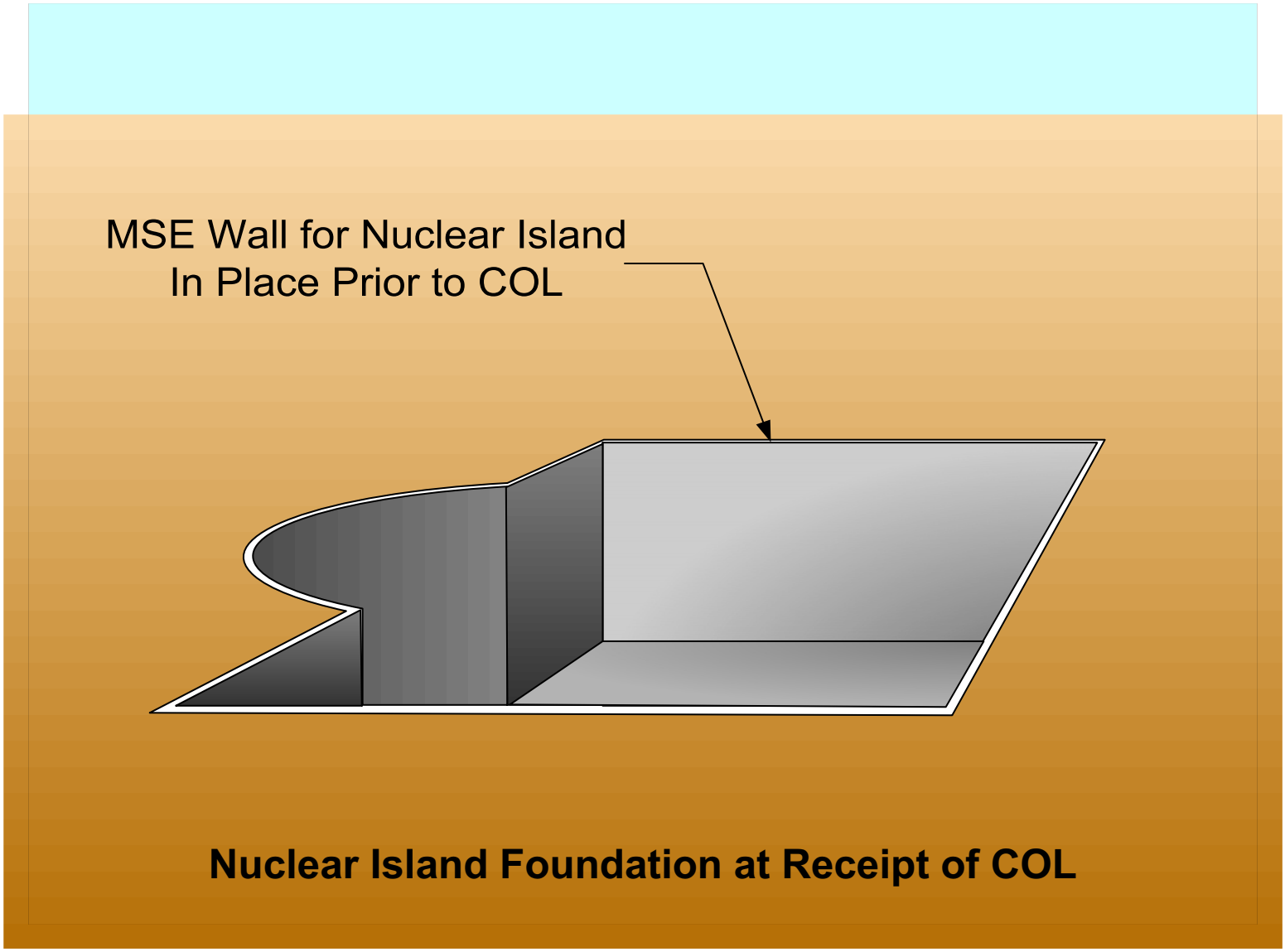
- Erection of support buildings for use in connection with the construction of the facility (Construction equipment storage sheds, Warehouse and shop facilities, Utilities, Concrete mixing plants, Docking and unloading facilities, Office buildings)
- Building of service facilities
- Paved roads
- Parking lots
- Railroad spurs
- Exterior utility and lighting systems
- Potable water systems
- Sanitary sewerage treatment facilities
- Transmission lines;
- Procurement or fabrication of components or portions of the proposed facility occurring at other than the final, in-place location at the facility

LWA Construction Activities

- The SNC LWA request is for the full extent of activities allowed by regulation and the site redress plan encompasses all such activities. Examples of VEGP LWA activities that SNC has identified include the following:
  - Engineered Backfill
  - Retaining Walls (mechanically stabilized earth walls)
  - Lean concrete backfill (Mud Mats)
  - Waterproof membrane
  - FFD
  - QA
  - PI&R

  - Note: Rebar has been removed form the request due to scheduling complexity, and may be added to the ESP or COL as an additional LWA request at a later date.


LWA Activities - Placement of Engineered Fill for Nuclear Island
Upper Sands
Utley Limestone
Engineered Fill
Blue Bluff Marl (Bearing Layer)
Lower Sands
~86'
~63'
~900

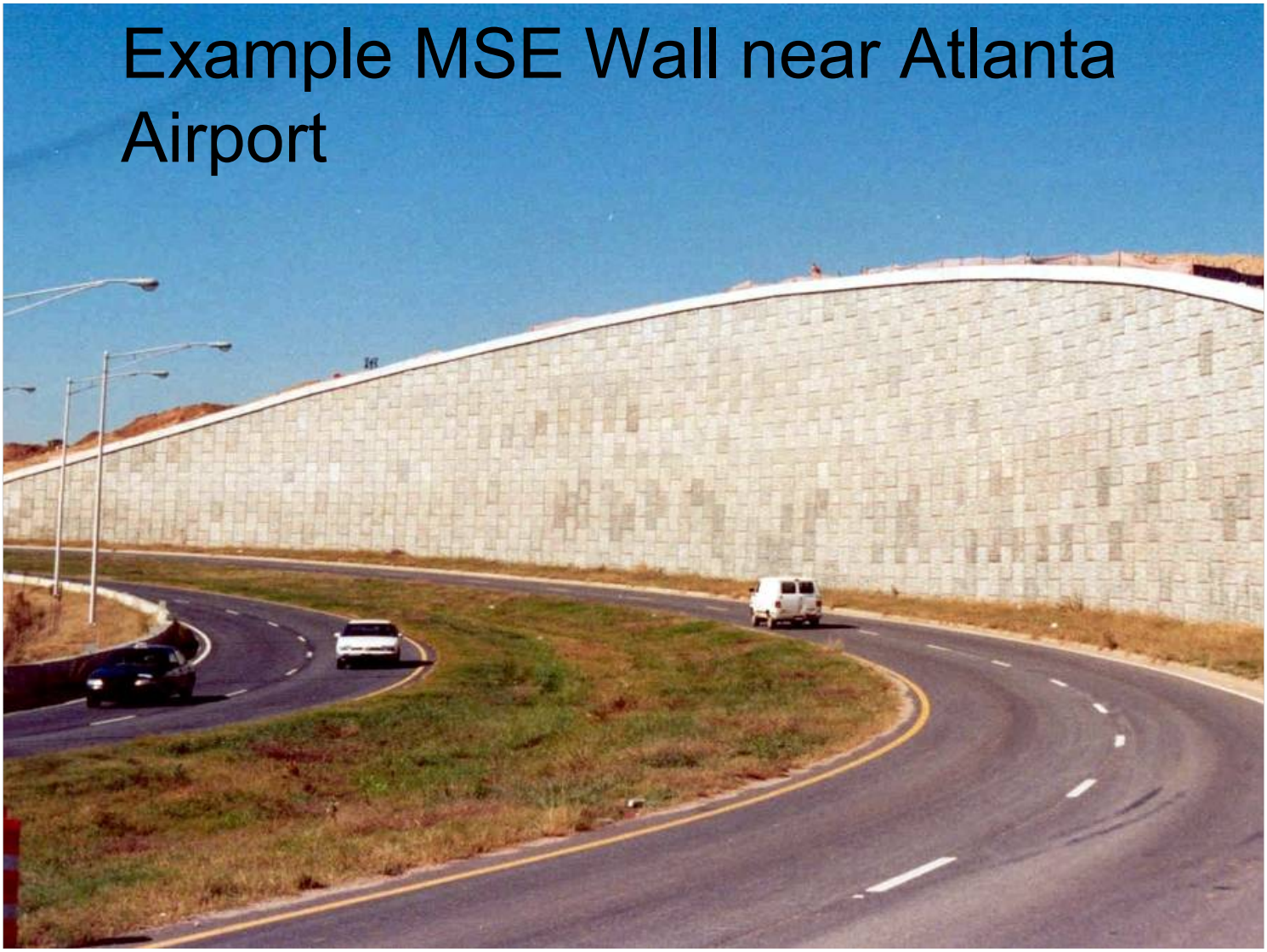


Nuclear Island Foundation at Receipt of COL

MSE Wall Test Section - July 2008

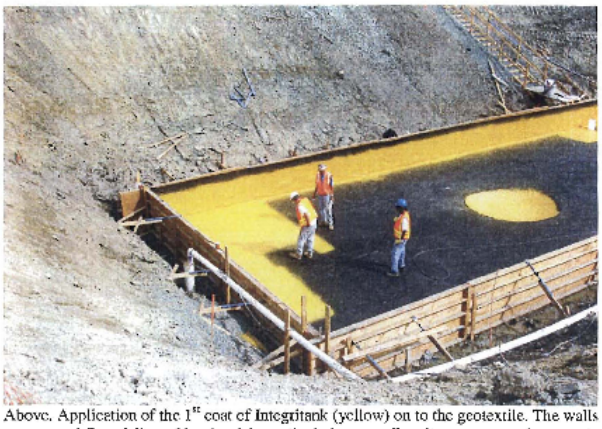
12/2/2008

Example MSE Wall near Atlanta Airport



Waterproof Membrane

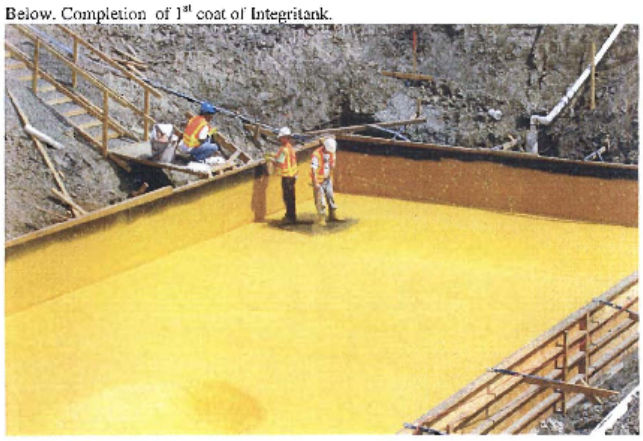
stirling lloyd
THE TECHNOLOGY OF PROTECTION



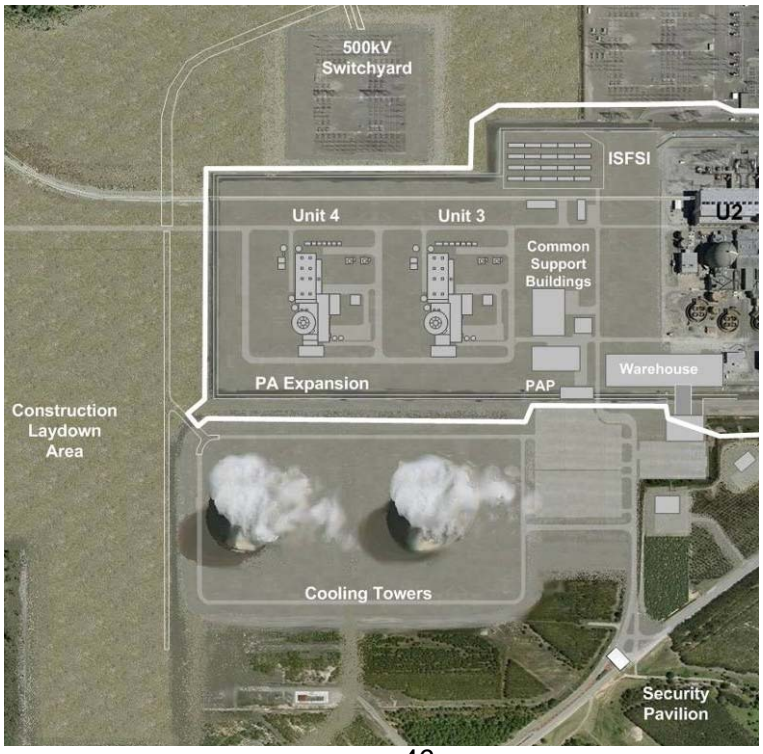
Above. Application of the 1st coat of Integritank (yellow) on to the geotextile. The walls are sprayed first, followed by the slab, particularly at smaller sites, to ensure the material is cured at the applicators' entrance and exit points.

Installation

Below. Completion of 1st coat of Integritank.



Construction Support Buildings Layout



Site Specific LWA ITAAC

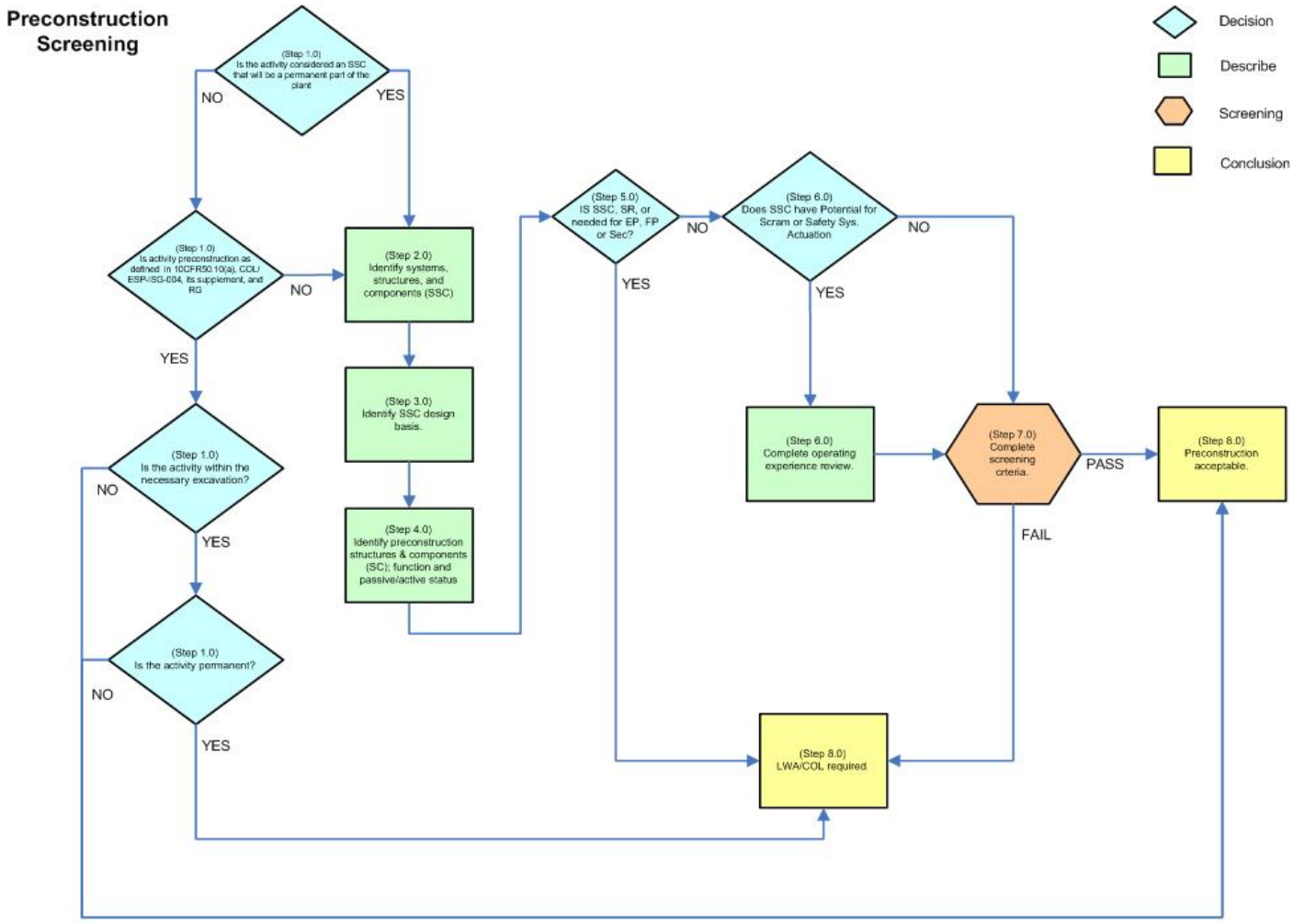
Design Requirement	Inspections and Tests	Acceptance Criteria
Backfill material under Seismic Category 1 structures is installed to meet a minimum of 95 percent modified Proctor compaction.	Required testing will be performed during placement of the backfill materials.	A report exists that documents that the backfill material under Seismic Category 1 structures meets the minimum 95 percent modified Proctor compaction.
Backfill shear wave velocity is greater than or equal to 1,000 fps at the depth of the NI foundation and below.	Field shear wave velocity measurements will be performed when backfill placement is at the elevation of the bottom of the Nuclear Island foundation and at finish grade.	A report exists and documents that the as-built backfill shear wave velocity at the NI foundation depth and below is greater than or equal to 1,000 fps.
The friction coefficient to resist sliding is 0.7 or higher.	Testing will be performed to confirm that the mudmat-waterproofing-mudmat interface beneath the Nuclear Island basemat has a minimum coefficient of friction to resist sliding of 0.7.	A report exists and documents that the as-built 'waterproof system (mudmat-waterproofing-mudmat interface) has a minimum coefficient of friction of 0.7 as demonstrated through material qualification testing.

Questions

Optional/Backup

Preconstruction Screening Process

- Regulations and guidance such as: 10CFR50.10(a), ESP/COL-ISG-004, its supplement, and RG 1.206 (when amended), were used to determined “preconstruction” status
- Screening process developed by Southern for determining “preconstruction” status
  - Process with examples
  - Being developed in DCWG process with NEI and NRC



Revision B 11.11.2008