

B. L. (Pete) Ivey
Vice President
Nuclear Development Support

**Southern Nuclear
Operating Company, Inc.**
42 Inverness Center
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7619
Fax 205.992.5217

APR 28 2010



Docket Nos.: 52-011

ND-10-0843

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Early Site Permit Site Safety Analysis Report Amendment Request
Response to Request for Additional Information

Ladies and Gentlemen:

By letter dated April 20, 2010, Southern Nuclear Operating Company (SNC) submitted a license amendment request to the U.S. Nuclear Regulatory Commission (NRC), in accordance with 10 CFR 50.90, to change the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 Early Site Permit (ESP) Site Safety Analysis Report (SSAR). The requested change would allow the use of onsite backfill areas not specifically identified in the SSAR. During the NRC's review of this amendment request, the NRC identified a need for additional information, involving the extent of the requested area boundary and the rationale used to conclude that the Barnwell Group of sands extends throughout the VEGP site. This additional information need was conveyed to SNC in teleconferences between the NRC and SNC held on April 22 and 23, 2010. The Enclosure to this letter provides SNC's response to this additional information need.

If you have any questions regarding this letter, please contact Mr. Brandon Waites at (205) 992-7024. Thank you.

D678
NRD

Mr. B. L. (Pete) Ivey states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY



B. L. (Pete) Ivey

Sworn to and subscribed before me this 28th day of April, 2010

Notary Public: Charlotte A. Graham

My commission expires: 6/9/12

BLI/BJS/dmw

Enclosure: Response to NRC Request for Additional Information on the License
Amendment Request to Change the VEGP Units 3 and 4 ESP SSAR
Regarding Onsite Backfill Areas

cc: Southern Nuclear Operating Company

Mr. J. H. Miller, III, President and CEO (w/o enclosure)
Mr. J. A. Miller, Executive Vice President, Nuclear Development (w/o enclosure)
Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)
Mr. D. H. Jones, Site Vice President, Vogtle 3 & 4
Mr. T. E. Tynan, Vice President - Vogtle (w/o enclosure)
Mr. D. M. Lloyd, Vogtle 3 & 4 Project Support Director (w/o enclosure)
Mr. M. K. Smith, Technical Support Director (w/o enclosure)
Mr. C. R. Pierce, AP1000 Licensing Manager
Mr. M. J. Ajluni, Nuclear Licensing Manager
Mr. J. D. Williams, Vogtle 3 & 4 Site Support Manager
Mr. T. C. Moorer, Manager, Environmental Affairs, Chemistry and Radiological Services
Mr. J. T. Davis, Vogtle 3 & 4 Site Licensing Manager
Mr. B. W. Waites, Construction Licensing Project Engineer
Document Services RTYPE: AR01.1053
File AR.01.01.06

Nuclear Regulatory Commission

Mr. L. A. Reyes, Region II Administrator
Mr. F. M. Akstulewicz, Deputy Director Div. of Safety Systems & Risk Assess. (w/o encl.)
Mr. R. G. Joshi, Lead Project Manager of New Reactors
Ms. T. E. Simms, Project Manager of New Reactors
Mr. B. C. Anderson, Project Manager of New Reactors
Mr. M. M. Comar, Project Manager of New Reactors
Ms. S. Goetz, Project Manager of New Reactors
Mr. J. M. Sebrosky, Project Manager of New Reactors
Mr. D. C. Habib, Project Manager of New Reactors
Ms. D. L. McGovern, Project Manager of New Reactors
Ms. T. L. Spicher, Project Manager of New Reactors
Mr. C. P. Patel, Project Manager of New Reactors
Ms. M. A. Sutton, Environmental Project Manager
Mr. M. D. Notich, Environmental Project Manager
Mr. L. M. Cain, Senior Resident Inspector of VEGP 1 & 2
Mr. J. D. Fuller, Senior Resident Inspector of VEGP 3 & 4

Georgia Department of Natural Resources – Commissioner's Office

Mr. Chris Clark, Commissioner

Georgia Power Company

Mr. T. W. Yelverton, Nuclear Development Director
Ms. A. N. Faulk, Nuclear Regulatory Affairs Manager

Oglethorpe Power Corporation

Mr. M. W. Price, Executive Vice President and Chief Operating Officer
Mr. K. T. Haynes, Director of Contracts and Regulatory Oversight

Municipal Electric Authority of Georgia

Mr. S. M. Jackson, Vice President, Power Supply

Dalton Utilities

Mr. D. Cope, President and Chief Executive Officer

Bechtel Power Corporation

Mr. J. S. Prebula, Project Engineer (w/o enclosure)

Mr. R. W. Prunty, Licensing Engineer

Tetra Tech NUS, Inc.

Ms. K. K. Patterson, Project Manager

Shaw Stone & Webster, Inc.

Mr. C. A. Fonseca, Vogtle Project Manager (w/o enclosure)

Mr. J. M. Oddo, Licensing Manager

Mr. D. C. Shutt, Licensing Engineer

Westinghouse Electric Company, LLC

Mr. S. D. Rupprecht, Vice President of Regulatory Affairs & Strategy (w/o enclosure)

Mr. N. C. Boyter, Consortium Project Director Vogtle Units 3 & 4 (w/o enclosure)

Mr. S. A. Bradley, Vogtle Project Licensing Manager

Mr. M. A. Melton, Manager, Regulatory Interfaces

Mr. R. B. Sisk, Manager, AP1000 Licensing and Customer Interface

Mr. D. A. Lindgren, Principal Engineer, AP1000 Licensing and Customer Interface

NuStart Energy

Mr. R. J. Grumbir

Mr. P. S. Hastings

Mr. E. R. Grant

Mr. B. Hirmanpour

Mr. N. Haggerty

Ms. K. N. Slays

Other NuStart Energy Associates

Ms. M. C. Kray, NuStart

Mr. S. P. Frantz, Morgan Lewis

Mr. J. A. Bailey, TVA

Ms. A. L. Sterdis, TVA

Mr. J. P. Berger, EDF

Mr. M. W. Gettler, FP&L

Mr. P. Hinnenkamp, Entergy

Mr. G. D. Miller, PG&N

Mr. N. T. Simms, Duke Energy

Mr. G. A. Zinke, NuStart & Entergy

Mr. R. H. Kitchen, PGN

Ms. A. M. Monroe, SCE&G

Mr. T. Beville, DOE/PM

Southern Nuclear Operating Company

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Enclosure

**Response to NRC Request for Additional Information
on the License Amendment Request to
Change the VEGP Units 3 and 4 ESP SSAR
Regarding Onsite Backfill Areas**

NRC Question No. 1

The extent of the requested approval for the use of borrow material from other onsite areas is not clear in the proposed revision to SSAR Section 2.5.4.5.4. Clarify in the proposed SSAR Section 2.5.4.5.4 the extent of the area from which additional borrow material may be used.

SNC Response:

The additional borrow areas are located inside the Exclusion Area Boundary (EAB) of the VEGP site. The VEGP EAB is depicted on SSAR Figure 1-4, Site Layout – New Development. The License Amendment Request proposed Table 2.5.4-15 referred to the Owner Controlled Area as the limits for onsite borrow areas. The term Owner Controlled Area is not currently defined in the ESP SSAR. Table 2.5.4-15 is revised to change the reference from the Owner Controlled Area to the Exclusion Area Boundary to be consistent with the description used on Figure 1-4. Revised proposed additions to SSAR Section 2.5.4 are shown in Attachment 1.

NRC Question No. 2

The basis the applicant uses to conclude that backfill obtained from additional onsite borrow areas located inside the boundaries of the VEGP site is from the same geological origin as the existing ESP approved areas is not clear. Provide the basis for concluding that backfill obtained from additional onsite borrow areas and located inside the boundaries of the VEGP site, will be from the same geological origin as the existing ESP approved areas.

SNC Response:

The VEGP site area stratigraphy is described in ESP section 2.5.1.2.3.2. This section provides a detailed description of the soil layers applicable to the VEGP site and the surrounding five-mile area. This SSAR section provides a detailed description of the Barnwell Group sediments and provides evidence that the Barnwell Group deposits are found extensively on the VEGP site and the surrounding area.

SNC is supplementing the information contained in the SSAR with a geological assessment of the VEGP Site. This assessment, provided as Attachment 2, describes the location and extent of the Barnwell Group sediments with specific emphasis on the upper portion of the Barnwell Group sediments that contain suitable Category 1 backfill within the VEGP Exclusion Area Boundary (EAB). This assessment supports the general conclusion that the sediments located within the VEGP EAB above an approximate of elevation 180 feet are associated with the Barnwell Group and of the same geological origin as the three borrow areas identified in SSAR section 2.5.4.5.4.

As supplemental information to the geological assessment in Attachment 2, SNC is providing a review of selected representative test pits and boring logs as Attachment 3. This review illustrates the variability from location to location onsite, demonstrates the stratigraphy for the areas across the site is consistent with the description of the Barnwell Group sediments, and thus corroborates the conclusions of the geological assessment.

SNC has segregated approximately 500,000 cubic yards of material from borrow areas outside of the three areas described in ESP Section 2.5.4.5.4 for use as Category 1 backfill. This stockpiled material was excavated from areas impacted by ongoing construction areas south and northwest of the power block excavation. SNC has also identified significant deposits of suitable material from new borrow areas west and southeast of the VEGP 3 and 4 construction areas. These areas are identified on Attachment 2 Figure 1 as the Cooling Tower Borrow Area, Western

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Borrow Area, and Southern Borrow Area. All of these areas are contained within areas designated as Barnwell sands in Attachment 2.

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Attachment 1

SSAR Markup

(3 pages)

Attachment 1

SSAR Markup

2.5.4.5.4 Backfill Sources

Sufficient sources of backfill have been identified on the Vogtle site through the boring and laboratory testing programs and analysis of their results as described below. Flowable fill may also be used as backfill in small restricted areas where adequate compaction cannot be achieved. The flowable fill mix will be designed to have similar strength characteristics as the compacted backfill.

Identified onsite sources of borrow material for the proposed backfill include acceptable materials from the Upper Sand stratum excavated from the power block and a borrow area (switchyard) north of the power block. An alternative borrow area is located about 4,000 feet north of the power block. This alternative location (Borrow Area 4) was also identified and investigated during construction of VEGP Units 1 and 2.

Approximately 3,900,000 cubic yards of material (including an allowance for ramps) will be excavated for the Units 3 and 4 power blocks. Approximately 3,600,000 cubic yards of material will be required to backfill these excavations. Based on a review of the 70 SPT boring logs and laboratory test results on selected samples from the COL subsurface investigation, approximately 50 percent of the material excavated from the power block areas will qualify for reuse as Seismic Category 1 or 2 backfill. However, because a portion of the excavated material may be difficult to segregate, an estimated 30–50 percent of the excavated material is designated for borrow. This quantity accounts for approximately 1,200,000–2,000,000 cubic yards.

Additional backfill for the power blocks, approximately 1,600,000 cubic yards, is available from a borrow source located immediately north of the power blocks (Units 3 and 4 switchyard area). See Figures 2.5.4-15 and 2.5.4-16 for plan and section views, respectively. The switchyard borrow source was explored with 15 SPT borings and five test pits during the COL investigation. The engineering properties of these materials were evaluated with laboratory tests on disturbed, undisturbed, and bulk samples. The COL laboratory testing program (Appendix 2.5.C) included sieve analyses of 27 samples that disclosed an average value of 15 percent fines and a median value of 15 percent. Based on the subsurface data, suitable backfill materials at the switchyard borrow source were identified. These materials were classified according to ASTM D 2488 as silty sands (SM) and poorly graded sands (SP). Clayey sands (SC) were also encountered in some samples. Compaction tests (ASTM D 1557) were conducted on five bulk samples taken from representative soils. Test results disclosed a range of 111 pcf to 125 pcf for the maximum dry density with an average value of 116 pcf.

If additional material is needed, an alternative borrow source is located about 4,000 feet north of the power block area, designated Borrow Area 4. It was explored with four SPT borings and three test pits during the COL investigation. This area was previously explored but not utilized during

Attachment 1

SSAR Markup

the design and construction of Units 1 and 2. Sieve analyses were conducted on 31 representative samples and disclosed values ranging from 7 percent to 43 percent fines content with an average value of 16. Compaction tests (ASTM D 1557) were conducted on five bulk samples taken from representative soils. Test results disclosed a range of 113 pcf to 121 pcf for the maximum dry density with an average value of 116 pcf. Based on the subsurface data, suitable backfill materials at Borrow Area 4 are located at the surface (approximate El. 246 ft) to a depth of 36 ft (approximate El. 210 ft) and the borrow area is estimated to contain approximately 1,200,000 cubic yards.

Other localized deposits of suitable material within the Upper Sand stratum located within the VEGP Exclusion Area Boundary (EAB) (Figure 1-4) outside of the above three borrow areas may be evaluated for use as borrow material. Such deposits may be identified by review of existing boring data, additional informational borings or test pits, or excavation activities incidental to construction. The evaluation to use such material would include a geologic review of the materials, a laboratory testing program, and an engineering review of soil properties. This material would be designated as suitable for use as Category 1 and 2 backfill provided the evaluation concludes that the material meets the acceptance criteria contained in Table 2.5.4-15. Once identified as suitable backfill, the material will be qualified and placed in accordance with all requirements for Category 1 and 2 backfill.

Attachment 1

SSAR Markup

Table 2.5.4-15 **Criteria for Evaluation of Borrow Material from Outside of the Three Designated Category 1 Borrow Areas**

Parameter	Acceptance Criteria
Location	Exclusion Area Boundary (Figure 1-4)
Geological Origin	Barnwell Group
Soil Classification	SP, SP-SM or SM
Maximum Dry Density (Modified Proctor)	Engineering Evaluation
Fines Content, Percent passing on a #200 Sieve	3% Minimum 25% Maximum
Gradation	Table 2.5.4-14 and associated text in Section 2.5.4.5.3

Attachment 2

Geological Assessment - Extent and Distribution of Barnwell Sediments at the VEGP Site

NOTE: This attachment consists of a two page letter followed by two figures.



FUGRO WILLIAM LETTIS & ASSOCIATES, INC.

1454 Greene Street, Suite A
Augusta, GA 30901
Tel: (706) 722-7360
Fax: (706) 722-7365

Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, AL 35201
Building 42
Inverness Center Parkway
Birmingham, AL 35242

28 April 2010


Subject: Extent and Distribution of Barnwell Sediments at the VEGP Site

Gentlemen,

The attached brief summarizes the extent and distribution of Barnwell Group sediments in the vicinity of, and throughout, the VEGP Site. This information is provided under seal as a Registered Professional Geologist in the state of Georgia and South Carolina.

Please let me know if you need further information.

Frank H. Syms, Ph.D., P.G.
Principal Engineering Geologist


Georgia License No. PG001813

South Carolina License No. 2072

syms@lettis.com

Encl:

Extent and Distribution of Barnwell Sediments at the VEGP Site

This evaluation has been prepared at the request of Southern Nuclear in support of locating additional borrow sources for Category 1 backfill within the boundaries of the VEGP Site. The existing borrow sources at the VEGP utilize material that meets specific soil classification and index properties as well as compaction characteristics to achieve predictable static and dynamic properties. For the recent construction of Units 3 and 4, these materials have been acquired from the upper sands of the Barnwell Group sediments in three active borrow areas (Power Block Area, Switchyard Area and Borrow Area 4) as shown on Figure 1. These same onsite Barnwell Group sediments were also used as the backfill source for the construction of Units 1 and 2. This evaluation addresses the extent and presence of similar Barnwell Group sediments throughout the remaining VEGP Site area.

The Barnwell Group is a regionally extensive geologic unit that consists of several formations and members of the Coastal Plain of Georgia and South Carolina. In the region surrounding the VEGP Site, the Barnwell Group has been shown to be slightly less than about 100 feet thick to the north of the site thickening to over 200 feet south of the site and is generally recognized as the upper most geologic unit. The most recent regional geologic investigation pertinent to the Barnwell Group in the vicinity of the VEGP Site is provided in U.S. Geological Survey Professional Publication 1603-A. This report summarizes the extent of the Barnwell Group lithologies present as well as their stratigraphic significance.

In vicinity of the VEGP Site, the Barnwell Group is typically the upper most unit encountered and extends down to about elevation 130 feet above Mean Sea Level (MSL) which yields an average thickness greater than 100 feet across the VEGP Site. In some topographically higher areas, Hawthorne Formation materials may be present, however, they tend to be fairly thin (less than about 10 feet thick) and are similar sandy sediments distinguished by coarser grained particles up to cobble size. In most developed areas of the VEGP Site, the Hawthorne has been removed. Lithologies within the Barnwell Group range from sands with varying amounts of silts and clays to carbonate sands and limestones. The upper portions of the Barnwell Group in the vicinity of the VEGP Site are primarily quartz sands informally referred to as "upper sands". These upper sands are the deposits which yield materials meeting the Category 1 backfill specification requirements and are shown as they are encountered in the subsurface on Figure 2.

Figure 2 provides a generalized stratigraphic column for the VEGP Site and typical sediments encountered within the Barnwell Group. The lower portion of the Barnwell Group where carbonate sediments are typically encountered is also shown and has been used to delineate an approximate demarcation (Elevation 180 ft) with the lower section shaded grey. The carbonate sediments contain unsuitable clays, shell hash and limestone and are clearly distinguishable from the upper sand deposits of suitable backfill material. The actual demarcation between carbonate sediments and the upper portion of the Barnwell Group may vary locally but can be readily determined as material is removed from test pits or the borrow excavation.

The aerial extent of the Barnwell Group sediments respective to the VEGP Site and surrounding area are shown on Figure 1. These geologic contacts were derived from the ESP SSAR Figure 2.5.1-31. Also shown are the locations of the 3 active borrow areas mentioned above and locations of additional borrow areas not currently described in ESP SSAR section 2.5.4.5.4. Representative borings and test pits in various areas across the VEGP Site are also shown. The material descriptions from these logs are typical of the upper sands within the Barnwell Group and are consistent with larger scale exposures of the Barnwell in the Unit 3 and 4 excavation, surrounding road cuts, and other areas of excavation such as the abandoned borrow area in the southern portion of the site used for Units 1 and 2. These observations confirm the presence of the Barnwell Group throughout the VEGP Site.

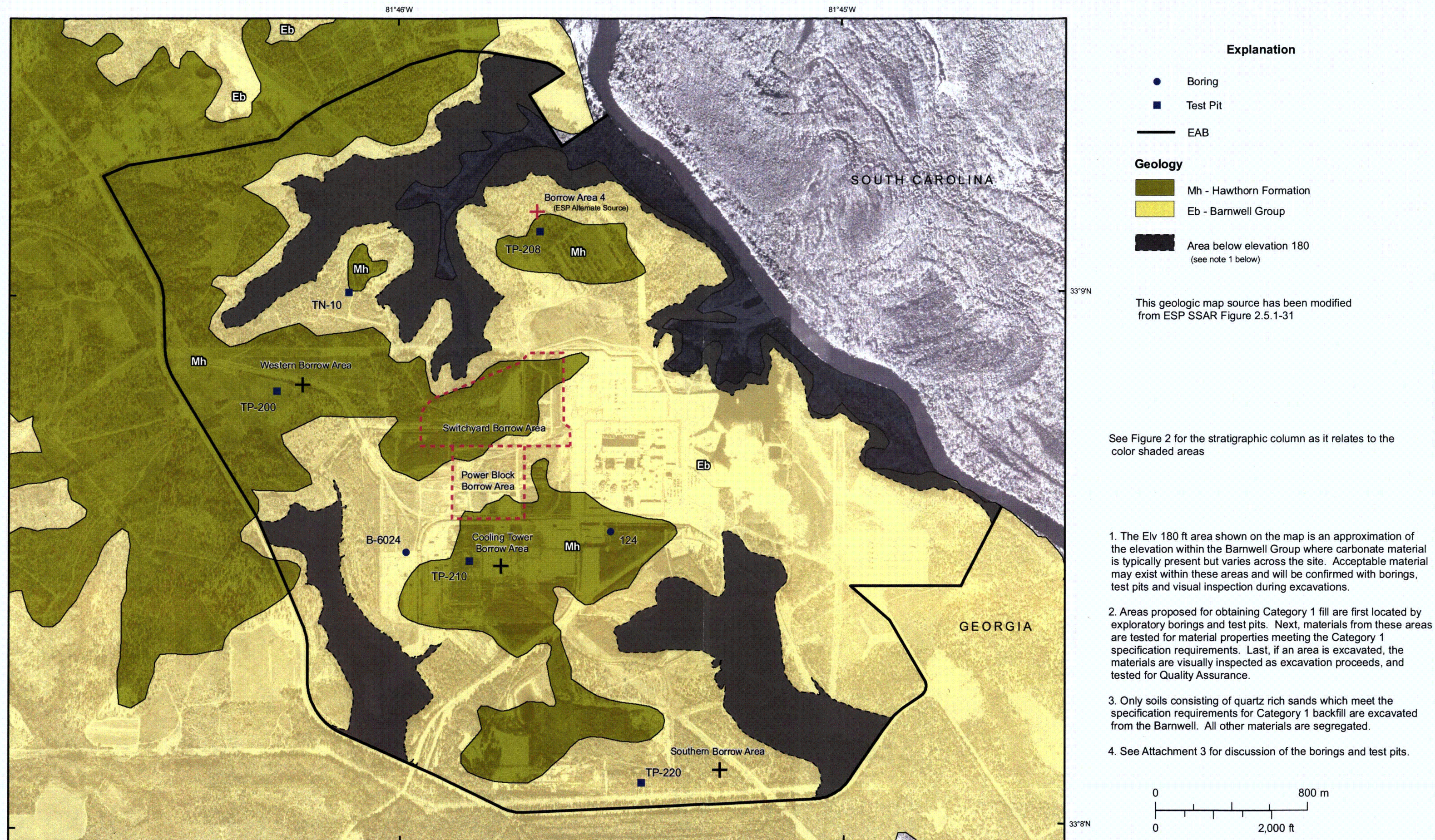


Figure 1. Map Showing Extent of Barnwell Group

HAWTHORNE FORMATION

These materials exist on topographic highs, are generally thin (less than 5-10 feet thick), and are materially similar to the Barnwell Group (Upper Sands) but typically contain coarser material up to cobble-size particles.

BARNWELL GROUP (UPPER SANDS)

These materials are predominantly quartz sands with varying amounts of silt and clay. Clay seams are present that require segregation and removal.

Upper Sands of the Barnwell Group are shown on Figure 1 respective to borrow areas for the Unit 3 and 4 Power Block Area and Switchyard, Borrow Area 4 (ESP approved areas), and proposed expansion of borrow areas within the VEGP owner controlled area (EAB).

180 elevation demarcation

Observations from the Units 1 & 2 and 3 & 4 excavations as well as geologic maps and investigations indicate that below about elevation 180 feet material contains variable amounts of carbonate that are unacceptable for use as backfill. Areas below elevation 180 feet are shown on Figure 1. New proposed borrow area locations are confirmed with borings and test pits. Actual excavation of borrow materials requires visual inspection and testing to confirm engineering properties as specified for all Category I backfill material prior to use.

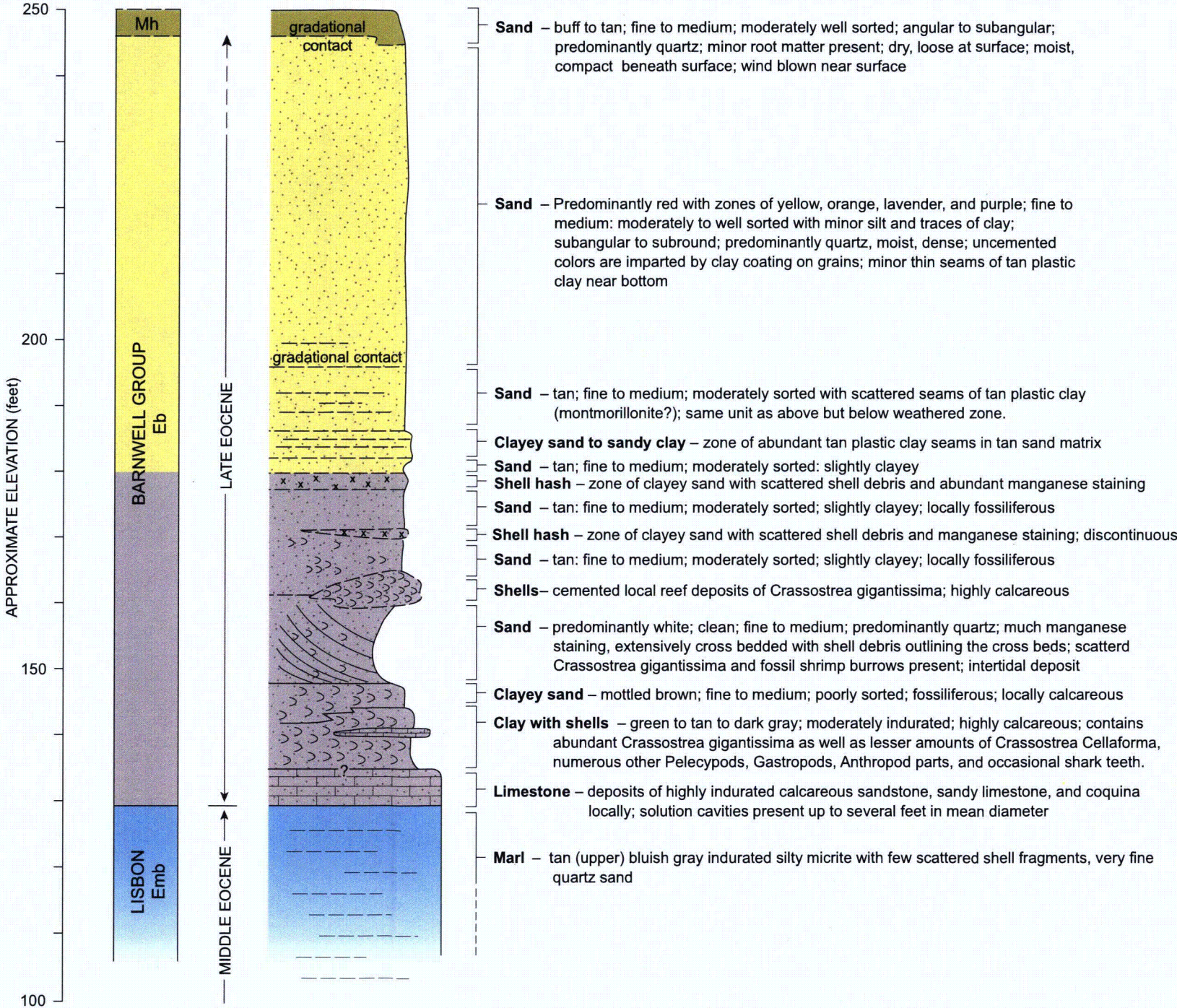


Figure 2. Vogle Plant Area General Stratigraphic Column

Attachment 3

Illustration of Barnwell Group Soils Across VEGP Site from Test Pit and Boring Logs

NOTE: This attachment consists of one page of text followed by 13 pages of boring logs.

Illustration of Barnwell Group Soils Across VEGP Site from Test Pits and Boring Logs

The Vogtle Electric Generating Plant (VEGP) site, as described in Section 1.2 of the Site Safety Analysis Report (SSAR), encompasses over 3,169 acres and is bounded by River Road, Hancock Landing Road and 1.7 miles of the Savannah River. A detailed geologic description of the site is provided in Section 2.5.1 of the SSAR. The site is located in the Atlantic Coastal Plain physiographic province and, in general, is overlain with sediments of the Upper Eocene Aged Barnwell Group. For purposes of characterizing the engineering properties of the subsurface materials, as presented in SSAR Section 2.5.4, the Barnwell Group sediments were designated as the Upper Sand Stratum.

Numerous subsurface explorations have been conducted at the VEGP site since the early 1970s. The early works are summarized in the *Alvin W. Vogtle Nuclear Project, Report on Foundation Investigations*, dated July 1974. More recent works are summarized in the VEGP SSAR. These explorations have included a variety of methods such as test pits, soil borings, coring, cone penetrometer testing, observations wells, and geophysical methods. In total, over 1,000 exploration holes and pits have been drilled or excavated on the VEGP site to support development activities.

A small sampling of representative test pit and boring log records taken from various areas across the site is attached herein. These records provide representative data of the Upper Sand Stratum across the site and illustrate typical variability of the materials, both in material type and thickness. Materials include poorly graded sand (SP), silty to poorly graded sand (SP-SM), clayey sand (SC), silty sand (SM), silt (ML) and clay (CL), all typical of the Upper Sand Stratum (Barnwell Group). A summary of the attached records is presented in Table 1.

Table 1 – Summary of Exploration Points

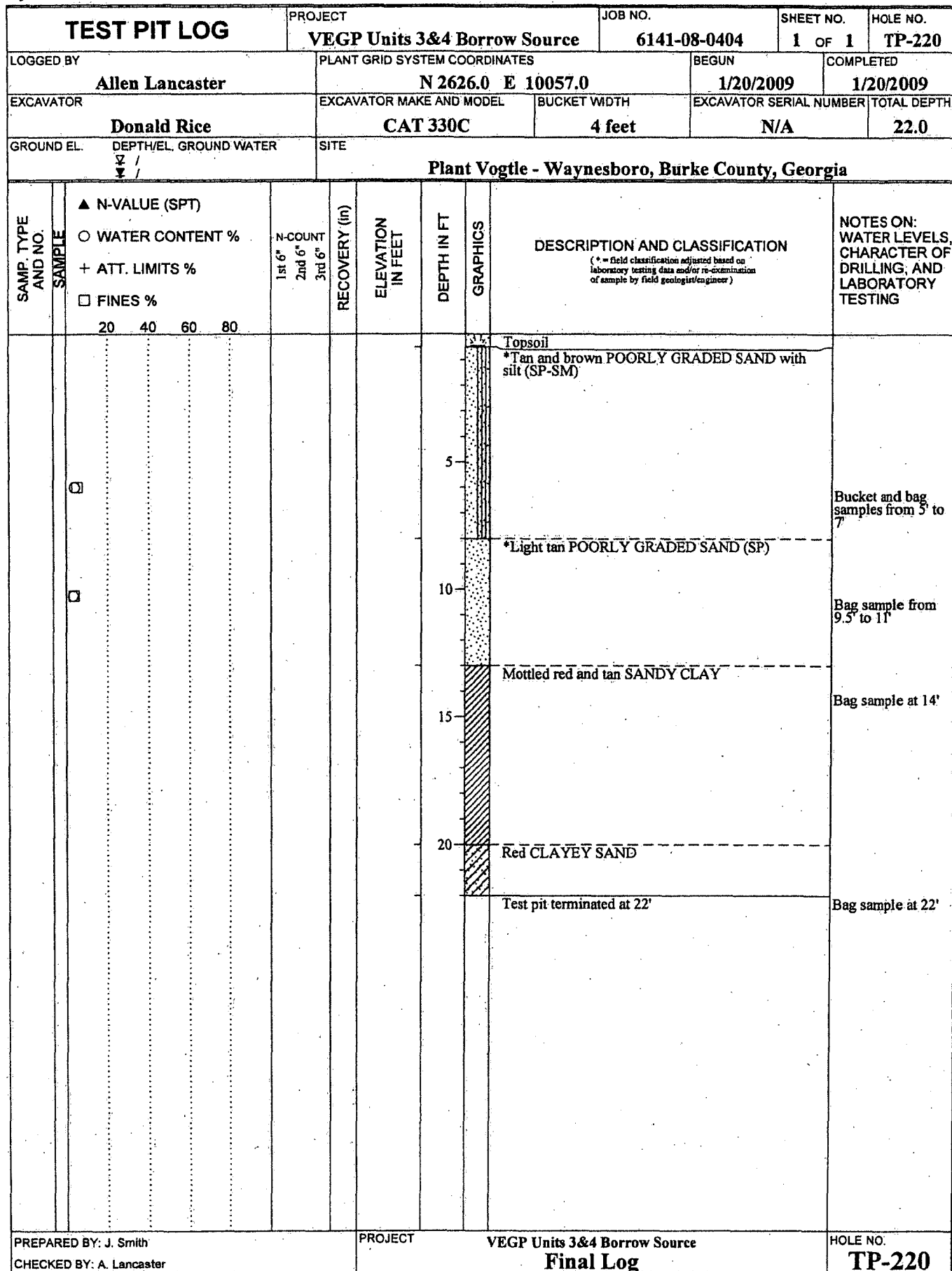
Id	Exploration		Elevation	Depth	Plant Grid		Source
	Type	Date			Northing	Easting	
TP-200	Test pit	Jan. 2009	274	25	9303	3764	1
TP-208	Test pit	Jan. 2009	242	26	12043	8293	1
TP-210	Test pit	Jan. 2009	222	20	6395	7086	1
TP-220	Test pit	Jan. 2009	214 ¹⁾	22	2626	10057	1
B-6024	Boring	April 2007	216	50	6546	5998	2
TN-10	Test pit	Sept. 1977	229	25	11000	5000	3
124	Boring	Sept. 1971	260	200	6896	9527	4
Notes							
1) Elevation scaled from existing topography							
Sources							
1. Engineering Report for Evaluation of Alternative Borrow Sources for VEGP Units 3 and 4, Bechtel Power Corporation, June 2009.							
2. VEGP SSAR, Appendix 2.5C, December 2008.							
3. Report of Backfill Material Investigation Volume II, Part 2, Bechtel Incorporated, January 1978.							
4. Alvin W. Vogtle Nuclear Project, Report on Foundation Investigation, Volume 2, Bechtel Incorporated, July 1974.							

The data provided above corroborate the discussion in Attachment 2 and the supporting figures that show the Barnwell Group is prevalent throughout the VEGP Site.

TEST PIT LOG				PROJECT VEGP Units 3&4 Borrow Source		JOB NO. 6141-08-0404		SHEET NO. 1 OF 1		HOLE NO. TP-200		
LOGGED BY Mark Davis				PLANT GRID SYSTEM COORDINATES N 9303.4 E 3763.7				BEGUN 1/13/2009		COMPLETED 1/13/2009		
EXCAVATOR Donald Rice				EXCAVATOR MAKE AND MODEL CAT 330C		BUCKET WIDTH 4 feet		EXCAVATOR SERIAL NUMBER N/A		TOTAL DEPTH 25.0		
GROUND EL. 274.2		DEPTH/EL. GROUND WATER 2 /		SITE Plant Vogtle - Waynesboro, Burke County, Georgia								
SAMP. TYPE AND NO.	SAMPLE	▲ N-VALUE (SPT)				N-COUNT 1st 6" 2nd 6" 3rd 6"	RECOVERY (in)	ELEVATION IN FEET	DEPTH IN FT	GRAPHICS	DESCRIPTION AND CLASSIFICATION <small>(* = field classification adjusted based on laboratory testing data and/or re-examination of sample by field geologist/engineer)</small>	NOTES ON: WATER LEVELS, CHARACTER OF DRILLING, AND LABORATORY TESTING
		○ WATER CONTENT % + ATT. LIMITS % □ FINES % 20 40 60 80										
								274.2 273.9			Topsoil *Tan white POORLY GRADED SAND with silt (SP-SM)	
								264.7	10		*Red brown SILTY CLAYEY SAND (SC-SM)	Bucket and bag samples at 9' Bucket and bag samples at 10'
								258.2	15		*Brown CLAYEY SAND (SC)	
								250.2 249.2	20 25		Red brown white SILTY SAND Test pit terminated at 25'	Bag sample at 20' Bag sample at 25'
PREPARED BY: J. Smith				PROJECT VEGP Units 3&4 Borrow Source				HOLE NO. TP-200				
CHECKED BY: A. Lancaster				Final Log								

TEST PIT LOG				PROJECT VEGP Units 3&4 Borrow Source		JOB NO. 6141-08-0404		SHEET NO. 1 OF 1		HOLE NO. TP-208		
LOGGED BY Allen Lancaster				PLANT GRID SYSTEM COORDINATES N 12042.6 E 8293.1				BEGUN 1/13/2009		COMPLETED 1/13/2009		
EXCAVATOR Donald Rice				EXCAVATOR MAKE AND MODEL CAT 330C		BUCKET WIDTH 4 feet		EXCAVATOR SERIAL NUMBER N/A		TOTAL DEPTH 26.0		
GROUND EL. 242.2		DEPTH/EL. GROUND WATER 2 / 1		SITE Plant Vogtle - Waynesboro, Burke County, Georgia								
SAMP. TYPE AND NO.	SAMPLE	▲ N-VALUE (SPT)				N-COUNT 1st 6" 2nd 6" 3rd 6"	RECOVERY (in)	ELEVATION IN FEET	DEPTH IN FT	GRAPHICS	DESCRIPTION AND CLASSIFICATION <small>(* = field classification adjusted based on laboratory testing data and/or re-examination of sample by field geologist/engineer)</small>	NOTES ON: WATER LEVELS, CHARACTER OF DRILLING, AND LABORATORY TESTING
		○ WATER CONTENT %	+ ATT. LIMITS %	□ FINES %								
		20	40	60	80			242.2				
								241.5			Topsoil	
									5		*Tan and red brown POORLY GRADED SAND with silt (SP-SM)	
									10			Bucket and bag samples at 8'
									15			
								222.2	20		*Red brown SILTY SAND (SM)	
									25			Bucket and bag samples at 23'
								216.2			Test pit terminated at 26'	
PREPARED BY: J. Smith				PROJECT VEGP Units 3&4 Borrow Source				HOLE NO. TP-208				
CHECKED BY: A. Lancaster				Final Log								

TEST PIT LOG				PROJECT VEGP Units 3&4 Borrow Source		JOB NO. 6141-08-0404		SHEET NO. 1 OF 1		HOLE NO. TP-210		
LOGGED BY Mark Davis				PLANT GRID SYSTEM COORDINATES N 6394.6 E 7085.8				BEGUN 1/19/2009		COMPLETED 1/19/2009		
EXCAVATOR Donald Rice				EXCAVATOR MAKE AND MODEL CAT 330C		BUCKET WIDTH 4 feet		EXCAVATOR SERIAL NUMBER N/A		TOTAL DEPTH 20.0		
GROUND EL. 222.4				DEPTH/EL. GROUND WATER 222.4		SITE Plant Vogtle - Waynesboro, Burke County, Georgia						
SAMP. TYPE AND NO.	SAMPLE	N-VALUE (SPT)				N-COUNT 1st 6" 2nd 6" 3rd 6"	RECOVERY (in)	ELEVATION IN FEET	DEPTH IN FT	GRAPHICS	DESCRIPTION AND CLASSIFICATION <small>(* = field classification adjusted based on laboratory testing data and/or re-examination of sample by field geologist/engineer)</small>	NOTES ON: WATER LEVELS, CHARACTER OF DRILLING, AND LABORATORY TESTING
		+ ATT. LIMITS %										
		<input type="checkbox"/> FINES % <div style="display: flex; justify-content: space-around; width: 100%;"> 20 40 60 80 </div>										
								222.4			Topsoil	
								222.1			Possible Fill: Red brown and tan CLAYEY SAND (moist)	Bag sample from 5' to 7'
									5			
								213.9			*Red brown POORLY GRADED SAND with silt (SP-SM)	Bag sample from 10' to 12'
									10			
									15			Bag sample from 13' to 15'
								205.9			Red white POORLY GRADED SAND (moist)	
								205.4			*Red white POORLY GRADED SAND with silt (SP-SM)	Bag sample from 17.5' to 20'
								202.4	20		Test pit terminated at 20'	
PREPARED BY: J. Smith				PROJECT VEGP Units 3&4 Borrow Source				HOLE NO. TP-210				
CHECKED BY: A. Lancaster				Final Log								





GEOTECHNICAL LOG				PROJECT Vogtle Units 3 & 4 COL Project		JOB NO. 6141-06-0286		SHEET NO. 1 OF 2		HOLE NO. B-6024	
LOGGED BY B. Sharp				COORDINATES N 1141545.9 E 619997.7		BEGUN 4/6/2007		COMPLETED 4/6/2007			
DRILLER White-MACTEC				DRILL MAKE AND MODEL CME-55		HOLE DIAMETER 4 Inches		HAMMER SERIAL NUMBER 331145		TOTAL DEPTH 50.0	
GROUND EL. 216.1		DEPTH/EL. GROUND WATER 3 / 1		SITE: Vogtle Electric Generating Plant - Waynesboro, GA							
SAMP. TYPE AND NO.	▲ N-VALUE (SPT) ○ WATER CONTENT % + ATT. LIMITS % □ FINES %	N-COUNT 1st 6" 2nd 6" 3rd 6"	RECOVERY (in)	ELEVATION IN FEET	DEPTH IN FT	GRAPHICS	DESCRIPTION AND CLASSIFICATION <small>(* = field classification adjusted based on laboratory testing data and/or re-examination of sample by field geologist/engineer)</small>	NOTES ON: WATER LEVELS, CHARACTER OF DRILLING AND LABORATORY TESTING			
SS 1	▲	13-12-8	16	216.1			GRAVEL (GP)- Dark gray (7.5YR 4/1), damp, medium dense	Top of Fill at a depth of 0.0 feet			
SS 2	▲	13-9-4	10	215.3			SAND, clayey (SC)- Red (2.5YR 4/8), damp to moist, medium dense, fine grained				
SS 3	▲	3-4-4	13	212.6	5		SAA				
SS 4	▲	5-7-9	13				SAND, clayey (SC)- Red (2.5YR 4/8), damp to moist, loose, fine to medium grained	Top of Barnwell Group at a depth of 3.5 feet			
SS 5	▲	6-8-7	15				SAA except medium dense	Installed 4" steel casing to a depth of 5.0 feet			
SS 6	▲	6-7-7	17	205.6	10		SAA				
SS 7	▲	5-7-8	13		15		SAND, silty (SM)- Red (2.5YR 4/6), moist, medium dense, fine to medium grained	End logging by S. Woodham.			
SS 8	▲	6-7-8	12		20		SAA except red (2.5YR 4/8), fine grained	Begin logging by B. Sharp.			
SS 9	▲	6-7-7	11		25		SAA except red (10R 4/8)				
SS 10	▲	8-9-12	8		30		SAA except red (10R 4/8) and (7.5YR 5/8), coarse grained				
SS 11	▲	5-6-9	12	184.1	35		SAA except contains some brownish yellow (10YR 6/8), medium to coarse grained				
UD 1	▲	6-5-6	15		40		SILT, sandy (ML)- Yellow (10YR 7/8) and yellowish brown (10YR 5/8), moist, stiff to very stiff, low plasticity, contains thin fine to medium grained SAND lenses, -HCL	Direct Push			
SS 12	▲	4-11-6	18		45		SAA				
SS 13	▲	3-3-4	17	169.6			SAA except brownish yellow (10YR 6/8), stiff, contains black manganese staining				
UD 2	▲			168.1			SAA except very stiff, medium grained				
SS	▲			167.1			SAA	Direct Push			
				166.1			Pocket Penetrometer: <0.25 TSF				
							SAND, silty (SM)- Brownish yellow (10YR 6/8), moist, medium dense, medium grained, -HCL				
							CLAY (CL)- Brownish yellow (10YR 6/8)				

PREPARED BY: A. TAYLOR
REVIEWED BY: P. DEPREE

SITE
Vogtle Units 3 & 4 COL Project
Final Log

HOLE NO.
B-6024



GEOTECHNICAL LOG				PROJECT Vogle Units 3 & 4 COL Project		JOB NO. 6141-06-0286		SHEET NO. 2 OF 2		HOLE NO. B-6024		
SAMP. TYPE AND NO.	SAMPLE	N-VALUE (SPT)				N-COUNT 1st 6" 2nd 6" 3rd 6"	RECOVERY (in)	ELEVATION IN FEET	DEPTH IN FT	GRAPHICS	DESCRIPTION AND CLASSIFICATION <small>(* = field classification adjusted based on laboratory testing data and/or re-examination of sample by field geologist/engineer)</small>	NOTES ON: WATER LEVELS, CHARACTER OF DRILLING AND LABORATORY TESTING
		▲	○	+	□							
		20	40	60	80							
14											moist, medium stiff, low plasticity, contains fine grained SAND seams. -HCL SILT, sandy (ML) - Olive yellow (2.5Y 6/6), moist, medium stiff, low plasticity, fine to medium grained SAND. -HCL Boring terminated at 50 feet	

SITE		Vogle Units 3 & 4 COL Project Final Log		HOLE NO. B-6024	
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TEST PIT NO. TN-10

LOCATION: N 110+00 E 50+00

ELEVATION - 229.1

DEPTH (FEET)

DESCRIPTION

0.0 - 1.0	TOPSOIL
1.0 - 9.0	RED-BROWN SLIGHTLY CLAYEY SILTY MEDIUM TO FINE SAND WITH ORGANIC MATERIAL (SM)
9.0 - 21.0	TAN-BROWN SILTY MEDIUM TO FINE SAND (SP-SM)
21.0 - 25.0	WHITE AND BLACK MEDIUM TO FINE SAND (SP)
25.0	PIT TERMINATED NO GROUNDWATER ENCOUNTERED

BECHTEL

SHEET 1 OF 6

GEOLOGIC LOG OF DRILL HOLE

HOLE NO. 124

PROJECT Alvin W. Vogtle Site ANGLE FROM HORIZ 90° BEARING --
 LOCATION E 623,526.9 N 1,141,896.0 BEGUN 9-13-71 COMPLETED 9-16-71
 OVERBURDEN DEPTH DRILLED INTO ROCK TOTAL DEPTH OF HOLE 200.0'
 ELEV. WATER TABLE NO. CORE BOXES NO. SAMPLES TAKEN 40
 CORE RECOVERY (%) FEET MODEL & MAKE OF DRILL CME 55
 GROUND ELEV. 260.2 HOLE LOGGED BY N. Campagna DRILLER LETICO-Ross

NOTES ON WATER TABLE LEVELS, WATER RE- TURN, CHARACTER OF DRILLING, ETC.	SAMPLE DATA					ELEVATION	DEPTH	LOG	CLASSIFICATION AND PHYSICAL CONDITION
	PENETRATION TOOL	TOOL SIZE	METHOD n - BLOWS	ADVANCE	RECOVERY				
0'-170' PVC	Split Spoon		1-1-2 3			250	5	1	0-7.0': <u>SAND</u> ; Tan, fine- grained, trace of roots. (SP)
	"		13-15-13 28				10	2	7.0-17.0': <u>SAND</u> ; Red-brown, coarse to fine-grained, trace of silt. (SM)
	"		6-9-13 22				15	3	13.5': <u>SANDY SILT</u> ; Red- brown, trace of clay with white streaks.
	"		5-6-7 13			240	20	4	17.0-36.0': <u>SILTY SAND</u> ; Purple, trace of clay. (SM/SP)
	"		5-7-8 15				25	5	23.5': Fine-grained.
	"		4-5-6 11			230	30	6	28.5': Trace of silt. (SM/SP)
	"		4-7-9 16					7	33.5': Purple, clayey, fine- grained <u>SAND</u> changing to red fine-grained <u>SAND</u> .

Hole Size 3"

Hole No. 124
Cooling Tower

PROJECT Alvin W. Vogtle SiteSHEET 2 OF 6HOLE NO 124

NOTES ON WATER TABLE LEVELS, WATER RE- TURN, CHARACTER OF DRILLING, ETC.	SAMPLE DATA					ELEVATION	DEPTH	LOG	CLASSIFICATION AND PHYSICAL CONDITION.
	PENETRATION TOOL	TOOL SIZE	METHOD n - BLOWS	ADVANCE	RECOVERY				
								SAMPLE	(SM/SP)
	"		8-9-10 19			220	40	8	36.0-62.0': <u>SAND</u> ; Red, medium to fine-grained, trace of silt. (SP)
	"		7-9-10 19				45	9	43.5': <u>SILTY SAND</u> ; Purple, fine-grained, trace of silt. (SP)
	"		6-9-12 21			210	50	10	
	"		6-8-11 19				55	11	53.5': Red.
	"		7-8-11 19			200	60	12	
	"		6-7-11 18				65	13	62.0-82.0': <u>SAND</u> ; Yellow- brown, coarse to fine- grained, trace of silt. (SM)
	"		5-8-11 19			190	70	14	68.5': <u>SILTY SAND</u> ; Yellow- brown, fine-grained.
	"		5-7-10 17					15	

e Size 3"Hole No 124

PROJECT Alvin W. Vogtle SiteSHEET 3 OF 6HOLE NO 124

NOTES ON WATER TABLE LEVELS, WATER RE- TURN, CHARACTER OF DRILLING, ETC.	SAMPLE DATA					ELEVATION	DEPTH	LOG	CLASSIFICATION AND PHYSICAL CONDITION.
	PENETRATION TOOL	TOOL SIZE	METHOD n - BLOWS	ADVANCE	RECOVERY				
								SAMPLE	
	"		14-12-12 24			180	80	16	(SM) 78.5': Red & brown, coarse to medium-grained.
	"		2-6-6 12				85	17	82.0-87.0': <u>SANDY, CLAYEY SILT</u> ; Yellow-brown.
	"		6-8-11 19			170	90	18	(ML) 87.0-92.0': <u>SAND</u> ; Yellow- brown, coarse to fine- grained, some silt.
	"		3-5-7 12				95	19	(SP) 92.0-98.0': <u>SILTY CLAY</u> ; Mottled tan and yellow- brown.
	"		3-9-11 20			160	100	20	(CL) 98.0-102.0': <u>SAND</u> ; Yellow- brown changing to white, fine-grained, slightly calcareous. (SP)
	"		3-6-9 15				105	21	102.0-106.0': <u>SILTY CLAY</u> ; Yellow-brown.
	"		9-10-11 21			150	110	22	(CL) 106.0-112.0': <u>SAND</u> ; Yellow- brown, medium to fine- grained.
	"		2-3-5 8					23	(SP) 112.0-117.0': <u>CLAY</u> ; White, slightly calcareous, some silt.
									(CL)

Hole Size 3"Hole No 124Site Cooling Tower

NOTES ON WATER TABLE LEVELS, WATER RE- TURN, CHARACTER OF DRILLING, ETC.	SAMPLE DATA					ELEVATION	DEPTH	LOG	CLASSIFICATION AND PHYSICAL CONDITION.
	PENETRATION TOOL	TOOL SIZE	METHOD n - BLOWS	ADVANCE	RECOVERY				
								SAMPLE	
									(CL)
	"		5-8-11 19			140	120	24	117.0-120.0': <u>CLAYEY, SILTY SAND</u> ; Yellow-brown, medium to fine-grained. (SM)
	"		11-12-9 21				125	25	120.0-128.0': <u>SAND</u> ; Yellow-brown, fine-grained. (SP)
	"		3-6-9 15			130	130	26	128.0-200.0': <u>SILTY CLAY</u> ; Tan. (CL/ML)
	"		8-13-19 31				135	27	133.5': Hard, gray.
	"		20-35-40 75			120	140	28	138.5': Very hard, gray, <u>CLAYEY SILT</u> .
	"		16-31-32 63				145	29	143.5': Contains shell fragments.
	"		12-15-43 58			110	150	30	(CL/ML)
	"		100 2"					31	

PROJECT <u>Alvin W. Vogtle Site</u>							SHEET <u>5</u> OF <u>6</u>		
							HOLE NO <u>124</u>		
NOTES ON WATER TABLE LEVELS, WATER RE- TURN, CHARACTER OF DRILLING, ETC.	SAMPLE DATA					ELEVATION	DEPTH	LOG	CLASSIFICATION AND PHYSICAL CONDITION
	PENETRATION TOOL	TOOL SIZE	METHOD n - BLOWS	ADVANCE	RECOVERY				
									(CL/ML)
	"		<u>16-32-33</u> 65			100	160	32	158.5': Without shells.
	"		<u>20-25-29</u> 54				165	33	163.5': <u>CLAYEY SILT</u> ; Very hard, light gray with shell fragments.
	"		<u>100</u> 2"			90	170	34	(CL/ML)
	"		<u>100</u> 2"				175	35	(CL/ML)
	"		<u>35-40-61</u> 101			80	180	36	178.5': <u>CLAYEY SILT</u> ; Very hard, light gray.
	"		<u>9-18-18</u> 36				185	37	(CL/ML)
	"		<u>100</u> 6"			70	190	38	
	"		<u>20-30-55</u> 85					39	

Hole Size 3"

Hole No 124

NOTES
ON WATER TABLE
LEVELS, WATER RE-
TURN, CHARACTER OF
DRILLING, ETC.

PENETRATION

TOOL	SIZE
1	1/2"
2	3/4"
3	1"
4	1 1/2"
5	2"
6	2 1/2"
7	3"
8	3 1/2"
9	4"
10	4 1/2"
11	5"
12	5 1/2"
13	6"
14	6 1/2"
15	7"
16	7 1/2"
17	8"
18	8 1/2"
19	9"
20	9 1/2"
21	10"
22	10 1/2"
23	11"
24	11 1/2"
25	12"
26	12 1/2"
27	13"
28	13 1/2"
29	14"
30	14 1/2"
31	15"
32	15 1/2"
33	16"
34	16 1/2"
35	17"
36	17 1/2"
37	18"
38	18 1/2"
39	19"
40	19 1/2"
41	20"
42	20 1/2"
43	21"
44	21 1/2"
45	22"
46	22 1/2"
47	23"
48	23 1/2"
49	24"
50	24 1/2"
51	25"
52	25 1/2"
53	26"
54	26 1/2"
55	27"
56	27 1/2"
57	28"
58	28 1/2"
59	29"
60	29 1/2"
61	30"
62	30 1/2"
63	31"
64	31 1/2"
65	32"
66	32 1/2"
67	33"
68	33 1/2"
69	34"
70	34 1/2"
71	35"
72	35 1/2"
73	36"
74	36 1/2"
75	37"
76	37 1/2"
77	38"
78	38 1/2"
79	39"
80	39 1/2"
81	40"
82	40 1/2"
83	41"
84	41 1/2"
85	42"
86	42 1/2"
87	43"
88	43 1/2"
89	44"
90	44 1/2"
91	45"
92	45 1/2"
93	46"
94	46 1/2"
95	47"
96	47 1/2"
97	48"
98	48 1/2"
99	49"
100	49 1/2"

SMO78-n
METHOD

ADVANCE

RECOVERY

ELEVATION.

DEPTH

907

SAMPLE

CLASSIFICATION AND
PHYSICAL CONDITION.

(CL/ML)

Set PYC to 170.0'

BOH 200.0'