
Vogtle Geologic Site Audit
January 10-12, 2007


January 10-12, 2007 Audit Location
Field Support Building

Vogtle Geologic Site Audit: Jan 10-12, 2007

Wednesday January 10th

SRS Tour

6:30 Meet Van at Hampton Inn (4081 South Belair Road Augusta, GA)
SNC: McCallum, Moore, Lettis, Lindvall, Hartleb, Fenster
NRC: Christian Araguas or Mark Notich, Clifford Munson, Yong Li, Gerry Stirewalt, Sarah Gonzalez
USGS: Anthony Crone, Charles Mueller, Rus Wheeler
SRS: Randy Cumbest
Note: Two forms of government issued identification required for access on SRS site.

6:30 – 7:15 Depart from Hampton Inn for SRS

7:15 - 8:15 Badges at SRS Administrative Building

8:15 - 10:00 – Tour of Terraces

10:00 – 11:30 Depart SRS for Vogtle

11:30 – 12:30 Lunch Break

12:30 – 2:30 Introduce Team/Site Tour

NRC Team	SNC Team
Christian Araguas – PM (240) 498-7614	Tom McCallum – SNC Lead (205) 438-0973
Clifford Munson	Don Moore – SNC Seismic Lead
Yong Li	Bill Lettis (WLA)
Gerry Stirewalt	Scott Lindvall (WLA)
Sarah Gonzalez	Ross Hartleb (WLA)
USGS Team	Randy Cumbest (Bechtel – SRS)
Anthony Crone	John Prebula (Bechtel)
Charles Mueller	Jim Marrone (Bechtel)
Rus Wheeler	David Fenster (Bechtel)
	Jose Clemente (Bechtel)
	Robin McGuire (REI)

Possible Geologic/Geotechnical Features or Items to View During Tours

Technical Experts: Bill Lettis, Scott Lindvall (WLA) Items: 1,2,3, 4 & 6
Technical Experts: David Fenster (Bechtel) Item: 5

1. Monoclinal flexure in the Blue Bluff Marl.
2. Straight, incised river channel in the site area and stratigraphic units along that part of the river.
3. Youngest fluvial terrace, Qty, in the site area.
4. Small-scale "deformation structures" in walls of the garbage trench or other trenches.
5. Cores from ESP site investigation.
6. Other features which demonstrate conclusions drawn in application with regard to Pen Branch or other faults.

Vogtle Geologic Site Audit: Jan 10-12, 2007

Wednesday January 10th

Discussion Topics for Vogtle ESP Site Visit

2:30-5:30+ Geology and Surface Faulting (2.5.1 and 2.5.3)

1. Discuss fault geometry, characteristics, and displacement history of the Pen Branch fault. In particular,
   a. Since SRS subsurface data on characteristics of the Pen Branch fault (as referred to under SSAR Sections 2.5.1.2.4.1 through 2.5.1.2.4.3) were used to draw the conclusion that the Pen Branch is a non-capable fault, information on the following aspects of the fault are important to review
      i. Age and type of youngest displacement.
      ii. Location of projected surface trace of the fault at SRS.
      iii. Physical characteristics of the fault surface.
   b. Seismic logs imaging the Pen Branch fault in regard to fault orientation and location of projected surface trace of the fault in the site area.
   c. Descriptions of the monoclinal flexure in the Blue Bluff Marl (as referred to under SSAR Section 2.5.1.2.4.2 and illustrated in SSAR Figure 2.5.1-40) since this feature is interpreted to have developed due to reverse (Eocene) slip on the Pen Branch fault and consequently is tectonic in origin.
   d. Descriptions of the straight, incised river channel in the site area (as referred to under SSAR Section 2.5.1.2.1).
   e. Descriptions of the youngest fluvial terrace, Qty, in the site area (as shown in SSAR Figure 2.5.1-29).

   Technical Experts: Bill Lettis, Scott Lindvall (WLA)

2. Discuss small-scale "deformation structures" in walls of a garbage trench (as referred to under SSAR Section 2.5.3.8.2 and illustrated in SSAR Figures 2.5.3-1 and 2.5.3-2, referencing Bechtel, 1984b). Features are currently interpreted as non-tectonic in origin and unrelated to faulting.
   Technical Experts: Bill Lettis, Scott Lindvall (WLA)

3. Describe how the following information was used to determine site stratigraphy
   a. Cores and/or trenches
   b. seismic logs

   Technical Experts: Jose Clemente, David Fenster (Bechtel)

Vogtle Geologic Site Audit: Jan 10-12, 2007

Thursday January 11, 2007

8:00 -11:00 Ground Motion (2.5.2)

1. Rationale for not updating other EPRI source models in addition to the Charleston seismic source with regard to post-EPRI PSHA studies (USGS, TIP, SCDOT).
   Technical Experts: Bill Lettis, Scott Lindvall (WLA)

2. Discuss update of the Charleston seismic zone. Specifically, describe
   c. process used to elicit expert opinion
   d. use of other post-EPRI studies as part of update (USGS, TIP, SCDOT)
   e. rationale for new Charleston source geometries
   f. combining updated source configurations with original EPRI configurations and potential for gaps in coverage
   g. rationale for maximum magnitude range and weights used for maximum magnitudes
   h. rationale for recurrence models
   i. combined weighting of different magnitudes, recurrence, and source configurations
   Technical Experts: Bill Lettis, Scott Lindvall (WLA)

   RAI 2.5.2 – 2
   In order for the staff to fully evaluate the update for the Charleston seismic source, please provide a copy of Bechtel engineering study report 25144-006-V14-CY06-00006 entitled "Update of Charleston Seismic Source and Integration with EPRI Source Models."
   Technical Experts: Bill Lettis, Scott Lindvall (WLA)

   RAI 2.5.2 – 1
   In order for the staff to determine the adequacy of the Probabilistic Seismic Hazard Analysis (PSHA) for the Vogtle ESP site, please provide the following data electronically:
   1. EPRI seismicity catalog (EPRI NP-4726-A 1988) for the region of interest (30° to 37° N, 78° to 86° W).
   2. Updated EPRI seismicity catalog as shown in SSAR Table 2.5.2-1.
   3. Geographic coordinates of the corner points for the primary (99% of total hazard) source zones for each of the 6 EPRI-SOG Earth Science Teams (ESTs).
   4. 1- and 10-Hz mean hazard curves for each of the 6 EPRI-SOG ESTs for each of their source zones.
   5. 1- and 10-Hz mean hazard curves for the updated Charleston seismic source.
   Technical Experts: Robin McGuire (REI)

3. Discuss method used for site response analysis, in particular, randomization of site properties.
   Technical Experts: Robin McGuire (REI); Jose Clemente, Jim Marrone (Bechtel)

4. Discuss combined use of EPRI and SRS shear modulus and damping curves for the site response analysis.
   Technical Experts: Jose Clemente, Jim Marrone (Bechtel)

Vogtle Geologic Site Audit: Jan 10-12, 2007

Thursday January 11, 2007

8:00 -11:00 Ground Motion (2.5.2) contiued

5. Discuss method used to determine control point site specific UHRS. Provide rationale for smoothing spectral shapes.
   Technical Experts: Robin McGuire (REI)

   RAI 2.5.2 – 3
   In order for the staff to verify the adequacy of the SSE, please provide electronically 1, 2.5, 5, 10, 25, and 100 Hz mean hazard curves at the prescribed elevation, which takes into account the effect of rock and soil above the hard rock horizon.
   Technical Experts: Robin McGuire (REI)

6. Discuss method used to determine vertical SSE.
   Technical Expert: Jim Marrone (Bechtel)

11:00 -12:00 Lunch

12:00 -5:00 Stability of Subsurface Materials (2.5.4)

1. Discuss potential for weak zones (i.e, dissolution, collapse) within the three soil groups as indicated by other local and regional investigations. Discuss evidence that would indicate the presence of weak zones within the soil units underlying the ESP site, such as low SPT N-values or shear wave velocities, and the adequacy of the ESP site investigation (geophysical and geotechnical) to detect these zones and map their extent.
   Technical Expert: Jose Clemente (Bechtel)

2. Discuss the basis for not conducting dynamic testing of the site soils to verify suitability of EPRI and SRS shear modulus and damping curves.
   Technical Expert: Jose Clemente (Bechtel)

3. Discuss potential for site liquefaction and results of previous analyses done for Units 1 and 2.
   Technical Expert: Jose Clemente (Bechtel)

4. Discuss the wide range in undrained shear strength values for the Blue Bluff Marl and justification for the selected design value of 10,000 psf.
   Technical Expert: Jose Clemente (Bechtel)

5. Discuss in greater detail the variability in soil properties across the site as demonstrated by each of the borings. Information in the ESP application focuses primarily on the ranges of the different values (i.e., N-values, P- and S-wave velocities, etc.)
   Technical Expert: Jose Clemente (Bechtel)

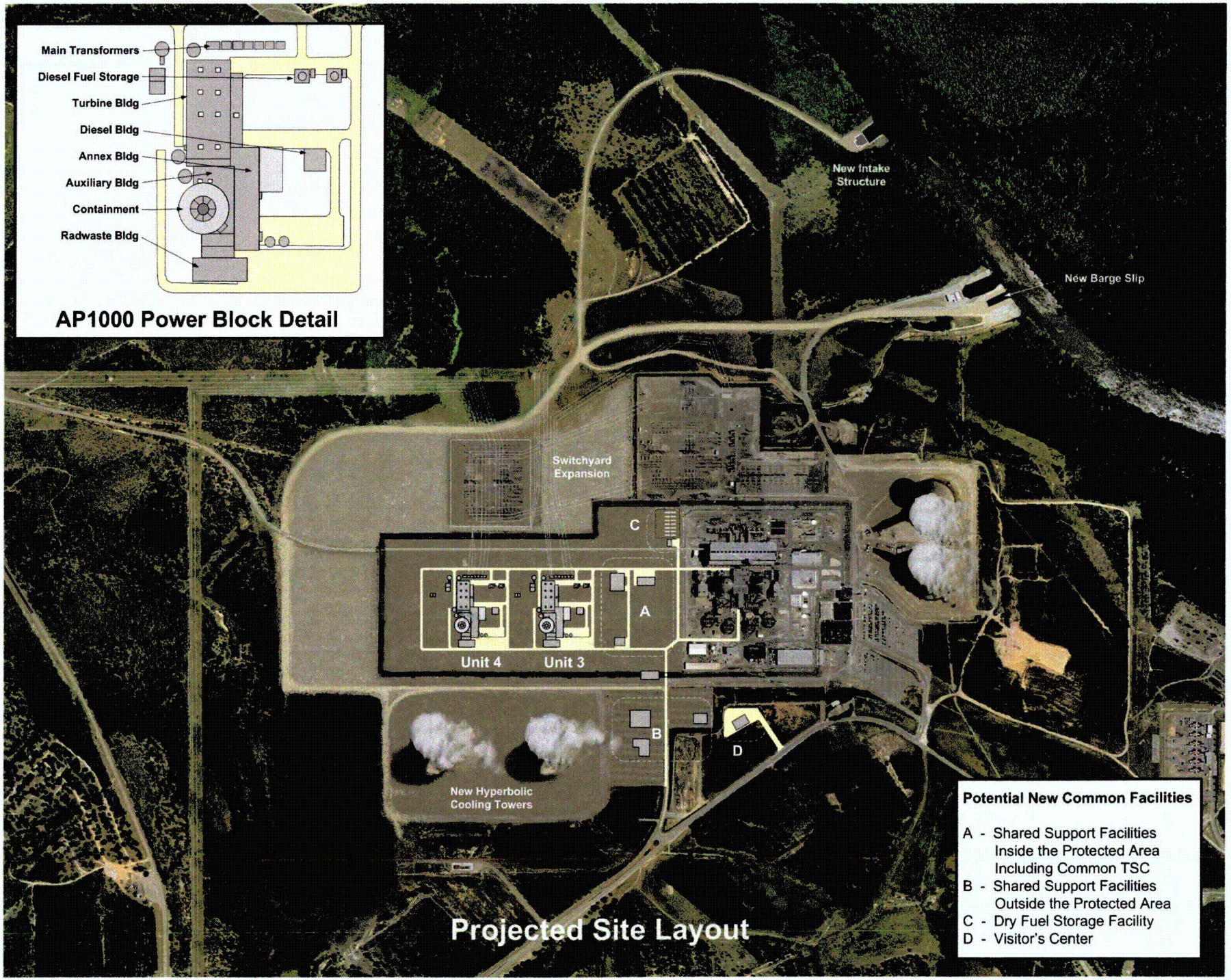
6. (moved to Ground Motion (2.5.2) discussion)

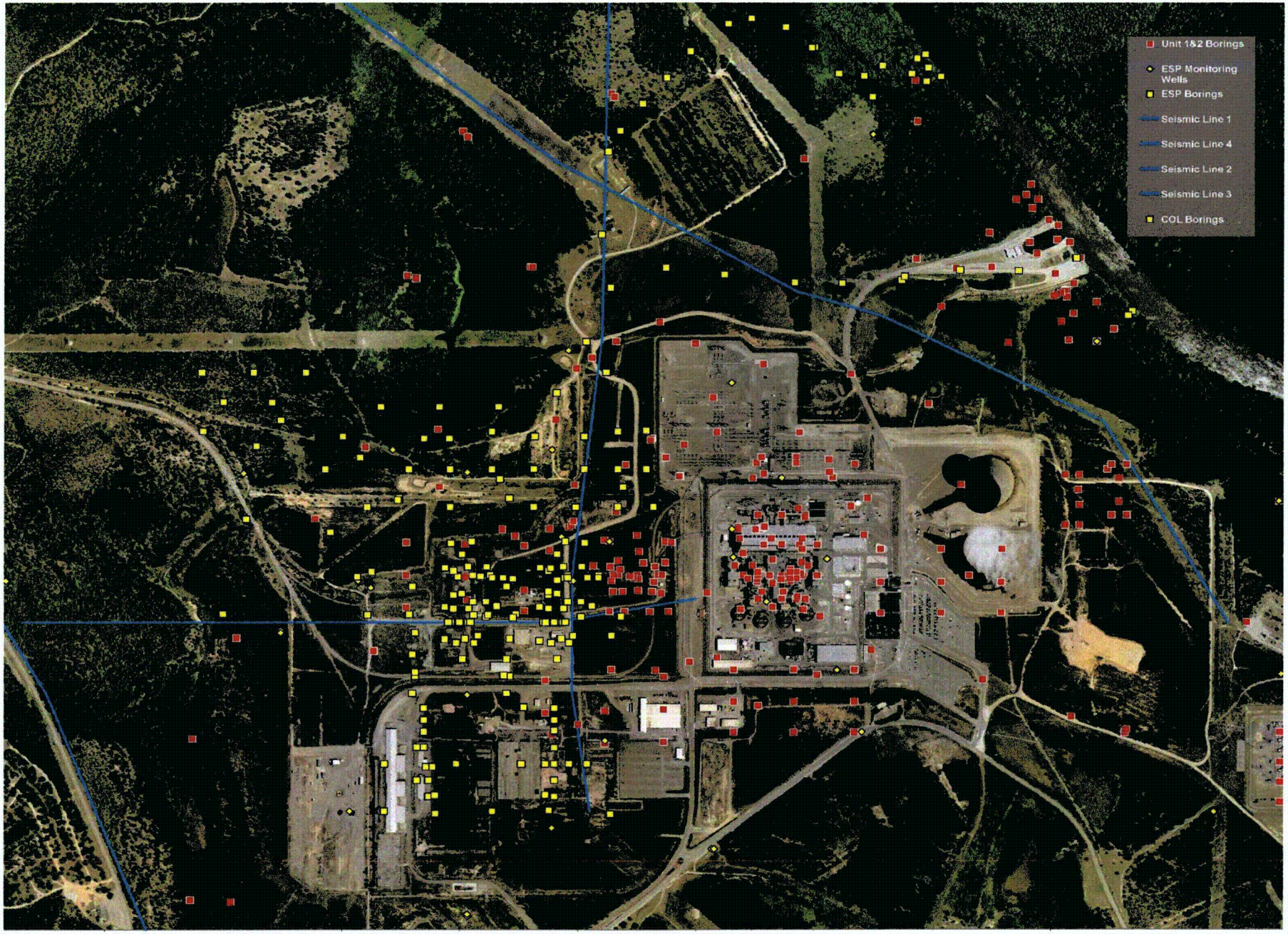
Vogtle Geologic Site Audit: Jan 10-12, 2007

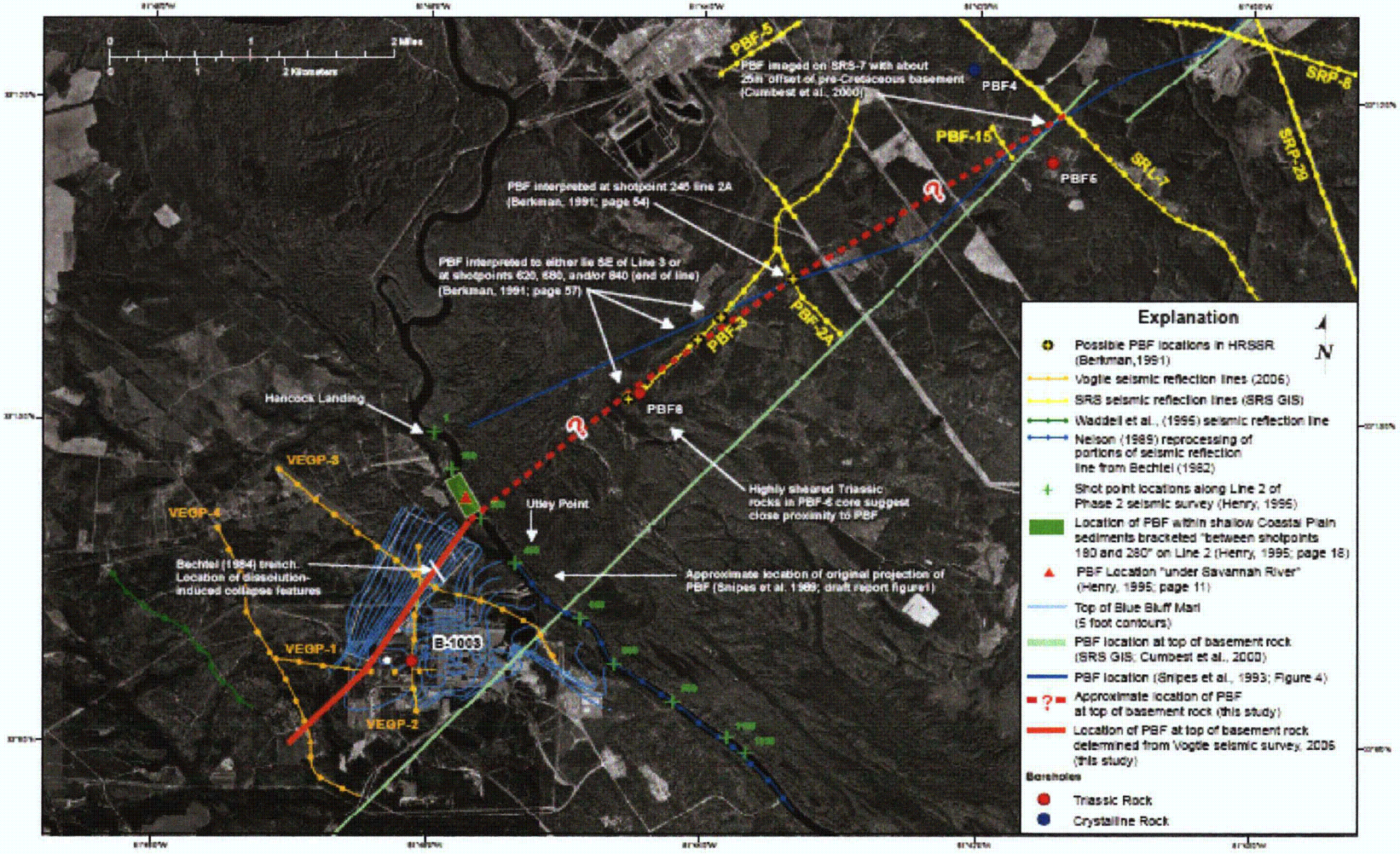
Friday January 12, 2007

8:00 – 10:00 Wrap Up of Questions

11:00 Exit


Main Transformers
Diesel Fuel Storage
Turbine Bldg
Diesel Bldg
Annex Bldg
Auxiliary Bldg
Containment
Radwaste Bldg
AP1000 Power Block Detail
New Intake Structure
New Barge Slip
Switchyard Expansion
C
A
Unit 4
Unit 3
B
D
New Hyperbolic Cooling Towers
Potential New Common Facilities
A - Shared Support Facilities Inside the Protected Area Including Common TSC
B - Shared Support Facilities Outside the Protected Area
C - Dry Fuel Storage Facility
D - Visitor's Center
Projected Site Layout


Unit 1&2 Borings
ESP Monitoring Wells
ESP Borings
Seismic Line 1
Seismic Line 4
Seismic Line 2
Seismic Line 3
COL Borings


PBF-5
PBF imaged on SRS-7 with about 25m offset of pre-Cretaceous basement (Cumbest et al., 2000)
PBF4
PBF-15
PBF5
SRL-7
SRP-28
SRP-8
PBF interpreted at shotpoint 245 line 2A (Berkman, 1991; page 54)
PBF interpreted to either lie SE of Line 3 or at shotpoints 620, 680, and/or 840 (end of line) (Berkman, 1991; page 57)
PBF-3
PBF-2A
PBF6
Hancock Landing
VEGP-3
VEGP-4
Utley Point
Highly sheared Triassic rocks in PBF-6 core suggest close proximity to PBF
Bechtel (1984) trench. Location of dissolution-induced collapse features
Approximate location of original projection of PBF (Snipes et al. 1993; draft report figure)
VEGP-1
B-1003
VEGP-2
Explanation
N
Possible PBF locations in HRSBR (Berkman,1991)
Vogtle seismic reflection lines (2006)
SRS seismic reflection lines (SRS GIS)
Waddell et al., (1995) seismic reflection line
Nelson (1989) reprocessing of portions of seismic reflection line from Bechtel (1982)
Shot point locations along Line 2 of Phase 2 seismic survey (Henry, 1996)
Location of PBF within shallow Coastal Plain sediments bracketed "between shotpoints 180 and 280" on Line 2 (Henry, 1995; page 18)
PBF Location "under Savannah River" (Henry, 1995; page 11)
Top of Blue Bluff Marl (5 foot contours)
PBF location at top of basement rock (SRS GIS; Cumbest et al., 2000)
PBF location (Snipes et al., 1993; Figure 4)
Approximate location of PBF at top of basement rock (this study)
Location of PBF at top of basement rock determined from Vogtle seismic survey, 2006 (this study)
Boreholes
Triassic Rock
Crystalline Rock