# APPENDIX A

# Wansley Site Assessment Report 2007

# PLANT WANSLEY
# PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY

# SITE ACCEPTABILITY REPORT
# REVISION 1

October 2007

GEORGIA POWER
A SOUTHERN COMPANY

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# PLANT WANSLEY
# PROPOSED COAL COMBUSTION BY-PRODUCT
# DISPOSAL FACILITY
# SITE ACCEPTABILITY REPORT
# REVISION 1

Prepared for

Georgia Power Company

By

Earth Science and Environmental Engineering
Southern Company Generation

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TABLE OF CONTENTS

## LIST OF FIGURES AND DRAWINGS



## LIST OF TABLES

## LIST OF APPENDICES

# EXECUTIVE SUMMARY

Plant Wansley is located in northeast Heard County and southeast Carroll County, Georgia, off Liberty Church Road, approximately 15 miles west of the city of Newnan, 9 miles northeast of the city of Franklin and 12 miles southeast of the city of Carrollton. Plant property is adjacent and west of the Chattahoochee River. Georgia Power Company proposes to develop a 325 acre portion of this property as a Coal Combustion By-Product (CCB) disposal facility.

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility.

Per Circular 14, site investigations have been performed to determine if the site is acceptable for gypsum disposal. This Site Acceptability Report presents the results of the site investigations. The following key points are discussed in the report:

- The site is not located within
  - 0.5 mile of a county boundary,
  - 5,708 yards of a National Historic Site, or
  - the 100-year floodplain.
- At least a 200-foot buffer will be maintained beyond the limits of the disposal area. A new fence and security road will be constructed parallel to the existing fence along Hollingsworth Ferry Road. The proposed 200-foot buffer will be maintained inside the proposed security road and fence.
- No threatened or endangered animal or plant species were observed at the site.
- No portion of the site is located within a significant groundwater recharge area.
- The site contains approximately 7.4 acres of wetlands associated with small streams that traverse the site. Any jurisdictional wetlands present, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis.
- No public water supply wells were identified within 2 miles of the site. The site is not within the water management area of a public water supply well. Twenty domestic wells were located within ½ mile of the site. All the wells are located up-gradient of the site.
- Based on laboratory testing, the remolded permeability of the material proposed for use as a potential soil liner averages $1.6 \times 10^{-6}$ cm/sec with a range of $3.7 \times 10^{-6}$ cm/sec to $1.7 \times 10^{-7}$ cm/sec. The recommended maximum permeability of the compacted soil liner beneath the synthetic liner is $1 \times 10^{-5}$ cm/sec.
- Fate and transport modeling indicated that selenium would travel only 0.39 inches into a compacted soil liner, using a conservative estimate of permeability equal to $5 \times 10^{-4}$ cm/sec, after 100 years under a realistic scenario without a synthetic liner.

- Based on fate and transport modeling, the facility will not contaminate groundwater since the leachate will not travel through a compacted soil liner and a minimum 5-foot barrier between the gypsum and groundwater.
- Groundwater pollution potential was also determined using the LeGrand Method as described in Circular 14, using measured site input parameters. The LeGrand analysis produced a score of 15.8, which means groundwater pollution potential is "possible, but not likely", depending on design.
- A groundwater monitoring network will be designed to provide early detection in the unlikely event that regulated constituents might reach groundwater and surface water.
- According to Heard County Board of Commissioners, the site complies with local zoning and land use ordinance for a private industrial solid waste disposal site.

# 1.0 GENERAL SITE AREA

## 1.1 Description of General Site Area

### *1.1.1 Location*

Plant Wansley is located in northeast Heard County and southeast Carroll County, Georgia, off Liberty Church Road, approximately 15 miles west of the city of Newnan, 9 miles northeast of the city of Franklin and 12 miles southeast of the city of Carrollton. The physical address of the plant is 1371 Liberty Church Road, Carrollton, Georgia. The plant property encompasses approximately 5100 acres and is bounded on the east by the Chattahoochee River.

Plant Wansley consists of four gas-fired combined cycle units and two coal-fired units. Due to proposed air quality regulations, the plant is currently in the process of installing flue gas desulfurization (FGD) equipment (scrubbers) on both coal-fired units. Between 386,000 and 900,000 tons per year of gypsum disposal, depending on the percent sulfur coal burned, may be required as a result of these scrubbers.

The project proposes to develop approximately 325 acres of plant property located along the north side of Hollingsworth Ferry Road, south-southeast of the plant, as a private industry coal combustion by-product disposal area. The site is located at approximate longitude W85° 03´ and latitude N33° 24´. This waste is classified in Circular 14, Appendix A, as industrial waste with a moderate potential for groundwater pollution. The site topographic map and site boundary are shown on Figure 1-1. The general area of the plant and the site are shown on Figure 1-2. Copies of the original topographic survey and signed and sealed site boundary survey drawings are located in Appendix A.

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility. This report presents the results of a site acceptability study performed for the purpose of obtaining the necessary EPD approval to develop the property as a private industry coal combustion by-product disposal facility for gypsum.

### *1.1.2 General Site Geology*

The proposed disposal facility is located within the Southern Piedmont Physiographic province, which lies between the Blue Ridge Mountains and the Upper Coastal Plain. This province is underlain by metamorphic rocks including mica schists and granitic gneisses. The Brevard Fault Zone, a major feature that cuts across the Piedmont, occurs approximately one mile north of the proposed disposal facility. This zone is bounded by a thrust fault on the southeastern border and trends northeast, as do most of the rocks of the Piedmont.

Rock cores recovered from borings within the disposal facility are interbedded granitic gneisses, garnet mica schists, augen schists and augen gneisses with occasional quartzite veins and accessory minerals of garnet, epidote and calcite. Figure 1-3 shows the regional geology of the site area.

### *1.1.3 Population Trends*

The population of Heard County, Georgia for the year 2005 was estimated to be 11,346. From 2000 to 2005, the county grew in population an estimated 3.0%. Carroll County, to the north of the site, had an estimated population of 105,453 in 2005, an increase of 20.8% since 2000. Coweta County, to the east of the site, had an estimated 2005 population of 109,903, with an increase of 23.3% since 2000 (U. S. Census Bureau, 2006). According to the Carroll County Plan Update, these trends are due largely to the proximity of the area to the City of Atlanta.

### *1.1.4 Other Permitted State/Federal Facilities*

According to the Georgia Environmental Protection Division of the Department of Natural Resources, the Georgia Power Company-Plant Wansley Private Waste Disposal Facility, an inert landfill, permit number PBR-074-01IL, is the only waste disposal facility located within 2 miles of the site. No other State or Federal permitted waste disposal facility is located within 2 miles of the site.

### *1.1.5 Threatened and Endangered Species/Wildlife Habitat Survey*

The proposed disposal area was surveyed by representatives of Georgia Power Company's Environmental Affairs for threatened and endangered species. Both database and field surveys were conducted. No threatened and endangered species or their habitats were identified during these surveys. According to the report, one known location of a federally listed species (bald eagle – federally listed threatened) occurs approximately 1600 feet northwest of the site boundary within the Plant Wansley site. The location of the active nest is outside the primary zone (750 – 1500 ft) and will not be impacted by project activities.

The field survey indicated that the site was dominated by forested community types. Primary cover types included hardwood, mixed pine/hardwood, forested wetland, and scrub/shrub wetland. The full report is located in Appendix B.

## 1.2 Proximity to Roads, Airports and Railroads

The site is adjacent to Hollingsworth Ferry Road, with road frontage of approximately 5600 feet. A rail spur for the plant is located along Georgia Power Road, approximately one-quarter mile northeast of the proposed gypsum disposal site.

Twelve airports are located in the general site vicinity. The airports, their location, and their distance to the plant are listed in Table 1-1. None of the airports are closer than 5 miles to the site. This is greater than the most stringent requirements specified by Circular 14, requiring a minimum separation distance of 10,000 feet from the end of runways servicing turbojet aircraft. Additionally, the proposed facility will not receive wastes that will attract birds.

**Table 1-1**
**Airports Located in the General Vicinity of the Proposed Gypsum Disposal Facility**

| Airport Name | ID | Latitude | Longitude | Distance from Facility |
|---|---|---|---|---|
| Andy Fields | 2GE8 | 33-27-51.00N | 084-39-48.00W | 22.2 miles |
| Answered Prayer | 1GE3 | 33-15-14.00N | 085-10-13.00W | 12.0 |
| C&R Farm | 78GA | 33-30-15.40N | 085-01-01.79W | 7.0 |
| Dresden | GA79 | 33-20-41.42N | 084-54-40.78W | 7.9 |
| Falcons Aerie | 8GA8 | 33-34-38.40N | 085-00-10.79W | 12.1 |
| Flying W Farms | 6GA8 | 33-30-28.00N | 085-11-08.00W | 10.3 |
| Gum Creek | 8GA1 | 33-25-16.41N | 085-09-42.80W | 5.9 |
| Murphree | 26GA | 33-20-10.42N | 084-54-49.78W | 8.5 |
| Newnan Coweta County | CCO | 33-18-41.63N | 084-46-11.12W | 16.8 |
| Panther Creek | 17GA | 33-28-00.00N | 084-51-58.00W | 11.0 |
| West Georgia Regional – OV Gray Field | CTJ | 33-37-51.70N | 085-09-07.30W | 16.2 |
| Wilson Intl | 27GA | 33-39-30.39N | 085-00-35.80W | 17.6 |

(AirportBug.org, 2007)

### 1.3 Proximity to County Boundaries and National Historic Sites

Although the plant property is located in both Heard and Carroll Counties, and borders Coweta County along the Chattahoochee River, the proposed disposal site is located approximately 1.9 miles east of the boundary of Heard County and Coweta County and approximately 1.5 miles south of the boundary between Heard County and Carroll County. Circular 14 states that no permit shall be issued to an applicant if any part of the site is within ½ mile of an adjoining county without the approval of the government of the adjoining county. No portion of the proposed facility is within ½ mile of an adjoining county.

The National Parks Service's National Register of Historic Places was searched for a listing of historical places in Heard, Coweta, and Carroll Counties. The search indicated two historic sites in Heard County, 14 in Carroll County, and 23 in Coweta County. None of these listings are within 3 ¼ miles (5,708 yards) of the site. According to Circular 14, no industrial landfill shall be located within 5,708 yards of a National Historic Site. The complete list of historic sites in these counties, along with the approximate distance from the site is included in Appendix C.

## 1.4 Proximity to Flood Plains

Based on the Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Map for unincorporated Heard County, Map Number 130105A, page 4, the site is not located in the 100-year flood plain (Figure 1-4).

## 1.5 Proximity to Streams and Wetlands

A wetland delineation survey was performed by Georgia Power Environmental Affairs. The wetland delineation was performed in accordance with the United States Army Corps of Engineers "Wetland Delineation Manual, 1987" by two certified wetlands scientists. Several small wetlands were delineated that are associated with small streams. The total area of these wetlands is 7.4 acres. Any jurisdictional wetlands present, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis. All streams on the site property are tributaries of the Chattahoochee River which is located approximately 2000 feet east of the site boundary. Neither the river nor any of its tributaries are classified "trout streams" in Heard County. The streams and wetland areas are shown on Figure 1-5.

## 1.6 Proximity to Significant Groundwater Recharge Areas

According to Digital Environmental Atlas of Georgia, the site is not located in or adjacent to an area of significant groundwater recharge. The nearest significant unconfined aquifer recharge area is located approximately 2 miles southwest of the site. Figure 1-6 indicates the nearest significant recharge areas.

## 1.7 Proximity to Public and Domestic Water Wells

In November and December 2006, a survey was performed to identify water supply wells and surface water intakes near the site. The survey was performed by Kemron Environmental Services in accordance with the specifications for a Private Industrial Disposal Facility as outlined in Chapter 391-3-4-.05(k) of the Rules for Solid Waste Management, and Appendix A, Circular 14, Criteria for Performing Site Acceptability Studies for Solid Waste Landfills. An inventory of all privately owned (domestic) water supply wells within ½-mile radius and all public water supply wells and surface water intakes within a 2-mile radius was completed. The survey included the following:

- Obtaining tax maps of the adjacent properties from the Heard County Tax Assessors Office to identify property owners.
- Contacting the Heard County Water Authority.
- Searching the Water Resources Division of the United States Geologic Survey (USGS) and state of Georgia Environmental Protection Division (EPD) databases.
- Field reconnaissance of the 2-mile radius for public water supply wells and surface water intakes and ½-mile radius for private water supply wells.

The search produced the following information:

- The USGS database included nine private wells within the 2-mile radius of the site. Based on field observation, these wells appear to be outside the ½-mile radius for private water supply wells.

- The State of Georgia Environmental Protection Division (GAEPD) database for water supply wells and water intakes in Heard County was searched for drinking water sources. Of the 7 sources listed in Heard County 2 water intakes are located within 2 miles of the site. These 2 water intakes belong to Georgia Power Company's Plant Wansley and are listed as 1) Plant Service Pond and 2) Chattahoochee River. Neither of these intakes are used for drinking water; however the Plant Service Pond intake is used for an emergency eye-wash station. A third Plant Wansley water source, the Lake Gentry – Yellow Dirt Creek intake is listed in the database. It is located outside the 2-mile radius for surface water intakes and is not used for drinking water. The locations of the plant service water intakes are shown on Figure 2 of the Kemron report located in Appendix D. 2).

- The Heard County Water Authority was contacted and indicated that the two surface water intakes belonging to them were within the City of Franklin. The city limits of Franklin are approximately 10.5 miles downstream of the site. They also indicated that they do not keep records of private water wells.

- The Heard County Tax Assessors database indicated that seven properties with water wells are located within the ½-mile radius for domestic water supply wells. All of these wells are located up-gradient of the site.

- Field reconnaissance with the ½-mile radius of the site boundaries indicated 13 additional private water wells. Field reconnaissance was not performed on Plant Wansley property. The locations of these wells are shown on Figure 4 of the Kemron report, located in Appendix D. All of these wells are located up-gradient of the site.

Table 1-2 is a summary of the domestic wells identified during the survey to be within ½-mile of the site. Also included are properties adjacent to the site which are connected to the public water supply, but which may have wells. The complete Kemron report is included in Appendix D. Figure 1-7 shows both the ½-mile and 2-mile radii from the site boundaries. No public water wells are present within the 2-miles radius. The private water wells within the ½-mile radius are located on the map.

**Table 1-2**
**Water Supply Well Inventory**

| Well Owner | Property Address | Map | Parcel | Water Supply* |
|---|---|---|---|---|
| Wendall S. Lewis | 4819 Hollingsworth Ferry Rd. | 43 | 24 | well |
| Jerry L. & Tim R. Hudson | 4704 Hollingsworth Ferry Rd. | 43 | 25 | well |
| Pink & Gertrude Webb | 4944 Hollingsworth Ferry Rd. | 43 | 22 | well |
| Matthew R. Ridley | 4474 Hollingsworth Ferry Rd. | 43 | 26 | well |
| Gary C. Philpott | 4430 Hollingsworth Ferry Rd. | 43 | 27 | well |
| Yellow Dirt Baptist Church | 4058 Hollingsworth Ferry Rd. | 43 | 28 | well |
| Joe Stephens | Hollingsworth Ferry Rd. | 43 | 10 | well |
| Samuel Harmon | 6990 Five Notch Rd. | 44 | 18 | well |
| Samuel Harmon | 6990 Five Notch Rd. | 44 | 18.02 | well |
| Jud Hall | Five Notch Rd. | 44 | 18.03 | well |
| Wayne Morris | 240 Webb Rd. | 44 | 17 | well |
| James D. Green & Amanda Lovell | 50 Webb Rd. | 43 | 23.01 | well |
| Brenda Webb | 212 Webb Rd. | 43 | 20 | well |
| Gertrude Webb | Webb Rd. | 43 | 21 | well |
| James R. Price | Hollingsworth Ferry Rd. | 43 | 11 | well |
| Wayne Webb | 201 Webb Rd. | 43 | 19 | well |
| Steven Kirk | 4986 Hollingsworth Ferry Rd. | 43 | 16 | well |
| Johnnie Steele | 5120 Hollingsworth Ferry Rd. | 43 | 12 | well |
| Gertrude Webb | Hollingsworth Ferry Rd. | 43 | 13 | well |
| Rufus Adamson | 5040 Hollingsworth Ferry Rd. | 43 | 14 | well |
| Jeremy Milam | 6903 Five Notch Rd. | 44 | 18.01 | public |
| Jane Sullivan | 231 Webb Rd. | 44 | 17.01 | public |
| James & Lisa Perry | 288 Webb Rd. | 44 | 17.02 | public |
| Loyette Echols | 4848 Hollingsworth Ferry Rd. | 43 | 23 | public |
| Wendall C. Lewis | Hollingsworth Ferry Rd. | 43 | 23.02 | public |

* - Addresses shown with a well as the water supply were either listed on the Heard County Tax Assessors office to have a well or a well was visually observed during field reconnaissance. Addresses shown with public as the water supply are adjacent properties with public water supply. However, existence of a well has not been confirmed.

Circular 14 specifies a wellhead protection area around wells and springs used as sources of water supply for public water systems serving municipalities, counties, and authorities. The site is not within the water management area of a public water supply well or surface water intake.

## 1.8 Zoning and Notification

A copy of the letter stating that the proposed solid waste disposal facility at Plant Wansley complies with local zoning and land use ordinance, from June Jackson, Commission Chair, Heard County Board of Commissioners, dated December 4, 2006, is located in Appendix E.

## 2.0 CHARACTERIZATION OF WASTES

Installation of flue gas desulfurization (FGD) equipment (scrubbers) on two coal-fired units at Plant Wansley will result in the production of gypsum ($Ca_2SO_4 \cdot 2H_2O$). FGD technologies are categorized as dry or wet, depending on the state of the reagent as it leaves the absorber. The scrubbers planned for Plant Wansley will be wet and will use limestone as the reagent. Hydrated lime is to be injected into the slurry upstream of the scrubbers to remove $SO_3$. Wet FGD systems are comprised of three main processing areas: sorbent handling, $SO_2$ scrubbing, and by-product handling.

FGD systems that use limestone continually discharge scrubber slurry from the absorber that is generally more than 90% water. The slurry can be dewatered by a number of processes, and depending on the slurry composition, it can be sold commercially as gypsum, mixed with fly ash to create a fairly impermeable fill, or handled and placed in storage. The only Georgia Power plant that currently generates gypsum is Plant Yates. When scrubbers are installed at Plant Wansley, the gypsum generated will be similar in physical and chemical properties to the gypsum that is currently generated at Plant Yates. Table 2-1 presents the range of results of total metals analyses based on 12 gypsum samples collected over a 12-day period from Plant Yates. The 12 samples were composited, and the TCLP was run on the composite. A duplicate TCLP was also run. Table 2-2 presents a summary of Plant Yates gypsum leachate data, compared to the regulatory thresholds that the EPA has set for hazardous waste. None of the elements in gypsum exceed the TCLP regulatory threshold. The laboratory reports and a figure showing the sampling location of the gypsum are located in Appendix F.

**Table 2-1**
**Plant Yates Gypsum Total Metals Data**

| Element | Range of Results mg/kg | Detection Limits mg/kg |
|---|---|---|
| Total Antimony | ND | 7.4 – 8.1 |
| Total Arsenic | ND | 4.4 – 4.9 |
| Total Barium | 120 – 210 | 1.5 – 1.6 |
| Total Beryllium | ND | 1.5 – 1.6 |
| Total Cadmium | ND | 1.5 – 1.6 |
| Total Chromium | ND – 1.6 | 1.5 – 1.6 |
| Total Cobalt | ND | 5.9 – 6.5 |
| Total Copper | ND | 1.5 – 3.3 |
| Total Iron | 260 – 560 | 5.9 – 6.5 |
| Total Lead | ND | 2.2 – 2.4 |
| Total Manganese | ND | 5.9 – 6.5 |
| Total Mercury | ND – 0.77 | 0.37 – 0.8 |
| Total Nickel | ND | 2.9 – 3.3 |
| Total Selenium | 7.5 – 14 | 5.9 – 6.5 |
| Total Silver | ND | 1.6 – 1.6 |
| Total Thallium | ND | 29 – 33 |
| Total Vanadium | ND | 2.9 – 3.3 |
| Total Zinc | 10 – 29 | 2.9 – 3.3 |

Note: Twelve separate samples were collected from 2/4/02 to 2/15/02.

**Table 2-2**
**Plant Yates Gypsum TCLP Data**

| Element | Sample #1 TCLP Concentration, mg/L | Duplicate TCLP Concentration, mg/L | TCLP Detection Limit, mg/L | TCLP Regulatory Limit, mg/L |
|---|---|---|---|---|
| Antimony | ND | ND | 0.1 | |
| Arsenic | ND | ND | 0.03 | 5.0 |
| Barium | 0.2 | 0.2 | 0.1 | 100.0 |
| Beryllium | ND | ND | 0.01 | |
| Cadmium | ND | ND | 0.01 | 1.0 |
| Chromium | 0.02 | 0.02 | 0.01 | 5.0 |
| Cobalt | ND | ND | 0.04 | |
| Copper | 0.03 | ND | 0.02 | |
| Iron | 0.35 | 0.31 | 0.01 | |
| Lead | ND | ND | 0.1 | 5.0 |
| Manganese | 0.10 | 0.10 | 0.04 | |
| Mercury | ND | ND | 0.005 | 0.2 |
| Nickel | ND | ND | 0.02 | |
| Selenium | ND | ND | 0.5 | 1.0 |
| Silver | ND | ND | 0.01 | 5.0 |
| Vanadium | ND | ND | 0.02 | |
| Zinc | 0.51 | 0.45 | 0.03 | |

Note: Samples collected on 2/4/02.

# 3.0 SURFACE AND SUBSURFACE EXPLORATIONS

## 3.1 Topography

The general topography of the area consists of rolling hills and narrow valleys. The elevations over the proposed disposal facility range from about 880 feet msl in the westernmost section to approximately 670 feet msl in the southeast corner nearest to the Chattahoochee River. A number of small wet-weather streams form a dendritic pattern and merge to drain to the river in the southeast corner. The larger portion of the site is vegetated with mature woods. High under-brush covers the areas that have been previously cleared of trees. The topography is shown on Figure 1-1

## 3.2 Boring and Sampling Plan

### *3.2.1 Basis*

The boring location plan was developed based on the locations of streams and wetland areas over the site and the topography of the site. Groundwater flow was expected to be influenced by the streams and the Chattahoochee River. A minimum of three borings were drilled for each drainage area.

### *3.2.2 Depth Criteria*

The drilling and sampling program consisted of borings drilled at 31 locations dispersed over the approximately 325 acres. Per Circular 14, the criterion was established to extend the borings to a minimum depth of 20 feet below the groundwater table. It was expected that rock would be encountered within this 20 feet in a majority of the holes. In the instances where this was the case, a minimum of 10 feet of rock core was performed or until core recovery exceeded 95% within the last 5 feet. Boring locations are shown on Figure 3-1.

### *3.2.3 Drilling Methods*

Drilling was performed using 4.875-inch diameter hollow stem augers to auger refusal. Rock coring was performed using a HQ wire-line coring system. The borings were advanced with a CME55 drill rig by Civil Field Services, Engineering and Construction Services, Southern Company Generation, a bonded service group under the Georgia Water Well Standards Act. A copy of the bond is located in Appendix G. All soil sampling and rock cores were logged under the direct supervision of a geologist or engineer registered in the State of Georgia.

### *3.2.4 Sampling Methods*

Split-spoon samples were taken in the soil and saprolite profile on 5-foot center-to-center spacing beginning at the ground surface or one foot below ground surface (bgs) and continuing to auger refusal. The soil samples were collected from the spoon, placed in sample containers and labeled with boring number, depth, standard penetration counts (N), sample number, job name and date. HW size surface casing was set into the top of rock as determined by auger refusal depths. Rock coring was performed with five foot runs with a HQ coring system. The recovered core was placed in wooden boxes, labeled with the boring number, date, depth of the run and core recovery. The piezometers were installed with 2-inch diameter screen and casing, a 10-foot screened interval, and a filter pack surrounding the screen to approximately 2 feet above the top of the screen. Bentonite was placed above the filter pack to the ground surface.

Twelve undisturbed samples were collected from six locations in the upper fourteen feet for permeability and classification testing. Bag samples were also collected from a number of locations for density and remolded permeability testing. Table 3-1 presents a summary of the boring data. Boring logs and piezometer logs are located in Appendix H.

**Table 3-1**
**Summary Boring Data**

| Boring | Ground Elev. | Auger Refusal | | Boring Termination | | Groundwater Measurements | | |
|---|---|---|---|---|---|---|---|---|
| | | Depth, ft. | Elev. | Depth, ft. | Elev. | Depth to GW, ft. | Time GW Measured | GW Elev. |
| GS-1 | 847.7 | 38.9 | 808.8 | 54.2 | 793.5 | 31.2 | 24 hrs | 816.5 |
| GS-2 | 834.2 | 21.2 | 813.0 | 45.7 | 788.5 | - | - | - |
| GS-3 | 803.2 | na | na | 50.0 | 753.2 | 27.0 | TOD | 776.2 |
| GS-4 | 805.9 | 17.0 | 788.9 | 35.5 | 770.4 | | - | 805.9 |
| GS-5 | 773.1 | 10.0 | 763.1 | 31.6 | 741.5 | - | - | - |
| GS-6 | 767.1 | na | na | 41.5 | 725.6 | 20.5 | TOD | 746.6 |
| GS-7 | 794.7 | na | na | 66.5 | 728.2 | 44.7 | 24 hrs | 750.0 |
| GS-8 | 766.5 | 16.3 | 750.2 | 37.4 | 729.1 | 15.1 | 24 hrs | 751.4 |
| GS-9 | 772.7 | 15.0 | 757.2 | 35.5 | 737.2 | 18.0 | TOD | 754.7 |
| GS-10 | 761.4 | 30.0 | 731.4 | 51.8 | 709.6 | 33.7 | 24 hrs | 727.7 |
| GS-11 | 773.9 | na | na | 61.0 | 712.9 | 39.3 | TOD | 734.6 |
| GS-12 | 773.2 | na | na | 81.0 | 692.2 | 58.7 | 24 hrs | 714.5 |
| GS-13 | 780.6 | 12.5 | 768.1 | 37.5 | 743.1 | 16.7 | 24 hrs | 763.9 |
| GS-14 | 737.7 | 6.5 | 731.2 | 44.5 | 693.2 | 20.4 | 24 hrs | 717.3 |
| GS-15 | 719.7 | 21.0 | 698.7 | 41.3 | 678.4 | 18.0 | 24 hrs | 701.7 |
| GS-16 | 710.5 | 26.9 | 683.6 | 40.1 | 670.4 | 20.7 | 24 hrs | 689.8 |
| GS-17 | 756.1 | 30.0 | 726.1 | 50.4 | 705.7 | 21.7 | - | 734.4 |
| GS-18 | 731.6 | 7.4 | 724.2 | 32.5 | 699.1 | 15.2 | - | 716.4 |
| GS-19 | 750.0 | 15.2 | 734.8 | 39.2 | 710.8 | 17.3 | 24 hrs | 732.7 |
| GS-20 | 713.8 | na | na | 43.5 | 670.3 | - | - | - |
| GS-21 | 789.4 | 66.0 | 723.4 | 77.5 | 711.9 | 74.0 | 24 hrs | 715.4 |
| GS-22 | 729.3 | na | na | 75.0 | 654.3 | 48.7 | TOD | 680.6 |
| GS-23 | 697.9 | na | na | 60.0 | 637.9 | 12.6 | TOD | 685.3 |
| GS-24 | 725.0 | na | na | 65.5 | 659.5 | 39.5 | TOD | 685.5 |
| GS-25 | 785.7 | 29.0 | 756.7 | 43.7 | 742.0 | 20.2 | 24 hrs | 765.5 |
| GS-26 | 744.7 | 50.5 | 694.2 | 60.0 | 684.7 | - | - | - |
| GS-27 | 699.7 | na | na | 35.0 | 664.7 | - | - | - |
| GS-28 | 813.4 | na | na | 68.0 | 745.4 | - | - | - |
| GS-29 | 746.7 | na | na | 50.0 | 696.7 | - | - | - |
| GS-30 | 714.6 | na | na | 46.5 | 668.1 | - | - | - |
| GS-31 | 843.5 | 23.5 | 820.0 | 43.5 | 800.0 | 15.0 | 24 hrs | 828.5 |

na – not applicable
TOD – time of drilling

### *3.2.5 Field and Laboratory Testing*

Split-spoon, undisturbed, and bulk samples were collected for laboratory soils testing. The laboratory testing was performed by Southern Company Generation in Alabaster, Alabama. The following tests were performed on the soil samples using the standard noted:

- Standard Test Method for Particle-Size Analysis of Soils R (1998) - ASTM D-422
- Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits Tests) - ASTM D-4318
- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) - ASTM D-2487
- Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer E(2002) - ASTM D-854
- Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass - ASTM D-2216
- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) - ASTM D-698
- Fall Head Permeability Tests – Corps of Engineers Method
- Cation Exchange Capacity – EPA method SW-846
- Standard Test Method for Batch-Type Measurement of Contaminant Sorption by Soils and Sediments – ASTM D-4646

Remolded samples were used to test for permeability of the overburden soil. Samples were remolded to 98% maximum dry density and +1.5% optimum moisture content using the results of the compaction testing (ASTM D698). Falling head permeability tests were also run on ten undisturbed samples of the overburden soils. Additionally, slug testing was performed in the field to determine the field hydraulic conductivity of the in situ rock and saprolite aquifer. This testing is discussed in Section 3.4.4.

The cation exchange capacity and the adsorption coefficient ($K_d$) were also determined for five samples. The results of the laboratory testing are shown in Table 3-2 and the laboratory test reports are included in Appendix I.

Table 3-2
Summary of Soil Laboratory Test Results

| Sample | Type | Depth, ft. | Description | % Fines | LL | PI | USCS | In-Situ Density, pcf | Natural Moisture, % | Max. Dry Density, (Proctor) pcf | Optimum Moisture, (Proctor) % | Gs | Perm, cm/sec | Remolded Density, pcf | Remolded Moisture, % | CEC, meq/100g | $K_d$, ml/g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-2 | Bulk | 1.0 - 2.5 | Light reddish brown sandy lean CLAY | 66.5 | 47 | 21 | CL | | | 96.9 | 22.7 | 2.63 | $3.7 \times 10^{-7}$ | 94.9 | 24.2 | 14.8 | 4380 |
| GS-2 | Bulk | 3.0 - 4.5 | Light brown sandy SILT | 50.1 | NP | NP | ML | | | 99.3 | 18.0 | 2.63 | $3.5 \times 10^{-6}$ | 97.7 | 19.5 | | |
| GS-4 | UD | 3.0 - 5.0 | Light reddish brown sandy SILT | 57.4 | NP | NP | ML | 91.6 | 15.6 | | | 2.64 | $1.6 \times 10^{-5}$ | | | | |
| GS-4 | UD | 10.0 – 12.0 | Light brown silty SAND | 44.2 | NP | NP | SM | 91.9 | 22.7 | | | 2.62 | $9.9 \times 10^{-5}$ | | | | |
| GS-7 | Bulk | 2.0 - 3.0 | | | | | | | | 104.2 | 19.8 | | $1.4 \times 10^{-6}$ | 100.9 | 21.3 | | |
| GS-7 | SS | 4.5 - 6.0 | Reddish brown elastic SILT w/sand | 78.5 | 58 | 26 | MH | | | | | 2.72 | | | | | |
| GS-7 | Bulk | 6.0 - 8.0 | | | | | | | | 107.9 | 17.8 | | $4.0 \times 10^{-7}$ | 105.4 | 19.3 | | |
| GS-7 | SS | 14.5 – 16.0 | Reddish brown elastic SILT w/sand | 70.3 | 53 | 8 | MH | | | | | 2.73 | | | | | |
| GS-7 | SS | 34.5 – 36.0 | Light reddish brown sandy SILT | 59.6 | NP | NP | ML | | | | | 2.72 | | | | | |
| GS-11 | UD | 3.0 - 5.0 | Reddish brown elastic SILT w/sand | 73.3 | 51 | 17 | MH | 86.1 | 27.5 | | | 2.69 | $4.7 \times 10^{-5}$ | | | | |
| GS-11 | UD | 10.0 – 12.0 | Light brown sandy SILT | 51.3 | NP | NP | ML | 95.0 | 15.4 | | | 2.67 | $7.3 \times 10^{-5}$ | | | | |
| GS-13 | Bulk | 1.5 - 3.0 | Light reddish brown elastic SILT w/sand | 78.5 | 50 | 17 | MH | | | 90.1 | 28.3 | 2.83 | $1.8 \times 10^{-6}$ | 87.7 | 29.8 | 19.7 | 2345 |
| GS-13 | Bulk | 5.0 - 6.0 | Light brown sandy SILT | 59.1 | NP | NP | ML | | | 91.1 | 24.8 | 2.83 | $1.3 \times 10^{-6}$ | 89.7 | 26.3 | 18.2 | 5313 |
| GS-16 | UD | 4.0 - 6.0 | Dark brown elastic SILT | 86.0 | 86 | 31 | MH | 78.6 | 40.8 | | | 2.83 | $8.2 \times 10^{-6}$ | | | | |
| GS-16 | UD | 12.0 – 14.0 | Light reddish brown sandy SILT | 65.7 | NP | NP | ML | 87.0 | 22.1 | | | 2.70 | $2.3 \times 10^{-4}$ | | | | |
| GS-17 | SS | 4.0 - 5.5 | Reddish brown elastic SILT w/sand | 81.6 | 55 | 22 | MH | | | | | 2.74 | | | | | |
| GS-17 | SS | 14.5 – 15.5 | Light brown sandy SILT | 65.3 | NP | NP | ML | | | | | 2.73 | | | | | |
| GS-17 | SS | 24.0 – 25.5 | Light brown sandy SILT | 57.1 | NP | NP | ML | | | | | 2.83 | | | | | |
| GS-19 | Bulk | 1.5 - 3.0 | Light reddish brown elastic SILT w/sand | 83.7 | 54 | 24 | MH | | | 98.2 | 22.5 | 2.75 | $2.4 \times 10^{-6}$ | 96.2 | 24.0 | 13.8 | 3030 |
| GS-19 | Bulk | 6.0 - 7.0 | Light reddish brown sandy SILT | 57.4 | NP | NP | ML | | | 77.1 | 34.4 | 2.84 | $3.7 \times 10^{-6}$ | 75.6 | 34.4 | 27.4 | 5847 |
| GS-21 | UD | 4.0 - 6.0 | Reddish brown silty SAND | 43.0 | NP | NP | SM | 97.5 | 11.3 | | | 2.78 | $6.6 \times 10^{-5}$ | | | | |
| GS-21 | UD | 9.0 - 11.0 | Brown silty SAND | 46.1 | NP | NP | SM | 109.9 | 13.3 | | | 2.73 | $1.4 \times 10^{-4}$ | | | | |
| GS-21 | SS | 49.5 – 51.0 | Gray silty SAND | 38.9 | NP | NP | SM | | | | | 2.75 | | | | | |
| GS-22 | SS | 4.5 - 6.0 | Light brown SILT with sand | 79.2 | NP | NP | ML | | | | | 2.69 | | | | | |
| GS-23 | SS | 1.0 - 2.5 | Reddish brown elastic SILT w/sand | 80.4 | 54 | 18 | MH | | | | | 2.73 | | | | | |
| GS-23 | SS | 14.5 – 16.0 | Light brown SILT w/sand | 71 | NP | NP | ML | | | | | 2.70 | | | | | |
| GS-23 | SS | 39.5 – 41.0 | Light gray silty SAND | 43.1 | NP | NP | SM | | | | | 2.86 | | | | | |
| GS-26 | UD | 1.0 - 3.0 | Light brown silty SAND | 35.4 | NP | NP | SM | 102.5 | 12.2 | | | 2.74 | | | | | |
| GS-26 | UD | 10.0 – 12.0 | Brown silty SAND | 33.6 | NP | NP | SM | 109.9 | 13.2 | | | 2.73 | | | | | |
| GS-28 | UD | 4.0 - 6.0 | Reddish brown sandy SILT | 55.5 | NP | NP | ML | 96.9 | 13.1 | | | 2.78 | $2.3 \times 10^{-5}$ | | | | |
| GS-28 | UD | 11.0 – 12.5 | Lavender sandy SILT | 51.4 | NP | NP | ML | 100.4 | 15.5 | | | 2.75 | $7.1 \times 10^{-5}$ | | | | |
| GS-29 | Bulk | 1.0 - 2.5 | | | | | | | | 100.2 | 21.8 | | $1.7 \times 10^{-7}$ | 98.2 | 23.3 | | |
| GS-29 | SS | 3.0 - 4.5 | Reddish brown silty SAND | 44.3 | 43 | 12 | SM | | | | | 2.79 | | | | | |
| GS-29 | Bulk | 6.0 - 8.0 | | | | | | | | 101.5 | 20.6 | | $5.7 \times 10^{-7}$ | 98.9 | 22.2 | | |
| GS-29 | SS | 13.0 – 14.5 | Light brown sandy SILT | 55.3 | NP | NP | ML | | | | | 2.77 | | | | | |
| GS-29 | SS | 37.0 – 39.5 | Light brown sandy SILT | 32 | NP | NP | SM | | | | | 2.77 | | | | | |

LL – Liquid Limit
PI – Plasticity Index
% Fines – Sieve Analysis
SS – Split Spoon Sample
USCS – Unified Soil Classification System Designation

CEC – Cation Exchange Capacity
$K_d$ – Sorption Coefficient
Gs – Specific Gravity
UD – Undisturbed Sample
NP – Non Plastic

## 3.3 Soil and Rock Description

### *3.3.1 Soil Description*

The soils over the proposed disposal area consist primarily of light brown to reddish brown, sandy silt, silty sand, and sandy lean clay, with occasional fragments of the underlying rock. The thickness of the soil encountered in the borings is variable, from thin (less than five feet) to as much as 61 feet. Laboratory tests classify the soils as ML, MH, SM and CL.

The soil cover is underlain by saprolite typical of Piedmont settings. This saprolite retains relict features of the parent rock such as schistocity (schists) and banding (gneisses) while having the texture of a soil. Described as dense and red to gray to black in color, the saprolite may be as much as 60 feet thick.

### *3.3.2 Rock Description*

Rock coring began at auger refusal using an HQ (2.5 inch diameter core) wire-line coring system. Top of rock is irregular, ranging from 6.5 feet below ground surface to as much as 75 feet below the ground surface. The rock consists of interbedded dark gray to greenish gray augen schist, mica garnet schist and black and white to gray to pink and gray augen gneiss and biotite gneiss. Pyrite, calcite laminations and quartzite veins are common. Large porphyroblasts of pink feldspar occur in several intervals. Manganese oxides are observed in fractures, which are numerous and often steep. Weathering due to water movement is observed along open fractures. Iron staining from water movement along fractures is common.

Top of rock is slightly to strongly weathered but becomes unweathered with depth. Core recovery ranged from poor (26%) to excellent (100%), averaging 92%. Recovery increased significantly with depth as the rock became less weathered. RQD ranged from 0% to 100%, averaging 67%. RQD also increased significantly with depth. Geologic cross-sections A-A and B-B of the site are shown on Figure 3-2.

## 3.4 Hydrogeologic Assessment

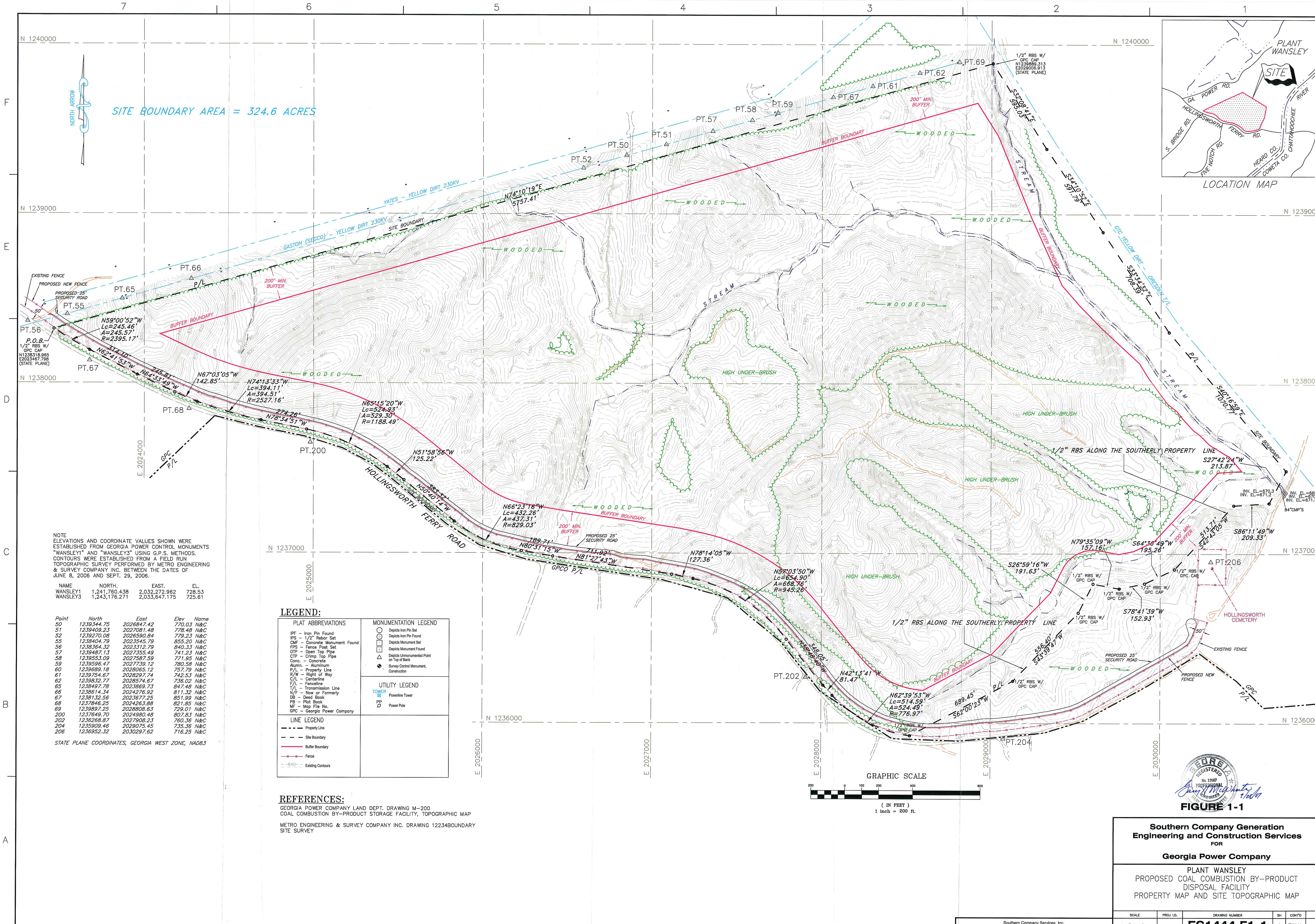
### *3.4.1 Description of Unconfined Aquifers*

Temporary piezometers were installed in borings GS-1 through GS-31 with screened intervals in either the lower portion of the saprolite or the upper part of rock. The top of casing elevations, depths to groundwater and groundwater elevations are indicated in Table 3-3. The piezometer logs are located in Appendix H. Groundwater potentiometric maps were prepared for the unconfined groundwater surface aquifer from groundwater readings taken on November 17, 2006 and April 19, 2007. The April readings represent the highest groundwater levels to date. Both maps indicate that the general groundwater flow is from the south and west towards the creek that runs from west to east to the Chattahoochee River.

This flow is generally through the saprolite and partially weathered rock and is recharged by infiltration of storm water within the site itself. The groundwater potentiometric surfaces are represented on Figures 3-3 and 3-4.

Table 3-3
Depth to Groundwater and Groundwater Elevations

| Boring | Date Installed | TOC Elev. | Depth to GW 11/17/06 | GW Elev. 11/17/06 | Depth to GW 12/06/06 | GW Elev. 12/06/06 | Depth to GW 2/19/07 | GW Elev. 2/19/07 | Depth to GW 3/19/07 | GW Elev. 3/19/07 | Depth to GW 4/19/07 | GW Elev. 4/19/07 | Depth to GW 5/14/07 | GW Elev. 5/14/07 | Depth to GW 6/12/07 | GW Elev. 6/12/07 | Depth to GW 7/2/07 | GW Elev. 7/2/07 | Depth to GW 8/20/07 | GW Elev. 8/20/07 | Depth to GW 9/13/07 | GW Elev. 9/13/07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-1 | 10/12/06 | 850.30 | 32.80 | 817.50 | 33.00 | 817.30 | 33.24 | 817.06 | 33.35 | 816.95 | 33.48 | 816.82 | 33.89 | 816.41 | 34.33 | 815.97 | 34.61 | 815.69 | 34.56 | 815.74 | 34.90 | 815.40 |
| GS-2 | 10/23/06 | 837.07 | 33.32 | 803.75 | 31.33 | 805.74 | 29.68 | 807.39 | 29.38 | 807.69 | 28.84 | 808.23 | 29.03 | 808.04 | 29.75 | 807.32 | 29.93 | 807.14 | 30.15 | 806.92 | 31.77 | 805.30 |
| GS-3 | 10/23/06 | 806.32 | 29.25 | 777.07 | 28.30 | 778.02 | 25.03 | 781.29 | 25.10 | 781.22 | 25.15 | 781.17 | 26.01 | 780.31 | 27.69 | 778.63 | 28.85 | 777.47 | 30.38 | 775.94 | 31.09 | 775.23 |
| GS-4 | 10/24/06 | 808.99 | 17.19 | 791.80 | 17.73 | 791.26 | 18.10 | 790.89 | 16.98 | 792.01 | 16.70 | 792.29 | 17.42 | 791.57 | 17.36 | 791.63 | 17.58 | 791.41 | 18.20 | 790.79 | 18.37 | 790.62 |
| GS-5 | 10/22/06 | 775.97 | 26.53 | 749.44 | 26.67 | 749.30 | 26.76 | 749.21 | 26.77 | 749.20 | 26.35 | 749.62 | 26.74 | 749.23 | 27.15 | 748.82 | 27.05 | 748.92 | 26.82 | 749.15 | 26.80 | 749.17 |
| GS-6 | 10/21/06 | 769.71 | 19.55 | 750.16 | 19.62 | 750.09 | 17.16 | 752.55 | 17.01 | 752.70 | 17.70 | 752.01 | 17.90 | 751.81 | 19.48 | 750.23 | 20.53 | 749.18 | 22.10 | 747.61 | 22.66 | 747.05 |
| GS-7 | 10/11/06 | 797.43 | 40.65 | 756.78 | 46.36 | 751.07 | 44.98 | 752.45 | 44.60 | 752.83 | 44.56 | 752.87 | 45.13 | 752.30 | 45.93 | 751.50 | 46.09 | 751.34 | 47.69 | 749.74 | 48.40 | 749.03 |
| GS-8 | 10/11/06 | 769.40 | 18.55 | 750.85 | 18.42 | 750.98 | 16.66 | 752.74 | 16.85 | 752.55 | 16.48 | 752.92 | 18.41 | 750.99 | 19.26 | 750.14 | 19.94 | 749.46 | 21.07 | 748.33 | 21.81 | 747.59 |
| GS-9 | 10/12/06 | 776.44 | 26.84 | 749.60 | 26.40 | 750.04 | 24.33 | 752.11 | 24.10 | 752.34 | 23.72 | 752.72 | 24.89 | 751.55 | 26.28 | 750.16 | 27.31 | 749.13 | 28.78 | 747.66 | 29.53 | 746.91 |
| GS-10 | 10/20/06 | 764.18 | 35.00 | 729.18 | 35.74 | 728.44 | 32.31 | 731.87 | 32.31 | 731.87 | 32.79 | 731.39 | 32.86 | 731.32 | 33.17 | 731.01 | 34.66 | 729.52 | 35.80 | 728.38 | 36.27 | 727.91 |
| GS-11 | 10/20/06 | 776.63 | 42.61 | 734.02 | 42.32 | 734.31 | 40.97 | 735.66 | 40.58 | 736.05 | 40.36 | 736.27 | 40.73 | 735.90 | 41.43 | 735.20 | 42.35 | 734.28 | 42.88 | 733.75 | 43.19 | 733.44 |
| GS-12 | 10/19/06 | 775.70 | 48.18 | 727.52 | 48.12 | 727.58 | 46.78 | 728.92 | 46.70 | 729.00 | 46.68 | 729.02 | 47.31 | 728.39 | 48.00 | 727.70 | 48.32 | 727.38 | 49.21 | 726.49 | 49.34 | 726.36 |
| GS-13 | 10/10/06 | 783.96 | 18.69 | 765.27 | 18.48 | 765.48 | 14.33 | 769.63 | 13.46 | 770.50 | 13.39 | 770.57 | 14.09 | 769.87 | 16.24 | 767.72 | 17.52 | 766.44 | 19.80 | 764.16 | 20.60 | 763.36 |
| GS-14 | 10/18/06 | 740.82 | 21.27 | 719.55 | 21.76 | 719.06 | 20.51 | 720.31 | 21.19 | 719.63 | 21.17 | 719.65 | 23.06 | 717.76 | 24.81 | 716.01 | 25.42 | 715.40 | 26.75 | 714.07 | 27.10 | 713.72 |
| GS-15 | 10/19/06 | 722.61 | 15.51 | 707.10 | 16.84 | 705.77 | 11.26 | 711.35 | 13.15 | 709.46 | 14.57 | 708.04 | 16.04 | 706.57 | 18.32 | 704.29 | 19.33 | 703.28 | 20.95 | 701.66 | 21.57 | 701.04 |
| GS-16 | 10/18/06 | 713.11 | 20.44 | 692.67 | 20.67 | 692.44 | 20.17 | 692.94 | 20.55 | 692.56 | 20.42 | 692.69 | 21.87 | 691.24 | 22.95 | 690.16 | 23.23 | 689.88 | 23.90 | 689.21 | 23.36 | 689.75 |
| GS-17 | 10/5/06 | 758.78 | 22.66 | 736.12 | 22.00 | 736.78 | 19.88 | 738.90 | 21.17 | 737.61 | 20.58 | 738.20 | 20.99 | 737.79 | 21.46 | 737.32 | 21.75 | 737.03 | 24.80 | 733.98 | 25.5 | 733.28 |
| GS-18 | 10/4/06 | 733.45 | 15.07 | 718.38 | 15.79 | 717.66 | 15.18 | 718.27 | 15.21 | 718.24 | 15.14 | 718.31 | 15.54 | 717.91 | 16.00 | 717.45 | 16.13 | 717.32 | 17.45 | 716.00 | 17.61 | 715.84 |
| GS-19 | 9/27/06 | 752.89 | dry | dry | dry | dry | 21.99 | 730.90 | 21.91 | 730.98 | 21.68 | 731.21 | 20.79 | 732.10 | 21.83 | 731.06 | 23.13 | 729.76 | dry | dry | dry | dry |
| GS-20 | 10/3/06 | 716.61 | 19.58 | 697.03 | 20.47 | 696.14 | 19.31 | 697.30 | 19.46 | 697.15 | 19.32 | 697.29 | 20.62 | 695.99 | 21.68 | 694.93 | 21.92 | 694.69 | 22.84 | 693.77 | 22.65 | 693.96 |
| GS-21 | 10/2/06 | 792.11 | 35.03 | 757.08 | 35.16 | 756.95 | 33.15 | 758.96 | 32.70 | 759.41 | 32.45 | 759.66 | 32.84 | 759.27 | 33.52 | 758.59 | 33.72 | 758.39 | 35.79 | 756.32 | 36.49 | 755.62 |
| GS-22 | 10/3/06 | 732.71 | - | - | 36.22 | 696.49 | 35.30 | 697.41 | 34.95 | 697.76 | 34.63 | 698.08 | 34.74 | 697.97 | 35.10 | 697.61 | 35.50 | 697.21 | 36.61 | 696.10 | 36.85 | 695.86 |
| GS-23 | 10/4/06 | 700.73 | 18.03 | 682.70 | 18.45 | 682.28 | 17.93 | 682.80 | 18.44 | 682.29 | 18.52 | 682.21 | 19.65 | 681.08 | 21.29 | 679.44 | 21.68 | 679.05 | 22.49 | 678.24 | 22.22 | 678.51 |
| GS-24 | 10/5/06 | 728.21 | 42.18 | 686.03 | 42.54 | 685.67 | 40.97 | 687.24 | 40.59 | 687.62 | 40.33 | 687.88 | 40.56 | 687.65 | 41.29 | 686.92 | 41.79 | 686.42 | 43.05 | 685.16 | 43.18 | 685.03 |
| GS-25 | 9/26/06 | 788.47 | 18.05 | 770.42 | 20.81 | 767.66 | 18.44 | 770.03 | 18.74 | 769.73 | 19.09 | 769.38 | 19.68 | 768.79 | 20.47 | 768.00 | 21.18 | 767.29 | 22.65 | 765.82 | 23.18 | 765.29 |
| GS-26 | 9/27/06 | 748.14 | 28.89 | 719.25 | 22.26 | 725.88 | 26.81 | 721.33 | 27.10 | 721.04 | 27.40 | 720.74 | 28.20 | 719.94 | 29.80 | 718.34 | 30.18 | 717.96 | 30.80 | 717.34 | 31.92 | 716.22 |
| GS-27 | 10/3/06 | 702.67 | 13.61 | 689.06 | 13.95 | 688.72 | 13.77 | 688.90 | 14.15 | 688.52 | 13.78 | 688.89 | 15.25 | 687.42 | 16.91 | 685.76 | 17.38 | 685.29 | 18.76 | 683.91 | 19.17 | 683.50 |
| GS-28 | 9/12/06 | 816.37 | 42.88 | 773.49 | 44.80 | 771.57 | 42.83 | 773.54 | 42.15 | 774.22 | 41.69 | 774.68 | 42.06 | 774.31 | 42.87 | 773.50 | 43.05 | 773.32 | 45.72 | 770.65 | 46.40 | 769.97 |
| GS-29 | 9/14/06 | 749.67 | 19.81 | 729.86 | 19.14 | 730.53 | 17.03 | 732.64 | 17.51 | 732.16 | 18.03 | 731.64 | 19.06 | 730.61 | 42.87 | 706.80 | 20.98 | 728.69 | 22.03 | 727.64 | 24.29 | 725.38 |
| GS-30 | 9/19/06 | 717.54 | 14.92 | 702.62 | 15.22 | 702.32 | 14.28 | 703.26 | 14.54 | 703.00 | 14.46 | 703.08 | 15.42 | 702.12 | 17.10 | 700.44 | 17.52 | 700.02 | 19.92 | 697.62 | 20.35 | 697.19 |
| GS-31 | 10/21/06 | 846.39 | 26.93 | 819.46 | 24.94 | 821.45 | 24.04 | 822.35 | 23.87 | 822.52 | 23.82 | 822.57 | 24.18 | 822.21 | 24.31 | 822.08 | 24.52 | 821.87 | 25.62 | 820.77 | 25.61 | 820.78 |




NOTE
ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS. CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY METRO ENGINEERING & SURVEY COMPANY INC. BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

| NAME | NORTH. | EAST. | EL. |
|---|---|---|---|
| WANSLEY1 | 1,241,760.438 | 2,032,272.962 | 728.53 |
| WANSLEY3 | 1,243,176.271 | 2,033,647.175 | 725.61 |

| Point | North | East | Elev | Name |
|---|---|---|---|---|
| 50 | 1239344.75 | 2026847.42 | 770.03 | N&C |
| 51 | 1239409.23 | 2027081.48 | 778.48 | N&C |
| 52 | 1239270.08 | 2026590.84 | 779.23 | N&C |
| 55 | 1238404.79 | 2023545.79 | 855.20 | N&C |
| 56 | 1238364.32 | 2023312.79 | 840.33 | N&C |
| 57 | 1239487.13 | 2027355.49 | 741.23 | N&C |
| 58 | 1239553.09 | 2027587.59 | 771.95 | N&C |
| 59 | 1239596.47 | 2027739.12 | 780.58 | N&C |
| 60 | 1239689.18 | 2028065.12 | 757.79 | N&C |
| 61 | 1239754.67 | 2028297.74 | 742.53 | N&C |
| 62 | 1239832.77 | 2028574.67 | 736.02 | N&C |
| 65 | 1238497.78 | 2023869.73 | 847.48 | N&C |
| 66 | 1238614.34 | 2024276.92 | 811.32 | N&C |
| 67 | 1238132.56 | 2023677.25 | 851.99 | N&C |
| 68 | 1237846.25 | 2024263.88 | 821.85 | N&C |
| 69 | 1239897.25 | 2028808.63 | 729.01 | N&C |
| 200 | 1237649.70 | 2024980.48 | 807.83 | N&C |
| 202 | 1236268.87 | 2027908.23 | 760.36 | N&C |
| 204 | 1235909.46 | 2029075.45 | 735.36 | N&C |
| 206 | 1236952.32 | 2030297.62 | 716.25 | N&C |

STATE PLANE COORDINATES, GEORGIA WEST ZONE, NAD83

## LEGEND:

**PLAT ABBREVIATIONS**

IPF – Iron Pin Found
IPS – 1/2" Rebar Set
CMF – Concrete Monument Found
FPS – Fence Post Set
OTP – Open Top Pipe
CTP – Crimp Top Pipe
Conc. – Concrete
Alumn. – Aluminum
P/L – Property Line
R/W – Right of Way
C/L – Centerline
F/L – Fenceline
T/L – Transmission Line
N/F – Now or Formerly
DB – Deed Book
PB – Plat Book
MF – Map File No.
GPC – Georgia Power Company

**MONUMENTATION LEGEND**

Depicts Iron Pin Set
Depicts Iron Pin Found
Depicts Monument Set
Depicts Monument Found
Depicts Unmonumented Point on Top of Bank
Survey Control Monument, Construction

**UTILITY LEGEND**

TOWER Powerline Tower
PP Power Pole

**LINE LEGEND**

Property Line
Site Boundary
Buffer Boundary
Fence
-840- Existing Contours


## REFERENCES:

GEORGIA POWER COMPANY LAND DEPT. DRAWING M-200
COAL COMBUSTION BY-PRODUCT STORAGE FACILITY, TOPOGRAPHIC MAP

METRO ENGINEERING & SURVEY COMPANY INC. DRAWING 12234BOUNDARY SITE SURVEY


GEORGIA REGISTERED No. 12687 PROFESSIONAL ENGINEER GARY H. McWHORTER
Gary H McWhorter 9/28/07

**FIGURE 1-1**

**Southern Company Generation Engineering and Construction Services**
**FOR**
**Georgia Power Company**

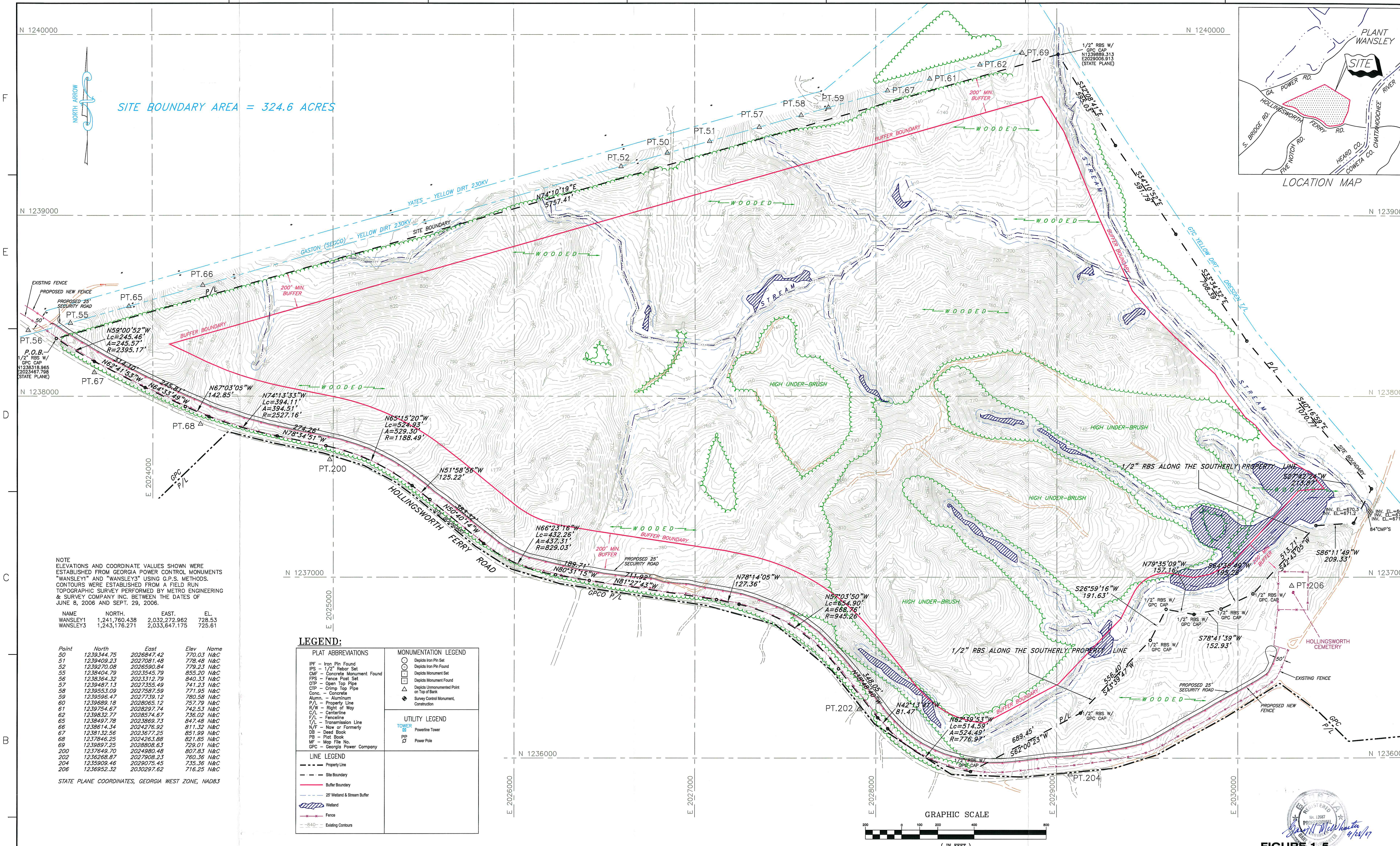
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
PROPERTY MAP AND SITE TOPOGRAPHIC MAP

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"=200' | | ES1444 F1-1 | 1 | FINAL |



Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\ES1444 SAR\dwg\ES1444_F1-1.dwg Sep 25, 2007 - 3:43pm

ANSI F: 40x28 Acad2004




NOTE

ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS. CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY METRO ENGINEERING & SURVEY COMPANY INC. BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

| NAME | NORTH. | EAST. | EL. |
|---|---|---|---|
| WANSLEY1 | 1,241,760.438 | 2,032,272.962 | 728.53 |
| WANSLEY3 | 1,243,176.271 | 2,033,647.175 | 725.61 |

| Point | North | East | Elev | Name |
|---|---|---|---|---|
| 50 | 1239344.75 | 2026847.42 | 770.03 | N&C |
| 51 | 1239409.23 | 2027081.48 | 778.48 | N&C |
| 52 | 1239270.08 | 2026590.84 | 779.23 | N&C |
| 55 | 1238404.79 | 2023545.79 | 855.20 | N&C |
| 56 | 1238364.32 | 2023312.79 | 840.33 | N&C |
| 57 | 1239487.13 | 2027355.49 | 741.23 | N&C |
| 58 | 1239553.09 | 2027587.59 | 771.95 | N&C |
| 59 | 1239596.47 | 2027739.12 | 780.58 | N&C |
| 60 | 1239689.18 | 2028065.12 | 757.79 | N&C |
| 61 | 1239754.67 | 2028297.74 | 742.53 | N&C |
| 62 | 1239832.77 | 2028574.67 | 736.02 | N&C |
| 65 | 1238497.78 | 2023869.73 | 847.48 | N&C |
| 66 | 1238614.34 | 2024276.92 | 811.32 | N&C |
| 67 | 1238132.56 | 2023677.25 | 851.99 | N&C |
| 68 | 1237846.25 | 2024263.88 | 821.85 | N&C |
| 69 | 1239897.25 | 2028808.63 | 729.01 | N&C |
| 200 | 1237649.70 | 2024980.48 | 807.83 | N&C |
| 202 | 1236268.87 | 2027908.23 | 760.36 | N&C |
| 204 | 1235909.46 | 2029075.45 | 735.36 | N&C |
| 206 | 1236952.32 | 2030297.62 | 716.25 | N&C |

STATE PLANE COORDINATES, GEORGIA WEST ZONE, NAD83

**FIGURE 1-5**

**Southern Company Generation Engineering and Construction Services**
**FOR**
**Georgia Power Company**

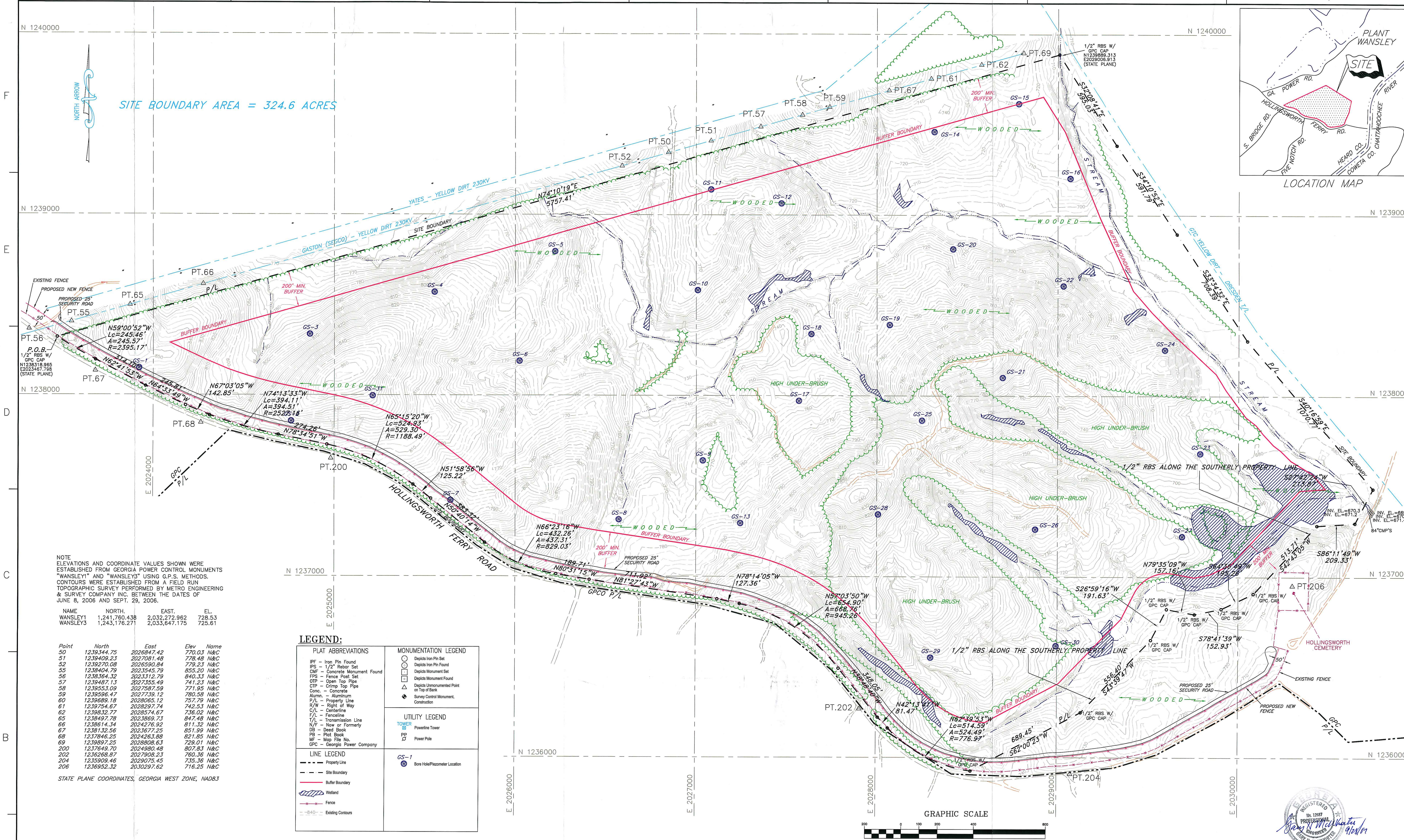
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
WETLAND & STREAM BUFFERS

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"=200' | | ES1444 F1-5 | 1 | FINAL |



Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\ES1444 SAR\dwg\ES1444_F1-5.dwg Sep 25, 2007 - 2:26pm

ANSI F: 40x28 Acad2004




NOTE
ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS. CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY METRO ENGINEERING & SURVEY COMPANY INC. BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

| NAME | NORTH. | EAST. | EL. |
|---|---|---|---|
| WANSLEY1 | 1,241,760.438 | 2,032,272.962 | 728.53 |
| WANSLEY3 | 1,243,176.271 | 2,033,647.175 | 725.61 |

| Point | North | East | Elev | Name |
|---|---|---|---|---|
| 50 | 1239344.75 | 2026847.42 | 770.03 | N&C |
| 51 | 1239409.23 | 2027081.48 | 778.48 | N&C |
| 52 | 1239270.08 | 2026590.84 | 779.23 | N&C |
| 55 | 1238404.79 | 2023545.79 | 855.20 | N&C |
| 56 | 1238364.32 | 2023312.79 | 840.33 | N&C |
| 57 | 1239487.13 | 2027355.49 | 741.23 | N&C |
| 58 | 1239553.09 | 2027587.59 | 771.95 | N&C |
| 59 | 1239596.47 | 2027739.12 | 780.58 | N&C |
| 60 | 1239689.18 | 2028065.12 | 757.79 | N&C |
| 61 | 1239754.67 | 2028297.74 | 742.53 | N&C |
| 62 | 1239832.77 | 2028574.67 | 736.02 | N&C |
| 65 | 1238497.78 | 2023869.73 | 847.48 | N&C |
| 66 | 1238614.34 | 2024276.92 | 811.32 | N&C |
| 67 | 1238132.56 | 2023677.25 | 851.99 | N&C |
| 68 | 1237846.25 | 2024263.88 | 821.85 | N&C |
| 69 | 1239897.25 | 2028808.63 | 729.01 | N&C |
| 200 | 1237649.70 | 2024980.48 | 807.83 | N&C |
| 202 | 1236268.87 | 2027908.23 | 760.36 | N&C |
| 204 | 1235909.46 | 2029075.45 | 735.36 | N&C |
| 206 | 1236952.32 | 2030297.62 | 716.25 | N&C |

STATE PLANE COORDINATES, GEORGIA WEST ZONE, NAD83

REGISTERED PROFESSIONAL ENGINEER No. 12687 GEORGIA GARY H. McWHORTER
Gary H McWhorter 9/28/07

**FIGURE 3-1**

**Southern Company Generation Engineering and Construction Services**
**FOR**
**Georgia Power Company**

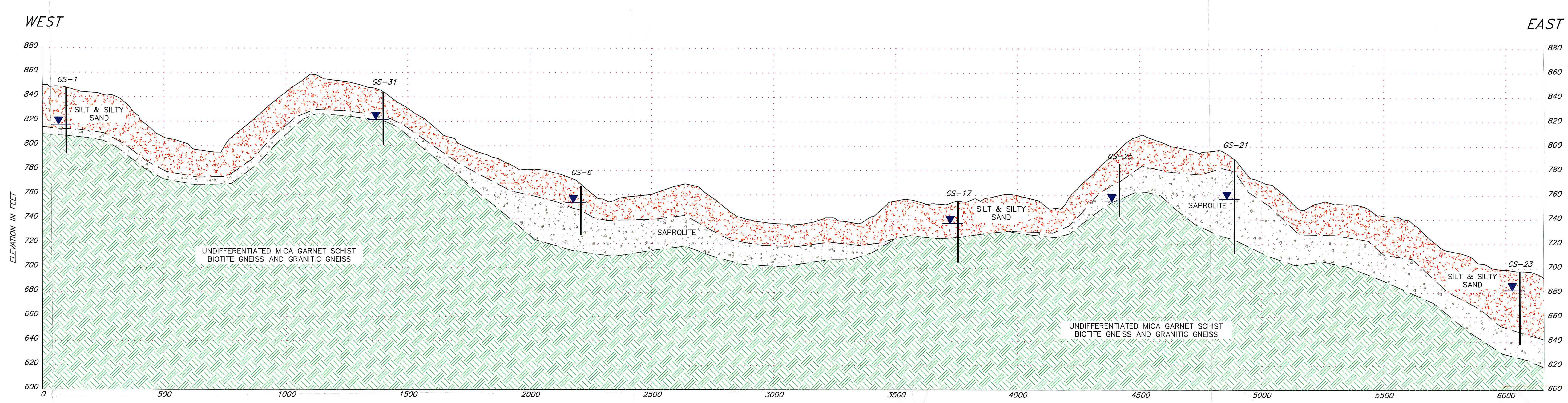
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
BORE HOLE/PIEZOMETER LOCATIONS



| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"=200' | | ES1444 F3-1 | 1 | FINAL |

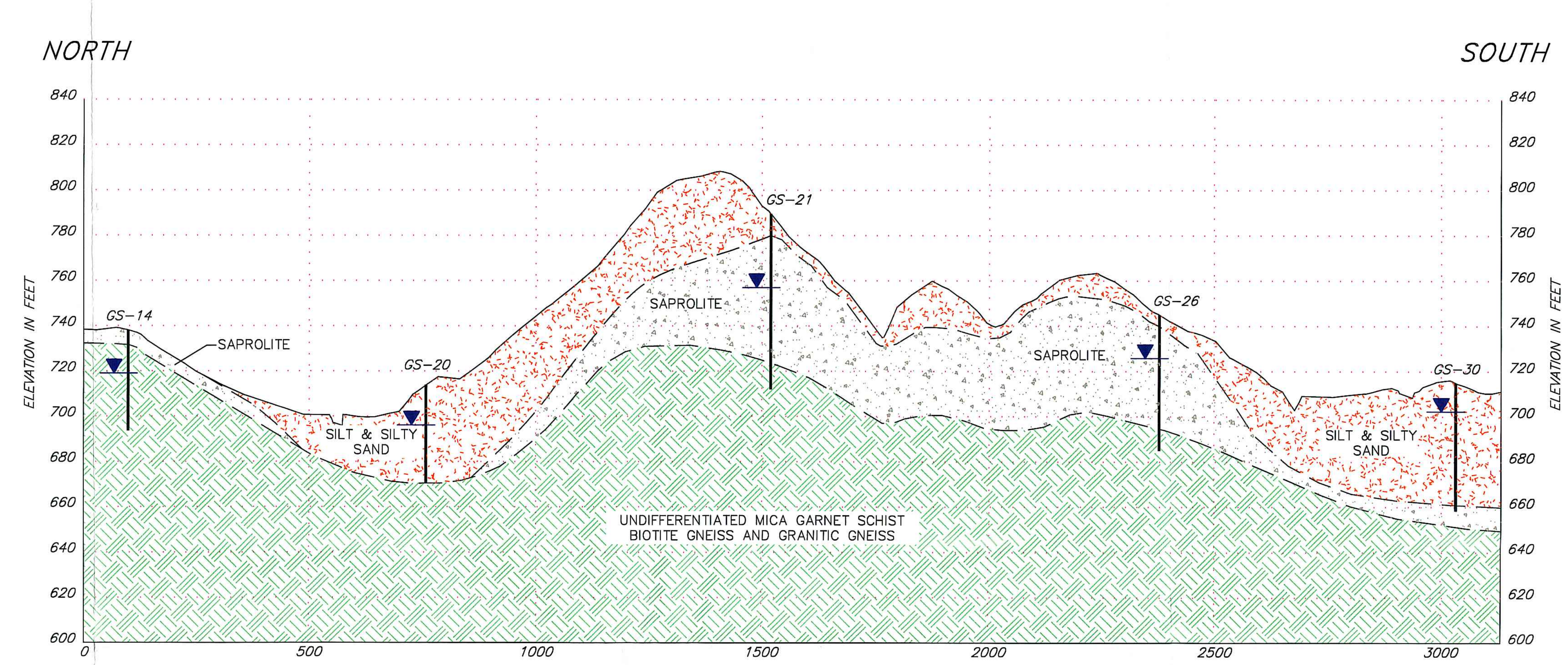
Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F3-1.dwg Sep 25, 2007 - 2:12pm

ANSI F: 40x28 Acad2004



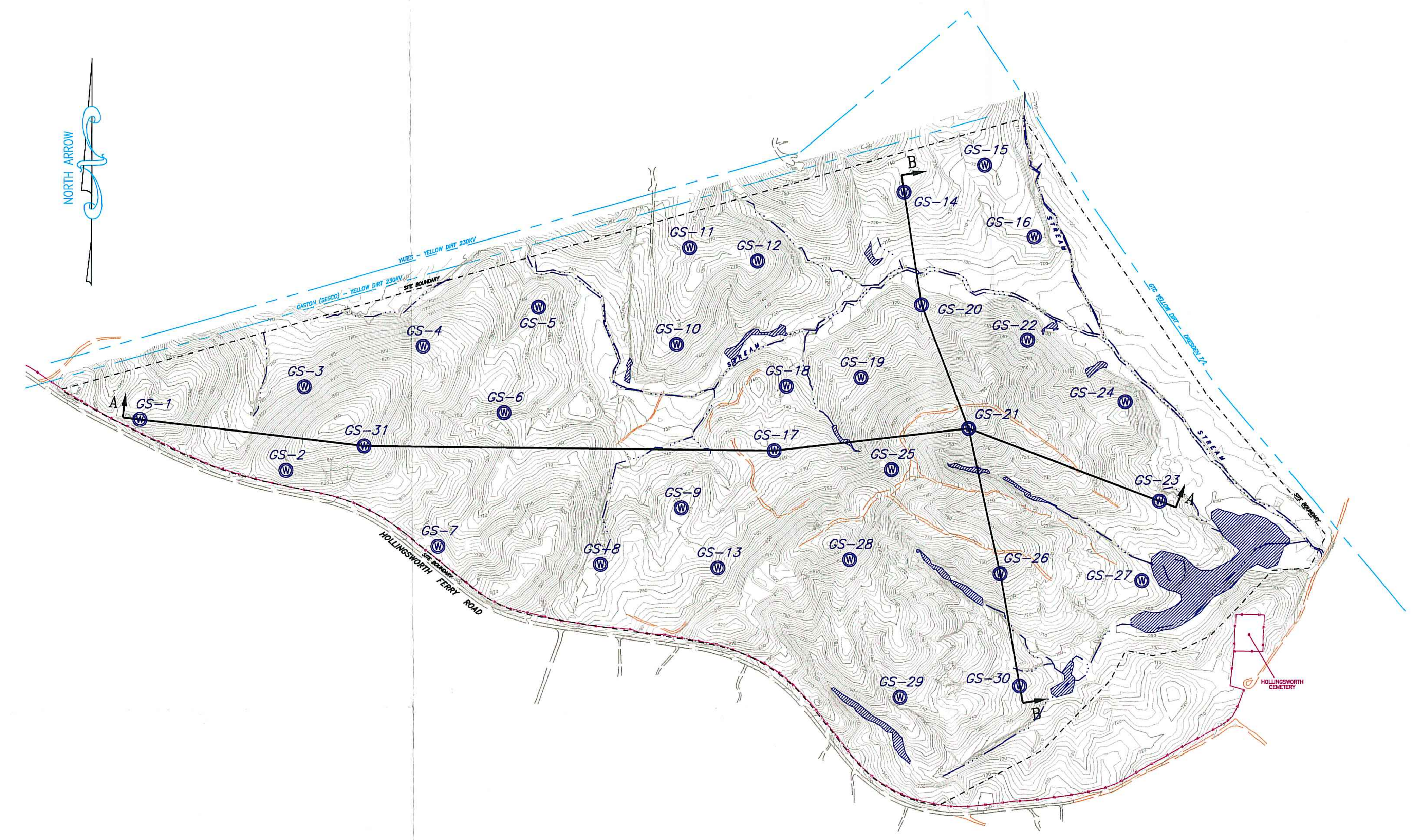

## GEOLOGIC CROSS-SECTION A-A

SCALE H: 1"=200' V: 1"=40'




## GEOLOGIC CROSS-SECTION B-B

SCALE H: 1"=200' V: 1"=40'




## KEY PLAN

SCALE : 1"=500'

**LEGEND:**

GROUNDWATER ELEVATION 12/6/2006

GS-1 PIEZOMETER

RHONDA J. TINSLEY GEORGIA REGISTERED PROFESSIONAL GEOLOGIST No. 001671

**FIGURE 3-2**

**Southern Company Generation Engineering and Construction Services**
FOR
**Georgia Power Company**

PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
GEOLOGIC CROSS-SECTION A-A ALONG STRIKE AND CROSS-SECTION B-B PERPENDICULAR TO STRIKE

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| AS SHOWN | | ES1444 F3-2 | 1 | FINAL |



Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F3-2.dwg Sep 25, 2007 - 2:14pm

ANSI F: 40x28 Acad2004


NOTE
ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS. CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY METRO ENGINEERING & SURVEY COMPANY INC. BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

**FIGURE 3-3**

**Southern Company Generation Engineering and Construction Services**
FOR
**Georgia Power Company**

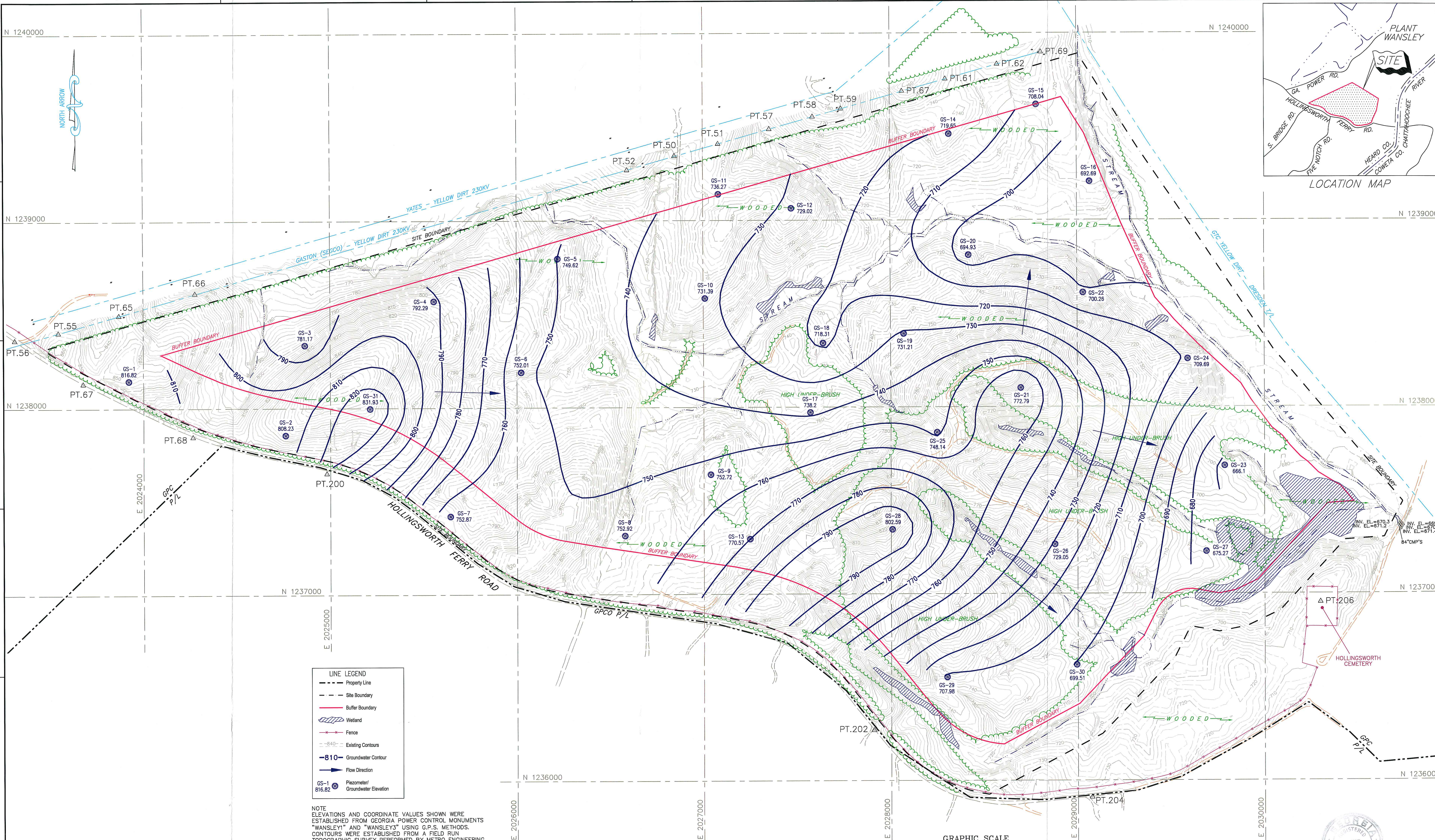
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
POTENTIOMETRIC SURFACE MAP 11/17/06



| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"=200' | | ES1444 F3-3 | 1 | FINAL |

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F3-3.dwg Sep 25, 2007 - 2:16pm

ANSI F: 40x28 Acad2004




NOTE
ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS. CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY METRO ENGINEERING & SURVEY COMPANY INC. BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

**FIGURE 3-4**

**Southern Company Generation Engineering and Construction Services**
FOR
**Georgia Power Company**

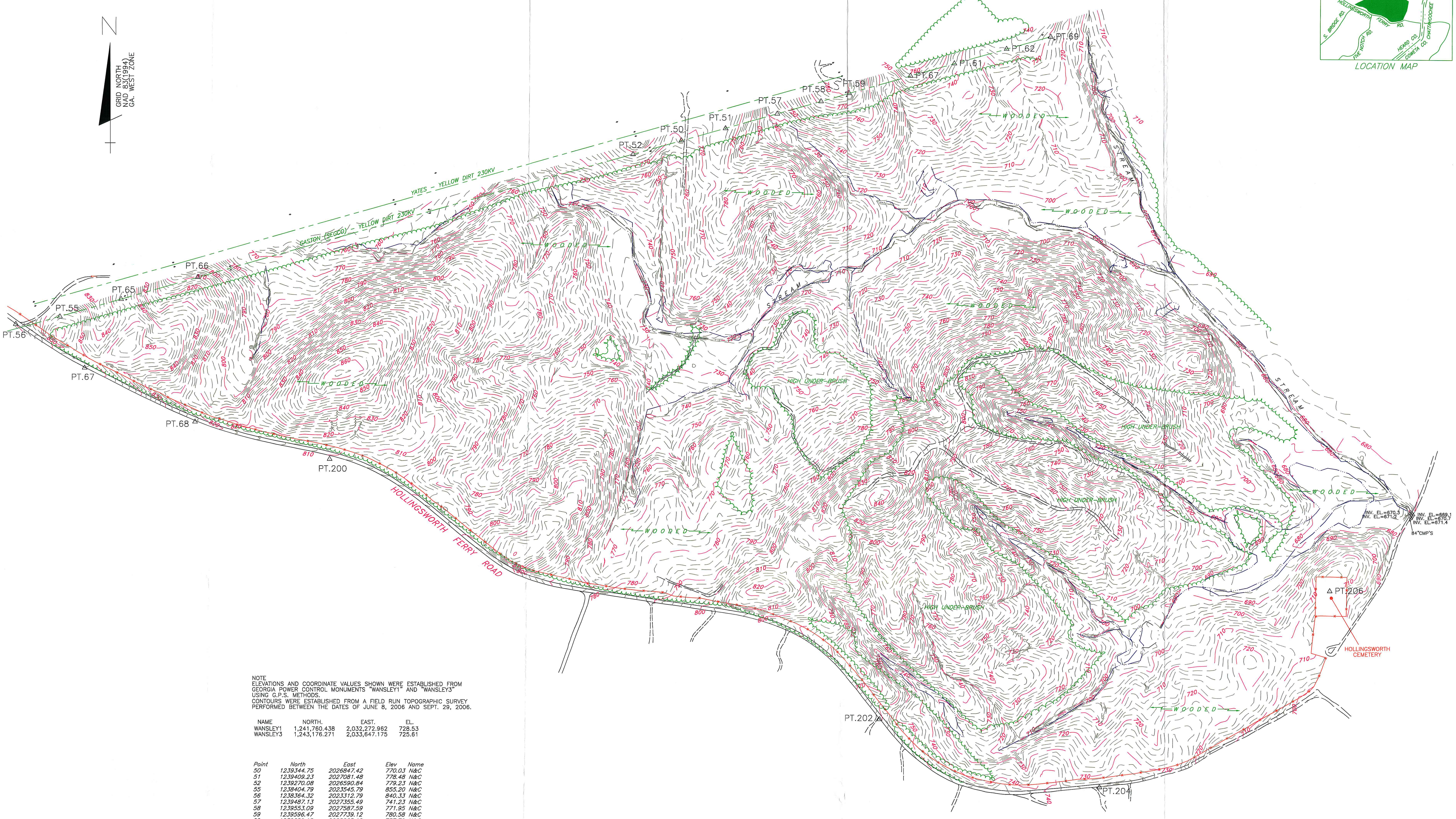
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
POTENTIOMETRIC SURFACE MAP 4/19/07

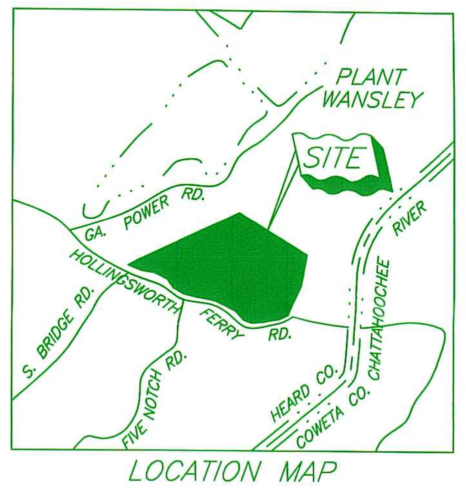
| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"=200' | | ES1444 F3-4 | 1 | FINAL |



Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F3-4.dwg Sep 25, 2007 - 2:18pm

ANSI F: 40x28 Acad2004




NOTE
ELEVATIONS AND COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS.
CONTOURS WERE ESTABLISHED FROM A FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BETWEEN THE DATES OF JUNE 8, 2006 AND SEPT. 29, 2006.

| NAME | NORTH. | EAST. | EL. |
|---|---|---|---|
| WANSLEY1 | 1,241,760.438 | 2,032,272.962 | 728.53 |
| WANSLEY3 | 1,243,176.271 | 2,033,647.175 | 725.61 |

| Point | North | East | Elev | Name |
|---|---|---|---|---|
| 50 | 1239344.75 | 2026847.42 | 770.03 | N&C |
| 51 | 1239409.23 | 2027081.48 | 778.48 | N&C |
| 52 | 1239270.08 | 2026590.84 | 779.23 | N&C |
| 55 | 1238404.79 | 2023545.79 | 855.20 | N&C |
| 56 | 1238364.32 | 2023312.79 | 840.33 | N&C |
| 57 | 1239487.13 | 2027355.49 | 741.23 | N&C |
| 58 | 1239553.09 | 2027587.59 | 771.95 | N&C |
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| 60 | 1239689.18 | 2028065.12 | 757.79 | N&C |
| 61 | 1239754.67 | 2028297.74 | 742.53 | N&C |
| 62 | 1239832.77 | 2028574.67 | 736.02 | N&C |
| 65 | 1238497.78 | 2023869.73 | 847.48 | N&C |
| 66 | 1238614.34 | 2024276.92 | 811.32 | N&C |
| 67 | 1238132.56 | 2023677.25 | 851.99 | N&C |
| 68 | 1237846.25 | 2024263.88 | 821.85 | N&C |
| 69 | 1239897.25 | 2028808.63 | 729.01 | N&C |
| 200 | 1237649.70 | 2024980.48 | 807.83 | N&C |
| 202 | 1236268.87 | 2027908.23 | 760.36 | N&C |
| 204 | 1235909.46 | 2029075.45 | 735.36 | N&C |
| 206 | 1236952.32 | 2030297.62 | 716.25 | N&C |

## CERTIFICATION:

THIS TOPOGRAPHIC MAP WAS PREPARED BY METRO ENGINEERING & SURVEYING CO., INC. FROM A GROUND RUN TOPOGRAPHIC SURVEY. I CERTIFY THAT THIS TOPOGRAPHIC MAP WAS GENERATED AT 1"= 100' WITH A CONTOUR ACCURACY OF 1 FT. BASED ON NATIONAL MAPPING STANDARDS.

Gary H. McWhorter 9/28/07

GARY H. McWHORTER, P.E.
GA. REG. NO. 012687

REGISTERED No. 12687 PROFESSIONAL ENGINEER GARY H. McWHORTER

200 0 200 400 600
SCALE IN FEET

TOPOGRAPHIC SURVEY AREA = 363.0 ACRES

PATH - T:\Working\ASH\Wansley\20060306 CCB Storage Facility\Plant Wansly CCB Storage Facility.dwg

GEORGIA POWER CO., ATLANTA, GA.
Land Department

Plant Wansley
Coal Combustion By-Product Storage Facility
Topographic Map
Heard County, Georgia

REVISION BLOCK

APPROVALS

| DR. Metro | TR. | Checked |
|---|---|---|
| SCALE 1" = 200' | | DATE 10/17/2006 |

DRAWING NUMBER
M-200

Metro Engineering & Surveying Co., Inc.
Engineers • Surveyors • Photogrammetrist
Clayton / Tara Airport
186 Selfridge Road • Hampton, GA 30228
Phone: 770-707-0777
Fax: 770.707-0755
www.metro-engineering.com

THIS PLAT IS NOT VALID UNLESS SURVEYOR'S SIGNATURE APPEARS IN BLACK INK.

"QUALITY SERVICE SINCE 1967"

TOPOGRAPHIC SURVEY FOR
THE SOUTHERN COMPANY
A PORTION OF PLANT WANSLEY

| | | | REVISIONS |
|---|---|---|---|
| LAND LOTS: | | | |
| DISTRICT: | | | |
| COUNTY: | -HEARD | | DWN: JCS CHCK: JES |
| STATE: | -GEORGIA | | JOB No.: 12234 |
| DATE: | -10/17/06 | SCALE: -1"=200' | DISK: |
| | | | FILE: 12234-TOPO |


FLOOD NOTE:

THIS SITE IS NOT WITHIN A 100-YEAR FLOOD HAZARD AREA AS PER HEARD COUNTY DEPARTMENT OF HOUSING & DEVELOPMENT COMMUNITY PANEL #1301050003 LAST REVISED 8/04/1986

LEGEND

| | |
|---|---|
| IPP | IRON PIN PLACED |
| P/P | POWER POLE/TRANSMISSION STRUCTURE |
| CMP | CORRUGATED METAL PIPE |
| N.T.S. | NOT TO SCALE |
| P/L | PROPERTY LINE |

The field data upon which this plat was compiled has an average angular error of 1 second per angle, and a closure precision of one foot in 34,975 ft. and was adjusted using the Least Squares Method.

This plat has been calculated for closure and its accuracy exceeds one foot in 789,307 ft.

Linear measurements obtained using TCRA 1105. Angular measurements obtained using TCRA 1105.

NOTES:

1. METRO ENGINEERING & SURVEYING CO., INC. DOES NOT WARRANT THE EXISTENCE OR NONEXISTENCE OF ANY WETLANDS OR HAZARDOUS WASTE IN THE SURVEYED SITE.
2. THE UNITS FOR THIS SURVEY ARE U.S. FEET.
3. THE DATE OF FIELD WORK FOR THIS SURVEY IS 9-26-06 THRU 12-4-06.
4. THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON VISIBLE STRUCTURES AND MAPS OR ON THE GROUND MARKINGS PROVIDED BY THE UTILITY COMPANIES SERVICING THAT UTILITY, AND ARE APPROXIMATE ONLY. THE PROPERTY SHOWN HEREON MAY BE SERVED BY UNDERGROUND UTILITIES WHICH ARE NOT SHOWN HEREON. ALL UTILITY COMPANIES SHOULD BE CONTACTED BEFORE BEGINNING ANY DESIGN OR CONSTRUCTION.

NOTE
COORDINATE VALUES SHOWN WERE ESTABLISHED FROM GEORGIA POWER CONTROL MONUMENTS "WANSLEY1" AND "WANSLEY3" USING G.P.S. METHODS.

| NAME | NORTH. | EAST. | EL. |
|---|---|---|---|
| WANSLEY1 | 1,241,760.438 | 2,032,272.962 | 728.53 |
| WANSLEY3 | 1,243,176.271 | 2,033,647.175 | 725.61 |

PATH - T:\Working\ASH\Wansley\20060306 CCB Storage Facility\Plant Wansly CCB Storage Facility.dwg

REVISION BLOCK

APPROVALS

GEORGIA POWER CO., ATLANTA, GA.
Land Department

Plant Wansley
Coal Combustion By-Product Storage Facility
Site Boundary
Heard County, Georgia

| DR. Metro | TR. | Checked |
|---|---|---|
| SCALE 1" = 200' | | DATE 12/19/2006 |

DRAWING NUMBER
M-200-1

Metro Engineering & Surveying Co., Inc.
Engineers • Surveyors • Photogrammetrist
Clayton / Tara Airport
186 Selfridge Road • Hampton, GA 30228
Phone: 770-707-0777
Fax: 770.707-0755
www.metro-engineering.com

GEORGIA REGISTERED No. 2543 PROFESSIONAL LAND SURVEYOR JAMES R. GREEN 12/19/06

THIS PLAT IS NOT VALID UNLESS SURVEYOR'S SIGNATURE APPEARS IN BLACK INK.

MES
"QUALITY SERVICE SINCE 1967"

SITE BOUNDARY SURVEY FOR
THE SOUTHERN COMPANY
A PORTION OF PLANT WANSLEY

REVISIONS

| | |
|---|---|
| LAND LOTS: | |
| DISTRICT: | |
| COUNTY: | HEARD |
| STATE: | GEORGIA |
| DATE: 12-13-06 | SCALE: 1'=200' |

DWN: RES CHCK: JG
JOB No.: 12234
DISK:
FILE: 12234BOUNDARY

### *3.4.2 Description of Confined Aquifers*

No confined aquifers were encountered at this site. As is typical of the Southern Piedmont Physiographic province, the groundwater aquifer is unconfined.

### *3.4.3 Uppermost Aquifer Gradient*

Using depth to groundwater data collected 11/17/06, which represent the highest groundwater levels to date, the hydraulic gradient of the unconfined aquifer was computed. Gradients were computed for several areas of the site using the following equation:

$$\text{hydraulic gradient} = i = \frac{(h_1 - h_2)}{L}$$

where:

$h_1$ = groundwater elevation at up-gradient well

$h_2$ = groundwater elevation at down-gradient well

L = distance between $h_1$ and $h_2$

Table 3-4 shows the gradients calculated for the site.

**Table 3-4**
**Hydraulic Gradients**

| Wells | $h_1$ | $h_2$ | L | i |
|---|---|---|---|---|
| | ft msl | ft msl | ft | ft/ft |
| GS-28 & GS-30 | 773.49 | 702.62 | 1226.2 | 0.058 |
| GS-31 & GS-6 | 819.46 | 750.16 | 831.9 | 0.083 |
| GS-25 & GS-20 | 770.42 | 697.03 | 963.4 | 0.076 |

### *3.4.4 Field Hydraulic Conductivity (Slug) Tests*

Field hydraulic conductivity tests (slug tests) were conducted at boring locations GS-3, GS-4, GS-18, GS-21, GS-25, GS-27, and GS-29. The tests were performed in the temporary piezometers installed during the drilling program. The piezometers were installed with 2-inch diameter screen and casing, a 10-foot screened interval, a filter pack surrounding the screen to approximately 2 feet above the top of the screen. Bentonite was placed above the filter pack to the ground surface. The piezometer construction logs are located in Appendix H. Table 3-5 presents the results of the hydraulic conductivity (K) tests. A copy of the data reduction and graphs are included in Appendix J.

**Table 3-5**
**Field Hydraulic Conductivity Tests**

| Location | Material | $K_{slug\ in}$ cm/sec | $K_{slug\ out}$ cm/sec | $K_{slug\ in}$ ft/day | $K_{slug\ out}$ ft/day |
|---|---|---|---|---|---|
| GS-3 | saprolite | $1.68 \times 10^{-4}$ | $1.88 \times 10^{-4}$ | $4.77 \times 10^{-1}$ | $5.33 \times 10^{-1}$ |
| GS-21 | saprolite | $1.11 \times 10^{-3}$ | $8.41 \times 10^{-4}$ | $3.14 \times 10^{0}$ | $2.39 \times 10^{0}$ |
| GS-27 | saprolite | $3.25 \times 10^{-4}$ | $3.25 \times 10^{-4}$ | $9.22 \times 10^{-1}$ | $9.22 \times 10^{-1}$ |
| GS-29 | saprolite | $1.59 \times 10^{-4}$ | $1.61 \times 10^{-4}$ | $4.50 \times 10^{-1}$ | $4.57 \times 10^{-1}$ |
| GS-4 | rock | $3.62 \times 10^{-2}$ | $2.06 \times 10^{-2}$ | $1.03 \times 10^{2}$ | $5.83 \times 10^{1}$ |
| GS-18 | rock | $2.67 \times 10^{-4}$ | $3.38 \times 10^{-4}$ | $7.57 \times 10^{-1}$ | $9.58 \times 10^{-1}$ |
| GS-25 | rock | $2.45 \times 10^{-4}$ | $1.76 \times 10^{-4}$ | $6.96 \times 10^{-1}$ | $5.00 \times 10^{-1}$ |
| **Average Soil** | | | $\mathbf{4.09 \times 10^{-4}}$ | | $\mathbf{1.16 \times 10^{0}}$ |
| **Average Rock** | | | $\mathbf{9.63 \times 10^{-3}}$ | | $\mathbf{2.73 \times 10^{1}}$ |

### *3.4.5 Sorption and Attenuation Capacity*

***Sorption (Distribution) Coefficients***

Environmental risk assessment of metals depends to a great extent on fate and transport modeling based on soil-liquid partitioning coefficients. The evaluation of the potential risks of metals in soils requires an assessment of the proportion of the total metal that is in a mobile and possibly bioavailable form. This can be done using a relatively simple partitioning of the total metal concentration between the fraction bound to the soil solids and the part that is dissolved in the soil solution (pore water). The dissolved metal concentration reflects the soil metal fraction that could potentially be leached from the soil and contaminate groundwater and surface waters. Conversely, the balance of the metal is assumed to be tightly retained by the soil solids and, hence, unavailable for biological uptake or movement into groundwater (Sauve and others, 2000).

Selenium was chosen as the potential contaminant to model, based on the results of the gypsum total metals concentrations and leaching tests (Tables 2-1 and 2-2), for fate and transport modeling. The partition or distribution coefficient $K_d$, is required for modeling. $K_d$ is a measure of sorption of contaminants to soils and is defined as the ratio of the contaminant concentration adhered to the solid to the contaminant concentration in the surrounding aqueous solution when the system is at equilibrium. Once groundwater is contaminated, it is important to understand how the contaminant moves in the subsurface environment. $K_d$ is one of the most important parameters used in determining the migration potential of contaminants present in aqueous solutions in contact with surface, subsurface and suspended solids. A contaminant with a $K_d$ value around zero would travel at the rate of water, while ones that react more strongly with the soils would have higher $K_d$ values. The $K_d$ value is basically used to determine how well a soil will adsorb a contaminant and thus not allow the contaminant to migrate through the groundwater.

ASTM D 4646 is the Standard Test Method for 24-hour Batch-Type Measurement of Contaminant Sorption by Soils and Sediments. The distribution coefficient ($K_d$) is defined identically to the distribution ratio ($R_d$), except $K_d$ is considered to be an equilibrium value and independent of the concentration of solute. The distribution ratio ($R_d$) is the ratio of the concentration of solute sorbed on the soil or other geomedia divided by its concentration in solution. The $R_d$ value is calculated as follows:

$$K_d = R_{d(\text{at equilibrium})} = \frac{(\text{mass of solute sorbed per unit mass of geomedia})}{(\text{mass of solute in solution per unit volume of solution})}$$

$$= \frac{\mu g/g}{\mu g/mL} = mL/g$$

The test method can be summarized as mixing distilled water, natural water, waste leachate, or other aqueous solution containing a known concentration of a solute with a known amount of unconsolidated geologic material (e.g., soil) for 24 hours. Changes in solute concentrations are used to calculate a distribution ratio ($R_d$) (ASTM, 2001).

This test method is meant to allow for a rapid (24 hour) index of soil sorption affinity for given chemicals or leachate constituents. A large number of samples may be run using this test method to determine a comparative ranking of those samples, based upon the amount of solute sorbed by the soil, or by various soil or leachate constituents. The 24-hour time is used to make the test convenient and also to minimize microbial degradation which may be a problem for organic contaminants in long-timed procedures (ASTM, 2001).

After the samples have been weighed and air-dried, a moisture content has been measured, and the volume of solution has been determined, the sample can be placed in a rotary extractor to be agitated for 24 hours. The sample is then removed and the solution is removed from the solid phase by decantation and then filtered. After a clear solution is obtained, the $K_d$ value can be calculated from the following equation:

$$K_d = \frac{(A - B)V}{(M_s)\,B}$$

where:
A = initial concentration of the solute defined as the mean concentration of the blanks, ug/mL,
B = final concentration of the solute after 24 hours in contact with the soil, ug/mL,
V = volume of solution used, ml,
Ms = mass of soil expressed on an oven-dried basis, grams, and
$K_d$ = distribution ratio, ml/g (ASTM, 2001).

Site specific sorption coefficients ($K_d$) were measured for soil samples collected from the Wansley site per ASTM D-4646. Five samples were collected from the site. The results of this testing are presented in Table 3-2.

## 3.5 Potential of Unconfined Aquifers as Sources of Drinking Water

Groundwater recharge is generally from infiltration of rainfall. The average annual rainfall for the area is 50 to 54 inches per year. Based on rainfall data collected from 1940 to 2003, the months of December through March have the highest average rainfall amounts. Determination of the seasonal fluctuation in the groundwater level is pending the collection of additional monitoring data.

Because unconfined implies interconnection between the soil and rock aquifers, there is a low potential for the unconfined aquifer in this area to be used as a source of drinking water. The USGS web site lists 345 wells in Heard and Carroll Counties (USGS, 2006). Twenty seven of these wells are less than 80 feet deep. The majority are greater than 100 feet deep. Additionally, groundwater flows toward the plant, away from any residences. Also, public water supply is provided along Hollingsworth Ferry Road.

## 3.6 Description of Geologic and/or Natural Hazards/Seismic Impact Zone

The proposed site is located approximately 1.5 miles south of the Brevard Fault Zone, a major feature that cuts across the Piedmont. However, no faults or fault zones, unstable areas, or shear zones were encountered during the site geologic exploration. The latest movement along the Brevard Zone was late Paleozoic to Triassic. The age date of 282 (±14) million years has been assigned based on mineralogy. The date also agrees with field evidence as the final major metamorphic event of the Georgia Piedmont as a whole (Higgins, 1966).

Earthquake acceleration maps prepared for the continental United States (Algermissen and others, 1990) were reviewed to determine the seismic impact zone for the site. Map C of this series indicates the horizontal acceleration with a 90% probability of not being exceeded in 250 years. According to Map C, the horizontal acceleration for the site is 0.17g.

The Seismic Design Category for this site is a "C" classification (Table 9.4.2.1 of ASCE 7-98). The Use Group is I (i.e., represents a low hazard to human life in the event of a failure) per Table 9.1.3 of ASCE 7-98.

# 4.0 GROUNDWATER POLLUTION POTENTIAL

## 4.1 Introduction

In order to determine groundwater pollution potential and rate of leachate migration from the proposed by-product disposal area, three analyses were performed:

- Fate and transport modeling using the SESOIL model,
- LeGrand (1964) scoring method per Circular 14, and a
- Pathway analysis per Circular 14.

The results of this work showed a very low potential for leachate to contaminate groundwater, and similarly, for leachate to leave the site. Fate and transport modeling showed that under a conservative scenario ($K_d$ = 235 ml/g for the soil), contamination would take more than 100 years to reach groundwater, and under a more realistic scenario ($K_d$ = 2345 ml/g), contamination would take more than 1000 years to reach groundwater. Two-media LeGrand analyses produced a score of 15.8 indicating groundwater pollution is "possible, but not likely".

The horizontal pathway analysis described in Circular 14 becomes relevant only after contamination has traveled vertically through at least a 2-foot compacted silty soil liner and a minimum of 5 feet of saprolite to the water table, that is, after more than 1000 years.

## 4.2 Fate and Transport Modeling

### *4.2.1 Background*

The fate and transport model selected for use in this study was RISKPRO's Seasonal Soil Compartment Model (SESOIL) for Windows, Version 3, May 1998, from General Science Corporation. The model was developed as a risk screening-level model. It is a one-dimensional vertical transport model for the unsaturated soil zone. The model can only consider one chemical (pollutant) compound at a time. The model is based on mass balance and equilibrium partitioning of a chemical between different phases (dissolved, sorbed, vapor, and pure).

SESOIL is used to estimate the rate of migration of chemicals through the soil and the concentration of chemicals in the soil layers after a chemical release to the environment. The model can accept time-varying pollutant loads and can simulate up to 9,999 years of chemical transport. Applications of the model include long term leaching studies from waste disposal sites, leaking underground storage tanks, agricultural applications, and pesticide and sediment transport on watersheds (SESOIL user's guide).

According to the SESOIL's user guide, the soil column is a user-defined compartment extending from the surface through the unsaturated zone to the water table. SESOIL requires several types of chemical- and site-specific data. The essential information needed to run the model includes the following:

- The behavior in the environment of the chemical to be modeled,
- The rate and frequency of the chemical's release into the environment,
- A description of the media in which the chemical is released, and
- Monthly estimates of climatic data. (Climate information is compiled in RISKPRO through on-line databases)

Output includes the following:

- Time-variant estimates of concentrations of pollutants in the soil column at various depths,
- Rate of leaching toward groundwater, including quantities of pollutants entering the groundwater (SESOIL does not model the saturated zone),
- Pollutant loss from the unsaturated zone in terms of surface runoff,
- Volatilization, and
- Degradation.

Pollutant transport and transformation in the unsaturated soil zone are complex processes affected by chemical, soil, and hydrogeologic properties. In SESOIL, these processes are included in one of three cycles or submodels. These submodels and their associated processes are shown below:

1. Hydrologic submodel (deals with moisture movement through the layers), including:
    - rainfall
    - surface runoff
    - capillary rise
    - groundwater runoff (recharge)
    - soil moisture (storage)
    - evapotranspiration
    - infiltration

2. Pollutant fate submodel, including:
    - advection
    - cation exchange
    - sorption
    - washload
    - volatilization
    - surface runoff
    - groundwater runoff (recharge)
    - metal complexation
    - diffusion (air phase)
    - hydrolysis

3. Sediment or washload submodel (deals with runoff from the soil surface). For this application, all precipitation is assumed to infiltrate into the subsurface (worst case) and zero runoff is assumed. Therefore, washload is not used in the Plant Wansley model.

***Hydrologic Submodel***

The hydrologic submodel is one-dimensional and considers vertical movement only. It focuses on the role of soil moisture (or interstitial pore water) in the soil layer. It is based on a statistical, dynamic formulation of a vertical water budget and has been adapted for either yearly or monthly simulations and for moisture variations in the soil. The submodel calculates results for the hydrology of the site and passes these results to both the pollutant fate and sediment washload cycles.

***Pollutant Fate Submodel***

The pollutant fate submodel breaks the soil column into several compartments, called layers. The soil column can be represented by up to 4 layers and the dimensions of these layers are defined by the user. Each layer in the pollutant cycle can be further broken up into 10 sublayers having the same soil properties as the layer of which they are a part. The total soil column is treated as a series of interconnected layers. Each layer or sublayer can receive and release pollutant to and from adjacent layers. Like the hydrologic submodel, pollutant fate is based on a mass balance equation that tracks the pollutant as it moves in the soil moisture between layers. When a pollutant enters a layer, the model assumes instantaneous and uniform distribution of the chemical throughout that layer. The model performs mass balance calculations over each entire soil layer or sublayer; there is no concentration gradient within a layer (SESOIL user's guide).

The pollutant cycle simulates transport and transformation processes in three phases present in the soil layers: soil-air or gaseous phase, soil-moisture phase, and adsorbed or soil-solids phase. The fate of the pollutant in the soil column includes both transport and transformation processes, which depend on the chemical's partitioning among these three phases. The three phases are assumed to be in equilibrium with each other at all times. The pollutant cycle in SESOIL is based on the chemical concentration in the soil water and all the mass balance equations are a function of this (SESOIL user's guide).

Theoretically, a non-reactive dissolved pollutant will travel to another soil layer or to groundwater at the same speed as the movement of moisture through the soil layer. However, the movement of a reactive pollutant will be retarded due to adsorption of the pollutant on the soil particles. Movement of pollutant may also be retarded due to the movement of bulk moisture mass due to vapor phase partitioning. For gypsum, this is not applicable (SESOIL user's guide).

SESOIL includes two partitioning processes for movement of pollutant from soil moisture to soil solids, the sorption process and cation exchange. The sorption process may be defined as the adhesion of pollutant molecules or ions to the surface of soil solids. The process is generally reversible; adsorption being the movement of a pollutant onto soil solids and desorption being the movement of pollutant off of soil solids to the liquid or gas phase. The two processes are assumed to be in equilibrium and are modeled that way (SESOIL user's guide).

### *4.2.2 Plant Wansley Gypsum Disposal Facility SESOIL Model*

Selenium was chosen as the potential contaminant to model, based on the results of the gypsum total metals concentrations and leaching tests (Tables 2-1 and 2-2). The general design of this model simulates 100 feet plus 2 cm of gypsum atop 5 feet of silty soil representing the liner material that may be used at the site (Figure 4-1). The 2 cm of gypsum is used to directly introduce the pollutant (selenium) to the soil.

***Model Assumptions***

- Gypsum will be stacked to a maximum height of 100 feet (maximum assumed cell height).
- The area of the disposal facility is 20 acres (maximum assumed cell size).
- The disposal area is not capped (worst case).
- Water moves vertically through the affected soils at a constant rate.
- Changes in soil components do not affect the overall infiltration rate or vertical movement.
- Dispersion in the vadose zone is negligible.
- The soil selenium linear sorption coefficients are constant throughout the source area.
- The model is conservative and does not account for all the geochemical processes on site.
- The program models the unsaturated zone only (basically migration through the silt layer). The model assumes that the pollutant front begins at the middle of the lowest layer that has a concentration of the constituent of interest.

***Input Parameters***

Table 4-1 presents the input parameters for the model.

Table 4-1
SESOIL Model Input Parameters – Basic Model

| Input Parameter | Value | Source/Comments |
|---|---|---|
| | | |
| **General Model Properties** | | |
| Climate data from Carrollton, GA rain gauge station | | National Climatic Center and the National Oceanographic and Atmospheric Administration |
| Simulation length | 100 years | |
| Application length | 50 years | Longest available application time. |
| Sediment washload cycle turned off | | Assumes no surface runoff. |
| Number of layers | 4 | Model has 3 layers of gypsum totaling 100 feet plus 2 cm to directly introduce selenium to the soil. A minimum 5-foot layer of silt will underlie the gypsum. |
| Continuous loading of contaminant | | Worst case. |
| Application area | 20 acres = 8.1 x $10^{-8}$ $cm^2$ | Assumed cell size. |
| Volatilization | 0.0 | Forces all contaminant transport downward through the soil. |
| **Soil/Gypsum Input Parameters** | | |
| Gypsum density | 1.36 $g/cm^3$ = 85 $lb/ft^3$ | |
| Gypsum effective porosity | 0.1 | RCRA Investigation Guidance, Table 10-4, Default Values for Effective Porosity; assumes gypsum behaves as a silt. |
| Freundlich equation exponent | 1.0 | Model recommended value in the absence of site-specific data; assumes linear sorption. |
| Disconnectedness index | 12 | Default value for silt and clay. |
| Organic carbon content | 0% | Assumed |
| Cation exchange capacity | NA | $K_d$ values were used in the model. Both $K_d$ and CEC can not be used in the model. |
| Intrinsic permeability gypsum | 5 x $10^{-9}$ $cm^2$ | SCS Engineering – average value for gypsum. This is equivalent to a hydraulic conductivity of 5 x $10^{-4}$ cm/sec |
| Intrinsic permeability soil | 5 x $10^{-9}$ $cm^2$ | Laboratory testing average value of remolded samples was 2 x $10^{-6}$ cm/sec. This was raised to 5 x $10^{-4}$ cm/sec as to be more compatible with the program restrictions. |
| $K_d$ gypsum | 1 mL/g | Assumed as a worst case value |
| $K_d$ silt | 2345 mL/g | The lowest value from the testing performed on Plant Wansley soils. |
| **Chemical Input Parameters – Selenium** | | |
| Selenium concentration in gypsum | 14 mg/kg | By product characterization of Yates gypsum |
| Atomic weight of selenium | 78.96 g/mole | |
| Solubility of selenium | 384,000 mg/L | Agency for Toxic Substances and Disease Registry/CDC website |

### *4.2.3 Sensitivity Analysis*

A sensitivity analysis of the finalized model was conducted by varying the travel time, $K_d$ values, intrinsic permeability, and contaminant concentration. The sensitivity testing, as with the basic model, was performed using selenium as the contaminant of interest. The following models were run for the sensitivity testing:

- The basic model travel time was extended to 1000 years.
- The adsorption coefficient was varied by doubling the original number ($K_d$ = 4690 mL/g) and using an approximate order of magnitude lower ($K_d$ = 235 mL/g) than that used for the basic model.
- The intrinsic permeability of the gypsum and soil was varied by an order of magnitude higher and lower.
- Selenium concentrations of the gypsum were increased by an order of magnitude higher to 140 mg/kg.

Table 4-2 contains the results of the sensitivity testing. Appendix K contains the model inputs and outputs from each of the runs.

**Table 4-2**
**Results of SESOIL Basic Model and Sensitivity Modeling**

| Case (modeled for 100 years except as noted) | Maximum Contaminant Depth Below Gypsum, inches (leading edge of contaminant) | Soil Moisture, ug/ml Lower Soil Layer | Adsorbed Selenium, mg/kg, on Lower Soil Layer |
|---|---|---|---|
| Basic Model | 0.39 | 0.59 | 1394 |
| Basic Model at 1000 years | 2.8 | 0.59 | 1394 |
| $K_d$ = 4690 mL/g | 0 | 0.30 | 1392 |
| $K_d$ = 235 mL/g | 14.6 | 1.1 | 251 |
| intrinsic permeability gypsum & soil = $1X10^{-7}cm^2$ | 0.39 | 0.59 | 194 |
| intrinsic permeability gypsum & soil = $1X10^{-9}cm^2$ | 0 | 0.47 | 1093 |
| Se gypsum = 140 mg/kg | 0.39 | 5.9 | 13940 |

***Summary of Results***

- For a $K_d$ of 2345 (realistic case), selenium traveled 0.39 inches into the compacted soil liner after 100 years. No detectable selenium was predicted to occur beneath the soil liner after 1000 years.

- After 1000 years, the predicted depth of selenium migration into the compacted clayey soil liner is 2.8 inches. This indicates that selenium would not break through the soil liner or reach the shallow rock aquifer.

- For a $K_d$ of 235 (very conservative case), the maximum selenium depth into the compacted clayey soil liner is 14.6 inches after 100 years; this means that for a minimum water table depth of 7 feet (2 feet of compacted soil liner and 5 feet of compacted soil), selenium would take at least 575 years to reach the water table, if then.

## 4.3 LeGrand Analysis

A LeGrand Analysis was performed on the proposed by-product disposal area site as described on pages 14 through 17 of Circular 14. The analysis was performed assuming a composite liner system would be installed, consisting of a synthetic liner, compacted clay and a leachate collection system. Table 4-3 gives the measured input parameters and results of the analyses (LeGrand scores). Two media analyses were used based on the following site characteristics:

- Presence of unconsolidated materials consisting of sandy, clayey silt.

- Overburden underlain at shallow depths by unweathered gneiss and schist.

**Table 4-3**
**LeGrand Analysis, Input Parameters and Results**

| Criteria | Measured Site-Specific Value | LeGrand Score Two Media Synthetic Liner w/LCS |
|---|---|---|
| Distance between waste management boundary and closest receptors (unnamed creek ) | 100 feet | 1 |
| Minimum depth below liner to water table | 5 feet | 0.3 |
| Water table gradient | 8.3% | 5.5 |
| Sorption | composite/clay liner | 4 |
| Permeability | fractured rock | 3 |
| Thickness of porous granular materials below disposal point | 37 feet (average) | 2 |
| | **Total** | **15.8** |

- For a synthetic liner and a leachate collection system, as allowed by the LeGrand Analysis, a maximum sorption rating of 4 (clay) a favorable flow direction, and a permeability rating of 3, were used in the analysis.

- A minimum depth of 5 feet below the clayey soil liner to the seasonal high groundwater table will be established for this site.

- Gradients varied between 5.8% and 8.3% toward the unnamed creek on the northeast side of the site. A gradient of 8.3% was used.

- A 100-foot buffer was assumed along the potential receptor (unnamed creek).

The LeGrand analysis for a two media site produced scores of 15.8 for a composite liner system. This would indicate that groundwater pollution potential is "possible, but not likely" (Table 4-4).

**Table 4-4**
**LeGrand Score Interpretation**
**(from Circular 14, p. 14)**

| Total Points | Pollution Potential of a Site |
|---|---|
| 0 – 4 | Imminent |
| 4 – 8 | Probably |
| 8 – 12 | Possible |
| 12 – 25 | Possible, but not likely |
| 25+ | Approaching impossible |

## 4.4 Pathway Analysis (Horizontal Travel Time)

### *4.4.1 Calculated Groundwater Velocities*

Horizontal flow velocity calculations were performed using the Darcy equation on page 14 of Circular 14. The linear flow velocity can be estimated using the following formula and permeabilities:

$$\nu = \frac{Ki}{\eta}$$

where:

$\nu$ = linear velocity (ft / sec or m / sec)

$i$ = hydraulic gradient $= \frac{(h_1 - h_2)}{l}$ (ft / ft)

$\eta$ = estimated effective porosity

K = hydraulic conductivity (ft/sec or m/sec)

The average hydraulic conductivity of the saprolite is 1.16 ft/day as determined by field slug tests (Table 3-5). The gradient of 0.082 ft/ft is the highest site gradient as determined from the groundwater potentiometric map (Table 3-4). A typical tabulated value for the effective porosity of gravelly clayey silts (used for site soils) is 0.10 (Maidment, 1993). The resulting flow velocity is as follows:

$$\nu = \frac{(1.16\ \text{ft/day})\,(0.083\ \text{ft/ft})}{(0.10)} = 0.963\ \text{ft/day}$$

The silt and saprolite comprises the approximate top 7 to 60 feet of the unconfined aquifer above the schist/gneiss.

#### *4.4.2 Description of the Relationship Between Groundwater Flow Directions and Potential Receptors*

The groundwater flow directions indicated on the potentiometric map are towards the unnamed creek on the northeast side of the site and the Chattahoochee River. These surface water bodies would be the closest groundwater receptors. There were no private or public water sources down-gradient of the site within the ½ mile and 2 mile radii.

#### *4.4.3 Estimated Travel Time for Leachate to Reach Potential Receptors*

The estimated travel time for leachate to reach the creek northeast of the site is determined from the groundwater flow velocities of Section 4.4.1. The following travel time is calculated assuming the limits of waste will not be within 100 feet of the unnamed creek.

Using the average calculated flow velocity for the saprolite resulted in a travel time of 120 days. This figure represents the travel time beyond that required for any contaminant to travel through the 2 feet of compacted clayey soil liner or the compacted soil portion of the composite liner and the 5 feet of separation above the groundwater elevation.

### 4.5 Description of Relationship Between the Vadose Zone and Uppermost Aquifer

A minimum 5 feet of separation will be established between the bottom of the composite liner and the seasonal high groundwater elevations. Continued monitoring of the temporary piezometers will establish these elevations. No flow paths for any infiltrate generated within the cells would be anticipated to be generated through the liner system and the separation zone of compacted soil prior to reaching groundwater. Hydraulic conductivity of the remolded and in-place material is shown in Tables 3-2 and 3-5.

Currently, groundwater recharge is accomplished through infiltration of surface storm water. The average annual rainfall is approximately 50 to 54 inches per year. The seasonal variation in the groundwater surface is currently being determined through periodic monitoring of the temporary piezometers on site. Based on data collected in the area from 1940 through 2003, the wettest months of the year are December through March.

## 4.6 Mitigation of Geologic and Natural Hazards

There were no geologic or other hazards detected at this site. The jurisdictional wetlands, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis.

# 5.0 RECOMMENDATIONS FOR DESIGN

## 5.1 Favorable and Unfavorable Areas

There are no unfavorable areas for construction at the site.

## 5.2 Liner/Leachate Collection Systems

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility. Based on laboratory testing, the remolded permeability of the material proposed for use as a potential soil liner averages $1.6 \times 10^{-6}$ cm/sec with a range of $3.7 \times 10^{-6}$ cm/sec to $1.7 \times 10^{-7}$ cm/sec. Based on the laboratory compaction criteria for remolded samples, the recommended maximum permeability of the compacted soil liner beneath the synthetic liner is $1 \times 10^{-5}$ cm/sec.

## 5.3 Cell Depths

Excavation requirements for the disposal cells will be determined during site design and development (design and operation plan). Excavation will not extend below the minimum 5-foot buffer required above the seasonal high groundwater table. Continued groundwater measurements will be made to determine this seasonal high level.

## 5.4 Site Drainage and Erosion Control

The site will be designed and constructed to minimize soil erosion and sediment migration. Diversion ditches, berms, piping, and sedimentation ponds will be included as needed to accomplish this task as well as to prevent site storm water run-on from entering disposal areas. Areas where excavation and earth fill operations occur will be vegetated immediately.

## 5.5 Buffer Zones

There will be a minimum 200 feet of buffer between the limits of the CCB disposal facility and adjacent property lines. There will be a minimum 25-foot buffer between the limits of the disposal facility and streams and wetland areas. No land disturbing activities are to take place within these buffer zones except for construction of groundwater monitoring wells and site ingress and egress.

### 5.6 Monitoring

A groundwater and surface water monitoring network for the CCB disposal facility will be designed to provide early detection in the unlikely event that any contaminates might reach groundwater and surface water. Proposed monitoring well locations will be submitted with the Groundwater Monitoring Plan when the limits of the disposal area have been established. Monitoring locations will be located around the periphery of the site and will meet the EPD requirements. Figure 5-1 shows a diagram of a typical monitoring well design.

Sampling will commence once the Groundwater Monitoring Plan has been approved and will continue semiannually for the life of the disposal area. Four initial sampling events will be performed at eight week intervals following approval of the Plan to establish statistical base. Background data will be determined prior to site development for the up-gradient and down-gradient wells as well as any surface water monitoring points.

### 5.7 Disposition of Borings

Boreholes and piezometers located within the area proposed for by-product disposal will be properly abandoned upon acceptance of this Report and establishment of the seasonal high groundwater levels.

According to the *Georgia Water Well Standards Act of 1991*, all wells which are to be abandoned shall be "filled, sealed, and plugged". Guidelines for well abandonment are set forth in the *Georgia Department of Natural Resources Manual for Groundwater Monitoring*, September 1991. Existing wells at the site will be abandoned according to these guidelines.

### 5.8 Security Fence and Road

A security fence currently exists along the south-southwest boundary of the proposed disposal facility along Hollingsworth Ferry Road. A 75-foot section of property adjacent to Hollingsworth Ferry Road, outside the 200-foot disposal area buffer, has been set aside for potential fence realignment and replacement and construction of a 25-foot security road along the outside boundary of the disposal facility. The approximate locations of the proposed fence and security road is shown on Figure 1-1.

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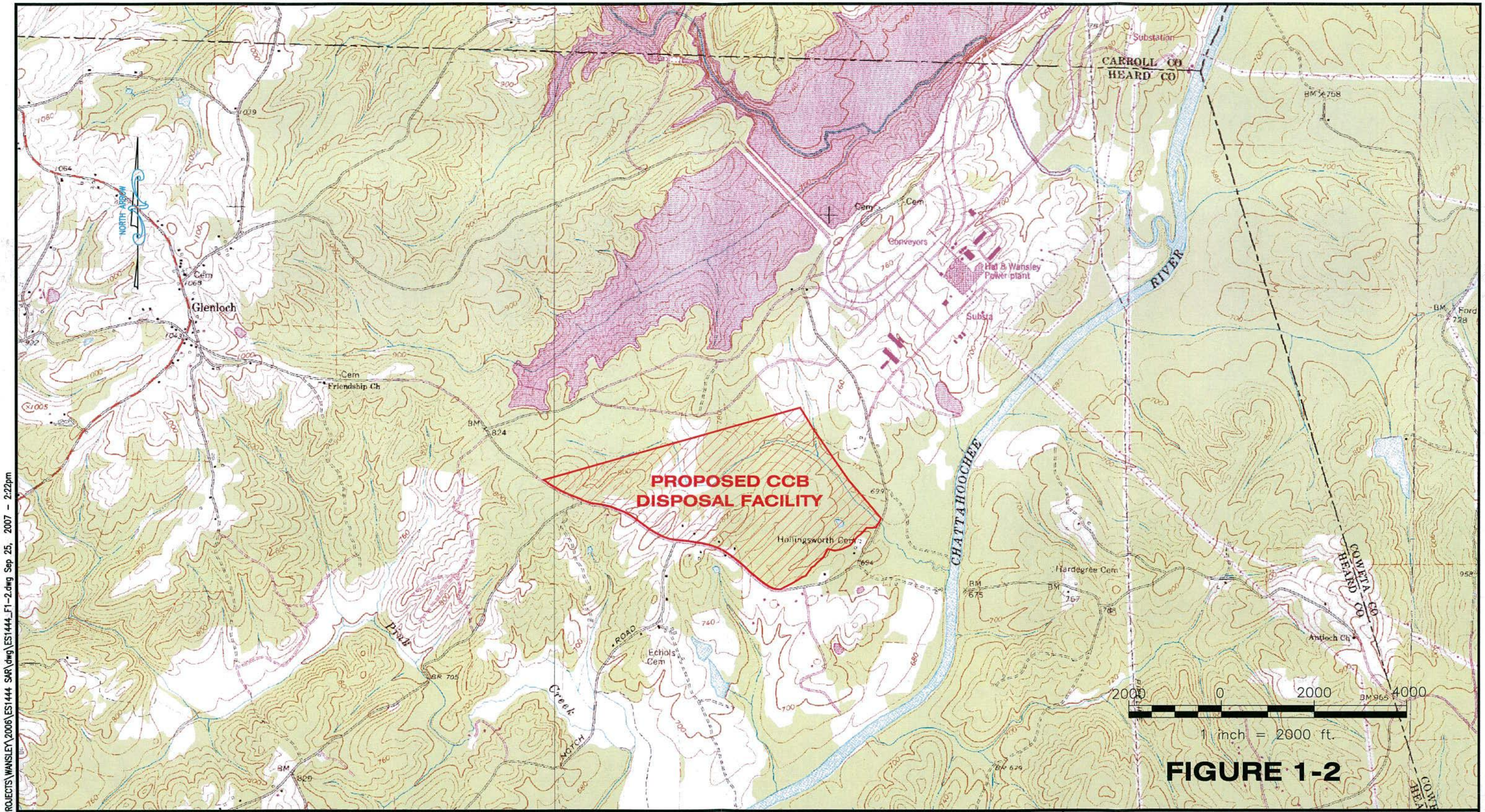
U. S. Census Bureau, Carroll County. Retrieved 11/9/06 from the QuickFacts from the US Census Bureau web site, http://quickfacts.census.gov/qfd/states/13/13045.html.




# FIGURE 1-2



**Southern Company Generation**
**Engineering and Construction Services**
FOR
**Georgia Power Company**

PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
TOPOGRAPHIC MAP OF GENERAL SITE AREA

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"= 2000' | | ES1444 F1-2 | 1 | FINAL |

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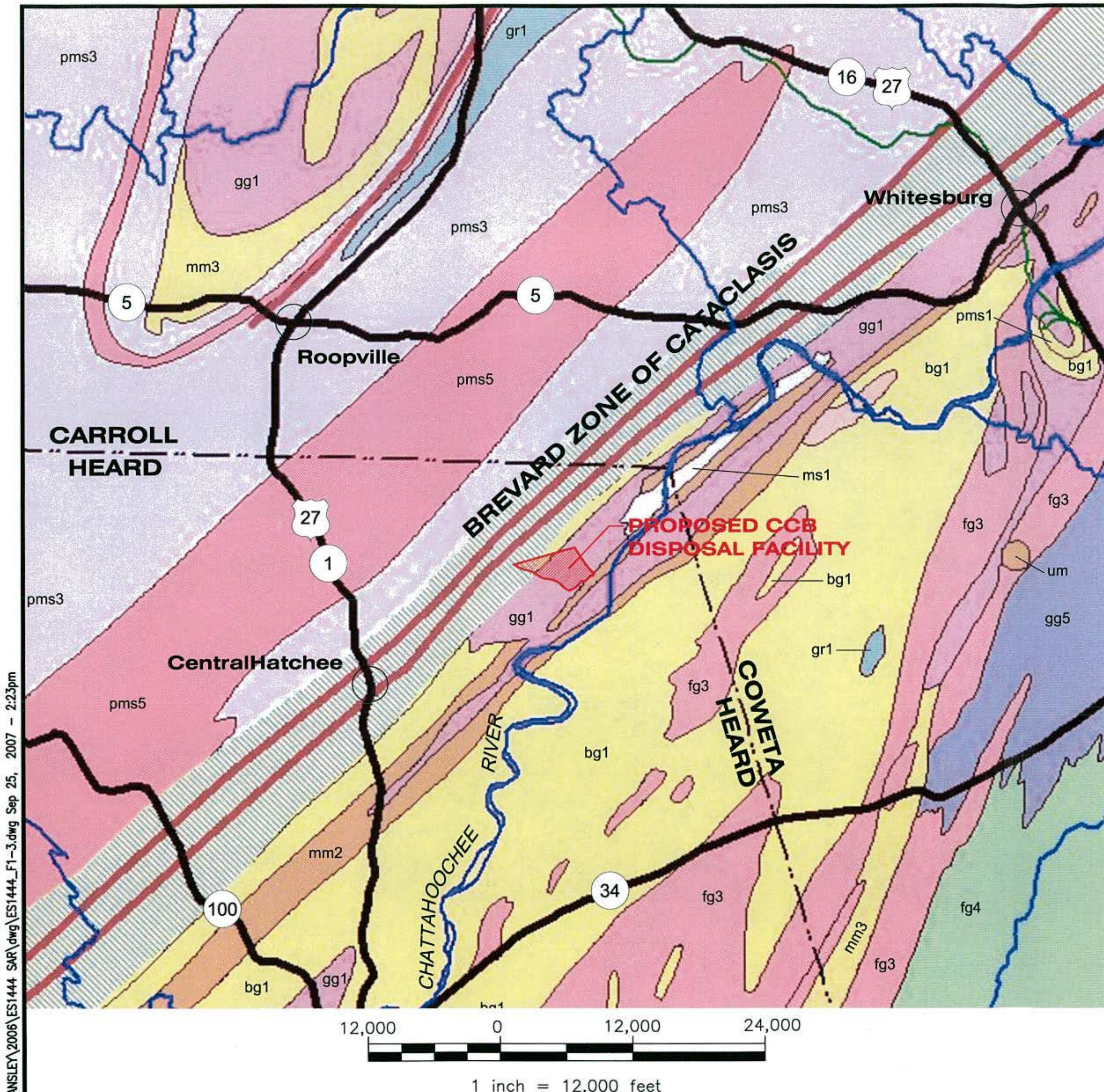



## LEGEND:

bg1 – Biotite Gneiss
fg3 – Biotitic Gneiss/Mica Schist/Amphibolite
fg4 – Biotitic Gneiss/Amphibolite
gg1 – Granite Gneiss Undifferentiated
gg5 – Calc–Silicate Granite Gneiss
gr1 – Granite Undifferentiated
pms1 – Mica Schist
pms3 – Mica Schist Gneiss
pms5 – Graphite Schist
mm2 – Hornblende Gneiss
mm3 – Hornblende Gneiss/Amphibolite
ms1 – Amphibolitic Schist
um – Ultramafic Rocks Undifferentiated
Fault
Fault Zone
34 Major Road

## REFERENCES:

GEOLOGIC MAP OF GEORGIA, 1976

# FIGURE 1-3



**Southern Company Generation Engineering and Construction Services**
FOR
**Georgia Power Company**

PLANT WANSLEY
PROPOSED COAL COMBUSTION BY–PRODUCT DISPOSAL FACILITY
REGIONAL GEOLOGY

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"= 12,000' | | ES1444 F1-3 | 1 | FINAL |

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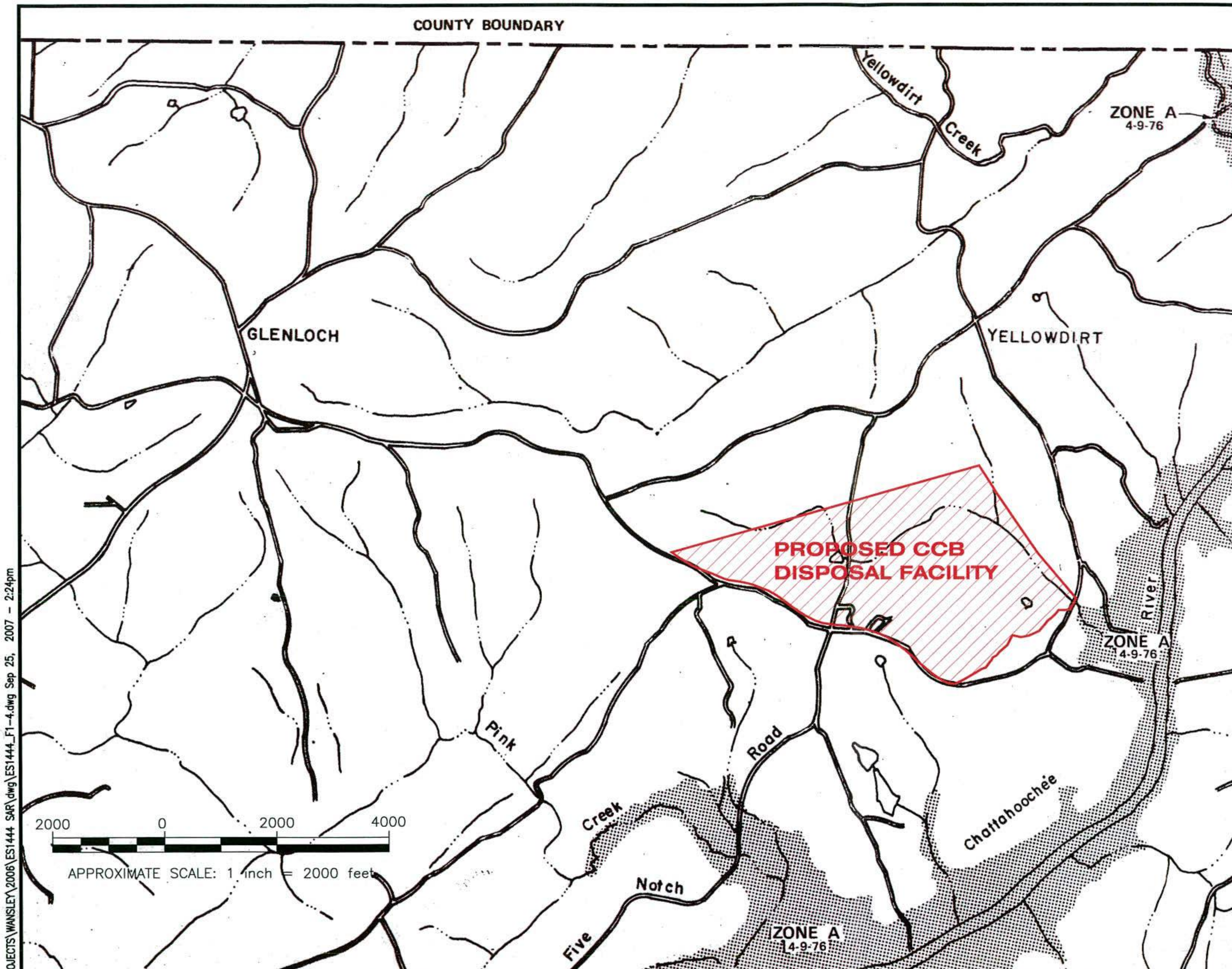


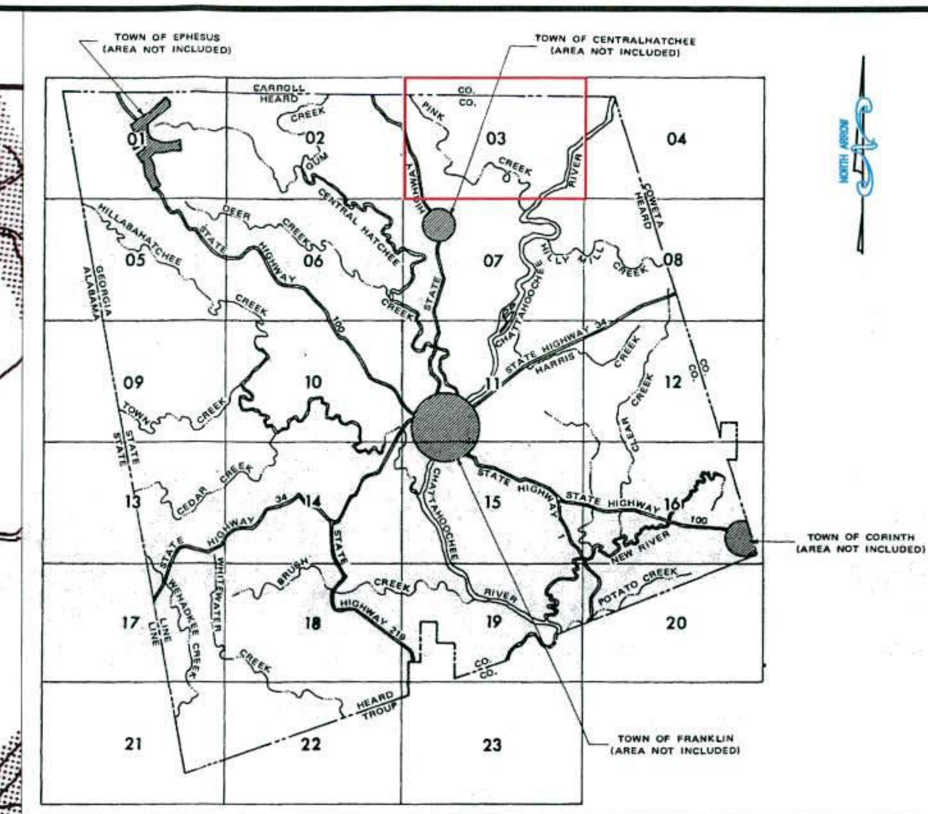


**KEY MAP**
NOT TO SCALE

**LEGEND:**

| | |
|---|---|
| SPECIAL FLOOD HAZARD AREA WITH DATE OF IDENTIFICATION | ZONE A<br>DATE |

Note: These maps may not include all Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

INITIAL IDENTIFICATION DATE:
APRIL 9, 1976

**REFERENCES:**
DEPT. OF HOUSING AND URBAN DEVELOPMENT,
FEDERAL INSURANCE ADMINISTRATION,
HEARD CO., GA. (UNINC. AREAS)
FLOOD HAZARD BOUNDARY MAP 130105A, PAGE 4, APRIL 9, 1976

# FIGURE 1-4



**Southern Company Generation**
**Engineering and Construction Services**
FOR
**Georgia Power Company**

PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT
DISPOSAL FACILITY
FLOOD ZONE MAP

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| AS SHOWN | | ES1444 F1-4 | 1 | FINAL |

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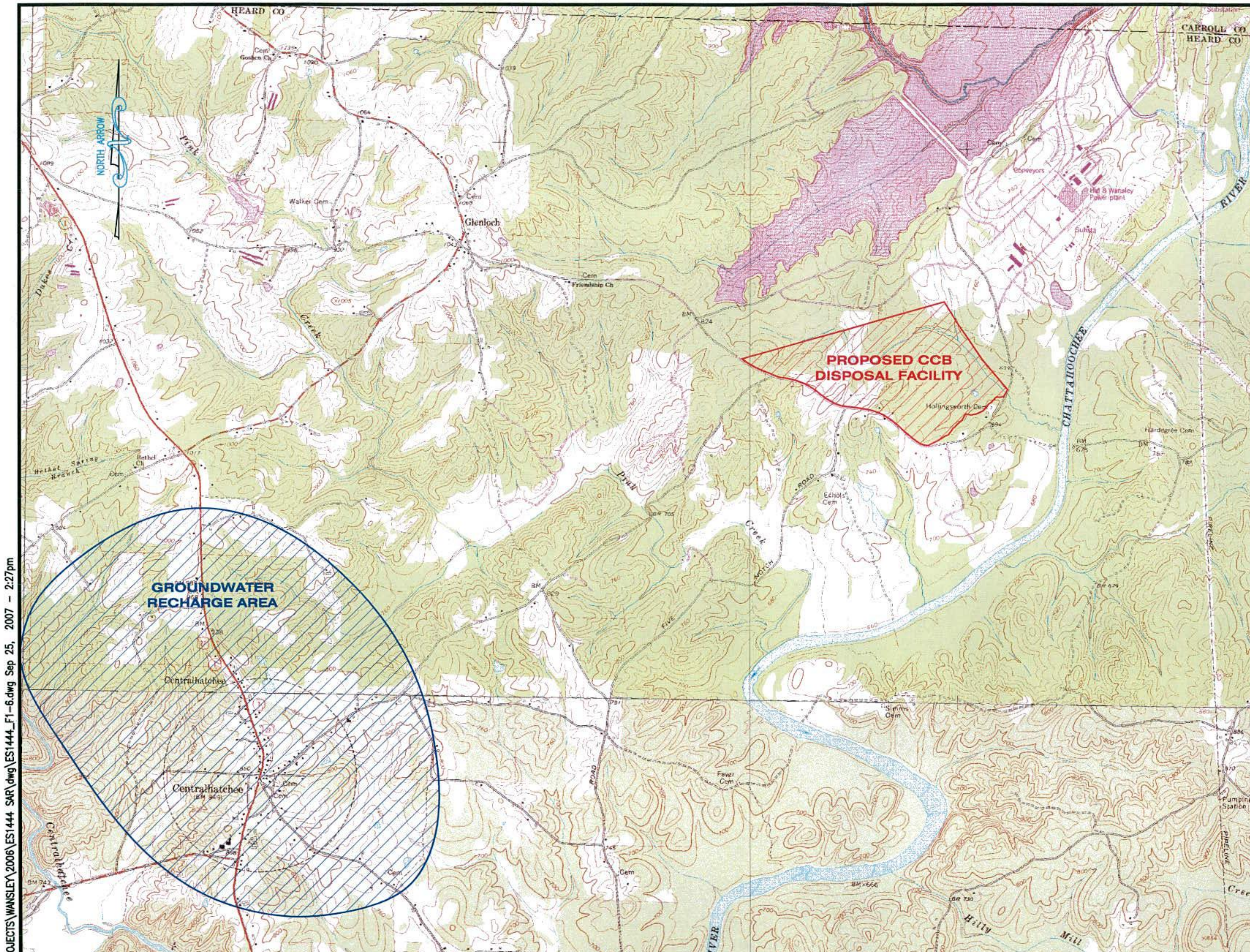



3000 0 3000 6000

1 inch = 3000 ft.

# FIGURE 1-6



**Southern Company Generation Engineering and Construction Services**

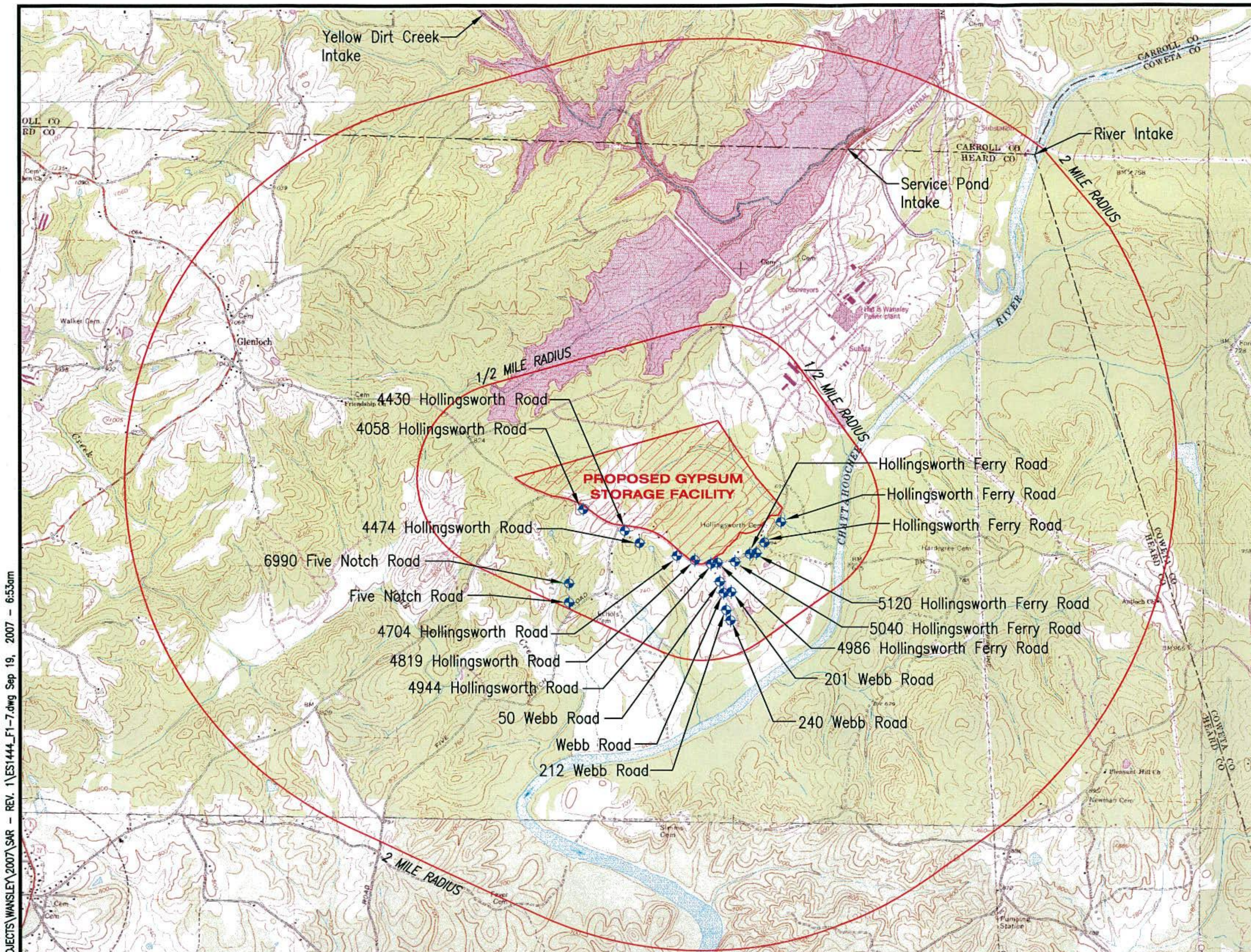
FOR

**Georgia Power Company**

PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
MOST SIGNIFICANT GROUNDWATER RECHARGE AREAS

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|---|
| 1"= 3000' | | ES1444 F1-6 | 1 | FINAL |

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\ES1444 SAR\dwg\ES1444_F1-6.dwg Sep 25, 2007 - 2:27pm




3000 0 3000 6000

1 inch = 3000 ft.

# FIGURE 1-7

| REV. | DATE | DESCRIPTION | BY | CHK'D | CIVIL APPR | ELECT APPR | I/C APPR | MECH APPR | MGR APPR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |



PLANT WANSLEY
PROPOSED CCB STORAGE FACILITY
PUBLIC & PRIVATE WATER SUPPLY WELLS AND SURFACE WATER INTAKES WITHIN 1/2 MILE OF SITE

**Southern Company Generation Engineering and Construction Services**
FOR
**Georgia Power Company**

| SCALE | PROJ I.D. | DRAWING NUMBER | SH | CONT'D | REV |
|---|---|---|---|---|---|
| 1"= 3000' | | ES1444 F1-7 | 1 | FINAL | 0 |

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR – REV. 1\ES1444_F1-7.dwg Sep 19, 2007 – 6:53am

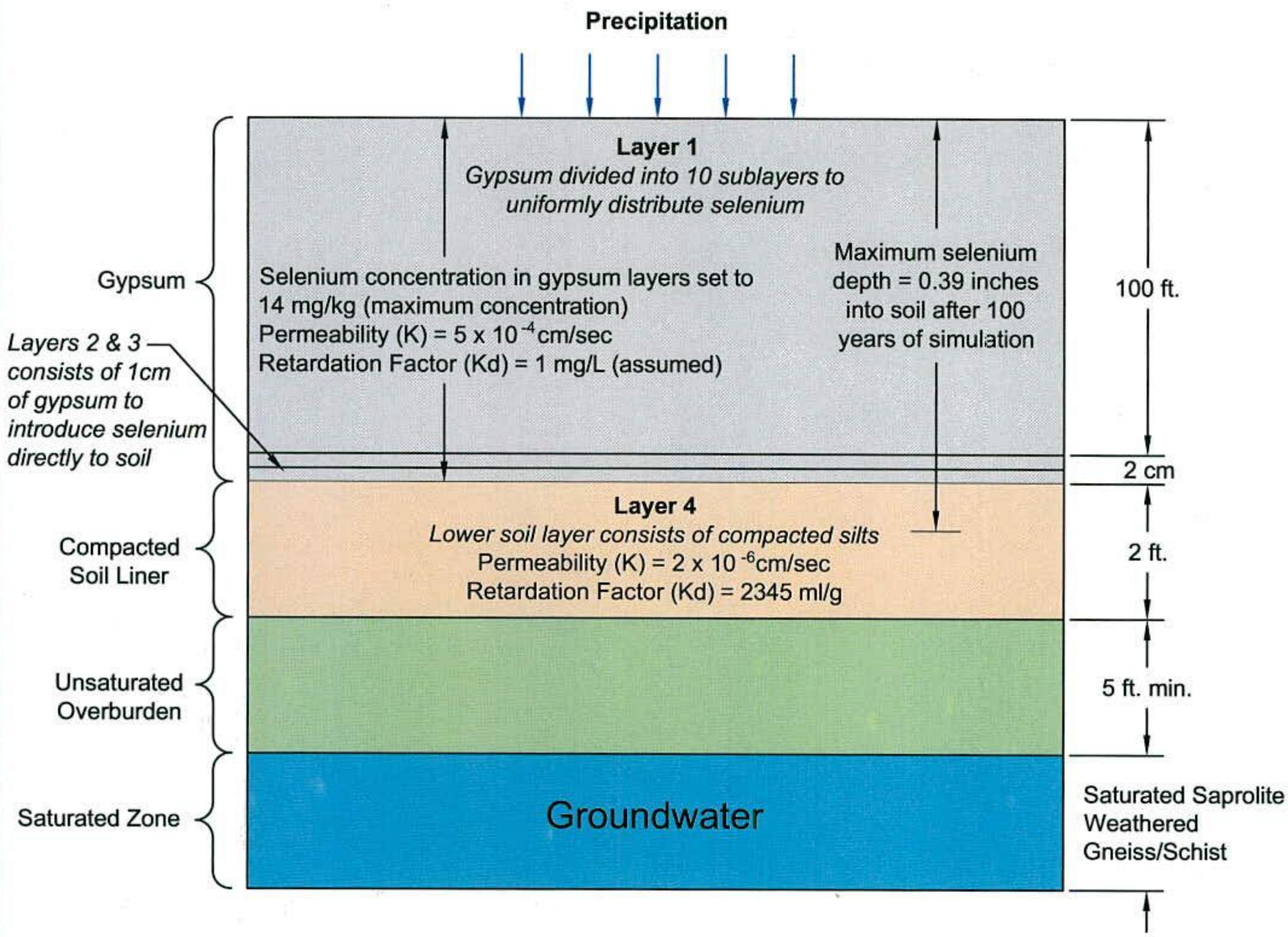
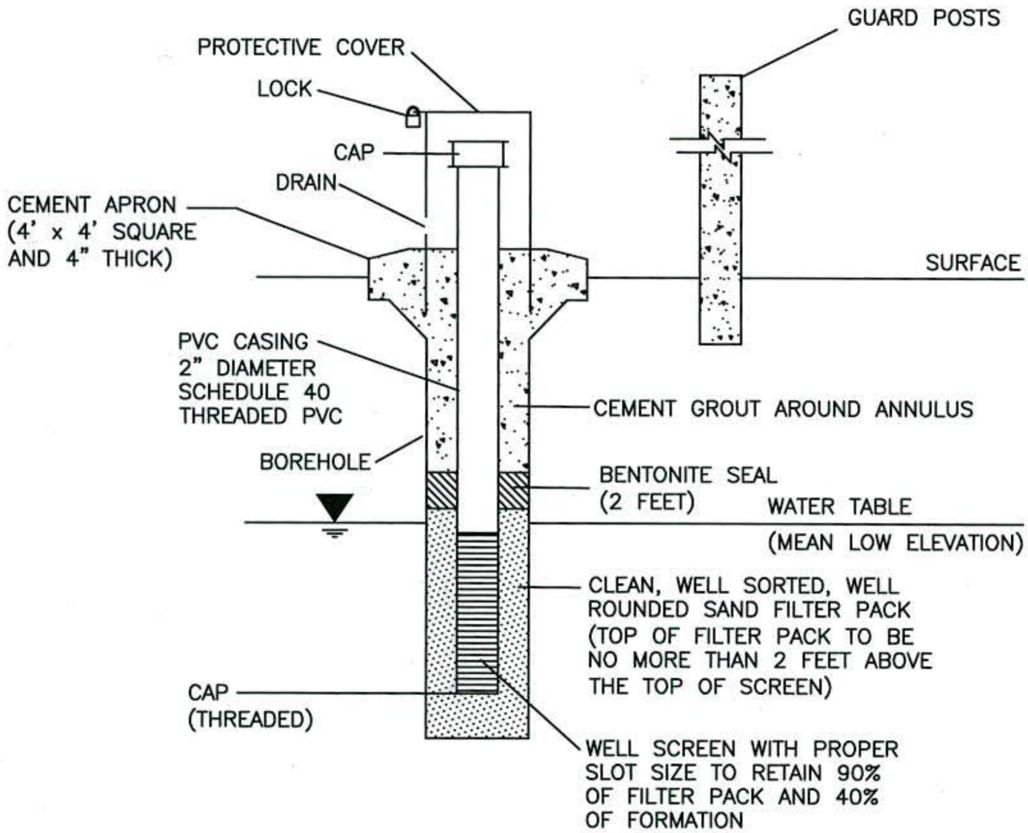



FIGURE 4-1
Plant Wansley Proposed Coal Combustion By-Product Disposal Facility SESOIL Model Simulation

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F4-1.dwg Sep 25, 2007 - 2:18pm

| | |
|---|---|
| PLANT WANSLEY<br>PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY | Southern Company Generation<br>Engineering and Construction Services<br>FOR |
| Southern Company Services, Inc.<br>© Copyright, 2007, Southern Company Services, Inc. All Rights Reserved | Power Company |

| PROJ I.D. | DRAWING NUMBER | SH | CONT'D |
|---|---|---|---|
| | ES1444 F4-1 | 1 | FINAL |




# FIGURE 5-1
## Typical Monitoring Well Design

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2007\SAR - REV. 1\ES1444_F5-1.dwg Sep 25, 2007 - 2:19pm

**PLANT WANSLEY**
PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY

Southern Company Generation
Engineering and Construction Services
FOR
**Georgia Power Company**

Southern Company Services, Inc.


| PROJ I.D. | DRAWING NUMBER | SH | CONT'D | |
|---|---|---|---|---|
| | ES1444 F5-1 | 1 | FINAL | |

# GEORGIA POWER COMPANY
# PLANT WANSLEY
# PROPOSED COAL COMBUSTION BY-PRODUCT DISPOSAL FACILITY
# SITE ACCEPTABILITY REPORT
# REVISION 1

October 2007

Prepared for
Georgia Power Company

Prepared by

Earth Science and Environmental Engineering
Technical Services
Southern Company Generation

Originator: Terri H. Hartsfield Date

Reviewer: Gary H. McWhorter Date

Approval: David W. Morris Date

| Revision No. | Description | Date |
|---|---|---|
| 1 | Addressing comments from the EPD | 9/21/07 |
| | | |
| | | |

# GEORGIA POWER COMPANY
# PLANT WANSLEY
# PROPOSED COAL COMBUSTION BY-PRODUCT
# DISPOSAL FACILITY
# SITE ACCEPTABILITY REPORT
# REVISION 1

Prepared for

Georgia Power Company

By

Earth Science and Environmental Engineering
Southern Company Generation

October 2007

GEORGIA POWER

A SOUTHERN COMPANY

GEORGIA POWER COMPANY
PLANT WANSLEY
PROPOSED COAL COMBUSTION BY-PRODUCT
DISPOSAL FACILITY
SITE ACCEPTABILITY REPORT
REVISION 1

October 2007

Prepared for
Georgia Power Company

By


Earth Science and Environmental Engineering
Southern Company Generation
Birmingham, Alabama

Rhonda J. Tinsley, PG
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Georgia Reg. No. 012687

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TABLE OF CONTENTS

## LIST OF FIGURES AND DRAWINGS



## LIST OF TABLES

## LIST OF APPENDICES

| | |
|---|---|
| Appendix A | Drawings M-100 Topographic Survey and M-200-1 Site Boundary |
| Appendix B | Georgia Power Company Environmental Laboratory Letter Regarding Threatened and Endangered Species |
| Appendix C | List of Historic Sites |
| Appendix D | Kemron Report |
| Appendix E | Zoning Letter and Special Use Permit |
| Appendix F | Gypsum Laboratory Results |
| Appendix G | Drilling Company Bond Letter |
| Appendix H | Boring and Piezometer Logs |
| Appendix I | Soil Laboratory Test Results (Soil Classification, Sorption, and Cation Exchange Capacity) |
| Appendix J | Slug Test Data Reduction, and Graphs |
| Appendix K | SESOIL Model Output |

## EXECUTIVE SUMMARY

Plant Wansley is located in northeast Heard County and southeast Carroll County, Georgia, off Liberty Church Road, approximately 15 miles west of the city of Newnan, 9 miles northeast of the city of Franklin and 12 miles southeast of the city of Carrollton. Plant property is adjacent and west of the Chattahoochee River. Georgia Power Company proposes to develop a 325 acre portion of this property as a Coal Combustion By-Product (CCB) disposal facility.

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility.

Per Circular 14, site investigations have been performed to determine if the site is acceptable for gypsum disposal. This Site Acceptability Report presents the results of the site investigations. The following key points are discussed in the report:

- The site is not located within
    - 0.5 mile of a county boundary,
    - 5,708 yards of a National Historic Site, or
    - the 100-year floodplain.
- At least a 200-foot buffer will be maintained beyond the limits of the disposal area. A new fence and security road will be constructed parallel to the existing fence along Hollingsworth Ferry Road. The proposed 200-foot buffer will be maintained inside the proposed security road and fence.
- No threatened or endangered animal or plant species were observed at the site.
- No portion of the site is located within a significant groundwater recharge area.
- The site contains approximately 7.4 acres of wetlands associated with small streams that traverse the site. Any jurisdictional wetlands present, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis.
- No public water supply wells were identified within 2 miles of the site. The site is not within the water management area of a public water supply well. Twenty domestic wells were located within ½ mile of the site. All the wells are located up-gradient of the site.
- Based on laboratory testing, the remolded permeability of the material proposed for use as a potential soil liner averages $1.6 \times 10^{-6}$ cm/sec with a range of $3.7 \times 10^{-6}$ cm/sec to $1.7 \times 10^{-7}$ cm/sec. The recommended maximum permeability of the compacted soil liner beneath the synthetic liner is $1 \times 10^{-5}$ cm/sec.
- Fate and transport modeling indicated that selenium would travel only 0.39 inches into a compacted soil liner, using a conservative estimate of permeability equal to $5 \times 10^{-4}$ cm/sec, after 100 years under a realistic scenario without a synthetic liner.

- Based on fate and transport modeling, the facility will not contaminate groundwater since the leachate will not travel through a compacted soil liner and a minimum 5-foot barrier between the gypsum and groundwater.
- Groundwater pollution potential was also determined using the LeGrand Method as described in Circular 14, using measured site input parameters. The LeGrand analysis produced a score of 15.8, which means groundwater pollution potential is "possible, but not likely", depending on design.
- A groundwater monitoring network will be designed to provide early detection in the unlikely event that regulated constituents might reach groundwater and surface water.
- According to Heard County Board of Commissioners, the site complies with local zoning and land use ordinance for a private industrial solid waste disposal site.

# 1.0 GENERAL SITE AREA

## 1.1 Description of General Site Area

### *1.1.1 Location*

Plant Wansley is located in northeast Heard County and southeast Carroll County, Georgia, off Liberty Church Road, approximately 15 miles west of the city of Newnan, 9 miles northeast of the city of Franklin and 12 miles southeast of the city of Carrollton. The physical address of the plant is 1371 Liberty Church Road, Carrollton, Georgia. The plant property encompasses approximately 5100 acres and is bounded on the east by the Chattahoochee River.

Plant Wansley consists of four gas-fired combined cycle units and two coal-fired units. Due to proposed air quality regulations, the plant is currently in the process of installing flue gas desulfurization (FGD) equipment (scrubbers) on both coal-fired units. Between 386,000 and 900,000 tons per year of gypsum disposal, depending on the percent sulfur coal burned, may be required as a result of these scrubbers.

The project proposes to develop approximately 325 acres of plant property located along the north side of Hollingsworth Ferry Road, south-southeast of the plant, as a private industry coal combustion by-product disposal area. The site is located at approximate longitude W85° 03´ and latitude N33° 24´. This waste is classified in Circular 14, Appendix A, as industrial waste with a moderate potential for groundwater pollution. The site topographic map and site boundary are shown on Figure 1-1. The general area of the plant and the site are shown on Figure 1-2. Copies of the original topographic survey and signed and sealed site boundary survey drawings are located in Appendix A.

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility. This report presents the results of a site acceptability study performed for the purpose of obtaining the necessary EPD approval to develop the property as a private industry coal combustion by-product disposal facility for gypsum.

### *1.1.2 General Site Geology*

The proposed disposal facility is located within the Southern Piedmont Physiographic province, which lies between the Blue Ridge Mountains and the Upper Coastal Plain. This province is underlain by metamorphic rocks including mica schists and granitic gneisses. The Brevard Fault Zone, a major feature that cuts across the Piedmont, occurs approximately one mile north of the proposed disposal facility. This zone is bounded by a thrust fault on the southeastern border and trends northeast, as do most of the rocks of the Piedmont.

Rock cores recovered from borings within the disposal facility are interbedded granitic gneisses, garnet mica schists, augen schists and augen gneisses with occasional quartzite veins and accessory minerals of garnet, epidote and calcite. Figure 1-3 shows the regional geology of the site area.

### *1.1.3 Population Trends*

The population of Heard County, Georgia for the year 2005 was estimated to be 11,346. From 2000 to 2005, the county grew in population an estimated 3.0%. Carroll County, to the north of the site, had an estimated population of 105,453 in 2005, an increase of 20.8% since 2000. Coweta County, to the east of the site, had an estimated 2005 population of 109,903, with an increase of 23.3% since 2000 (U. S. Census Bureau, 2006). According to the Carroll County Plan Update, these trends are due largely to the proximity of the area to the City of Atlanta.

### *1.1.4 Other Permitted State/Federal Facilities*

According to the Georgia Environmental Protection Division of the Department of Natural Resources, the Georgia Power Company-Plant Wansley Private Waste Disposal Facility, an inert landfill, permit number PBR-074-01IL, is the only waste disposal facility located within 2 miles of the site. No other State or Federal permitted waste disposal facility is located within 2 miles of the site.

### *1.1.5 Threatened and Endangered Species/Wildlife Habitat Survey*

The proposed disposal area was surveyed by representatives of Georgia Power Company's Environmental Affairs for threatened and endangered species. Both database and field surveys were conducted. No threatened and endangered species or their habitats were identified during these surveys. According to the report, one known location of a federally listed species (bald eagle – federally listed threatened) occurs approximately 1600 feet northwest of the site boundary within the Plant Wansley site. The location of the active nest is outside the primary zone (750 – 1500 ft) and will not be impacted by project activities.

The field survey indicated that the site was dominated by forested community types. Primary cover types included hardwood, mixed pine/hardwood, forested wetland, and scrub/shrub wetland. The full report is located in Appendix B.

## 1.2 Proximity to Roads, Airports and Railroads

The site is adjacent to Hollingsworth Ferry Road, with road frontage of approximately 5600 feet. A rail spur for the plant is located along Georgia Power Road, approximately one-quarter mile northeast of the proposed gypsum disposal site.

Twelve airports are located in the general site vicinity. The airports, their location, and their distance to the plant are listed in Table 1-1. None of the airports are closer than 5 miles to the site. This is greater than the most stringent requirements specified by Circular 14, requiring a minimum separation distance of 10,000 feet from the end of runways servicing turbojet aircraft. Additionally, the proposed facility will not receive wastes that will attract birds.

**Table 1-1**
**Airports Located in the General Vicinity of the Proposed Gypsum Disposal Facility**

| Airport Name | ID | Latitude | Longitude | Distance from Facility |
|---|---|---|---|---|
| Andy Fields | 2GE8 | 33-27-51.00N | 084-39-48.00W | 22.2 miles |
| Answered Prayer | 1GE3 | 33-15-14.00N | 085-10-13.00W | 12.0 |
| C&R Farm | 78GA | 33-30-15.40N | 085-01-01.79W | 7.0 |
| Dresden | GA79 | 33-20-41.42N | 084-54-40.78W | 7.9 |
| Falcons Aerie | 8GA8 | 33-34-38.40N | 085-00-10.79W | 12.1 |
| Flying W Farms | 6GA8 | 33-30-28.00N | 085-11-08.00W | 10.3 |
| Gum Creek | 8GA1 | 33-25-16.41N | 085-09-42.80W | 5.9 |
| Murphree | 26GA | 33-20-10.42N | 084-54-49.78W | 8.5 |
| Newnan Coweta County | CCO | 33-18-41.63N | 084-46-11.12W | 16.8 |
| Panther Creek | 17GA | 33-28-00.00N | 084-51-58.00W | 11.0 |
| West Georgia Regional – OV Gray Field | CTJ | 33-37-51.70N | 085-09-07.30W | 16.2 |
| Wilson Intl | 27GA | 33-39-30.39N | 085-00-35.80W | 17.6 |

(AirportBug.org, 2007)

## 1.3 Proximity to County Boundaries and National Historic Sites

Although the plant property is located in both Heard and Carroll Counties, and borders Coweta County along the Chattahoochee River, the proposed disposal site is located approximately 1.9 miles east of the boundary of Heard County and Coweta County and approximately 1.5 miles south of the boundary between Heard County and Carroll County. Circular 14 states that no permit shall be issued to an applicant if any part of the site is within ½ mile of an adjoining county without the approval of the government of the adjoining county. No portion of the proposed facility is within ½ mile of an adjoining county.

The National Parks Service's National Register of Historic Places was searched for a listing of historical places in Heard, Coweta, and Carroll Counties. The search indicated two historic sites in Heard County, 14 in Carroll County, and 23 in Coweta County. None of these listings are within 3 ¼ miles (5,708 yards) of the site. According to Circular 14, no industrial landfill shall be located within 5,708 yards of a National Historic Site. The complete list of historic sites in these counties, along with the approximate distance from the site is included in Appendix C.

## 1.4 Proximity to Flood Plains

Based on the Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Map for unincorporated Heard County, Map Number 130105A, page 4, the site is not located in the 100-year flood plain (Figure 1-4).

## 1.5 Proximity to Streams and Wetlands

A wetland delineation survey was performed by Georgia Power Environmental Affairs. The wetland delineation was performed in accordance with the United States Army Corps of Engineers "Wetland Delineation Manual, 1987" by two certified wetlands scientists. Several small wetlands were delineated that are associated with small streams. The total area of these wetlands is 7.4 acres. Any jurisdictional wetlands present, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis. All streams on the site property are tributaries of the Chattahoochee River which is located approximately 2000 feet east of the site boundary. Neither the river nor any of its tributaries are classified "trout streams" in Heard County. The streams and wetland areas are shown on Figure 1-5.

## 1.6 Proximity to Significant Groundwater Recharge Areas

According to Digital Environmental Atlas of Georgia, the site is not located in or adjacent to an area of significant groundwater recharge. The nearest significant unconfined aquifer recharge area is located approximately 2 miles southwest of the site. Figure 1-6 indicates the nearest significant recharge areas.

## 1.7 Proximity to Public and Domestic Water Wells

In November and December 2006, a survey was performed to identify water supply wells and surface water intakes near the site. The survey was performed by Kemron Environmental Services in accordance with the specifications for a Private Industrial Disposal Facility as outlined in Chapter 391-3-4-.05(k) of the Rules for Solid Waste Management, and Appendix A, Circular 14, Criteria for Performing Site Acceptability Studies for Solid Waste Landfills. An inventory of all privately owned (domestic) water supply wells within ½-mile radius and all public water supply wells and surface water intakes within a 2-mile radius was completed. The survey included the following:

- Obtaining tax maps of the adjacent properties from the Heard County Tax Assessors Office to identify property owners.
- Contacting the Heard County Water Authority.
- Searching the Water Resources Division of the United States Geologic Survey (USGS) and state of Georgia Environmental Protection Division (EPD) databases.
- Field reconnaissance of the 2-mile radius for public water supply wells and surface water intakes and ½-mile radius for private water supply wells.

The search produced the following information:

- The USGS database included nine private wells within the 2-mile radius of the site. Based on field observation, these wells appear to be outside the ½-mile radius for private water supply wells.

- The State of Georgia Environmental Protection Division (GAEPD) database for water supply wells and water intakes in Heard County was searched for drinking water sources. Of the 7 sources listed in Heard County 2 water intakes are located within 2 miles of the site. These 2 water intakes belong to Georgia Power Company's Plant Wansley and are listed as 1) Plant Service Pond and 2) Chattahoochee River. Neither of these intakes are used for drinking water; however the Plant Service Pond intake is used for an emergency eye-wash station. A third Plant Wansley water source, the Lake Gentry – Yellow Dirt Creek intake is listed in the database. It is located outside the 2-mile radius for surface water intakes and is not used for drinking water. The locations of the plant service water intakes are shown on Figure 2 of the Kemron report located in Appendix D. 2).

- The Heard County Water Authority was contacted and indicated that the two surface water intakes belonging to them were within the City of Franklin. The city limits of Franklin are approximately 10.5 miles downstream of the site. They also indicated that they do not keep records of private water wells.

- The Heard County Tax Assessors database indicated that seven properties with water wells are located within the ½-mile radius for domestic water supply wells. All of these wells are located up-gradient of the site.

- Field reconnaissance with the ½-mile radius of the site boundaries indicated 13 additional private water wells. Field reconnaissance was not performed on Plant Wansley property. The locations of these wells are shown on Figure 4 of the Kemron report, located in Appendix D. All of these wells are located up-gradient of the site.

Table 1-2 is a summary of the domestic wells identified during the survey to be within ½-mile of the site. Also included are properties adjacent to the site which are connected to the public water supply, but which may have wells. The complete Kemron report is included in Appendix D. Figure 1-7 shows both the ½-mile and 2-mile radii from the site boundaries. No public water wells are present within the 2-miles radius. The private water wells within the ½-mile radius are located on the map.

**Table 1-2**
**Water Supply Well Inventory**

| Well Owner | Property Address | Map | Parcel | Water Supply* |
|---|---|---|---|---|
| Wendall S. Lewis | 4819 Hollingsworth Ferry Rd. | 43 | 24 | well |
| Jerry L. & Tim R. Hudson | 4704 Hollingsworth Ferry Rd. | 43 | 25 | well |
| Pink & Gertrude Webb | 4944 Hollingsworth Ferry Rd. | 43 | 22 | well |
| Matthew R. Ridley | 4474 Hollingsworth Ferry Rd. | 43 | 26 | well |
| Gary C. Philpott | 4430 Hollingsworth Ferry Rd. | 43 | 27 | well |
| Yellow Dirt Baptist Church | 4058 Hollingsworth Ferry Rd. | 43 | 28 | well |
| Joe Stephens | Hollingsworth Ferry Rd. | 43 | 10 | well |
| Samuel Harmon | 6990 Five Notch Rd. | 44 | 18 | well |
| Samuel Harmon | 6990 Five Notch Rd. | 44 | 18.02 | well |
| Jud Hall | Five Notch Rd. | 44 | 18.03 | well |
| Wayne Morris | 240 Webb Rd. | 44 | 17 | well |
| James D. Green & Amanda Lovell | 50 Webb Rd. | 43 | 23.01 | well |
| Brenda Webb | 212 Webb Rd. | 43 | 20 | well |
| Gertrude Webb | Webb Rd. | 43 | 21 | well |
| James R. Price | Hollingsworth Ferry Rd. | 43 | 11 | well |
| Wayne Webb | 201 Webb Rd. | 43 | 19 | well |
| Steven Kirk | 4986 Hollingsworth Ferry Rd. | 43 | 16 | well |
| Johnnie Steele | 5120 Hollingsworth Ferry Rd. | 43 | 12 | well |
| Gertrude Webb | Hollingsworth Ferry Rd. | 43 | 13 | well |
| Rufus Adamson | 5040 Hollingsworth Ferry Rd. | 43 | 14 | well |
| Jeremy Milam | 6903 Five Notch Rd. | 44 | 18.01 | public |
| Jane Sullivan | 231 Webb Rd. | 44 | 17.01 | public |
| James & Lisa Perry | 288 Webb Rd. | 44 | 17.02 | public |
| Loyette Echols | 4848 Hollingsworth Ferry Rd. | 43 | 23 | public |
| Wendall C. Lewis | Hollingsworth Ferry Rd. | 43 | 23.02 | public |

* - Addresses shown with a well as the water supply were either listed on the Heard County Tax Assessors office to have a well or a well was visually observed during field reconnaissance. Addresses shown with public as the water supply are adjacent properties with public water supply. However, existence of a well has not been confirmed.

Circular 14 specifies a wellhead protection area around wells and springs used as sources of water supply for public water systems serving municipalities, counties, and authorities. The site is not within the water management area of a public water supply well or surface water intake.

## 1.8 Zoning and Notification

A copy of the letter stating that the proposed solid waste disposal facility at Plant Wansley complies with local zoning and land use ordinance, from June Jackson, Commission Chair, Heard County Board of Commissioners, dated December 4, 2006, is located in Appendix E.

## 2.0 CHARACTERIZATION OF WASTES

Installation of flue gas desulfurization (FGD) equipment (scrubbers) on two coal-fired units at Plant Wansley will result in the production of gypsum ($Ca_2SO_4{\cdot}2H_2O$). FGD technologies are categorized as dry or wet, depending on the state of the reagent as it leaves the absorber. The scrubbers planned for Plant Wansley will be wet and will use limestone as the reagent. Hydrated lime is to be injected into the slurry upstream of the scrubbers to remove $SO_3$. Wet FGD systems are comprised of three main processing areas: sorbent handling, $SO_2$ scrubbing, and by-product handling.

FGD systems that use limestone continually discharge scrubber slurry from the absorber that is generally more than 90% water. The slurry can be dewatered by a number of processes, and depending on the slurry composition, it can be sold commercially as gypsum, mixed with fly ash to create a fairly impermeable fill, or handled and placed in storage. The only Georgia Power plant that currently generates gypsum is Plant Yates. When scrubbers are installed at Plant Wansley, the gypsum generated will be similar in physical and chemical properties to the gypsum that is currently generated at Plant Yates. Table 2-1 presents the range of results of total metals analyses based on 12 gypsum samples collected over a 12-day period from Plant Yates. The 12 samples were composited, and the TCLP was run on the composite. A duplicate TCLP was also run. Table 2-2 presents a summary of Plant Yates gypsum leachate data, compared to the regulatory thresholds that the EPA has set for hazardous waste. None of the elements in gypsum exceed the TCLP regulatory threshold. The laboratory reports and a figure showing the sampling location of the gypsum are located in Appendix F.

**Table 2-1**
**Plant Yates Gypsum Total Metals Data**

| Element | Range of Results mg/kg | Detection Limits mg/kg |
|---|---|---|
| Total Antimony | ND | 7.4 – 8.1 |
| Total Arsenic | ND | 4.4 – 4.9 |
| Total Barium | 120 – 210 | 1.5 – 1.6 |
| Total Beryllium | ND | 1.5 – 1.6 |
| Total Cadmium | ND | 1.5 – 1.6 |
| Total Chromium | ND – 1.6 | 1.5 – 1.6 |
| Total Cobalt | ND | 5.9 – 6.5 |
| Total Copper | ND | 1.5 – 3.3 |
| Total Iron | 260 – 560 | 5.9 – 6.5 |
| Total Lead | ND | 2.2 – 2.4 |
| Total Manganese | ND | 5.9 – 6.5 |
| Total Mercury | ND – 0.77 | 0.37 – 0.8 |
| Total Nickel | ND | 2.9 – 3.3 |
| Total Selenium | 7.5 – 14 | 5.9 – 6.5 |
| Total Silver | ND | 1.6 – 1.6 |
| Total Thallium | ND | 29 – 33 |
| Total Vanadium | ND | 2.9 – 3.3 |
| Total Zinc | 10 – 29 | 2.9 – 3.3 |

Note: Twelve separate samples were collected from 2/4/02 to 2/15/02.

**Table 2-2**
**Plant Yates Gypsum TCLP Data**

| Element | Sample #1 TCLP Concentration, mg/L | Duplicate TCLP Concentration, mg/L | TCLP Detection Limit, mg/L | TCLP Regulatory Limit, mg/L |
|---|---|---|---|---|
| Antimony | ND | ND | 0.1 | |
| Arsenic | ND | ND | 0.03 | 5.0 |
| Barium | 0.2 | 0.2 | 0.1 | 100.0 |
| Beryllium | ND | ND | 0.01 | |
| Cadmium | ND | ND | 0.01 | 1.0 |
| Chromium | 0.02 | 0.02 | 0.01 | 5.0 |
| Cobalt | ND | ND | 0.04 | |
| Copper | 0.03 | ND | 0.02 | |
| Iron | 0.35 | 0.31 | 0.01 | |
| Lead | ND | ND | 0.1 | 5.0 |
| Manganese | 0.10 | 0.10 | 0.04 | |
| Mercury | ND | ND | 0.005 | 0.2 |
| Nickel | ND | ND | 0.02 | |
| Selenium | ND | ND | 0.5 | 1.0 |
| Silver | ND | ND | 0.01 | 5.0 |
| Vanadium | ND | ND | 0.02 | |
| Zinc | 0.51 | 0.45 | 0.03 | |

Note: Samples collected on 2/4/02.

# 3.0 SURFACE AND SUBSURFACE EXPLORATIONS

## 3.1 Topography

The general topography of the area consists of rolling hills and narrow valleys. The elevations over the proposed disposal facility range from about 880 feet msl in the westernmost section to approximately 670 feet msl in the southeast corner nearest to the Chattahoochee River. A number of small wet-weather streams form a dendritic pattern and merge to drain to the river in the southeast corner. The larger portion of the site is vegetated with mature woods. High under-brush covers the areas that have been previously cleared of trees. The topography is shown on Figure 1-1

## 3.2 Boring and Sampling Plan

### *3.2.1 Basis*

The boring location plan was developed based on the locations of streams and wetland areas over the site and the topography of the site. Groundwater flow was expected to be influenced by the streams and the Chattahoochee River. A minimum of three borings were drilled for each drainage area.

### *3.2.2 Depth Criteria*

The drilling and sampling program consisted of borings drilled at 31 locations dispersed over the approximately 325 acres. Per Circular 14, the criterion was established to extend the borings to a minimum depth of 20 feet below the groundwater table. It was expected that rock would be encountered within this 20 feet in a majority of the holes. In the instances where this was the case, a minimum of 10 feet of rock core was performed or until core recovery exceeded 95% within the last 5 feet. Boring locations are shown on Figure 3-1.

### *3.2.3 Drilling Methods*

Drilling was performed using 4.875-inch diameter hollow stem augers to auger refusal. Rock coring was performed using a HQ wire-line coring system. The borings were advanced with a CME55 drill rig by Civil Field Services, Engineering and Construction Services, Southern Company Generation, a bonded service group under the Georgia Water Well Standards Act. A copy of the bond is located in Appendix G. All soil sampling and rock cores were logged under the direct supervision of a geologist or engineer registered in the State of Georgia.

### *3.2.4 Sampling Methods*

Split-spoon samples were taken in the soil and saprolite profile on 5-foot center-to-center spacing beginning at the ground surface or one foot below ground surface (bgs) and continuing to auger refusal. The soil samples were collected from the spoon, placed in sample containers and labeled with boring number, depth, standard penetration counts (N), sample number, job name and date. HW size surface casing was set into the top of rock as determined by auger refusal depths. Rock coring was performed with five foot runs with a HQ coring system. The recovered core was placed in wooden boxes, labeled with the boring number, date, depth of the run and core recovery. The piezometers were installed with 2-inch diameter screen and casing, a 10-foot screened interval, and a filter pack surrounding the screen to approximately 2 feet above the top of the screen. Bentonite was placed above the filter pack to the ground surface.

Twelve undisturbed samples were collected from six locations in the upper fourteen feet for permeability and classification testing. Bag samples were also collected from a number of locations for density and remolded permeability testing. Table 3-1 presents a summary of the boring data. Boring logs and piezometer logs are located in Appendix H.

**Table 3-1**
**Summary Boring Data**

| Boring | Ground Elev. | Auger Refusal Depth, ft. | Auger Refusal Elev. | Boring Termination Depth, ft. | Boring Termination Elev. | Groundwater Measurements Depth to GW, ft. | Groundwater Measurements Time GW Measured | Groundwater Measurements GW Elev. |
|---|---|---|---|---|---|---|---|---|
| GS-1 | 847.7 | 38.9 | 808.8 | 54.2 | 793.5 | 31.2 | 24 hrs | 816.5 |
| GS-2 | 834.2 | 21.2 | 813.0 | 45.7 | 788.5 | - | - | - |
| GS-3 | 803.2 | na | na | 50.0 | 753.2 | 27.0 | TOD | 776.2 |
| GS-4 | 805.9 | 17.0 | 788.9 | 35.5 | 770.4 | | - | 805.9 |
| GS-5 | 773.1 | 10.0 | 763.1 | 31.6 | 741.5 | - | - | - |
| GS-6 | 767.1 | na | na | 41.5 | 725.6 | 20.5 | TOD | 746.6 |
| GS-7 | 794.7 | na | na | 66.5 | 728.2 | 44.7 | 24 hrs | 750.0 |
| GS-8 | 766.5 | 16.3 | 750.2 | 37.4 | 729.1 | 15.1 | 24 hrs | 751.4 |
| GS-9 | 772.7 | 15.0 | 757.2 | 35.5 | 737.2 | 18.0 | TOD | 754.7 |
| GS-10 | 761.4 | 30.0 | 731.4 | 51.8 | 709.6 | 33.7 | 24 hrs | 727.7 |
| GS-11 | 773.9 | na | na | 61.0 | 712.9 | 39.3 | TOD | 734.6 |
| GS-12 | 773.2 | na | na | 81.0 | 692.2 | 58.7 | 24 hrs | 714.5 |
| GS-13 | 780.6 | 12.5 | 768.1 | 37.5 | 743.1 | 16.7 | 24 hrs | 763.9 |
| GS-14 | 737.7 | 6.5 | 731.2 | 44.5 | 693.2 | 20.4 | 24 hrs | 717.3 |
| GS-15 | 719.7 | 21.0 | 698.7 | 41.3 | 678.4 | 18.0 | 24 hrs | 701.7 |
| GS-16 | 710.5 | 26.9 | 683.6 | 40.1 | 670.4 | 20.7 | 24 hrs | 689.8 |
| GS-17 | 756.1 | 30.0 | 726.1 | 50.4 | 705.7 | 21.7 | - | 734.4 |
| GS-18 | 731.6 | 7.4 | 724.2 | 32.5 | 699.1 | 15.2 | - | 716.4 |
| GS-19 | 750.0 | 15.2 | 734.8 | 39.2 | 710.8 | 17.3 | 24 hrs | 732.7 |
| GS-20 | 713.8 | na | na | 43.5 | 670.3 | - | - | - |
| GS-21 | 789.4 | 66.0 | 723.4 | 77.5 | 711.9 | 74.0 | 24 hrs | 715.4 |
| GS-22 | 729.3 | na | na | 75.0 | 654.3 | 48.7 | TOD | 680.6 |
| GS-23 | 697.9 | na | na | 60.0 | 637.9 | 12.6 | TOD | 685.3 |
| GS-24 | 725.0 | na | na | 65.5 | 659.5 | 39.5 | TOD | 685.5 |
| GS-25 | 785.7 | 29.0 | 756.7 | 43.7 | 742.0 | 20.2 | 24 hrs | 765.5 |
| GS-26 | 744.7 | 50.5 | 694.2 | 60.0 | 684.7 | - | - | - |
| GS-27 | 699.7 | na | na | 35.0 | 664.7 | - | - | - |
| GS-28 | 813.4 | na | na | 68.0 | 745.4 | - | - | - |
| GS-29 | 746.7 | na | na | 50.0 | 696.7 | - | - | - |
| GS-30 | 714.6 | na | na | 46.5 | 668.1 | - | - | - |
| GS-31 | 843.5 | 23.5 | 820.0 | 43.5 | 800.0 | 15.0 | 24 hrs | 828.5 |

na – not applicable
TOD – time of drilling

### *3.2.5 Field and Laboratory Testing*

Split-spoon, undisturbed, and bulk samples were collected for laboratory soils testing. The laboratory testing was performed by Southern Company Generation in Alabaster, Alabama. The following tests were performed on the soil samples using the standard noted:

- Standard Test Method for Particle-Size Analysis of Soils R (1998) - ASTM D-422
- Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits Tests) - ASTM D-4318
- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) - ASTM D-2487
- Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer E(2002) - ASTM D-854
- Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass - ASTM D-2216
- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) - ASTM D-698
- Fall Head Permeability Tests – Corps of Engineers Method
- Cation Exchange Capacity – EPA method SW-846
- Standard Test Method for Batch-Type Measurement of Contaminant Sorption by Soils and Sediments – ASTM D-4646

Remolded samples were used to test for permeability of the overburden soil. Samples were remolded to 98% maximum dry density and +1.5% optimum moisture content using the results of the compaction testing (ASTM D698). Falling head permeability tests were also run on ten undisturbed samples of the overburden soils. Additionally, slug testing was performed in the field to determine the field hydraulic conductivity of the in situ rock and saprolite aquifer. This testing is discussed in Section 3.4.4.

The cation exchange capacity and the adsorption coefficient ($K_d$) were also determined for five samples. The results of the laboratory testing are shown in Table 3-2 and the laboratory test reports are included in Appendix I.

Table 3-2
Summary of Soil Laboratory Test Results

| Sample | Type | Depth, ft. | Description | % Fines | LL | PI | USCS | In-Situ Density, pcf | Natural Moisture, % | Max. Dry Density, (Proctor) pcf | Optimum Moisture, (Proctor) % | Gs | Perm, cm/sec | Remolded Density, pcf | Remolded Moisture, % | CEC, meq/100g | $K_d$, ml/g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-2 | Bulk | 1.0 - 2.5 | Light reddish brown sandy lean CLAY | 66.5 | 47 | 21 | CL | | | 96.9 | 22.7 | 2.63 | $3.7 \times 10^{-7}$ | 94.9 | 24.2 | 14.8 | 4380 |
| GS-2 | Bulk | 3.0 - 4.5 | Light brown sandy SILT | 50.1 | NP | NP | ML | | | 99.3 | 18.0 | 2.63 | $3.5 \times 10^{-6}$ | 97.7 | 19.5 | | |
| GS-4 | UD | 3.0 - 5.0 | Light reddish brown sandy SILT | 57.4 | NP | NP | ML | 91.6 | 15.6 | | | 2.64 | $1.6 \times 10^{-5}$ | | | | |
| GS-4 | UD | 10.0 – 12.0 | Light brown silty SAND | 44.2 | NP | NP | SM | 91.9 | 22.7 | | | 2.62 | $9.9 \times 10^{-5}$ | | | | |
| GS-7 | Bulk | 2.0 - 3.0 | | | | | | | | 104.2 | 19.8 | | $1.4 \times 10^{-6}$ | 100.9 | 21.3 | | |
| GS-7 | SS | 4.5 - 6.0 | Reddish brown elastic SILT w/sand | 78.5 | 58 | 26 | MH | | | | | 2.72 | | | | | |
| GS-7 | Bulk | 6.0 - 8.0 | | | | | | | | 107.9 | 17.8 | | $4.0 \times 10^{-7}$ | 105.4 | 19.3 | | |
| GS-7 | SS | 14.5 – 16.0 | Reddish brown elastic SILT w/sand | 70.3 | 53 | 8 | MH | | | | | 2.73 | | | | | |
| GS-7 | SS | 34.5 – 36.0 | Light reddish brown sandy SILT | 59.6 | NP | NP | ML | | | | | 2.72 | | | | | |
| GS-11 | UD | 3.0 - 5.0 | Reddish brown elastic SILT w/sand | 73.3 | 51 | 17 | MH | 86.1 | 27.5 | | | 2.69 | $4.7 \times 10^{-5}$ | | | | |
| GS-11 | UD | 10.0 – 12.0 | Light brown sandy SILT | 51.3 | NP | NP | ML | 95.0 | 15.4 | | | 2.67 | $7.3 \times 10^{-5}$ | | | | |
| GS-13 | Bulk | 1.5 - 3.0 | Light reddish brown elastic SILT w/sand | 78.5 | 50 | 17 | MH | | | 90.1 | 28.3 | 2.83 | $1.8 \times 10^{-6}$ | 87.7 | 29.8 | 19.7 | 2345 |
| GS-13 | Bulk | 5.0 - 6.0 | Light brown sandy SILT | 59.1 | NP | NP | ML | | | 91.1 | 24.8 | 2.83 | $1.3 \times 10^{-6}$ | 89.7 | 26.3 | 18.2 | 5313 |
| GS-16 | UD | 4.0 - 6.0 | Dark brown elastic SILT | 86.0 | 86 | 31 | MH | 78.6 | 40.8 | | | 2.83 | $8.2 \times 10^{-6}$ | | | | |
| GS-16 | UD | 12.0 – 14.0 | Light reddish brown sandy SILT | 65.7 | NP | NP | ML | 87.0 | 22.1 | | | 2.70 | $2.3 \times 10^{-4}$ | | | | |
| GS-17 | SS | 4.0 - 5.5 | Reddish brown elastic SILT w/sand | 81.6 | 55 | 22 | MH | | | | | 2.74 | | | | | |
| GS-17 | SS | 14.5 – 15.5 | Light brown sandy SILT | 65.3 | NP | NP | ML | | | | | 2.73 | | | | | |
| GS-17 | SS | 24.0 – 25.5 | Light brown sandy SILT | 57.1 | NP | NP | ML | | | | | 2.83 | | | | | |
| GS-19 | Bulk | 1.5 - 3.0 | Light reddish brown elastic SILT w/sand | 83.7 | 54 | 24 | MH | | | 98.2 | 22.5 | 2.75 | $2.4 \times 10^{-6}$ | 96.2 | 24.0 | 13.8 | 3030 |
| GS-19 | Bulk | 6.0 - 7.0 | Light reddish brown sandy SILT | 57.4 | NP | NP | ML | | | 77.1 | 34.4 | 2.84 | $3.7 \times 10^{-6}$ | 75.6 | 34.4 | 27.4 | 5847 |
| GS-21 | UD | 4.0 - 6.0 | Reddish brown silty SAND | 43.0 | NP | NP | SM | 97.5 | 11.3 | | | 2.78 | $6.6 \times 10^{-5}$ | | | | |
| GS-21 | UD | 9.0 - 11.0 | Brown silty SAND | 46.1 | NP | NP | SM | 109.9 | 13.3 | | | 2.73 | $1.4 \times 10^{-4}$ | | | | |
| GS-21 | SS | 49.5 – 51.0 | Gray silty SAND | 38.9 | NP | NP | SM | | | | | 2.75 | | | | | |
| GS-22 | SS | 4.5 - 6.0 | Light brown SILT with sand | 79.2 | NP | NP | ML | | | | | 2.69 | | | | | |
| GS-23 | SS | 1.0 - 2.5 | Reddish brown elastic SILT w/sand | 80.4 | 54 | 18 | MH | | | | | 2.73 | | | | | |
| GS-23 | SS | 14.5 – 16.0 | Light brown SILT w/sand | 71 | NP | NP | ML | | | | | 2.70 | | | | | |
| GS-23 | SS | 39.5 – 41.0 | Light gray silty SAND | 43.1 | NP | NP | SM | | | | | 2.86 | | | | | |
| GS-26 | UD | 1.0 - 3.0 | Light brown silty SAND | 35.4 | NP | NP | SM | 102.5 | 12.2 | | | 2.74 | | | | | |
| GS-26 | UD | 10.0 – 12.0 | Brown silty SAND | 33.6 | NP | NP | SM | 109.9 | 13.2 | | | 2.73 | | | | | |
| GS-28 | UD | 4.0 - 6.0 | Reddish brown sandy SILT | 55.5 | NP | NP | ML | 96.9 | 13.1 | | | 2.78 | $2.3 \times 10^{-5}$ | | | | |
| GS-28 | UD | 11.0 – 12.5 | Lavender sandy SILT | 51.4 | NP | NP | ML | 100.4 | 15.5 | | | 2.75 | $7.1 \times 10^{-5}$ | | | | |
| GS-29 | Bulk | 1.0 - 2.5 | | | | | | | | 100.2 | 21.8 | | $1.7 \times 10^{-7}$ | 98.2 | 23.3 | | |
| GS-29 | SS | 3.0 - 4.5 | Reddish brown silty SAND | 44.3 | 43 | 12 | SM | | | | | 2.79 | | | | | |
| GS-29 | Bulk | 6.0 - 8.0 | | | | | | | | 101.5 | 20.6 | | $5.7 \times 10^{-7}$ | 98.9 | 22.2 | | |
| GS-29 | SS | 13.0 – 14.5 | Light brown sandy SILT | 55.3 | NP | NP | ML | | | | | 2.77 | | | | | |
| GS-29 | SS | 37.0 – 39.5 | Light brown sandy SILT | 32 | NP | NP | SM | | | | | 2.77 | | | | | |

LL – Liquid Limit
PI – Plasticity Index
% Fines – Sieve Analysis
SS – Split Spoon Sample
USCS – Unified Soil Classification System Designation

CEC – Cation Exchange Capacity
$K_d$ – Sorption Coefficient
Gs – Specific Gravity
UD – Undisturbed Sample
NP – Non Plastic

## 3.3 Soil and Rock Description

### *3.3.1 Soil Description*

The soils over the proposed disposal area consist primarily of light brown to reddish brown, sandy silt, silty sand, and sandy lean clay, with occasional fragments of the underlying rock. The thickness of the soil encountered in the borings is variable, from thin (less than five feet) to as much as 61 feet. Laboratory tests classify the soils as ML, MH, SM and CL.

The soil cover is underlain by saprolite typical of Piedmont settings. This saprolite retains relict features of the parent rock such as schistocity (schists) and banding (gneisses) while having the texture of a soil. Described as dense and red to gray to black in color, the saprolite may be as much as 60 feet thick.

### *3.3.2 Rock Description*

Rock coring began at auger refusal using an HQ (2.5 inch diameter core) wire-line coring system. Top of rock is irregular, ranging from 6.5 feet below ground surface to as much as 75 feet below the ground surface. The rock consists of interbedded dark gray to greenish gray augen schist, mica garnet schist and black and white to gray to pink and gray augen gneiss and biotite gneiss. Pyrite, calcite laminations and quartzite veins are common. Large porphyroblasts of pink feldspar occur in several intervals. Manganese oxides are observed in fractures, which are numerous and often steep. Weathering due to water movement is observed along open fractures. Iron staining from water movement along fractures is common.

Top of rock is slightly to strongly weathered but becomes unweathered with depth. Core recovery ranged from poor (26%) to excellent (100%), averaging 92%. Recovery increased significantly with depth as the rock became less weathered. RQD ranged from 0% to 100%, averaging 67%. RQD also increased significantly with depth. Geologic cross-sections A-A and B-B of the site are shown on Figure 3-2.

## 3.4 Hydrogeologic Assessment

### *3.4.1 Description of Unconfined Aquifers*

Temporary piezometers were installed in borings GS-1 through GS-31 with screened intervals in either the lower portion of the saprolite or the upper part of rock. The top of casing elevations, depths to groundwater and groundwater elevations are indicated in Table 3-3. The piezometer logs are located in Appendix H. Groundwater potentiometric maps were prepared for the unconfined groundwater surface aquifer from groundwater readings taken on November 17, 2006 and April 19, 2007. The April readings represent the highest groundwater levels to date. Both maps indicate that the general groundwater flow is from the south and west towards the creek that runs from west to east to the Chattahoochee River.

This flow is generally through the saprolite and partially weathered rock and is recharged by infiltration of storm water within the site itself. The groundwater potentiometric surfaces are represented on Figures 3-3 and 3-4.

Table 3-3
Depth to Groundwater and Groundwater Elevations

| Boring | Date Installed | TOC Elev. | Depth to GW 11/17/06 | GW Elev. 11/17/06 | Depth to GW 12/06/06 | GW Elev. 12/06/06 | Depth to GW 2/19/07 | GW Elev. 2/19/07 | Depth to GW 3/19/07 | GW Elev. 3/19/07 | Depth to GW 4/19/07 | GW Elev. 4/19/07 | Depth to GW 5/14/07 | GW Elev. 5/14/07 | Depth to GW 6/12/07 | GW Elev. 6/12/07 | Depth to GW 7/2/07 | GW Elev. 7/2/07 | Depth to GW 8/20/07 | GW Elev. 8/20/07 | Depth to GW 9/13/07 | GW Elev. 9/13/07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-1 | 10/12/06 | 850.30 | 32.80 | 817.50 | 33.00 | 817.30 | 33.24 | 817.06 | 33.35 | 816.95 | 33.48 | 816.82 | 33.89 | 816.41 | 34.33 | 815.97 | 34.61 | 815.69 | 34.56 | 815.74 | 34.90 | 815.40 |
| GS-2 | 10/23/06 | 837.07 | 33.32 | 803.75 | 31.33 | 805.74 | 29.68 | 807.39 | 29.38 | 807.69 | 28.84 | 808.23 | 29.03 | 808.04 | 29.75 | 807.32 | 29.93 | 807.14 | 30.15 | 806.92 | 31.77 | 805.30 |
| GS-3 | 10/23/06 | 806.32 | 29.25 | 777.07 | 28.30 | 778.02 | 25.03 | 781.29 | 25.10 | 781.22 | 25.15 | 781.17 | 26.01 | 780.31 | 27.69 | 778.63 | 28.85 | 777.47 | 30.38 | 775.94 | 31.09 | 775.23 |
| GS-4 | 10/24/06 | 808.99 | 17.19 | 791.80 | 17.73 | 791.26 | 18.10 | 790.89 | 16.98 | 792.01 | 16.70 | 792.29 | 17.42 | 791.57 | 17.36 | 791.63 | 17.58 | 791.41 | 18.20 | 790.79 | 18.37 | 790.62 |
| GS-5 | 10/22/06 | 775.97 | 26.53 | 749.44 | 26.67 | 749.30 | 26.76 | 749.21 | 26.77 | 749.20 | 26.35 | 749.62 | 26.74 | 749.23 | 27.15 | 748.82 | 27.05 | 748.92 | 26.82 | 749.15 | 26.80 | 749.17 |
| GS-6 | 10/21/06 | 769.71 | 19.55 | 750.16 | 19.62 | 750.09 | 17.16 | 752.55 | 17.01 | 752.70 | 17.70 | 752.01 | 17.90 | 751.81 | 19.48 | 750.23 | 20.53 | 749.18 | 22.10 | 747.61 | 22.66 | 747.05 |
| GS-7 | 10/11/06 | 797.43 | 40.65 | 756.78 | 46.36 | 751.07 | 44.98 | 752.45 | 44.60 | 752.83 | 44.56 | 752.87 | 45.13 | 752.30 | 45.93 | 751.50 | 46.09 | 751.34 | 47.69 | 749.74 | 48.40 | 749.03 |
| GS-8 | 10/11/06 | 769.40 | 18.55 | 750.85 | 18.42 | 750.98 | 16.66 | 752.74 | 16.85 | 752.55 | 16.48 | 752.92 | 18.41 | 750.99 | 19.26 | 750.14 | 19.94 | 749.46 | 21.07 | 748.33 | 21.81 | 747.59 |
| GS-9 | 10/12/06 | 776.44 | 26.84 | 749.60 | 26.40 | 750.04 | 24.33 | 752.11 | 24.10 | 752.34 | 23.72 | 752.72 | 24.89 | 751.55 | 26.28 | 750.16 | 27.31 | 749.13 | 28.78 | 747.66 | 29.53 | 746.91 |
| GS-10 | 10/20/06 | 764.18 | 35.00 | 729.18 | 35.74 | 728.44 | 32.31 | 731.87 | 32.31 | 731.87 | 32.79 | 731.39 | 32.86 | 731.32 | 33.17 | 731.01 | 34.66 | 729.52 | 35.80 | 728.38 | 36.27 | 727.91 |
| GS-11 | 10/20/06 | 776.63 | 42.61 | 734.02 | 42.32 | 734.31 | 40.97 | 735.66 | 40.58 | 736.05 | 40.36 | 736.27 | 40.73 | 735.90 | 41.43 | 735.20 | 42.35 | 734.28 | 42.88 | 733.75 | 43.19 | 733.44 |
| GS-12 | 10/19/06 | 775.70 | 48.18 | 727.52 | 48.12 | 727.58 | 46.78 | 728.92 | 46.70 | 729.00 | 46.68 | 729.02 | 47.31 | 728.39 | 48.00 | 727.70 | 48.32 | 727.38 | 49.21 | 726.49 | 49.34 | 726.36 |
| GS-13 | 10/10/06 | 783.96 | 18.69 | 765.27 | 18.48 | 765.48 | 14.33 | 769.63 | 13.46 | 770.50 | 13.39 | 770.57 | 14.09 | 769.87 | 16.24 | 767.72 | 17.52 | 766.44 | 19.80 | 764.16 | 20.60 | 763.36 |
| GS-14 | 10/18/06 | 740.82 | 21.27 | 719.55 | 21.76 | 719.06 | 20.51 | 720.31 | 21.19 | 719.63 | 21.17 | 719.65 | 23.06 | 717.76 | 24.81 | 716.01 | 25.42 | 715.40 | 26.75 | 714.07 | 27.10 | 713.72 |
| GS-15 | 10/19/06 | 722.61 | 15.51 | 707.10 | 16.84 | 705.77 | 11.26 | 711.35 | 13.15 | 709.46 | 14.57 | 708.04 | 16.04 | 706.57 | 18.32 | 704.29 | 19.33 | 703.28 | 20.95 | 701.66 | 21.57 | 701.04 |
| GS-16 | 10/18/06 | 713.11 | 20.44 | 692.67 | 20.67 | 692.44 | 20.17 | 692.94 | 20.55 | 692.56 | 20.42 | 692.69 | 21.87 | 691.24 | 22.95 | 690.16 | 23.23 | 689.88 | 23.90 | 689.21 | 23.36 | 689.75 |
| GS-17 | 10/5/06 | 758.78 | 22.66 | 736.12 | 22.00 | 736.78 | 19.88 | 738.90 | 21.17 | 737.61 | 20.58 | 738.20 | 20.99 | 737.79 | 21.46 | 737.32 | 21.75 | 737.03 | 24.80 | 733.98 | 25.5 | 733.28 |
| GS-18 | 10/4/06 | 733.45 | 15.07 | 718.38 | 15.79 | 717.66 | 15.18 | 718.27 | 15.21 | 718.24 | 15.14 | 718.31 | 15.54 | 717.91 | 16.00 | 717.45 | 16.13 | 717.32 | 17.45 | 716.00 | 17.61 | 715.84 |
| GS-19 | 9/27/06 | 752.89 | dry | dry | dry | dry | 21.99 | 730.90 | 21.91 | 730.98 | 21.68 | 731.21 | 20.79 | 732.10 | 21.83 | 731.06 | 23.13 | 729.76 | dry | dry | dry | dry |
| GS-20 | 10/3/06 | 716.61 | 19.58 | 697.03 | 20.47 | 696.14 | 19.31 | 697.30 | 19.46 | 697.15 | 19.32 | 697.29 | 20.62 | 695.99 | 21.68 | 694.93 | 21.92 | 694.69 | 22.84 | 693.77 | 22.65 | 693.96 |
| GS-21 | 10/2/06 | 792.11 | 35.03 | 757.08 | 35.16 | 756.95 | 33.15 | 758.96 | 32.70 | 759.41 | 32.45 | 759.66 | 32.84 | 759.27 | 33.52 | 758.59 | 33.72 | 758.39 | 35.79 | 756.32 | 36.49 | 755.62 |
| GS-22 | 10/3/06 | 732.71 | - | - | 36.22 | 696.49 | 35.30 | 697.41 | 34.95 | 697.76 | 34.63 | 698.08 | 34.74 | 697.97 | 35.10 | 697.61 | 35.50 | 697.21 | 36.61 | 696.10 | 36.85 | 695.86 |
| GS-23 | 10/4/06 | 700.73 | 18.03 | 682.70 | 18.45 | 682.28 | 17.93 | 682.80 | 18.44 | 682.29 | 18.52 | 682.21 | 19.65 | 681.08 | 21.29 | 679.44 | 21.68 | 679.05 | 22.49 | 678.24 | 22.22 | 678.51 |
| GS-24 | 10/5/06 | 728.21 | 42.18 | 686.03 | 42.54 | 685.67 | 40.97 | 687.24 | 40.59 | 687.62 | 40.33 | 687.88 | 40.56 | 687.65 | 41.29 | 686.92 | 41.79 | 686.42 | 43.05 | 685.16 | 43.18 | 685.03 |
| GS-25 | 9/26/06 | 788.47 | 18.05 | 770.42 | 20.81 | 767.66 | 18.44 | 770.03 | 18.74 | 769.73 | 19.09 | 769.38 | 19.68 | 768.79 | 20.47 | 768.00 | 21.18 | 767.29 | 22.65 | 765.82 | 23.18 | 765.29 |
| GS-26 | 9/27/06 | 748.14 | 28.89 | 719.25 | 22.26 | 725.88 | 26.81 | 721.33 | 27.10 | 721.04 | 27.40 | 720.74 | 28.20 | 719.94 | 29.80 | 718.34 | 30.18 | 717.96 | 30.80 | 717.34 | 31.92 | 716.22 |
| GS-27 | 10/3/06 | 702.67 | 13.61 | 689.06 | 13.95 | 688.72 | 13.77 | 688.90 | 14.15 | 688.52 | 13.78 | 688.89 | 15.25 | 687.42 | 16.91 | 685.76 | 17.38 | 685.29 | 18.76 | 683.91 | 19.17 | 683.50 |
| GS-28 | 9/12/06 | 816.37 | 42.88 | 773.49 | 44.80 | 771.57 | 42.83 | 773.54 | 42.15 | 774.22 | 41.69 | 774.68 | 42.06 | 774.31 | 42.87 | 773.50 | 43.05 | 773.32 | 45.72 | 770.65 | 46.40 | 769.97 |
| GS-29 | 9/14/06 | 749.67 | 19.81 | 729.86 | 19.14 | 730.53 | 17.03 | 732.64 | 17.51 | 732.16 | 18.03 | 731.64 | 19.06 | 730.61 | 42.87 | 706.80 | 20.98 | 728.69 | 22.03 | 727.64 | 24.29 | 725.38 |
| GS-30 | 9/19/06 | 717.54 | 14.92 | 702.62 | 15.22 | 702.32 | 14.28 | 703.26 | 14.54 | 703.00 | 14.46 | 703.08 | 15.42 | 702.12 | 17.10 | 700.44 | 17.52 | 700.02 | 19.92 | 697.62 | 20.35 | 697.19 |
| GS-31 | 10/21/06 | 846.39 | 26.93 | 819.46 | 24.94 | 821.45 | 24.04 | 822.35 | 23.87 | 822.52 | 23.82 | 822.57 | 24.18 | 822.21 | 24.31 | 822.08 | 24.52 | 821.87 | 25.62 | 820.77 | 25.61 | 820.78 |

### *3.4.2 Description of Confined Aquifers*

No confined aquifers were encountered at this site. As is typical of the Southern Piedmont Physiographic province, the groundwater aquifer is unconfined.

### *3.4.3 Uppermost Aquifer Gradient*

Using depth to groundwater data collected 11/17/06, which represent the highest groundwater levels to date, the hydraulic gradient of the unconfined aquifer was computed. Gradients were computed for several areas of the site using the following equation:

$$\text{hydraulic gradient} = i = \frac{(h_1 - h_2)}{L}$$

where:

$h_1$ = groundwater elevation at up-gradient well

$h_2$ = groundwater elevation at down-gradient well

$L$ = distance between $h_1$ and $h_2$

Table 3-4 shows the gradients calculated for the site.

**Table 3-4**
**Hydraulic Gradients**

| Wells | $h_1$ | $h_2$ | L | i |
|---|---|---|---|---|
| | ft msl | ft msl | ft | ft/ft |
| GS-28 & GS-30 | 773.49 | 702.62 | 1226.2 | 0.058 |
| GS-31 & GS-6 | 819.46 | 750.16 | 831.9 | 0.083 |
| GS-25 & GS-20 | 770.42 | 697.03 | 963.4 | 0.076 |

### *3.4.4 Field Hydraulic Conductivity (Slug) Tests*

Field hydraulic conductivity tests (slug tests) were conducted at boring locations GS-3, GS-4, GS-18, GS-21, GS-25, GS-27, and GS-29. The tests were performed in the temporary piezometers installed during the drilling program. The piezometers were installed with 2-inch diameter screen and casing, a 10-foot screened interval, a filter pack surrounding the screen to approximately 2 feet above the top of the screen. Bentonite was placed above the filter pack to the ground surface. The piezometer construction logs are located in Appendix H. Table 3-5 presents the results of the hydraulic conductivity (K) tests. A copy of the data reduction and graphs are included in Appendix J.

**Table 3-5**
**Field Hydraulic Conductivity Tests**

| Location | Material | $K_{slug\ in}$ cm/sec | $K_{slug\ out}$ cm/sec | $K_{slug\ in}$ ft/day | $K_{slug\ out}$ ft/day |
|---|---|---|---|---|---|
| GS-3 | saprolite | $1.68 \times 10^{-4}$ | $1.88 \times 10^{-4}$ | $4.77 \times 10^{-1}$ | $5.33 \times 10^{-1}$ |
| GS-21 | saprolite | $1.11 \times 10^{-3}$ | $8.41 \times 10^{-4}$ | $3.14 \times 10^{0}$ | $2.39 \times 10^{0}$ |
| GS-27 | saprolite | $3.25 \times 10^{-4}$ | $3.25 \times 10^{-4}$ | $9.22 \times 10^{-1}$ | $9.22 \times 10^{-1}$ |
| GS-29 | saprolite | $1.59 \times 10^{-4}$ | $1.61 \times 10^{-4}$ | $4.50 \times 10^{-1}$ | $4.57 \times 10^{-1}$ |
| GS-4 | rock | $3.62 \times 10^{-2}$ | $2.06 \times 10^{-2}$ | $1.03 \times 10^{2}$ | $5.83 \times 10^{1}$ |
| GS-18 | rock | $2.67 \times 10^{-4}$ | $3.38 \times 10^{-4}$ | $7.57 \times 10^{-1}$ | $9.58 \times 10^{-1}$ |
| GS-25 | rock | $2.45 \times 10^{-4}$ | $1.76 \times 10^{-4}$ | $6.96 \times 10^{-1}$ | $5.00 \times 10^{-1}$ |
| **Average Soil** | | | $\mathbf{4.09 \times 10^{-4}}$ | | $\mathbf{1.16 \times 10^{0}}$ |
| **Average Rock** | | | $\mathbf{9.63 \times 10^{-3}}$ | | $\mathbf{2.73 \times 10^{1}}$ |

### *3.4.5 Sorption and Attenuation Capacity*

***Sorption (Distribution) Coefficients***

Environmental risk assessment of metals depends to a great extent on fate and transport modeling based on soil-liquid partitioning coefficients. The evaluation of the potential risks of metals in soils requires an assessment of the proportion of the total metal that is in a mobile and possibly bioavailable form. This can be done using a relatively simple partitioning of the total metal concentration between the fraction bound to the soil solids and the part that is dissolved in the soil solution (pore water). The dissolved metal concentration reflects the soil metal fraction that could potentially be leached from the soil and contaminate groundwater and surface waters. Conversely, the balance of the metal is assumed to be tightly retained by the soil solids and, hence, unavailable for biological uptake or movement into groundwater (Sauve and others, 2000).

Selenium was chosen as the potential contaminant to model, based on the results of the gypsum total metals concentrations and leaching tests (Tables 2-1 and 2-2), for fate and transport modeling. The partition or distribution coefficient $K_d$, is required for modeling. $K_d$ is a measure of sorption of contaminants to soils and is defined as the ratio of the contaminant concentration adhered to the solid to the contaminant concentration in the surrounding aqueous solution when the system is at equilibrium. Once groundwater is contaminated, it is important to understand how the contaminant moves in the subsurface environment. $K_d$ is one of the most important parameters used in determining the migration potential of contaminants present in aqueous solutions in contact with surface, subsurface and suspended solids. A contaminant with a $K_d$ value around zero would travel at the rate of water, while ones that react more strongly with the soils would have higher $K_d$ values. The $K_d$ value is basically used to determine how well a soil will adsorb a contaminant and thus not allow the contaminant to migrate through the groundwater.

ASTM D 4646 is the Standard Test Method for 24-hour Batch-Type Measurement of Contaminant Sorption by Soils and Sediments. The distribution coefficient ($K_d$) is defined identically to the distribution ratio ($R_d$), except $K_d$ is considered to be an equilibrium value and independent of the concentration of solute. The distribution ratio ($R_d$) is the ratio of the concentration of solute sorbed on the soil or other geomedia divided by its concentration in solution. The $R_d$ value is calculated as follows:

$$K_d = R_{d(\text{at equilibrium})} = \frac{(\text{mass of solute sorbed per unit mass of geomedia})}{(\text{mass of solute in solution per unit volume of solution})}$$

$$= \frac{\mu g / g}{\mu g / mL} = mL/g$$

The test method can be summarized as mixing distilled water, natural water, waste leachate, or other aqueous solution containing a known concentration of a solute with a known amount of unconsolidated geologic material (e.g., soil) for 24 hours. Changes in solute concentrations are used to calculate a distribution ratio ($R_d$) (ASTM, 2001).

This test method is meant to allow for a rapid (24 hour) index of soil sorption affinity for given chemicals or leachate constituents. A large number of samples may be run using this test method to determine a comparative ranking of those samples, based upon the amount of solute sorbed by the soil, or by various soil or leachate constituents. The 24-hour time is used to make the test convenient and also to minimize microbial degradation which may be a problem for organic contaminants in long-timed procedures (ASTM, 2001).

After the samples have been weighed and air-dried, a moisture content has been measured, and the volume of solution has been determined, the sample can be placed in a rotary extractor to be agitated for 24 hours. The sample is then removed and the solution is removed from the solid phase by decantation and then filtered. After a clear solution is obtained, the $K_d$ value can be calculated from the following equation:

$$K_d = \frac{(A - B)V}{(M_s)B}$$

where:
A = initial concentration of the solute defined as the mean concentration of the blanks, ug/mL,
B = final concentration of the solute after 24 hours in contact with the soil, ug/mL,
V = volume of solution used, ml,
Ms = mass of soil expressed on an oven-dried basis, grams, and
$K_d$ = distribution ratio, ml/g (ASTM, 2001).

Site specific sorption coefficients ($K_d$) were measured for soil samples collected from the Wansley site per ASTM D-4646. Five samples were collected from the site. The results of this testing are presented in Table 3-2.

### 3.5 Potential of Unconfined Aquifers as Sources of Drinking Water

Groundwater recharge is generally from infiltration of rainfall. The average annual rainfall for the area is 50 to 54 inches per year. Based on rainfall data collected from 1940 to 2003, the months of December through March have the highest average rainfall amounts. Determination of the seasonal fluctuation in the groundwater level is pending the collection of additional monitoring data.

Because unconfined implies interconnection between the soil and rock aquifers, there is a low potential for the unconfined aquifer in this area to be used as a source of drinking water. The USGS web site lists 345 wells in Heard and Carroll Counties (USGS, 2006). Twenty seven of these wells are less than 80 feet deep. The majority are greater than 100 feet deep. Additionally, groundwater flows toward the plant, away from any residences. Also, public water supply is provided along Hollingsworth Ferry Road.

### 3.6 Description of Geologic and/or Natural Hazards/Seismic Impact Zone

The proposed site is located approximately 1.5 miles south of the Brevard Fault Zone, a major feature that cuts across the Piedmont. However, no faults or fault zones, unstable areas, or shear zones were encountered during the site geologic exploration. The latest movement along the Brevard Zone was late Paleozoic to Triassic. The age date of 282 (±14) million years has been assigned based on mineralogy. The date also agrees with field evidence as the final major metamorphic event of the Georgia Piedmont as a whole (Higgins, 1966).

Earthquake acceleration maps prepared for the continental United States (Algermissen and others, 1990) were reviewed to determine the seismic impact zone for the site. Map C of this series indicates the horizontal acceleration with a 90% probability of not being exceeded in 250 years. According to Map C, the horizontal acceleration for the site is 0.17g.

The Seismic Design Category for this site is a "C" classification (Table 9.4.2.1 of ASCE 7-98). The Use Group is I (i.e., represents a low hazard to human life in the event of a failure) per Table 9.1.3 of ASCE 7-98.

# 4.0 GROUNDWATER POLLUTION POTENTIAL

## 4.1 Introduction

In order to determine groundwater pollution potential and rate of leachate migration from the proposed by-product disposal area, three analyses were performed:

- Fate and transport modeling using the SESOIL model,
- LeGrand (1964) scoring method per Circular 14, and a
- Pathway analysis per Circular 14.

The results of this work showed a very low potential for leachate to contaminate groundwater, and similarly, for leachate to leave the site. Fate and transport modeling showed that under a conservative scenario ($K_d$ = 235 ml/g for the soil), contamination would take more than 100 years to reach groundwater, and under a more realistic scenario ($K_d$ = 2345 ml/g), contamination would take more than 1000 years to reach groundwater. Two-media LeGrand analyses produced a score of 15.8 indicating groundwater pollution is "possible, but not likely".

The horizontal pathway analysis described in Circular 14 becomes relevant only after contamination has traveled vertically through at least a 2-foot compacted silty soil liner and a minimum of 5 feet of saprolite to the water table, that is, after more than 1000 years.

## 4.2 Fate and Transport Modeling

### *4.2.1 Background*

The fate and transport model selected for use in this study was RISKPRO's Seasonal Soil Compartment Model (SESOIL) for Windows, Version 3, May 1998, from General Science Corporation. The model was developed as a risk screening-level model. It is a one-dimensional vertical transport model for the unsaturated soil zone. The model can only consider one chemical (pollutant) compound at a time. The model is based on mass balance and equilibrium partitioning of a chemical between different phases (dissolved, sorbed, vapor, and pure).

SESOIL is used to estimate the rate of migration of chemicals through the soil and the concentration of chemicals in the soil layers after a chemical release to the environment. The model can accept time-varying pollutant loads and can simulate up to 9,999 years of chemical transport. Applications of the model include long term leaching studies from waste disposal sites, leaking underground storage tanks, agricultural applications, and pesticide and sediment transport on watersheds (SESOIL user's guide).

According to the SESOIL's user guide, the soil column is a user-defined compartment extending from the surface through the unsaturated zone to the water table. SESOIL requires several types of chemical- and site-specific data. The essential information needed to run the model includes the following:

- The behavior in the environment of the chemical to be modeled,
- The rate and frequency of the chemical's release into the environment,
- A description of the media in which the chemical is released, and
- Monthly estimates of climatic data. (Climate information is compiled in RISKPRO through on-line databases)

Output includes the following:

- Time-variant estimates of concentrations of pollutants in the soil column at various depths,
- Rate of leaching toward groundwater, including quantities of pollutants entering the groundwater (SESOIL does not model the saturated zone),
- Pollutant loss from the unsaturated zone in terms of surface runoff,
- Volatilization, and
- Degradation.

Pollutant transport and transformation in the unsaturated soil zone are complex processes affected by chemical, soil, and hydrogeologic properties. In SESOIL, these processes are included in one of three cycles or submodels. These submodels and their associated processes are shown below:

1. Hydrologic submodel (deals with moisture movement through the layers), including:
   - rainfall
   - surface runoff
   - capillary rise
   - groundwater runoff (recharge)
   - soil moisture (storage)
   - evapotranspiration
   - infiltration

2. Pollutant fate submodel, including:
   - advection
   - cation exchange
   - sorption
   - washload
   - volatilization
   - surface runoff
   - groundwater runoff (recharge)
   - metal complexation
   - diffusion (air phase)
   - hydrolysis

3. Sediment or washload submodel (deals with runoff from the soil surface). For this application, all precipitation is assumed to infiltrate into the subsurface (worst case) and zero runoff is assumed. Therefore, washload is not used in the Plant Wansley model.

***Hydrologic Submodel***

The hydrologic submodel is one-dimensional and considers vertical movement only. It focuses on the role of soil moisture (or interstitial pore water) in the soil layer. It is based on a statistical, dynamic formulation of a vertical water budget and has been adapted for either yearly or monthly simulations and for moisture variations in the soil. The submodel calculates results for the hydrology of the site and passes these results to both the pollutant fate and sediment washload cycles.

***Pollutant Fate Submodel***

The pollutant fate submodel breaks the soil column into several compartments, called layers. The soil column can be represented by up to 4 layers and the dimensions of these layers are defined by the user. Each layer in the pollutant cycle can be further broken up into 10 sublayers having the same soil properties as the layer of which they are a part. The total soil column is treated as a series of interconnected layers. Each layer or sublayer can receive and release pollutant to and from adjacent layers. Like the hydrologic submodel, pollutant fate is based on a mass balance equation that tracks the pollutant as it moves in the soil moisture between layers. When a pollutant enters a layer, the model assumes instantaneous and uniform distribution of the chemical throughout that layer. The model performs mass balance calculations over each entire soil layer or sublayer; there is no concentration gradient within a layer (SESOIL user's guide).

The pollutant cycle simulates transport and transformation processes in three phases present in the soil layers: soil-air or gaseous phase, soil-moisture phase, and adsorbed or soil-solids phase. The fate of the pollutant in the soil column includes both transport and transformation processes, which depend on the chemical's partitioning among these three phases. The three phases are assumed to be in equilibrium with each other at all times. The pollutant cycle in SESOIL is based on the chemical concentration in the soil water and all the mass balance equations are a function of this (SESOIL user's guide).

Theoretically, a non-reactive dissolved pollutant will travel to another soil layer or to groundwater at the same speed as the movement of moisture through the soil layer. However, the movement of a reactive pollutant will be retarded due to adsorption of the pollutant on the soil particles. Movement of pollutant may also be retarded due to the movement of bulk moisture mass due to vapor phase partitioning. For gypsum, this is not applicable (SESOIL user's guide).

SESOIL includes two partitioning processes for movement of pollutant from soil moisture to soil solids, the sorption process and cation exchange. The sorption process may be defined as the adhesion of pollutant molecules or ions to the surface of soil solids. The process is generally reversible; adsorption being the movement of a pollutant onto soil solids and desorption being the movement of pollutant off of soil solids to the liquid or gas phase. The two processes are assumed to be in equilibrium and are modeled that way (SESOIL user's guide).

### *4.2.2 Plant Wansley Gypsum Disposal Facility SESOIL Model*

Selenium was chosen as the potential contaminant to model, based on the results of the gypsum total metals concentrations and leaching tests (Tables 2-1 and 2-2). The general design of this model simulates 100 feet plus 2 cm of gypsum atop 5 feet of silty soil representing the liner material that may be used at the site (Figure 4-1). The 2 cm of gypsum is used to directly introduce the pollutant (selenium) to the soil.

***Model Assumptions***

- Gypsum will be stacked to a maximum height of 100 feet (maximum assumed cell height).
- The area of the disposal facility is 20 acres (maximum assumed cell size).
- The disposal area is not capped (worst case).
- Water moves vertically through the affected soils at a constant rate.
- Changes in soil components do not affect the overall infiltration rate or vertical movement.
- Dispersion in the vadose zone is negligible.
- The soil selenium linear sorption coefficients are constant throughout the source area.
- The model is conservative and does not account for all the geochemical processes on site.
- The program models the unsaturated zone only (basically migration through the silt layer). The model assumes that the pollutant front begins at the middle of the lowest layer that has a concentration of the constituent of interest.

***Input Parameters***

Table 4-1 presents the input parameters for the model.

Table 4-1
SESOIL Model Input Parameters – Basic Model

| **Input Parameter** | **Value** | **Source/Comments** |
|---|---|---|
| | | |
| **General Model Properties** | | |
| Climate data from Carrollton, GA rain gauge station | | National Climatic Center and the National Oceanographic and Atmospheric Administration |
| Simulation length | 100 years | |
| Application length | 50 years | Longest available application time. |
| Sediment washload cycle turned off | | Assumes no surface runoff. |
| Number of layers | 4 | Model has 3 layers of gypsum totaling 100 feet plus 2 cm to directly introduce selenium to the soil. A minimum 5-foot layer of silt will underlie the gypsum. |
| Continuous loading of contaminant | | Worst case. |
| Application area | 20 acres = 8.1 x $10^{-8}$ $cm^2$ | Assumed cell size. |
| Volatilization | 0.0 | Forces all contaminant transport downward through the soil. |
| **Soil/Gypsum Input Parameters** | | |
| Gypsum density | 1.36 $g/cm^3$ = 85 $lb/ft^3$ | |
| Gypsum effective porosity | 0.1 | RCRA Investigation Guidance, Table 10-4, Default Values for Effective Porosity; assumes gypsum behaves as a silt. |
| Freundlich equation exponent | 1.0 | Model recommended value in the absence of site-specific data; assumes linear sorption. |
| Disconnectedness index | 12 | Default value for silt and clay. |
| Organic carbon content | 0% | Assumed |
| Cation exchange capacity | NA | $K_d$ values were used in the model. Both $K_d$ and CEC can not be used in the model. |
| Intrinsic permeability gypsum | 5 x $10^{-9}$ $cm^2$ | SCS Engineering – average value for gypsum. This is equivalent to a hydraulic conductivity of 5 x $10^{-4}$ cm/sec |
| Intrinsic permeability soil | 5 x $10^{-9}$ $cm^2$ | Laboratory testing average value of remolded samples was 2 x $10^{-6}$ cm/sec. This was raised to 5 x $10^{-4}$ cm/sec as to be more compatible with the program restrictions. |
| $K_d$ gypsum | 1 mL/g | Assumed as a worst case value |
| $K_d$ silt | 2345 mL/g | The lowest value from the testing performed on Plant Wansley soils. |
| **Chemical Input Parameters – Selenium** | | |
| Selenium concentration in gypsum | 14 mg/kg | By product characterization of Yates gypsum |
| Atomic weight of selenium | 78.96 g/mole | |
| Solubility of selenium | 384,000 mg/L | Agency for Toxic Substances and Disease Registry/CDC website |

### *4.2.3 Sensitivity Analysis*

A sensitivity analysis of the finalized model was conducted by varying the travel time, $K_d$ values, intrinsic permeability, and contaminant concentration. The sensitivity testing, as with the basic model, was performed using selenium as the contaminant of interest. The following models were run for the sensitivity testing:

- The basic model travel time was extended to 1000 years.
- The adsorption coefficient was varied by doubling the original number ($K_d$ = 4690 mL/g) and using an approximate order of magnitude lower ($K_d$ = 235 mL/g) than that used for the basic model.
- The intrinsic permeability of the gypsum and soil was varied by an order of magnitude higher and lower.
- Selenium concentrations of the gypsum were increased by an order of magnitude higher to 140 mg/kg.

Table 4-2 contains the results of the sensitivity testing. Appendix K contains the model inputs and outputs from each of the runs.

**Table 4-2**
**Results of SESOIL Basic Model and Sensitivity Modeling**

| Case (modeled for 100 years except as noted) | Maximum Contaminant Depth Below Gypsum, inches (leading edge of contaminant) | Soil Moisture, ug/ml Lower Soil Layer | Adsorbed Selenium, mg/kg, on Lower Soil Layer |
|---|---|---|---|
| Basic Model | 0.39 | 0.59 | 1394 |
| Basic Model at 1000 years | 2.8 | 0.59 | 1394 |
| $K_d$ = 4690 mL/g | 0 | 0.30 | 1392 |
| $K_d$ = 235 mL/g | 14.6 | 1.1 | 251 |
| intrinsic permeability gypsum & soil = $1X10^{-7}cm^2$ | 0.39 | 0.59 | 194 |
| intrinsic permeability gypsum & soil = $1X10^{-9}cm^2$ | 0 | 0.47 | 1093 |
| Se gypsum = 140 mg/kg | 0.39 | 5.9 | 13940 |

***Summary of Results***

- For a $K_d$ of 2345 (realistic case), selenium traveled 0.39 inches into the compacted soil liner after 100 years. No detectable selenium was predicted to occur beneath the soil liner after 1000 years.

- After 1000 years, the predicted depth of selenium migration into the compacted clayey soil liner is 2.8 inches. This indicates that selenium would not break through the soil liner or reach the shallow rock aquifer.

- For a $K_d$ of 235 (very conservative case), the maximum selenium depth into the compacted clayey soil liner is 14.6 inches after 100 years; this means that for a minimum water table depth of 7 feet (2 feet of compacted soil liner and 5 feet of compacted soil), selenium would take at least 575 years to reach the water table, if then.

## 4.3 LeGrand Analysis

A LeGrand Analysis was performed on the proposed by-product disposal area site as described on pages 14 through 17 of Circular 14. The analysis was performed assuming a composite liner system would be installed, consisting of a synthetic liner, compacted clay and a leachate collection system. Table 4-3 gives the measured input parameters and results of the analyses (LeGrand scores). Two media analyses were used based on the following site characteristics:

- Presence of unconsolidated materials consisting of sandy, clayey silt.

- Overburden underlain at shallow depths by unweathered gneiss and schist.

**Table 4-3**
**LeGrand Analysis, Input Parameters and Results**

| Criteria | Measured Site-Specific Value | LeGrand Score Two Media Synthetic Liner w/LCS |
|---|---|---|
| Distance between waste management boundary and closest receptors (unnamed creek ) | 100 feet | 1 |
| Minimum depth below liner to water table | 5 feet | 0.3 |
| Water table gradient | 8.3% | 5.5 |
| Sorption | composite/clay liner | 4 |
| Permeability | fractured rock | 3 |
| Thickness of porous granular materials below disposal point | 37 feet (average) | 2 |
| | **Total** | **15.8** |

- For a synthetic liner and a leachate collection system, as allowed by the LeGrand Analysis, a maximum sorption rating of 4 (clay) a favorable flow direction, and a permeability rating of 3, were used in the analysis.

- A minimum depth of 5 feet below the clayey soil liner to the seasonal high groundwater table will be established for this site.

- Gradients varied between 5.8% and 8.3% toward the unnamed creek on the northeast side of the site. A gradient of 8.3% was used.

- A 100-foot buffer was assumed along the potential receptor (unnamed creek).

The LeGrand analysis for a two media site produced scores of 15.8 for a composite liner system. This would indicate that groundwater pollution potential is "possible, but not likely" (Table 4-4).

**Table 4-4**
**LeGrand Score Interpretation**
**(from Circular 14, p. 14)**

| Total Points | Pollution Potential of a Site |
|---|---|
| 0 – 4 | Imminent |
| 4 – 8 | Probably |
| 8 – 12 | Possible |
| 12 – 25 | Possible, but not likely |
| 25+ | Approaching impossible |

## 4.4 Pathway Analysis (Horizontal Travel Time)

### *4.4.1 Calculated Groundwater Velocities*

Horizontal flow velocity calculations were performed using the Darcy equation on page 14 of Circular 14. The linear flow velocity can be estimated using the following formula and permeabilities:

$$\nu = \frac{Ki}{\eta}$$

where :

$\nu$ = linear velocity (ft / sec or m / sec)

$$i = \text{hydraulic gradient} = \frac{(h_1 - h_2)}{l}\ (\text{ft / ft})$$

$\eta$ = estimated effective porosity

K = hydraulic conductivity (ft/sec or m/sec)

The average hydraulic conductivity of the saprolite is 1.16 ft/day as determined by field slug tests (Table 3-5). The gradient of 0.082 ft/ft is the highest site gradient as determined from the groundwater potentiometric map (Table 3-4). A typical tabulated value for the effective porosity of gravelly clayey silts (used for site soils) is 0.10 (Maidment, 1993). The resulting flow velocity is as follows:

$$v = \frac{(1.16\ \text{ft/day})(0.083\ \text{ft/ft})}{(0.10)} = 0.963\ \text{ft/day}$$

The silt and saprolite comprises the approximate top 7 to 60 feet of the unconfined aquifer above the schist/gneiss.

### *4.4.2 Description of the Relationship Between Groundwater Flow Directions and Potential Receptors*

The groundwater flow directions indicated on the potentiometric map are towards the unnamed creek on the northeast side of the site and the Chattahoochee River. These surface water bodies would be the closest groundwater receptors. There were no private or public water sources down-gradient of the site within the ½ mile and 2 mile radii.

### *4.4.3 Estimated Travel Time for Leachate to Reach Potential Receptors*

The estimated travel time for leachate to reach the creek northeast of the site is determined from the groundwater flow velocities of Section 4.4.1. The following travel time is calculated assuming the limits of waste will not be within 100 feet of the unnamed creek.

Using the average calculated flow velocity for the saprolite resulted in a travel time of 120 days. This figure represents the travel time beyond that required for any contaminant to travel through the 2 feet of compacted clayey soil liner or the compacted soil portion of the composite liner and the 5 feet of separation above the groundwater elevation.

## 4.5 Description of Relationship Between the Vadose Zone and Uppermost Aquifer

A minimum 5 feet of separation will be established between the bottom of the composite liner and the seasonal high groundwater elevations. Continued monitoring of the temporary piezometers will establish these elevations. No flow paths for any infiltrate generated within the cells would be anticipated to be generated through the liner system and the separation zone of compacted soil prior to reaching groundwater. Hydraulic conductivity of the remolded and in-place material is shown in Tables 3-2 and 3-5.

Currently, groundwater recharge is accomplished through infiltration of surface storm water. The average annual rainfall is approximately 50 to 54 inches per year. The seasonal variation in the groundwater surface is currently being determined through periodic monitoring of the temporary piezometers on site. Based on data collected in the area from 1940 through 2003, the wettest months of the year are December through March.

## 4.6 Mitigation of Geologic and Natural Hazards

There were no geologic or other hazards detected at this site. The jurisdictional wetlands, if impacted, will be permitted as required by the Corps of Engineers 404 permitting process. Non-jurisdictional wetlands will be voluntarily mitigated on a 1:1 basis.

# 5.0 RECOMMENDATIONS FOR DESIGN

## 5.1 Favorable and Unfavorable Areas

There are no unfavorable areas for construction at the site.

## 5.2 Liner/Leachate Collection Systems

The method of gypsum disposal at Plant Wansley will be by the wet stack method. In this disposal method, a synthetic liner, compacted soil liner, and drainage collection system will be used in the design of the facility. A 5-foot buffer distance from the bottom of the liner to the seasonal high groundwater elevation will be provided in the design of the facility. Based on laboratory testing, the remolded permeability of the material proposed for use as a potential soil liner averages $1.6 \times 10^{-6}$ cm/sec with a range of $3.7 \times 10^{-6}$ cm/sec to $1.7 \times 10^{-7}$ cm/sec. Based on the laboratory compaction criteria for remolded samples, the recommended maximum permeability of the compacted soil liner beneath the synthetic liner is $1 \times 10^{-5}$ cm/sec.

## 5.3 Cell Depths

Excavation requirements for the disposal cells will be determined during site design and development (design and operation plan). Excavation will not extend below the minimum 5-foot buffer required above the seasonal high groundwater table. Continued groundwater measurements will be made to determine this seasonal high level.

## 5.4 Site Drainage and Erosion Control

The site will be designed and constructed to minimize soil erosion and sediment migration. Diversion ditches, berms, piping, and sedimentation ponds will be included as needed to accomplish this task as well as to prevent site storm water run-on from entering disposal areas. Areas where excavation and earth fill operations occur will be vegetated immediately.

## 5.5 Buffer Zones

There will be a minimum 200 feet of buffer between the limits of the CCB disposal facility and adjacent property lines. There will be a minimum 25-foot buffer between the limits of the disposal facility and streams and wetland areas. No land disturbing activities are to take place within these buffer zones except for construction of groundwater monitoring wells and site ingress and egress.

## 5.6 Monitoring

A groundwater and surface water monitoring network for the CCB disposal facility will be designed to provide early detection in the unlikely event that any contaminates might reach groundwater and surface water. Proposed monitoring well locations will be submitted with the Groundwater Monitoring Plan when the limits of the disposal area have been established. Monitoring locations will be located around the periphery of the site and will meet the EPD requirements. Figure 5-1 shows a diagram of a typical monitoring well design.

Sampling will commence once the Groundwater Monitoring Plan has been approved and will continue semiannually for the life of the disposal area. Four initial sampling events will be performed at eight week intervals following approval of the Plan to establish statistical base. Background data will be determined prior to site development for the up-gradient and down-gradient wells as well as any surface water monitoring points.

## 5.7 Disposition of Borings

Boreholes and piezometers located within the area proposed for by-product disposal will be properly abandoned upon acceptance of this Report and establishment of the seasonal high groundwater levels.

According to the *Georgia Water Well Standards Act of 1991*, all wells which are to be abandoned shall be "filled, sealed, and plugged". Guidelines for well abandonment are set forth in the *Georgia Department of Natural Resources Manual for Groundwater Monitoring*, September 1991. Existing wells at the site will be abandoned according to these guidelines.

## 5.8 Security Fence and Road

A security fence currently exists along the south-southwest boundary of the proposed disposal facility along Hollingsworth Ferry Road. A 75-foot section of property adjacent to Hollingsworth Ferry Road, outside the 200-foot disposal area buffer, has been set aside for potential fence realignment and replacement and construction of a 25-foot security road along the outside boundary of the disposal facility. The approximate locations of the proposed fence and security road is shown on Figure 1-1.

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Appendix C
List of Historic Sites in the Vicinity of Plant Wansley
Reference: National Register of Historic Places

| County | Site | Address | City | Approximate Distance from Site |
|---|---|---|---|---|
| Carroll | Bonner-Sharp-Gunn House | West Georgia College Campus | Carrollton | 12 miles |
| Carroll | Burns Quarry | Address Restricted | Carrollton | unknown |
| Carroll | Carroll County Courthouse | Newnan and Dixie Streets | Carrollton | 12 miles |
| Carroll | Dorough Round Barn and Farm | N. of Hickory Level on Villa Rica Road | Hickory Level | >20 miles |
| Carroll | Folds, Eric Vernon House | 1575 GA 16 | Carrollton | > 9 miles |
| Carroll | Lawler Hosiery Mill | 301 Brandley Street | Carrollton | 12 miles |
| Carroll | Lovvorn, Dr. James L., House | 113 E. College Street | Carrollton | 12 miles |
| Carroll | McDaniel-Huie Place | 1238 SR 166 West | Bowdon | > 15 miles |
| Carroll | North Villa Rica Commercial Historic District | Roughly bounded by Southern Railroad, North Avenue, and East Gordon and West Chruch Streets | Villa Rica | 24 miles |
| Carroll | South Carrollton Residential Historic District | Roughly bounded by railroad tracks, Harmon and West Avenues, Bradley, Mill and Garrett Streets, Tillman and Hill Drives | Carrollton | 12 miles |
| Carroll | U. S. Post Office | 402 Newnan St. | Carrollton | 12 miles |
| Carroll | Veal School | 2753 Old Columbus Road | Roopville | 10 miles |
| Carroll | Whitesburg Baptist Church | 662 Main Street | Whitesburg | 10 miles |
| Carroll | Williams Family Farm | 55 Goldworth Road | Villa Rica | 22 miles |
| Heard | Heard County Jail | Court Square and Shady Lane | Franklin | 8 miles |
| Heard | Ware, John M., Sr., House | Address Restricted | Corinth | 13 miles (assumed) |
| Coweta | Brannon, W. A., Store-Moreland Knitting Mills | Main Street | Moreland | 17 miles |
| Coweta | Cole Town District | Roughly bounded Washington, Thompson, and Davis Sts., and Hooligan Alley | Newnan | 14 miles |
| Coweta | Coweta County Courthouse | Courthouse Square | Newnan | 14 miles |
| Coweta | Crowder, William Leonard, Home | 1615 Handy Road | Newnan | 4.5 miles |
| Coweta | Goodwyn-Bailey House | 2295 Old Poplar Road | Newnan | 19 miles |
| Coweta | Gordon-Banks House | South of Newnan on Highway 29 | Newnan | >14 miles |
| Coweta | Grantville Historic District | Bounded by US 29, LaGrange St. W. Grantville Rd. and the city cemetary | Grantville | 16 miles |
| Coweta | Greenville Street-LaGrange Street Hisotric District | LaGrange, Ninnons, Greenville, Powell, Reese, and Buchanan Streets | Newnan | 14 miles |

Appendix C
List of Historic Sites in the Vicinity of Plant Wansley
Reference: National Register of Historic Places

| | | | | |
|---|---|---|---|---|
| Coweta | Henderson-Orr House | Junction of Thomas Powers Road and GA34 | Stallings Crossings | 5.5 miles |
| Coweta | Hollberg Hotel | Seavy and Barnes Streets | Senoia | 29 miles |
| Coweta | Newnan Commercial Historic District | Roughly bounded by Lee, Perry, Salbide, Lagrange, W. Spring, Brown, Madison, and Jefferson | Newnan | 14 miles |
| Coweta | Newnan Cotton Mill and Mill Village Historic District | Roughly bounded by E. Washington, Wilcoxen and Farmer Streets, and CSX Railroad | Newnan | 14 miles |
| Coweta | Oak Grove Plantation | 4537 N US 29 | Newnan | 20 miles |
| Coweta | Platinum Point Historic District | Along Jackson Street, 1/2 mile north of downtown Newnan | Newnan | 14 miles |
| Coweta | Powell Chapel School | 620 Old Atlanta Highway | Newnan | 15 miles |
| Coweta | Roscoe-Dunaway Gardens Historic District | Roughly bounded by the Chattahoochee River., Cedar Creek, Hood Branch, and White Oak Circle | Roscoe | 13 miles |
| Coweta | Sargent Historic District | Roughly centered on the ArnallMill Complex at the junction of GA16 and Old Carrollton Road | Sargent | 10 miles |
| Coweta | Senoia Historic District | Roughly bounded bounded by Couch St., CSX railroad tracks, GA 16, and Pylant Street | Senoia | 29 miles |
| Coweta | Sims, George R., House | 1851 Collinsworth Road | Palmetto | 25 miles |
| Coweta | Smith, Dr. Robert L. and Sarah Alberta, House | 1262 Bob Smith Road | Sharpsburg | 23 miles |
| Coweta | Tidwell-Amis-Haynes House | 1200 Sid Hunter Road | Senoia | 23 miles |
| Coweta | Willcoxon-Arnold House | One Bullsboro Drive | Newnan | 14 miles |

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Project SE4422

December 13, 2006

Ms. Terri Hartsfield
Senior Engineer
Earth Science & Environmental Engineering
Southern Company
42 Inverness Center Parkway
Bin B 426
Birmingham, AL 35242

**Subject:** **Water Supply Well and Surface Water Intake Survey Plant Wansley Proposed Gypsum Storage Facility, Roopville, Heard County, Georgia**

Dear Ms. Hartsfield:

KEMRON Environmental Services, Inc. (KEMRON) is pleased to submit this letter report including the results of the water supply well and surface water intake survey conducted at the Plant Wansley Proposed Gypsum Storage Facility, Roopville, Heard County, Georgia. The purpose of this survey was to identify all reasonably identifiable private (domestic) water supply wells within ½ mile of the site and all reasonably identifiable public water supply wells/intakes within 2 miles of the site prior to the construction of a proposed gypsum storage facility.

Survey activities included site reconnaissance, contacting the Heard County Water Authority, obtaining tax maps from the Heard County Tax Assessor's office, and using the information obtained to determine the location and ownership of public or private wells in the area.

## SITE DESCRIPTION

KEMRON located the proposed gypsum storage facility along Hollingsworth Ferry Road in Roopville, Georgia (See Figure I). Identification was made using a topographic map provided by Georgia Power, as well as a road atlas. The site is located to the south of Plant Wansley, on Georgia Power property. Based on visual observations, the site is wooded with a mixture of deciduous and evergreen hardwoods and contains no current development.

## RECORDS SEARCH

KEMRON searched the water well database of the United States Geological Survey (USGS) for water supply wells located within two miles of the site boundaries. The search yielded nine (9) wells within the two mile radius. Based on field observations, no private wells as identified by the USGS search were located within the applicable ½ mile radius for private wells. A copy of the USGS search results are included as Exhibit I.

KEMRON searched the State of Georgia Environmental Protection Division (GAEPD) database for water supply wells and surface water intakes within Heard County. The GAEPD lists seven drinking water sources in Heard County. Two are listed as belonging to the Heard County Water Authority and are located far outside of the applicable radius. Three surface water intakes are listed for Georgia Power Plant Wansley. Georgia Power provided KEMRON with the location of the surface water intakes at Plant Wansley. The locations of these intakes are shown on Figure 2. The remaining two wells are listed for the Town of Ephesus, which is well outside the applicable search radius of 2 miles.

KEMRON searched the Heard County Tax Assessors database to determine which of the properties appearing within the ½ mile radius contained a private drinking water well. According to the information available in the database, there are seven properties with private wells located within the ½ mile radius. The address of 6990 Five Notch Road was listed in the Heard County database twice. KEMRON contacted the Heard County Tax Assessors office to obtain a tax map of the area to identify the adjacent property owners. This information is summarized in Table I.

KEMRON visited the Heard County Water Authority in order to obtain any information regarding surface water intakes and private wells in the vicinity of the site. The Water Authority informed KEMRON that all intakes are within the City of Franklin. Using a tax map, KEMRON and Water Authority personnel determined that there are no public water wells or intakes within the 2 mile applicable search radius. KEMRON was also informed that Hollingsworth Ferry Road, where many of the adjacent properties are located, have county water available to the residences. The Heard County Water Authority did inform KEMRON that they do not keep any records of private water wells.

KEMRON also contacted the Heard County Health Department, but was informed the department keeps no records of private water wells in Heard County unless a particular well has been tested.

## FIELD RECONNAISSANCE

Field reconnaissance activities were performed on October 30, 2006 and November 8, 2006. KERMON conducted a drive-through reconnaissance of the two mile radius surrounding the site and searched for public water supply wells and surface water intakes. KEMRON also searched the ½ mile radius to identify private wells not listed in the databases. KEMRON did not search those areas in the radius known to be owned by Georgia Power/Plant Wansley.

## WELLS AND SURFACE WATER INTAKES WITHIN THE APPLICABLE RADII

None of the wells identified within the USGS Database or the GAEPD database were applicable to the search radii. However, the Heard County Tax Assessor's Office identified seven properties/parcels containing wells. KEMRON has identified these properties during the site reconnaissance as the following properties:

4474 Hollingsworth Ferry Road
4430 Hollingsworth Ferry Road
6990 Five Notch Road (listed twice in the database; consists of two parcels)
240 Webb Road
212 Webb Road
50 Webb Road

In addition, thirteen addresses were identified as containing wells. Georgia Power personnel provided KEMRON a list of properties/parcels in the area that contained a drinking water well. Mr. Robert York, P.G. of KEMRON is related to the Webb families in the area and has confirmed the presence of drinking water wells on these properties. Additionally, the parcels that were visually observed to contain a residential home and were not identified as a public water user were assumed to contain a drinking water well on the parcel. These properties are:

201 Webb Road
4944 Hollingsworth Ferry Road
4704 Hollingsworth Ferry Road
4819 Hollingsworth Ferry Road
4058 Hollingsworth Ferry Road
Hollingsworth Ferry Road (no number given)
Five Notch Road (no number given)
Webb Road (no number given)
4986 Hollingsworth Ferry Road
5120 Hollingsworth Ferry Road
Hollingsworth Ferry Road (no number given)
5040 Hollingsworth Ferry Road
Hollingsworth Ferry Road (no number given)

KEMRON visually surveyed all of the above properties. However, during site reconnaissance, KEMRON did not visually observe well houses, well caps or other evidence of wells on each of these properties. Figure 3 is a tax map illustrating well locations for the properties in the immediate vicinity of the site based on information provided in the tax assessment maps. A total of nineteen (19) private drinking water wells were identified within ½ mile of the proposed gypsum storage facility. Table I contains a comprehensive list of all private drinking water wells located within the ½ mile radius of the proposed gypsum storage facility.

## SURFACE WATER

The nearest accessible surface water shown on the topographic map provided to KEMRON was the Chattahoochee River. Three surface water intakes were identified on the GAEPD Database at Plant Wansley and have been illustrated on Figure 2. None of the three surface water intakes are for potable use. The reservoir at Plant Wansley, also shown on the topographic map, is in actuality closer to the proposed gypsum storage facility than the Chattahoochee River. However, KEMRON did not observe the private reservoir of Plant Wansley.

## SUMMARY

KEMRON searched readily available sources of water supply information for the area, including the USGS and GAEPD databases, local health department, the local water authority, and the local tax assessor's office. KEMRON conducted a visual survey of the applicable radii for private and public water supply wells. Three surface water intakes for non-potable use were identified on the Georgia Power Plant Wansley property. Six private wells (on seven parcels) were identified via the Heard County Tax Assessor's office and field reconnaissance. Therefore, based on available information, KEMRON has located nineteen addresses that contain private drinking water wells within the applicable ½ mile radius of the subject site. KEMRON did not locate any public drinking water wells or potable surface water intakes within the 2 mile radius of the subject site outside of the three located on Plant Wansley property.

KEMRON appreciates this opportunity to be of service to Southern Company. If you have any questions regarding this well search, or if KEMRON can be of further service, please do not hesitate to call either of the undersigned at (404) 636-0928.

Sincerely,
**KEMRON Environmental Services, Inc.**

For

Norman L. Schuyler
Staff Scientist

Jeanette Hamm, P.E.
Project Manager

# Figures

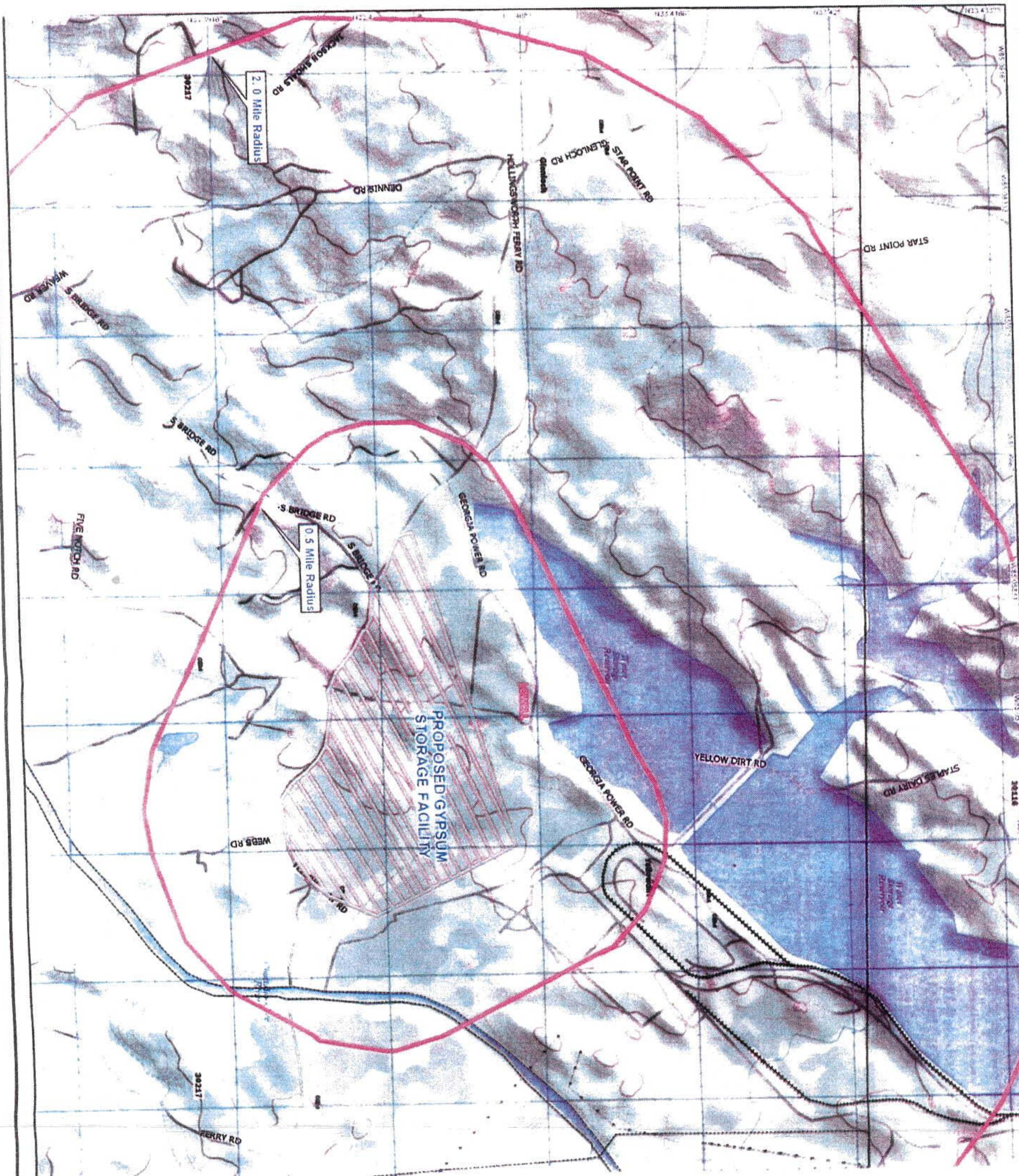


Figure 1. SITE MAP
PROPOSED GYPSON STORAGE FACILITY
ROOPVILLE, GA

7.5 Minute USGS Topographic Quadrangle
LOWELL QUADRANGLE, GEORGIA
Scale 1: 24000

1 1/2 0 1 mile
1000 0 1000 2000 3000 4000 5000 6000 7000FEET
1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

GEORGIA
QUADRANGLE LOCATION

SOURCE: 2006 DeLorme. Topo USA 6.0

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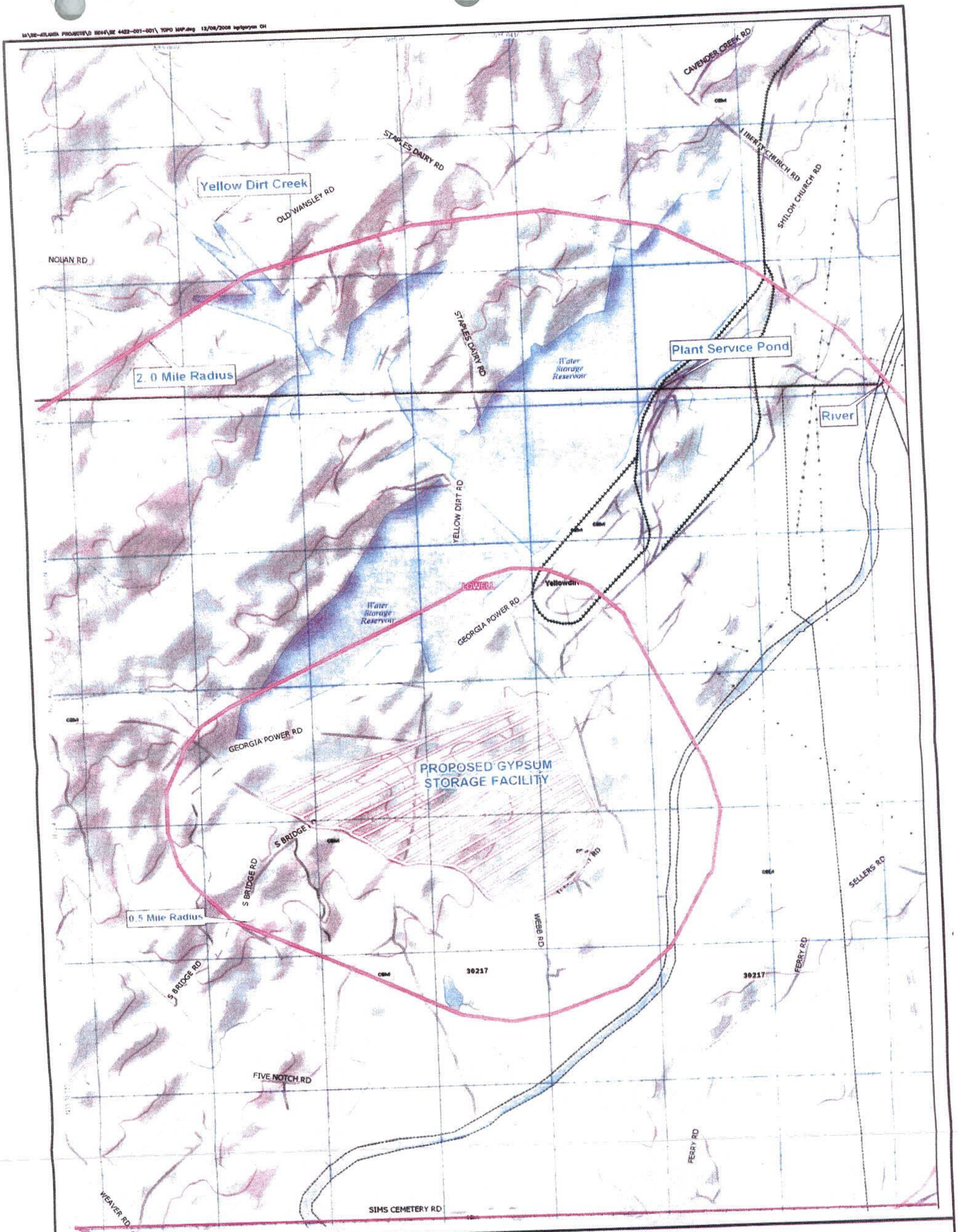


Figure 2. SURFACE WATER MAP
PROPOSED GYPSUM STORAGE FACILITY
ROOPVILLE, GA, HEARD COUNTY

7.5 Minute USGS Topographic Quadrangle
LOWELL QUADRANGLE, GEORGIA

Scale 1: 24000

1 1/2 0 1 mile

1000 0 1000 2000 3000 4000 5000 6000 7000FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

GEORGIA
QUADRANGLE LOCATION

SOURCE: 2006 DeLorme. Topo USA 6.0

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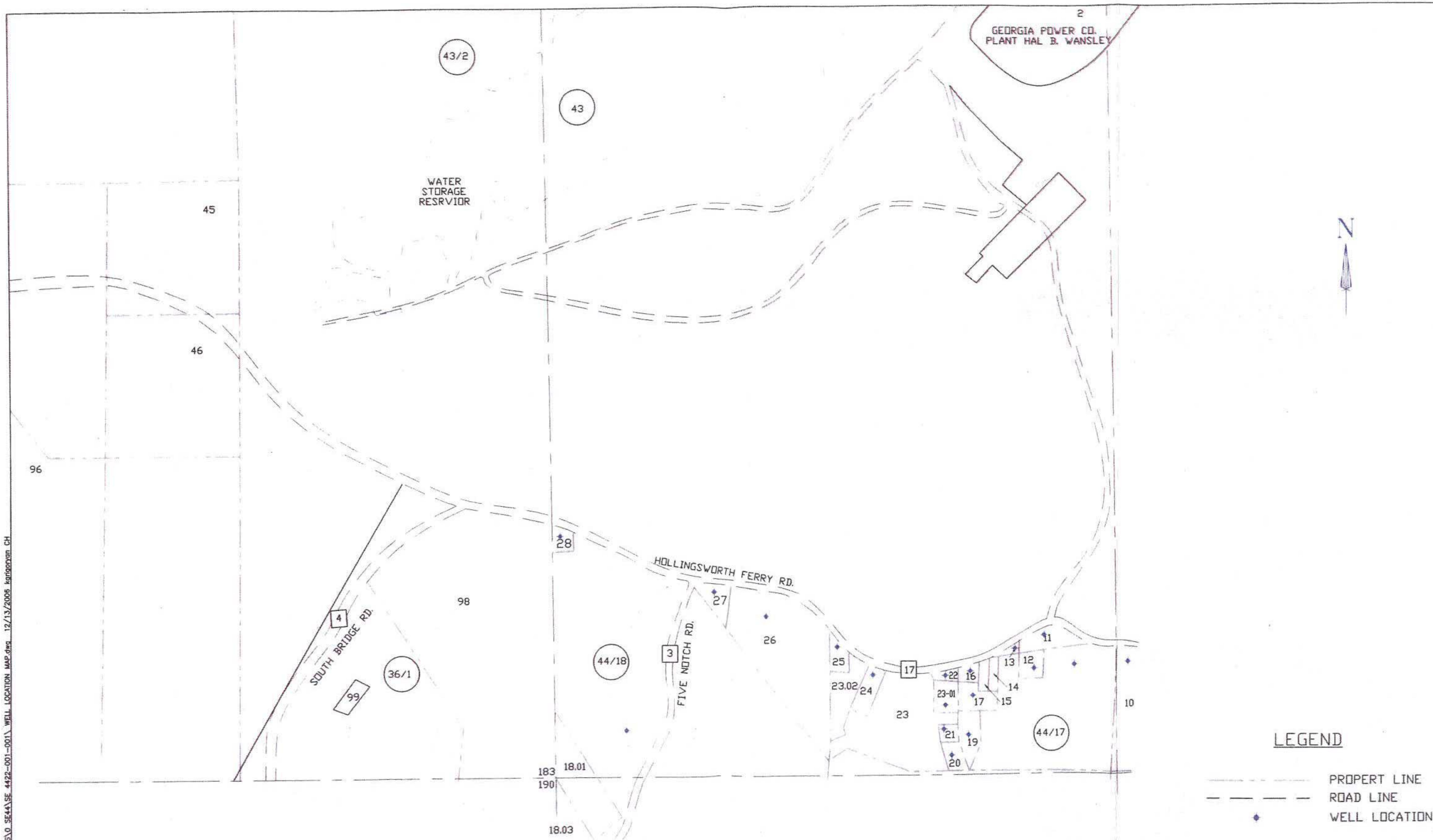



| | | | | | |
|---|---|---|---|---|---|
| KEMRON ENVIRONMENTAL SERVICES | NOT TO SCALE | DRAWN BY: KG<br>REVIEWED: R 3<br>APPROVED: | DATE: 13 DECEMBER 2006<br>PROJECT NO. SE4422-001-001<br>DWG NO. WELL LOC. MAP | FIGURE 3 | WELL LOCATION/TAX MAP<br>PROPOSED GYPSUM STORAGE FACILITY<br>ROOPVILLE, GA, HEARD COUNTY |

M:\SE-ATLANTA PROJECTS\0 SE44\SE 4422-001-001\ WELL LOCATION MAP.dwg 12/13/2006 kgrigoryan CH

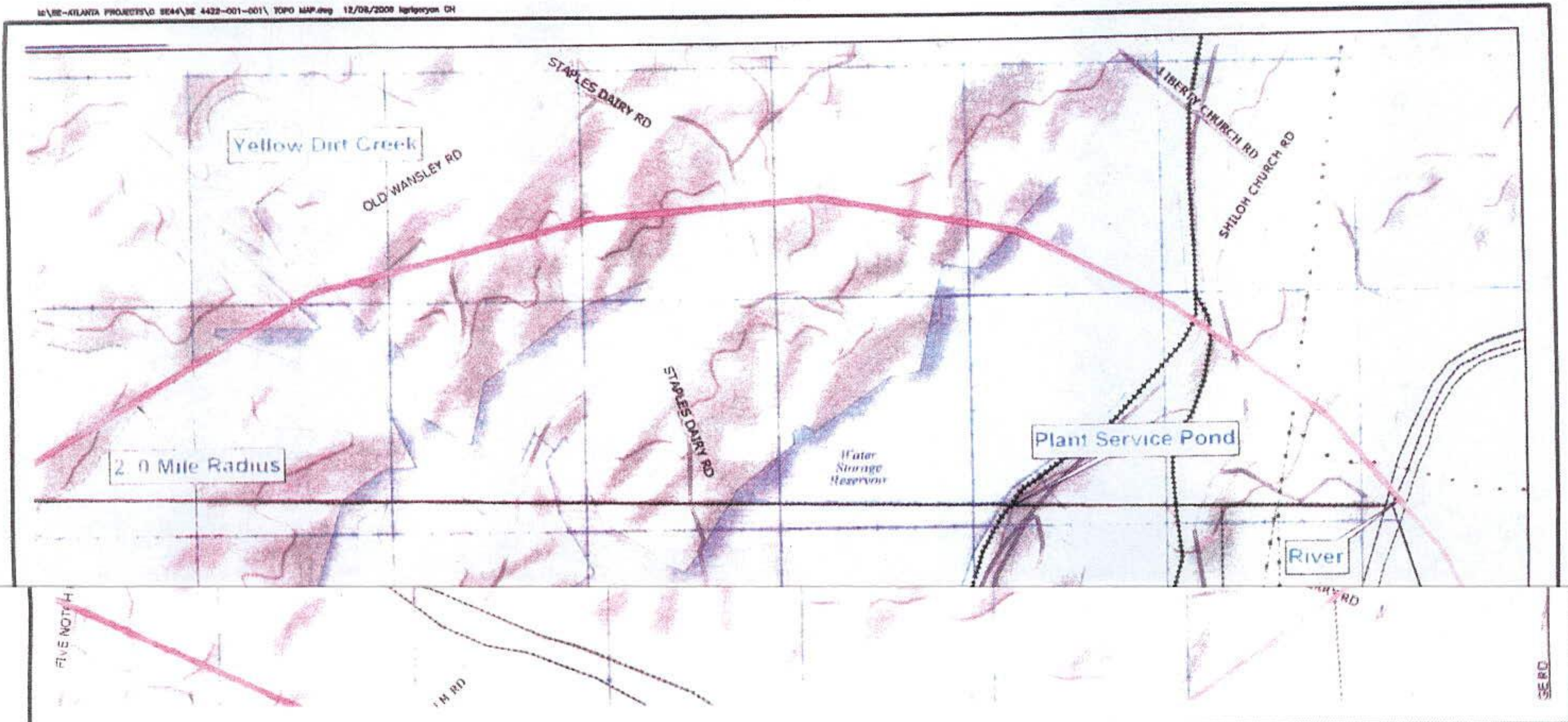



Figure 4. WELL LOCATION & TOPO MAP
PROPOSED GYPSUM STORAGE FACILITY
ROOPVILLE, GA, HEARD COUNTY

• WELL LOCATION

7.5 Minute USGS Topographic Quadrangle
LOWELL QUADRANGLE, GEORGIA
Scale 1: 24000

1 — 1/2 — 0 — 1 mile
1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET
1 — 0.5 — 0 — 1 KILOMETER

GEORGIA
QUADRANGLE LOCATION

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

SOURCE: 2006 DeLorme Topo USA 6.0

KEMRON ENVIRONMENTAL SERVICES

# Tables

TABLE 1: 1/2 MILE RADIUS PROPERTIES
SE4422 PROPOSED GYPSUM STORAGE FACILITY
ROOPVILLE, GEORGIA

| Owner Name | Property Address** | Water Supply | Map | Parcel |
|---|---|---|---|---|
| Lewis, Wendell Scott | 4819 Hollingsworth Ferry Road | Well* | 43 | 24 |
| Hudson, Jerry L & Tim R | 4704 Hollingsworth Ferry Road | Well* | 43 | 25 |
| Webb, Pink and Gertrude | 4944 Hollingsworth Ferry Road | Well* | 43 | 22 |
| Ridley, Matthew R | 4474 Hollingsworth Ferry Road | Well | 43 | 26 |
| Philpott, Gary C | 4430 Hollingsworth Ferry Road | Well | 43 | 27 |
| Yellow Dirt Baptist Church | 4058 Hollingsworth Ferry Road | Well* | 43 | 28 |
| Stephens, Joe | Hollingsworth Ferry Road | Well* | 43 | 10 |
| Harman, Samuel | 6990 Five Notch Road | Well | 44 | 18 |
| Milam, Jeremy | 6903 Five Notch Road | Public | 44 | 18.01 |
| Harman, Samuel | 6990 Five Notch Road | Well | 44 | 18.02 |
| Hall, Jud | Five Notch Road | Well* | 44 | 18.03 |
| Morris, Wayne | 240 Webb Road | Well | 44 | 17 |
| Sullivan, Jane | 231 Webb Road | Public | 44 | 17.01 |
| Perry, James and Lisa | 288 Webb Road | Public | 44 | 17.02 |
| Echols, Loyette | 4848 Hollingsworth Ferry Road | Public | 43 | 23 |
| Green, James Derrick and Amanda Lovell | 50 Webb Road | Well | 43 | 23.01 |
| Lewis, Wendell Scott | Hollingsworth Ferry Road | Public | 43 | 23.02 |
| Webb, Brenda | 212 Webb Road | Well | 43 | 20 |
| Webb, Gertrude | Webb Road | Well* | 43 | 21 |
| Price, James R | Hollingsworth Ferry Road | Well* | 43 | 11 |
| Webb, Wayne | 201 Webb Road | Well* | 43 | 19 |
| Kirk, Steven | 4986 Hollingsworth Ferry Road | Well* | 43 | 16 |
| Steele, Johnnie | 5120 Hollingsworth Ferry Road | Well* | 43 | 12 |
| Webb, Gertrude | Hollingsworth Ferry Road | Well* | 43 | 13 |
| Adamson, Rufus | 5040 Hollingworth Ferry Road | Well* | 43 | 14 |

* Although no Heard County Tax Accessor records exist that document a private well on this property, this property is not connected to public water, and has a well.
** Alternate mailing addresses have been obtained from the Heard County Tax Assessor's Office for addresses with no number

# Exhibit I

USGS
science for a changing world

# FAX COVER SHEET

U.S. Department of the Interior
U.S. Geological Survey
Georgia District Office
3039 Amwiler Road, Suite 130
Atlanta, GA 30360-2824

Phone: 770.903.9100
Fax: 770.903.9199
http://wwwga.usgs.gov

Total Number of Pages— Including Cover Sheet: 2

To: Norman Schuyler
Office: Kemron Env. Svcs.
Fax:
Phone:

Date: 11/2/06
From: Rob Allen
Phone:
E-mail:

Message: Your data survey for the SE 4422 project

U.S. Geological Survey
Georgia District Office
Ground-Water Site Inventory
Date 11-2-04 Completed by R Allen
these data were collected
as part of areal studies and
Do Not represent an exhaustive
search of wells in the area.

copy to:

| LOCAL WELL NUMBER | LATITUDE (DDMMSS) | LONGITUDE (DDDMMSS) | LAT/LONG DATUM (CODE) | [illegible]UDE OF LAND SURFACE (FEET) | [illegible]TUDE [illegible]TUM (CODE) | DEPTH OF WELL (FEET) | BOT[illegible] OF CASING (FEET) | DIAM[illegible] OF CASING (IN) | DATE OF CONSTRUCTION |
|---|---|---|---|---|---|---|---|---|---|
| 05BB13 | 332512 | 0850555 | NAD27 | 1081.00 | NGVD29 | 160 | 49 | 4 | 12-01-1961 |
| 05BB21 | 332451 | 0850548 | NAD27 | 1025 | NGVD29 | 200 | 22 | 6 | 09-15-1987 |
| 05BB23 | 332231 | 0850520 | NAD27 | 810 | NGVD29 | 200 | 80 | 6 | 12-19-1990 |
| 05BB24 | 332434 | 0850512 | NAD27 | 1050 | NGVD29 | 35 | -- | -- | - -1900 |
| 05BB25 | 332417 | 0850408 | NAD27 | 860 | NGVD29 | 380 | 26 | 6.25 | 05-01-1992 |
| 05BB26 | 332300 | 0850359 | NAD27 | 730 | NGVD29 | 300 | 16 | 6.25 | 10-27-1979 |
| 05BB27 | 332354 | 0850520 | NAD27 | 880 | NGVD29 | 300 | 74 | 6.25 | 12-27-1990 |
| 05BB28 | 332606 | 0850208 | NAD27 | 780 | NGVD29 | 400 | 45 | 16.25 | 08-13-1985 |
| 05BB29 | 332432 | 0850256 | NAD27 | 810 | NGVD29 | 35.45 | -- | 27.00 | - -1900 |
| 05BB30 | 332450 | 0850229 | NAD27 | 770 | NGVD29 | -- | 6 | -- | - -1900 |
| 05BB31 | 332454 | 0850228 | NAD27 | 790 | NGVD29 | -- | -- | -- | -- |
| 05BB32 | 332402 | 0850354 | NAD27 | 830 | NGVD29 | -- | 24 | -- | - -1900 |



| DISCHARGE (GPM) |
|---|
| -- |
| 7.5 |
| 14 |
| -- |
| 1 |
| .63 |
| 2.75 |
| 5 |
| -- |
| -- |
| -- |
| -- |

770-854-329(


# HEARD COUNTY COMMISSIONERS

P.O. Box 40 215 East Court Square, Room 15
Franklin, Georgia 30217

heardcounty@charter.net

Phone (706) 675-3821 Fax # (706) 675-2493

JUNE JACKSON
COMMISSION CHAIR

JOHN MORMAN
FINANCE DIRECTOR

PATTY JILES
COUNTY CLERK

JERRY ANN CONNER
COUNTY ATTORNEY

BOARD OF COMMISSIONERS

LARRY F. HOOKS
DISTRICT 1
LEE BOONE
DISTRICT 2
GWEN CALDWELL
DISTRICT 3
FRANK CROOK
DISTRICT 4
JOE ADAMS
DISTRICT 5


December 4, 2006

RECEIVED
DEC 8 2006
PLANT WANSLEY

Mr. Jeff Cown, Program Manager
Georgia Environmental Protection Division
Solid Waste Management Program
4244 International Parkway, Suite 104
Atlanta, Georgia 30354

RE: Proposed Plant Wansley Gypsum Disposal Facility
Industrial Waste Landfill

Dear Mr. Cown:

The proposed private industrial solid waste disposal facility located at Plant Wansley complies with local zoning and land use ordinance, if any.

Sincerely,

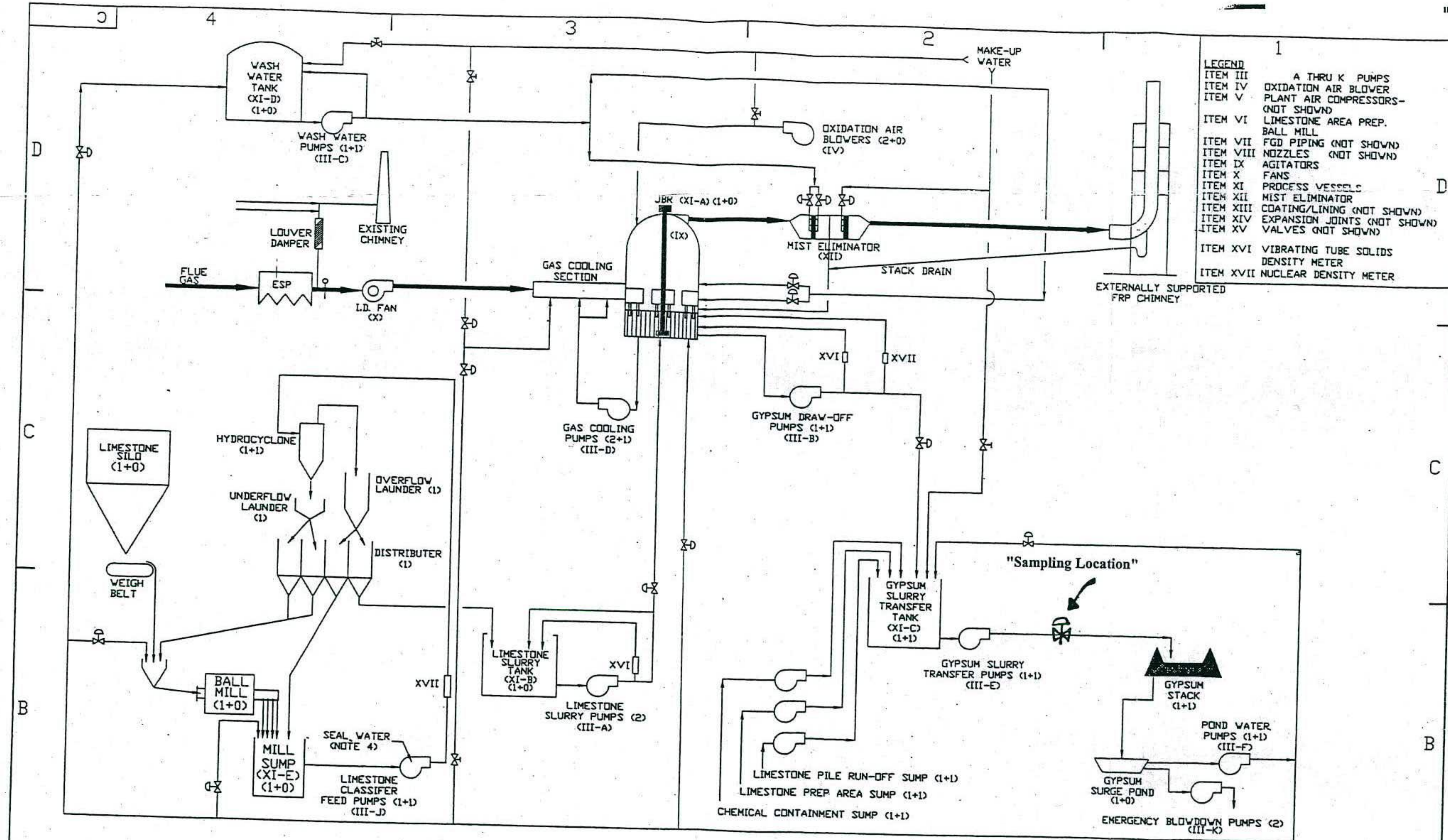
June Jackson

June Jackson, Commission Chair
Heard County Board of Commissioners

Cc: Jim P. Heilbron/Plant Wansley

R. ROUTMAN

# Gypsum Sampling Location




NOTES:
1. PUMP ISOLATION VALVES REMOVED FOR CLARITY
2. NORMAL GAS COOLING WATER SUPPLIED FROM SURGE POND.
3. ALL TANKS HAVE MIXERS EXCEPT WASHING WATER TANK.
4. SEAL WATER PACKING REPLACED AFTER INITIAL OPERATION WITH MECHANICAL SEAL.

| REVISION | DATE | REVISION | DATE | REVISION | DATE | REVISION | DATE |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

BY | CHK'D | APPR.1 | APPR.2 | APPR.3 | APPR.4 | APPR.5

SOUTHERN COMPANY SERVICES, INC.
FOR

YATES
D.O.E. PROJECT
PROCESS FLOW DIAGRAM

DESIGNED PMH DRAWN JWB CHECKED FRR
SCALE PROJECT I.D. DRAWING NUMBER REV.

# Laboratory Results
# Gypsum TCLP

consecutive days

Bin 39110
5131 Maner Road
Smyrna, Georgia 30080
Tel 404.799.2100

GEORGIA POWER
A SOUTHERN COMPANY

April 15, 2002

Rochelle Routman
Georgia Power Company
Environmental Affairs
241 Ralph McGill Blvd.
Atlanta, GA 30308

RE: Plant Yates Gypsum Scrubber TCLP Metals Results

The Environmental Laboratory has completed the analysis of your samples and reports the results on the attached pages. All results relate only to the contents of the samples submitted. This report may not be reproduced except in full without the written consent of the Environmental Laboratory.

Please note the attached results analyzed by Analytical Services, Inc.

All samples will be disposed of after 30 days unless otherwise instructed.

If you have any questions, please advise.

Respectfully submitted,

D.A.D

D. A. Davis
Senior Environmental Specialist

Page 1 of 1
Report Number: 041502-4638-1

ASI

# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

## Laboratory Report

Report Number **154732**

Project: Plant Yates Gypsum Scrubber, Project#4638

Prepared For:
**Georgia Power**
**5131 Maner Road**
**Smyrna, GA 30080**

**Attention:** Mr. Craig Scott

April 17, 2002

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Judy Wagner
**Project Manager**

Christy D. Glidden
**Quality Assurance**

lytical Services Inc., Norcross Laboratory maintains the following certifications, approvals, and accreditations: .orgia (812); NELAC (E87315) scope: CWA, SDWA, RCRA expires July 1, 2002; NSF International (04180) scope: SDWA expires August 17, 2002; Arkansas, California (01160CA); Connecticut (PH-0250); Florida (E87315); Kansas (E-10334); Kentucky (90126); Louisiana (02069); New Jersey (GA001); New York (11762); North Carolina (381); Oklahoma (9907). South Carolina (98011); Tennessee (02994); USDA Soil Import License (S-36027). For more information visit our web site at: asi-lab.com

**Single Analyte Data**
**Sample Batch Information**
***Analysis : TCLP EXT***

***Batch # TCLP884*** ***Matrix : TCLP***

| | | Preparation | | | | Analysis | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Tag | Date | Time | By | Notes | Date | Time | By | Inst |
| TCLPBLK | | 03/31/02 | 1700 | RF | | / / | | | |
| 154210-1 | | 03/31/02 | 1700 | RF | | / / | | | |
| 154210-2 | | 03/31/02 | 1700 | RF | | / / | | | |
| 154221-1 | | 03/31/02 | 1700 | RF | | / / | | | |
| TCLPBLK | | 04/02/02 | 1145 | YC | | / / | | | |
| 154382-3 | | 04/02/02 | 1145 | YC | | / / | | | |
| 154382-4 | | 04/02/02 | 1145 | YC | | / / | | | |
| 154382-5 | | 04/02/02 | 1145 | YC | | / / | | | |
| 154391-1 | | 04/02/02 | 1145 | YC | | / / | | | |
| TCLPBLK | | 04/03/02 | 1400 | MS | | / / | | | |
| 154456-1 | | 04/03/02 | 1400 | MS | | / / | | | |
| 154506-2 | | 04/03/02 | 1400 | MS | | / / | | | |
| 154506-3 | | 04/03/02 | 1400 | MS | | / / | | | |
| 154506-2DUP | | 04/03/02 | 1400 | MS | | / / | | | |
| TCLPBLK | | 04/04/02 | 1400 | MS | | / / | | | |
| 154585-10 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154585-11 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154487-1 | | 04/04/02 | 1400 | MS | | / / | | | |
| 4482-1 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154487-1 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154554-2 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154554-3 | | 04/04/02 | 1400 | MS | | / / | | | |
| 154482-1DUP | | 04/04/02 | 1400 | MS | | / / | | | |
| TCLPBLK | | 04/08/02 | 1100 | RF | | / / | | | |
| 154732-1 | | 04/08/02 | 1100 | RF | | / / | | | |
| 154732-2 | | 04/08/02 | 1100 | RF | | / / | | | |
| TCLPBLK | | 04/09/02 | 1400 | RF | | / / | | | |
| 154542-3 | | 04/09/02 | 1400 | RF | | / / | | | |

## Single Analyte Data
### Sample Batch Information

***Analysis : Se, Ag, As, Ba, Be, Cd, Cr, Pb, Sb, Ni, Fe, Cu, Zn, Co, V,***

***Batch # 77209*** ***Matrix : TCLP***

| Sample ID | Tag | Preparation Date | Preparation Time | Preparation By | Notes | Analysis Date | Analysis Time | Analysis By | Inst |
|---|---|---|---|---|---|---|---|---|---|
| 154877-4 | | 04/11/02 | 0920 | MHU | TCLP | 04/11/02 | 1402 | MLR | ICP2 |
| 154877-3 | | 04/11/02 | 0920 | MHU | TCLP | 04/11/02 | 1359 | MLR | ICP2 |
| 154877-2 | | 04/11/02 | 0920 | MHU | TCLP | 04/11/02 | 1355 | MLR | ICP2 |
| 154877-1 | | 04/11/02 | 0920 | MHU | TCLP | 04/11/02 | 1352 | MLR | ICP2 |
| BLANK04-11 | | 04/11/02 | 0920 | MHU | TCLP | 04/11/02 | 1349 | MLR | ICP2 |
| 77209BLK | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1521 | FBS | ICP3 |
| 77209LCS | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1525 | FBS | ICP3 |
| 77209LCSD | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1528 | FBS | ICP3 |
| 154732-1MS | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1532 | FBS | ICP3 |
| 154732-1MSD | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1536 | FBS | ICP3 |
| 154732-1PDS | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1540 | FBS | ICP3 |
| 154732-2DUP | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1543 | FBS | ICP3 |
| 154732-1 | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1602 | FBS | ICP3 |
| 154732-2 | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1605 | FBS | ICP3 |
| 154797-1 | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1554 | FBS | ICP3 |
| 154797-2 | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1558 | FBS | ICP3 |
| LCDI | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1609 | FBS | ICP3 |
| LCDI | | 04/10/02 | 0910 | MHU | TCLP | 04/10/02 | 1613 | FBS | ICP3 |

## Single Analyte Data
### Sample Batch Information
***Analysis : Hg***

***Batch # 77080*** ***Matrix : TCLP***

| Sample ID | Tag | Preparation Date | Preparation Time | Preparation By | Notes | Analysis Date | Analysis Time | Analysis By | Inst |
|---|---|---|---|---|---|---|---|---|---|
| BLANK04-12 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1648 | EAH | HG1 |
| 154732-2 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1700 | EAH | HG1 |
| 154732-1 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1658 | EAH | HG1 |
| 154877-4 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1656 | EAH | HG1 |
| 154877-3 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1654 | EAH | HG1 |
| 154877-2 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1652 | EAH | HG1 |
| 154877-1 | | 04/12/02 | 1015 | EAH | TCLP | 04/12/02 | 1650 | EAH | HG1 |
| 77080BLK | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1511 | EAH | HG1 |
| 77080LCS | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1513 | EAH | HG1 |
| 77080LCSD | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1515 | EAH | HG1 |
| 154554-3MS | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1517 | EAH | HG1 |
| 154554-3MSD | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1519 | EAH | HG1 |
| 154554-3DUP | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1521 | EAH | HG1 |
| 154189-1 | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1531 | EAH | HG1 |
| 154189-2 | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1533 | EAH | HG1 |
| 154554-3 | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1535 | EAH | HG1 |
| 154482-1 | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1537 | EAH | HG1 |
| 154487-1 | | 04/08/02 | 1130 | EAH | TCLP | 04/08/02 | 1539 | EAH | HG1 |

## Single Analyte Data
### Post Digestion Spike Information

| Batch Number | Analyte | Analysis Method | PDS %Rec | %Recovery Range |
|---|---|---|---|---|
| 77209 | Pb | EPA 6010 | 97 | 76 - 124 |
| 77209 | Sb | EPA 6010 | 113 | 76 - 124 |
| 77209 | Ni | EPA 6010 | 99 | 76 - 124 |
| 77209 | Fe | EPA 6010 | 98 | 76 - 124 |
| 77209 | Cu | EPA 6010 | 113 | 76 - 124 |
| 77209 | Zn | EPA 6010 | 109 | 76 - 124 |
| 77209 | Co | EPA 6010 | 107 | 76 - 124 |
| 77209 | V | EPA 6010 | 96 | 76 - 124 |
| 77209 | Mn | EPA 6010 | 96 | 76 - 124 |

## Single Analyte Data

### Lab Control Information

| Batch Number | Analyte | Analysis Method | LC % Rec. | LCD % Rec. | LC/LCD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 77209 | Co | EPA 6010 | 97 | 96 | 1 | 76 - 124 | 0 - 20 |
| 77209 | V | EPA 6010 | 86 | 84 | 2 | 76 - 106 | 0 - 10 |
| 77209 | Mn | EPA 6010 | 86 | 84 | 2 | 76 - 124 | 0 - 20 |

### Matrix Spike Information

| Batch Number | Analyte | Analysis Method | MS % Rec. | MSD % Rec. | MS/MSD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 77080 | Hg | EPA 7470 | 109 | 76 | 36 | 81 - 116 | 0 - 15 |
| 77209 | Se | EPA 6010 | 106 | 109 | 3 | 76 - 124 | 0 - 20 |
| 77209 | Ag | EPA 6010 | 102 | 105 | 3 | 76 - 124 | 0 - 20 |
| 77209 | As | EPA 6010 | 100 | 101 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Ba | EPA 6010 | 90 | 91 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Be | EPA 6010 | 83 | 84 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Cd | EPA 6010 | 88 | 89 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Cr | EPA 6010 | 80 | 81 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Pb | EPA 6010 | 87 | 88 | 1 | 76 - 124 | 0 - 20 |
| 77209 | Sb | EPA 6010 | 101 | 103 | 2 | 76 - 124 | 0 - 20 |
| 77209 | Ni | EPA 6010 | 89 | 90 | 1 | 76 - 124 | 0 - 20 |
| 209 | Fe | EPA 6010 | 85 | 88 | 3 | 76 - 124 | 0 - 20 |
| /209 | Cu | EPA 6010 | 98 | 101 | 3 | 76 - 124 | 0 - 20 |
| 7209 | Zn | EPA 6010 | 97 | 99 | 2 | 76 - 124 | 0 - 20 |
| 77209 | Co | EPA 6010 | 98 | 98 | 0 | 76 - 124 | 0 - 20 |
| 77209 | V | EPA 6010 | 87 | 87 | 0 | 76 - 124 | 0 - 20 |
| 77209 | Mn | EPA 6010 | 85 | 87 | 2 | 76 - 124 | 0 - 20 |

### Post Digestion Spike Information

| Batch Number | Analyte | Analysis Method | PDS %Rec | %Recovery Range |
|---|---|---|---|---|
| 77209 | Se | EPA 6010 | 121 | 76 - 124 |
| 77209 | Ag | EPA 6010 | 115 | 76 - 124 |
| 77209 | As | EPA 6010 | 111 | 76 - 124 |
| 77209 | Ba | EPA 6010 | 99 | 76 - 124 |
| 77209 | Be | EPA 6010 | 93 | 76 - 124 |
| 77209 | Cd | EPA 6010 | 99 | 76 - 124 |
| 77209 | Cr | EPA 6010 | 90 | 76 - 124 |

## Single Analyte Data

### Blank Results Information

| Batch Number | Analyte | Analysis Method | Preparation Method | Units | Blank Result | Matrix |
|---|---|---|---|---|---|---|
| 77080 | Hg | EPA 7470 | Hg-Aq | mg/L | < 0.0050 | TCLP |
| 77209 | Se | EPA 6010 | EPA 3010 | mg/L | < 0.0400 | TCLP |
| 77209 | Ag | EPA 6010 | EPA 3010 | mg/L | < 0.0100 | TCLP |
| 77209 | As | EPA 6010 | EPA 3010 | mg/L | < 0.0300 | TCLP |
| 77209 | Ba | EPA 6010 | EPA 3010 | mg/L | < 0.0100 | TCLP |
| 77209 | Be | EPA 6010 | EPA 3010 | mg/L | < 0.0100 | TCLP |
| 77209 | Cd | EPA 6010 | EPA 3010 | mg/L | < 0.0100 | TCLP |
| 77209 | Cr | EPA 6010 | EPA 3010 | mg/L | < 0.0100 | TCLP |
| 77209 | Pb | EPA 6010 | EPA 3010 | mg/L | < 0.0150 | TCLP |
| 77209 | Sb | EPA 6010 | EPA 3010 | mg/L | < 0.0500 | TCLP |
| 77209 | Ni | EPA 6010 | EPA 3010 | mg/L | < 0.0200 | TCLP |
| 77209 | Fe | EPA 6010 | EPA 3010 | mg/L | < 0.0400 | TCLP |
| 77209 | Cu | EPA 6010 | EPA 3010 | mg/L | < 0.0200 | TCLP |
| 77209 | Zn | EPA 6010 | EPA 3010 | mg/L | < 0.0300 | TCLP |
| 77209 | Co | EPA 6010 | EPA 3010 | mg/L | < 0.0400 | TCLP |
| 77209 | V | EPA 6010 | EPA 3010 | mg/L | < 0.0200 | TCLP |
| 77209 | Mn | EPA 6010 | EPA 3010 | mg/L | < 0.0400 | TCLP |
| TCLP884 | TCLP EXT | EPA 1311 | | mg/L | 0.0000 | TCLP |

### Lab Control Information

| Batch Number | Analyte | Analysis Method | LC % Rec. | LCD % Rec. | LC/LCD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 77080 | Hg | EPA 7470 | 105 | 105 | 0 | 86 - 114 | 0 - 12 |
| 77209 | Se | EPA 6010 | 104 | 100 | 4 | 88 - 118 | 0 - 13 |
| 77209 | Ag | EPA 6010 | 100 | 97 | 3 | 80 - 106 | 0 - 12 |
| 77209 | As | EPA 6010 | 97 | 96 | 1 | 87 - 109 | 0 - 12 |
| 77209 | Ba | EPA 6010 | 89 | 88 | 1 | 77 - 103 | 0 - 13 |
| 77209 | Be | EPA 6010 | 82 | 81 | 1 | 83 - 104 | 0 - 14 |
| 77209 | Cd | EPA 6010 | 90 | 87 | 3 | 83 - 106 | 0 - 13 |
| 77209 | Cr | EPA 6010 | 82 | 79 | 4 | 81 - 105 | 0 - 14 |
| 77209 | Pb | EPA 6010 | 86 | 85 | 1 | 80 - 105 | 0 - 12 |
| 77209 | Sb | EPA 6010 | 101 | 100 | 1 | 83 - 109 | 0 - 13 |
| 77209 | Ni | EPA 6010 | 90 | 89 | 1 | 82 - 103 | 0 - 13 |
| 77209 | Fe | EPA 6010 | 87 | 84 | 4 | 71 - 105 | 0 - 14 |
| 77209 | Cu | EPA 6010 | 98 | 93 | 5 | 78 - 110 | 0 - 16 |
| 77209 | Zn | EPA 6010 | 97 | 94 | 3 | 78 - 124 | 0 - 11 |

# ASI ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

## Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **154732-2**

April 17, 2002

**Sample Description**
Georgia Power

Solid, Plant Yates Gypsum Scrubber, Project#4638, PTY040422-2, 463802, 04/04/2002, 12:00, received 04/05/2002

**Toxicity Characteristic Leaching Procedure (EPA 1311)**
**TCLP Non-volatile Extraction**

| Analytical Method | Analyte | | Result | Detection Limit | Units | Regulatory Limit |
|---|---|---|---|---|---|---|
| | **Metals** | | | | | |
| EPA 6010 | D004 | Arsenic (As) | BDL | 0.03 | mg/L | 5.0 |
| EPA 6010 | D005 | Barium (Ba) | 0.2 | 0.1 | mg/L | 100.0 |
| EPA 6010 | D006 | Cadmium (Cd) | BDL | 0.01 | mg/L | 1.0 |
| EPA 6010 | D007 | Chromium (Cr) | 0.02 | 0.01 | mg/L | 5.0 |
| EPA 6010 | D008 | Lead (Pb) | BDL | 0.1 | mg/L | 5.0 |
| EPA 7470 | D009 | Mercury (Hg) | BDL | 0.005 | mg/L | 0.2 |
| EPA 6010 | D010 | Selenium (Se) | BDL | 0.5 | mg/L | 1.0 |
| EPA 6010 | D011 | Silver (Ag) | BDL | 0.01 | mg/L | 5.0 |
| EPA 6010 | --- | Beryllium (Be) | BDL | 0.01 | mg/L | -- |
| EPA 6010 | --- | Cobalt (Co) | BDL | 0.04 | mg/L | -- |
| EPA 6010 | --- | Copper (Cu) | BDL | 0.02 | mg/L | -- |
| EPA 6010 | --- | Manganese (Mn) | 0.10 | 0.04 | mg/L | -- |
| EPA 6010 | --- | Nickel (Ni) | BDL | 0.02 | mg/L | -- |
| EPA 6010 | --- | Antimony (Sb) | BDL | 0.1 | mg/L | -- |
| EPA 6010 | --- | Vanadium (V) | BDL | 0.02 | mg/L | -- |
| EPA 6010 | --- | Zinc (Zn) | 0.45 | 0.03 | mg/L | -- |
| EPA 6010 | --- | Iron (Fe) | 0.31 | 0.01 | mg/L | -- |

BDL - Below Detection Limit

ASI **ANALYTICAL SERVICES, INC.**
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **154732-1**

April 17, 2002

## Sample Description

Georgia Power
Solid, Plant Yates Gypsum Scrubber, Project#4638, PTY040422-1, 04/04/2002, 12:00, received 04/05/2002

| Analytical Method | Analyte | | Result | Detection Limit | Units | Regulatory Limit |
|---|---|---|---|---|---|---|
| | **Toxicity Characteristic Leaching Procedure (EPA 1311)** | | | | | |
| | **TCLP Non-volatile Extraction** | | | | | |
| | **Metals** | | | | | |
| EPA 6010 | D004 | Arsenic (As) | BDL | 0.03 | mg/L | 5.0 |
| EPA 6010 | D005 | Barium (Ba) | 0.2 | 0.1 | mg/L | 100.0 |
| EPA 6010 | D006 | Cadmium (Cd) | BDL | 0.01 | mg/L | 1.0 |
| EPA 6010 | D007 | Chromium (Cr) | 0.02 | 0.01 | mg/L | 5.0 |
| EPA 6010 | D008 | Lead (Pb) | BDL | 0.1 | mg/L | 5.0 |
| EPA 7470 | D009 | Mercury (Hg) | BDL | 0.005 | mg/L | 0.2 |
| EPA 6010 | D010 | Selenium (Se) | BDL | 0.5 | mg/L | 1.0 |
| EPA 6010 | D011 | Silver (Ag) | BDL | 0.01 | mg/L | 5.0 |
| EPA 6010 | --- | Beryllium (Be) | BDL | 0.01 | mg/L | -- |
| EPA 6010 | --- | Cobalt (Co) | BDL | 0.04 | mg/L | -- |
| EPA 6010 | --- | Copper (Cu) | 0.03 | 0.02 | mg/L | -- |
| EPA 6010 | --- | Manganese (Mn) | 0.10 | 0.04 | mg/L | -- |
| EPA 6010 | --- | Nickel (Ni) | BDL | 0.02 | mg/L | -- |
| EPA 6010 | --- | Antimony (Sb) | BDL | 0.1 | mg/L | -- |
| EPA 6010 | --- | Vanadium (V) | BDL | 0.02 | mg/L | -- |
| EPA 6010 | --- | Zinc (Zn) | 0.51 | 0.03 | mg/L | -- |
| EPA 6010 | --- | Iron (Fe) | 0.35 | 0.01 | mg/L | -- |

BDL - Below Detection Limit





JUL 22 '02 16:56 FR GEORGIA POWER 4045061499 TO 912059920556 P.04/13

Environme. , Laboratory
5131 Maner Road, Bin 39110
Smyrna, Georgia 30080

Phone: (404) 799-2100 Fax: (404) 799-2141
Company: 8-530-2100 Fax: 8-530-2141

# TRANSFER OF SAMPLES

US

GIA POWER
A SOUTHERN COMPANY

Sample Delivery Group No. 4638

| Lab Contact: CRAIG SCOTT | Project Name: PLANT YATES GYPSUM SCRUBBER | Vendor Laboratory Name and Address: ASI 154732 |
|---|---|---|
| ☒ Fax Results To: CRAIG SCOTT<br>☒ Mail Results To: ↓ | | |
| Turnaround Time: (or expected date of results) 4/12/02<br>Rush Charges Authorized: ☒ Yes ☐ No Signature: ECS | | Date of Sample Transfer 4/5/02 |

| Sample Date | Sample Time | No. of Containers | Project ID No. | Lab. ID No. | Analysis Requested | REMARKS |
|---|---|---|---|---|---|---|
| 4/4/02 | 12:00 | 1 | PLTY040402-1 | 463801 | TCLP METALS (HSRA LIST) | -1 |
| 4/4/02 | 12:00 | 1 | PLTY040402-2 | 463802 | ↓ | -2 |
| | | | | | HSRA LIST | EPA - |
| | | | | | Ag, As, Ba, Be, Cd, Co, Cu, Mn, Tl | 1311/6010B/7470 |
| | | | | | Ni, Pb, Sb, V, Zn, Se, Fe, Hg | |

*** Note: Attach copy of original Analysis Request**

TRANSFERRED BY (Signature) [signature]

DATE 4/5/02 TIME

RECEIVED BY (Signature) Susan DeHart 4.5.02 1430 TELEPHONE

TITLE DATE TIME

13°@1430, No seal, ice Lims: OD pH=N/A



CANARY - Originator PINK - Laboratory

ASI

# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Services
110 Technology Parkway, Norcross, GA 30092
(770)734-4200 FAX (770)734-4201

## SAMPLE RECEIPT VARIANCE FORM

**Attn:** Mr. Craig Scott

**Client:** GEORGIA POWER GA SMYRNA
**Project:** Plant Yates Gypsum Scrubber, Project#4638
**Recvd :** 04/05/2002
**Logged By:** SDD
**NPDES:**
**Work Order:** 154732

**OBSERVATIONS**

**#Samples:** 2 **#Containers:** 2 **Temp(C):** 13 **Ice:** Yes **Custody Seal(s):** Not Present
**pH:** n\a

**CHECKLIST ITEMS****

| | |
|---|---|
| 1. COC included with Samples | Yes |
| 2. Chain of Custody Complete | Yes |
| 3. Sample Container(s) Intact | Yes |
| 4. Sample Container(s) Match COC | Yes |
| 5. Methods Designated by Client on COC | Yes |
| 6. Params Designated by Client on COC | Yes |
| 7. Temperature in Compliance | No |
| 8. Sufficient Sample Volume for Analysis | Yes |
| 9. Zero HeadSpace Maintained for VOA Analyses | N/A |
| 10. Samples properly preserved | Yes |
| 11. Samples Received within Allowable Hold Times | Yes |

*Temperature above compliance level.*

**Status:** Samples processed as received. **Arrive Via:** Client **Airbill:**

**acted:** **Date:** **By:**

** North Carolina Samples ONLY - When a laboratory receives samples which do not meet sample collection, holding time, or preservative requirements, the laboratory must notify the sample collector or client and secure another sample. If another sample cannot be secured, the original sample may be analyzed but the results reported must be qualified with the nature of the infraction(s) and the laboratory must notify the State Laboratory about the infraction(s). *North Carolina Administrative Code, Reference 15A NCAC 2H.0805(a)(7)(N)*

Georgia Environmental Laboratory
5131 Maner Road, Bin 39110
Smyrna, GA 30080

Phone: (404) 799-2100 Fax: (404) 799-2141
Company: 8-530-2100 Fax: 8-530-2141

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

**LAB USE ONLY**
Control No. CC- 00
Sample Delivery Group: 4638

11 Page 1 of 1

[X] 12 Standard Turnaround Time
[ ] Rush in ______ Business Days
*(Must be cleared through Env. Lab. prior to shipment)*

Company: 1
Report To Address: 2 ROCHELLE ROUTMAN
Phone: 3 ______ Fax ______
Contact: 4 CRAIG SCOTT
Project Location: 5 PLANT YATES
Account Number: 6
Special Instructions: 7

Sample Shipment Date: 8 4/4/02
Sample Received Date: 9
Sampled By: 10 CRAIG SCOTT
Print Name

Signature

*Authorization to subcontract analysis will be assumed acceptable by customer unless stated otherwise.*

PRESERVATIVE 20: I

ANALYSIS REQUESTED 21: TCLP METALS (HSDA LIST)

Sample Type Key 22: G-Grab, C-Composite, O-Other

Matrix Key 23: O-Oil, S-Solid, SL-Sludge, W-Wipe, SW-Surface Water, GW-Ground Water, WW-Waste Water, DW-Drinking Water

Preservative Key 24: H-Hydrochloric Acid, N-Nitric Acid, S-Sulfuric Acid, SH-Sodium Hydroxide, SB-Sodium Bisulfide, P-Phosphoric Acid, ST-Sodium Thiosulfate, I-Ice, U-Unpreserved

| LAB USE ONLY 13 LAB ID | Sample Number 14 | Collection 15 Date | Collection 15 Time | Sample Description 16 | 17 Sample Type | 18 Matrix | 19 No. of Containers | TCLP METALS (HSDA LIST) | | | | | | LAB USE ONLY 25 Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 463801 | PLTY040402-1 | 4/4/02 | 12:00 | PLANT YATES GYPSUM SCRUBBER | C | S | 1 | ✓ | | | | | | |
| 463802 | PLTY040402-2 | 4/4/02 | 12:00 | PLANT YATES GYPSUM SCRUBBER | C | S | 1 | ✓ | | | | | | |

Relinquished by: 26 [signature] Date/Time 4/4/02 12:05
Received by: 27 [signature] Date/Time 4/4/02 1205
Relinquished by: Date/Time
Received by: Date/Time

LAB USE ONLY Sample Disposition Information 28

| Type: | Type: | Type: |
|---|---|---|
| Date: | Date: | Date: |
| Container: | Container: | Container: |

# Sample Receipt and Non-Conformance

GEORGIA POWER
A SOUTHERN COMPANY

Sample Delivery Group 4638 Location Yates

Control Numbers 463801 - 463802

**A. Method of Shipment:** [x] Hand Delivered [ ] Courier [ ] UPS/Fedex [ ] Other ______

a. Did shipment come with a shipping air bill? [ ] Y [ ] N [ ] N/A

b. If "yes" document carrier and air bill #: ______

**B. Preliminary Examination:**

1. Was Chain of Custody initiated? If "no" proceed to number 2. [x] Y [ ] N
   a. Were custody seals intact? [ ] Y [ ] N [x] N/A
   b. Were custody papers filled out properly? [x] Y [ ] N
   c. Were custody papers signed? [x] Y [ ] N
2. Are sampling time(s) present? [x] Y [ ] N
3. Are sampling date(s) present? [x] Y [ ] N
4. Are samples received within the specified holding times? [x] Y [ ] N
5. Were samples packaged properly? [x] Y [ ] N

**C. Sample Login:**

1. Did all sample containers arrive intact? [x] Y [ ] N
2. Did all container labels agree with custody papers? [x] Y [ ] N
3. Were proper containers used for requested test(s)? [x] Y [ ] N [ ] N/A
4. Were samples properly preserved for requested test(s)? [ ] Y [ ] N [x] N/A
   a. pH (acid)? [ ] < 2 [ ] ≥ 2 [ ] N/A
   b. pH (base)? [ ] ≥ 12 [ ] < 12 [ ] N/A
   c. temperature? [ ] < 4 [ ] ≥ 4 [ ] N/A
5. Was sufficient sample received for requested test(s)? [x] Y [ ] N
6. Were air bubbles present in VOA samples? [ ] Y [ ] N [x] N/A

**D. Corrective Action:** (Complete this section only if needed)

1. Client notified verbally - Date: ______ Time: ______
   (attach written notification, e.g. e-mail, memo, etc.)
2. Samples processed as received [ ] Y [ ] N

**E. Comments** ______

Completed by: J. Daniel Brooks Date 4/4/02

707446 MAC

# Laboratory Results
# Gypsum Total Metals

Bin 39110
5131 Manor Road
Smyrna, Georgia 30080
Tel 404.799.2100

GEORGIA POWER
A SOUTHERN COMPANY

April 01, 2002

Rochelle Routman
Georgia Power Company
Environmental Affairs
241 Ralph McGill Blvd.
Atlanta, GA 30308

RE: Plant Yates Gypsum Ash Analytical Results

The Environmental Laboratory has completed the analysis of your sample and reports the results on the attached pages. All results relate only to the contents of the samples submitted. This report may not be reproduced except in full without the written consent of the Environmental Laboratory.

All samples will be disposed of after 30 days unless otherwise instructed.

If you have any questions, please advise.

Respectfully submitted,

D.A.D.

D. A. Davis
Senior Environmental Specialist

CC: David Parks
Jim Redwine ✓

Page 1 of 1
Report Number: 040102-4395-1

**ASI**

# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

## Laboratory Report

Report Number **153897**

Project: Yates-Gypsum, Project#4395

Prepared For:
**Georgia Power**
**5131 Maner Road**
**Smyrna, GA 30080**

**Attention:** Mr. Craig Scott

April 2, 2002

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Judy Wagner
**Project Manager**

**Quality Assurance**

Analytical Services Inc., Norcross Laboratory maintains the following certifications, approvals, and accreditations: Georgia (812); NELAC (E87315) scope: CWA, SDWA, RCRA expires July 1, 2002; NSF International (04180) scope: SDWA expires August 17, 2002; Arkansas; California (01160CA); Connecticut (PH-0250); Florida (E87315); Kansas (E-10334); Kentucky (90126); Louisiana (02069); Nebraska; New Jersey (GA001); New York (11762); North Carolina (381); North Dakota (R-116); Oklahoma (9907); South Carolina (98011); Tennessee (02994); USDA Soil Import License (S-36027); Virginia (00026). For more information visit our web site at: asi-lab.com

ASI

# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

## Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-1**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 01GYP020402, 439501, 02/04/2002, 14:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 34.1 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.6 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.6 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 150 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.1 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 360 | 6.1 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.3 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.1 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.40 | 0.8 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 11 | 6.1 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 30 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 26 | 3.0 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-2**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 02GYP020502, 439502, 02/05/2002, 13:55, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 36.2 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.8 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.7 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 160 | 1.6 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.3 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 350 | 6.3 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.4 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.3 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | BDL | 0.39 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 9.4 | 6.3 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 31 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 22 | 3.1 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-3**

April 2, 2002

## Sample Description

Georgia Power
Soil, Yates-Gypsum, Project#4395, 03GYP020602, 439503, 02/06/2002, 14:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 38.6 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 8.1 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.9 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 180 | 1.6 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.5 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.3 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 380 | 6.5 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.4 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.5 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | BDL | 0.41 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.3 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 10 | 6.5 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 33 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.3 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 23 | 3.3 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-4**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 04GYP020702, 439504, 02/07/2002, 14:25, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 38.9 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 8.1 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.9 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 180 | 1.6 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.5 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 370 | 6.5 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.4 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.5 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | BDL | 0.41 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 10 | 6.5 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 32 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 28 | 3.2 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-5**

April 2, 2002

## Sample Description

Georgia Power
Soil, Yates-Gypsum, Project#4395, 05GYP020802, 439505, 02/08/2002, 13:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 35.1 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.7 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.6 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 210 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | 1.6 | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.2 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 560 | 6.2 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.3 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.2 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.65 | 0.39 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 14 | 6.2 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 31 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.1 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 14 | 3.1 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-6**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 06GYP020902, 439506, 02/09/2002, 14:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 34.3 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.6 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.6 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 190 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.1 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 480 | 6.1 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.3 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.1 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.49 | 0.38 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 10 | 6.1 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 30 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 24 | 3.0 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
ANALYTICAL SERVICES, INC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-7**

April 2, 2002

## Sample Description

Georgia Power
Soil, Yates-Gypsum, Project#4395, 07GYP021002, 439507, 02/10/2002, 14:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 37.4 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 8.0 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.8 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 170 | 1.6 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.4 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 400 | 6.4 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.4 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.4 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.43 | 0.40 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 8.8 | 6.4 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 32 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 16 | 3.2 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
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# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-8**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 08GYP021102, 439508, 02/11/2002, 13:30, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 34.1 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.6 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.6 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 170 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.1 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 340 | 6.1 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.3 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.1 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | BDL | 0.38 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 9.7 | 6.1 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 30 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 17 | 3.0 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI ANALYTICAL SERVICES, INC.
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110 Technology Parkway Norcross, GA 30092
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# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-9**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 09GYP021202, 439509, 02/12/2002, 13:35, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 33.5 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.5 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.5 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 130 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.0 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 270 | 6.0 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.3 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.0 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | BDL | 0.38 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 7.9 | 6.0 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 30 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 13 | 3.0 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI ANALYTICAL SERVICES, INC.
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110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-10**

April 2, 2002

## Sample Description

Georgia Power
Soil, Yates-Gypsum, Project#4395, 10GYP021302, 439510, 02/13/2002, 13:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 37.2 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 8.0 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.8 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 200 | 1.6 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.4 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 430 | 6.4 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.4 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.4 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.61 | 0.40 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.6 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 11 | 6.4 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 32 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.2 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 29 | 3.2 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI
**ANALYTICAL SERVICES, INC.**
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110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-11**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 11GYP021402, 439511, 02/14/2002, 13:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 33.3 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.5 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.5 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 120 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 6.0 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 260 | 6.0 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.2 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 6.0 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.46 | 0.37 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 7.5 | 6.0 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 30 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 3.0 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 10 | 3.0 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

ASI ANALYTICAL SERVICES, INC.
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110 Technology Parkway Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

Georgia Power
5131 Maner Road
Smyrna, GA 30080

Attention: Mr. Craig Scott
Report No. **153897-12**

April 2, 2002

**Sample Description**
Georgia Power
Soil, Yates-Gypsum, Project#4395, 12GYP021502, 439512, 02/15/2002, 13:00, received 03/22/2002

| Analytical Method | Analyte | Result | Detection Limit | Units |
|---|---|---|---|---|
| | **General Chemistry** | | | |
| | Moisture | 32.0 | 0.04 | % |
| | **Metals** | | | |
| EPA 6010 | Total Antimony (Sb) | BDL | 7.4 | mg/kg |
| EPA 6010 | Total Arsenic (As) | BDL | 4.4 | mg/kg |
| EPA 6010 | Total Barium (Ba) | 160 | 1.5 | mg/kg |
| EPA 6010 | Total Beryllium (Be) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cadmium (Cd) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Chromium (Cr) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Cobalt (Co) | BDL | 5.9 | mg/kg |
| EPA 6010 | Total Copper (Cu) | BDL | 2.9 | mg/kg |
| EPA 6010 | Total Iron (Fe) | 360 | 5.9 | mg/kg |
| EPA 6010 | Total Lead (Pb) | BDL | 2.2 | mg/kg |
| EPA 6010 | Total Manganese (Mn) | BDL | 5.9 | mg/kg |
| EPA 7471 | Total Mercury (Hg) | 0.77 | 0.37 | mg/kg |
| EPA 6010 | Total Nickel (Ni) | BDL | 2.9 | mg/kg |
| EPA 6010 | Total Silver (Ag) | BDL | 1.5 | mg/kg |
| EPA 6010 | Total Selenium (Se) | 11 | 5.9 | mg/kg |
| EPA 6010 | Total Thallium (Tl) | BDL | 29 | mg/kg |
| EPA 6010 | Total Vanadium (V) | BDL | 2.9 | mg/kg |
| EPA 6010 | Total Zinc (Zn) | 18 | 2.9 | mg/kg |

BDL - Below Detection Limit
Note: Results reported on dry-weight basis

Analytical Services, Inc. **Quality Control** Report No. 153897

## Single Analyte Data

### Blank Results Information

| Batch Number | Analyte | Analysis Method | Preparation Method | Units | Blank Result | Matrix |
|---|---|---|---|---|---|---|
| 76819 | Sb | EPA 6010 | EPA 3050 | mg/kg | < 0.0500 | SOLID |
| 76819 | Ba | EPA 6010 | EPA 3050 | mg/kg | < 0.0100 | SOLID |
| ~~76819~~ | ~~Be~~ | ~~EPA 6010~~ | ~~EPA 3050~~ | ~~mg/kg~~ | ~~< 0.0100~~ | ~~SOLID~~ |
| 76819 | Cd | EPA 6010 | EPA 3050 | mg/kg | < 0.0100 | SOLID |
| 76819 | Cr | EPA 6010 | EPA 3050 | mg/kg | < 0.0100 | SOLID |
| 76819 | Co | EPA 6010 | EPA 3050 | mg/kg | < 0.0400 | SOLID |
| 76819 | Cu | EPA 6010 | EPA 3050 | mg/kg | < 0.0200 | SOLID |
| 76819 | Fe | EPA 6010 | EPA 3050 | mg/kg | < 0.0400 | SOLID |
| 76819 | Pb | EPA 6010 | EPA 3050 | mg/kg | < 0.0150 | SOLID |
| 76819 | Ni | EPA 6010 | EPA 3050 | mg/kg | < 0.0200 | SOLID |
| 76819 | Ag | EPA 6010 | EPA 3050 | mg/kg | < 0.0100 | SOLID |
| 76819 | As | EPA 6010 | EPA 3050 | mg/kg | < 0.0300 | SOLID |
| 76819 | Mn | EPA 6010 | EPA 3050 | mg/kg | < 0.0400 | SOLID |
| 76819 | Se | EPA 6010 | EPA 3050 | mg/kg | < 0.0400 | SOLID |
| 76819 | Tl | EPA 6010 | EPA 3050 | mg/kg | < 0.2000 | SOLID |
| 76819 | V | EPA 6010 | EPA 3050 | mg/kg | < 0.0200 | SOLID |
| 76819 | Zn | EPA 6010 | EPA 3050 | mg/kg | < 0.2000 | SOLID |
| 77070 | Hg | EPA 7471 | Hg-Solid | mg/kg | 0.0000 | SOLID |

### Lab Control Information

| Batch Number | Analyte | Analysis Method | LC % Rec. | LCD % Rec. | LC/LCD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 76819 | Sb | EPA 6010 | 94 | 91 | 3 | 76 - 124 | 0 - 20 |
| 76819 | Ba | EPA 6010 | 86 | 86 | 0 | 81 - 92 | 0 - 8 |
| 76819 | Be | EPA 6010 | 83 | 82 | 1 | 81 - 96 | 0 - 7 |
| 76819 | Cd | EPA 6010 | 89 | 89 | 0 | 80 - 93 | 0 - 4 |
| 76819 | Cr | EPA 6010 | 82 | 82 | 0 | 82 - 95 | 0 - 5 |
| 76819 | Co | EPA 6010 | 94 | 95 | 1 | 82 - 95 | 0 - 7 |
| 76819 | Cu | EPA 6010 | 90 | 89 | 1 | 84 - 97 | 0 - 5 |
| 76819 | Fe | EPA 6010 | 88 | 88 | 0 | 86 - 118 | 0 - 12 |
| 76819 | Pb | EPA 6010 | 88 | 88 | 0 | 78 - 95 | 0 - 5 |
| 76819 | Ni | EPA 6010 | 88 | 89 | 1 | 82 - 93 | 0 - 5 |
| 76819 | Ag | EPA 6010 | 78 | 78 | 0 | 75 - 88 | 0 - 5 |
| 76819 | As | EPA 6010 | 85 | 85 | 0 | 77 - 90 | 0 - 6 |
| 76819 | Mn | EPA 6010 | 86 | 86 | 0 | 79 - 100 | 0 - 11 |
| 76819 | Se | EPA 6010 | 84 | 85 | 1 | 73 - 86 | 0 - 7 |

## Single Analyte Data

### Lab Control Information

| Batch Number | Analyte | Analysis Method | LC % Rec. | LCD % Rec. | LC/LCD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 76819 | Tl | EPA 6010 | 87 | 86 | 1 | 77 - 96 | 0 - 8 |
| 76819 | V | EPA 6010 | 86 | 85 | 1 | 81 - 94 | 0 - 5 |
| 76819 | Zn | EPA 6010 | 92 | 97 | 5 | 82 - 95 | 0 - 8 |
| 77070 | Hg | EPA 7471 | 92 | 93 | 1 | 81 - 114 | 0 - 13 |

### Matrix Spike Information

| Batch Number | Analyte | Analysis Method | MS % Rec. | MSD % Rec. | MS/MSD RPD | %Recovery Range | RPD Range |
|---|---|---|---|---|---|---|---|
| 76819 | Sb | EPA 6010 | 22 | 29 | 28 | 76 - 124 | 0 - 20 |
| 76819 | Ba | EPA 6010 | 98 | 90 | 5 | 76 - 124 | 0 - 20 |
| 76819 | Be | EPA 6010 | 82 | 82 | 1 | 76 - 124 | 0 - 20 |
| 76819 | Cd | EPA 6010 | 87 | 87 | 0 | 76 - 124 | 0 - 20 |
| 76819 | Cr | EPA 6010 | 82 | 78 | 4 | 76 - 124 | 0 - 20 |
| 76819 | Co | EPA 6010 | 90 | 90 | 0 | 76 - 124 | 0 - 20 |
| 76819 | Cu | EPA 6010 | 92 | 87 | 5 | 76 - 124 | 0 - 20 |
| 76819 | Fe | EPA 6010 | 0 | 102 | 200 | 76 - 124 | 0 - 20 |
| 76819 | Pb | EPA 6010 | 84 | 82 | 2 | 76 - 124 | 0 - 20 |
| 76819 | Ni | EPA 6010 | 86 | 79 | 5 | 76 - 124 | 0 - 20 |
| 76819 | Ag | EPA 6010 | 80 | 80 | 0 | 76 - 124 | 0 - 20 |
| 76819 | As | EPA 6010 | 83 | 81 | 2 | 76 - 124 | 0 - 20 |
| 76819 | Mn | EPA 6010 | 101 | 119 | 4 | 76 - 124 | 0 - 20 |
| 76819 | Se | EPA 6010 | 84 | 84 | 1 | 76 - 124 | 0 - 20 |
| 76819 | Tl | EPA 6010 | 52 | 59 | 9 | 76 - 124 | 0 - 20 |
| 76819 | V | EPA 6010 | 85 | 82 | 3 | 76 - 124 | 0 - 20 |
| 76819 | Zn | EPA 6010 | 116 | 80 | 19 | 76 - 124 | 0 - 20 |
| 77070 | Hg | EPA 7471 | 105 | 97 | 6 | 82 - 120 | 0 - 13 |

### Post Digestion Spike Information

| Batch Number | Analyte | Analysis Method | PDS %Rec | %Recovery Range |
|---|---|---|---|---|
| 76819 | Sb | EPA 6010 | 102 | 76 - 124 |
| 76819 | Ba | EPA 6010 | 90 | 76 - 124 |
| 76819 | Be | EPA 6010 | 101 | 76 - 124 |
| 76819 | Cd | EPA 6010 | 108 | 76 - 124 |
| 76819 | Cr | EPA 6010 | 95 | 76 - 124 |

## Single Analyte Data
### Post Digestion Spike Information

| Batch Number | Analyte | Analysis Method | PDS %Rec | %Recovery Range |
|---|---|---|---|---|
| 76819 | Co | EPA 6010 | 109 | 76 - 124 |
| 76819 | Cu | EPA 6010 | 109 | 76 - 124 |
| 76819 | Fe | EPA 6010 | 196 | 76 - 124 |
| 76819 | Pb | EPA 6010 | 103 | 76 - 124 |
| 76819 | Ni | EPA 6010 | 96 | 76 - 124 |
| 76819 | Ag | EPA 6010 | 103 | 76 - 124 |
| 76819 | As | EPA 6010 | 103 | 76 - 124 |
| 76819 | Mn | EPA 6010 | 0 | 76 - 124 |
| 76819 | Se | EPA 6010 | 103 | 76 - 124 |
| 76819 | Tl | EPA 6010 | 81 | 76 - 124 |
| 76819 | V | EPA 6010 | 101 | 76 - 124 |
| 76819 | Zn | EPA 6010 | 98 | 76 - 124 |

## Single Analyte Data
### Sample Batch Information

***Analysis : Sb, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Ni, Ag, As, Mn, Se, Tl,***

***Batch # 76819*** ***Matrix : SOLID***

| | | Preparation | | | | Analysis | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Tag | Date | Time | By | Notes | Date | Time | By | Inst |
| 153897-12BS | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1400 | FBS | ICP3 |
| HPS2 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1355 | FBS | ICP3 |
| HPS1 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1352 | FBS | ICP3 |
| 76819BLK | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1206 | FBS | ICP3 |
| 76819LCS | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1209 | FBS | ICP3 |
| 76819LCSD | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1213 | FBS | ICP3 |
| 153901-1MS | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1217 | FBS | ICP3 |
| 153901-1MSD | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1221 | FBS | ICP3 |
| 153901-1PDS | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1224 | FBS | ICP3 |
| 153901-1DUP | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1228 | FBS | ICP3 |
| 153901-1 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1232 | FBS | ICP3 |
| 153901-2 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1235 | FBS | ICP3 |
| 153901-3 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1239 | FBS | ICP3 |
| 153901-4 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1251 | FBS | ICP3 |
| 153901-5 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1255 | FBS | ICP3 |
| 153897-1 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1259 | FBS | ICP3 |
| 153897-2 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1302 | FBS | ICP3 |
| 153897-3 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1306 | FBS | ICP3 |
| 153897-4 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1310 | FBS | ICP3 |
| 153897-5 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1314 | FBS | ICP3 |
| 153897-6 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1317 | FBS | ICP3 |
| 153897-7 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1321 | FBS | ICP3 |
| 153897-8 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1325 | FBS | ICP3 |
| 153897-9 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1337 | FBS | ICP3 |
| 153897-10 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1341 | FBS | ICP3 |
| 153897-11 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1344 | FBS | ICP3 |
| 153897-12 | | 03/26/02 | 1030 | MHU | TRACE | 03/27/02 | 1348 | FBS | ICP3 |

## Single Analyte Data
### Sample Batch Information
***Analysis : Hg***

***Batch # 77070*** ***Matrix : SOLID***

| | | Preparation | | | | Analysis | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Tag | Date | Time | By | Notes | Date | Time | By | Inst |
| WIPEBLK | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1652 | EAH | HG1 |
| 153990-6 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1650 | EAH | HG1 |
| 153990-5 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1648 | EAH | HG1 |
| 153990-4 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1646 | EAH | HG1 |
| 153990-3 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1644 | EAH | HG1 |
| 153897-12 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1637 | EAH | HG1 |
| 153897-11 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1635 | EAH | HG1 |
| 153897-10 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1633 | EAH | HG1 |
| 153897-9 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1631 | EAH | HG1 |
| 153897-8 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1629 | EAH | HG1 |
| 153897-7 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1627 | EAH | HG1 |
| 153897-6 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1624 | EAH | HG1 |
| 153897-5 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1622 | EAH | HG1 |
| 153897-4 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1620 | EAH | HG1 |
| 153897-3 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1618 | EAH | HG1 |
| 153897-2 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1509 | EAH | HG1 |
| 153897-1 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1507 | EAH | HG1 |
| 153674-2 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1505 | EAH | HG1 |
| 153674-1 | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1503 | EAH | HG1 |
| 153897-2DUP | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1457 | EAH | HG1 |
| 153897-2MSD | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1455 | EAH | HG1 |
| 153897-2MS | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1452 | EAH | HG1 |
| 77070LCSD | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1442 | EAH | HG1 |
| 77070LCS | | 03/27/02 | 1100 | EAH | | 03/27/02 | 1444 | EAH | HG1 |
| 77070BLK | | 03/27/02 | 1100 | EAH | SOIL | 03/27/02 | 1440 | EAH | HG1 |

**Georgia P[illegible]nvironmental Laboratory**
5131 Maner [illegible], Bin 39110
Smyrna, GA 30080

Phone: (404) 799-2100 Fax: (404) 799-2141
Company: 8-530-2100 Fax: 8-530-2141

# ANALYSIS [illegible]UEST AND CHAIN OF CUSTODY RECORD

**LAB USE ONLY**
Control No. CC-[illegible]63
Sample Delivery Group: 4395

11 Page 1 of 2

Company: 1 GA. POWER COMPANY
Report To Address: 2 ROCHELLE ROUTMAN
241 RALPH McGILL BLVD, NE
ATLANTA, GA. 30308
Phone: 3 8-506-7780 Fax 8-506-1499
Contact: 4 ROCHELLE ROUTMAN
Project Location: 5 PLANT YATES
Account Number: 6
Special Instructions: 7 METALS HSRA LIST

Sample Shipment Date: 8 2/19/02
Sample Received Date: 9
Sampled By: 10 DAVID D. PARKS
Print Name
Signature

*Authorization to subcontract analysis will be assumed acceptable by customer unless stated otherwise.*

☑ 12 Standard Turnaround Time
☐ Rush in ______ Business Days
*(Must be cleared through Env. Lab. prior to shipment)*

PRESERVATIVE 20: 1

ANALYSIS REQUESTED 21: METALS HSRA LIST

Sample Type Key: 22
G-Grab C-Composite
O-Other

Matrix Key: 23
O-Oil SW-Surface Water
S-Solid GW-Ground Water
SL-Sludge WW-Waste Water
W-Wipe DW-Drinking Water

Preservative Key: 24
H-Hydrochloric Acid
N-Nitric Acid
S-Sulfuric Acid
SH-Sodium Hydroxide
SB-Sodium Bisulfide
P-Phosphoric Acid
ST-Sodium Thiosulfate
I-Ice
U-Unpreserved

| LAB USE ONLY 13 LAB ID | Sample Number 14 | Collection 15 Date | Collection 15 Time | Sample Description 16 | Sample Type 17 | Matrix 18 | No. of Containers 19 | METALS HSRA LIST | | | | | | LAB USE ONLY 25 Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 439501 | 01GYP020402 | 2/4/02 | 1400 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439502 | 02GYP020502 | 2/5/02 | 1355 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439503 | 03GYP020602 | 2/6/02 | 1400 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439504 | 04GYP020702 | 2/7/02 | 1425 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439505 | 05GYP020802 | 2/8/02 | 1300 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439506 | 06GYP020902 | 2/9/02 | 1400 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439507 | 07GYP021002 | 2/10/02 | 1400 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439508 | 08GYP021102 | 2/11/02 | 1330 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439509 | 09GYP021202 | 2/12/02 | 1335 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |
| 439510 | 10GYP021302 | 2/13/02 | 1300 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | |

| | |
|---|---|
| Relinquished by: 26 | Date/Time |
| Received by: 27 | Date/Time |
| Relinquished by: | Date/Time |
| Received by: | Date/Time |

**LAB USE ONLY: Sample Disposition Information 28**

| | | |
|---|---|---|
| Type: | Type: | Type: |
| Date: | Date: | Date: |
| Container: | Container: | Container: |

707211B MAC



WHITE, CANARY & PINK—Laboratory GOLDENROD—Originator

*(See Back For Instructions)*

Georgia Environmental Laboratory
5131 Maner Road, Bin 39110
Smyrna, GA 30080

Phone: (404) 799-2100 Fax: (404) 799-2141
Company: 8-530-2100 Fax: 8-530-2141

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

LAB USE ONLY
Control No. CC-64
Sample Delivery Group: 4395

11 Page 2 of 2

[✓] 12 Standard Turnaround Time
[ ] Rush in ____ Business Days
*(Must be cleared through Env. Lab. prior to shipment)*

Company: 1 GEORGIA POWER COMPANY
Report To Address: 2 ROCHELLE ROUTMAN
241 RALPH McGILL BLVD., NE
ATLANTA, GA. 30308
Phone: 3 8-506-7780 Fax 8-506-1499
Contact: 4 ROCHELLE ROUTMAN
Project Location: 5 PLANT YATES
Account Number: 6
Special Instructions: 7 METALS HSRA LIST

Sample Shipment Date: 8 2/19/02
Sample Received Date: 9
Sampled By: 10 DAVID D. PARKS
Print Name
Signature

*Authorization to subcontract analysis will be assumed acceptable by customer unless stated otherwise.*

PRESERVATIVE 20: 1

ANALYSIS REQUESTED 21

Sample Type Key: 22
G-Grab C-Composite
O-Other

Matrix Key: 23
O-Oil SW-Surface Water
S-Solid GW-Ground Water
SL-Sludge WW-Waste Water
W-Wipe DW-Drinking Water

Preservative Key: 24
H-Hydrochloric Acid
N-Nitric Acid
S-Sulfuric Acid
SH-Sodium Hydroxide
SB-Sodium Bisulfide
P-Phosphoric Acid
ST-Sodium Thiosulfate
I-Ice
U-Unpreserved

| LAB USE ONLY 13 LAB ID | Sample 14 Number | Collection 15 Date | Collection 15 Time | Sample 16 Description | 17 Sample Type | 18 Matrix | 19 No. of Containers | METALS HSRA LIST | | | | | | | LAB USE ONLY 25 Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 439511 | 11GYP021402 | 2/14/02 | 1330 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | | |
| 439512 | 12GYP021502 | 2/15/02 | 1300 | GYPSUM FROM UNIT 1 SCRUBBER | G | SL | 1 | ✓ | | | | | | | |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |

| | |
|---|---|
| Relinquished by: 26 | Date/Time |
| Received by: 27 | Date/Time |
| Relinquished by: | Date/Time |
| Received by: | Date/Time |

LAB USE ONLY: Sample Disposition Information 28

| | | |
|---|---|---|
| Type: | Type: | Type: |
| Date: | Date: | Date: |
| Container: | Container: | Container: |

707211B MAC WHITE, CANARY & PINK—Laboratory GOLDENROD—Originator *(See Back For Instructions)*

**Environmental Laboratory**
5131 Maner Road, Bin 39110
Smyrna, Georgia 30080

# TRANSFER OF SAMPLES

4

WO#153897

GEORGIA POWER
A SOUTHERN COMPANY

Phone: (404) 799-2100 Fax: (404) 799-2141
Company: 8-530-2100 Fax: 8-530-2141

Sample Delivery Group No. 4395

Lab Contact: J. Daniel-Broadnax

Project Name: Yates - Gypsum

Vendor Laboratory Name and Address: AST

☐ Fax Results To: Craig Scott

☐ Mail Results To:

Turnaround Time: (or expected date of results) 3/28/02

Rush Charges Authorized: ☐ Yes ☐ No Signature:

Date of Sample Transfer: 3/22/02

| ~~Sample Date~~ Time | ~~Sample Time~~ Date | No. of Containers | Project ID No. | Lab. ID No. | Analysis Requested | REMARKS |
|---|---|---|---|---|---|---|
| 1400 | 2/4/02 | 1 | 01GYP020402 | 439501 -1 | | |
| 1355 | 2/5/02 | 1 | 02GYP020502 | 439502 -2 | Total Element Concentration | |
| 1400 | 2/6/02 | 1 | 03GYP020602 | 439503 -3 | Ag, As, Ba, Be, Cd, Co, Cu, | EPA 3050B/ |
| 1325 | 2/7/02 | 1 | 04GYP020702 | 439504 -4 | Mn, Ni, Pb, Sb, V, Zn, Se, Fe, | EPA 6010B/ |
| 1300 | 2/8/02 | 1 | 05GYP020802 | 439505 -5 | Cr, Hg, Tl | + 7470 |
| 1400 | 2/9/02 | 1 | 06GYP020902 | 439506 -6 | | |
| 1400 | 2/10/02 | 1 | 07GYP021002 | 439507 -7 | | |
| 1330 | 2/11/02 | 1 | 08GYP021102 | 439508 -8 | | |
| 1335 | 2/12/02 | 1 | 09GYP021202 | 439509 -9 | | |
| 1300 | 2/13/02 | 1 | 10GYP021302 | 439510 -10 | | |
| 1300 | 2/14/02 | 1 | 11GYP021402 | 439511 -11 | | |
| 1300 | 2/15/02 | ~~3/15~~ 1 | 12GYP021502 | 439512 -12 | | |
| | | SDB 3/22/02 | | | | |

* Note: Attach copy of original Analysis Request

| TRANSFERRED BY (Signature) | | RECEIVED BY (Signature) | | TELEPHONE |
|---|---|---|---|---|
| | | [signature] | 3.22.02 | 1245 |
| DATE | TIME | TITLE | DATE | TIME |
| | | 6°C @ 1245, ice, no seal, pH n/a condition good | | |

707454 MAC WHITE—Laboratory CANARY—Originator PINK—Laboratory

ASI

# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Services
110 Technology Parkway, Norcross, GA 30092
(770)734-4200 FAX (770)734-4201

## LOG-IN CHECKLIST

**Attn:** Mr. Craig Scott

**Client:** GEORGIA POWER GA SMYRNA
**Project:** Yates-Gypsum, Project#4395
**Recvd :** 03/22/2002

**Logged By:** BAM

**NPDES:**
**Work Order:** 153897

**OBSERVATIONS**

**#Samples:** 12 **#Containers:** 12
**pH:** n\a **Temp(C):** 6 **Ice:** Yes **Custody Seal(s):** Not Present

**CHECKLIST ITEMS****

| | |
|---|---|
| 1. COC included with Samples | Yes |
| 2. Chain of Custody Complete | Yes |
| 3. Sample Container(s) Intact | Yes |
| 4. Sample Container(s) Match COC | Yes |
| 5. Methods Designated by Client on COC | Yes |
| 6. Params Designated by Client on COC | Yes |
| 7. Temperature in Compliance | Yes |
| 8. Sufficient Sample Volume for Analysis | Yes |
| 9. Zero HeadSpace Maintained for VOA Analyses | N/A |
| 10. Samples properly preserved | Yes |
| 11. Samples Received within Allowable Hold Times | Yes |

# Sample Receipt and Non-Conformance

GEORGIA POWER
A SOUTHERN COMPANY

Sample Delivery Group 4395 Location Yates

Control Numbers 439501 - 439512

**A. Method of Shipment:** ☐ ~~Hand Delivered~~ ☒ ~~Courier~~ ☐ ~~UPS/Fedex~~ ☐ ~~Other~~ ______

| | | | |
|---|---|---|---|
| a. Did shipment come with a shipping air bill? | ☐ Y | ☐ N | ☒ N/A |
| b. If "yes" document carrier and air bill #: ______ | | | |

**B. Preliminary Examination:**

| | | | |
|---|---|---|---|
| 1. Was Chain of Custody initiated? If "no" proceed to number 2. | ☒ Y | ☐ N | |
| a. Were custody seals intact? | ☐ Y | ☐ N | ☐ N/A |
| b. Were custody papers filled out properly? | ☐ Y | ☐ N | |
| c. Were custody papers signed? | ☐ Y | ☐ N | |
| 2. Are sampling time(s) present? | ☒ Y | ☐ N | |
| 3. Are sampling date(s) present? | ☒ Y | ☐ N | |
| 4. Are samples received within the specified holding times? | ☒ Y | ☐ N | |
| 5. Were samples packaged properly? | ☒ Y | ☐ N | |

**C. Sample Login:**

| | | | |
|---|---|---|---|
| 1. Did all sample containers arrive intact? | ☒ Y | ☐ N | |
| 2. Did all container labels agree with custody papers? | ☒ Y | ☐ N | |
| 3. Were proper containers used for requested test(s)? | ☒ Y | ☐ N | ☐ N/A |
| 4. Were samples properly preserved for requested test(s)? | ☒ Y | ☐ N | ☐ N/A |
| a. pH (acid)? | ☐ $< 2$ | ☐ $\geq 2$ | ☒ N/A |
| b. pH (base)? | ☐ $\geq 12$ | ☐ $< 12$ | ☒ N/A |
| c. temperature? | ☒ $< 4$ | ☐ $\geq 4$ | ☐ N/A |
| 5. Was sufficient sample received for requested test(s)? | ☒ Y | ☐ N | |
| 6. Were air bubbles present in VOA samples? | ☐ Y | ☐ N | ☒ N/A |

**D. Corrective Action:** (Complete this section only if needed)

1. Client notified verbally - Date: ______ Time: ______
(attach written notification, e.g. e-mail, memo, etc.)

2. Samples processed as received ☐ Y ☐ N

**E. Comments** ______

Completed by: S Daniel - Broadus Date 2/22/02

Safeco®

# CONTINUATION CERTIFICATE

SAFECO INSURANCE COMPANY OF AMERICA , Surety upon

a certain Bond No. **4993104**

dated effective June 30 2005
(MONTH-DAY-YEAR)

on behalf of Southern Company Services, Inc.
(PRINCIPAL)

and in favor of Georgia - Dept. of Natural Resources
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on June 30 2006
(MONTH-DAY-YEAR)

and ending on June 30 2007
(MONTH-DAY-YEAR)

Amount of bond $10,000

Description of bond License Bond - Water Well Contractors and Drillers

**PROVIDED:** That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on June 19 2006
(MONTH-DAY-YEAR)
SAFECO INSURANCE COMPANY OF AMERICA

By Laurel D. Huss
ATTORNEY-IN-FACT Laurel D. Huss

SAFECO INSURANCE COMPANY OF AMERICA CORPORATE SEAL 1953 STATE OF WASHINGTON

Marsh USA, Inc.
Agent

3475 Piedmont Road NE, Suite 1200, Atlanta, GA 30305
Address of Agent

(404) 995-3702
Telephone Number of Agent







FRP

SAFECO®

POWER OF ATTORNEY

SAFECO INSURANCE COMPANY OF AMERICA
GENERAL INSURANCE COMPANY OF AMERICA
HOME OFFICE: SAFECO PLAZA
SEATTLE, WASHINGTON 98185

No. 6724

**KNOW ALL BY THESE PRESENTS:**

That **SAFECO INSURANCE COMPANY OF AMERICA** and **GENERAL INSURANCE COMPANY OF AMERICA,** each a Washington corporation, does each hereby appoint
****SANDRA S. CARTER; GARY D. EKLUND; JUDY S. FLEMING; VIRGINIA B. MCMANUS; BARBARA S. MACARTHUR; EDWARD L. MITCHELL; NANCY NIX; BARBARA A. THOMPSON; CYNTHIA I. RODOLPH; LAUREL D. HUSS; CHAUN M. WILSON; Atlanta, Georgia***********************************************

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

**IN WITNESS WHEREOF, SAFECO INSURANCE COMPANY OF AMERICA** and **GENERAL INSURANCE COMPANY OF AMERICA** have each executed and attested these presents

this 23rd day of August, 2004.

CBMead
**CHRISTINE MEAD, SECRETARY**

Mike McGavick
**MIKE MCGAVICK, PRESIDENT**

**CERTIFICATE**

Extract from the By-Laws of **SAFECO INSURANCE COMPANY OF AMERICA**
and of **GENERAL INSURANCE COMPANY OF AMERICA:**

"Article V, Section 13. - FIDELITY AND SURETY BONDS ... the President, any Vice President, the Secretary, and any Assistant Vice President appointed for that purpose by the officer in charge of surety operations, shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business... On any instrument making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

Extract from a Resolution of the Board of Directors of **SAFECO INSURANCE COMPANY OF AMERICA**
and of **GENERAL INSURANCE COMPANY OF AMERICA** adopted July 28, 1970.

"On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

(i) The provisions of Article V, Section 13 of the By-Laws, and
(ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
(iii) Certifying that said power-of-attorney appointment is in full force and effect,

the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof."

I, Christine Mead, Secretary of **SAFECO INSURANCE COMPANY OF AMERICA** and of **GENERAL INSURANCE COMPANY OF AMERICA,** do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power of Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power of Attorney are still in full force and effect.

**IN WITNESS WHEREOF,** I have hereunto set my hand and affixed the facsimile seal of said corporation

this 19th day of June, 2006

SAFECO INSURANCE COMPANY OF AMERICA CORPORATE SEAL 1953 STATE OF WASHINGTON

GENERAL INSURANCE COMPANY OF AMERICA CORPORATE SEAL 1923 State of Washington

CBMead
**CHRISTINE MEAD, SECRETARY**

S-0974/SAEF 2/01

**Southern Company Services, Inc.**
30 Ivan Allen Jr. Boulevard NW
Atlanta, Georgia 30308

SOUTHERN COMPANY
*Energy to Serve Your World®*

June 30, 2006

Mr. Tony McCook
Georgia Geologic Survey
19 Martin Luther King Jr. Dr. SW
Room 400
Atlanta, GA 30334

**RE: Performance Bond for Water Well Contractors and Drillers**
**Safeco Bond #4993104**

Attached is the original signed Continuation Certificate for the above referenced bond on behalf of Southern Company Services, Inc. This certificate keeps this bond in force until June 30, 2007.

Please let us know if you need additional information.

Best Regards,

Annie Jackson

Annie Jackson
Southern Company Services, Inc.
Risk Management Department

/aj

Enclosure

cc: Alan Garrard, SCS

PERFORMANCE BOND FOR WATER WELL CONTRACTORS

AND DRILLERS Bond No. 4993104

WATER WELL CONTRACTOR OR DRILLER ______________________________

KNOW ALL MEN BY THESE PRESENTS.

That we SOUTHERN COMPANY SERVICES, INC., as Principal, and SAFECO INSURANCE COMPANY OF AMERICA, as Surety, are held and firmly bound unto the Director of the Environmental Protection Division ("Director"), Department of Natural Resources, State of Georgia and his successor or successors in office, as Obligee, in the full sum of TEN THOUSAND & No/100 Dollars ($10,000.00 ), for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Water Well Standards Act of 1985 (Ga. Laws 1985, p. 1192) (the "Act") requires that water well contractors and drillers file performance bonds with the Director to ensure compliance with the Act; and

WHEREAS, the above bound principal is subject to the terms and provisions of said Act.

NOW, THEREFORE, the conditions of this obligation are such that if the above bound Principal shall fully and faithfully perform the duties and in all things comply with the procedures and standards set forth in the Act as now or hereafter amended, and the rules and regulations promulgated pursuant thereto, including but not limited to the correction of any violation of such procedures and standards upon discovery, irrespective of whether such discovery is made before completion of any well subject to this bond, then this obligation shall be void; otherwise of full force and effect.

And Surety, for value received, agrees that no amendment to existing laws, rules or regulations, or adoption of new laws, rules or regulations shall in any way discharge its obligation on this bond, and does hereby waive notice of any such amendment, adoption, or modification.

This bond shall be effective from date of issuance or, in the case of a water well contractor, date of licensure and shall continue in effect until terminated by expiration, mutual agreement or cancellation upon 60 days written notice to Principal and Obligee; provided that the rights of the Obligee and beneficiaries under this bond which arose prior to such termination shall continue.

Unless sooner terminated, this bond shall terminate June 30, 2006

IN WITNESS WHEREOF the Principal and Surety have caused these presents to be duly signed and sealed, this 15th day of April, 2003.



SOUTHERN COMPANY SERVICES, INC.

SAFECO®

POWER
OF ATTORNEY

SAFECO INSURANCE COMPANY OF AMERICA
GENERAL INSURANCE COMPANY OF AMERICA
HOME OFFICE: SAFECO PLAZA
SEATTLE, WASHINGTON 98185

No. 6724

KNOW ALL BY THESE PRESENTS:

That **SAFECO INSURANCE COMPANY OF AMERICA** and **GENERAL INSURANCE COMPANY OF AMERICA**, each a Washington corporation, does each hereby appoint
*SANDRA S. CARTER; JUDY GAY CERA; GARY D. EKLUND; JUDY S. FLEMING; VIRGINIA B. MCMANUS; BARBARA S. MACARTHUR; EDWARD L. MITCHELL; NANCY NIX; BARBARA THOMPSON; CYNTHIA I. RUDOLPH; LAUREL D. HUSS; Atlanta, Georgia********************************************************************

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, **SAFECO INSURANCE COMPANY OF AMERICA** and **GENERAL INSURANCE COMPANY OF AMERICA** have each executed and attested these presents

this 14th day of November, 2001.

R A Pierson
R.A. PIERSON, SECRETARY

Mike McGavick
MIKE MCGAVICK, PRESIDENT

## CERTIFICATE

Extract from the By-Laws of **SAFECO INSURANCE COMPANY OF AMERICA**
and of **GENERAL INSURANCE COMPANY OF AMERICA:**

"Article V, Section 13. - FIDELITY AND SURETY BONDS ... the President, any Vice President, the Secretary, and any Assistant Vice President appointed for that pur[illegible] by the officer in charge of surety operations, shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to [illegible] on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business... On any [illegible]ment making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

Extract from a Resolution of the Board of Directors of **SAFECO INSURANCE COMPANY OF AMERICA**
and of **GENERAL INSURANCE COMPANY OF AMERICA** adopted July 28, 1970.

"On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

(i) The provisions of Article V, Section 13 of the By-Laws, and
(ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
(iii) Certifying that said power-of-attorney appointment is in full force and effect,

the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof."

I, R.A. Pierson, Secretary of **SAFECO INSURANCE COMPANY OF AMERICA** and of **GENERAL INSURANCE COMPANY OF AMERICA**, do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power of Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power of Attorney are still in full force and effect.

**IN WITNESS WHEREOF,** I have hereunto set my hand and affixed the facsimile seal of said corporation

this 15th day of April, 2003

SAFECO INSURANCE COMPANY OF AMERICA
CORPORATE SEAL 1953
STATE OF WASHINGTON

GENERAL INSURANCE COMPANY OF AMERICA
CORPORATE SEAL 1923
State of Washington

R A Pierson
R.A. PIERSON, SECRETARY

S-0974/SAEF 2/01

SOUTHERN COMPANY
*Energy to Serve Your World*

# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-1
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 54.2' | SURF.ELEV. | 847.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238147.8 | E | 2023921.8 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 8 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 78% | WATER TABLE DEPTH | 31.2' |
| ELEV. | | TIME AFTER COMP. | 24 hrs | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/12/2006 | DRILLER | M. Hughes | RECORDER | Filipovich/Grissom |
| APPROVED | | DRILLING COMP. DATE | 10/17/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 847.70 | Topsoil to 0.5' | | | | | | | |
| 1 | | Red/brown sandy CLAY (CL) with abundant mica flecks, dry | 1 | 0-1.5 | 4-4-8 | 12 | Bulk sample taken at 1.0 - 2.0 feet PL-26, PI-21 gravel - 1.4% sand - 32.1% silt - 25.3% clay - 41.2% | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Yellow brown silty sand to sandy SILT (ML) with abundant mica flecks, dry | 2 | 4-5.5 | 6-10-11 | 21 | Bulk sample taken at 3.0 to 4.0 feet nonplastic gravel - 0.5% sand - 49.4% silt - 35.6% clay - 14.5% | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA, reddish brown & yellow | 3 | 9-10.5 | 3-4-5 | 9 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Orange brown, fairly dry, slightly sandy SILT with trace of black minerals | 4 | 14-15.5 | 2-2-4 | 6 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Brown & tan, moist, sandy SILT with abundant mica (relic bedding) | 5 | 19-20.5 | 2-4-6 | 10 | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

**SOUTHERN COMPANY**
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-1


SITE: Plant Wansley | TOTAL DEPTH: 54.2' | SURF.ELEV.: 8-

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test: From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Orange brown to brown, moist, slightly silty fine SAND (ML) with some mica | 6 | 24-25.5 | 3-3-4 | 7 | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | SAA, less orange | 7 | 29-30.5 | 2-2-4 | 6 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Dark burgundy to brown, moist, silty Saprolite | 8 | 34-35.5 | 43-43-50 | 93 | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | Auger refusal @ 38.9' | | | | | | | |
| 40 | | Begin coring @ 39.2' | | | | | | | |
| 41 | | Gray to white, weathered GNEISS abundant pyrite growths and iron staining along fractures, calcite laminations, qtz veins | | | | | | | |
| 42 | | | | 39.2-44.2 | | | 2.3/5.0 | 46 | 0 |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | 44.2-49.2 | | | 4.7/5.0 | 94 | 100 |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | 49.2-54.2 | | | 4.8/5.0 | 96 | 50 |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | BOH @ 54.2' | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-2
Sheet 1 of 2

SITE: Plant Wansley | HOLE DEPTH: 45.7' | SURF.ELEV.: 834.2

LOCATION: Gypsum Storage Facility | COORDINATES N: 1237856.2 | E: 2024760.5

ANGLE: | BEARING: | CONTRACTOR: SCS | DRILL NO.: CME 550

DRILLING METHOD: HSA/HQ Core | NO. SAMPLES: 5 | NO. U.D. SAMPLES: 0

CASING SIZE: | LENGTH: | CORE SIZE: HQ | TOTAL % REC.: 77%

WATER TABLE DEPTH: | ELEV.: | TIME AFTER COMP.: | DATE TAKEN:

TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 10/23/2006

DRILLER: S. Milan | RECORDER: Bearce/Hartsfield | APPROVED: | DRILLING COMP. DATE: 10/24/2006

0.0

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 834.20 | | | | | | | | |
| 1 | | | | | | | Bulk sample taken at 1.0-2.5 feet | | |
| 2 | | Reddish brown and brown very silty fine SAND | 1 | 1-2.5 | 4-5-7 | 12 | LL-47 PI-21 gravel - 1.4% sand - 32.1% | | |
| 3 | | | | | | | silt - 25.3% clay - 41.2% | | |
| 4 | | | | | | | Bulk sample taken 3.0-4.0 feet | | |
| 5 | | Pale orange silty fine SAND, hard, dry | 2 | 4.5-6 | 5-7-8 | 15 | non-plastic gravel - 0.5% sand - 49.4% | | |
| 6 | | | | | | | silt - 35.6% clay - 14.5% | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA | 3 | 9.5-11 | 6-8-13 | 21 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA | 4 | 14.5-16 | 5-5-7 | 12 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Tan silty fine SAND, relic bedding | 5 | 19.5-21 | 5-10-50/4 | | | | |
| 21 | | | | | | | | | |
| 22 | | Start coring at 21.2' | | | open fracture | | 4.0/4.5 | | |
| 23 | | Biotite GNEISS, pink & black with phenoblasts of feldspar | | 21.2-25.7 | | | lost water @ 22' never regained circulation | 88 | 90 |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-2
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 45.7' SURF.ELEV. 83-

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | SAA | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | 25.7-30.7 | | | 4.9/5.0 | 98 | 69 |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | 30.7-35.7 | | | 3.8/5.0 | 76 | 79 |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | SAA | | | | | | | |
| 37 | | Smokey quartz vein<br>Biotite GNEISS | | | | | | | |
| 38 | | | | 35.7-40.7 | | | 1.5/5.0 | 30 | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | Biotite GNEISS | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | 40.7-45.7 | | | 4.8/5.0 | 96 | 95 |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | BOH @ 45.7' | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
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| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-3


| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 50' | SURF.ELEV. | 803.2 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238337.1 | E | 2024864.7 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | | | | |
| DRILLING METHOD | HSA | NO. SAMPLES | 11 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | |
| TOTAL % REC. | | | | | |
| WATER TABLE DEPTH | 27.0' | ELEV. | | TIME AFTER COMP. | TOD |
| DATE TAKEN | 10/20/2006 | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/23/2006 | | | | |
| DRILLER | M. Hughes | RECORDER | K. Hobbs | APPROVED | |
| DRILLING COMP. DATE | 10/23/2006 | | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 803.20 | | | | | | | | |
| 1 | | Reddish brown SILT, soft | 1 | 0-1.5 | 2-2-2 | 4 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | 2 | 3.5-5 | 5-7-10 | 17 | | | |
| 5 | | Reddish brown SILT, medium stiff | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | Red brown SILT, slightly damp, soft | 3 | 8.5-10 | 2-2-3 | 5 | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | SAA | 4 | 13.5-15 | 2-4-3 | 7 | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | SAA/relic banding | 5 | 18.5-20 | 2-2-4 | 6 | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-3



SITE Plant Wansley | TOTAL DEPTH 50' | SURF.ELEV. 803.2

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Wet yellowish orange, sandy SILT, relic banding with dark staining, medium stiff | 6 | 23.5-25 | 2-4-4 | 8 | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | Clayey sandy SILT, medium stiff, saturated | 7 | 28.5-30 | 2-2-4 | 6 | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | SAA, soft, medium stiff | 8 | 33.5-35 | 2-2-3 | 5 | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | SAA, medium stiff | 9 | 38.5-40 | 2-4-6 | 10 | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | Light brown, mika flakes, saturated, SILT, very soft | 10 | 43.5-45 | (dropped) | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | SAA, medium stiff | 11 | 48.5-50 | 2-3-4 | 7 | | | |
| 50 | | | | | | | | | |
| 51 | | Boring terminated at 50' | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-4
Sheet 1 of 2

SITE Plant Wansley HOLE DEPTH 35.5' SURF.ELEV. 805.9
LOCATION Gypsum Storage Facility COORDINATES N 1238570.9 E 2025555.3
ANGLE BEARING CONTRACTOR SCS DRILL NO. CME 550
DRILLING METHOD HSA/HQ Coring NO. SAMPLES 4 NO. U.D. SAMPLES 2
CASING SIZE LENGTH CORE SIZE HQ TOTAL % REC. 95%
WATER TABLE DEPTH ELEV. TIME AFTER COMP. DATE TAKEN
TYPE GROUT QUANTITY MIX DRILLING START DATE 10/24/2006
DRILLER S. Milam RECORDER K. Hobbs APPROVED DRILLING COMP. DATE 10/24/2006

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 805.90 | | | | | | | | |
| 1 | | Reddish brown sandy SILT, medium stiff | | | | | | | |
| 2 | | | 1 | 1-2.5 | 4-4-6 | 10 | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | UD taken @ 3.0-5.0 feet in offset hole | | |
| 5 | | Buff sandy SILT,Relic banding & feldspar crystals stiff | 2 | 4.5-6 | 5-7-11 | 18 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Buff sandy SILT, relic banding with dark oxidation stains, stiff | 3 | 9.5-11 | 6-9-9 | 18 | UD taken @ 10.0-12.0 feet in offset hole | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA, saprolite, hard | 4 | 14.5-16 | 3-7-50/4 | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | Begin Coring<br>Gray/pink GNEISS with quartz, mica, feldspar banding some large feldspar crysals, highly weathered, red oxidation stains on large fractures | | 17-21.7 | | | coarse-grained granitic | 85 | 71 |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | SAA, highly fractured, heavy iron staining | | | | | | | |
| 23 | | | | 21.7-25.5 | | | | 100 | 50 |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-4



SITE Plant Wansley  TOTAL DEPTH 35.5'  SURF.ELEV. 80[illegible]

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Gray/pink GNEISS, banding of quartz, mica, feldspar | | 21.7-25.5 | | | | 100 | 50 |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | SAA | | 25.5-30.5 | | | | 94 | 74 |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | SA, highly fractured, heavy iron staining | | 30.5-35.5 | | | | 100 | 36 |
| 34 | | | | | | | | | |
| 35 | | BOH @ 35.5' | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
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Form GS9901 7-26-2004

# DRILLING LOG
## GEOLOGICAL SERVICES

SOUTHERN COMPANY
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Hole No. GS-5
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 31.6' | SURF.ELEV. | 773.1 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238797.0 | E | 2026220.1 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 3 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 100% | WATER TABLE DEPTH | |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/22/2006 | DRILLER | M. Hughes | RECORDER | K. Hobbs/Bearce |
| APPROVED | | DRILLING COMP. DATE | 10/22/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 773.10 | | | | | | | | |
| 1 | | SILT, buff., gravel interlayers | 1 | 0-0.5 | 50/5 | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | Yellowish orange silty SAND | 2 | 5-5.5 | 50/5 | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA | 3 | | 38-50/1 | | | | |
| 11 | | Begin Coring | | | | | | | |
| 12 | | Light gray, hard GNEISS with large feldspar crystals and banding of quartz, micas and feldspar. | | | | | | | |
| 13 | | very fractured | | 10-14.4 | | | | 100 | 85 |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | SAA with Fe, Mn oxides on larger vertical fracture faces | | 14.4-19.4 | | | | 100 | 72 |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | SAA | | 19.4-24.4 | | | | 100 | 72 |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-5
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 31.6' SURF.ELEV. 773.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | Gray/pink GNEISS with large feldspar crystals, banded quartz, feldspar and mica, Fe/Mn oxides on all fracture faces | | 24.4-29.4 | | | | 100 | 92 |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA | | 29.4-31.6 | | | | 100 | 100 |
| 32 | | BOH @ 31.6' | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
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Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-6
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 41.5' | SURF.ELEV. | 767.1 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238189.4 | E | 2026022.5 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 9 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | 20.5' |
| ELEV. | | TIME AFTER COMP. | TOD | DATE TAKEN | 10/21/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/21/2006 | DRILLER | M. Hughes | RECORDER | T. Hartsfield |
| APPROVED | | DRILLING COMP. DATE | 10/22/2006 | | |

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 767.10 | | | | | | | | |
| | 1 | | Dark reddish brown sandy SILT | 1 | 0-1.5 | 2-3-3 | 6 | | | |
| | 2 | | | | | | | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | | | | | | | | |
| | 6 | | SAA with dark minerals | 2 | 5-6.5 | 3-4-4 | 8 | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | | | | | | | | |
| | 11 | | Brown SILT | 3 | 10-11.5 | 3-2-3 | 5 | | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | | | | | | | | |
| | 16 | | Gray brown SILT with relic bedding, damp, contains mica and black minerals | 4 | 15-16.5 | 3-2-4 | 6 | | | |
| | 17 | | | | | | | | | |
| | 18 | | | | | | | | | |
| | 19 | | | | | | | | | |
| | 20 | | | | | | | | | |
| | 21 | | Saprolite, very micaceous | 5 | 20-21.5 | 3-4-4 | 8 | | | |
| | 22 | | | | | | | | | |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-6
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 41.5' SURF.ELEV. 767.?

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | SAA | 6 | 25-26.5 | 8-26-45 | 71 | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA (saprolite) | 7 | 30-31.5 | 6-12-11 | 23 | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | Saprolite contains quartz crystals (1/8") and bands of orange-brown silt | 8 | 35-36.5 | 11-13-27 | 40 | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | Saprolite, contains feldspar and dark brown staining<br>BOH @ 41.5' | 9 | 40-41.5 | 14-30-50 | 80 | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-7
Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 66.5' | SURF.ELEV. | 794.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237419.6 | E | 2025643.0 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 14 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | 44.7' |
| ELEV. | | TIME AFTER COMP. | 24 hrs. | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/11/2006 | DRILLER | M. Hughes | RECORDER | R. Mudd |
| APPROVED | | DRILLING COMP. DATE | 10/11/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 794.70 | Surface raked by bulldozer | | | | | | | |
| 1 | | Red slightly sandy SILT<br>Sand portion is medium & appears to be highly weathered rock, very stiff, moist | 1 | 0-1.5 | 6-8-9 | 17 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Reddish brown elastic SILT with sand (MH); weathered rocks larger - size of small to medium very angular pebbles | 2 | 4.5-6 | 7-11-15 | 26 | LL-58<br>PI-26<br>gravel - 0.3%<br>sand - 21.2%<br>silt - 29.6%<br>clay - 48.9% | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA | 3 | 9.5-11 | 2-8-14 | 22 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Reddish brown elastic SILT with sand (MH); with interbedded layers of a yellowish clay of same nature as above - less weathered rock | 4 | 14.5-16 | 3-4-8 | 12 | LL-53<br>PI-8<br>gravel 0.6%<br>sand - 29.1%<br>silt - 45.9%<br>clay - 24.4% | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Red, very clayey SILT,<br>with very thin layers of extremely friable black rock, medium to stiff, slightly moist | 5 | 19.5-21 | 2-4-5 | 9 | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-7


SITE Plant Wansley TOTAL DEPTH 66.5' SURF.ELEV. 794.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | SAA. with feldspar | 6 | 24.5-26 | 4-4-7 | 11 | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Light red, white, black clayey weathered rock with large pebble sized pieces of intact rock quartz - like in appearance, stiff | 7 | 29.5-31 | 2-4-7 | 11 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Mottled pink, white, yellow & black sandy SILT (ML) with very small angular pebbles (weathered rock), black material makes a "C" shape in x-section, wet, medium stiff | 8 | 34.5-36 | 1-2-3 | 5 | non-plastic<br>gravel - 1.0%<br>sand - 39.4%<br>silt - 44.2%<br>clay - 15.4% | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Saprolite with<br>Orangish tan clayey SILT with 3" layer grayish white clayey SILT interbedded - very distinct layering, some iron staining on white, moist, very stiff | 9 | 39.5-41 | 5-5-13 | 18 | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | Dark brown, black & white interbedded micaceous saprolite - heavily weathered, moist | 10 | 44.5-46 | 5-7-22 | 29 | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | SAA - wet | 11 | 49.5-51 | 9-15-34 | 49 | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | SAA, more weathered, very little intact rock, very wet | 12 | 54.5-56 | 8-29-40 | 69 | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-7


SITE Plant Wansley | TOTAL DEPTH 66.5' | SURF.ELEV. 794.7

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | | | | | | | | |
| 61 | | SAA | 13 | 59.6-61 | 11-31-46 | 77 | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | SAA<br>BOH @ 66.5' | 14 | 64.5-66 | 14-31-50 | 81 | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | | | | | | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
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| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-8
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 37.4 | SURF.ELEV. | 766.5 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237314.2 | E | 2026576.3 |
| ANGLE | | BEARING | | CONTRACTOR | SCS | DRILL NO. | CME 550 |
| DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 4 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | HQ | TOTAL % REC. | 97% |
| WATER TABLE DEPTH | 15.1' | ELEV. | | TIME AFTER COMP. | 24 hrs | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | | DRILLING START DATE | 10/12/2006 |
| DRILLER | S. Milam | RECORDER | R. Mudd | APPROVED | | DRILLING COMP. DATE | 10/12/2006 |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 766.50 | | | | | | | | |
| 1 | | Red SILT, dry, medium stiff | 1 | 0-1.5 | 3-4-4 | 8 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | SAA, slightly moist, stiff | | | | | | | |
| 6 | | | 2 | 4.5-6 | 5-5-7 | 12 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | 6" red SILT, with medium angular pebbles (black) | | | | | | | |
| 11 | | 6" white powdery very fine sandy SILT | 3 | 9.5-11 | 3-8-9 | 17 | | | |
| 12 | | 6" dark green to black CLAY, with distinct layering, some weathered rock at bottom of sample | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Red sandy SILT (ML) with medium angular pebbles, last 6" white & gray layers of very friable weathered rock - breaks down to silt | 4 | 14.5-16 | 13-8-5 | 13 | | | |
| 16 | | | | | | | | | |
| 17 | | Begin Coring @ 16.3' | | | | | | | |
| 18 | | Highly fractured/weathered dark gray interbedded GNEISS/SCHIST with 40 deg fracture - some pyrite flecks on the more weathered material | | | | | | | |
| 19 | | | | 16.7-20.2 | | | | 85 | 0 |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | Light gray interbedded SCHIST/GNEISS; fractured 40 deg bedding | | | | | | | |
| 23 | | | | 20.2-25.2 | | | | 100 | 72 |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-8
Sheet 2 of 2

SITE: Plant Wansley | TOTAL DEPTH: 37.4 | SURF.ELEV. 766.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | SAA - | | 25.2-30.2 | | | | 100 | 90 |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | SAA - | | 30.2-35.2 | | | | 100 | 100 |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | SAA | | 35.2-37.4 | | | | 100 | 0 |
| 38 | | BOH @ 37.4' | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
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| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-9
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 35.5' | SURF.ELEV. | 772.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237640.6 | E | 2027036.9 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 4 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 87% | WATER TABLE DEPTH | 18.0' |
| ELEV. | | TIME AFTER COMP. | TOD | DATE TAKEN | 10/17/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/12/2006 | DRILLER | S. Milam | RECORDER | R. Mudd |
| APPROVED | | DRILLING COMP. DATE | 10/17/2006 | | |

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 772.70 | | | | | | | | |
| | 1 | | Light tan clayey SAND, very stiff, very dry | 1 | 0-1.5 | 10-13-15 | 28 | | | |
| | 2 | | | | | | | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | SAA | 2 | 4.5-6 | 31-18-22 | 40 | | | |
| | 6 | | | | | | | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | Red SILT, moist, medium stiff | 3 | 9.5-11 | 5-4-5 | 9 | | | |
| | 11 | | White powdery SILT, dry, medium stiff | | | | | | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | Light Tan clayay SAND, very stiff, dry<br>Auger refusal 15' | 4 | 14.5-16 | 50/1" | ref | | | |
| | 16 | | Begin coring @ 15.5' | | | | | | | |
| | 17 | | | | | | | | | |
| | 18 | | Medium gray, slightly weathered interbedded GNEISS and SCHIST | | 15.5-20.5 | | | | 48 | 60 |
| | 19 | | | | | | | | | |
| | 20 | | | | | | | | | |
| | 21 | | | | | | | | | |
| | 22 | | | | 20.5-25.5 | | | | 100 | 95 |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-9
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 35.5' SURF.ELEV. 772

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Dark gray augen GNEISS, slightly weathered | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | 25.5-30.5 | | | | 100 | 85 |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | Hard, competent | | 30.5-35.5 | | | | 100 | 100 |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | BOH @ 35.5' | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
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| 46 | | | | | | | | | |
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| 56 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-10
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 51.8' | SURF.ELEV. | 761.4 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238583.6 | E | 2027008.5 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Coring | NO. SAMPLES | 7 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 94% | WATER TABLE DEPTH | 33.65 |
| ELEV. | | TIME AFTER COMP. | 24 hrs | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/20/2006 | DRILLER | M. Hughes | RECORDER | T. Hartsfield |
| APPROVED | | DRILLING COMP. DATE | 10/20/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 761.40 | | | | | | | | |
| 1 | | Dark reddish brown SILT with clay, white sandy lenses and pebbles | 1 | 0-1.5 | 1-1-3 | 4 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Stiff reddish brown SILT | | | | | | | |
| 6 | | | 2 | 4.5-6 | 4-6-10 | 16 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Saprolite, micaceous | | | | | | | |
| 11 | | | 3 | 9.5-11 | 5-15-20 | 35 | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA | | | | | | | |
| 16 | | | 4 | 14.5-16 | 5-10-11 | 21 | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Saprolite and weathered rock | | | | | | | |
| 21 | | | 5 | 19.5-21 | 50/5 | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

0.0

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-10



SITE Plant Wansley TOTAL DEPTH 51.8' SURF.ELEV. 76

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Saprolite | 6 | 24.5-26 | 23-23-18 | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Rock fragments | 7 | 29.5-30 | 50/5 | | | | |
| 31 | | Begin coring @ 30'<br>Gray mica SCHIST with garnet and quartz throughout, slightly weathered along fractures | | 30-34.3 | | | | 70 | 40 |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | 34.3-39.3 | | | | 100 | 50 |
| 37 | | | | | | | | | |
| 38 | | Fresher with less weathering along fractures | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | 39.3-44.3 | | | | 100 | 85 |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | 44.3-49.3 | | | | 100 | 88 |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | 49.3-51.8 | | | | 100 | 80 |
| 52 | | BOH @ 51.8' | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
*Energy to Serve Your World*

# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-11



SITE Plant Wansley HOLE DEPTH 61.0' SURF.ELEV. 773.9

LOCATION Gypsum Storage Facility COORDINATES N 1239140.5 E 2027081.8

ANGLE BEARING CONTRACTOR SCS DRILL NO. CME 550

DRILLING METHOD HSA NO. SAMPLES 13 NO. U.D. SAMPLES 0

CASING SIZE LENGTH CORE SIZE TOTAL % REC.

WATER TABLE DEPTH 39.3' ELEV. TIME AFTER COMP. TOD DATE TAKEN

TYPE GROUT QUANTITY MIX DRILLING START DATE

DRILLER S. Milam RECORDER K. Hobbs APPROVED DRILLING COMP. DATE

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 773.90 | | | | | | | | |
| | 1 | | | | | | | | | |
| | 2 | | Reddish brown elastic SILT with SAND (MH), soft | 1 | 1-2.5 | 2-2-3 | 5 | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | UD taken @ 3.0-5.0 feet in offset hole LL-51 PI-17 | | |
| | 5 | | | | | | | | | |
| | 6 | | Reddish brown SILT (ML), stiff | 2 | 4.5-6 | 3-7-11 | 18 | gravel - 0.3% sand - 26.4% silt - 32.9% clay - 40.4% | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | Buff. Hard SILT (ML) with mica flakes, saprolite | 3 | 9.5-11 | 22-50/2 | ref | UD taken @ 10.0 - 12.0 feet in offset hole non-plastic sand - 48.7% silt - 42.6% clay - 8.7% | | |
| | 11 | | | | | | | | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | Light brown/reddish SILT (ML) with dark fractures, some quartz in fractures | 4 | 14.5-16 | 2-4-5 | 9 | | | |
| | 16 | | | | | | | | | |
| | 17 | | | | | | | | | |
| | 18 | | | | | | | | | |
| | 19 | | | | | | | | | |
| | 20 | | SAA | 5 | 19.5-21 | 3-3-5 | 6 | | | |
| | 21 | | | | | | | | | |
| | 22 | | | | | | | | | |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-11



SITE Plant Wansley TOTAL DEPTH 61.0' SURF.ELEV. 77

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Reddish brown SILT with mica flakes, medium stiff | 6 | 24.5-26 | 3-4-7 | 11 | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | SAA | 7 | 29.5-31 | 0-5-4 | 9 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | SAA | 8 | 34.5-36 | 3-4-4 | 8 | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | SAA very moist | 9 | 39.5-41 | 2-3-4 | 7 | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | Yellowish orange SILT, very stiff with fractures and dark stains on fractures | 10 | 44.5-46 | 9-14-31 | 45 | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | Yellowish orange SILT, hard, with relic banding | 11 | 49.5-51 | 11-29-50/3 | ref | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | SAA | 12 | 54.5-56 | 41-50/3 | ref | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-11
Sheet 3 of 3

SITE Plant Wansley TOTAL DEPTH 61.0' SURF.ELEV. 773.9

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | Yellowish orange SILT with mica flakes | 13 | 59.5-61 | | | | | |
| 61 | | BOH @ 61' | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | | | | | | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-12


| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 81.0' | SURF.ELEV. | 773.2 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1239064.2 | E | 2027471.4 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 17 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | 58.7' |
| ELEV. | | TIME AFTER COMP. | 24 hrs | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/19/2006 | DRILLER | S. Milam | RECORDER | A. Grissom |
| APPROVED | | DRILLING COMP. DATE | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 773.20 | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | Reddish brown, clayey, slightly sandy SILT, very stiff | 1 | 1.0-2.5 | 7-8-8 | 16 | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Very firm, layered light gray/yellow/red, dry, sandy silty highly weathered rock Saprolite | 2 | 4.5-6 | 13-10-11 | 21 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA | 3 | 9.5-11 | 10-19-27 | 46 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA with some mica | 4 | 14.5-16 | 10-18-32 | 50 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Very dense, layered light gray to red to black, dry, sandy silty highly weathered Saprolite with gneissic banding and minerals | 5 | 19.5-21 | 13-28-50/4 | ref | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-12
Sheet 2 of 3

SITE Plant Wansley TOTAL DEPTH 81.0' SURF.ELEV. 77

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | SAA with mica layers | 6 | 24.5-26 | 50/4 | ref | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | SAA, with mica | 7 | 29.5-31 | 50/4 | ref | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | SAA, more silty | 8 | 34.5-36 | 0-4-5 | 9 | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Firm, layers of orange/red/black, dry, silty sandy highly weathered Saprolite with small mica flakes | 9 | 39.5-41 | 3-6-8 | 14 | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | SAA | 10 | 44.5-46 | 31-10-8 | 18 | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | Very dense, layers of brown/red/orange/black and mica, dry, sandy silty highly weathered Saprolite (abundant mica) | 11 | 49.5-51 | 11-30-31 | 61 | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | SAA plus ~4" of weathered quartz | 12 | 54.5-56 | 6-6-11 | 17 | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-12


SITE Plant Wansley TOTAL DEPTH 81.0' SURF.ELEV. 773.2

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | Very dense, layered red/orange/brown/black, fairly dry, sandy silty weathered Saprolite and mica with several large rock fragments | 13 | 59.5-61 | 11-26-46 | 72 | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | SAA | 14 | 64.5-66 | 12-50/4 | ref | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | SAA | 15 | 69.5-71 | 22-50/4 | ref | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | Light brown /grey hard, dry Saprolite with banding | 16 | 74.5-76 | 19-50/4 | ref | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | SAA, very stiff | 17 | 79.5-81 | 6-9-12 | 21 | | | |
| 81 | | | | | | | | | |
| 82 | | BOH @ 81' | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-13
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 37.5' | SURF.ELEV. | 780.6 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237295.0 | E | 2027246.4 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 3 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 100% | WATER TABLE DEPTH | 16.7' |
| ELEV. | | TIME AFTER COMP. | 24 hrs. | DATE TAKEN | 10/10/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/10/2006 | DRILLER | M. Hughes | RECORDER | R. Mudd |
| APPROVED | | DRILLING COMP. DATE | 10/10/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 780.60 | | | | | | | | |
| 1 | | Light reddish brown elastic SILT with sand (MH), dry, soft | 1 | 0-1.5 | 2-3-1 | 4 | Bulk sample taken at 1.5-3.0 feet LL-50 PI-17 sand - 21.5% silt - 32.2% clay - 46.3% | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Red micaceous sandy SILT (ML), moist, medium to stiff | 2 | 4.5-6 | 3-3-6 | 9 | non-plastic sand - 40.9% silt - 39.1% clay - 20.0% | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Reddish brown & black micaceous SILT, moist, medium to stiff - flakes apart along planes relict bedding | 3 | 9.5-11 | 2-2-7 | 9 | | | |
| 11 | | | | | | | | | |
| 12 | | TOR @ 12.5' | | | | | | | |
| 13 | | Grey to greenish grey, hard interbedded GNEISS and SCHIST with abundant pyrite | | 12.5-14 | | | 1.5/1.5 | 100 | 90 |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | SAA, rust - water | | 14-19 | | | 5/5 | 100 | 94 |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | SAA | | 19-24 | 4.7/5 | | | 100 | 88 |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES



SITE Plant Wansley TOTAL DEPTH 37.5' SURF.ELEV. 78

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Grey to greenish grey, hard fresh GNEISS | | 24-29 | 5/5 | | | 100 | 84 |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA | | 29-32.5 | 3.5/3.5 | | | 100 | 50 |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | SAA | | 32.5-37.5 | 5/5 | | | 100 | 85 |
| 36 | | | | | | | | | |
| 37 | | BOH @ 37.5' | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-14
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 44.5' | SURF.ELEV. | 737.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1239460.6 | E | 2028315.3 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 2 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 93% | WATER TABLE DEPTH | 20.4' |
| ELEV. | | TIME AFTER COMP. | TOD | DATE TAKEN | 10/19/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/18/2006 | DRILLER | S. Milam | RECORDER | A. Grissom |
| APPROVED | | DRILLING COMP. DATE | 10/19/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 737.70 | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | No recovery | 1 | 1-2.5 | 25-50/4 | ref | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Medium gray to dark brown, fairly dry, Saprolite | 2 | 4.5-6 | 50/4 | ref | | | |
| 6 | | | | | | | | | |
| 7 | | Begin Coring @ 6.5' | | | | | | | |
| 8 | | Dark to medium gray, weathered interbedded GNEISS and SCHIST; steep fractures; heavy iron staining; v. low recovery | | 6.5-9.5 | | | 3.0/0.8 | 26 | 0 |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | 9.5-14.5 | | | 5.0/1.3 | 26 | 0 |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | Reamed casing from 6.5' to 25' Restarted coring at 25' | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-14



SITE Plant Wansley | TOTAL DEPTH 44.5' | SURF.ELEV. 737

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Dark gray, slightly weathered GNEISS; v. fractured heavy iron staining; Becomes light gray to almost white around 28', | | 25-29.5 | | | 4.5/4.0 | 88 | 0 |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | SAA | | 29.5-34.5 | | | 5.0/4.5 | 90 | 20 |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | SAA | | 34.5-39.5 | | | 5.0/5.0 | 100 | 50 |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | extremely weathered zone from 42 - 42.5' | | 39.5-44.5 | | | 5.0/4.7 | 94 | 35 |
| 43 | | | | | | | | | |
| 44 | | BOH @ 44.5' | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
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Form GS9901 7-26-2004

SOUTHERN COMPANY
*Energy to Serve Your World*

# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-15


SITE Plant Wansley HOLE DEPTH 41.3' SURF.ELEV. 719.7
LOCATION Gypsum Storage Facility COORDINATES N 1239617.3 E 2028782.9
ANGLE BEARING CONTRACTOR SCS DRILL NO. CME 550
DRILLING METHOD HSA/HQ Core NO. SAMPLES 5 NO. U.D. SAMPLES 0
CASING SIZE LENGTH CORE SIZE HQ TOTAL % REC. 97%
WATER TABLE DEPTH 18.0' ELEV. TIME AFTER COMP. 24 hrs DATE TAKEN
TYPE GROUT QUANTITY MIX DRILLING START DATE 10/19/2006
DRILLER M. Hughes RECORDER A. Grissom APPROVED DRILLING COMP. DATE

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 719.70 | Topsoil to 0.5' | | | | | | | |
| 1 | | Stiff, reddish brown, fairly dry, slightly sandy SILT with few pebbles | 1 | 0-1.5 | 3-5-6 | 11 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Stiff, red and yellowish orange mottled, fairly dry, SILT | 2 | 4.5-6 | 3-5-6 | 11 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Soft, orange brown, slightly moist, clayey SILT with trace of pebbles | 3 | 9.5-11 | 1-1-1 | 2 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Stiff, light tannish gray to red orange, slightly damp, sandy clayey SILT with lots of mica and highly decomposed rock | 4 | 14.5-16 | 1-1-10 | 11 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Dense, grayish brown, dry, silty sandy highly weathered rock (Saprolite) TOR @ 21' | 5 | 19.5-21 | 10-21-21 | 42 | | | |
| 21 | | | | | | | | | |
| 22 | | Grey to dark grey augen GNEISS with calcite laminations | | 20.7 - 23.9 | | | | 100 | 90 |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

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Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-15
Sheet 2 of 2

SITE: Plant Wansley  TOTAL DEPTH: 41.3'  SURF.ELEV. 719

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Grey to dark grey, hard augen GNEISS with calcite laminations | | 23.9-28.9 | | | | 92 | 88 |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | 28.9-33.9 | | | | 96 | 98 |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | 33.9-38.9 | | | | 100 | 85 |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | 38.9-41.3 | | | | 100 | 80 |
| 41 | | | | | | | | | |
| 42 | | BOH @ 41.3 | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
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Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-16
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 40.1' | SURF.ELEV. | 710.5 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1239205.2 | E | 2029067.9 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 6 |
| NO. U.D. SAMPLES | 2 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 97% | WATER TABLE DEPTH | 20.7' |
| ELEV. | | TIME AFTER COMP. | 24 hrs | DATE TAKEN | 10/19/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/18/2006 | DRILLER | M. Hughes | RECORDER | A. Grissom |
| APPROVED | | DRILLING COMP. DATE | 10/19/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 710.50 | Topsoil to 0.5' | | | | | | | |
| 1 | | Reddish brown, sandy slightly sandy SILT, fairly dry, firm | 1 | 0-1.5 | 1-3-5 | 8 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | UD taken @ 4.0 - 6.0 feet in offset hole | | |
| 6 | | Very stiff, reddish brown and yellowish orange mottling, fairly dry, slightly sandy SILT with trace of pebbles | 2 | 5-6.5 | 6-12-14 | 26 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | Stiff, black/brown to yellow, fairly dry, silty SAND and weathered rock (layered) | 3 | 10-11.5 | 4-5-6 | 11 | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | UD taken @ 12.0 - 14.0 feet in offset hole | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | Very loose, tan to light yellowish brown, slightly moist, silty fine grained SAND | 4 | 15-16.5 | WOH-2-2 | 4 | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | SAA, loose | 5 | 20-21.5 | 3-2-5 | 7 | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-16



SITE Plant Wansley    TOTAL DEPTH 40.1'    SURF.ELEV. 710

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Very dense, gray and dark brown layers, slightly moist, weathered rock and clayey fine sand | 6 | 25-26.5 | 26-50/3 | ref | | | |
| 27 | | Begin coring @ 26.9' | | | | | | | |
| 28 | | Medium gray, hard mica SCHIST with multiple fractures and iron stains in the first 2' with small quartzite veins | | 26.9-30.1 | | | 3.2/3.0 | 93 | 25 |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | SAA, less fractured | | 30.1-35.1 | | | 5.0/4.9 | 98 | 50 |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | 35.1-40.1 | | | 5.0/5.0 | 100 | 30 |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | BOH @ 40.1' | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
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Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-17
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 50.4' | SURF.ELEV. | 756.1 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237971.7 | E | 2027569.5 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 7 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 94% | WATER TABLE DEPTH | 21.65' |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | 10/5/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/5/2006 | DRILLER | B. Filipovich | RECORDER | I. Millet/R. Mudd |
| APPROVED | | DRILLING COMP. DATE | 10/9/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 756.10 | | | | | | | | |
| 1 | | 0.2" Topsoil<br>Red SILT with sand (MH),elastic, dry, firm, small pebbles, trace mica | 1 | 0-1.5 | 2-3-3 | 6 | | | |
| 2 | | | | | | | LL-55<br>PI-22<br>gravel - 0.3%<br>sand - 18.1%<br>silt - 40.1%<br>clay - 41.5% | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | SAA | 2 | 4-5.5 | 4-4-6 | 10 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Orange & tan sandy SILT (ML), dry, trace mica, crumbly | 3 | 9-10.5 | 2-3-4 | 7 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA, black, mottled | 4 | 14-15.5 | 1-2-3 | 5 | non-plastic | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Orange & white clayey SILT, dry, trace mica, heavy black mottled | 5 | 19-20.5 | 2-2-2 | 4 | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

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Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-17


SITE Plant Wansley TOTAL DEPTH 50.4' SURF.ELEV. 756

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | White & tan sandy silt (ML), moist, trace mica, trace residual schist form, black, mottled | 6 | 24-25.5 | 2-2-5 | 7 | non-plastic<br>sand - 42.9%<br>silt.- 51.5%<br>clay - 5.6% | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Brown & white SILT, saturated, then fractured gneiss last 1" | 7 | 29-30.5 | 6-50-6 | ref | | | |
| 31 | | TOR @ 30' - Begin Coring | | | | | | 100 | 5 |
| 32 | | Grey very weathered fractured GNEISS | | 30-33.4 | 3.4/3.4 | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | 33.4-38.4 | 4.3/5 | | | 86 | 95 |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Grey augen SCHIST hard, fresh, iron staining along fractures | | | | | | | |
| 41 | | | | 38.4-43.4 | 4.9/5 | | | 100 | 95 |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | 43.4-48.4 | 5/5 | | | 100 | 66 |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | 48.4-50.4 | 2.3/2 | | | | |
| 50 | | SAA | | | | | | 86 | 85 |
| 51 | | BOH @ 50.4' | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-18
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 32.5' | SURF.ELEV. | 731.6 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238342.8 | E | 2027638.3 |
| ANGLE | | BEARING | - | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 2 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 95% | WATER TABLE DEPTH | 15.2' |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/4/2006 | DRILLER | B. Filipovich | RECORDER | L. Millet |
| APPROVED | | DRILLING COMP. DATE | 10/5/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 731.60 | Topsoil removed by bulldozer | | | | | | | |
| 1 | | Red and Tan silty CLAY, dry | 1 | 0-1.5 | 2-5-2 | ref | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | SAA, abundant mica | 2 | 5-6.5 | 12-17-30 | 47 | | | |
| 7 | | TOR @ 7.4' | | | | | | | |
| 8 | | Begin coring | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Fractured, weathered black and white augen GNEISS, heavy iron staining, thin clay rinds in fractures, fractures ~30°, 3-6" b/t fracs | | 7.5-12.2 | | | 5.7/5.7 | 100 | 47 |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA | | 12.2-17.5 | | | 5.3/5.3 | 100 | 73 |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | Black and white fractured GNEISS, ~30° fractures, occ, thin clay rinds, no Fe stains pyrite calcite laminations | | 17.5-22.5 | | | 5/4.8 | 96 | 95 |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | SAA | | 22.5-27.5 | | | 5/4.9 | 98 | 100 |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-18
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 32.5' SURF.ELEV. 73

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | 22.5-27.5 | | | | 98 | 100 |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Black and white augen GNEISS, 3-6" b/t fractures, ~30°, epidote and pyrite in fractures | | 27.5-32.5 | | | lost circulation ~300 gallons of water used to core 32' | 100 | 60 |
| 31 | | | | | | | | | |
| 32 | | BOH @ 32.5' | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
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Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-19
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 39.2' | SURF.ELEV. | 750.0 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238392.9 | E | 2028069.8 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 3 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | HQ | TOTAL % REC. | 94% | WATER TABLE DEPTH | 17.25' |
| ELEV. | | TIME AFTER COMP. | 24 hrs. | DATE TAKEN | 9/27/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 9/27/2006 | DRILLER | B. Filipovich | RECORDER | A. Grissom |
| APPROVED | | DRILLING COMP. DATE | 9/27/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 750.00 | Topsoil 3/10' deep | | | | | | | |
| 1 | | Firm, reddish brown, fairly dry, elastic SILT with sand (MH) | 1 | 0-1.5 | 2-4-4 | 8 | Bulk sample taken' at 1.5 - 3.0 feet LL-54 PI-24 gravel - 1.1% sand - 15.2% silt - 35.7% clay - 48.0% | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | Very firm, stratified red orange to tan to olive gray, dry, sandy SILT (ML) (Saprolite) | 2 | 5-6.5 | 7-8-12 | 20 | Bulk sample taken' at 6.0 - 7.0 feet non-plastic gravel - 5.0% sand - 37.6% silt - 24.9% clay - 32.5% | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | Dense, layered dark red to greenish gray, dry, clayey SAND (SC) & Saprolite | 3 | 10-11.5 | 20-21-20 | 41 | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | Screen | | |
| 15 | | Auger refusal @ 15.2' | | | | | | | |
| 16 | | Begin coring @ 15.2' | | | | | | | |
| 17 | | Dark gray, hard, compettent GNEISS Water stains at soil rock interface Fracture with water stains 6" below TOR | | 15.2-19.2 | | | Water table at 17.25' 2.9/4 | 73 | 69 |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | 19.2-24.2 | | | 5.1/5 | 100 | 88 |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-19
Sheet 2 of 2

SITE Plant Wansley TOTAL DEPTH 39.2' SURF.ELEV. 75

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Greensh grey, hard competent GNEISS | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | 24.2-29.2 | | | 5/5 | 100 | 95 |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | 29.2-34.2 | | | 5/5 | 100 | 100 |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | 34.2-39.2 | | | 5/5 | 100 | 100 |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | BOH @ 39.2' | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-20
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 43.5' | SURF.ELEV. | 713.8 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238812.9 | E | 2028418.9 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 10 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/3/2006 | DRILLER | B. Filipovich | RECORDER | L. Millet |
| APPROVED | | DRILLING COMP. DATE | 10/4/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 713.80 | | | | | | | | |
| 1 | | Red stiff silty CLAY with organics, dry | 1 | 0-1.5 | 2-2-3 | 5 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | 2 | 5-6.5 | 6-8-12 | 20 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | Yellow, stiff silty CLAY to clayey SILT (Saprolite) mica and occasional black mottling | 3 | 10-11.5 | 6-8-7 | 15 | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | Yellowish tan SILT w/occasional organics and black mottling, abundant mica, crumbly | 4 | 15-16.5 | 1-1-2 | 3 | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | Reddish orange SILT, wet black mottling, trace mica, crumbly | 5 | 20-21.5 | 1-1-1 | 2 | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-20


SITE Plant Wansley TOTAL DEPTH 43.5' SURF.ELEV. 71[illegible]

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | White and brown SILT, residual schist form, abundant mica, black mottled, saturated | 6 | 25-26.5 | 1-2-3 | 5 | Water table @ 26' | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | Grayish tan SILT | 7 | 30-31.5 | 1-2-3 | 5 | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | trace mica | 8 | 35-36.5 | 2-5-8 | 13 | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | SAA, including mica content | 9 | 40-41.5 | 30-30-50/2 | ref | | | |
| 42 | | | | | | | | | |
| 43 | | BOH/TOR @ 43.5 | 10 | 43.3 | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-21
Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 77.5' | SURF.ELEV. | 789.4 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238101.4 | E | 2028695.2 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | | | | |
| DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 13 | NO. U.D. SAMPLES | 2 |
| CASING SIZE | | LENGTH | | CORE SIZE | HQ |
| TOTAL % REC. | 92% | | | | |
| WATER TABLE DEPTH | 74' | ELEV. | | TIME AFTER COMP. | 2 hrs |
| DATE TAKEN | 10/3/2006 | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/2/2006 | | | | |
| DRILLER | S. Milam | RECORDER | L. Millet | APPROVED | |
| DRILLING COMP. DATE | 10/4/2006 | | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 789.40 | Topsoil removed to flatten area for rig | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | Red silty clayey SAND and Saprolite, dry, | 1 | 1-2.5 | 1-2-3 | 5 | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Red silty SAND and schist Saprolite, dry, crumbly, silty SAND | | 4.5-6 | 4-8-14 | 22 | UD taken @ 4.0 - 6.0 feet in offset hole | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Brown and orange clay and highly weathered schist, with black mottling, dry, | 2 | 9.5-11 | 8-12-13 | 25 | UD taken @ 9.0 - 11.0 feet in offset hole | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Saprolite schist with some silty sand, Fe staining and black mottling, dry, silty SAND, saprolite | 3 | 14.5-16 | 5-12-18 | 30 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | SAA | 4 | 19.5-21 | 4-6-14 | 20 | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-21


SITE Plant Wansley — TOTAL DEPTH 77.5' — SURF.ELEV. 789.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test: From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Saprolite with some silty SAND , Fe staining and black mottling, moist | 5 | 24.5-26 | 8-16-43 | 59 | | 50 | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Saprolite, silty SAND, occ Fe staining, black mottling, moist, more cohesive | 6 | 29.5-31 | 8-17-33 | 50 | | 60 | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Black/green schist Saprolite, decomposed, some clay, dry some Fe staining, occ black mottled | 7 | 34.5-36 | 50/4 | ref | | 10 | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Gray clay and highly weathered Saprolite schist, crumbly, Fe staining and black mottled | 8 | 39.5-41 | 41-50/4 | ref | | 30 | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | Gray clay and highly weathered schist Saprolite, more cohesive, moist, occ heavy black mottled | 9 | 44.5-46 | 12-18-24 | 42 | | 90 | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | SAA wit silty SAND (SM) with more Fe staining | 10 | 49.5-51 | 8-16-50/4 | ref | non-plastic<br>gravel - 3.8%<br>sand - 57.3%<br>silt - 33.7%<br>clay - 5.2% | 50 | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | Gray-brown saprolite | 11 | 54.5-56 | 8-24-27 | 51 | | 30 | |
| 56 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-21


SITE Plant Wansley TOTAL DEPTH 77.5' SURF.ELEV. 789.4

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | Silty weathered schist Saprolite, dry | | | | | | | |
| 61 | | | 12 | 59.5-61 | 50/4 | ref | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | Gray silty SAND with highly weathered schist Saprolite, | | | | | | | |
| 66 | | wet, Fe staining, occ black mottling (silty SAND) TOR Begin coring @ 66' | 13 | 64.5-66 | 50/4 | ref | water table at 64' | | |
| 67 | | | | | | | | | |
| 68 | | Dark gray and black SCHIST, regular fractures | | | | | | | |
| 69 | | heavy Fe staining | | 66-70 | | | | 87 | 49 |
| 70 | | | | | | | | | |
| 71 | | SAA, with garnets | | 70-75 | | | | 100 | 88 |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | Silver gray SCHIST, hard. little to no Fe staining in fractur few garnets | | | | | | | |
| 75 | | | | | | | | | |
| 76 | | | | 75-77.5 | | | | 90 | 100 |
| 77 | | | | | | | | | |
| 78 | | BOH @ 77.5' | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-22
Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 75.0' | SURF.ELEV. | 729.3 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238610.8 | E | 2029031.2 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | | | | |
| DRILLING METHOD | HSA | NO. SAMPLES | 16 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | |
| TOTAL % REC. | | | | | |
| WATER TABLE DEPTH | 48.7' | ELEV. | | TIME AFTER COMP. | TOD |
| DATE TAKEN | | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/3/2006 | | | | |
| DRILLER | S. Milam | RECORDER | L. Millet | APPROVED | |
| DRILLING COMP. DATE | 10/4/2006 | | | | |

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 729.30 | Topsoil removed to flatten area for rig | | | | | | | |
| | 1 | | | | | | | | | |
| | 2 | | Tan silty SAND and schist Saprolite, dry | 1 | 1-2.5 | 3-9-16 | 25 | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | Light brown SILT with sand (ML), crumbly | 2 | 4.5-6 | 9-18-29 | 47 | non-plastic<br>sand - 20.8%<br>silt - 65.6%<br>clay - 13.6% | | |
| | 6 | | | | | | | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | Brown silty SAND and schist Saprolite, dry, Fe staining and black mottling | 3 | 9.5-11 | 4-8-38 | 46 | | | |
| | 11 | | | | | | | | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | SAA, less Fe staining | 4 | 14.5-16 | 10-17-41 | 58 | | | |
| | 16 | | | | | | | | | |
| | 17 | | | | | | | | | |
| | 18 | | | | | | | | | |
| | 19 | | | | | | | | | |
| | 20 | | Contains abundant rock fragments | 5 | 19.5-21 | 10-16-22 | 38 | | | |
| | 21 | | | | | | | | | |
| | 22 | | | | | | | | | |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

**SOUTHERN COMPANY** *Energy to Serve Your World*

# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-22



SITE: Plant Wansley    TOTAL DEPTH: 75.0'    SURF.ELEV.: 7

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Tan silty SAND and schist Saprolite, dry, some Fe staining and black mottling | 6 | 24.5-26 | 12-36-50/4 | ref | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Schist Saprolite with brownish gray CLAY, dry, Fe staining and black mottling, firm | 7 | 29.5-31 | 15-21-36 | 57 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Tan gray silty SAND with residual schist, dry, crumbly, black mottling | 8 | 34.5-36 | 15-25-50/4 | ref | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Highly weathered schist with tan and gray silty SAND , dry occ organics and heavy black mottling | 9 | 39.5-41 | 50/4 | ref | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | Light tan and gray silty SAND with schist Saprolite dry, occ organics and black mottling | 10 | 44.5-46 | 31-43-50/4 | ref | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | Schist Saprolite with silty SAND, dry, Fe staining | 11 | 49.5-51 | 24-23-19 | 42 | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | Highly weathered schist Saprolite with tan silty SAND loose, Fe staining, black mottling, saturated | 12 | 54.5-56 | 50/4 | ref | water table at 55' | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-22
Sheet 3 of 3

SITE Plant Wansley TOTAL DEPTH 75.0' SURF.ELEV. 729.3

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | Highly weathered schist Saprolite with gray silty SAND Fe staining | 13 | 59.5-61 | 23-50/4 | ref | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | SAA, less Fe staining | 14 | 64.5-66 | 15-50/2 | ref | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | SAA | 15 | 69.5-71 | 50/4 | ref | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | Heavy Fe oxide staining BOH/TOR @ 75' | 16 | 74.5-76 | 50/1 | ref | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-23
Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 60.0' | SURF.ELEV. | 697.9 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237682.9 | E | 2029786.7 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 13 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | 12.6' |
| ELEV. | | TIME AFTER COMP. | TOD | DATE TAKEN | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/4/2006 | DRILLER | S. Milam | RECORDER | L. Millet |
| APPROVED | | DRILLING COMP. DATE | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 697.90 | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | Reddish brown elastic SILT with sand (MH) | 1 | 1-2.5 | 3-6-8 | 14 | LL-54 PI-18<br>gravel - 0.3%<br>sand - 19.3%<br>silt - 46.6%<br>clay - 33.8% | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Orange and light orange SILT, dry, dark red mottling, firm | 2 | 4.5-6 | 3-3-4 | 7 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | SAA, occasional black mottling | 3 | 9.5-11 | 2-2-2 | 4 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Light gray and tan SILT with sand, orange and black mottling, firm | 4 | 14.5-16 | 1-2-6 | 8 | non-plastic<br>sand - 29.0%<br>silt - 58.2%<br>clay - 12.8% | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Tan and brown SILT, residual schist, dry, crumbly, orange and black mottling | 5 | 19.5-21 | 9-20-25 | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-23



SITE Plant Wansley | TOTAL DEPTH 60.0' | SURF.ELEV. 6

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | SAA, residual chert form | 6 | 24.5-26 | 9-14-21 | 35 | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | Highly weathered schist, with red silty SAND, dry, black mottling | 7 | 29.5-31 | 9-14-28 | 42 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Red brown and tan SILT, saturated, abundant mica, residual schist, occasional black mottling | 8 | 34.5-36 | 50/5 | ref | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | Brown, tan and green silty SAND, dry, black mottling, trace mica | 9 | 39.5-41 | 0-24-29 | 53 | non-plastic<br>gravel - 6.9%<br>sand - 50.0%<br>silt - 30.0%<br>clay - 13.1% | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | SAA, Schist Saprolite | 10 | 44.5-46 | 22-50-3 | ref | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | Green, orange and white SILT , dry, with mica, schist Saprolite | 11 | 49.5-51 | 20-50-2 | ref | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | SAA, some red mottling | 12 | 54.5-56 | 50/2 | ref | | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-23


SITE Plant Wansley TOTAL DEPTH 60.0' SURF.ELEV. 697.9

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | residual<br>schist Saprolite, abundant mica, dry | | 59.5-61 | 50/4 | ref | | | |
| 60 | | BOH @ 60' | | | | | | | |
| 61 | | | 13 | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
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| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-24


| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 65.5' | SURF.ELEV. | 725.0 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1238255.5 | E | 2029589.1 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | | | | |
| DRILLING METHOD | HSA | NO. SAMPLES | 14 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | |
| TOTAL % REC. | | | | | |
| WATER TABLE DEPTH | 39.5' | ELEV. | | TIME AFTER COMP. | TOD |
| DATE TAKEN | 10/5/2006 | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/5/2006 | | | | |
| DRILLER | S. Milam | RECORDER | R. Mudd | APPROVED | |
| DRILLING COMP. DATE | 10/11/2006 | | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 725.00 | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | Red SILT, with pieces of weathered rock - dry, very stiff | 1 | 1-2.5 | 3-6-12 | 18 | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Reddish tan micaceous SILT, with pieces of weathered rock - dry, very stiff | | | | | | | |
| 6 | | | 2 | 4.5-6 | 5-9-16 | 25 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Tannish silver micaceous clayey SILT, dry, very stiff | 3 | 9.5-11 | 12-17-25 | 42 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Light brown micaceous clayey SILT, with large pieces of easily plyable weathered rock (black & gold), dry, very stiff | 4 | 14.5-16 | 6-15-24 | 39 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | SAA | 5 | 19.5-21 | 10-15-50/4 | Ref | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-24
Sheet 2 of 3

SITE Plant Wansley TOTAL DEPTH 65.5' SURF.ELEV. 72...

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | ~~SAA~~ | | | | | | | |
| 26 | | | 6 | 24.5-26 | 19-21-34 | 58 | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | SAA | 7 | 29.5-31 | 22-37-43 | 80 | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | Large seams of black as well | 8 | 34.5-36 | 20-27-38 | 65 | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | SAA, mostly silver & gold, no black seams, still dry | 9 | 39.5-41 | 20-19-36 | 55 | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | Tan, silver & white SILT with pieces of weathered rock, moist - iron staining on faces | 10 | 44.5-46 | 19-21-29 | 50 | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | Orangish CLAY with tan & silver SILT with SAPROLITE, seams of very dark brown silt throughout - moist, iron staining | 11 | 49.5-51 | 12-22-26 | 48 | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | Gray & silver SAPROLITE, very micaceous SILT (ML), some black areas - all breaks apart easily (same as everything above), moist | 12 | 54.5-56 | 13-22-37 | 59 | | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-24



SITE Plant Wansley TOTAL DEPTH 65.5' SURF.ELEV. 725

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | SAA, iron staining, moist | 13 | 59.5-61 | 12-26-29 | 55 | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | SAA, more powdery, dry | 14 | 64.5-66 | 50/4 | Ref | | | |
| 66 | | TOR @ 65.5' no coring | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
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| 88 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-25
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 43.7' | SURF.ELEV. | 785.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237863.9 | E | 2028247.1 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | | | | |
| DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 6 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | HQ |
| TOTAL % REC. | 98% | | | | |
| WATER TABLE DEPTH | 20.2' | ELEV. | | TIME AFTER COMP. | 24 hrs. |
| DATE TAKEN | 9/27/2006 | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 9/26/2006 | | | | |
| DRILLER | B. Filipovich | RECORDER | A. Grissom | APPROVED | |
| DRILLING COMP. DATE | 9/27/2006 | | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 785.70 | | | | | | | | |
| 1 | | Topsoil 4/10' deep<br>Soft, reddish brown, moist,<br>slightly sandy SILT | 1 | 0-1.5 | 2-2-2 | 4 | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Very stiff, light brown to red (layered), fairly dry,<br>sandy SILT & Saprolite | 2 | 4-5.5 | 7-10-18 | 28 | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Very stiff, yellow to orange red, dry, sandy clayey<br>SILT and some Saprolite | 3 | 9-10.5 | 7-15-12 | 27 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Yellowish brown to dark gray, dry,<br>clayey SILT & weathered schist Saprolite | 4 | 14-15.5 | 8-50/2 | Ref | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | SAA | 5 | 19-20.5 | 12-27-32 | 59 | water table at 20.2' | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-25


SITE Plant Wansley TOTAL DEPTH 43.7' SURF.ELEV. 78

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | SAA for 4", then light gray, dry, soft highly weathered Saprolite | 6 | 24-25.5 | 19-50/5 | Ref | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | Auger refusal @ 29.0' | | | | | | | |
| 30 | | Begin coring @ 29.0' | | | | | | | |
| 31 | | Dark gray mica SCHIST, weathered with many rust stains/water fractures | | | | | | | |
| 32 | | | | 29-33.7 | | | 4.4/4.7 | 93 | 25 |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | 33.7-38.7 | | | 5/5 | 100 | 45 |
| 37 | | | | | | | | | |
| 38 | | Dark gray, hard mica SCHIST with iron staining along fractures | | | | | | | |
| 39 | | SAA | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | 38.7-43.7 | | | 5/5 | 100 | 95 |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | BOH @ 43.7' | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

SOUTHERN COMPANY
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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-26


SITE Plant Wansley HOLE DEPTH 60.0' SURF.ELEV. 744.7

LOCATION Gypsum Storage Facility COORDINATES N 1237263.4 E 2028878.0

ANGLE BEARING CONTRACTOR SCS DRILL NO. CME 550

DRILLING METHOD HSA/HQ Core NO. SAMPLES 11 NO. U.D. SAMPLES 2

CASING SIZE LENGTH CORE SIZE HQ TOTAL % REC. 84%

WATER TABLE DEPTH ELEV. TIME AFTER COMP. DATE TAKEN 9/27/2006

TYPE GROUT QUANTITY MIX DRILLING START DATE 9/27/2006

DRILLER B. Filipovich RECORDER A. Grissom APPROVED DRILLING COMP. DATE 9/27/2006

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 744.70 | Topsoil 2/10' deep | | | | | | | |
| | 1 | | Stiff, reddish brown, very dry, sandy SILT with some mica fragments | 1 | 0-1.5 | 4-7-7 | 14 | UD taken @ 1.0 - 3.0 feet in offset hole | | |
| | 2 | | | | | | | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | | | | | | | | |
| | 6 | | Hard, light grayish brown, dry, clayey SILT & weathered Saprolite | 2 | 5-6.5 | 10-14-21 | 35 | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | | | | | | | | |
| | 11 | | SAA, increase in Saprolite | 3 | 10-11.5 | 8-16-32 | 48 | UD taken @ 10.0 - 12.0 feet in offset hole | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | | | | | | | | |
| | 16 | | SAA | 4 | 15-16.5 | 11-25-32 | 57 | | | |
| | 17 | | | | | | | | | |
| | 18 | | | | | | | | | |
| | 19 | | | | | | | | | |
| | 20 | | | | | | | | | |
| | 21 | | SAA, layers of light gray, black, & red brown | 5 | 20-21.5 | 12-13-22 | 35 | | | |
| | 22 | | | | | | | | | |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-26


SITE Plant Wansley TOTAL DEPTH 60.0' SURF.ELEV. 744.7

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Ver stiff, light grayish brown, slightly moist, very clayey SILT & Saprolite | 6 | 25-26.5 | 12-13-15 | 28 | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA, abundant mica | 7 | 30-31.5 | 25-50/5 | Ref | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | SAA | 8 | 35-36.5 | 14-35-50/5 | Ref | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | SAA | 9 | 40-41.5 | 20-29-30 | 59 | Reached water table | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | SAA | 10 | 45-4.5 | 10-14-20 | 34 | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | SAA<br>Auger refusal @ 50.5' | 11 | 50-51.5 | 50/5 | Ref | | | |
| 52<br>53.0<br>54<br>55<br>56<br>57.0<br>58 | | Begin coring at 50.5'<br>Grey, weathered mica SCHIST, iron staining along fractures and relict bedding | | 50.5-55 | | | | 77 | 75 |
| 59.0<br>60 | | extremely weathered to 60'<br>BOH @ 60' | | 55-60.0 | | | | 90 | 50 |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-27
Sheet 1 of 2

SITE Plant Wansley HOLE DEPTH 35.0' SURF.ELEV. 699.7
LOCATION Gypsum Storage Facility COORDINATES N 1237224.5 E 2029687.5
ANGLE BEARING CONTRACTOR SCS DRILL NO. CME 550
DRILLING METHOD HSA NO. SAMPLES 7 NO. U.D. SAMPLES 0
CASING SIZE LENGTH CORE SIZE TOTAL % REC.
WATER TABLE DEPTH ELEV. TIME AFTER COMP. DATE TAKEN
TYPE GROUT QUANTITY MIX DRILLING START DATE 10/3/2006
DRILLER B. Filipovich RECORDER L. Millet APPROVED DRILLING COMP. DATE 10/3/2006

| | Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | 699.70 | | | | | | | | |
| | 1 | | Red SILT, dry, stiff, trace mica | 1 | 0-1.5 | 2-3-4 | 7 | | | |
| | 2 | | | | | | | | | |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | | | | | | | | |
| | 6 | | Red and tan SILT, schist Saprolite black mottlrd, dry, firm, trace mica | 2 | 5-6.5 | 2-2-3 | 5 | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | | | | | | | | |
| | 11 | | Brown SILT, residual schist form, red and black mottling, moist, including mica content | 3 | 10-11.5 | 1-2-2 | 4 | | | |
| | 12 | | | | | | | | | |
| | 13 | | | | | | | | | |
| | 14 | | | | | | | | | |
| | 15 | | | | | | | | | |
| | 16 | | Brown and yellow-brown fine sandy SILT, saturated, black mottled, ~10% - 15% mica | 4 | 15-16.5 | 1-1-2 | 3 | | | |
| | 17 | | | | | | | | | |
| | 18 | | | | | | | | | |
| | 19 | | | | | | | | | |
| | 20 | | | | | | | | | |
| | 21 | | SAA, schist Saprolite | 5 | 20-21.5 | 2-2-3 | 5 | | | |
| | 22 | | | | | | | | | |
| | 23 | | | | | | | | | |
| | 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-27



SITE Plant Wansley TOTAL DEPTH 35.0' SURF.ELEV. 699.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Gray SILT and highly decomposed schist Saprolite, brown mottling, wet, quartz vein (1/4") at end of run | 6 | 25-26.5 | 5-5-12 | 17 | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | Gray SILT and highly decomposed schist Saprilote occasional black mottling, saturated | 7 | 30-31.5 | 7-6-13 | 19 | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | SAA | | | 17-35-50/3 | ref | | | |
| 36 | | BOH @ 35' | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
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| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-28
Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 64.0' | SURF.ELEV. | 813.4 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237344.9 | E | 2028007.0 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 11 |
| NO. U.D. SAMPLES | 2 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | 9/12/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 9/12/2006 | DRILLER | B. Filipovich | RECORDER | S. Bearce |
| APPROVED | | DRILLING COMP. DATE | 9/12/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 813.40 | Surface raked by bulldozer | | | | | | | |
| 1 | | approx. 1" of slightly humic red-brown topsoil, else red-brown, very soft CLAY | 1 | 0-1.5 | 2-3-4 | 7 | | 25% | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | UD taken @ 4.0 - 6.0 feet in offset hole | | |
| 5 | | Reddish brown SILT, schist Saprolite with gray mica plates 4 mm to 1 cm | 2 | 4.5-6 | 11-12-16 | 28 | moist after 2" rainfall 9/13/06 | 50% | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Tan SILT coating of soft gray mica schist Saprolite | 3 | 9.5-11 | 11-18-24 | 42 | Dry | 66% | |
| 11 | | | | | | | UD taken @ 11.0 - 12.5 feet in offset hole | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | SAA | 4 | 14.5-16 | 10-20-24 | 44 | Dry | 40% | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Less tan SILT - mostly soft light gray, olive sheened mica, schist Saprolite | 5 | 19.5-20 | 12-20-29 | 49 | Dry | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-28



SITE Plant Wansley TOTAL DEPTH 64.0' SURF.ELEV. 8[illegible]

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | SAA, tan SILT staining, gray to olive matrix, black MnO oxide stained relic fractures | 6 | 24.5-26 | 11-16-26 | 42 | Black MnO stained relic fractures | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | SAA, hard | 7 | 29.5-31 | 15-55/6 | ref | moisture seen on relic fracture faces | 100 /12" | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | SAA, hard | 8 | 34.5-36 | 18-24-32 | 56 | | 100% | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | SAA, all light olive, hard & gray | 9 | 39.5-41 | 23-35-38 | ref | 24 hr | 50% | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | SAA, soil damp, hard but spoon saturated - most likely a saturated relic fracture or schistocity | 10 | 44.5-46 | 25-50/6 | ref | saturation @ 45.5' | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | SAA, Saprolite fully saturated, dark olive brown when fully saturated, hard | 11 | 49.5-51 | 20-50/5.5 | ref | Auger refusal at 50.5' Stopped auger 9/13/06 | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | Set casing/started coring | | 52.4-54 | | | Start core 9/20/06 | | |
| 54 | | | | | | | | | |
| 55 | | Too soft to core - rock/hard soil lenses - resume rotary w/casing & water (not H.S.A.) at 54' Black highly weathered schist | | 54-56.5 | 50/4" | | easily broken apart laterally - strong vertically | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-28



SITE Plant Wansley TOTAL DEPTH 64.0' SURF.ELEV. 813.4

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 57 | | | | | | | | | |
| 58 | | | | 56.5-59 | 20 blows no movement | | (jumping cathead) 1.5" recovery | | |
| 59 | | | | | | | | | |
| 60 | | | | | | | | | |
| 61 | | | | | | | | | |
| 62 | | Set well @ 62.0' | | | | | | | |
| 63 | | | | 64 | 20 blows no movement | | | | |
| 64 | | BOH @ 64.0' | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | | | | | | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-29
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 50.0' | SURF.ELEV. | 746.7 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1236554.0 | E | 2028298.2 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 11 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | 9/14/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 9/14/2006 | DRILLER | B. Filipovich | RECORDER | S. Bearce |
| APPROVED | | DRILLING COMP. DATE | 9/14/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 746.70 | | | | | | | | |
| 1 | | | 1 | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | Red silty, clayey SAND (SM), stiff, with mixtured relict quartz grain, fine-medium, and biotite fine to coarse, highly weathered Saprolite or colluvium mixture; damp | 2 | 3-4.5 | 5-6-6 | 12 | LL=43 PI=12<br>gravel - 7.2%<br>sand - 48.5%<br>silt - 23.9%<br>clay - 20.4%<br>Bulk sample taken 6.0 to 8.0 ft | 30% | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | Firm, mottled, red-brown silty SAND/sandy SILT and yellow-brown SILT, with traces of biotite and relict metamorphic bonding; damp | 3 | 8-9.5 | 3-4-5 | 9 | | 50% | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | Firm, silvery, light gray to olive sandy SILT (ML), with relict muscovite schist Saprolite, texture very apparent and very thin black streaks; dry | 4 | 13-14.5 | 2-4-8 | 12 | non-plastic<br>gravel - 1.3%<br>sand - 43.4%<br>silt - 49.1%<br>clay - 6.2% | 100% | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | 18-19.5 | 3-3-6 | 9 | | | |
| 19 | | dry | 5 | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | Firm, band light olive (2") w/2" of red-brown 2" of lt. olive SILT as above and relic | | | | | fracture | | |
| 24 | | schist textures in each section, relic fractures cross-cut relic schistocity and have black MnO coating | 6 | 23-24.5 | 2-3-5 | 8 | wet @ 23.0'<br>soil is moist | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-29


SITE Plant Wansley TOTAL DEPTH 50.0' SURF.ELEV. 746.…

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | Very stiff, light olive silt & clay mixture (ML-CL), maybe some graphite mixed in, schistocity present, highly weathered rock | 7 | 28-29.5 | 6-9-11 | 20 | water on spoon moist soil soil very slippery when rubbed between fingers | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | Stiff, reddish brown SILT, one black MnO filled fracture (relic), other rock fabrics absent; wet | 8 | 33-34.5 | 7-6-8 | 14 | wet | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | Hard, weathered schist Saprolite w/abundant muscovite, graphite and silty SAND (SM) (white & red) from weathered feldspar, relic fractures w/black MnO coating and fill organics; moist | 9 | 38-39.5 | 13-36-50/5" | ref | non-plastic gravel - 8.9% sand - 59.1% silt - 28.0% clay - 4.0% | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | 10 | 43-44.5 | 16-25-50/6" | ref | over weekend came back and had 15' of water | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | Hard, brown Saprolite, flakey-micaceous with silty sand properties | 11 | 48-49.5 | 50/5" | ref | 20' water set well | | |
| 50 | | BOH @ 50.0' | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-30
Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 56.5' | SURF.ELEV. | 714.6 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1236619.1 | E | 2028993.8 |
| ANGLE | | BEARING | | CONTRACTOR | SCS |
| DRILL NO. | CME 550 | DRILLING METHOD | HSA | NO. SAMPLES | 10 |
| NO. U.D. SAMPLES | 0 | CASING SIZE | | LENGTH | |
| CORE SIZE | | TOTAL % REC. | | WATER TABLE DEPTH | |
| ELEV. | | TIME AFTER COMP. | | DATE TAKEN | 9/19/2006 |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 9/19/2006 | DRILLER | B. Filipovich | RECORDER | R. Mudd |
| APPROVED | | DRILLING COMP. DATE | 9/19/2006 | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 714.60 | | | - | | | | | |
| 1 | | Organics top 3"<br>Red SILT, medium stiff, moist | 1 | 0-1.5 | 1-2-3 | 5 | Rain last night | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | Sandy, red & tan mottled SILT, medium stiff, moist | 2 | 5-6.5 | 2-4-5 | 9 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | Sandy, mottled orange & tan SILT, fine sand portion, soft, moist | 3 | 10-11.5 | 1-2-2 | 4 | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | Light tan SILT w/interbedded layers of white weathered schist, large angular quartz pebble included, very soft, moist | 4 | 15-16.5 | WOH-WOH-1 | 1 | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | Tan sandy SILT with fine to medium sand portion, pieces of weathered rock, some as large as small pebbles & black in color, soft & very wet | 5 | 20-21.5 | 1-1-2 | 3 | water table at 20' | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-30
Sheet 2 of 2

SITE: Plant Wansley    TOTAL DEPTH: 56.5'    SURF.ELEV.: 714.

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | |
| 26 | | Light tan sandy SILT w/black weathered schist intrusions, some mica flecks, medium stiff, moist | 6 | 25-26.5 | 3-4-7 | 11 | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | SAA, with white schist layers | 7 | 30-31.5 | 5-6-10 | 16 | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | Gray & tan sandy SILT, w/mica intrusions, weathered in place with obvious bedding planes (Saprolite), very stiff, moist | 8 | 35-36.5 | 5-9-22 | 31 | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |
| 41 | | Layered red, yellow, orange SILT, very stiff, moist-bedding planes | 9 | 40-41.5 | 8-19-50 | 69 | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | Set well @ 44.5' | | | | | | | |
| 46 | | Clayey SILT Interbedded, layered orange, red, yellow & white heavily weathered Saprolite, very stiff, moist | 10 | 45-46.5 | 18-50/3" | ref | | | |
| 47 | | | | | | | | | |
| 48 | | BOH @ 46.5' | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-31
Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| SITE | Plant Wansley | HOLE DEPTH | 43.5' | SURF.ELEV. | 843.5 |
| LOCATION | Gypsum Storage Facility | COORDINATES N | 1237996.6 | E | 2025212.8 |
| ANGLE | | BEARING | | | |
| CONTRACTOR | SCS | DRILL NO. | CME 550 | | |
| DRILLING METHOD | HSA/HQ Core | NO. SAMPLES | 5 | NO. U.D. SAMPLES | 0 |
| CASING SIZE | | LENGTH | | CORE SIZE | HQ |
| TOTAL % REC. | 99% | | | | |
| WATER TABLE DEPTH | 15.0' | ELEV. | | TIME AFTER COMP. | 24 hrs |
| DATE TAKEN | | | | | |
| TYPE GROUT | | QUANTITY | | MIX | |
| DRILLING START DATE | 10/21/2006 | | | | |
| DRILLER | S. Milam | RECORDER | K. Hobbs | APPROVED | |
| DRILLING COMP. DATE | 10/21/2006 | | | | |

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 0 | 843.50 | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | Light brown/reddish sandy SILT, organic matter, stiff | 1 | 1-2.5 | 5-4-6 | 10 | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | Very stiff, buff. SILT | | | | | | | |
| 6 | | | 2 | 4.5-6 | 11-13-13 | 26 | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | Very stiff, yellowish orange SILT , relic gneissic features | 3 | 9.5-11 | 8-9-8 | 17 | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | Medium stiff, yellowish orange SILT, gneissic banding, dark oxidized stains | 4 | 14.5-16 | 4-4-5 | 9 | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | Buff Saprolite with gneissic mineral bands, stiff, sandy SILT | 5 | 19.5-21 | 7-6-13 | 19 | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | TOR @ 23.5' | | | | | | | |
| 24 | | | | | | | | | |

Form GS9901 7-26-2004

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# DRILLING LOG
## GEOLOGICAL SERVICES

Hole No. GS-31
Sheet 2 of 2

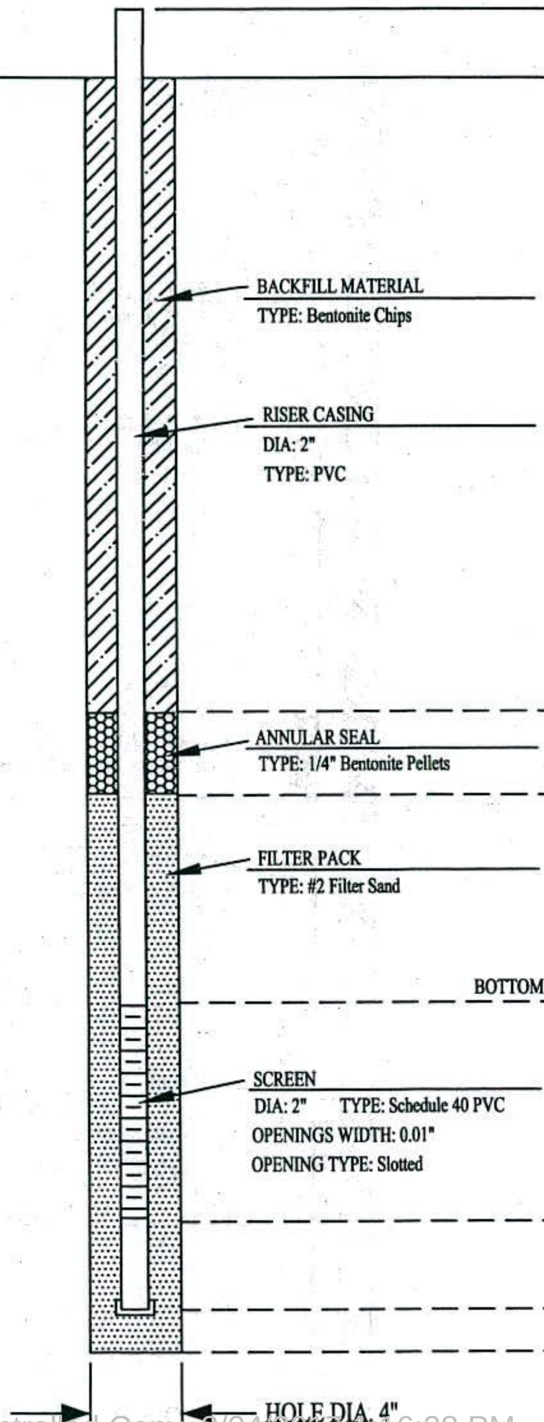
SITE Plant Wansley TOTAL DEPTH 43.5' SURF.ELEV. 84[illegible]

| Depth | Elev. | Material Description, Classification and Remarks | Sample No. | Standard Penetration Test From To | Blows | N | Comments | % Rec | RQD |
|---|---|---|---|---|---|---|---|---|---|
| 25 | | Pink and gray, hard, slightly weathered granitic GNEISS | | 23.5-28.5 | | | | 98 | 90 |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | iron staining along fractures | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | 28.5-33.5 | | | | 100 | 92 |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | 33.5-38.5 | | | | 100 | 70 |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | 38.5-43.5 | | | | 100 | 75 |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | BOH @ 43.5' | | | | | | | |
| 45 | | | | | | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: M. Hughes | **Well Name** |
| Elevation: | Rig type: CME 550 | GS-1 |
| Logger: A. Grissom | Drilling method: HSA/HQ | |
| Dates drilled: 10/17/06 | Sampling methods: SPT & Core | |
| | No. SPT: 8    No. UD:    Total depth: 54.7' | |

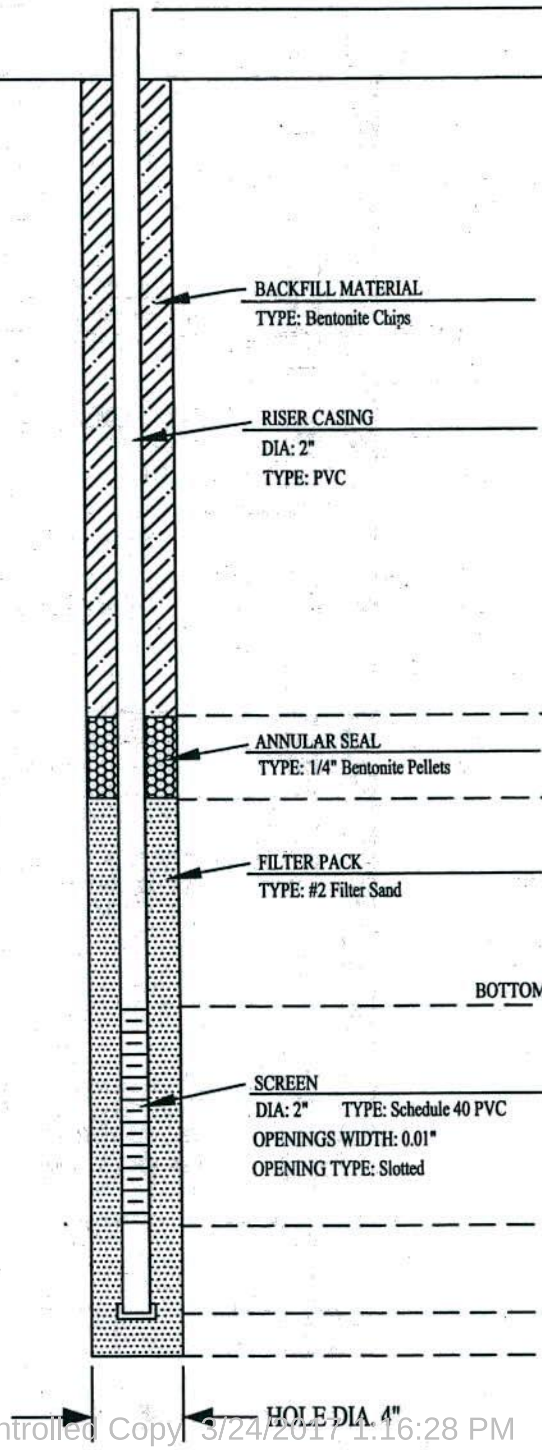



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.6 | 850.3 |
| GROUND SURFACE | 0.0 | 847.7 |
| TOP OF SEAL | NA | NA |
| TOP OF FILTER PACK | 38.7 | 809.0 |
| BOTTOM OF RISER/TOP OF SCREEN | 39.7 | 808.0 |
| BOTTOM OF SCREEN | 49.7 | 798.0 |
| BOTTOM OF CASING | 54.7 | 793.0 |
| BOTTOM OF HOLE | 54.7 | 793.0 |

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: S. Bearce<br>Dates drilled: 10/23/06 to 10/24/06 | Drilling Co: SCS<br>Driller: S. Milam<br>Rig type: CME 550<br>Drilling method: HSA/HQ<br>Sampling methods: SPT & Core<br>No. SPT: 5 No. UD: Total depth: 45.7' | Page 1 of 1<br>Well Name<br>GS-2 |




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 837.1 |
| GROUND SURFACE | 0.0 | 834.2 |
| TOP OF SEAL | 28.0 | 805.2 |
| TOP OF FILTER PACK | 31.0 | 803.2 |
| BOTTOM OF RISER/TOP OF SCREEN | 35.7 | 798.5 |
| BOTTOM OF SCREEN | 44.7 | 789.5 |
| BOTTOM OF CASING | 45.5 | 788.7 |
| BOTTOM OF HOLE | 45.7 | 788.5 |

# WELL CONSTRUCTION LOG

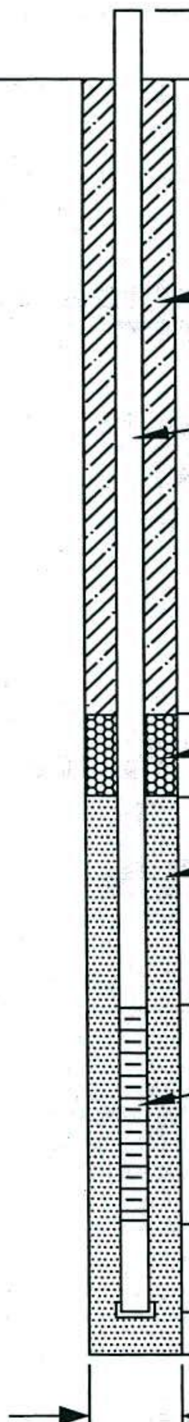
**Southern Company Generation**

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: K. Hobbs
Dates drilled: 10/23/06

Drilling Co: SCS
Driller: M. Hughes
Rig type: CME 550
Drilling method: HSA
Sampling methods: SPT
No. SPT: 5    No. UD:    Total depth: 48.5'



**Well Name**
**GS-3**

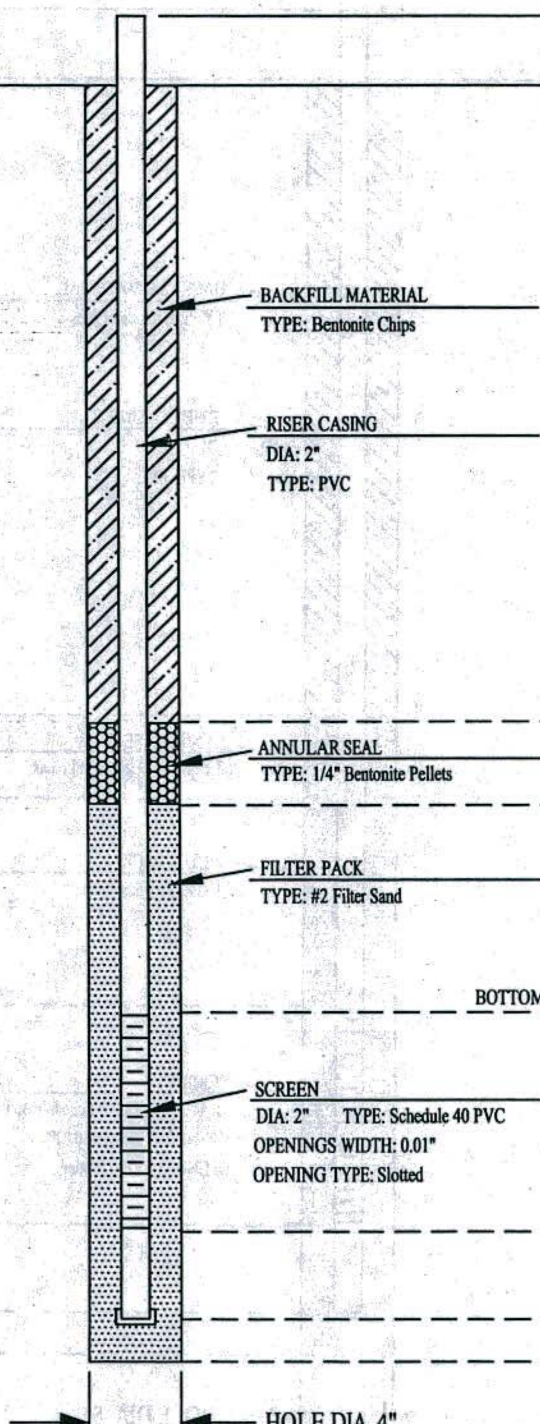



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.1 | 806.3 |
| GROUND SURFACE | 0.0 | 803.2 |
| TOP OF SEAL | 34.7 | 768.5 |
| TOP OF FILTER PACK | 37.2 | 766.0 |
| BOTTOM OF RISER/TOP OF SCREEN | 38.5 | 764.7 |
| BOTTOM OF SCREEN | 48.5 | 754.7 |
| BOTTOM OF CASING | 48.5 | 754.7 |
| BOTTOM OF HOLE | 48.5 | 754.7 |

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: K. Hobbs<br>Dates drilled: 10/25/06 | Drilling Co: SCS<br>Driller: S. Milam<br>Rig type: CME 550<br>Drilling method: HSA/HQ<br>Sampling methods: SPT & Core<br>No. SPT: 5 No. UD: Total depth: 35.5' | Page 1 of 1<br><br>Well Na<br>GS-4 |




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.1 | 809.0 |
| GROUND SURFACE | 0.0 | 805.9 |
| TOP OF SEAL | 20.5 | 785.4 |
| TOP OF FILTER PACK | 23.0 | 782.9 |
| BOTTOM OF RISER/TOP OF SCREEN | 25.5 | 780.4 |
| BOTTOM OF SCREEN | 34.5 | 771.4 |
| BOTTOM OF CASING | 35.3 | 770.6 |
| BOTTOM OF HOLE | 35.5 | 770.4 |

# WELL CONSTRUCTION LOG

Southern Company Generation

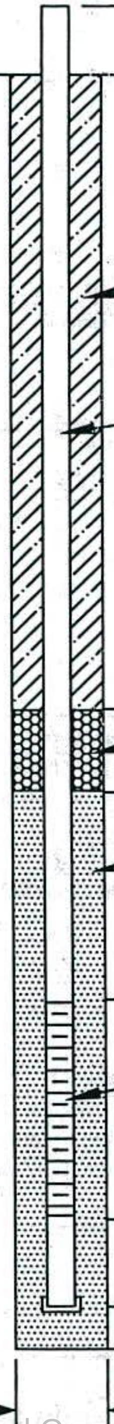
Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: K. Hobbs
Dates drilled: 10/22/06

Drilling Co: SCS
Driller: M. Hughes
Rig type: CME 550
Drilling method: HSA/HQ Core
Sampling methods: SPT & Core
No. SPT: 5
No. UD:



Total depth: 30.8'

**Well Name**
**GS-5**



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 776.0 |
| GROUND SURFACE | 0.0 | 773.1 |
| TOP OF SEAL | 14.3 | 758.8 |
| TOP OF FILTER PACK | 19.3 | 753.8 |
| BOTTOM OF RISER/TOP OF SCREEN | 20.6 | 752.5 |
| BOTTOM OF SCREEN | 30.6 | 742.5 |
| BOTTOM OF CASING | 30.6 | 742.5 |
| BOTTOM OF HOLE | 30.8 | 742.3 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

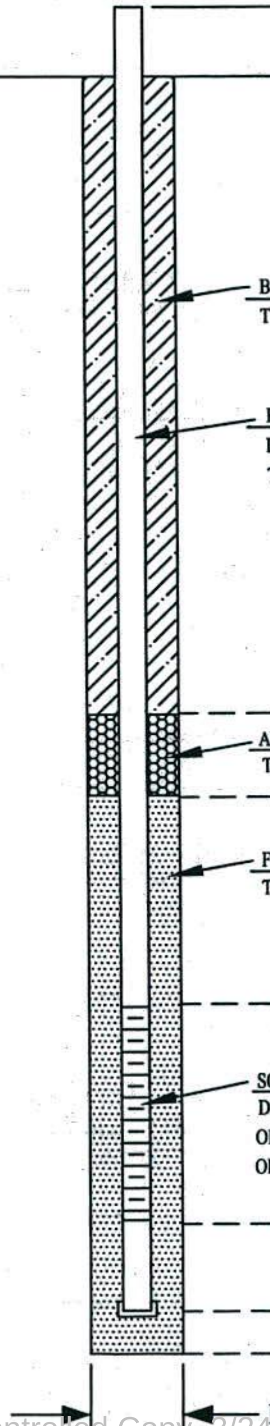
Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger:
Dates drilled: 10/21/06

Drilling Co: SCS
Driller: M. Hughes
Rig type: CME 550
Drilling method: HSA
Sampling methods: SPT
No. SPT: No. UD: Total depth: 41.5'



Well Na
GS-6

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.6 | 769.7 |
| GROUND SURFACE | 0.0 | 767.1 |
| TOP OF SEAL | 26.0 | 741.1 |
| TOP OF FILTER PACK | 28.3 | 738.8 |
| BOTTOM OF RISER/TOP OF SCREEN | 30.0 | 737.1 |
| BOTTOM OF SCREEN | 40.0 | 727.1 |
| BOTTOM OF CASING | 41.5 | 725.[illegible] |
| BOTTOM OF HOLE | 41.5 | 725.6 |



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

SCREEN
DIA: 2" TYPE: Schedule 40 PVC Pre-Pack
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 8"

# WELL CONSTRUCTION LOG

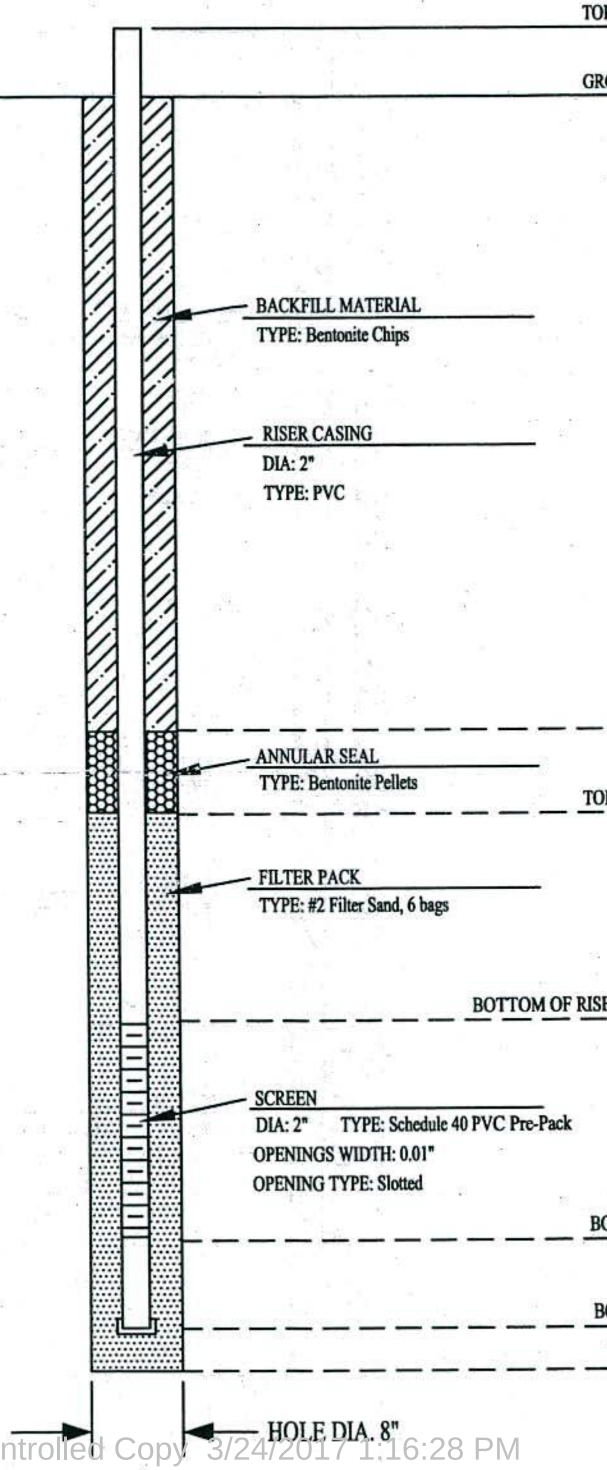
**Southern Company Generation**

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: R. Mudd
Dates drilled: 10/11/06

Drilling Co: SCS
Driller: M. Hughes
Rig type: CME 550
Drilling method: HSA
Sampling methods: SPT
No. SPT: No. UD: Total depth: 66.5'



**Well Name**
**GS-7**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.7 | 797.4 |
| GROUND SURFACE | 0.0 | 794.7 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 54.7 | 740.0 |
| BOTTOM OF RISER/TOP OF SCREEN | 55.0 | 739.7 |
| BOTTOM OF SCREEN | 65.0 | 729.7 |
| BOTTOM OF CASING | 65.0 | 729.7 |
| BOTTOM OF HOLE | 66.5 | 728.2 |

# WELL CONSTRUCTION LOG

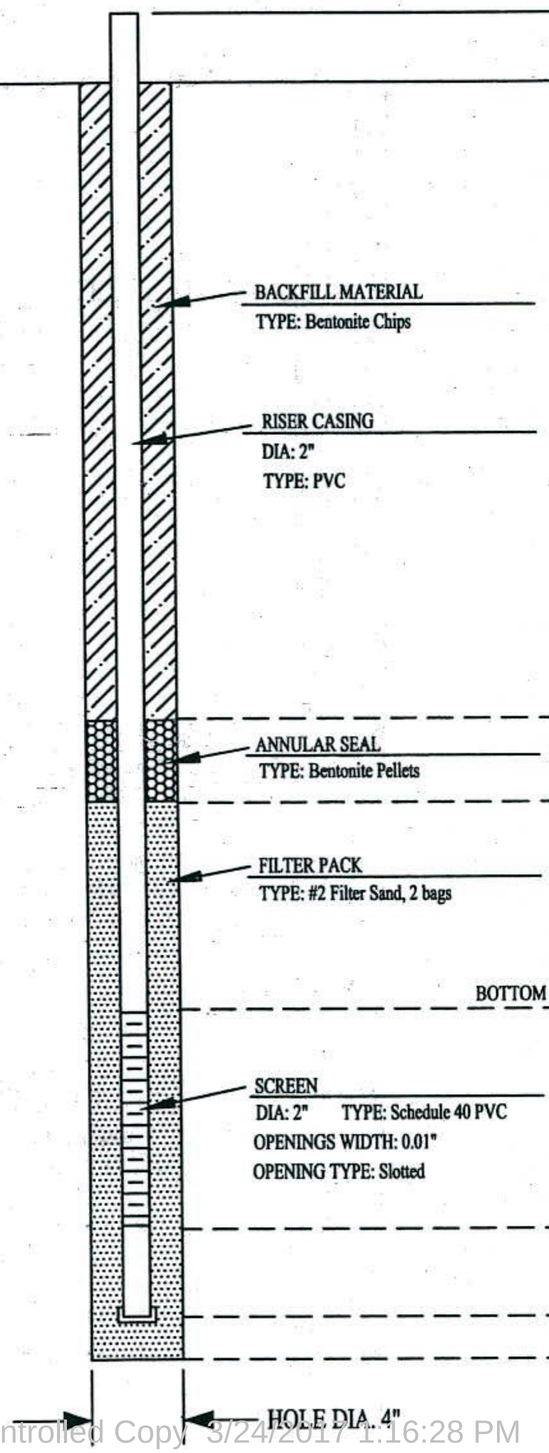
Southern Company Generation

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: R. Mudd
Dates drilled: 10/12/06

Drilling Co: SCS
Driller: S. Milam
Rig type: CME 550
Drilling method: HSA/HQ
Sampling methods:
No. SPT: No. UD: Total depth: 37.4'



Well Name: GS-8

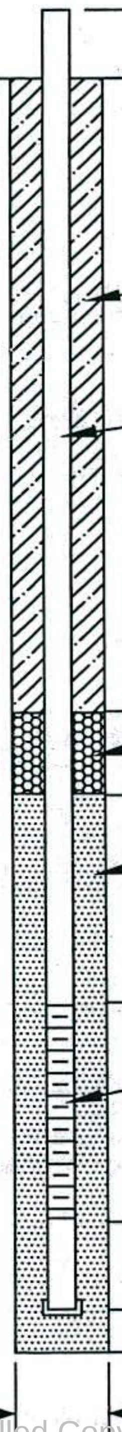



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 769.4 |
| GROUND SURFACE | 0.0 | 766.5 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 15.5 | 751.0 |
| BOTTOM OF RISER/TOP OF SCREEN | 17.4 | 749.1 |
| BOTTOM OF SCREEN | 27.4 | 739.1 |
| BOTTOM OF CASING | 37.4 | 729.1 |
| BOTTOM OF HOLE | 37.4 | 729.1 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: S. Milam | **Well Name** |
| Elevation: | Rig type: CME 550 | **GS-9** |
| Logger: R. Mudd | Drilling method: HSA/HQ Core | |
| Dates drilled: 10/12/06 | Sampling methods: SPT | |
| | No. SPT: 4 No. UD: | Total depth: 35.5' |



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.7 | 776.4 |
| GROUND SURFACE | 0.0 | 772.7 |
| TOP OF SEAL | 11.5 | 761.2 |
| TOP OF FILTER PACK | 13.0 | 759.7 |
| BOTTOM OF RISER/TOP OF SCREEN | 15.0 | 757.7 |
| BOTTOM OF SCREEN | 25.0 | 747.7 |
| BOTTOM OF CASING | 30.0 | 742.7 |
| BOTTOM OF HOLE | 35.5 | 737.2 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

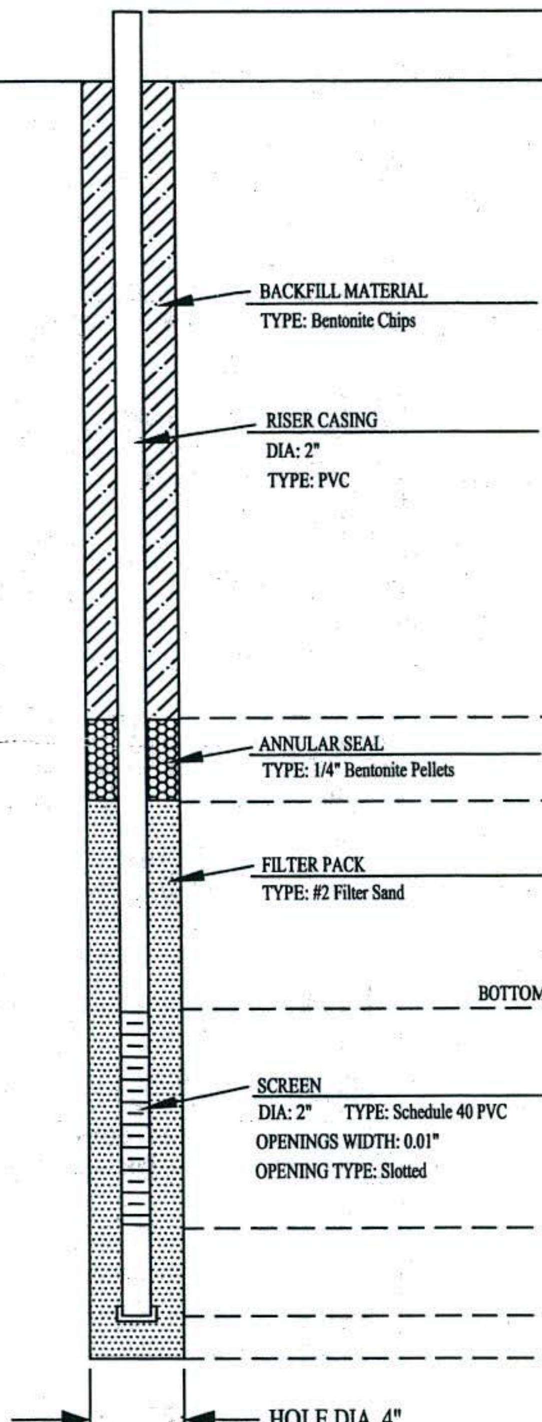
SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: M. Hughes | Well Na[illegible] |
| Elevation: | Rig type: CME 550 | GS-10 |
| Logger: | Drilling method: HSA/HQ | |
| Dates drilled: 10/21/06 | Sampling methods: SPT & Core | |
| | No. SPT: No. UD: Total depth: 51.8' | |




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.8 | 764.2 |
| GROUND SURFACE | 0.0 | 761.4 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 26.0 | 735.4 |
| BOTTOM OF RISER/TOP OF SCREEN | 27.7 | 733.7 |
| BOTTOM OF SCREEN | 37.7 | 723.7 |
| BOTTOM OF CASING | 38.0 | 723.[illegible] |
| BOTTOM OF HOLE | 51.8 | 709.6 |

# WELL CONSTRUCTION LOG

Southern Company Generation

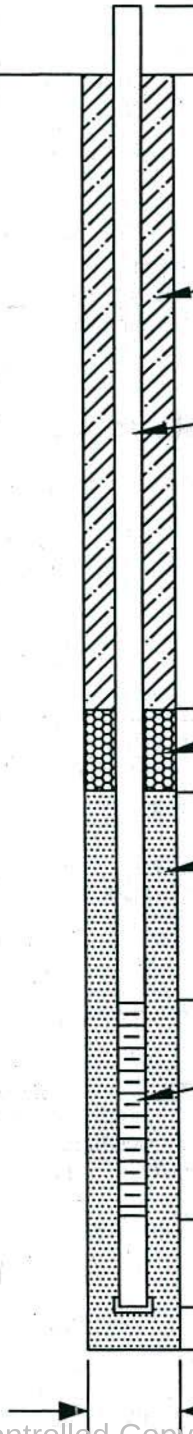
Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: G. McWhorter
Dates drilled: 10/20/06

Drilling Co: SCS
Driller: S. Milam
Rig type: CME 550
Drilling method: HSA
Sampling methods: SPT
No. SPT: 13 No. UD: Total depth: 60.5'



Well Name

GS-11



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

SCREEN
DIA: 2" TYPE: Schedule 40 PVC Pre-Pack
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

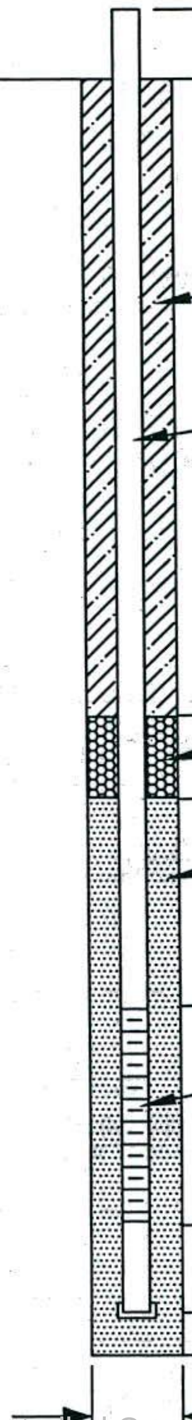
| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.7 | 776.6 |
| GROUND SURFACE | 0.0 | 773.9 |
| TOP OF SEAL | 45.5 | 728.4 |
| TOP OF FILTER PACK | 48.0 | 725.9 |
| BOTTOM OF RISER/TOP OF SCREEN | 50.5 | 723.4 |
| BOTTOM OF SCREEN | 60.5 | 713.4 |
| BOTTOM OF CASING | 60.5 | 713.4 |
| BOTTOM OF HOLE | 60.5 | 713.4 |

HOLE DIA. 8"

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: G. McWhorter<br>Dates drilled: 10/19/06 | Drilling Co: SCS<br>Driller: S. Milam<br>Rig type: CME 550<br>Drilling method: HSA<br>Sampling methods: SPT<br>No. SPT: 17 No. UD: Total depth: 81.0' | Page 1 of 1<br><br>Well Nam[e]<br>GS-12 |



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

SCREEN
DIA: 2" TYPE: Schedule 40 PVC Pre-Pack
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

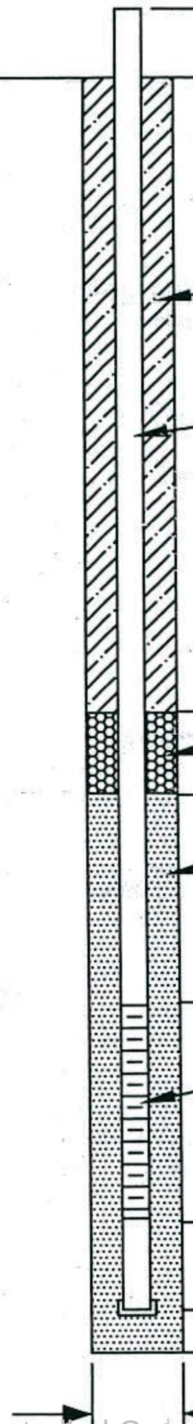
HOLE DIA. 8"

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.5 | 775.7 |
| GROUND SURFACE | 0.0 | 773.2 |
| TOP OF SEAL | 65.5 | 707.7 |
| TOP OF FILTER PACK | 68.0 | 705.2 |
| BOTTOM OF RISER/TOP OF SCREEN | 69.5 | 703.7 |
| BOTTOM OF SCREEN | 79.5 | 693.7 |
| BOTTOM OF CASING | 79.5 | 693.7 |
| BOTTOM OF HOLE | 81.0 | 692.2 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | | |
|---|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: R. Mudd<br>Dates drilled: 10/10/06 | Drilling Co: SCS<br>Driller: M. Hughes<br>Rig type: CME 550<br>Drilling method: HSA/HQ Core<br>Sampling methods: SPT & Core<br>No. SPT: No. UD: | Page 1 of 1<br><br><br><br><br>Total depth: 37.5' | **Well Name**<br>**GS-13** |



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 2.5 bags

SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

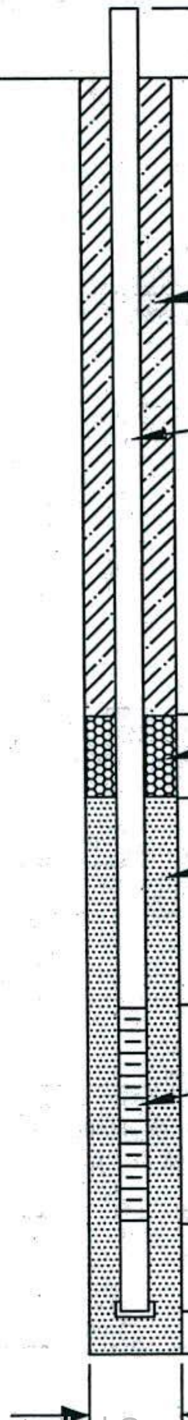
HOLE DIA. 4"

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.4 | 784.0 |
| GROUND SURFACE | 0.0 | 780.6 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 8.0 | 772.6 |
| BOTTOM OF RISER/TOP OF SCREEN | 12.5 | 768.1 |
| BOTTOM OF SCREEN | 22.5 | 758.1 |
| BOTTOM OF CASING | 37.5 | 743.1 |
| BOTTOM OF HOLE | 37.5 | 743.1 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | | |
|---|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 | Well Name |
| Location: Plant Wansley | Driller: S. Milam | | GS-14 |
| Elevation: | Rig type: CME 550 | | |
| Logger: G. McWhorter | Drilling method: HSA/HQ Core | | |
| Dates drilled: 10/19/06 | Sampling methods: SPT | | |
| | No. SPT: 2    No. UD: | Total depth: 45.5' | |



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.1 | 740.8 |
| GROUND SURFACE | 0.0 | 737.7 |
| TOP OF SEAL | 15.5 | 722.2 |
| TOP OF FILTER PACK | 18.0 | 719.2 |
| BOTTOM OF RISER/TOP OF SCREEN | 20.5 | 717.2 |
| BOTTOM OF SCREEN | 30.5 | 707.2 |
| BOTTOM OF CASING | 45.5 | 692.2 |
| BOTTOM OF HOLE | 45.5 | 692.2 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: 1/4" Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand

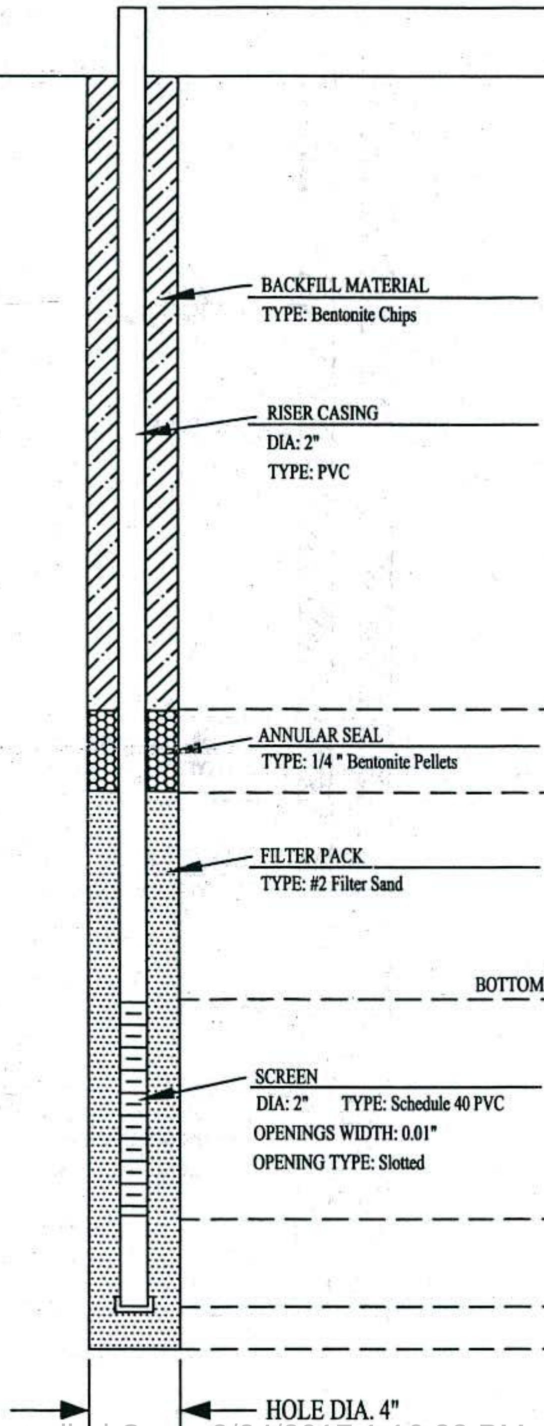
SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: B. Filipovich | **Well Name** |
| Elevation: | Rig type: CME 550 | GS-15 |
| Logger: | Drilling method: HSA/HQ Core | |
| Dates drilled: 10/20/06 | Sampling methods: SPT & Core | |
| | No. SPT: No. UD: Total depth: 41.3' | |



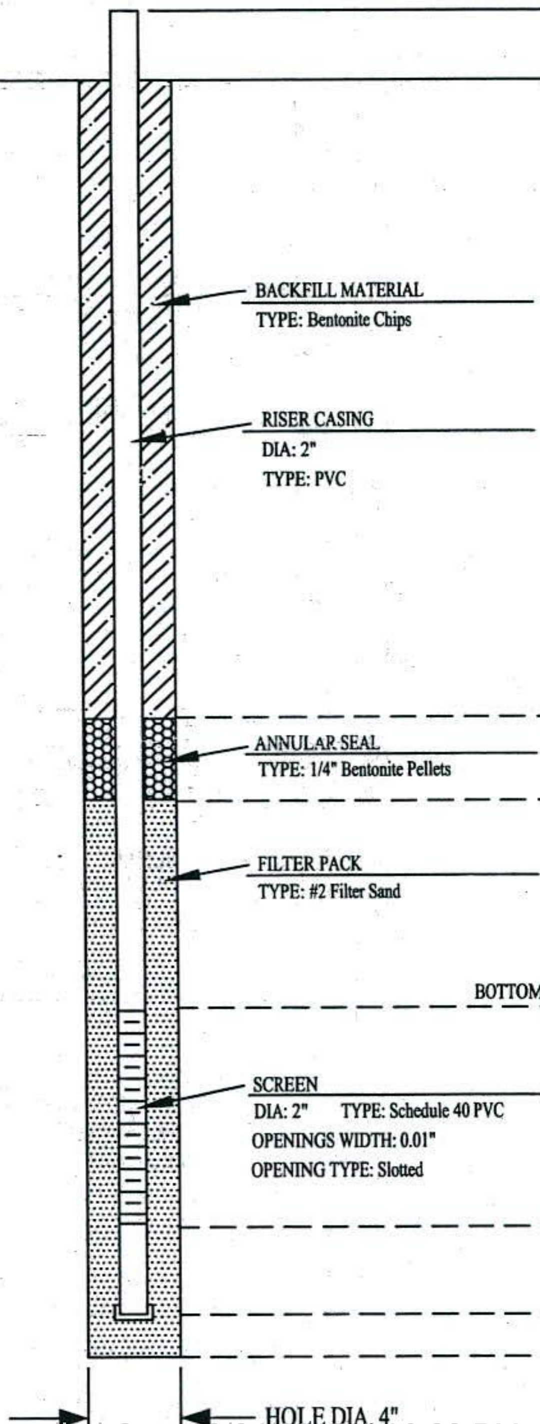

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 722.6 |
| GROUND SURFACE | 0.0 | 719.7 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 18.0 | 701.7 |
| BOTTOM OF RISER/TOP OF SCREEN | 20.0 | 699.7 |
| BOTTOM OF SCREEN | 30.0 | 689.7 |
| BOTTOM OF CASING | 30.0 | 689.7 |
| BOTTOM OF HOLE | 41.3 | 678.4 |

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: M. Hughes | Well Na |
| Elevation: | Rig type: CME 550 | GS-16 |
| Logger: | Drilling method: HSA/HQ | |
| Dates drilled: | Sampling methods: SPT & Core | |
| | No. SPT: No. UD: | Total depth: 40.0' |

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.6 | 713.1 |
| GROUND SURFACE | 0.0 | 710.5 |
| TOP OF SEAL | 24.2 | 686.3 |
| TOP OF FILTER PACK | 26.7 | 683.8 |
| BOTTOM OF RISER/TOP OF SCREEN | 30.0 | 680.5 |
| BOTTOM OF SCREEN | 40.0 | 670.5 |
| BOTTOM OF CASING | 40.0 | 670.[illegible] |
| BOTTOM OF HOLE | 40.0 | 670.5 |



# WELL CONSTRUCTION LOG

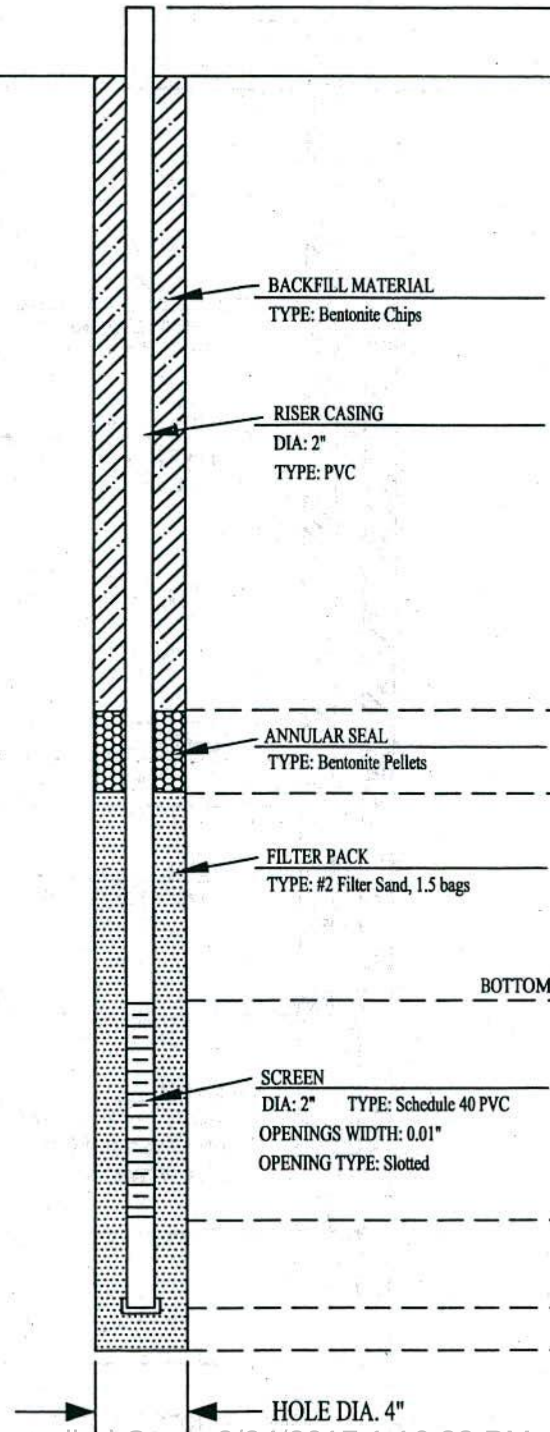
Southern Company Generation

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: L. Millet/R. Mudd
Dates drilled: 10/5/06 to 10/9/06

Drilling Co: SCS
Driller: B. Filipovich
Rig type: CME 550
Drilling method: HSA to 30', Rock core to 50.4'
Sampling methods:
No. SPT: No. UD: Total depth: 50.4'



Well Name
**GS-17**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.7 | 758.8 |
| GROUND SURFACE | 0.0 | 756.1 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 38.8 | 717.3 |
| BOTTOM OF RISER/TOP OF SCREEN | 40.4 | 715.7 |
| BOTTOM OF SCREEN | 50.4 | 705.7 |
| BOTTOM OF CASING | 50.4 | 705.7 |
| BOTTOM OF HOLE | 50.4 | 705.7 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: B. Filipovich | Well Na |
| Elevation: | Rig type: CME 550 | GS-18 |
| Logger: | Drilling method: HSA to 7.4', Rock core to 32.5' | |
| Dates drilled: | Sampling methods: | |
| | No. SPT: No. UD: Total depth: 32.5' | |

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -1.9 | 733.5 |
| GROUND SURFACE | 0.0 | 731.6 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 6.2 | 725.4 |
| BOTTOM OF RISER/TOP OF SCREEN | 7.5 | 724.1 |
| BOTTOM OF SCREEN | 17.5 | 714.1 |
| BOTTOM OF CASING | 32.5 | 699.1 |
| BOTTOM OF HOLE | 32.5 | 699.1 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 3 bags

SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

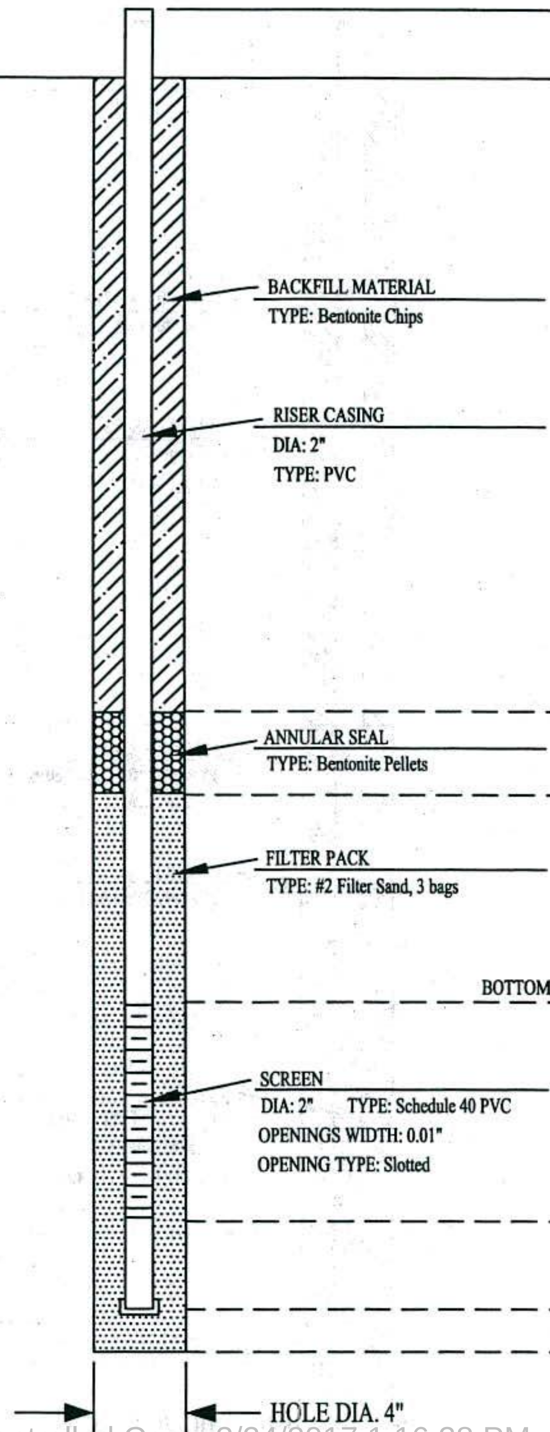
# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: A. Grissom<br>Dates drilled: 9/27/2006 | Drilling Co: SCS<br>Driller: B. Filipovich<br>Rig type: CME 550<br>Drilling method: HSA<br>Sampling methods:<br>No. SPT: No. UD: Total depth: 39.2' | Page 1 of 1 |

**Well Name**

**GS-19**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 752.9 |
| GROUND SURFACE | 0.0 | 750.0 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 13.2 | 736.8 |
| BOTTOM OF RISER/TOP OF SCREEN | 14.2 | 735.8 |
| BOTTOM OF SCREEN | 24.2 | 725.8 |
| BOTTOM OF CASING | 39.2 | 710.8 |
| BOTTOM OF HOLE | 39.2 | 710.8 |

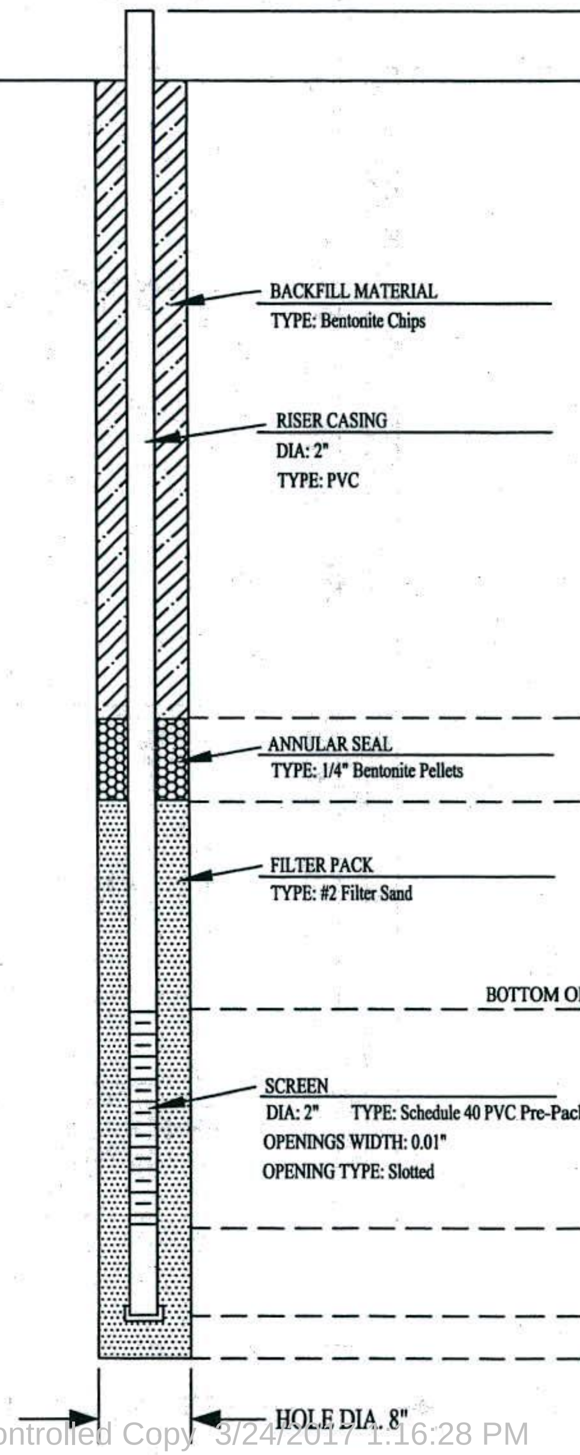
# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: L. Millet<br>Dates drilled: 10/4/06 | Drilling Co: SCS<br>Driller:<br>Rig type: CME 550<br>Drilling method: HSA/HQ<br>Sampling methods: SPT & Core<br>No. SPT: No. UD: | Page 1 of 1<br><br><br><br><br>Total depth: 43.5' |

Well Na
GS-20

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.8 | 716.6 |
| GROUND SURFACE | 0.0 | 713.8 |
| TOP OF SEAL | 24.0 | 689.8 |
| TOP OF FILTER PACK | 26.0 | 687.8 |
| BOTTOM OF RISER/TOP OF SCREEN | 28.5 | 685.3 |
| BOTTOM OF SCREEN | 38.5 | 675.3 |
| BOTTOM OF CASING | 43.5 | 670.3 |
| BOTTOM OF HOLE | 43.5 | 670.3 |

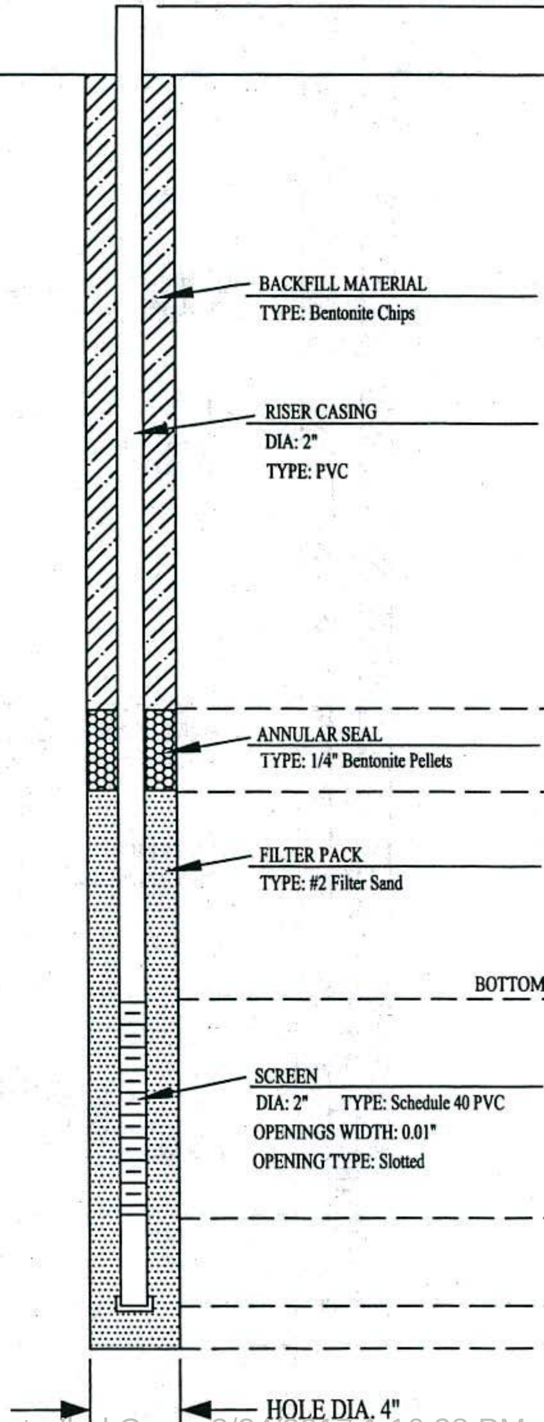


# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: | **Well Name** |
| Elevation: | Rig type: CME 550 | **GS-21** |
| Logger: L. Millet | Drilling method: HSA/HQ | |
| Dates drilled: 10/3/06 | Sampling methods: SPT & Core | |
| | No. SPT: No. UD: | Total depth: 72.5' |

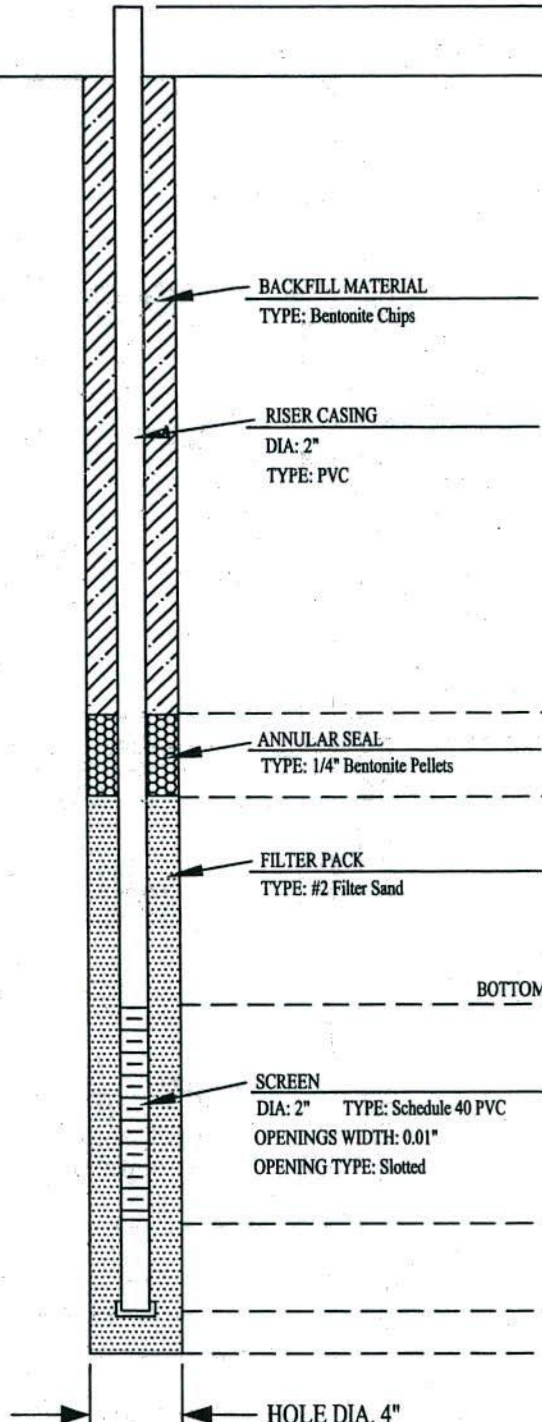
| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.7 | 792.1 |
| GROUND SURFACE | 0.0 | 789.4 |
| TOP OF SEAL | 53.0 | 736.4 |
| TOP OF FILTER PACK | 55.0 | 734.4 |
| BOTTOM OF RISER/TOP OF SCREEN | 57.5 | 731.9 |
| BOTTOM OF SCREEN | 67.5 | 721.9 |
| BOTTOM OF CASING | 67.5 | 721.9 |
| BOTTOM OF HOLE | 72.5 | 716.9 |



# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility | Drilling Co: SCS | Page 1 of 1 |
| Location: Plant Wansley | Driller: | Well Na |
| Elevation: | Rig type: CME 550 | GS-22 |
| Logger: L. Millet | Drilling method: HSA/HQ | |
| Dates drilled: 10/4/06 | Sampling methods: SPT & Core | |
| | No. SPT: No. UD: | Total depth: 72.0' |




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.4 | 732.7 |
| GROUND SURFACE | 0.0 | 729.3 |
| TOP OF SEAL | 53.0 | 676.3 |
| TOP OF FILTER PACK | 55.0 | 674.3 |
| BOTTOM OF RISER/TOP OF SCREEN | 57.0 | 672.3 |
| BOTTOM OF SCREEN | 67.0 | 662.3 |
| BOTTOM OF CASING | 72.0 | 657.[illegible] |
| BOTTOM OF HOLE | 72.0 | 657.3 |

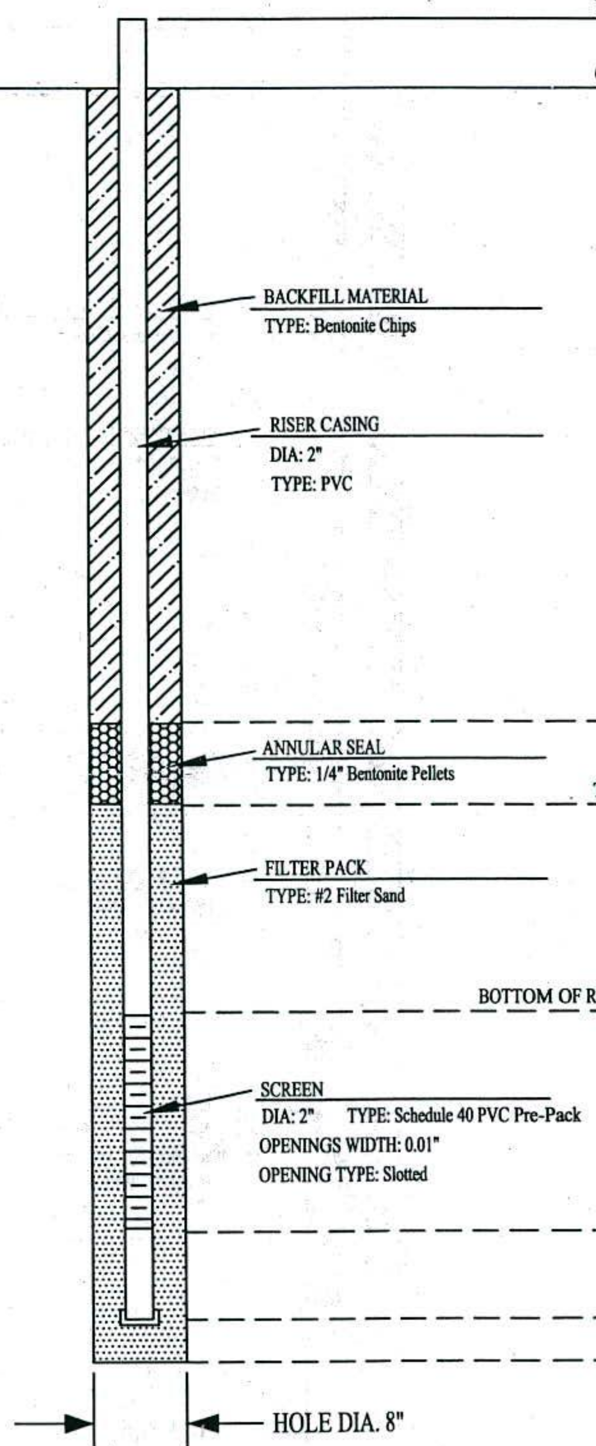
# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: L. Millet<br>Dates drilled: 10/5/06 | Drilling Co: SCS<br>Driller:<br>Rig type: CME 550<br>Drilling method: HSA/HQ<br>Sampling methods: SPT & Core<br>No. SPT: No. UD: | Page 1 of 1<br><br><br><br><br>Total depth: 50.0' |

**Well Name**

**GS-23**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.8 | 700.7 |
| GROUND SURFACE | 0.0 | 697.9 |
| TOP OF SEAL | 26.0 | 671.9 |
| TOP OF FILTER PACK | 28.0 | 669.9 |
| BOTTOM OF RISER/TOP OF SCREEN | 30.0 | 667.9 |
| BOTTOM OF SCREEN | 40.0 | 657.9 |
| BOTTOM OF CASING | 40.0 | 657.9 |
| BOTTOM OF HOLE | 50.0 | 647.9 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: R. Mudd
Dates drilled: 10/5/2006

Drilling Co: SCS
Driller: B. Filipovich
Rig type: CME 550
Drilling method: HSA
Sampling methods:
No. SPT: No. UD: Total depth: 65.5'



**Well Name**
**GS-24**

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.2 | 728.2 |
| GROUND SURFACE | 0.0 | 725.0 |
| TOP OF SEAL | 51.0 | 674.0 |
| TOP OF FILTER PACK | 53.5 | 671.5 |
| BOTTOM OF RISER/TOP OF SCREEN | 55.5 | 669.5 |
| BOTTOM OF SCREEN | 65.5 | 659.5 |
| BOTTOM OF CASING | 65.5 | 659.5 |
| BOTTOM OF HOLE | 65.5 | 659.5 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 3 bags

SCREEN
DIA: 2" TYPE: Schedule 40 PVC Pre-Pack
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 8"

# WELL CONSTRUCTION LOG

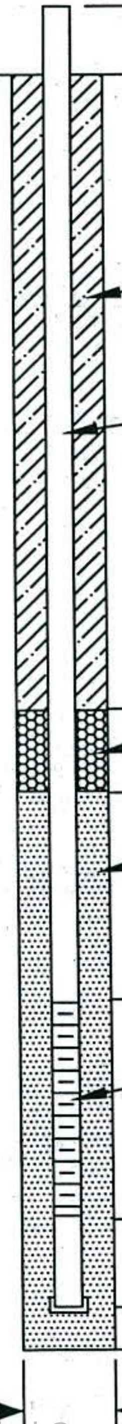
Southern Company Generation

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: A. Grissom
Dates drilled: 9/26/2006 to 9/27/2006

Drilling Co: SCS
Driller: B. Filipovich
Rig type: CME 550
Drilling method: HSA
Sampling methods:
No. SPT: No. UD: Total depth: 43.7'



Well Name
GS-25



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.8 | 788.5 |
| GROUND SURFACE | 0.0 | 785.7 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 32.0 | 753.7 |
| BOTTOM OF RISER/TOP OF SCREEN | 33.7 | 752.0 |
| BOTTOM OF SCREEN | 43.7 | 742.0 |
| BOTTOM OF CASING | 43.7 | 742.0 |
| BOTTOM OF HOLE | 43.7 | 742.0 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 2 bags

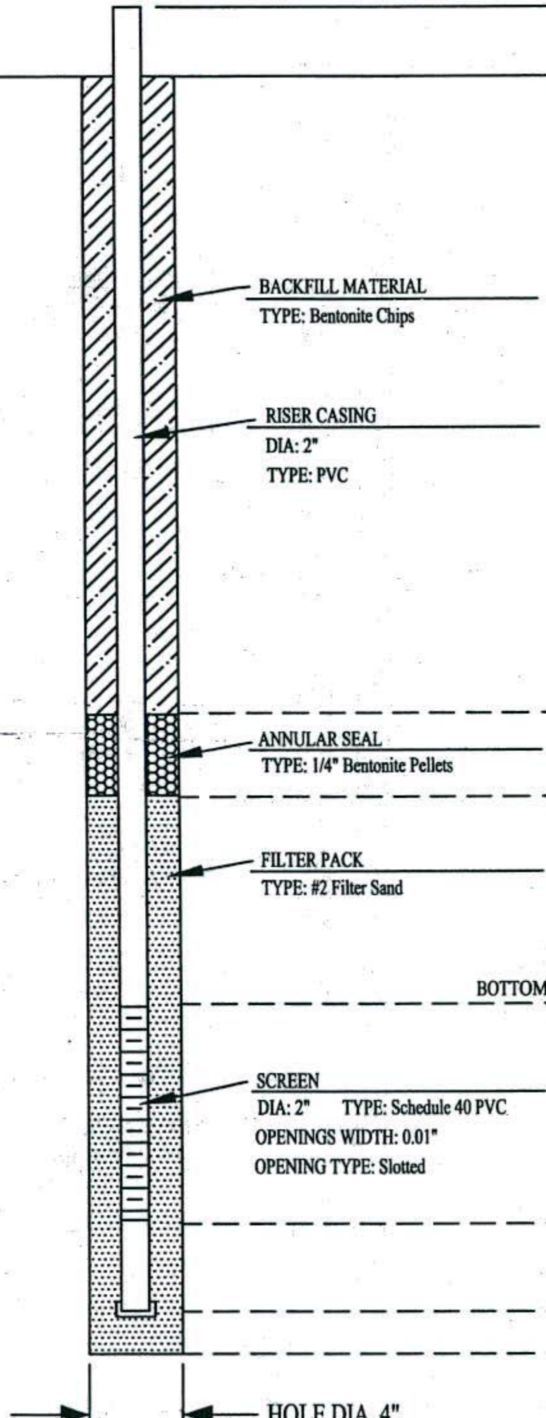
SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

# WELL CONSTRUCTION LOG

Southern Company Generation

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: L. Millet<br>Dates drilled: 10/2/06 | Drilling Co: SCS<br>Driller:<br>Rig type: CME 550<br>Drilling method: HSA/HQ<br>Sampling methods: SPT & Core<br>No. SPT: No. UD: Total depth: 60.0' | Page 1 of 1 |
| | | Well Na[me]<br>GS-26 |




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.4 | 748.1 |
| GROUND SURFACE | 0.0 | 744.7 |
| TOP OF SEAL | 41.0 | 703.7 |
| TOP OF FILTER PACK | 43.0 | 701.7 |
| BOTTOM OF RISER/TOP OF SCREEN | 45.0 | 699.7 |
| BOTTOM OF SCREEN | 55.0 | 689.7 |
| BOTTOM OF CASING | 60.0 | 684.7 |
| BOTTOM OF HOLE | 60.0 | 684.7 |

# WELL CONSTRUCTION LOG

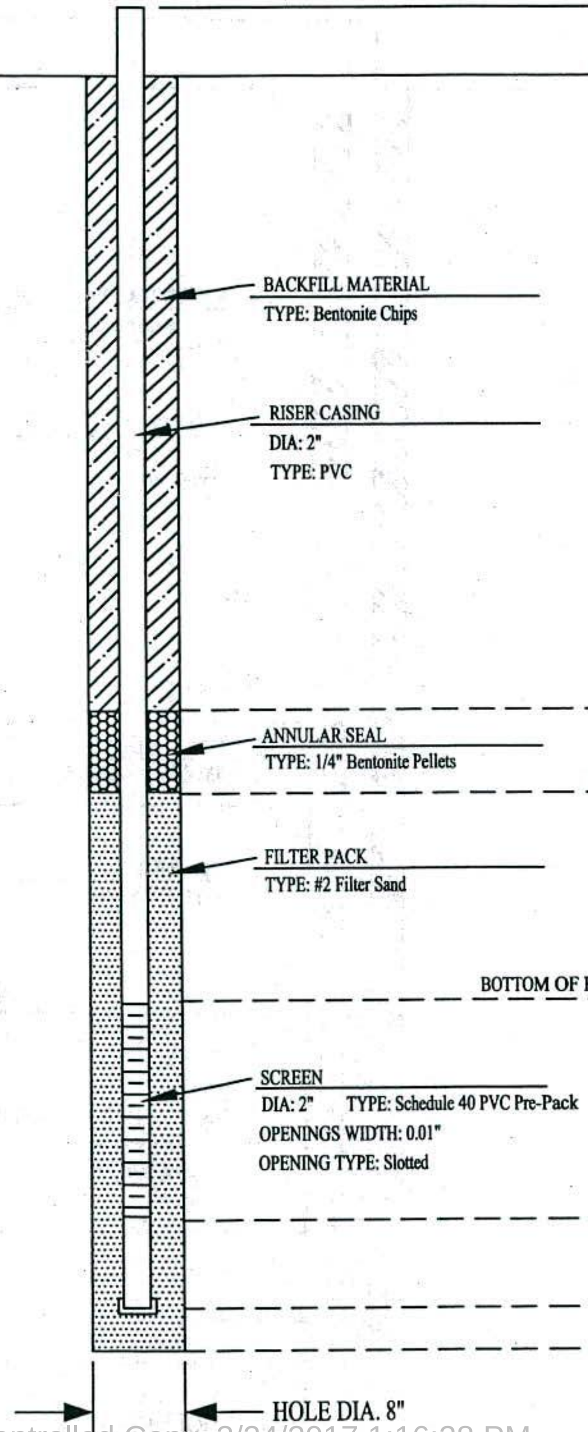
Southern Company Generation

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: L. Millet
Dates drilled: 10/3/06

Drilling Co: SCS
Driller:
Rig type: CME 550
Drilling method: HSA/HQ
Sampling methods: SPT & Core
No. SPT: No. UD: Total depth: 40.0'



Well Name
**GS-27**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.0 | 702.7 |
| GROUND SURFACE | 0.0 | 699.7 |
| TOP OF SEAL | 21.0 | 678.7 |
| TOP OF FILTER PACK | 23.0 | 676.7 |
| BOTTOM OF RISER/TOP OF SCREEN | 25.0 | 674.7 |
| BOTTOM OF SCREEN | 35.0 | 664.7 |
| BOTTOM OF CASING | 40.0 | 659.7 |
| BOTTOM OF HOLE | 40.0 | 659.7 |

# WELL CONSTRUCTION LOG

**Southern Company Generation**

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: S. Bearce
Dates drilled: 9/12/2006

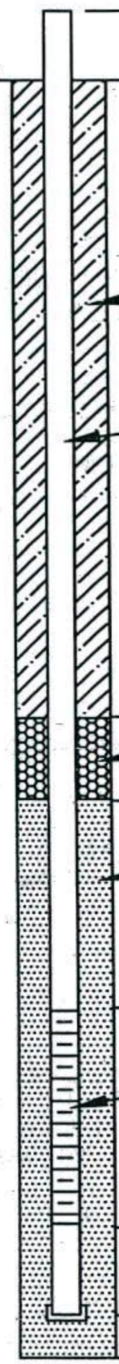
Drilling Co: SCS
Driller: B. Filipovich
Rig type: CME 550
Drilling method: HSA
Sampling methods:
No. SPT: No. UD: Total depth: 64.0



Well Na

GS-28

| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.0 | 816.4 |
| GROUND SURFACE | 0.0 | 813.4 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 52.2 | 761.2 |
| BOTTOM OF RISER/TOP OF SCREEN | 54.0 | 759.4 |
| BOTTOM OF SCREEN | 64.0 | 749.4 |
| BOTTOM OF CASING | 64.0 | 749.4 |
| BOTTOM OF HOLE | 64.0 | 749.4 |



BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 2 bags

SCREEN
DIA: 2" TYPE: Schedule 40 PVC
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 4"

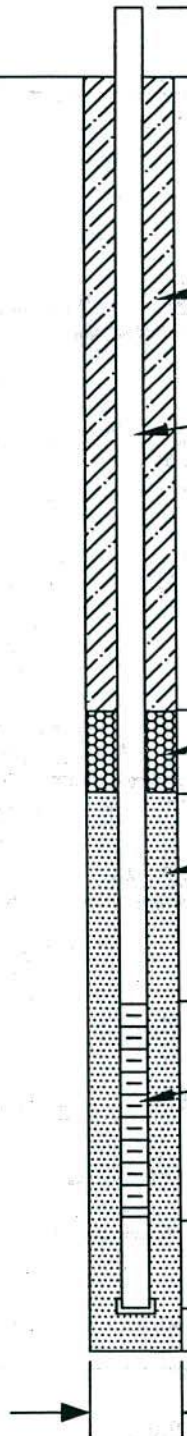
# WELL CONSTRUCTION LOG

**Southern Company Generation**

| | | |
|---|---|---|
| Project: Gypsum Storage Facility<br>Location: Plant Wansley<br>Elevation:<br>Logger: S. Bearce<br>Dates drilled: 9/14/2006 | Drilling Co: SCS<br>Driller: B. Filipovich<br>Rig type: CME 550<br>Drilling method: HSA<br>Sampling methods:<br>No. SPT: No. UD: Total depth: 49.0' | Page 1 of 1 |

**Well Name**

**GS-29**



| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -3.0 | 749.7 |
| GROUND SURFACE | 0.0 | 746.7 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 37.4 | 709.3 |
| BOTTOM OF RISER/TOP OF SCREEN | 39.0 | 707.7 |
| BOTTOM OF SCREEN | 49.0 | 697.7 |
| BOTTOM OF CASING | 49.0 | 697.7 |
| BOTTOM OF HOLE | 49.0 | 697.7 |

BACKFILL MATERIAL
TYPE: Bentonite Chips

RISER CASING
DIA: 2"
TYPE: PVC

ANNULAR SEAL
TYPE: Bentonite Pellets

FILTER PACK
TYPE: #2 Filter Sand, 7 bags

SCREEN
DIA: 2" TYPE: Schedule 40 PVC Pre-Pack
OPENINGS WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA. 8"

# WELL CONSTRUCTION LOG

Southern Company Generation

Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: R. Mudd
Dates drilled: 9/19/2006

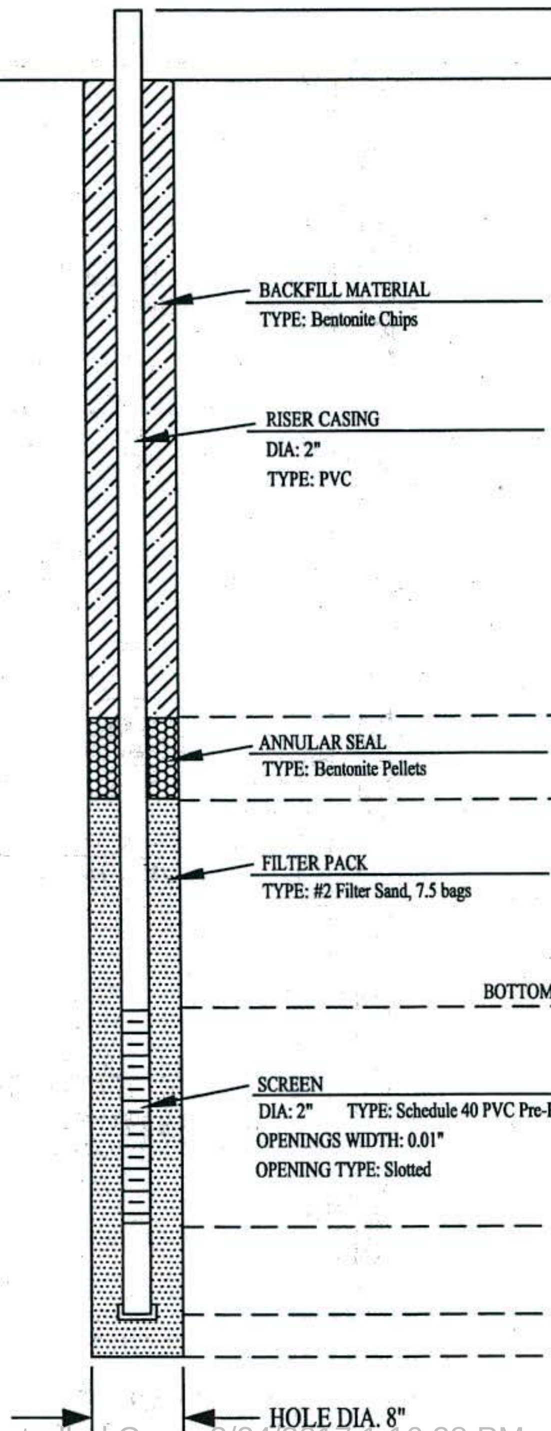
Drilling Co: SCS
Driller: B. Filipovich
Rig type: CME 550
Drilling method: HSA
Sampling methods:
No. SPT: No. UD:



Total depth: 56.5'

Well Na

GS-30




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 717.5 |
| GROUND SURFACE | 0.0 | 714.6 |
| TOP OF SEAL | | |
| TOP OF FILTER PACK | 33.5 | 681.1 |
| BOTTOM OF RISER/TOP OF SCREEN | 34.5 | 680.1 |
| BOTTOM OF SCREEN | 44.5 | 670.1 |
| BOTTOM OF CASING | 44.5 | 670.1 |
| BOTTOM OF HOLE | 56.5 | 658.1 |

# WELL CONSTRUCTION LOG

Southern Company Generation

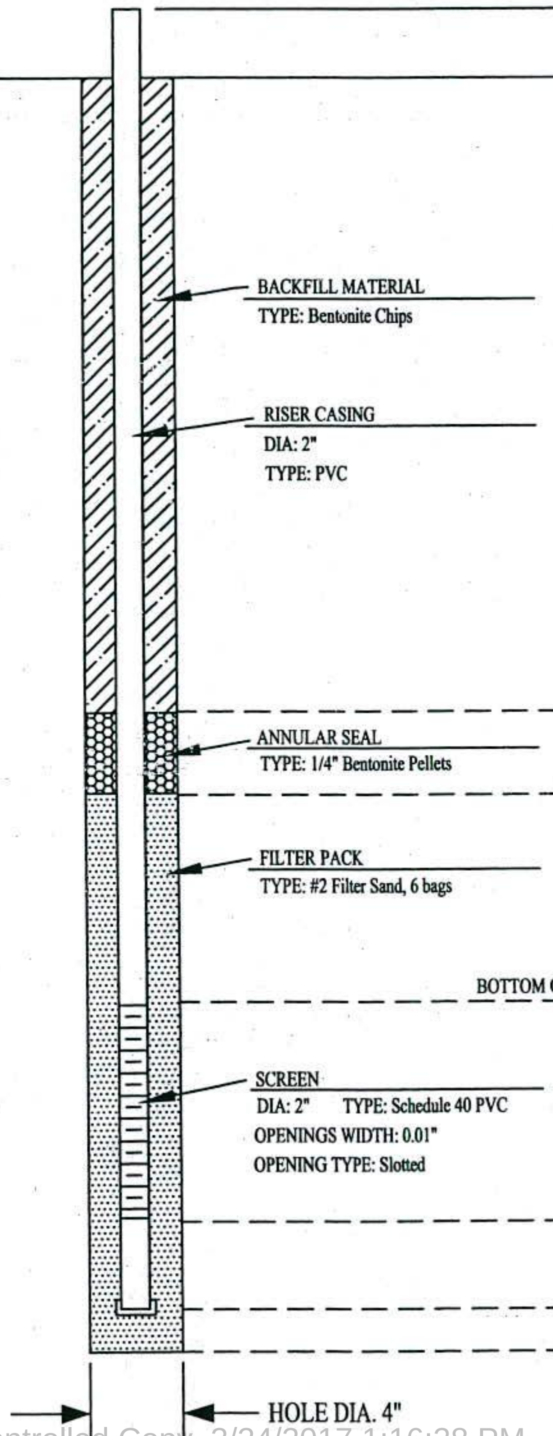
Project: Gypsum Storage Facility
Location: Plant Wansley
Elevation:
Logger: T. Hartsfield
Dates drilled: 10/21/06

Drilling Co: SCS
Driller: S. Milam
Rig type: CME 550
Drilling method: HSA/HQ Core
Sampling methods: SPT
No. SPT: 6 No. UD: Total depth: 43.5'



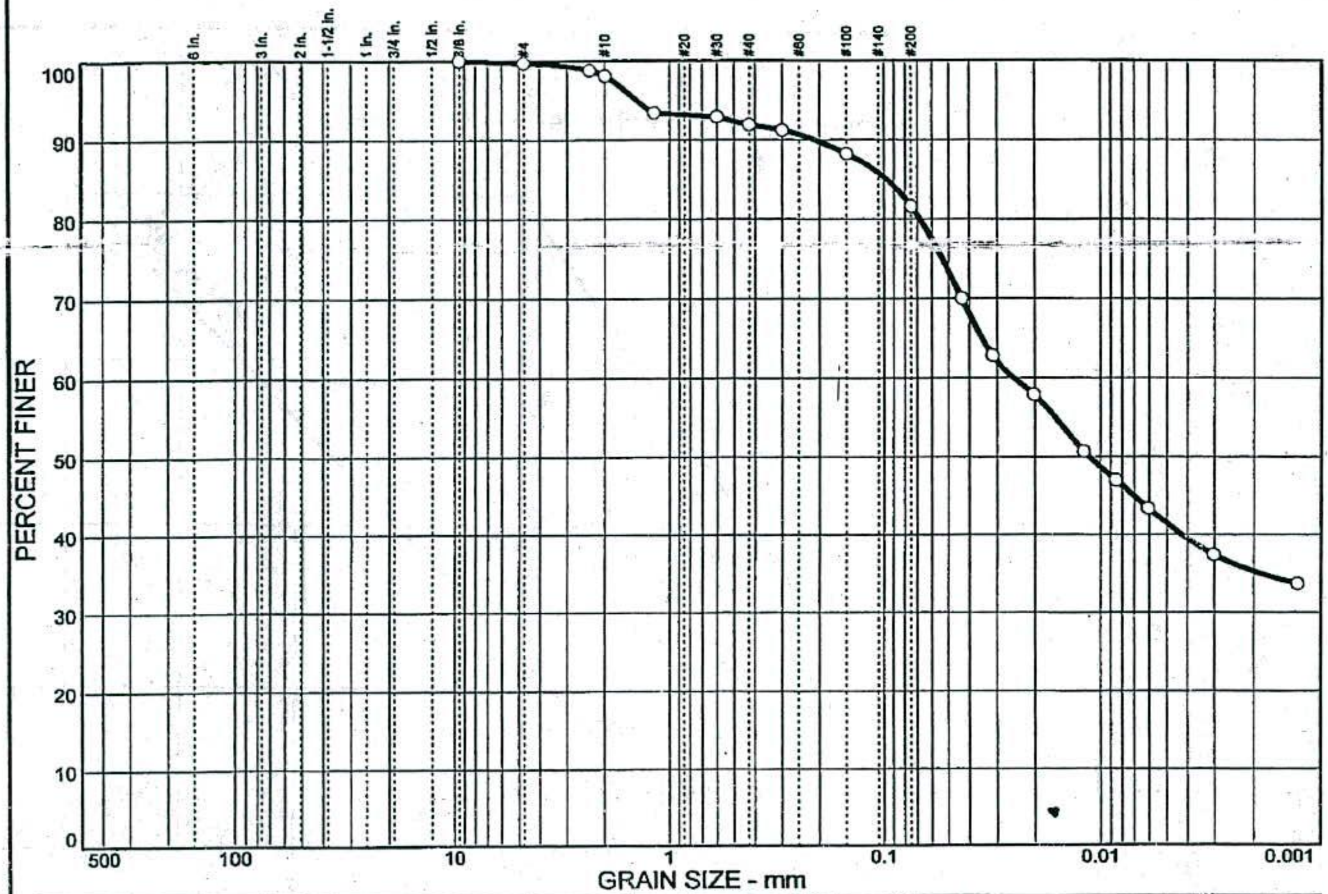
**Well Name**

**GS-31**




| | DEPTH | ELEV. |
|---|---|---|
| TOP OF CASING | -2.9 | 846.4 |
| GROUND SURFACE | 0.0 | 843.5 |
| TOP OF SEAL | 15.0 | 828.5 |
| TOP OF FILTER PACK | 18.5 | 825.0 |
| BOTTOM OF RISER/TOP OF SCREEN | 20.5 | 823.0 |
| BOTTOM OF SCREEN | 30.5 | 813.0 |
| BOTTOM OF CASING | 30.5 | 813.0 |
| BOTTOM OF HOLE | 43.5 | 800.0 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.3 | 18.1 | 40.1 | 41.5 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.7 | | |
| #8 | 98.8 | | |
| #10 | 98.1 | | |
| #16 | 93.4 | | |
| #30 | 92.9 | | |
| #40 | 91.9 | | |
| #50 | 91.2 | | |
| #100 | 88.2 | | |
| #200 | 81.6 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 33 LL= 55 PI= 22

**Coefficients**

$D_{85}$= 0.0976 $D_{60}$= 0.0252 $D_{50}$= 0.0112
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

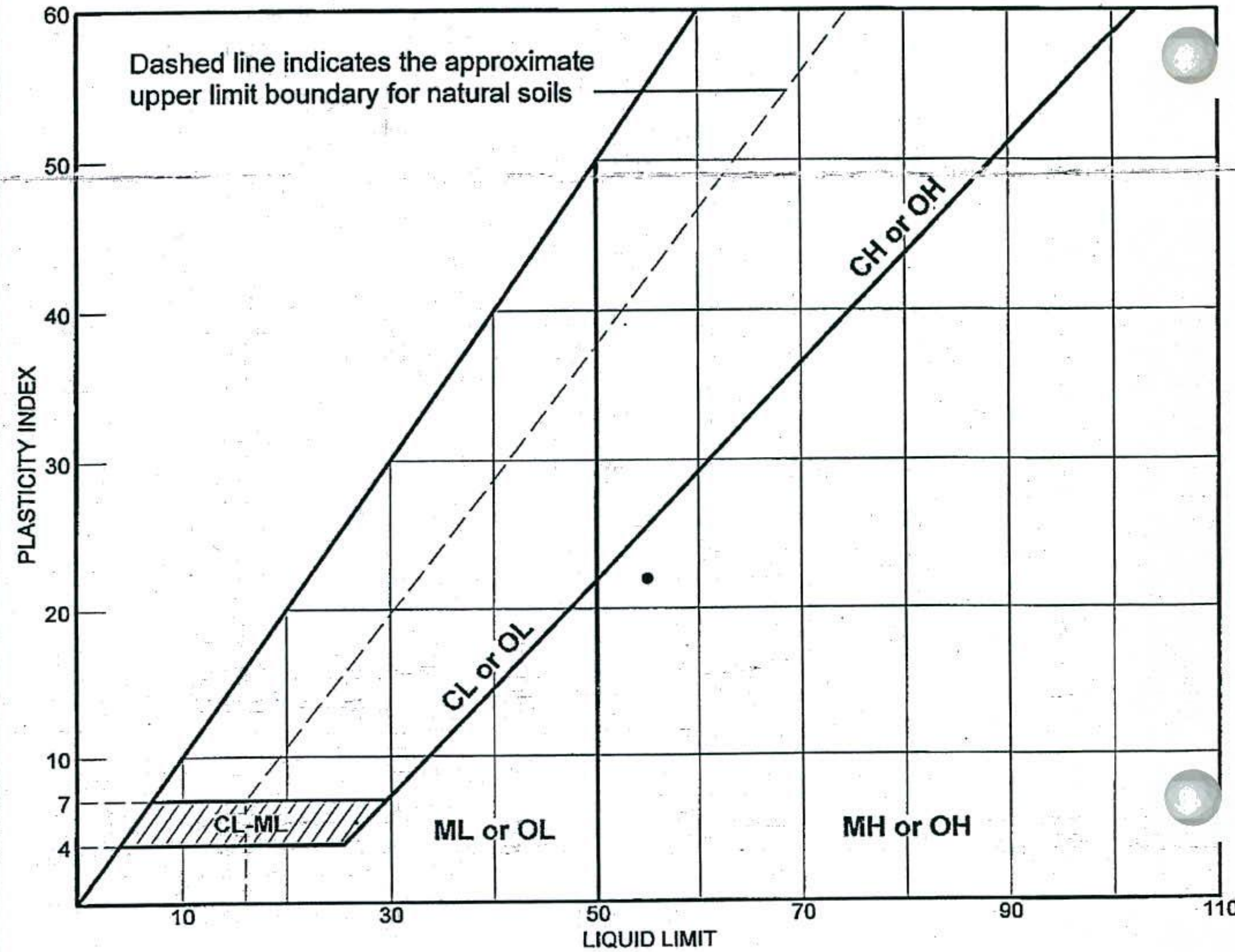
Specific Gravity - 2.74

**Sample No.:** S-2 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-17 **Elev./Depth:** 4.0 - 5.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 1

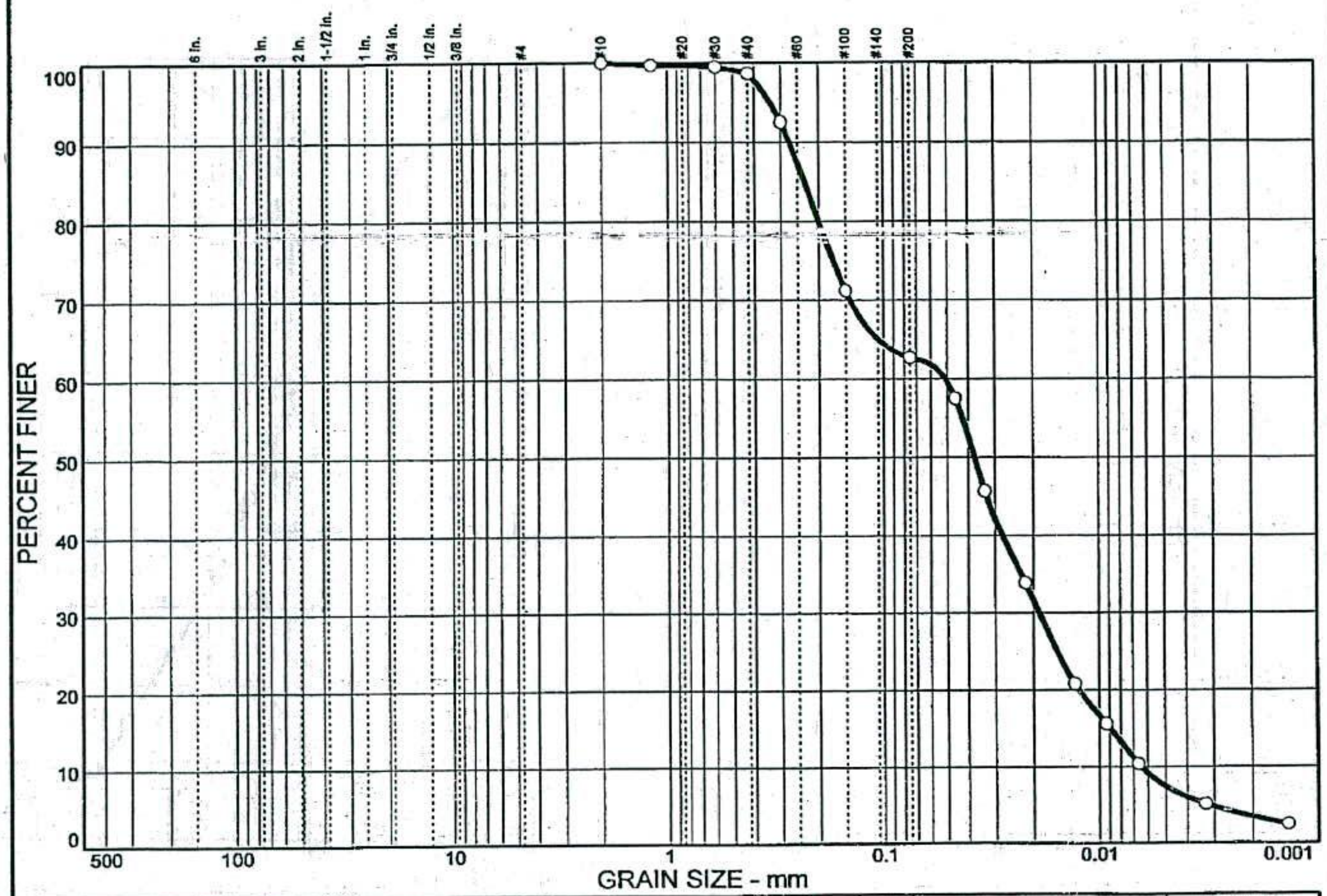
# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | S-2 (Jar) | 4.0 - 5.5 | | 33 | 55 | 22 | MH |

| | |
|---|---|
| LIQUID AND PLASTIC LIMITS TEST REPORT<br>**SOUTHERN COMPANY** | **Client:** SCS - Terri Hartsfield<br>**Project:** Plant Wansley Gypsum Disposal Facility<br>**Project No.:** EWO - 3186DE **Lab#** 1 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 37.3 | 55.3 | 7.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #10 | 100.0 | | |
| #16 | 99.7 | | |
| #30 | 99.5 | | |
| #40 | 98.7 | | |
| #50 | 92.5 | | |
| #100 | 71.2 | | |
| #200 | 62.7 | | |

* (no specification provided)

**Soil Description**

Sandy siltLight Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.232 $D_{60}$= 0.0512 $D_{50}$= 0.0374
$D_{30}$= 0.0188 $D_{15}$= 0.0089 $D_{10}$= 0.0064
$C_u$= 7.97 $C_c$= 1.07

**Classification**

USCS= ML AASHTO=

**Remarks**

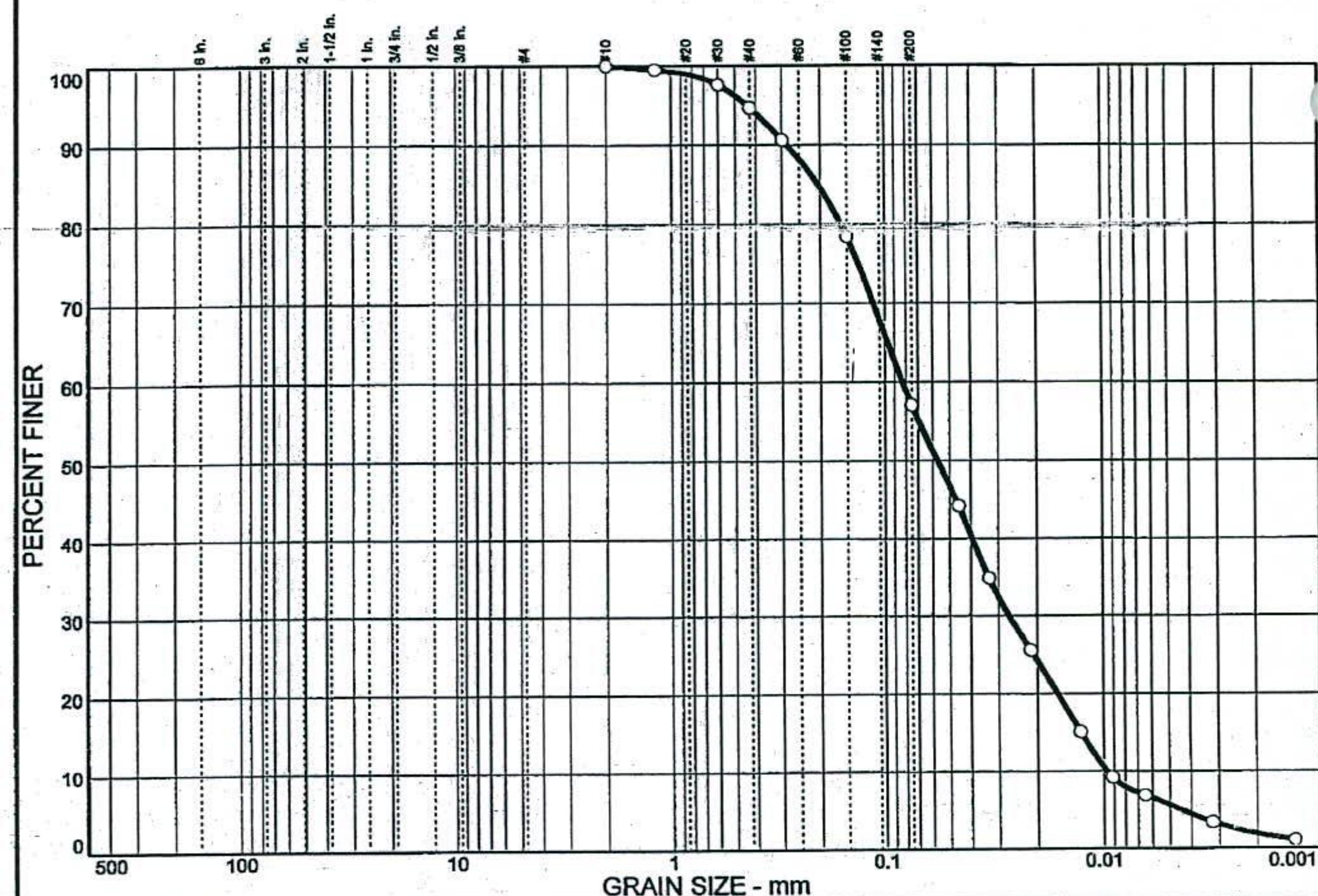
Specific Gravity - 2.73

**Sample No.:** S-4 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-17 **Elev./Depth:** 14.5 - 15.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 2

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 42.9 | 51.5 | 5.6 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #10 | 100.0 | | |
| #16 | 99.5 | | |
| #30 | 97.6 | | |
| #40 | 94.7 | | |
| #50 | 90.6 | | |
| #100 | 78.4 | | |
| #200 | 57.1 | | |

* (no specification provided)

**Soil Description**

Light Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.204 $D_{60}$= 0.0828 $D_{50}$= 0.0570
$D_{30}$= 0.0268 $D_{15}$= 0.0126 $D_{10}$= 0.0097
$C_u$= 8.57 $C_c$= 0.90

**Classification**

USCS= ML AASHTO=

**Remarks**

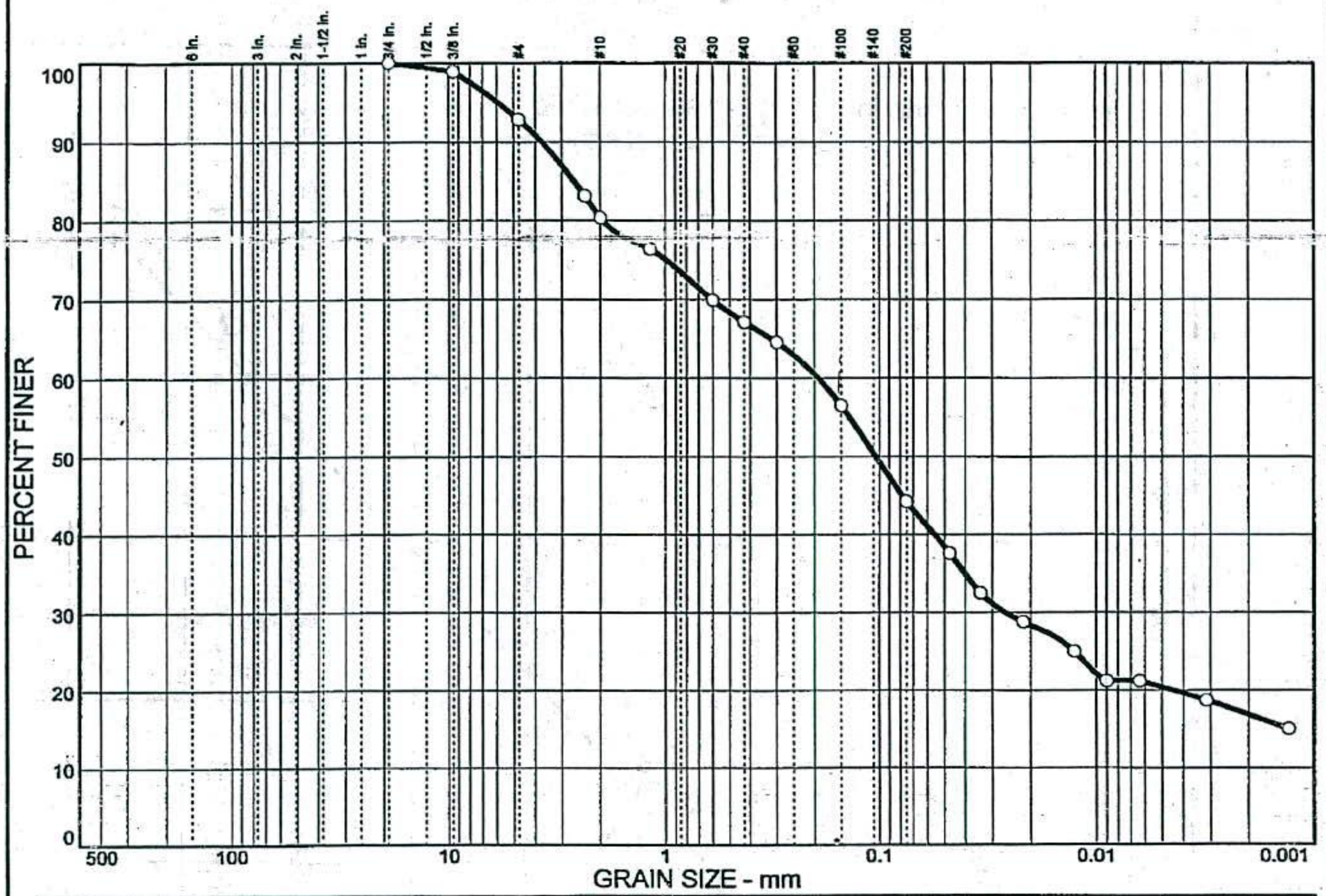
Specific Gravity - 2.83

**Sample No.:** S-6 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-17 **Elev./Depth:** 24.0 - 25.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 3

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 7.2 | 48.5 | 23.9 | 20.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 98.9 | | |
| #4 | 92.8 | | |
| #8 | 83.1 | | |
| #10 | 80.3 | | |
| #16 | 76.4 | | |
| #30 | 69.9 | | |
| #40 | 67.1 | | |
| #50 | 64.5 | | |
| #100 | 56.5 | | |
| #200 | 44.3 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Silty sand

**Atterberg Limits**

PL= 31 LL= 43 PI= 12

**Coefficients**

$D_{85}$= 2.64 $D_{60}$= 0.192 $D_{50}$= 0.104
$D_{30}$= 0.0262 $D_{15}$= 0.0013 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= SM AASHTO=

**Remarks**

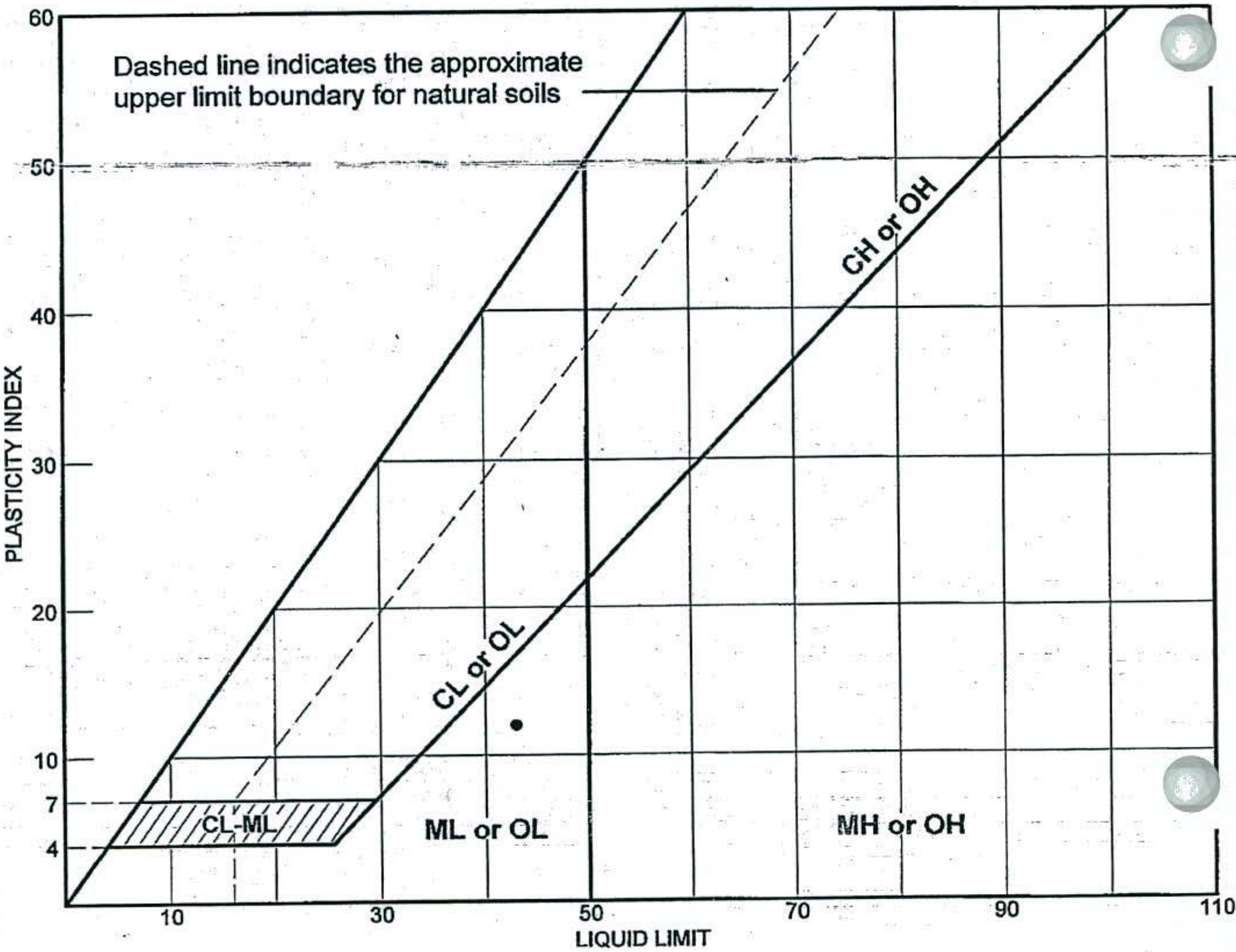
Specific Gravity - 2.79

**Sample No.:** S-2 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-29 **Elev./Depth:** 3.0 - 4.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 4

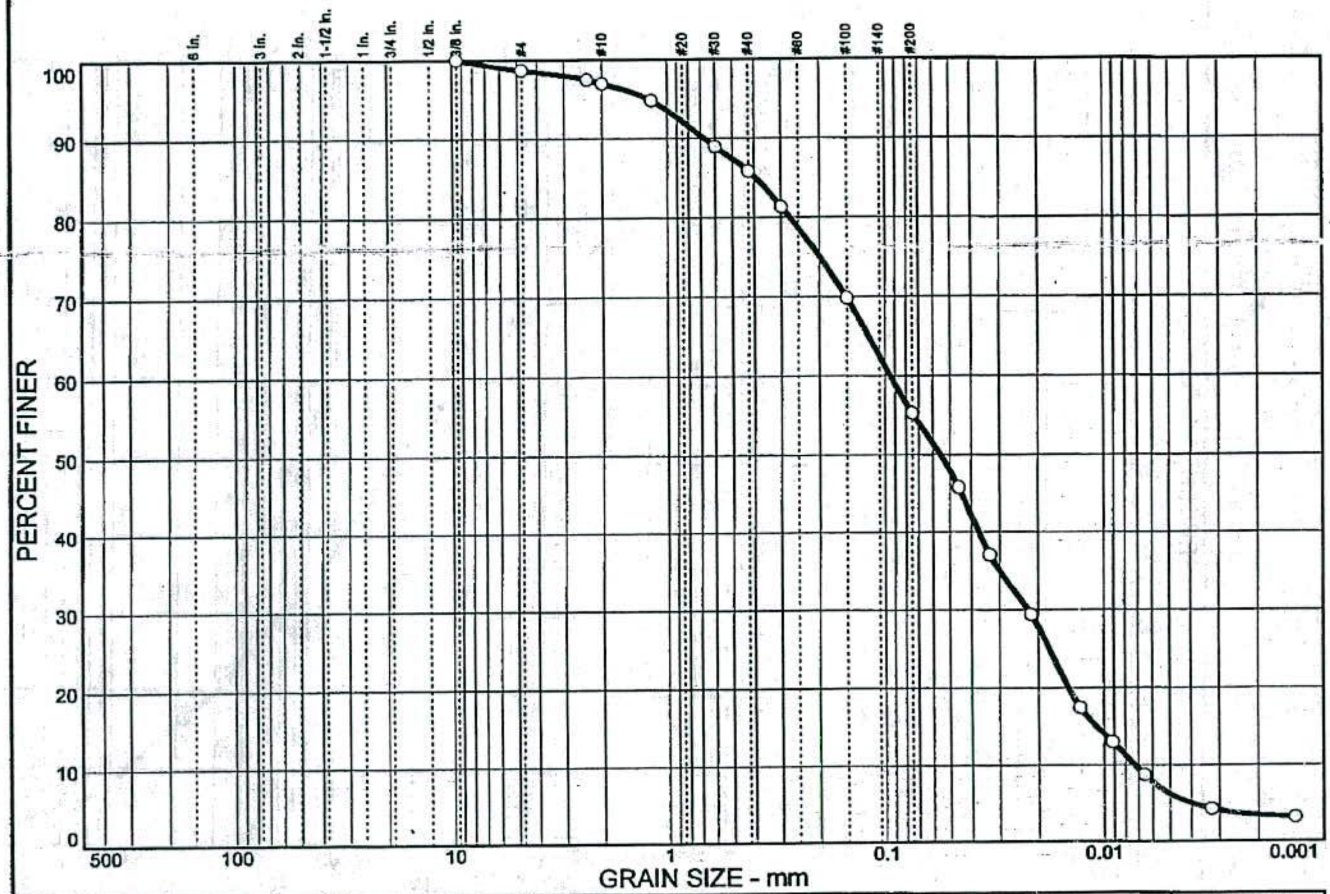
# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | S-2 (Jar) | 3.0 - 4.5 | | 31 | 43 | 12 | SM |

| | |
|---|---|
| LIQUID AND PLASTIC LIMITS TEST REPORT<br>**SOUTHERN COMPANY** | **Client:** SCS - Terri Hartsfield<br>**Project:** Plant Wansley Gypsum Disposal Facility<br>**Project No.:** EWO - 3186DE **Lab#** 4 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 1.3 | 43.4 | 49.1 | 6.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 98.7 | | |
| #8 | 97.5 | | |
| #10 | 97.0 | | |
| #16 | 94.8 | | |
| #30 | 88.9 | | |
| #40 | 85.8 | | |
| #50 | 81.3 | | |
| #100 | 69.8 | | |
| #200 | 55.3 | | |

* (no specification provided)

**Soil Description**

Light Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.396 $D_{60}$= 0.0949 $D_{50}$= 0.0554
$D_{30}$= 0.0221 $D_{15}$= 0.0109 $D_{10}$= 0.0073
$C_u$= 13.05 $C_c$= 0.71

**Classification**

USCS= ML AASHTO=

**Remarks**

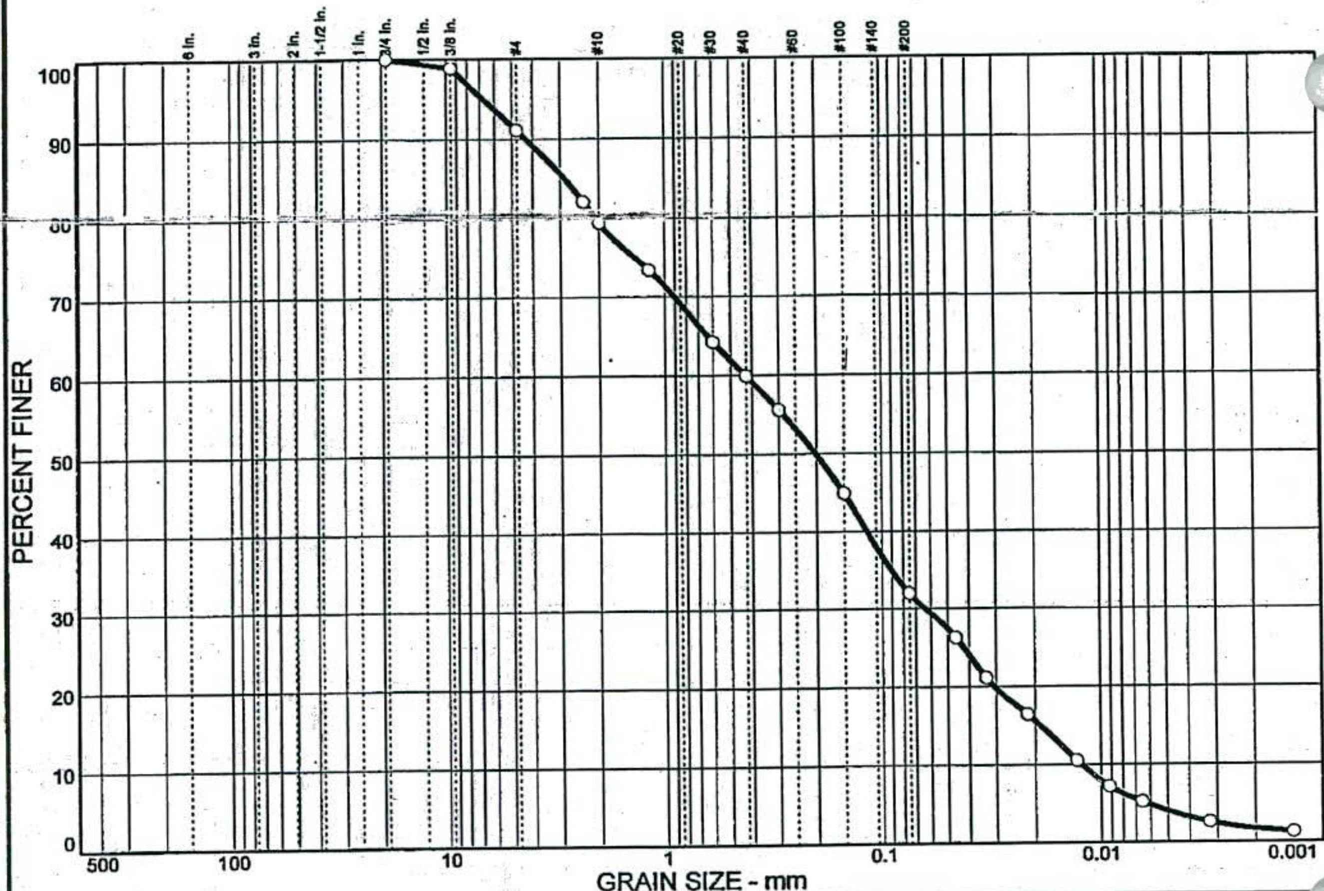
Specific Gravity - 2.77

**Sample No.:** S-4 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-29 **Elev./Depth:** 13 - 14.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 5

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 8.9 | 59.1 | 28.0 | 4.0 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 98.9 | | |
| #4 | 91.1 | | |
| #8 | 82.1 | | |
| #10 | 79.4 | | |
| #16 | 73.4 | | |
| #30 | 64.2 | | |
| #40 | 59.9 | | |
| #50 | 55.6 | | |
| #100 | 44.9 | | |
| #200 | 32.0 | | |

* (no specification provided)

**Soil Description**

Light Brown Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 2.86 $D_{60}$= 0.429 $D_{50}$= 0.202
$D_{30}$= 0.0634 $D_{15}$= 0.0189 $D_{10}$= 0.0122
$C_u$= 35.00 $C_c$= 0.77

**Classification**

USCS= SM AASHTO=

**Remarks**

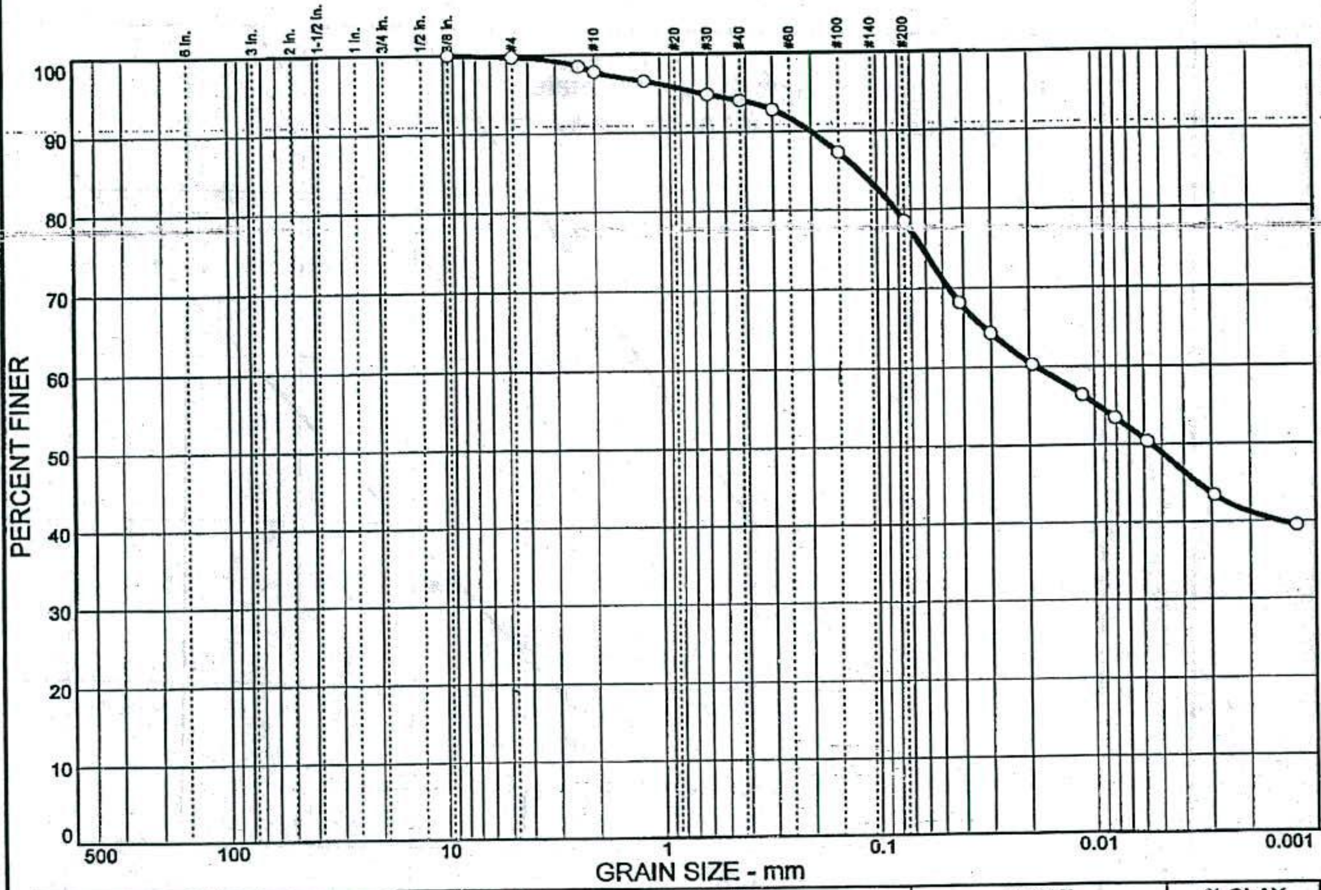
Specific Gravity - 2.77

**Sample No.:** S-9 (Jar) **Source of Sample:** **Date:** 11/10/06
**Location:** GYP-29 **Elev./Depth:** 37.0 - 39.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 6

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.3 | 21.2 | 29.6 | 48.9 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.7 | | |
| #8 | 98.5 | | |
| #10 | 97.8 | | |
| #16 | 96.6 | | |
| #30 | 94.8 | | |
| #40 | 94.0 | | |
| #50 | 92.8 | | |
| #100 | 87.3 | | |
| #200 | 78.5 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 32 LL= 58 PI= 26

**Coefficients**

$D_{85}$= 0.121 $D_{60}$= 0.0186 $D_{50}$= 0.0056
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

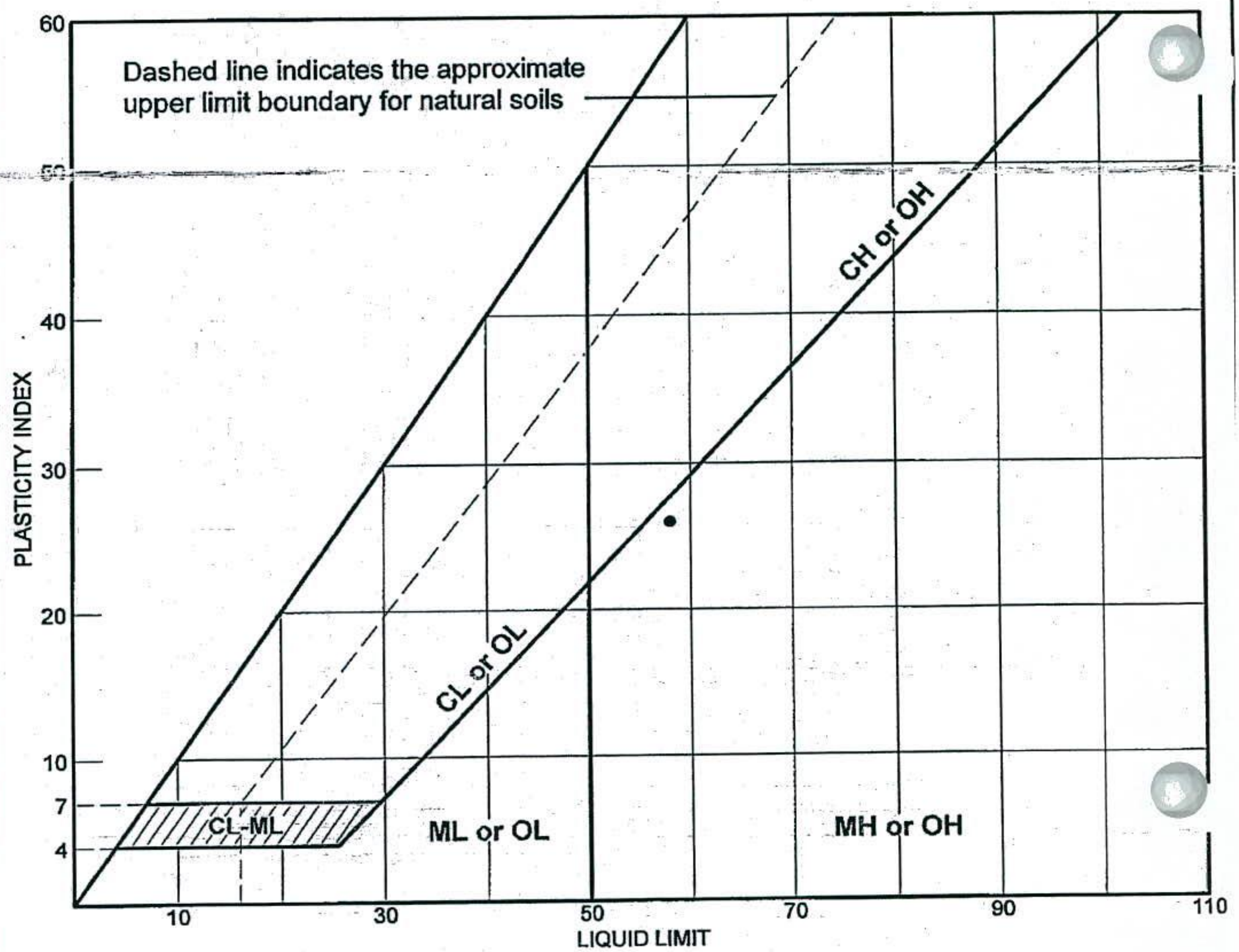
Specific Gravity - 2.72

**Sample No.:** S-2 (Jar)
**Location:** GYP-7
**Source of Sample:**
**Date:** 11/10/06
**Elev./Depth:** 4.5 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 7

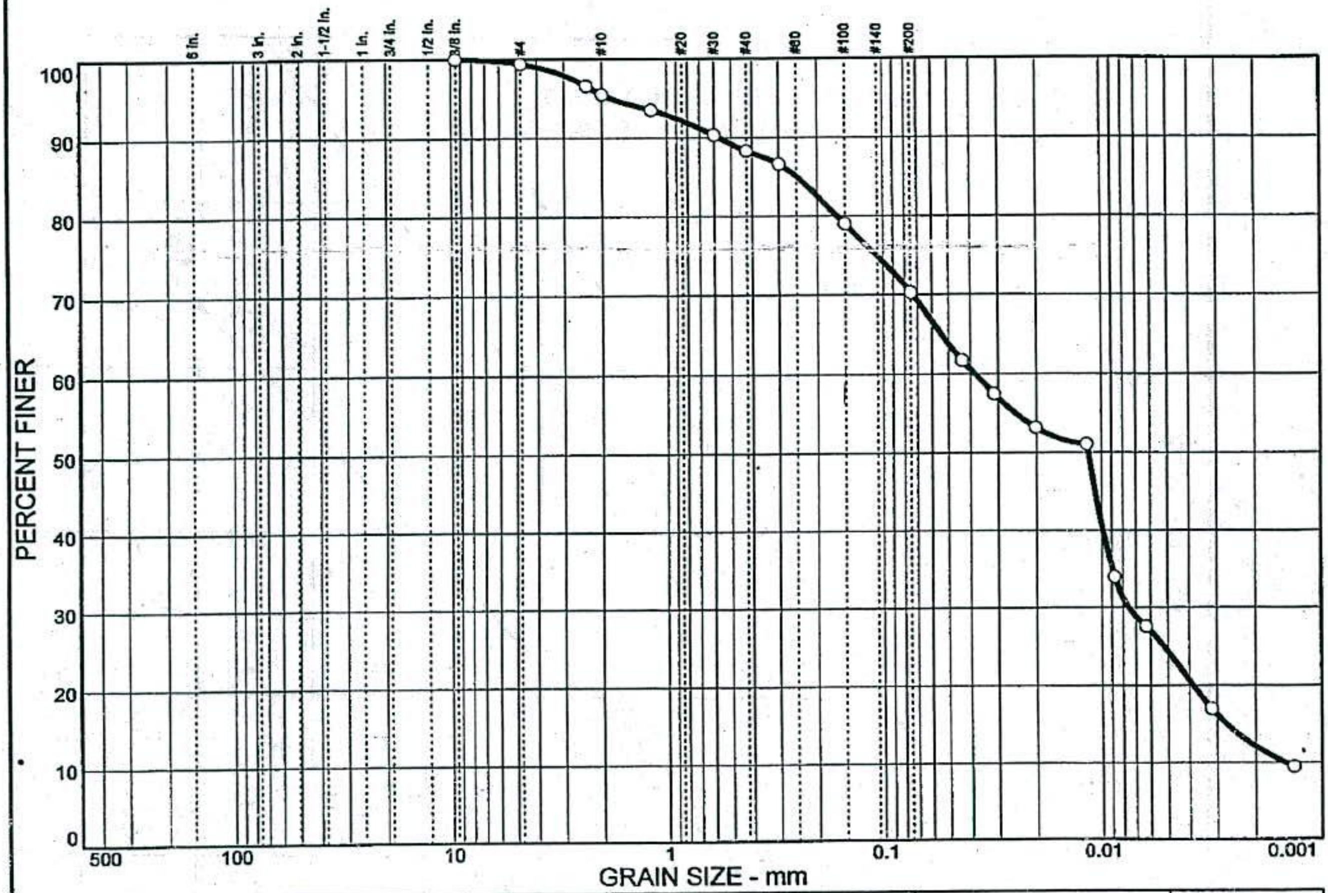
# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | S-2 (Jar) | 4.5 - 6.0 | | 32 | 58 | 26 | MH |

| LIQUID AND PLASTIC LIMITS TEST REPORT | **Client:** SCS - Terri Hartsfield |
|---|---|
| **SOUTHERN COMPANY** | **Project:** Plant Wansley Gypsum Disposal Facility |
| | **Project No.:** EWO - 3186DE **Lab#** 7 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.6 | 29.1 | 45.9 | 24.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.4 | | |
| #8 | 96.6 | | |
| #10 | 95.5 | | |
| #16 | 93.5 | | |
| #30 | 90.3 | | |
| #40 | 88.3 | | |
| #50 | 86.6 | | |
| #100 | 79.0 | | |
| #200 | 70.3 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 45 LL= 53 PI= 8

**Coefficients**

$D_{85}$= 0.248 $D_{60}$= 0.0382 $D_{50}$= 0.0115
$D_{30}$= 0.0075 $D_{15}$= 0.0027 $D_{10}$= 0.0015
$C_u$= 26.09 $C_c$= 1.02

**Classification**

USCS= MH AASHTO=

**Remarks**

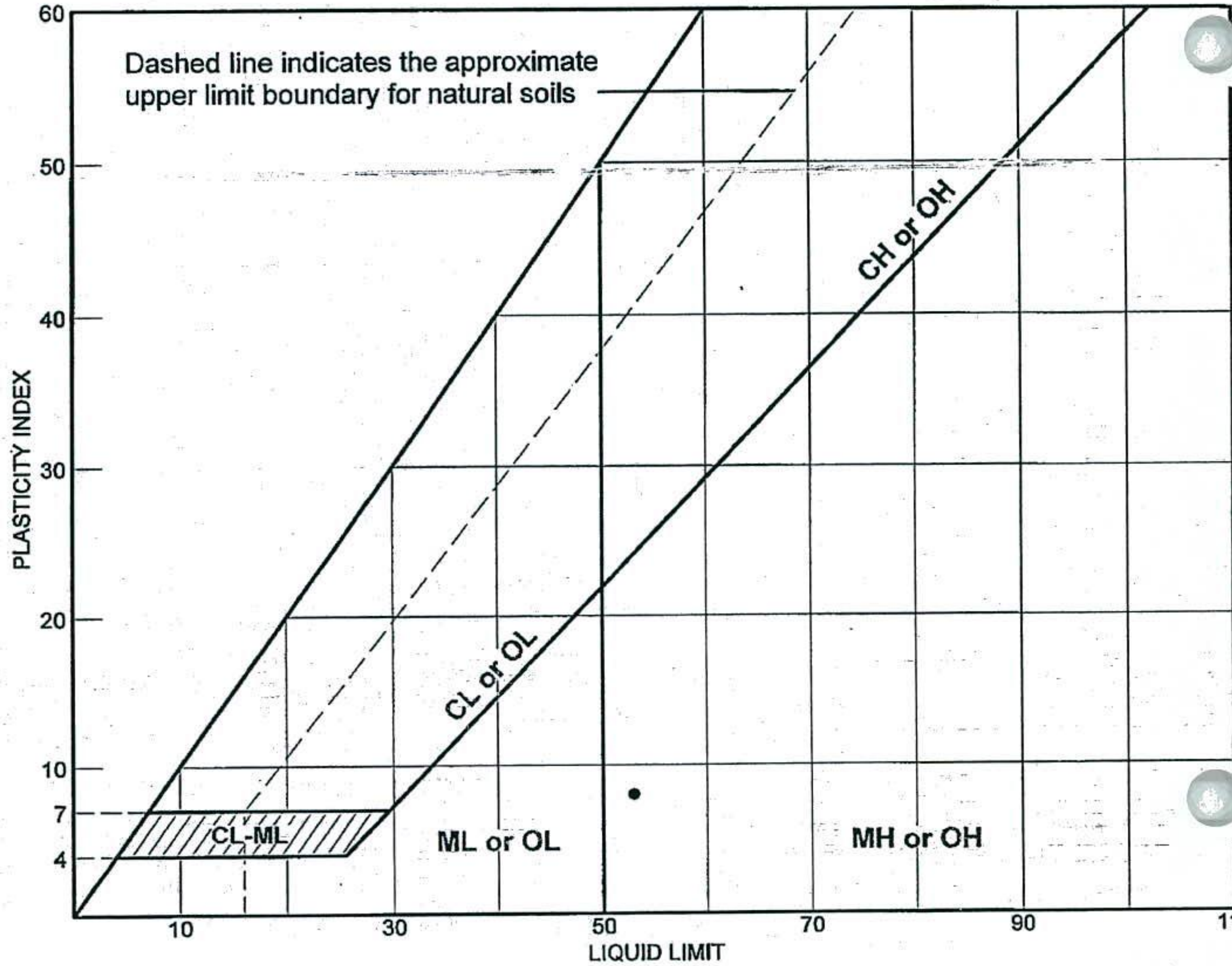
Specific Gravity - 2.73

**Sample No.:** S-4 (Jar) **Source of Sample:** **Date:** 11/11/06
**Location:** GYP-7 **Elev./Depth:** 14.5 - 16.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 8

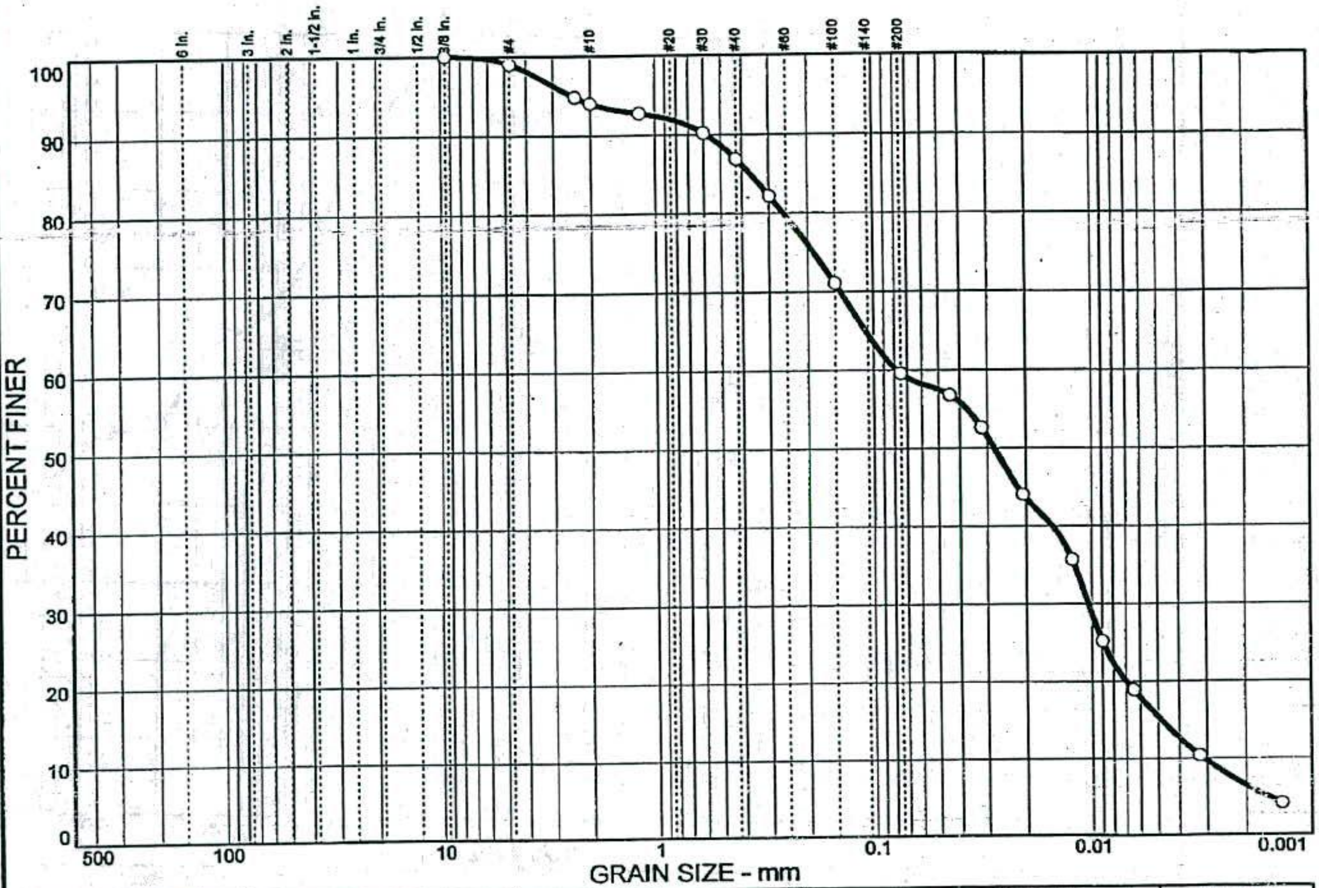
# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | S-4 | 14.5 - 16.0 | | 45 | 53 | 8 | MH |

| LIQUID AND PLASTIC LIMITS TEST REPORT | Client: SCS - Terri Hartsfield |
|---|---|
| **SOUTHERN COMPANY** | Project: Plant Wansley Gypsum Disposal Facility |
| | Project No.: EWO - 3186DE Lab# 8 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 1.0 | 39.4 | 44.2 | 15.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.0 | | |
| #8 | 94.8 | | |
| #10 | 94.0 | | |
| #16 | 92.7 | | |
| #30 | 90.2 | | |
| #40 | 86.9 | | |
| #50 | 82.2 | | |
| #100 | 71.1 | | |
| #200 | 59.6 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.366 $D_{60}$= 0.0781 $D_{50}$= 0.0280
$D_{30}$= 0.0104 $D_{15}$= 0.0048 $D_{10}$= 0.0031
$C_u$= 25.15 $C_c$= 0.44

**Classification**

USCS= ML AASHTO=

**Remarks**

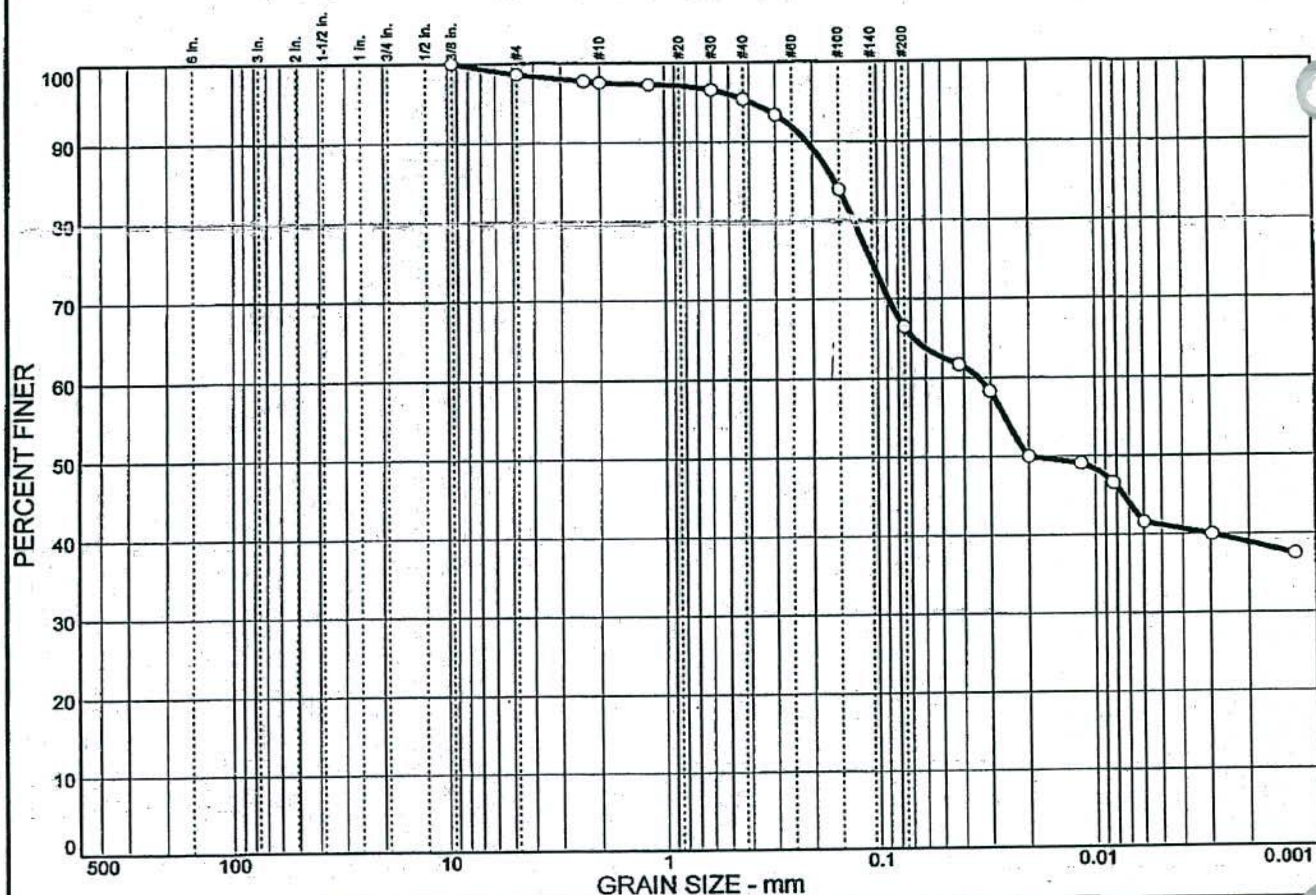
Specific Gravity - 2.72

**Sample No.:** S-8 (Jar) **Source of Sample:** **Date:** 11/11/06
**Location:** GYP-7 **Elev./Depth:** 34.5 - 36.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 9

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 1.4 | 32.1 | 25.3 | 41.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 98.6 | | |
| #8 | 97.7 | | |
| #10 | 97.5 | | |
| #16 | 97.2 | | |
| #30 | 96.5 | | |
| #40 | 95.3 | | |
| #50 | 93.3 | | |
| #100 | 83.9 | | |
| #200 | 66.5 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Sandy lean clay

**Atterberg Limits**

PL= 26 LL= 47 PI= 21

**Coefficients**

$D_{85}$= 0.158 $D_{60}$= 0.0341 $D_{50}$= 0.0199
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= CL AASHTO=

**Remarks**

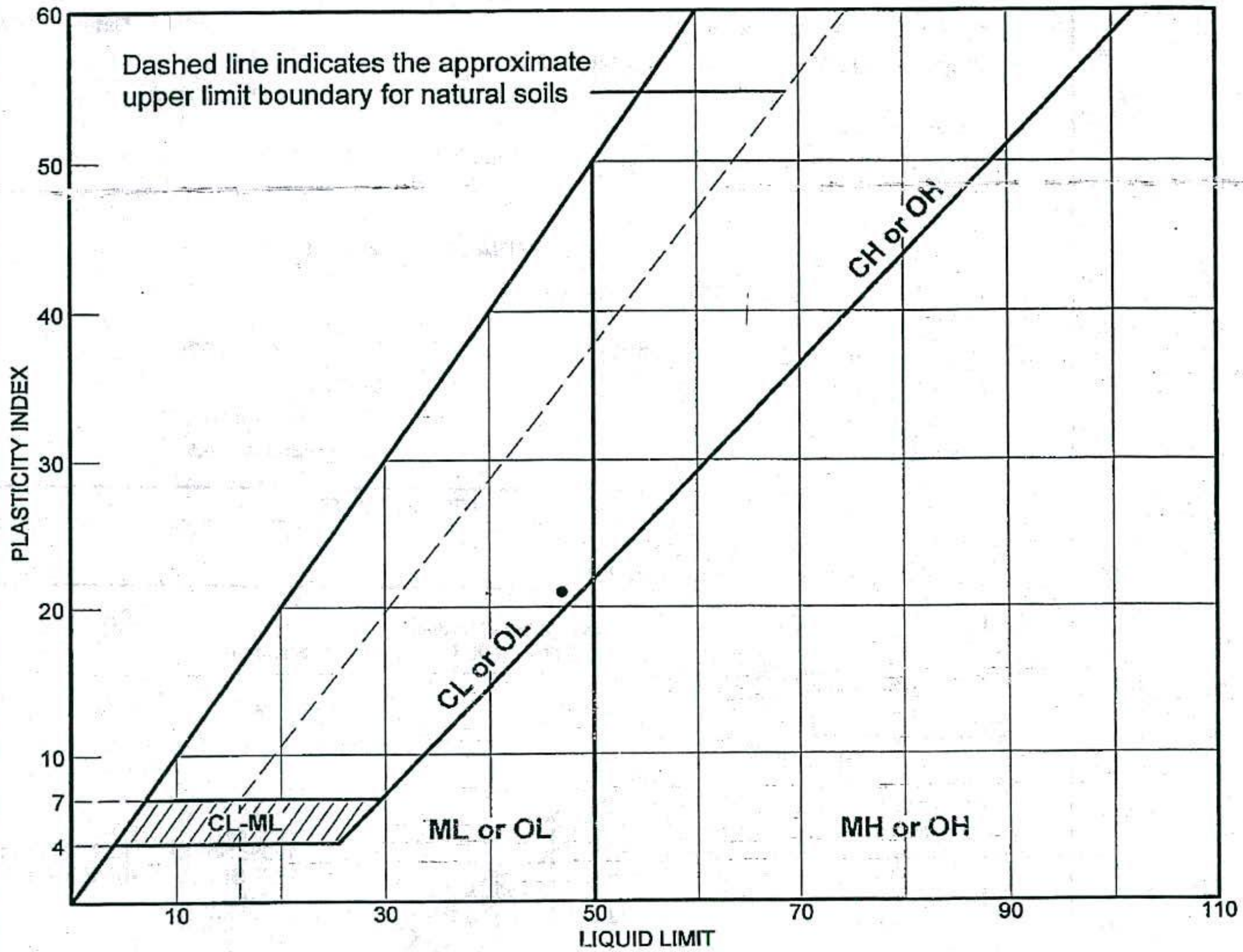
Specific Gravity - 2.63
Permeability - 3.7x10-7
Dry Density - 94.9pcf @ 24.2% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-2 **Elev./Depth:** 1.0 - 2.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 10

# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| • | | Bulk | 1.0 - 2.5 | | 26 | 47 | 21 | CL |

| LIQUID AND PLASTIC LIMITS TEST REPORT | Client: SCS - Terri Hartsfield |
|---|---|
| **SOUTHERN COMPANY** | Project: Plant Wansley Gypsum Disposal Facility |
| | Project No.: EWO - 3186DE Lab# 10 |

# COMPACTION TEST REPORT

**Curve No.: 10**

**Project No.:** EWO - 3186DE

**Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-2

**Elev./Depth:** 1.0 - 2.5 **Sample No.** Bulk

**Remarks:**

**MATERIAL DESCRIPTION**

**Description:** Light Reddish Brown Sandy lean clay

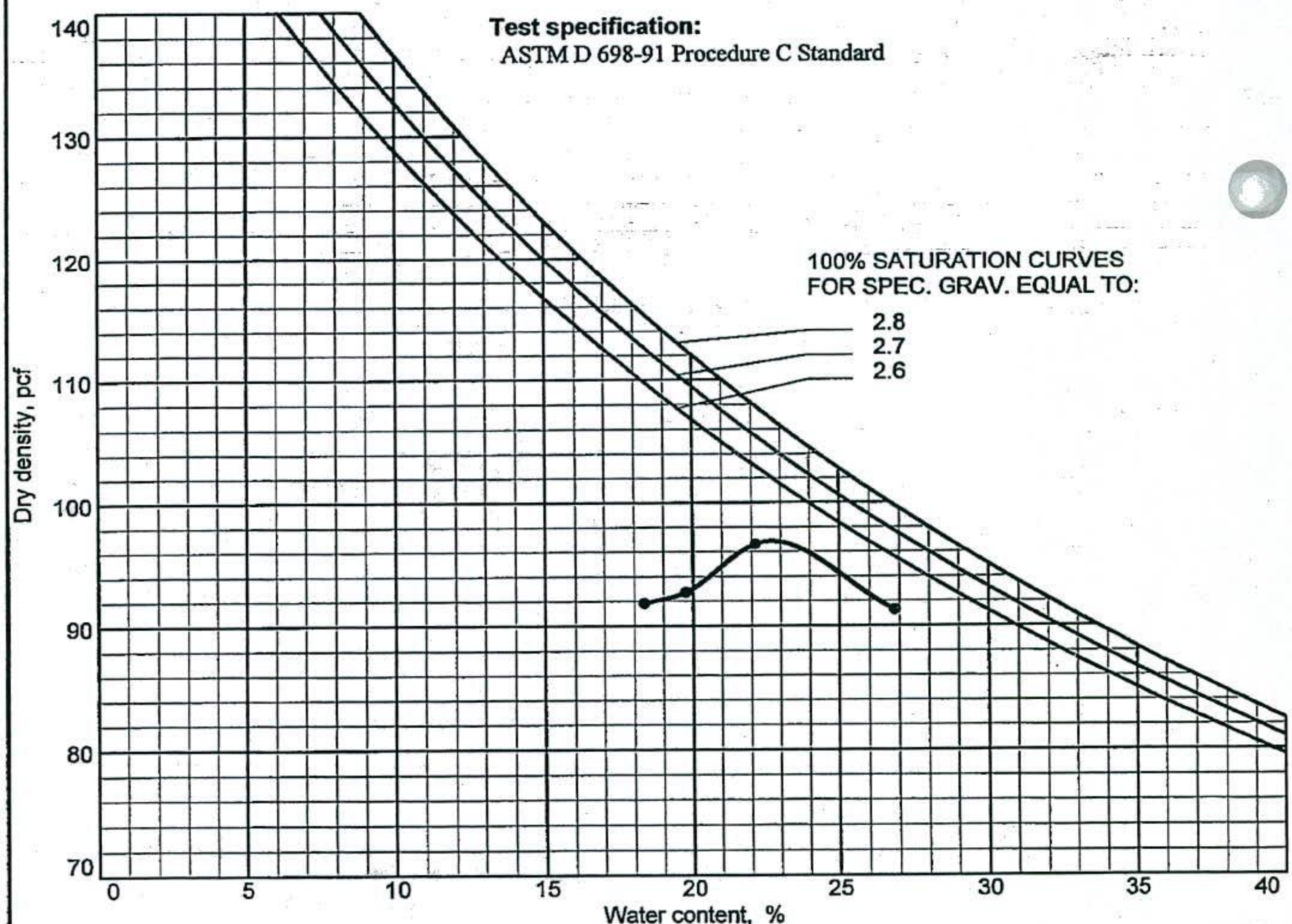
**Classifications -** **USCS:** CL **AASHTO:**

**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** 47 **Plasticity Index =** 21

**% > 3/4 in. =** % **% < No.200 =** 66.5 %

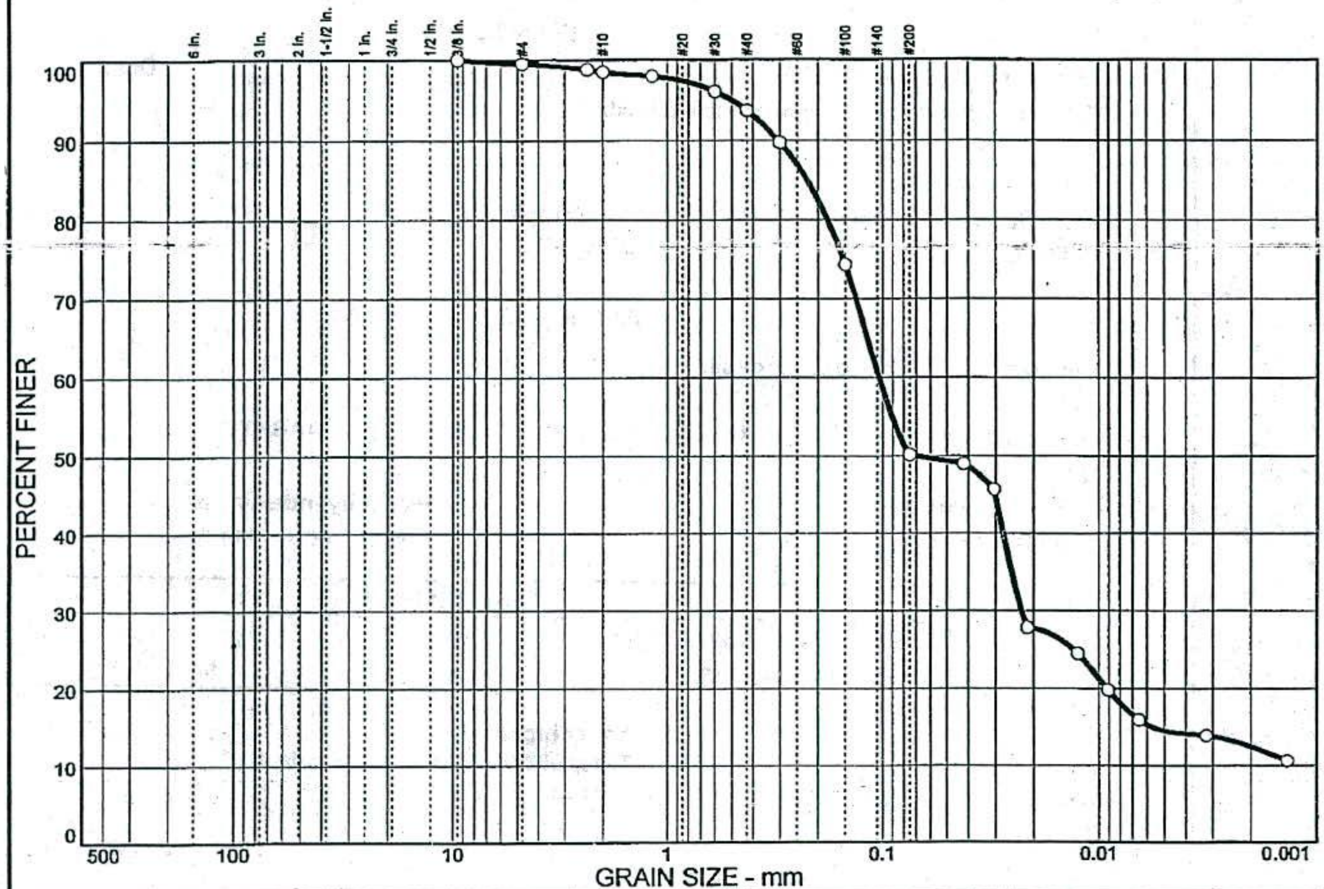
| TEST RESULTS |
| --- |
| Maximum dry density = 96.9 pcf |
| Optimum moisture = 22.7 % |




Lab#

SOUTHERN COMPANY

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.5 | 49.4 | 35.6 | 14.5 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.5 | | |
| #8 | 98.8 | | |
| #10 | 98.5 | | |
| #16 | 98.0 | | |
| #30 | 96.1 | | |
| #40 | 93.7 | | |
| #50 | 89.7 | | |
| #100 | 74.3 | | |
| #200 | 50.1 | | |

* (no specification provided)

**Soil Description**

Light Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.225 $D_{60}$= 0.104 $D_{50}$= 0.0712
$D_{30}$= 0.0227 $D_{15}$= 0.0057 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

Specific Gravity - 2.63
Permeability - 3.5x10-6
Dey Density - 97.7pcf @ 19.5% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-2 **Elev./Depth:** 3.0 - 4.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 11

# COMPACTION TEST REPORT

**Curve No.: 11**

**Project No.:** EWO - 3186DE **Date:** 10/29/06
**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-2
**Elev./Depth:** 3.0 - 4.5 **Sample No.** Bulk
**Remarks:**

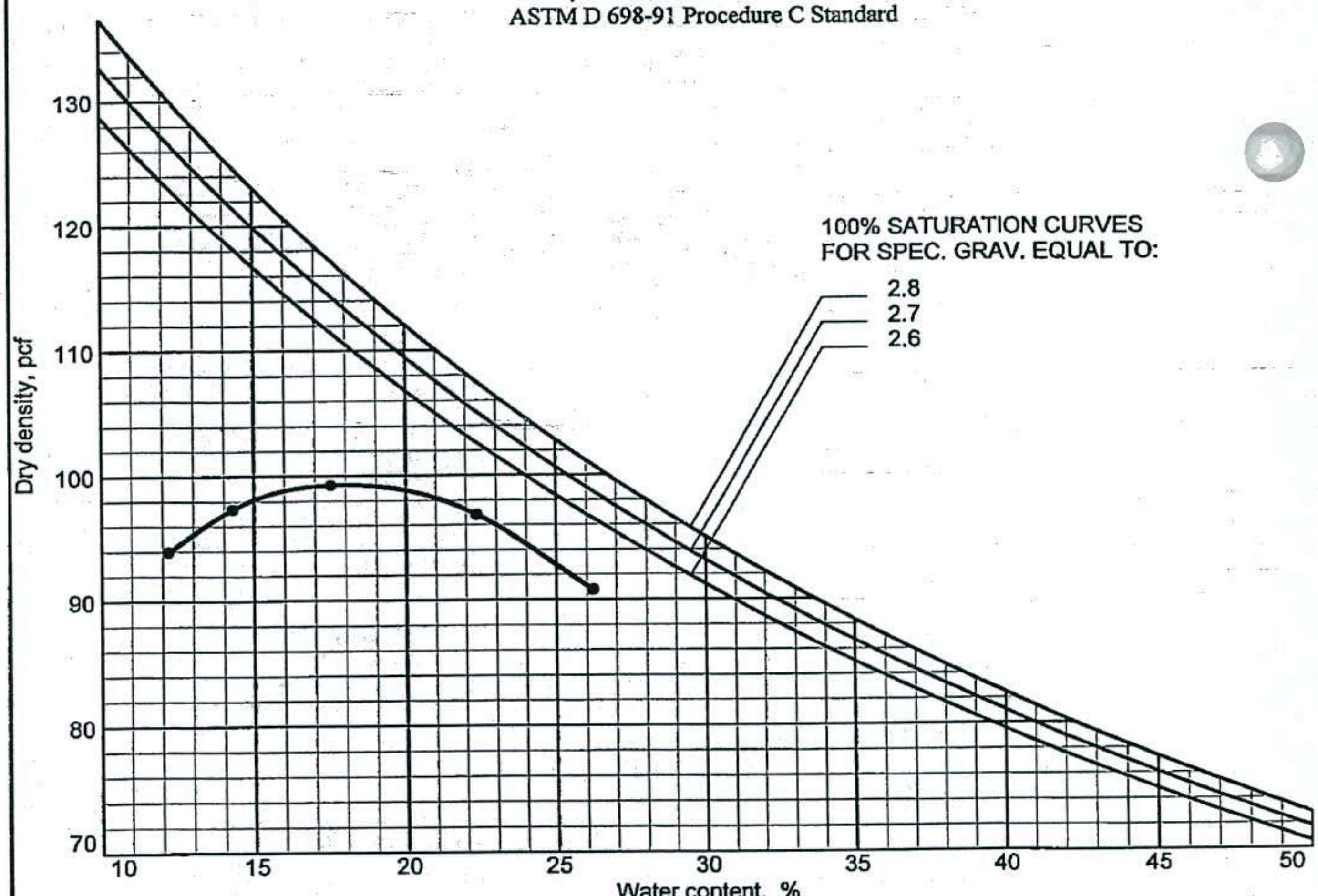
**MATERIAL DESCRIPTION**

**Description:** Light Brown Sandy silt

**Classifications -** **USCS:** ML **AASHTO:**
**Nat. Moist. =** **Sp.G. =**
**Liquid Limit =** NP **Plasticity Index =** NP
**% > 3/4 in. =** % **% < No.200 =** 50.1 %

| TEST RESULTS |
|---|
| Maximum dry density = 99.3 pcf |
| Optimum moisture = 18.0 % |

**Test specification:**
ASTM D 698-91 Procedure C Standard




**Lab#**

**SOUTHERN COMPANY**

# COMPACTION TEST REPORT

**Curve No.: 12**

**Project No.:** EWO - 3186DE  **Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-7

**Elev./Depth:** 2.0 - 3.0  **Sample No.** Bulk

**Remarks:** Permeability - 1.4x10-6
Dey Density - 100.9pcf @ 21.3% Moisture

## MATERIAL DESCRIPTION

**Description:** Light Brown

**Classifications -** **USCS:** **AASHTO:**

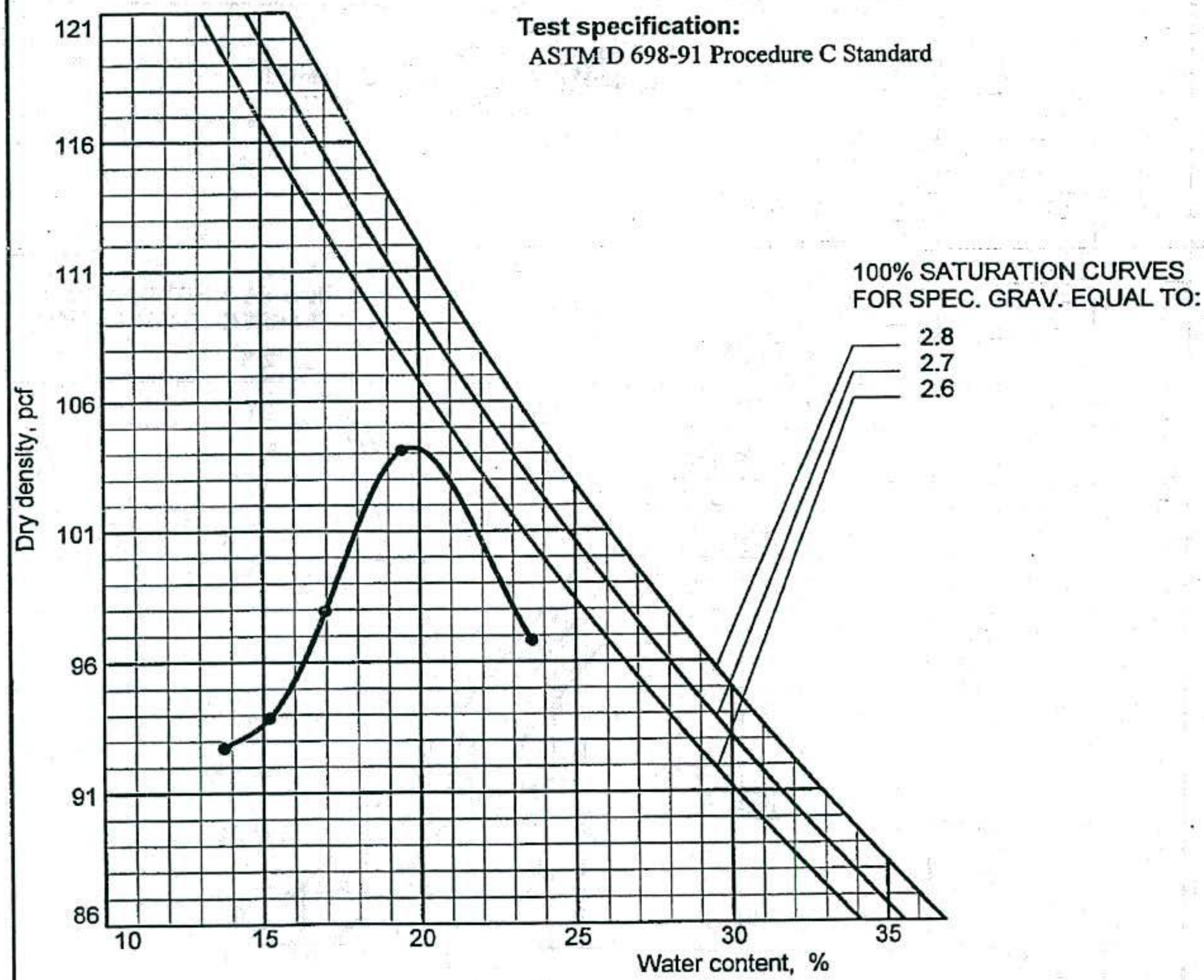
**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** **Plasticity Index =**

**% > 3/4 in. = %** **% < No.200 =**

| TEST RESULTS |
|---|
| Maximum dry density = 104.2 pcf |
| Optimum moisture = 19.8 % |

**Test specification:**
ASTM D 698-91 Procedure C Standard




**Lab#** 12

SOUTHERN COMPANY

# COMPACTION TEST REPORT

**Curve No.: 13**

**Project No.:** EWO - 3186DE

**Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-7

**Elev./Depth:** 6.0 - 8.0

**Sample No.** Bulk

**Remarks:** Permeability - 4.0x10-7
Dry Density - 105.4pcf @ 19.3% Moisture

**MATERIAL DESCRIPTION**

**Description:** Light Brown

**Classifications -** **USCS:** **AASHTO:**

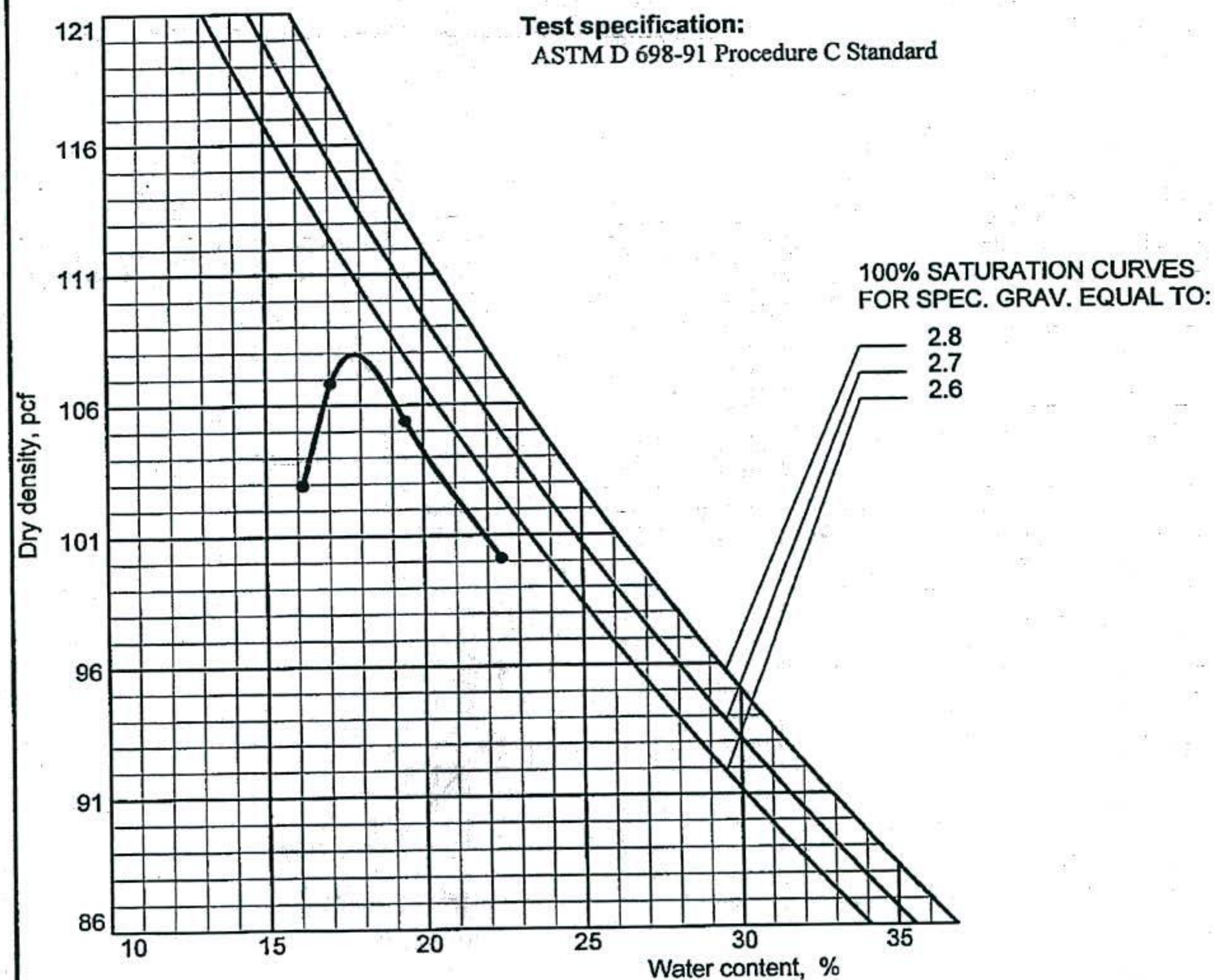
**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** **Plasticity Index =**

**% > 3/4 in. = %** **% < No.200 =**

| TEST RESULTS |
|---|
| Maximum dry density = 107.9 pcf |
| Optimum moisture = 17.8 % |

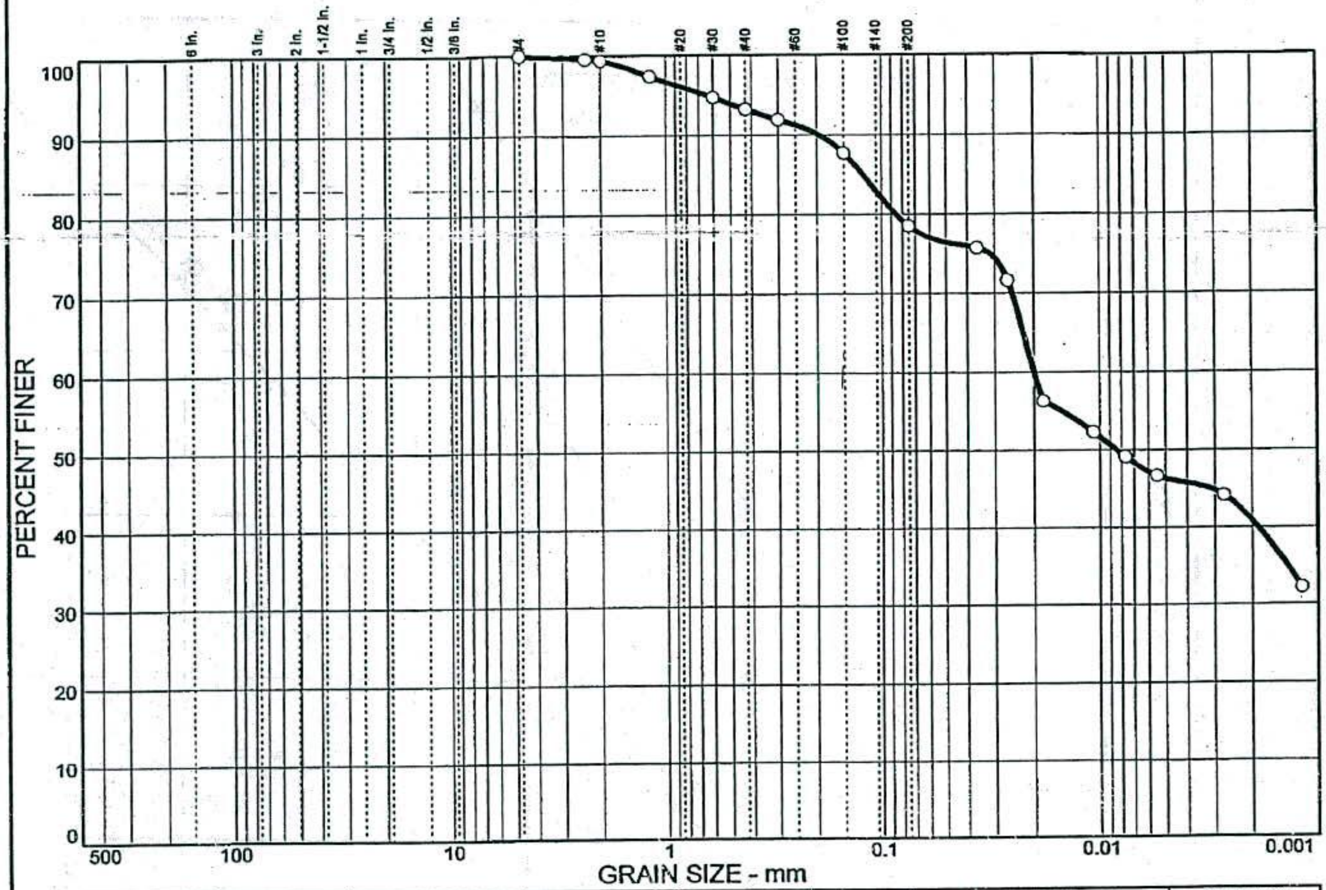
**Test specification:**
ASTM D 698-91 Procedure C Standard




Lab#

**SOUTHERN COMPANY**

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 21.5 | 32.2 | 46.3 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #8 | 99.6 | | |
| #10 | 99.4 | | |
| #16 | 97.4 | | |
| #30 | 94.7 | | |
| #40 | 93.2 | | |
| #50 | 91.9 | | |
| #100 | 87.7 | | |
| #200 | 78.5 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 33 LL= 50 PI= 17

**Coefficients**

$D_{85}$= 0.122 $D_{60}$= 0.0199 $D_{50}$= 0.0084
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

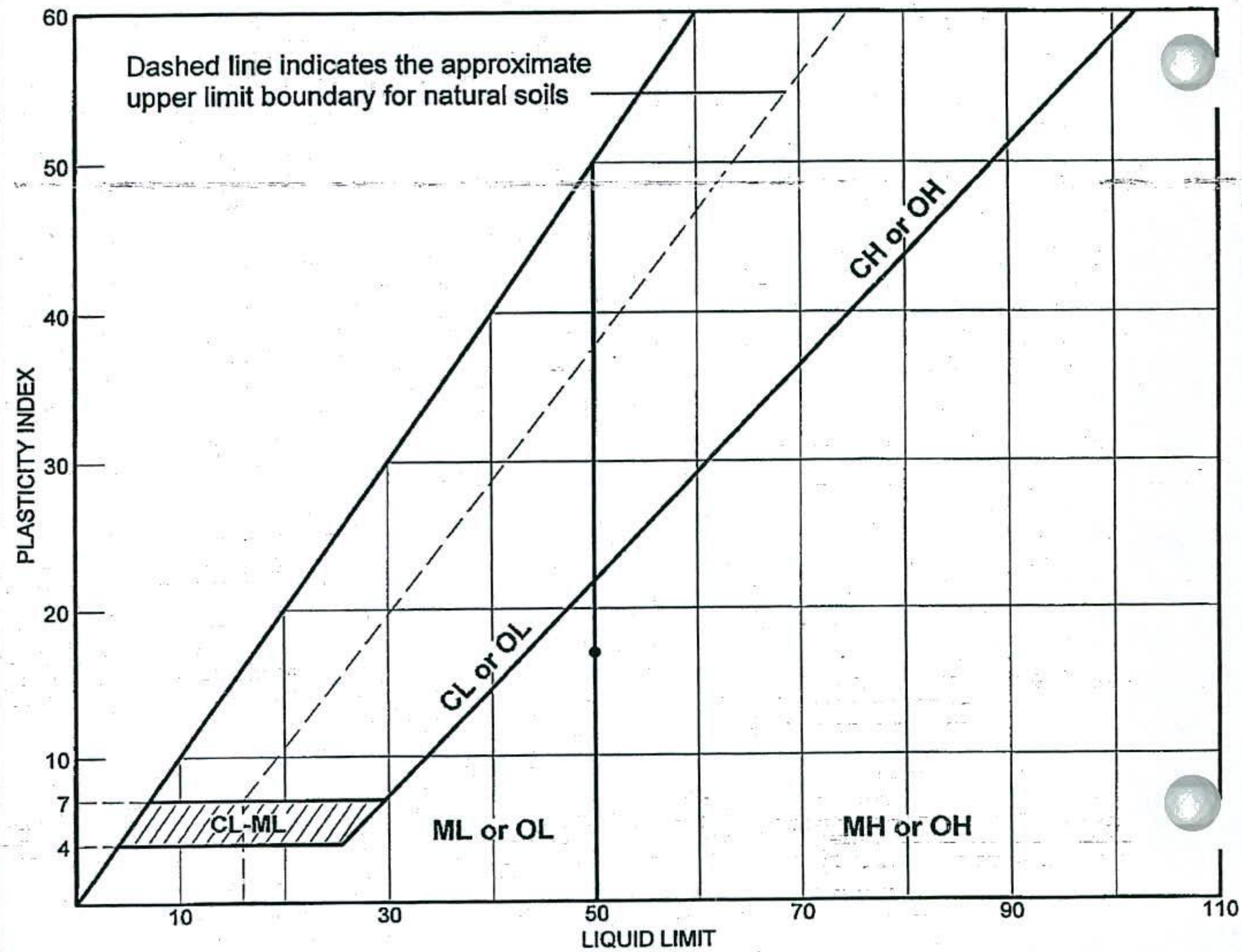
Specific Gravity - 2.83
Permeability - 1.8x10-6
Dry Density 87.7pcf @ 29.8% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-13 **Elev./Depth:** 1.5 - 3.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 14

# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | Bulk | 1.5 - 3.0 | | 33 | 50 | 17 | MH |

| | |
|---|---|
| LIQUID AND PLASTIC LIMITS TEST REPORT<br>**SOUTHERN COMPANY** | **Client:** SCS - Terri Hartsfield<br>**Project:** Plant Wansley Gypsum Disposal Facility<br>**Project No.:** EWO - 3186DE     **Lab#** 14 |

# COMPACTION TEST REPORT

**Curve No.: 14**

**Project No.:** EWO - 3186DE **Date:** 10/29/06
**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-13
**Elev./Depth:** 1.5 - 3.0 **Sample No.** Bulk
**Remarks:**

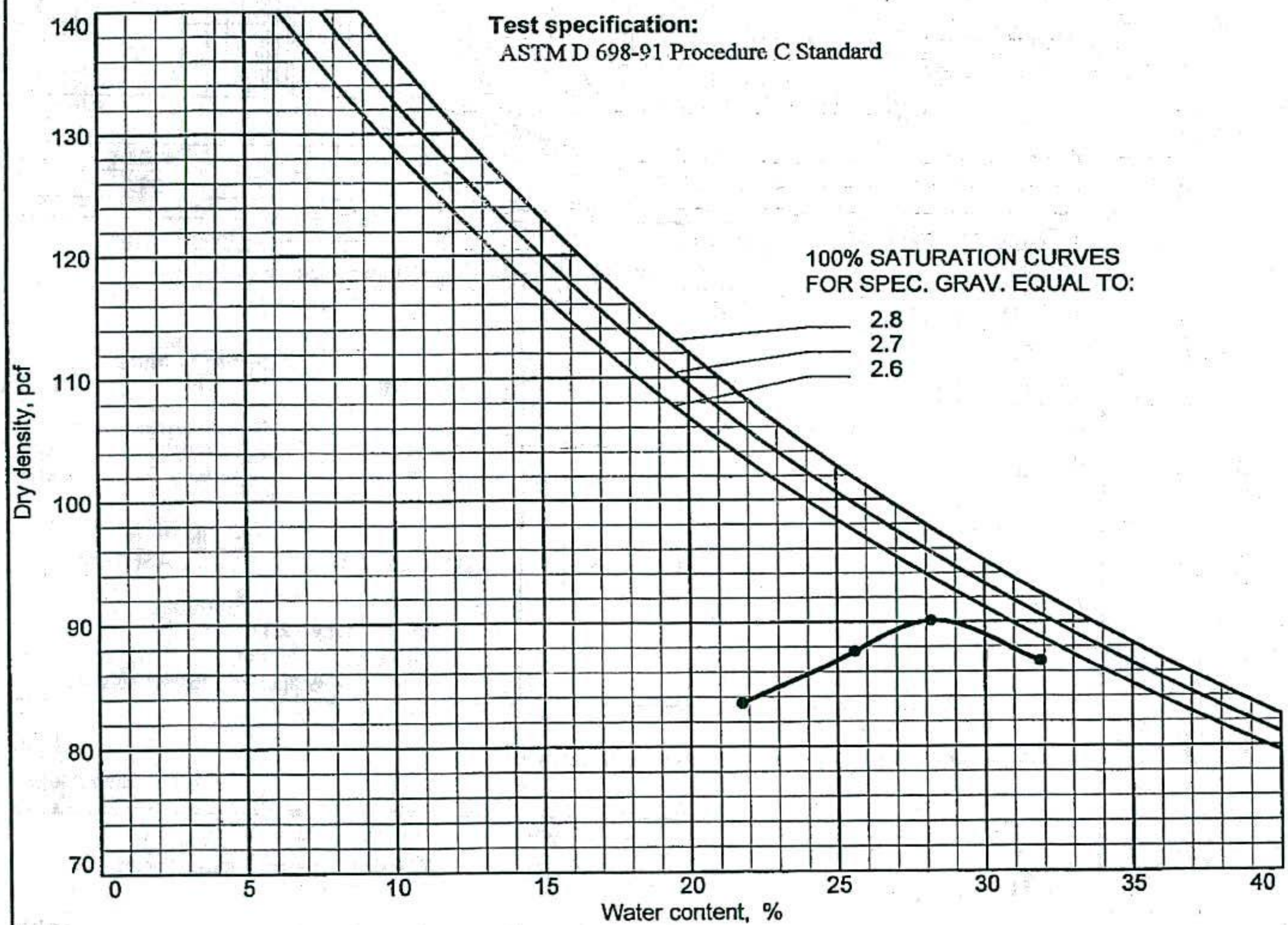
**MATERIAL DESCRIPTION**

**Description:** Light Reddish Brown Elastic silt with sand

**Classifications -** **USCS:** MH **AASHTO:**
**Nat. Moist. =** **Sp.G. =**
**Liquid Limit =** 50 **Plasticity Index =** 17
**% > 3/4 in. =** % **% < No.200 =** 78.5 %

| TEST RESULTS |
|---|
| Maximum dry density = 90.1 pcf |
| Optimum moisture = 28.3 % |

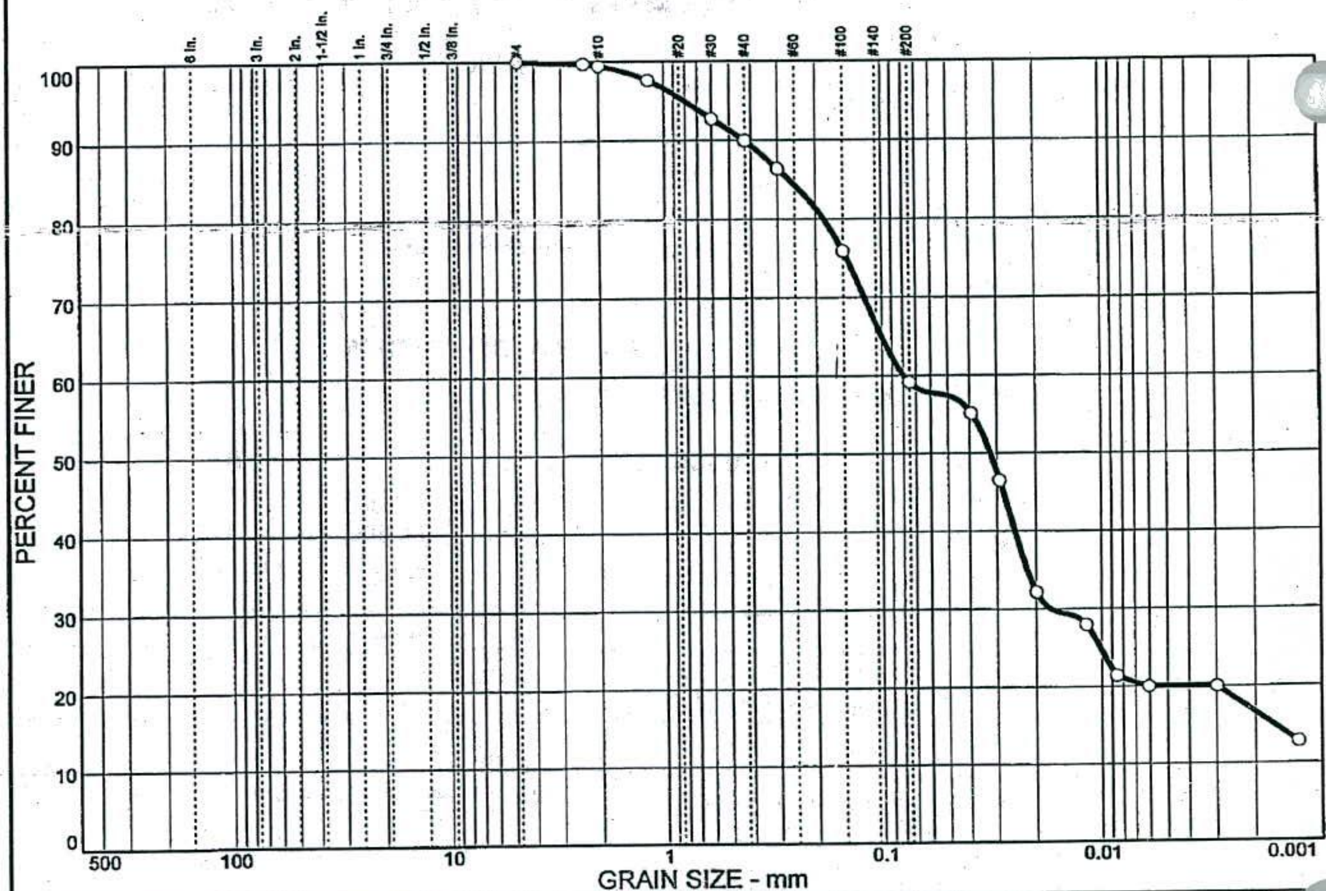
**Test specification:**
ASTM D 698-91 Procedure C Standard




**Lab#** 14

**SOUTHERN COMPANY**

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 40.9 | 39.1 | 20.0 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #8 | 99.7 | | |
| #10 | 99.4 | | |
| #16 | 97.6 | | |
| #30 | 92.7 | | |
| #40 | 89.9 | | |
| #50 | 86.3 | | |
| #100 | 75.9 | | |
| #200 | 59.1 | | |

* (no specification provided)

**Soil Description**

Light Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.266 $D_{60}$= 0.0799 $D_{50}$= 0.0322
$D_{30}$= 0.0171 $D_{15}$= 0.0017 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

Specific Gravity - 2.83
Permeability - 1.3x10-6
Dry Density - 89.8pcf - @ 26.3% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-13 **Elev./Depth:** 5.0 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 15

# COMPACTION TEST REPORT

**Curve No.: 15**

**Project No.:** EWO - 3186DE

**Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-13

**Elev./Depth:** 5.0 - 6.0

**Sample No.** Bulk

**Remarks:**

**MATERIAL DESCRIPTION**

**Description:** Light Brown Sandy silt

**Classifications -** **USCS:** ML **AASHTO:**

**Nat. Moist. =**

**Sp.G. =**

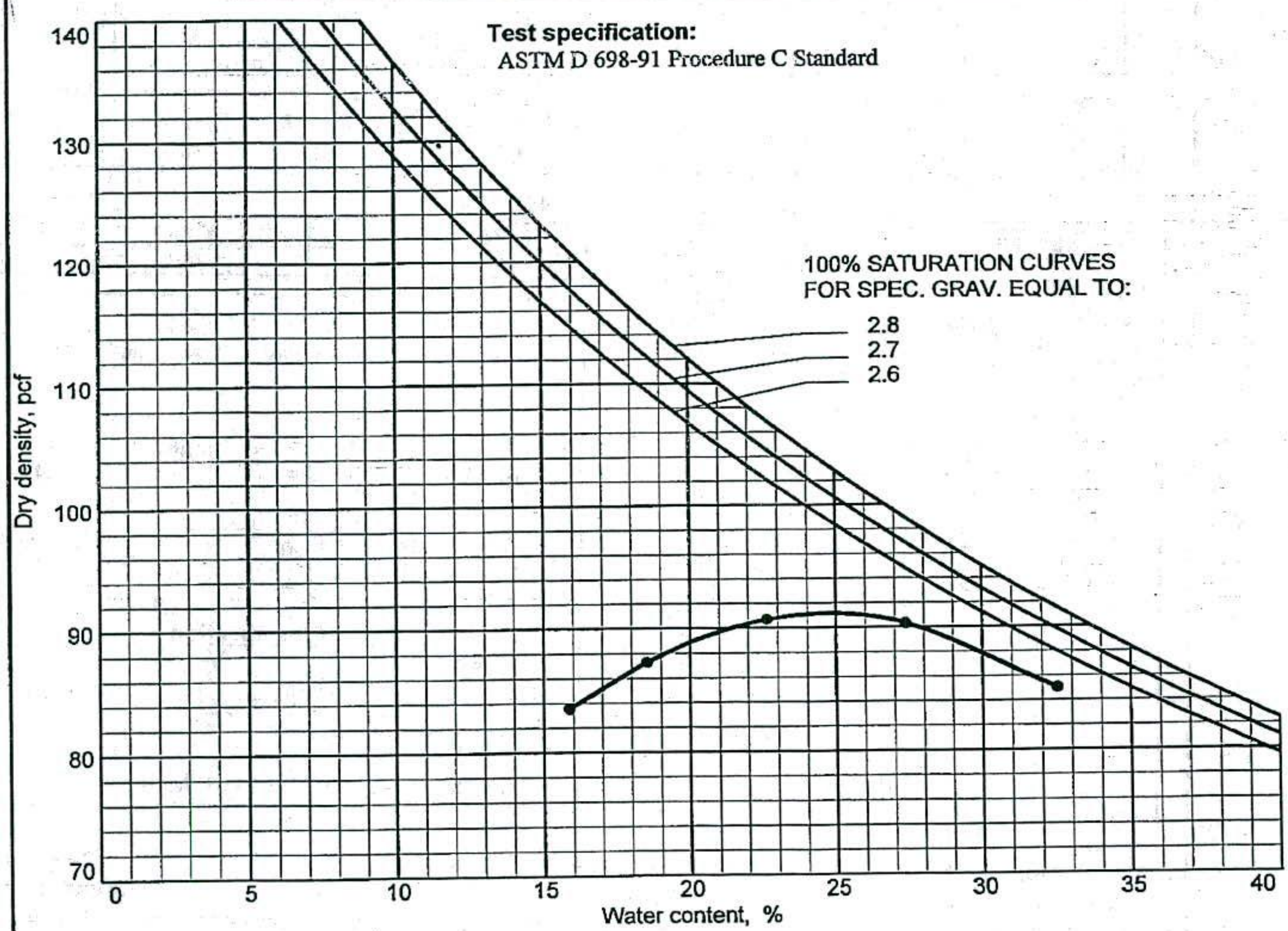
**Liquid Limit =** NP

**Plasticity Index =** NP

**% > 3/4 in. =** %

**% < No.200 =** 59.1 %

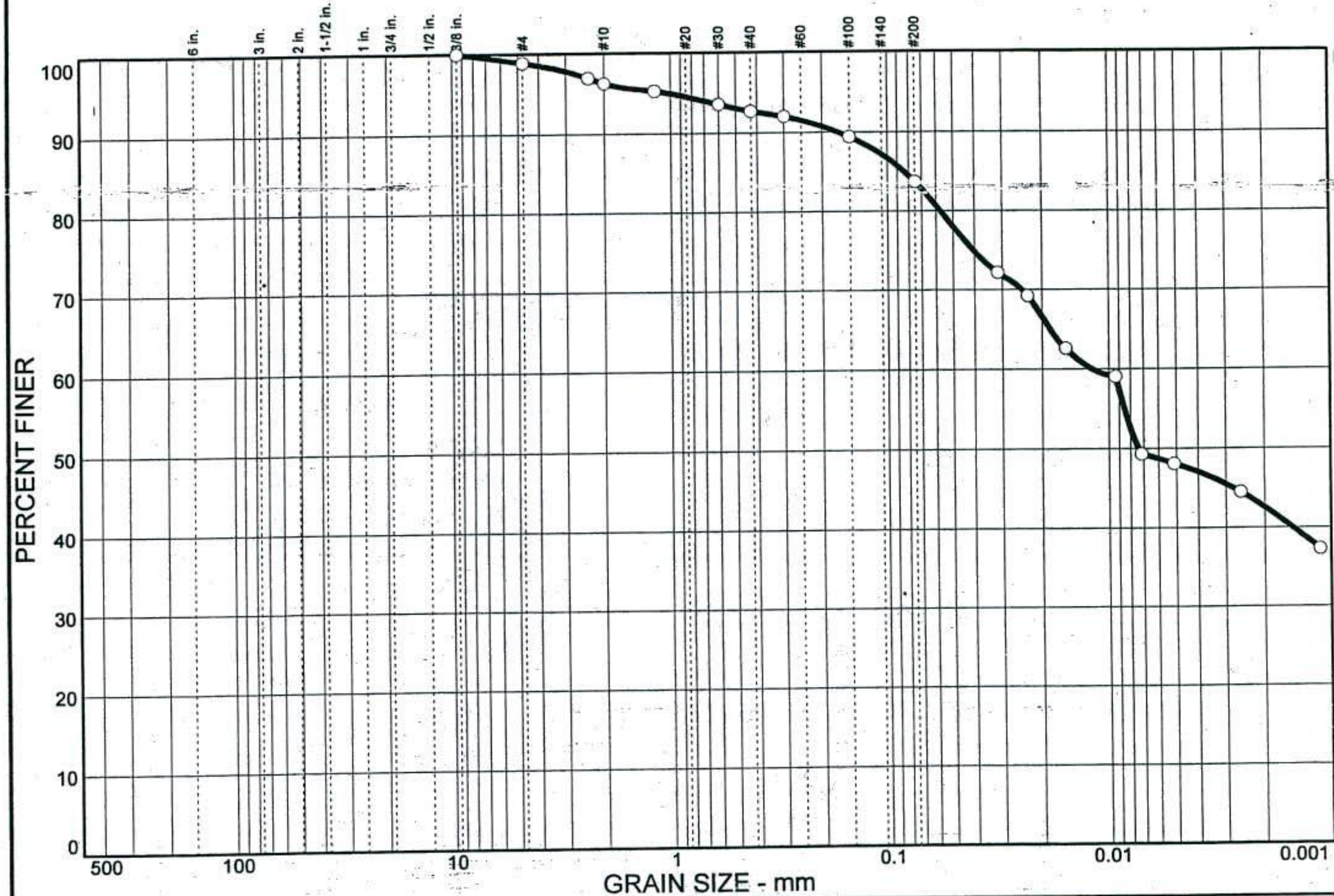
| TEST RESULTS |
|---|
| Maximum dry density = 91.1 pcf |
| Optimum moisture = 24.8 % |




Lab# 15

SOUTHERN COMPANY

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 1.1 | 15.2 | 35.7 | 48.0 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 98.9 | | |
| #8 | 97.0 | | |
| #10 | 96.3 | | |
| #16 | 95.3 | | |
| #30 | 93.6 | | |
| #40 | 92.7 | | |
| #50 | 92.0 | | |
| #100 | 89.4 | | |
| #200 | 83.7 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 30 LL= 54 PI= 24

**Coefficients**

$D_{85}$= 0.0840 $D_{60}$= 0.0120 $D_{50}$= 0.0074
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

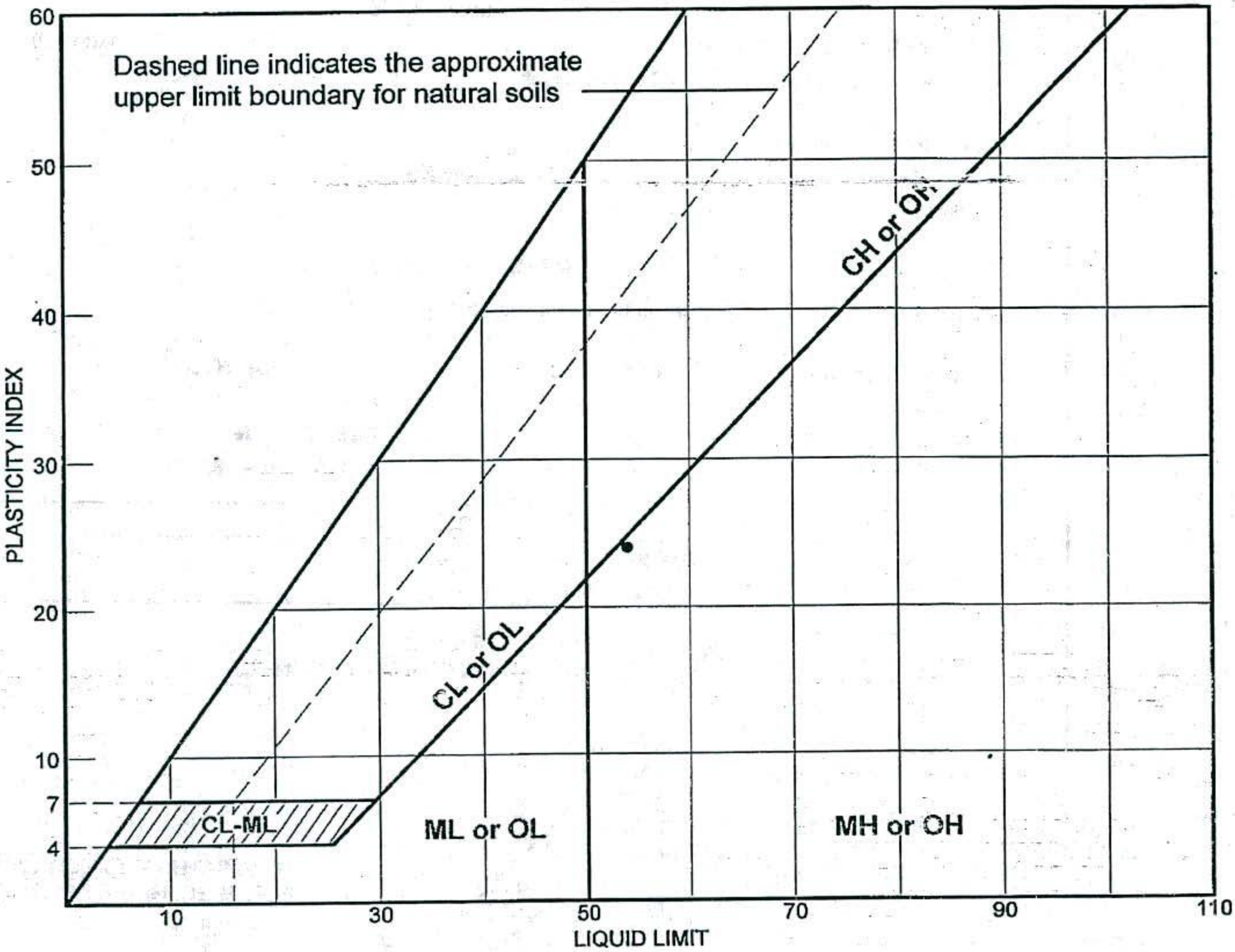
Specific Gravity - 2.75
Permeability 2.4x10-6
Dry Density - 96.2pcf - @ 24.0% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/11/06
**Location:** GYP-19 **Elev./Depth:** 1.5 - 3.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 16

# LIQUID AND PLASTIC LIMITS TEST REPORT




## SOIL DATA

| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
|---|---|---|---|---|---|---|---|---|
| • | | Bulk | 1.5 - 3.0 | | 30 | 54 | 24 | MH |

LIQUID AND PLASTIC LIMITS TEST REPORT

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield

**Project:** Plant Wansley Gypsum Disposal Facility

**Project No.:** EWO - 3186DE

**Lab#** 16

# COMPACTION TEST REPORT

**Curve No.: 16**

**Project No.:** EWO - 3186DE **Date:** 10/29/06
**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-19
**Elev./Depth:** 1.5 - 3.0 **Sample No.** Bulk
**Remarks:**

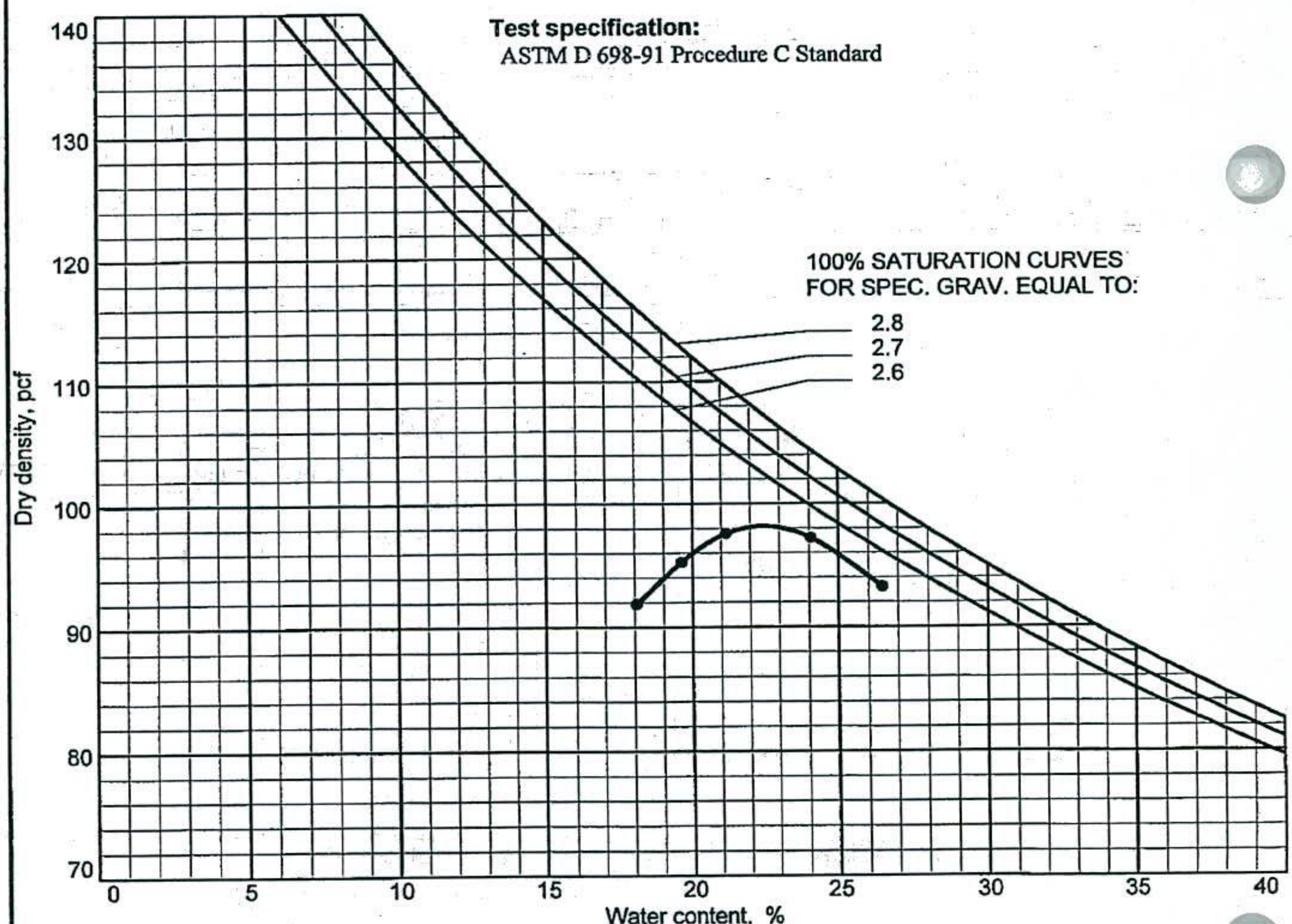
**MATERIAL DESCRIPTION**

**Description:** Light Reddish Brown Elastic silt with sand

**Classifications -** **USCS:** MH **AASHTO:**
**Nat. Moist. =** **Sp.G. =**
**Liquid Limit =** 54 **Plasticity Index =** 24
**% > 3/4 in. =** % **% < No.200 =** 83.7 %

| TEST RESULTS |
|---|
| Maximum dry density = 98.2 pcf |
| Optimum moisture = 22.5 % |

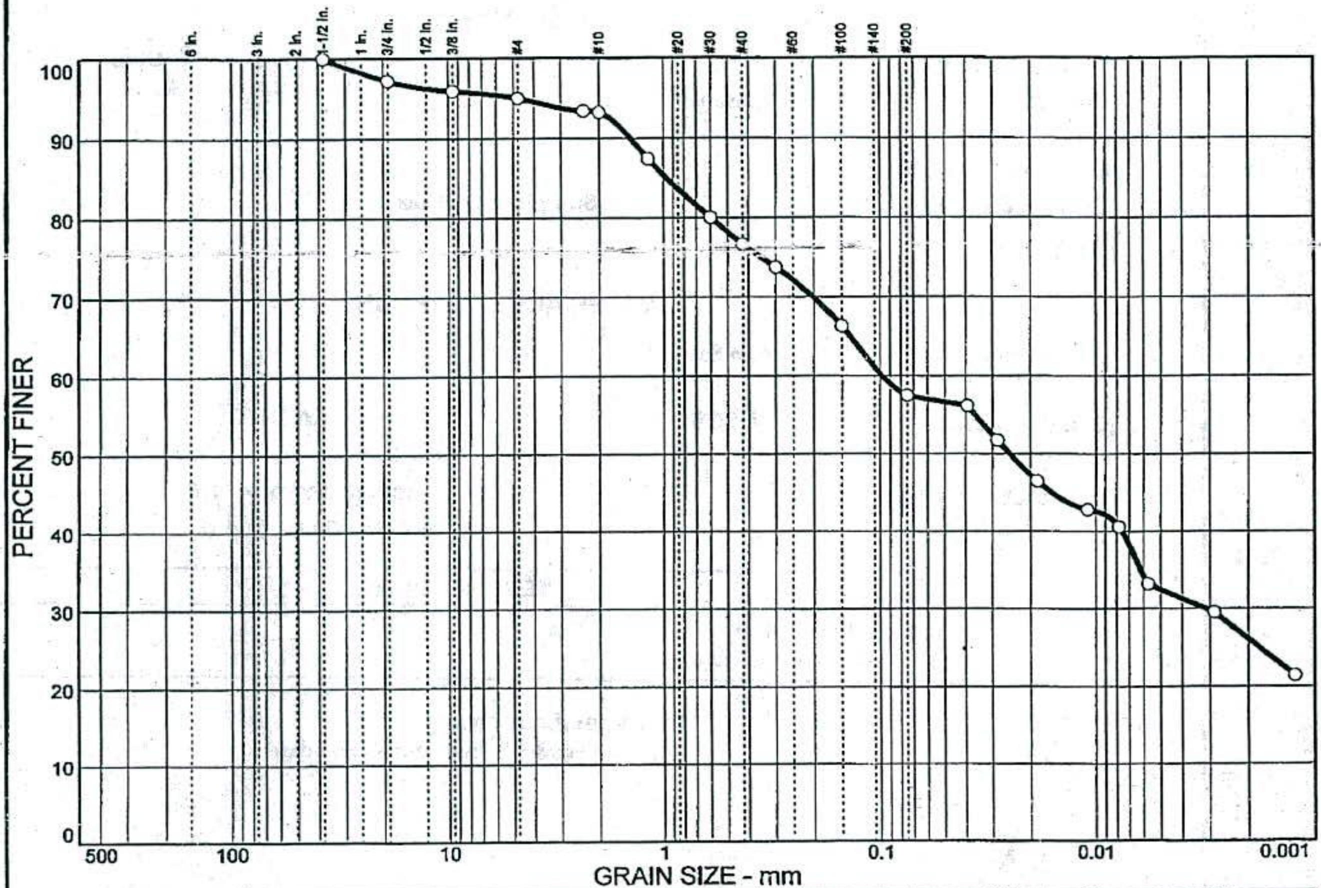
**Test specification:**
ASTM D 698-91 Procedure C Standard




Lab#

SOUTHERN COMPANY

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 5.0 | 37.6 | 24.9 | 32.5 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 1.50 in. | 100.0 | | |
| 0.75 in. | 97.2 | | |
| .375 in. | 95.9 | | |
| #4 | 95.0 | | |
| #8 | 93.4 | | |
| #10 | 93.2 | | |
| #16 | 87.4 | | |
| #30 | 80.0 | | |
| #40 | 76.6 | | |
| #50 | 73.7 | | |
| #100 | 66.3 | | |
| #200 | 57.4 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.970 $D_{60}$= 0.0983 $D_{50}$= 0.0250
$D_{30}$= 0.0031 $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

Specific Gravity - 2.84
Permeability - 3.7x10-6
Dry Density - 75.6pcf @ 35.9% Moisture

**Sample No.:** Bulk **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-19 **Elev./Depth:** 6.0 - 7.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 17

# COMPACTION TEST REPORT

**Curve No.: 17**

**Project No.:** EWO - 3186DE **Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-19

**Elev./Depth:** 6.0 - 7.0 **Sample No.** Bulk

**Remarks:**

## MATERIAL DESCRIPTION

**Description:** Light Reddish Brown Sandy silt

**Classifications -** **USCS:** ML **AASHTO:**

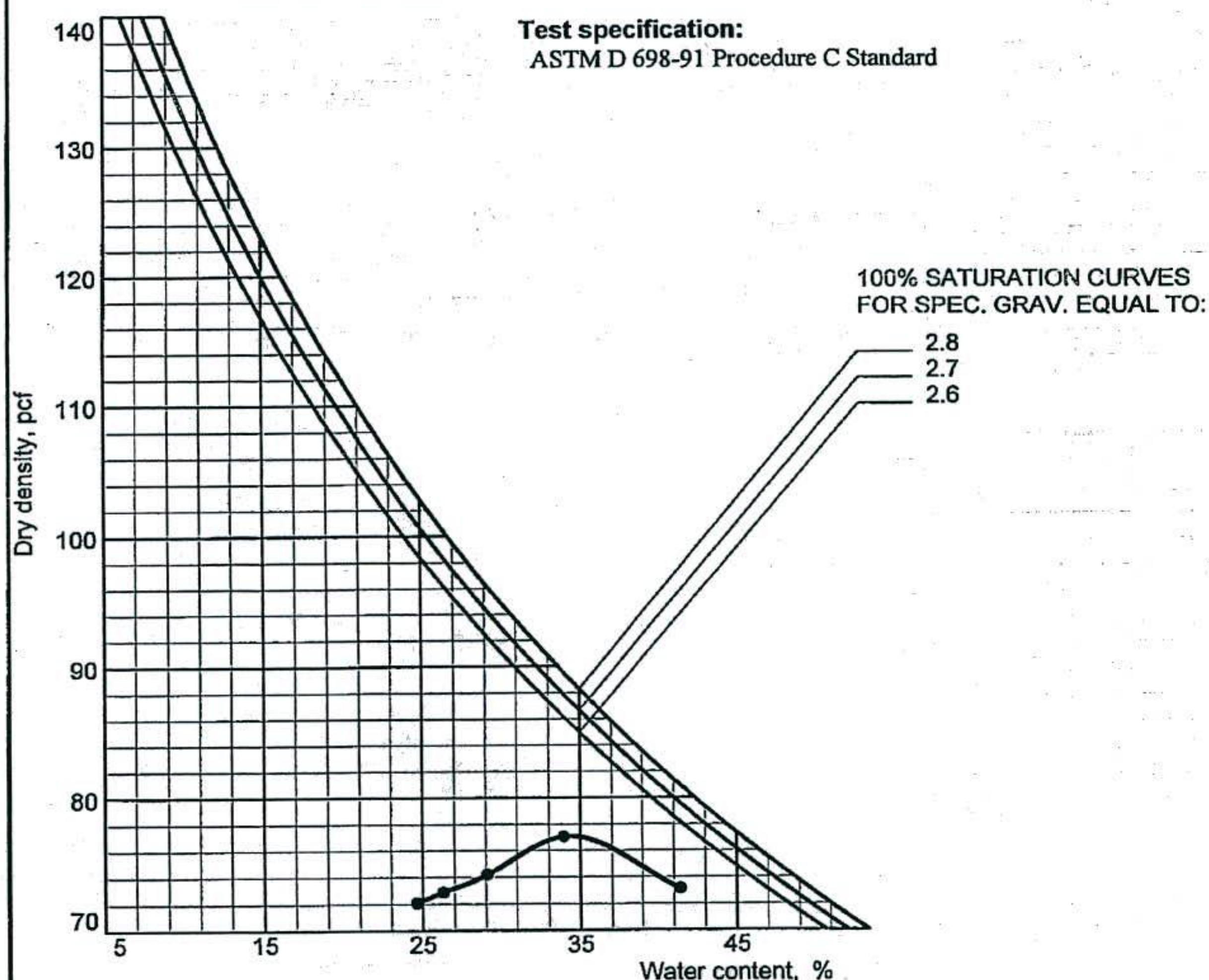
**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** NP **Plasticity Index =** NP

**% > 3/4 in. =** 2.8 % **% < No.200 =** 57.4 %

| TEST RESULTS |
|---|
| Maximum dry density = 77.1 pcf |
| Optimum moisture = 34.4 % |

**Test specification:**
ASTM D 698-91 Procedure C Standard




**Lab#**

SOUTHERN COMPANY

# COMPACTION TEST REPORT

**Curve No.: 18**

**Project No.:** EWO - 3186DE **Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-29

**Elev./Depth:** 1.0 - 2.5 **Sample No.** Bulk

**Remarks:** Permeability - 1.7x10-7
Dry Density - 98.2pcf @ 23.3% Moisture

## MATERIAL DESCRIPTION

**Description:** Light Brown

**Classifications -** **USCS:** **AASHTO:**

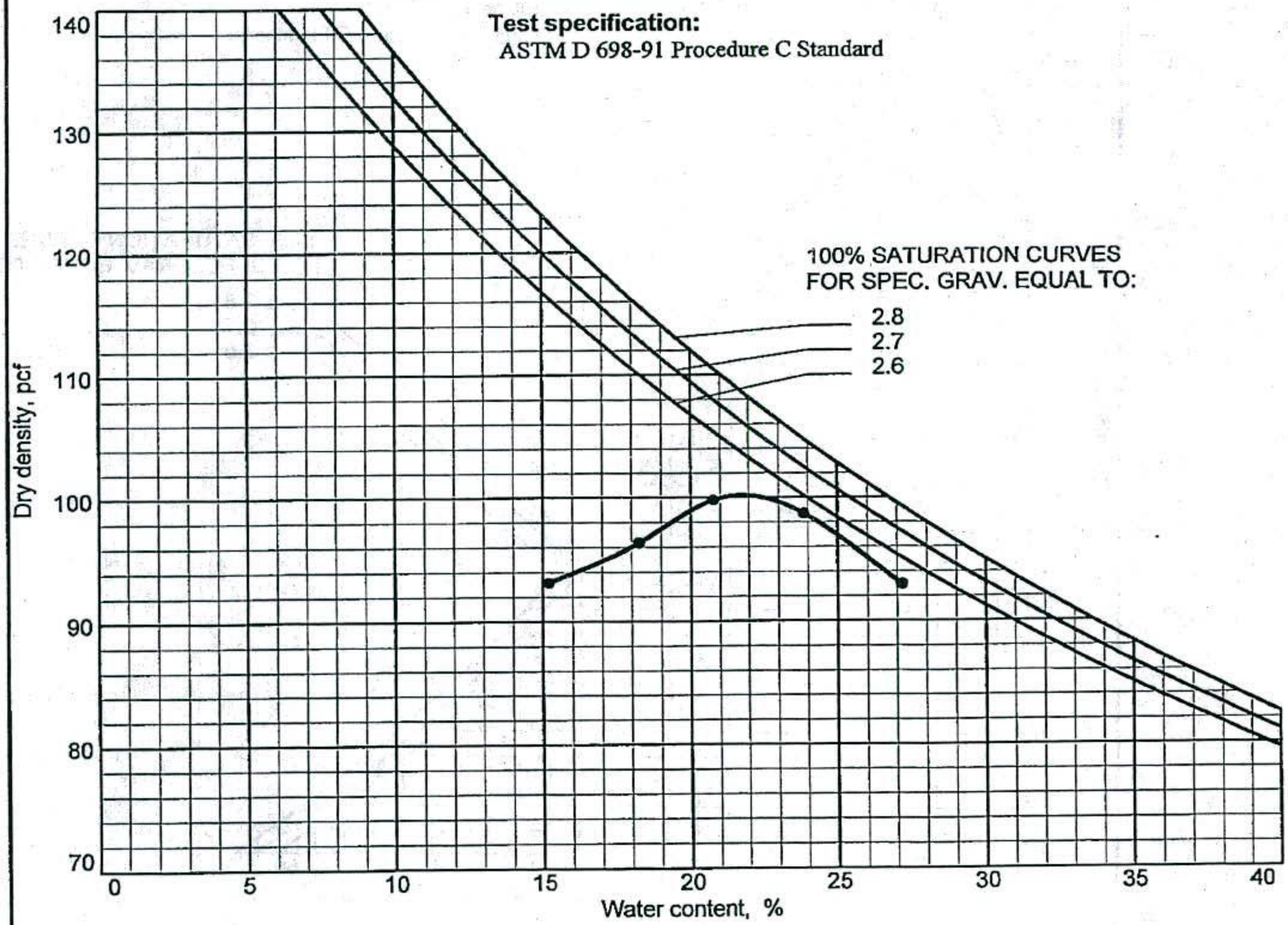
**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** **Plasticity Index =**

**% > 3/4 in. =** % **% < No.200 =**

| TEST RESULTS |
| --- |
| Maximum dry density = 100.2 pcf |
| Optimum moisture = 21.8 % |

**Test specification:**
ASTM D 698-91 Procedure C Standard




**Lab#** 18

SOUTHERN COMPANY

# COMPACTION TEST REPORT

**Curve No.:** 19

**Project No.:** EWO - 3186DE **Date:** 10/29/06

**Project:** Plant Wansley Gypsum Disposal Facility

**Location:** GYP-29

**Elev./Depth:** 6.0 - 8.0 **Sample No.** Bulk

**Remarks:** Permeability - 5.7x10-7
Dry Density - 98.9pcf @ 22.2% Moisture

**MATERIAL DESCRIPTION**

**Description:** Light Brown

**Classifications -** **USCS:** **AASHTO:**

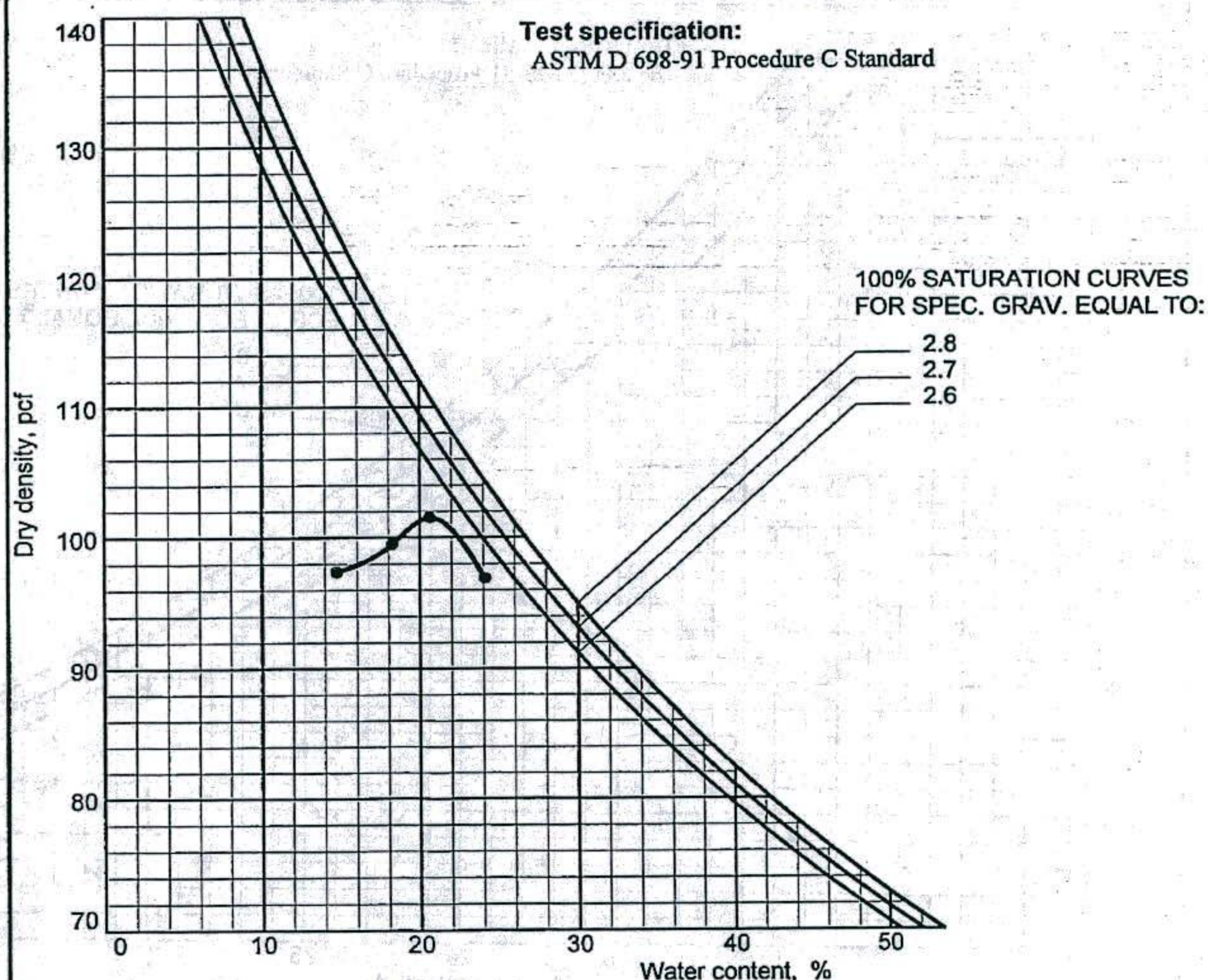
**Nat. Moist. =** **Sp.G. =**

**Liquid Limit =** **Plasticity Index =**

**% > 3/4 in. = %** **% < No.200 =**

| TEST RESULTS |
|---|
| Maximum dry density = 101.5 pcf |
| Optimum moisture = 20.6 % |

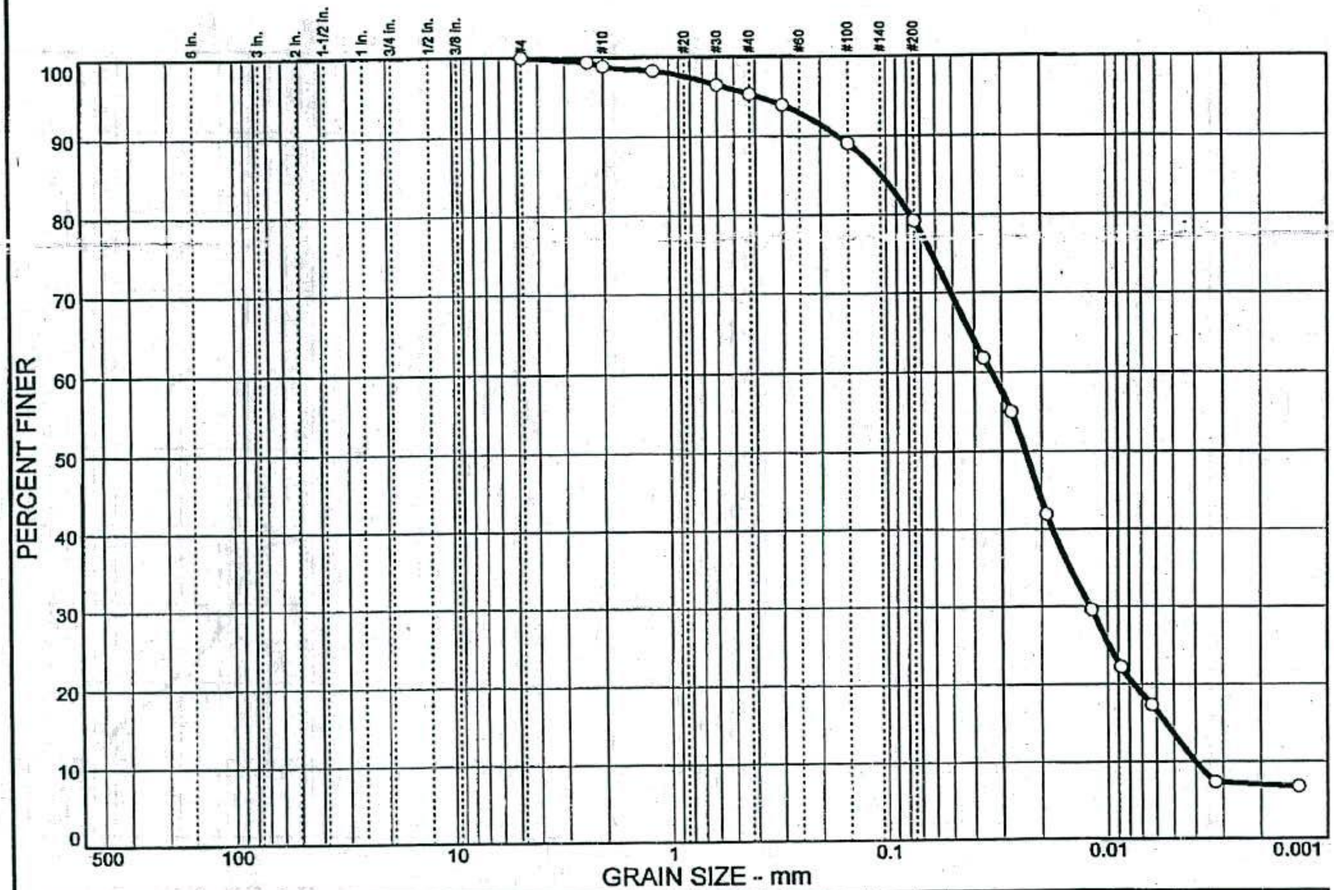
**Test specification:**
ASTM D 698-91 Procedure C Standard




Lab#

SOUTHERN COMPANY

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 20.8 | 65.6 | 13.6 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #8 | 99.4 | | |
| #10 | 98.9 | | |
| #16 | 98.3 | | |
| #30 | 96.5 | | |
| #40 | 95.3 | | |
| #50 | 93.9 | | |
| #100 | 89.0 | | |
| #200 | 79.2 | | |

* (no specification provided)

**Soil Description**

Light Brown Silt with sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.106 $D_{60}$= 0.0334 $D_{50}$= 0.0236
$D_{30}$= 0.0120 $D_{15}$= 0.0054 $D_{10}$= 0.0040
$C_u$= 8.38 $C_c$= 1.08

**Classification**

USCS= ML AASHTO=

**Remarks**

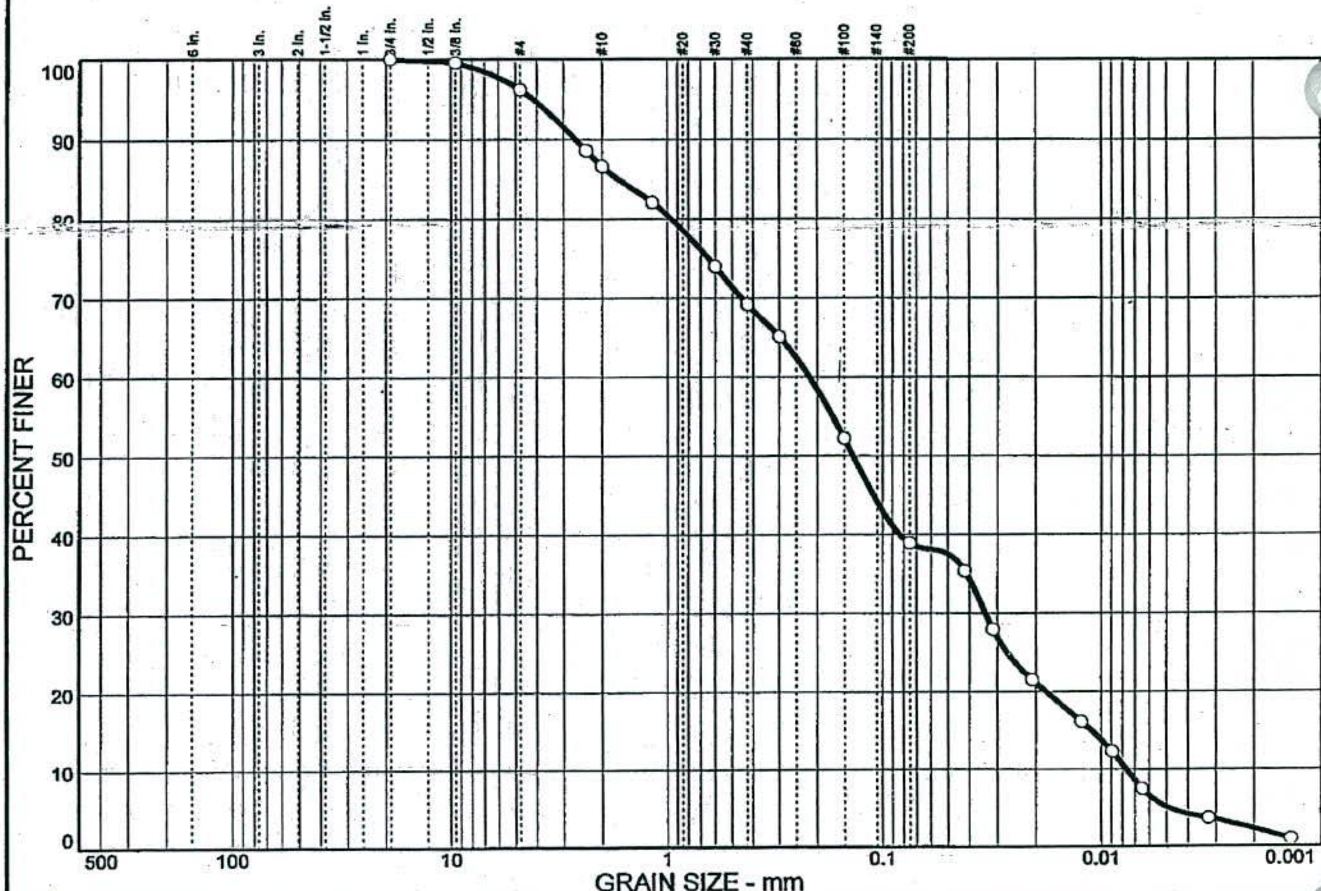
Specific Gravity - 2.69

**Sample No.:** S-2(Baggie) **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-22 **Elev./Depth:** 4.5 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 20

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 3.8 | 57.3 | 33.7 | 5.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 99.6 | | |
| #4 | 96.2 | | |
| #8 | 88.6 | | |
| #10 | 86.6 | | |
| #16 | 82.1 | | |
| #30 | 74.0 | | |
| #40 | 69.2 | | |
| #50 | 65.1 | | |
| #100 | 52.2 | | |
| #200 | 38.9 | | |

* (no specification provided)

**Soil Description**

Gray Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 1.69 $D_{60}$= 0.218 $D_{50}$= 0.137
$D_{30}$= 0.0340 $D_{15}$= 0.0111 $D_{10}$= 0.0077
$C_u$= 28.34 $C_c$= 0.69

**Classification**

USCS= SM AASHTO=

**Remarks**

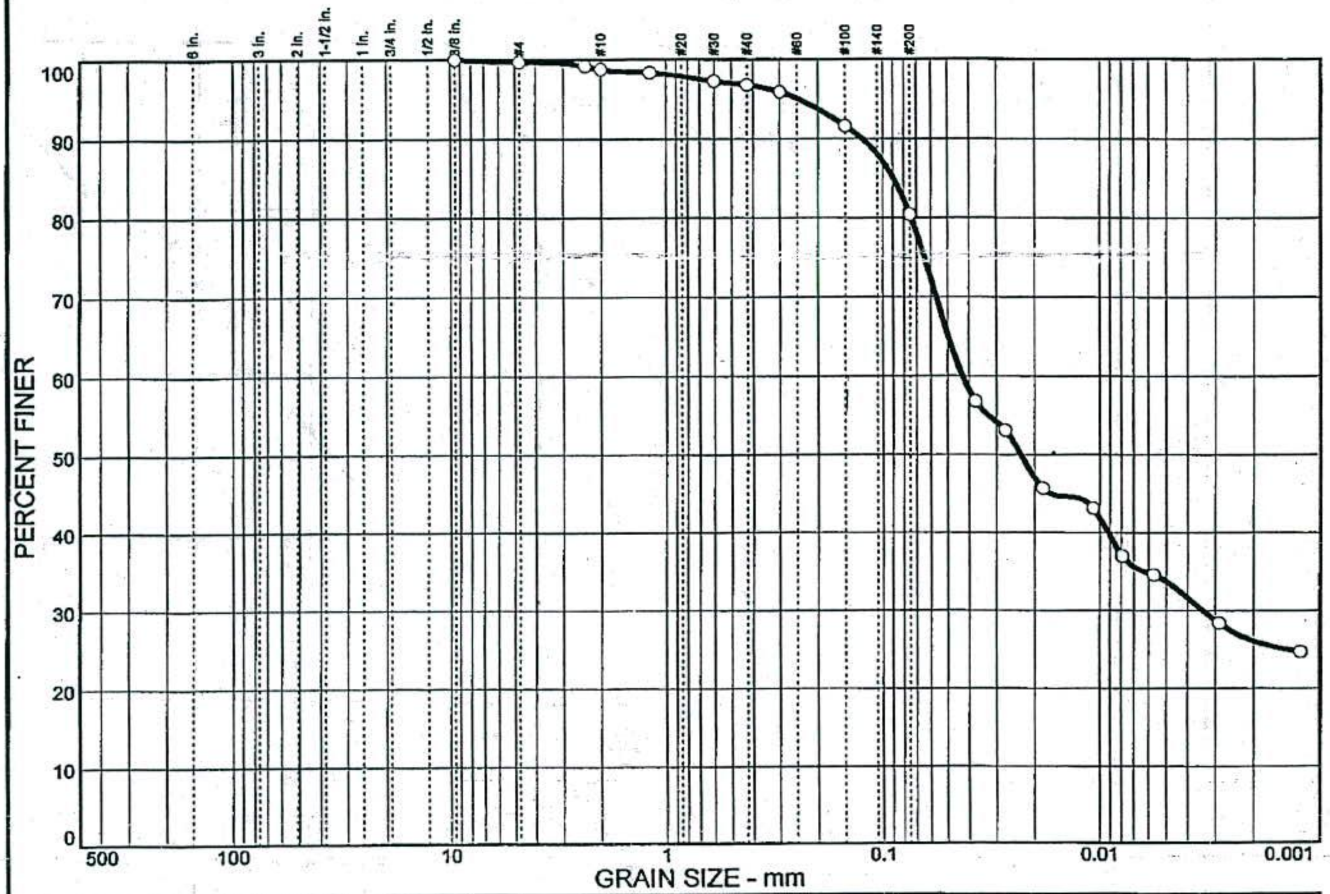
Specific Gravity - 2.75

**Sample No.:** S-11(Baggie) **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-21 **Elev./Depth:** 49.5 - 51.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 21

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.3 | 19.3 | 46.6 | 33.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.7 | | |
| #8 | 99.2 | | |
| #10 | 98.8 | | |
| #16 | 98.4 | | |
| #30 | 97.3 | | |
| #40 | 96.8 | | |
| #50 | 95.9 | | |
| #100 | 91.6 | | |
| #200 | 80.4 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 36 LL= 54 PI= 18

**Coefficients**

$D_{85}$= 0.0895 $D_{60}$= 0.0428 $D_{50}$= 0.0232
$D_{30}$= 0.0034 $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

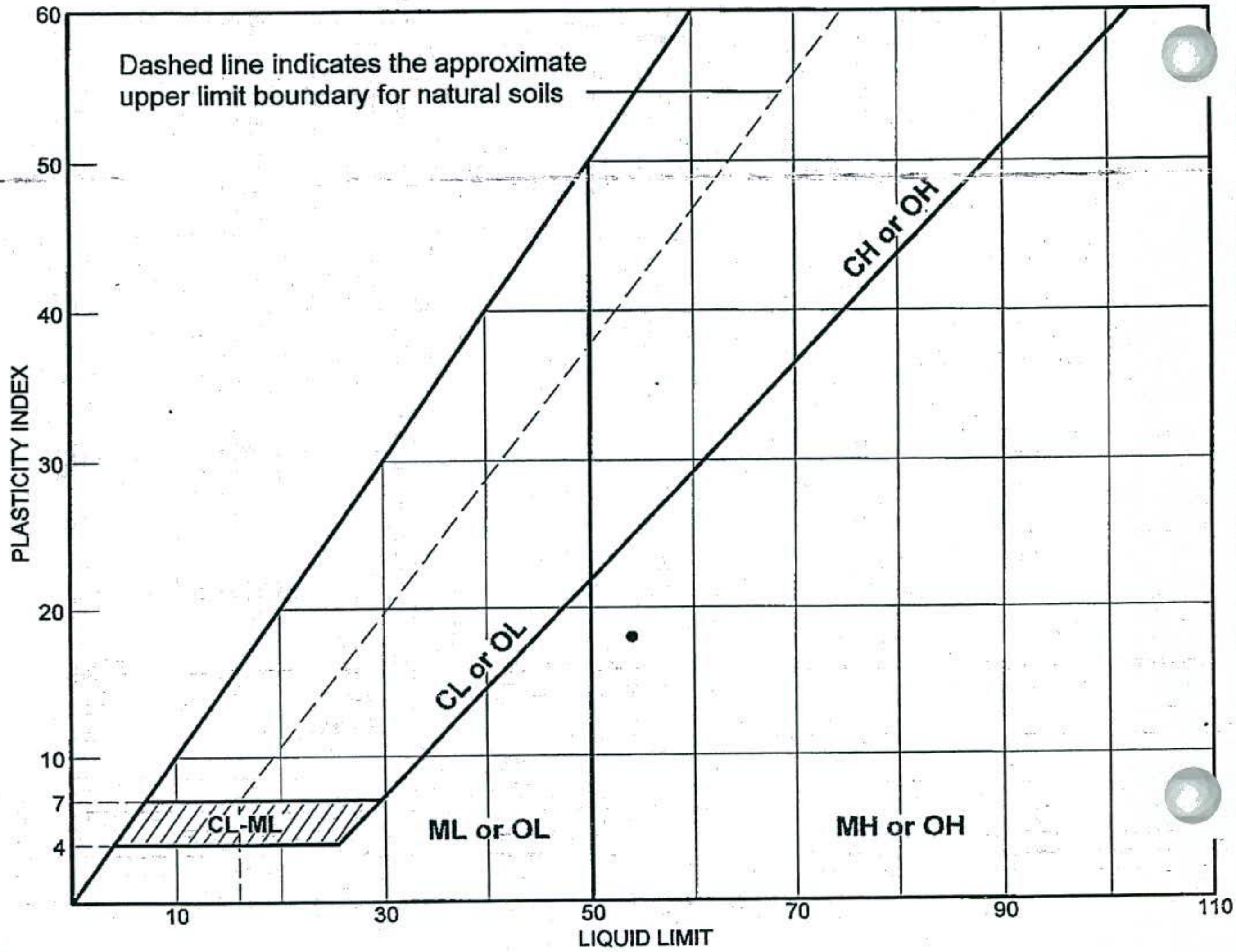
Specific Gravity - 2.73

**Sample No.:** S-1(Baggie) **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-23 **Elev./Depth:** 1.0 - 2.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 22

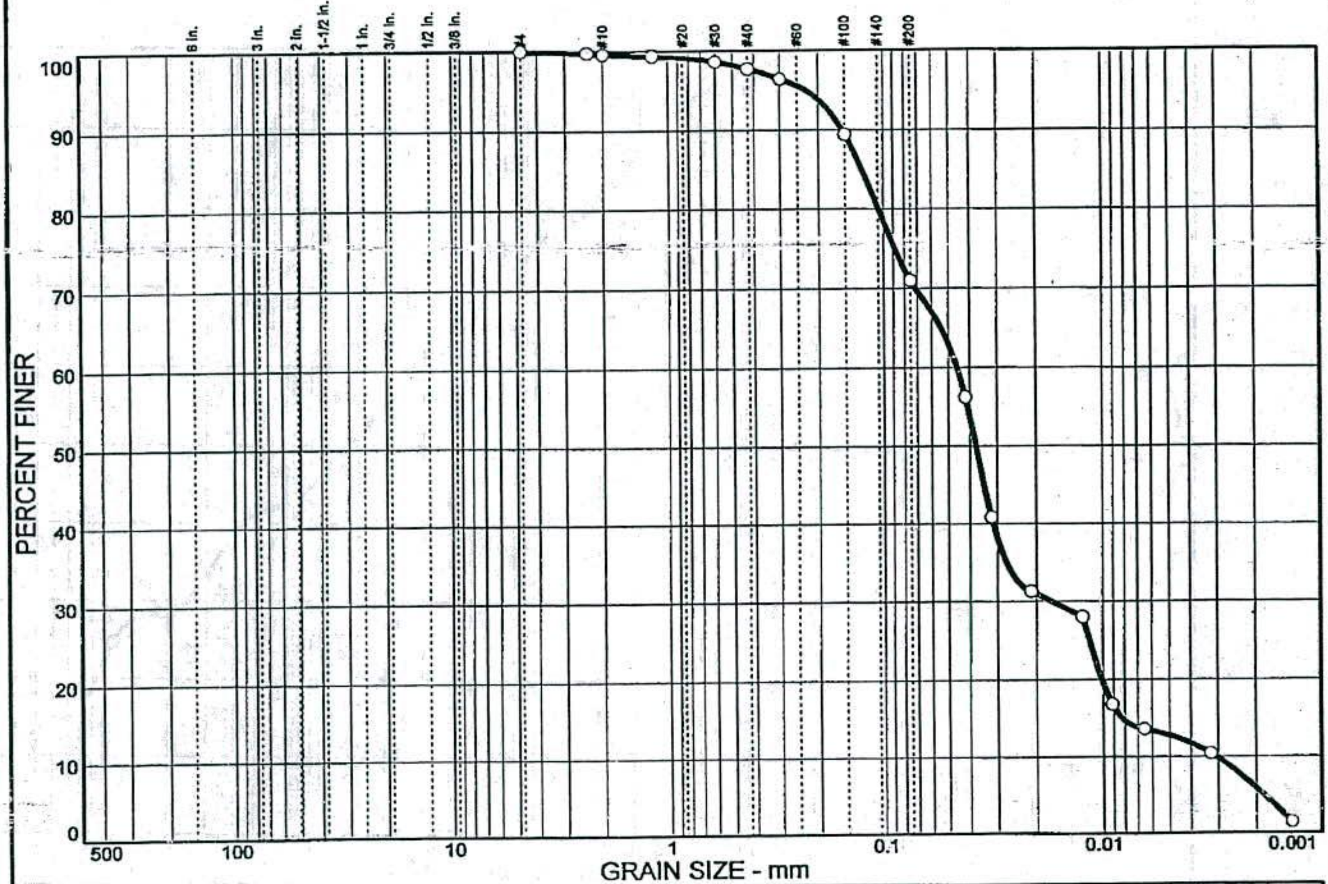
# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | S-1(Baggie) | 1.0 - 2.5 | | 36 | 54 | 18 | MH |

| | |
|---|---|
| LIQUID AND PLASTIC LIMITS TEST REPORT | **Client:** SCS - Terri Hartsfield |
| **SOUTHERN COMPANY** | **Project:** Plant Wansley Gypsum Disposal Facility |
| | **Project No.:** EWO - 3186DE **Lab#** 22 |

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 29.0 | 58.2 | 12.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #8 | 99.8 | | |
| #10 | 99.6 | | |
| #16 | 99.3 | | |
| #30 | 98.6 | | |
| #40 | 97.7 | | |
| #50 | 96.4 | | |
| #100 | 89.4 | | |
| #200 | 71.0 | | |

* (no specification provided)

**Soil Description**

Light Brown Silt with sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.126 $D_{60}$= 0.0458 $D_{50}$= 0.0375
$D_{30}$= 0.0171 $D_{15}$= 0.0082 $D_{10}$= 0.0031
$C_u$= 14.94 $C_c$= 2.07

**Classification**

USCS= ML AASHTO=

**Remarks**

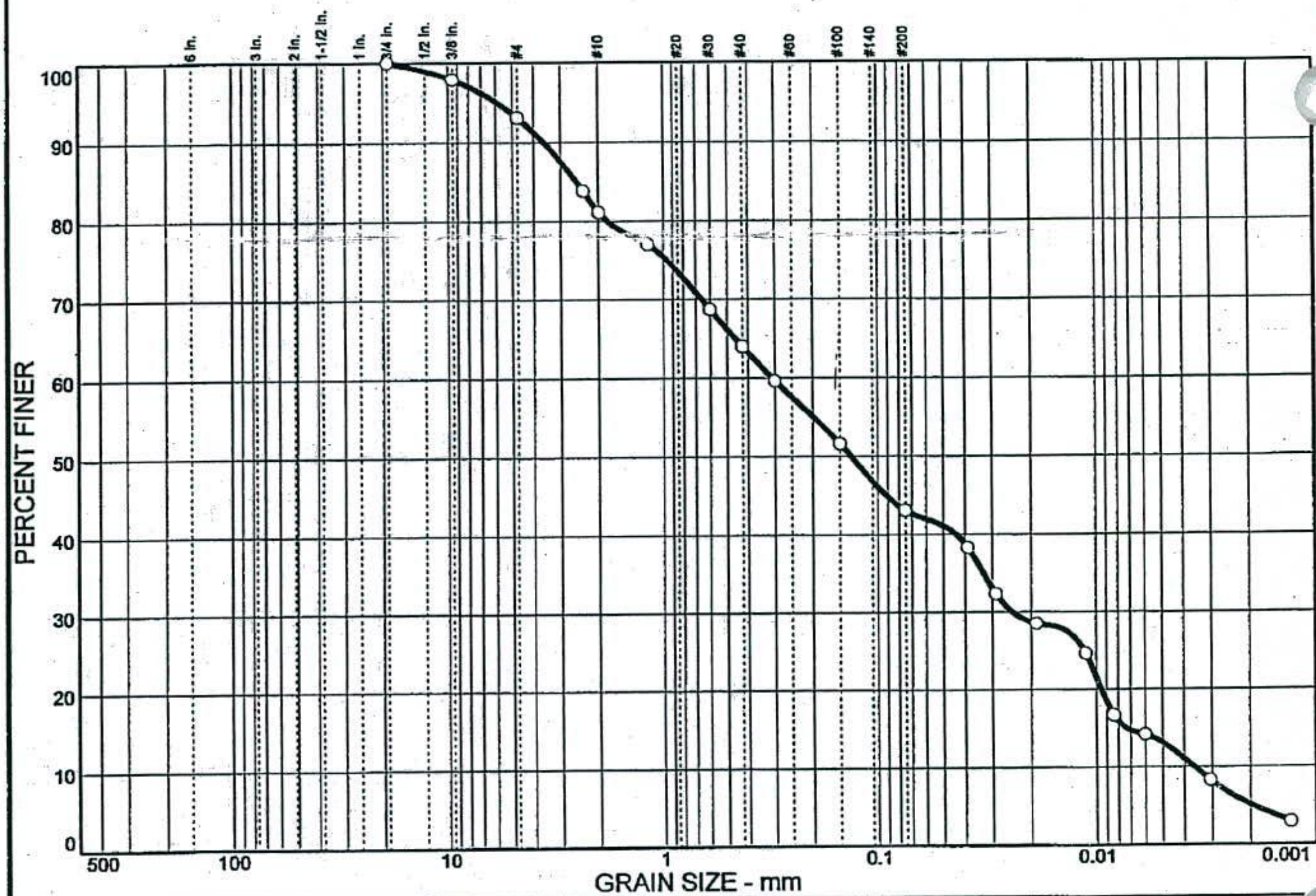
Specific Gravity - 2.70

**Sample No.:** S-4(Baggie) **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-23 **Elev./Depth:** 14.5 - 16.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 23

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 6.9 | 50.0 | 30.0 | 13.1 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 97.9 | | |
| #4 | 93.1 | | |
| #8 | 83.8 | | |
| #10 | 81.1 | | |
| #16 | 77.0 | | |
| #30 | 68.7 | | |
| #40 | 64.0 | | |
| #50 | 59.6 | | |
| #100 | 51.6 | | |
| #200 | 43.1 | | |

* (no specification provided)

**Soil Description**

Light Gray Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 2.54 $D_{60}$= 0.310 $D_{50}$= 0.133
$D_{30}$= 0.0242 $D_{15}$= 0.0073 $D_{10}$= 0.0036
$C_u$= 85.87 $C_c$= 0.52

**Classification**

USCS= SM AASHTO=

**Remarks**

Specific Gravity - 2.86

**Sample No.:** S-9(Baggie) **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-23 **Elev./Depth:** 39.5 - 40.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 24

# Particle Size Distribution Report


| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 14.0 | 27.6 | 58.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #8 | 99.9 | | |
| #10 | 99.9 | | |
| #16 | 99.5 | | |
| #30 | 98.1 | | |
| #40 | 97.1 | | |
| #50 | 95.9 | | |
| #100 | 92.7 | | |
| #200 | 86.0 | | |

* (no specification provided)

**Soil Description**

Dark Brown Elastic silt

**Atterberg Limits**

PL= 55 LL= 86 PI= 31

**Coefficients**

$D_{85}$= 0.0666 $D_{60}$= 0.0056 $D_{50}$=
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

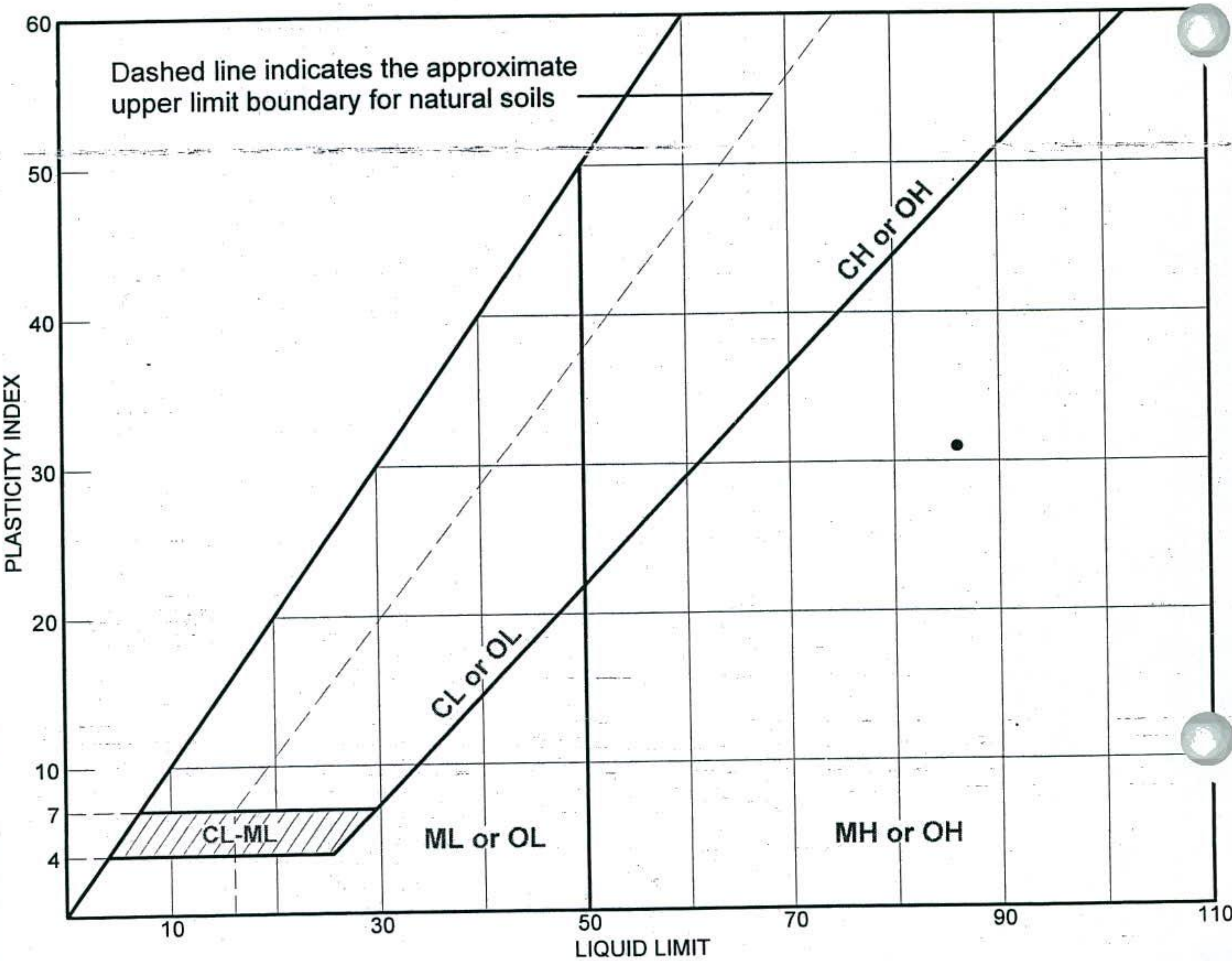
Seecific Gravity - 2.83
Permeability - 8.2x10-6
Dry Density - 78.6pcf - @40.8% Moisture

**Sample No.:** UD
**Location:** GYP-16
**Source of Sample:**
**Date:** 12/06/06
**Elev./Depth:** 4.0 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE
**Lab#** 25

# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ● | | UD | 4.0 - 6.0 | | 55 | 86 | 31 | MH |

LIQUID AND PLASTIC LIMITS TEST REPORT

**SOUTHERN COMPANY**

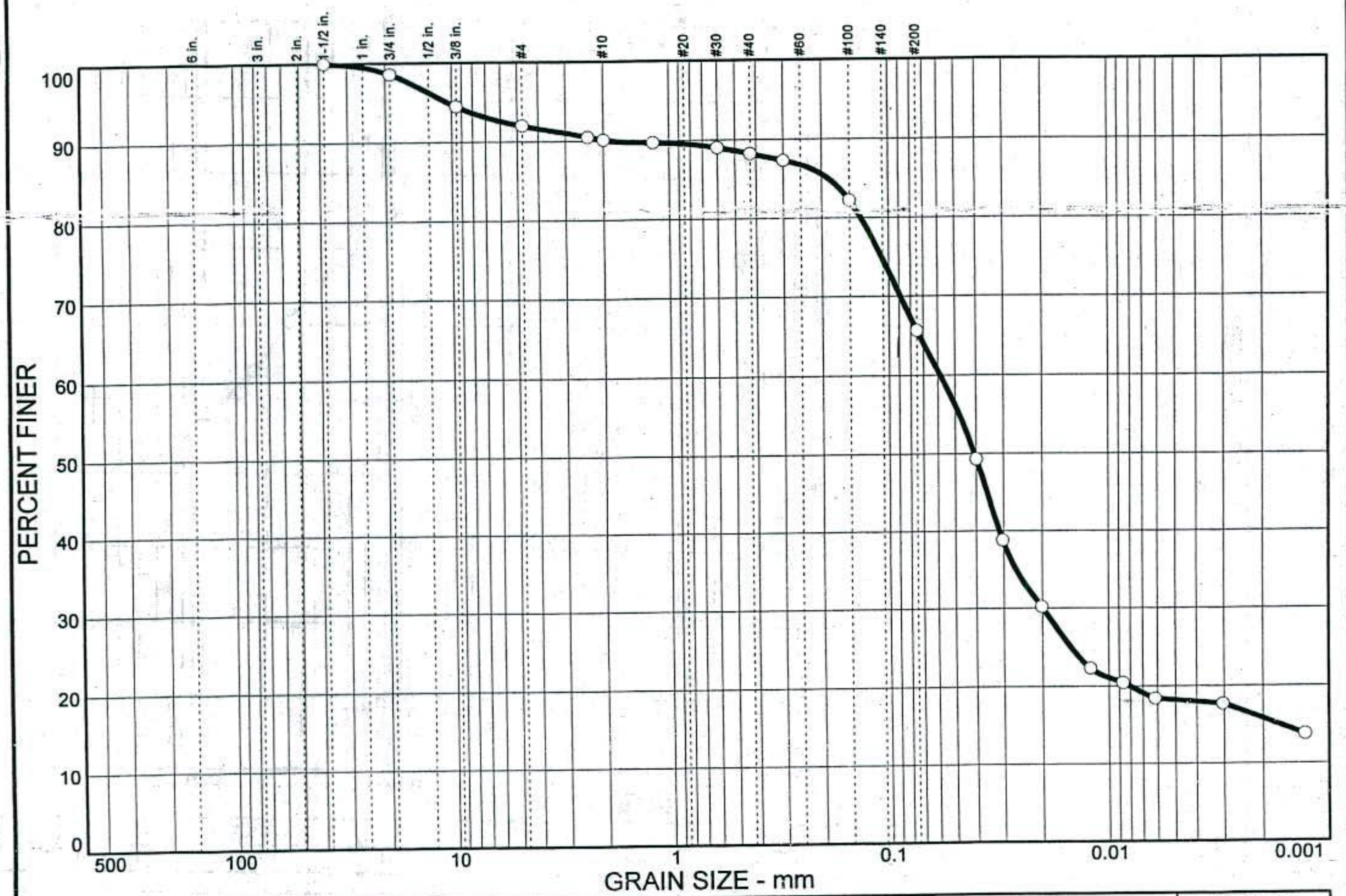
**Client:** SCS - Terri Hartsfield

**Project:** Plant Wansley Gypsum Disposal Facility

**Project No.:** EWO - 3186DE

**Lab#** 25

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 8.0 | 26.3 | 47.5 | 18.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 1.50 in. | 100.0 | | |
| 0.75 in. | 98.6 | | |
| .375 in. | 94.5 | | |
| #4 | 92.0 | | |
| #8 | 90.5 | | |
| #10 | 90.1 | | |
| #16 | 89.7 | | |
| #30 | 89.0 | | |
| #40 | 88.2 | | |
| #50 | 87.3 | | |
| #100 | 82.2 | | |
| #200 | 65.7 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.187 $D_{60}$= 0.0586 $D_{50}$= 0.0409
$D_{30}$= 0.0199 $D_{15}$= 0.0017 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

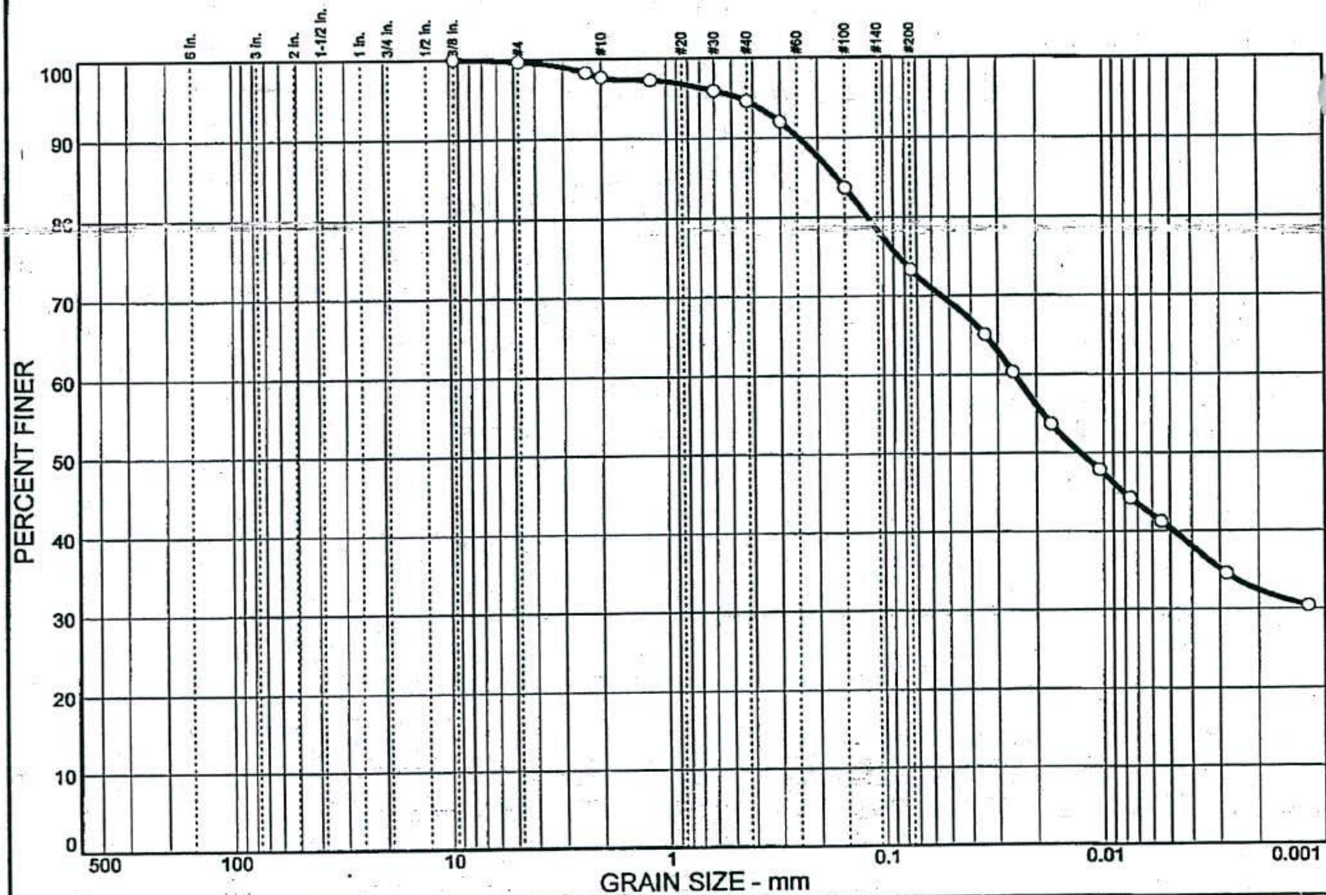
Specific Gravity - 2.70
Permesbility - 2.3x10-4
Dry Density - 87.0pcf @ 22.1% Moisture

**Sample No.:** UD
**Location:** GYP-16
**Source of Sample:**
**Date:** 12/09/06
**Elev./Depth:** 12.0 - 14.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 26

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.3 | 26.4 | 32.9 | 40.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 99.7 | | |
| #8 | 98.3 | | |
| #10 | 97.7 | | |
| #16 | 97.3 | | |
| #30 | 95.9 | | |
| #40 | 94.6 | | |
| #50 | 92.0 | | |
| #100 | 83.7 | | |
| #200 | 73.3 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Elastic silt with sand

**Atterberg Limits**

PL= 34 LL= 51 PI= 17

**Coefficients**

$D_{85}$= 0.164 $D_{60}$= 0.0251 $D_{50}$= 0.0127
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= MH AASHTO=

**Remarks**

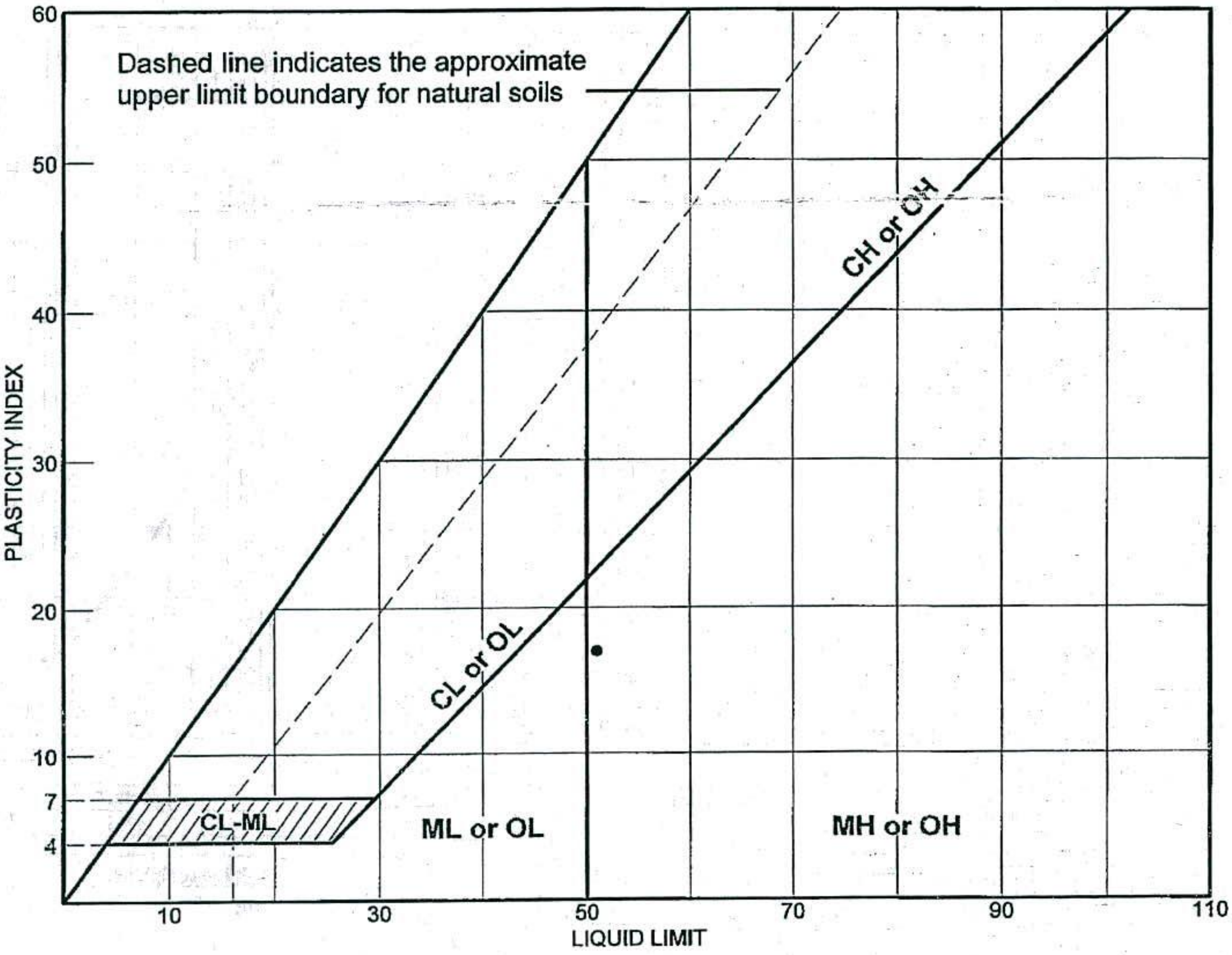
Specific Gravity - 2.69
Permeability - 4.7x10-5
Dry Density - 86.1pcf @ 27.5% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-11 **Elev./Depth:** 3.0 - 5.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 27

# LIQUID AND PLASTIC LIMITS TEST REPORT




| SOIL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SOURCE | SAMPLE NO. | DEPTH (ft.) | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| • | | UD | 3.0 - 5.0 | | 34 | 51 | 17 | MH |

LIQUID AND PLASTIC LIMITS TEST REPORT

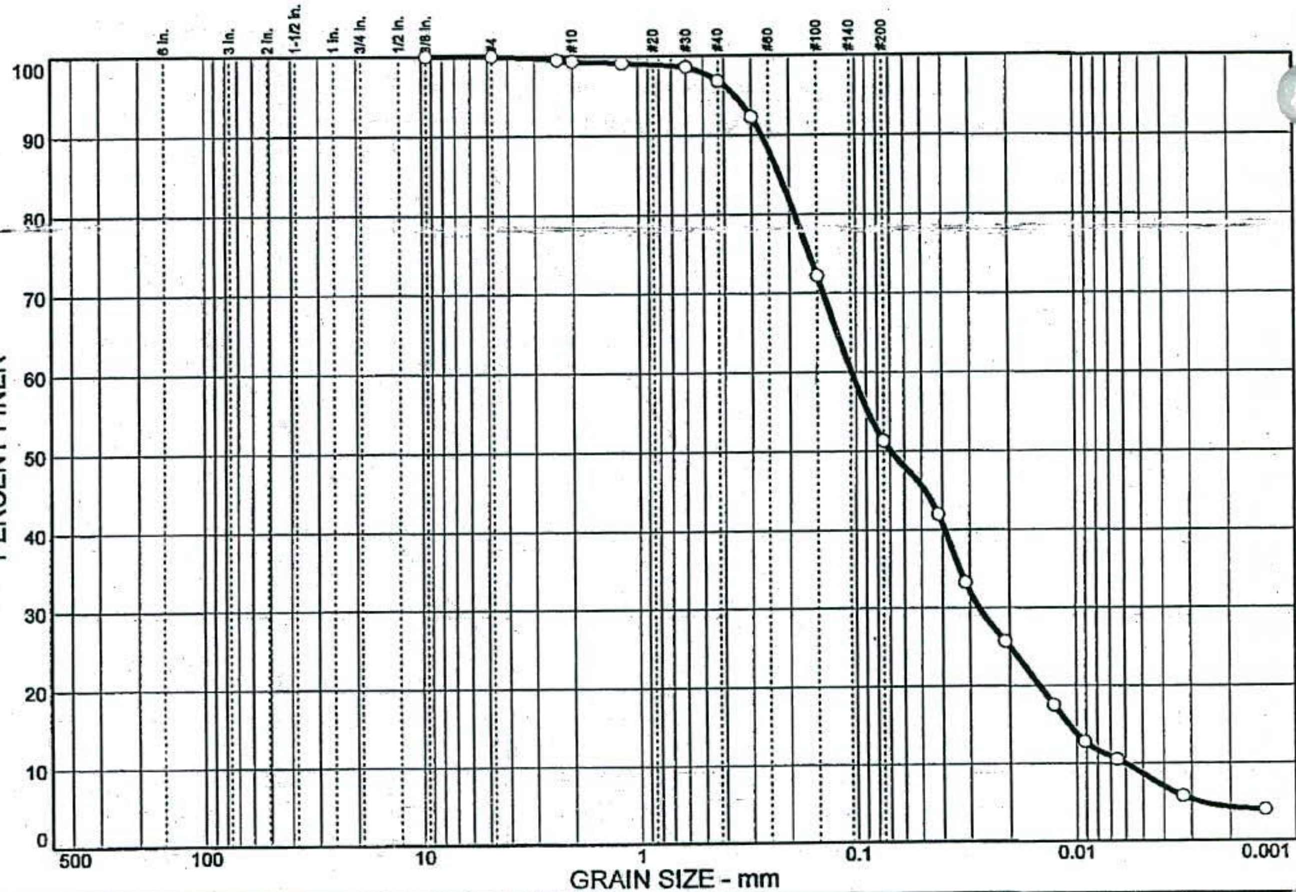
**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield

**Project:** Plant Wansley Gypsum Disposal Facility

**Project No.:** EWO - 3186DE **Lab#** 27

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 48.7 | 42.6 | 8.7 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 100.0 | | |
| #8 | 99.5 | | |
| #10 | 99.3 | | |
| #16 | 99.1 | | |
| #30 | 98.6 | | |
| #40 | 96.8 | | |
| #50 | 92.3 | | |
| #100 | 72.2 | | |
| #200 | 51.3 | | |

* (no specification provided)

**Soil Description**

Light Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.222 $D_{60}$= 0.105 $D_{50}$= 0.0694
$D_{30}$= 0.0273 $D_{15}$= 0.0108 $D_{10}$= 0.0060
$C_u$= 17.36 $C_c$= 1.18

**Classification**

USCS= ML AASHTO=

**Remarks**

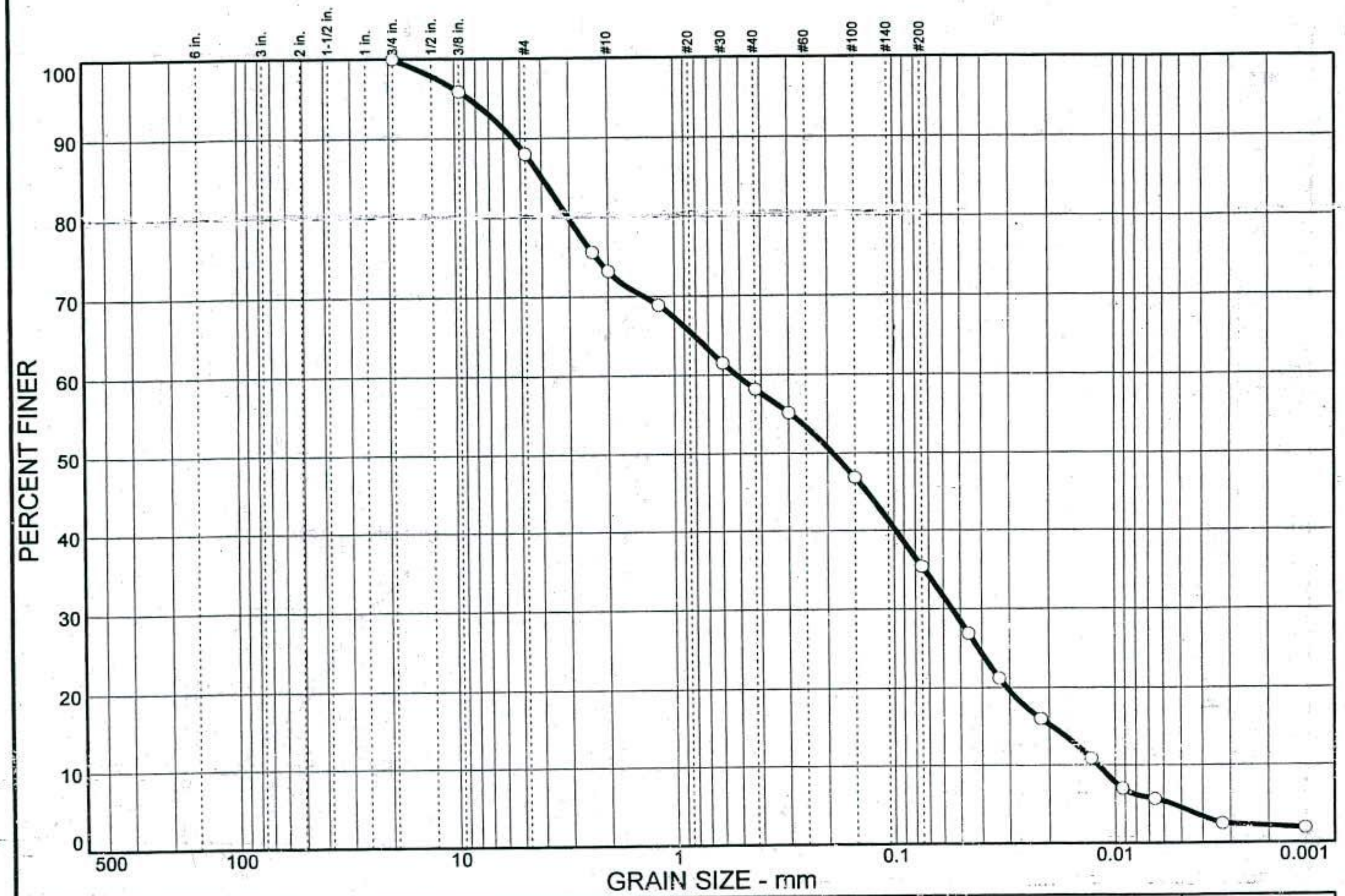
Specific Gravity - 2.67
Permeability - 7.3x10-5
Dry Density - 95.0pcf @ 15.4% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 11/17/06
**Location:** GYP-11 **Elev./Depth:** 10.0 - 12.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 28

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 12.0 | 52.6 | 30.8 | 4.6 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 95.9 | | |
| #4 | 88.0 | | |
| #8 | 75.6 | | |
| #10 | 73.2 | | |
| #16 | 68.9 | | |
| #30 | 61.5 | | |
| #40 | 58.1 | | |
| #50 | 55.1 | | |
| #100 | 46.8 | | |
| #200 | 35.4 | | |

* (no specification provided)

**Soil Description**

Light Brown Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 3.98 $D_{60}$= 0.520 $D_{50}$= 0.189
$D_{30}$= 0.0546 $D_{15}$= 0.0194 $D_{10}$= 0.0120
$C_u$= 43.50 $C_c$= 0.48

**Classification**

USCS= SM AASHTO=

**Remarks**

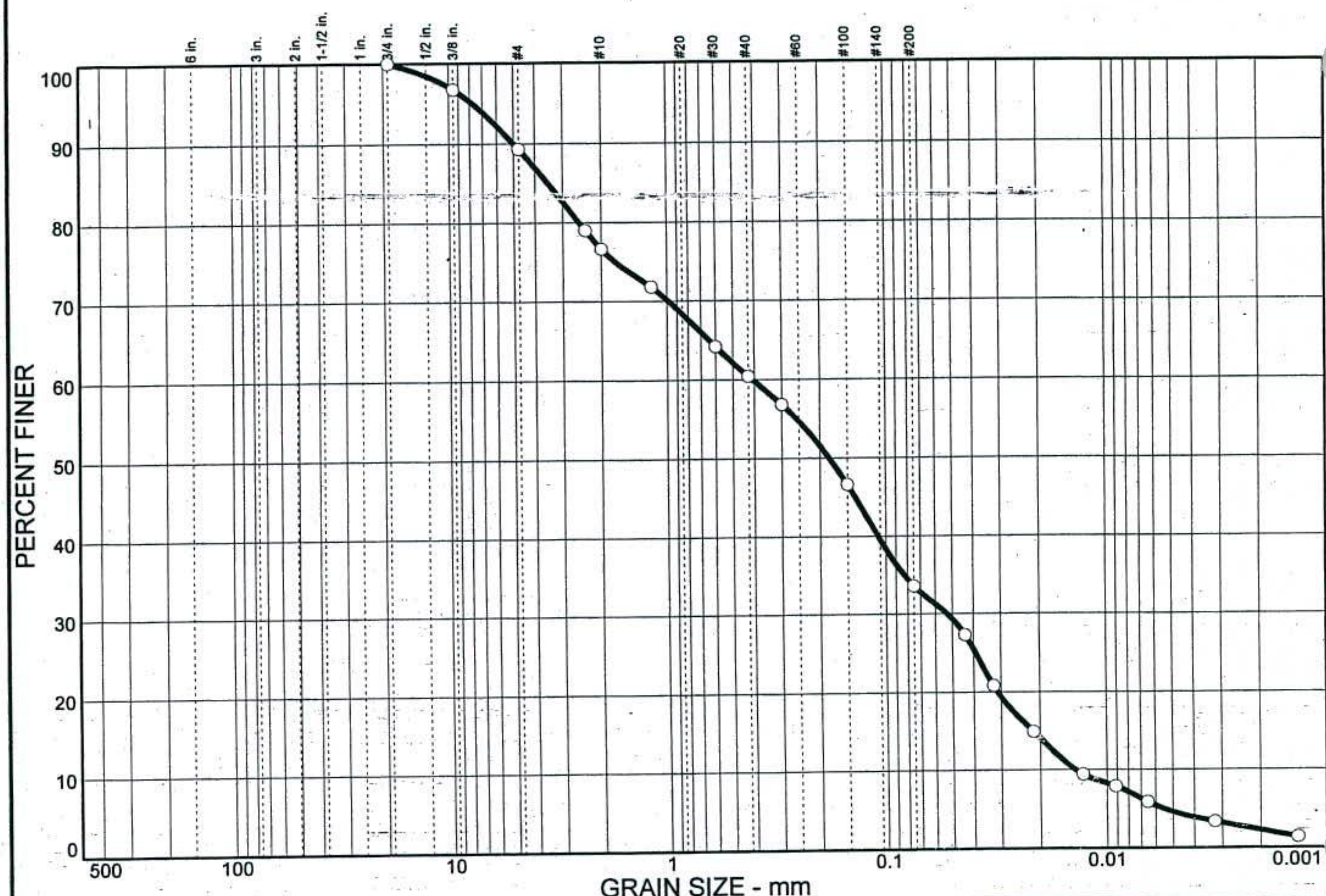
Specific Gravity - 2.74
Dry Density - 102.5pcf - @ 12.2% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-26 **Elev./Depth:** 1.0 - 3.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 29

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 10.7 | 55.7 | 28.9 | 4.7 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 96.8 | | |
| #4 | 89.3 | | |
| #8 | 79.0 | | |
| #10 | 76.6 | | |
| #16 | 71.8 | | |
| #30 | 64.2 | | |
| #40 | 60.4 | | |
| #50 | 56.8 | | |
| #100 | 46.6 | | |
| #200 | 33.6 | | |

* (no specification provided)

**Soil Description**

Brown Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 3.51 $D_{60}$= 0.409 $D_{50}$= 0.182
$D_{30}$= 0.0529 $D_{15}$= 0.0215 $D_{10}$= 0.0138
$C_u$= 29.60 $C_c$= 0.50

**Classification**

USCS= SM AASHTO=

**Remarks**

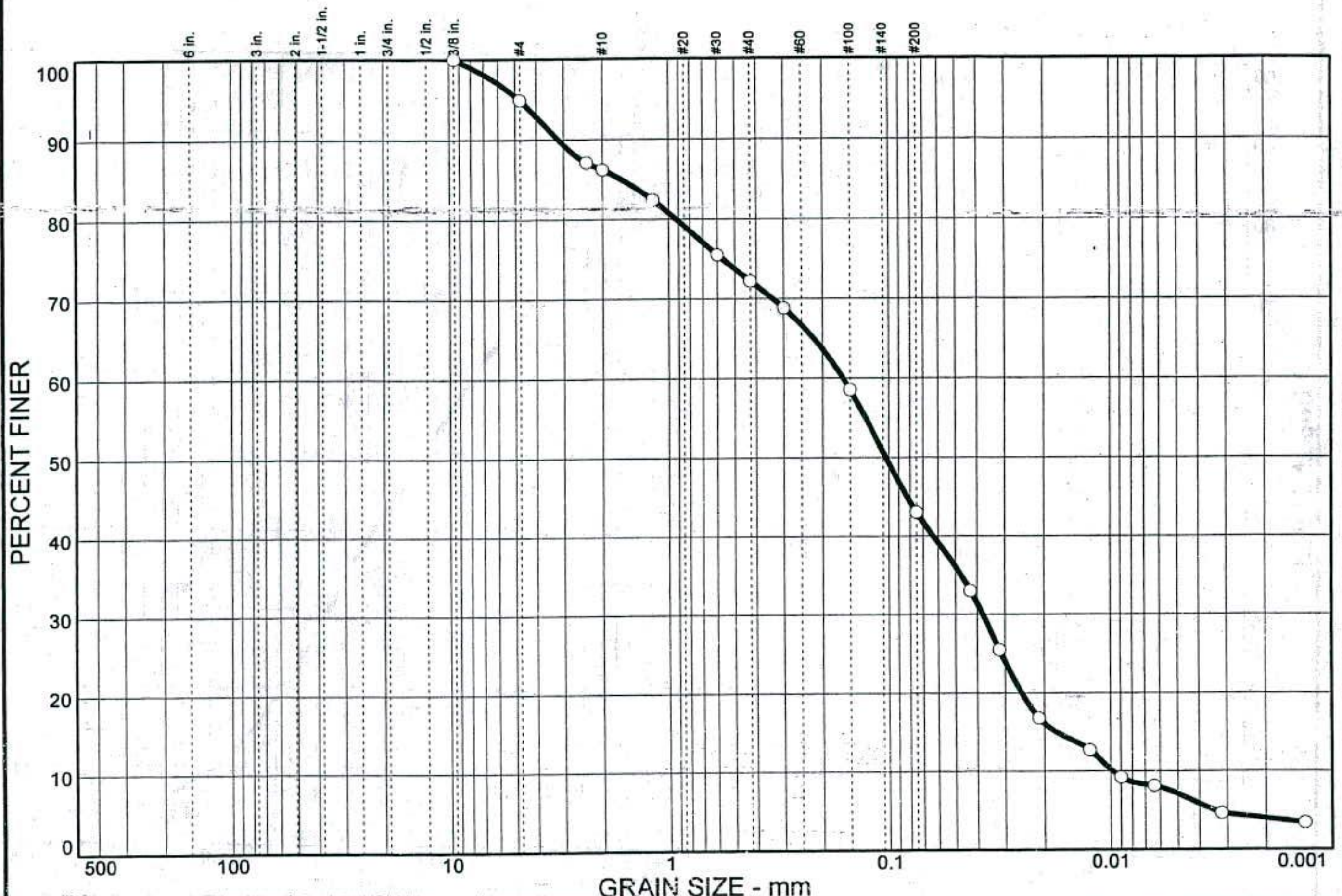
Specific Gravity - 2.73
Dry Density 109.9pcf - @ 13.2% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-26 **Elev./Depth:** NA

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 30

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 5.1 | 51.9 | 35.9 | 7.1 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 94.9 | | |
| #8 | 87.1 | | |
| #10 | 86.2 | | |
| #16 | 82.4 | | |
| #30 | 75.5 | | |
| #40 | 72.2 | | |
| #50 | 68.8 | | |
| #100 | 58.5 | | |
| #200 | 43.0 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Silty sand

**Atterberg Limits**

PL= NP  LL= NP  PI= NP

**Coefficients**

$D_{85}$= 1.64  $D_{60}$= 0.162  $D_{50}$= 0.103
$D_{30}$= 0.0378  $D_{15}$= 0.0177  $D_{10}$= 0.0098
$C_u$= 16.53  $C_c$= 0.90

**Classification**

USCS= SM  AASHTO=

**Remarks**

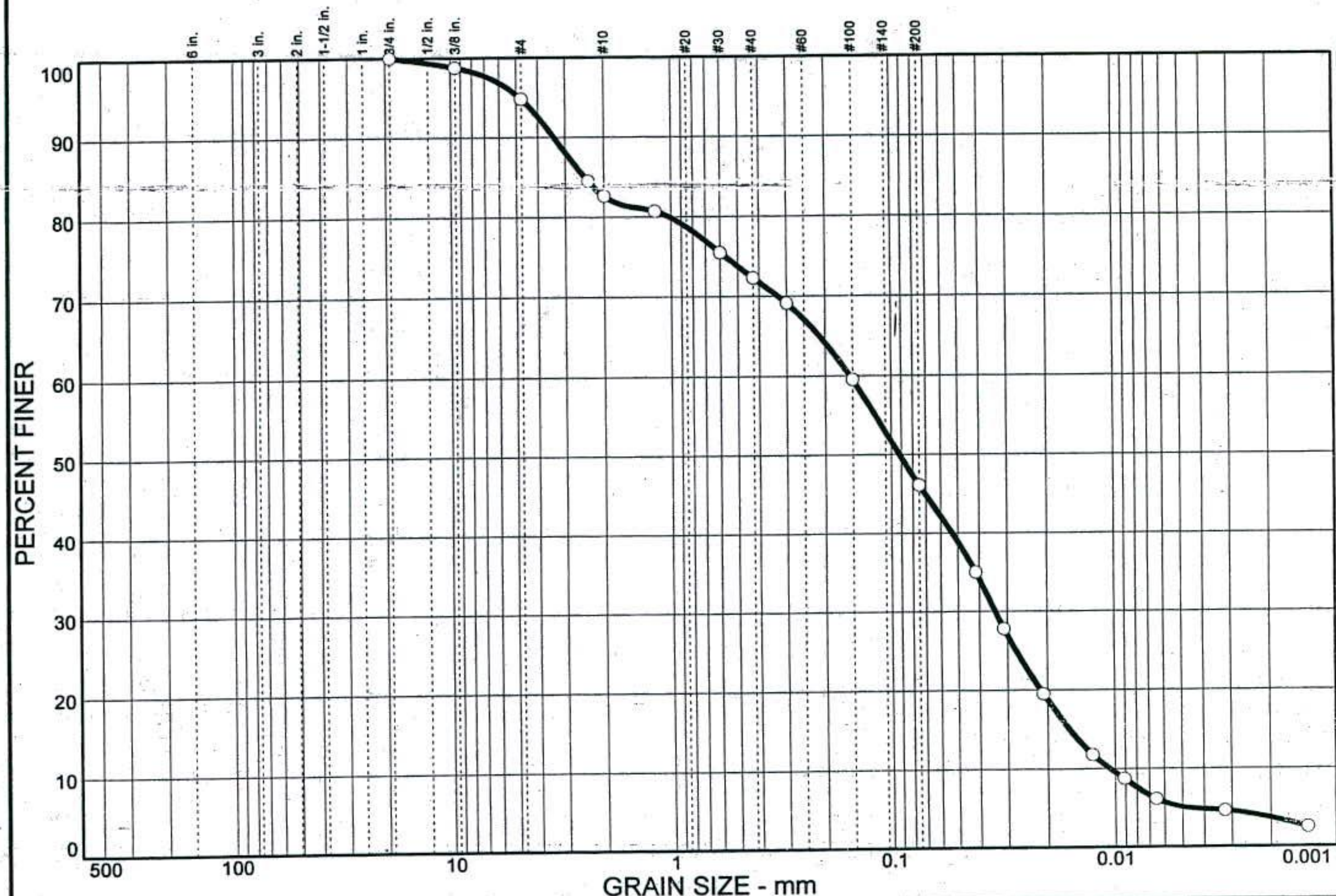
Specific Gravity - 2.78
Permebility - 6.6x10-5
Dry Density - 97.5pcf - @ 11.3% Moisture

**Sample No.:** UD
**Location:** GYP-21
**Source of Sample:**
**Date:** 12/09/06
**Elev./Depth:** 4.0 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE  **Lab#** 31

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 5.2 | 48.7 | 41.0 | 5.1 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 100.0 | | |
| .375 in. | 98.8 | | |
| #4 | 94.8 | | |
| #8 | 84.5 | | |
| #10 | 82.6 | | |
| #16 | 80.7 | | |
| #30 | 75.5 | | |
| #40 | 72.3 | | |
| #50 | 69.1 | | |
| #100 | 59.5 | | |
| #200 | 46.1 | | |

* (no specification provided)

**Soil Description**

Brown Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 2.45 $D_{60}$= 0.154 $D_{50}$= 0.0920
$D_{30}$= 0.0340 $D_{15}$= 0.0160 $D_{10}$= 0.0105
$C_u$= 14.64 $C_c$= 0.71

**Classification**

USCS= SM AASHTO=

**Remarks**

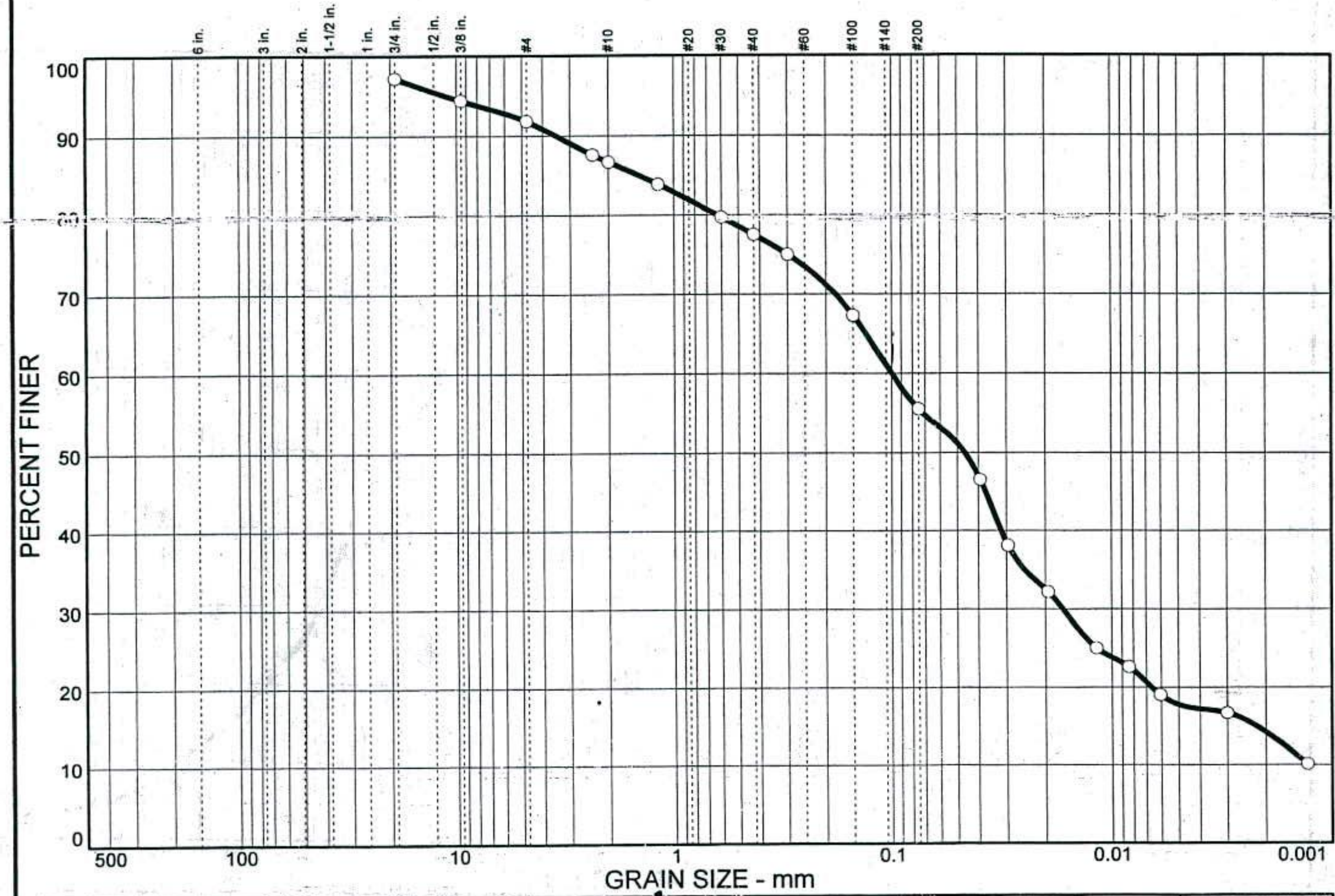
Seecific Gravity - 2.73
Permebility - 1.4x10-4
Dry Density - 109.9pcf - @ 13.3% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-21 **Elev./Depth:** 9.0 - 11.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 32

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| | | 36.3 | 37.7 | 17.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 0.75 in. | 97.2 | | |
| .375 in. | 94.4 | | |
| #4 | 91.8 | | |
| #8 | 87.6 | | |
| #10 | 86.7 | | |
| #16 | 83.9 | | |
| #30 | 79.7 | | |
| #40 | 77.5 | | |
| #50 | 75.0 | | |
| #100 | 67.3 | | |
| #200 | 55.5 | | |

* (no specification provided)

**Soil Description**

Reddish Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 1.44 $D_{60}$= 0.1000 $D_{50}$= 0.0462
$D_{30}$= 0.0166 $D_{15}$= 0.0022 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

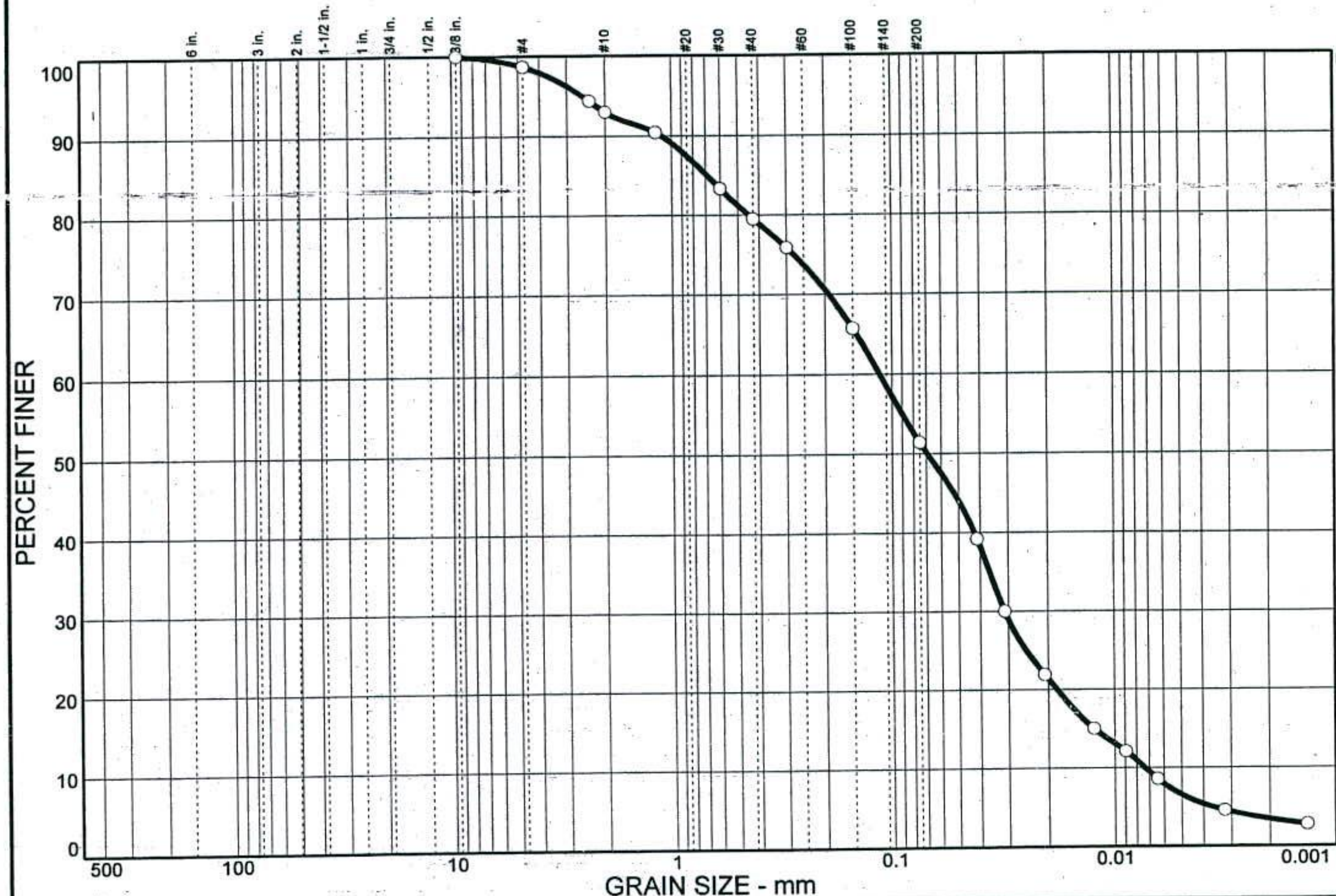
Specific Gravity - 2.78
Permebility - 2.3x10-5
Dry Density - 96.9pcf - @ 13.1% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-28 **Elev./Depth:** 4.0 - 6.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 33

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 1.3 | 47.3 | 44.8 | 6.6 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .375 in. | 100.0 | | |
| #4 | 98.7 | | |
| #8 | 94.4 | | |
| #10 | 93.0 | | |
| #16 | 90.4 | | |
| #30 | 83.3 | | |
| #40 | 79.5 | | |
| #50 | 75.9 | | |
| #100 | 65.7 | | |
| #200 | 51.4 | | |

* (no specification provided)

**Soil Description**

Lavender Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.692 $D_{60}$= 0.114 $D_{50}$= 0.0693
$D_{30}$= 0.0311 $D_{15}$= 0.0124 $D_{10}$= 0.0073
$C_u$= 15.55 $C_c$= 1.16

**Classification**

USCS= ML AASHTO=

**Remarks**

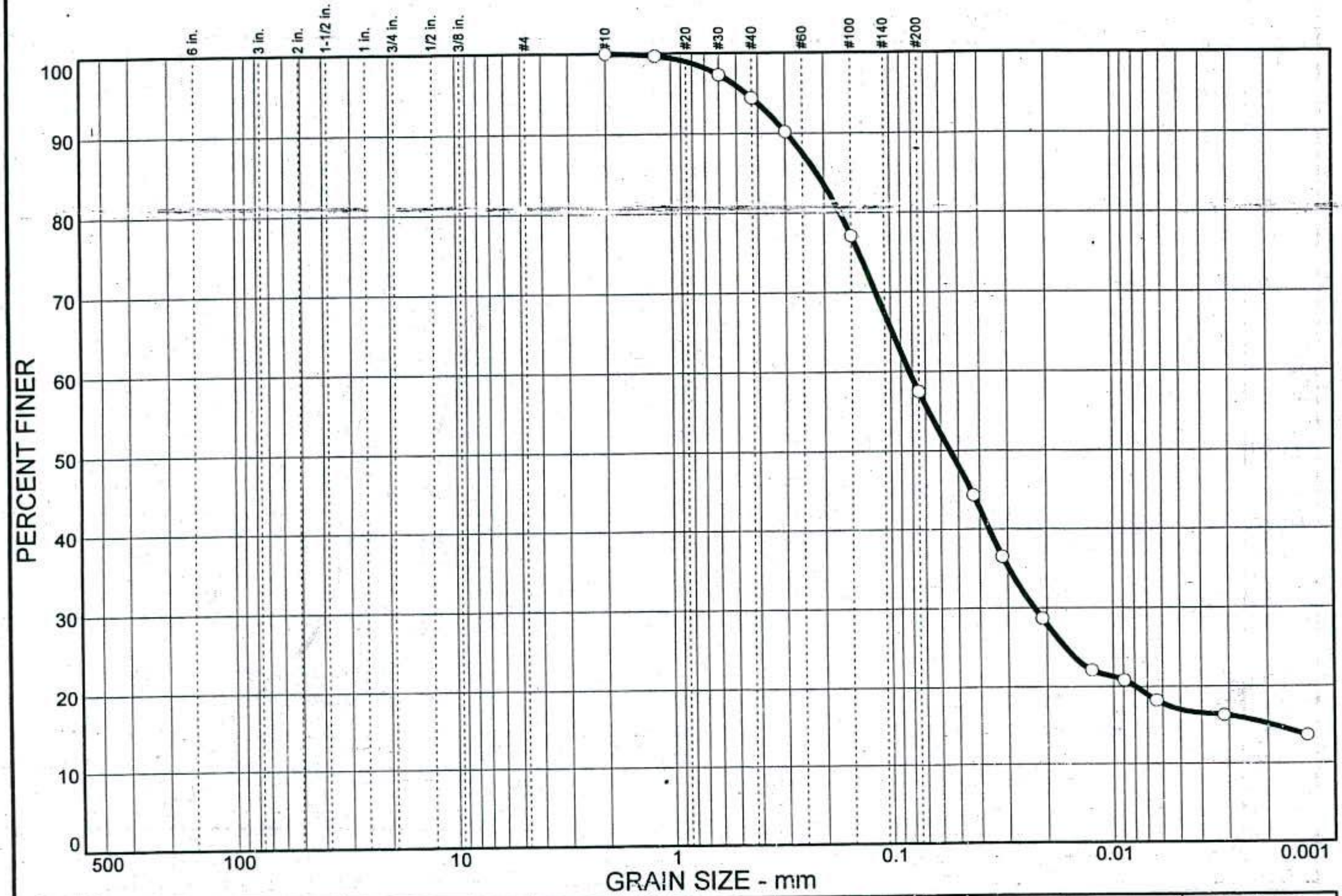
Specific Gravity - 2.75
Permebility - 7.1x10-5
Dry Density - 100.4pcf - @ 15.5% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-28 **Elev./Depth:** 11.0 -12.5

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 34

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 42.6 | 40.4 | 17.0 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #10 | 100.0 | | |
| #16 | 99.7 | | |
| #30 | 97.3 | | |
| #40 | 94.4 | | |
| #50 | 90.2 | | |
| #100 | 77.1 | | |
| #200 | 57.4 | | |

* (no specification provided)

**Soil Description**

Light Reddish Brown Sandy silt

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.216 $D_{60}$= 0.0827 $D_{50}$= 0.0545
$D_{30}$= 0.0227 $D_{15}$= 0.0019 $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= ML AASHTO=

**Remarks**

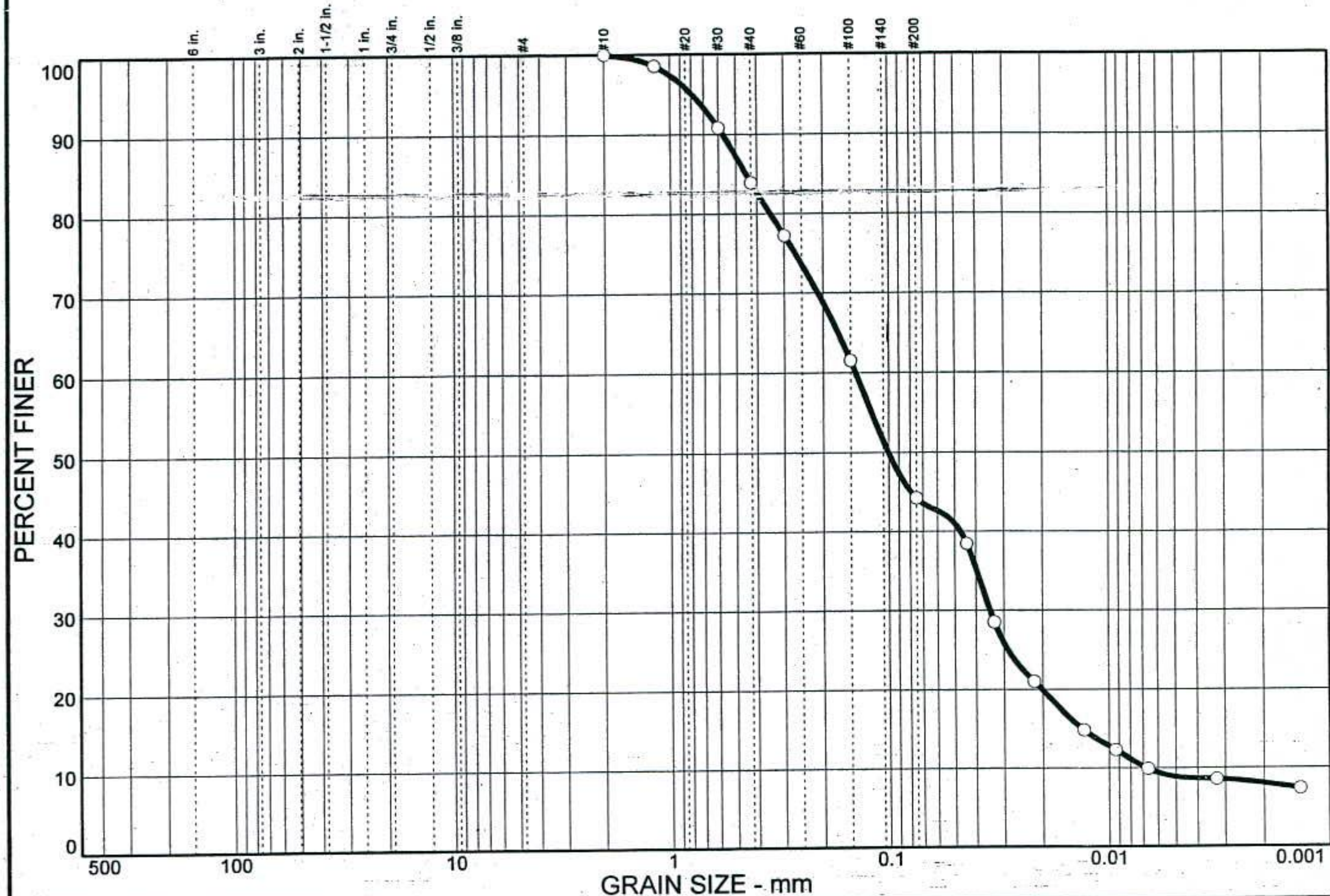
Specific Gravity - 2.64
Permebility - 1.6x10-5
Dry Density - 91.6pcf - @ 15.6% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-4 **Elev./Depth:** 3.0 - 5.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 35

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 55.8 | 35.3 | 8.9 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #10 | 100.0 | | |
| #16 | 98.6 | | |
| #30 | 90.8 | | |
| #40 | 83.9 | | |
| #50 | 77.2 | | |
| #100 | 61.5 | | |
| #200 | 44.2 | | |

* (no specification provided)

**Soil Description**

Light Brown Silty sand

**Atterberg Limits**

PL= NP LL= NP PI= NP

**Coefficients**

$D_{85}$= 0.449 $D_{60}$= 0.142 $D_{50}$= 0.101
$D_{30}$= 0.0346 $D_{15}$= 0.0133 $D_{10}$= 0.0068
$C_u$= 21.03 $C_c$= 1.24

**Classification**

USCS= SM AASHTO=

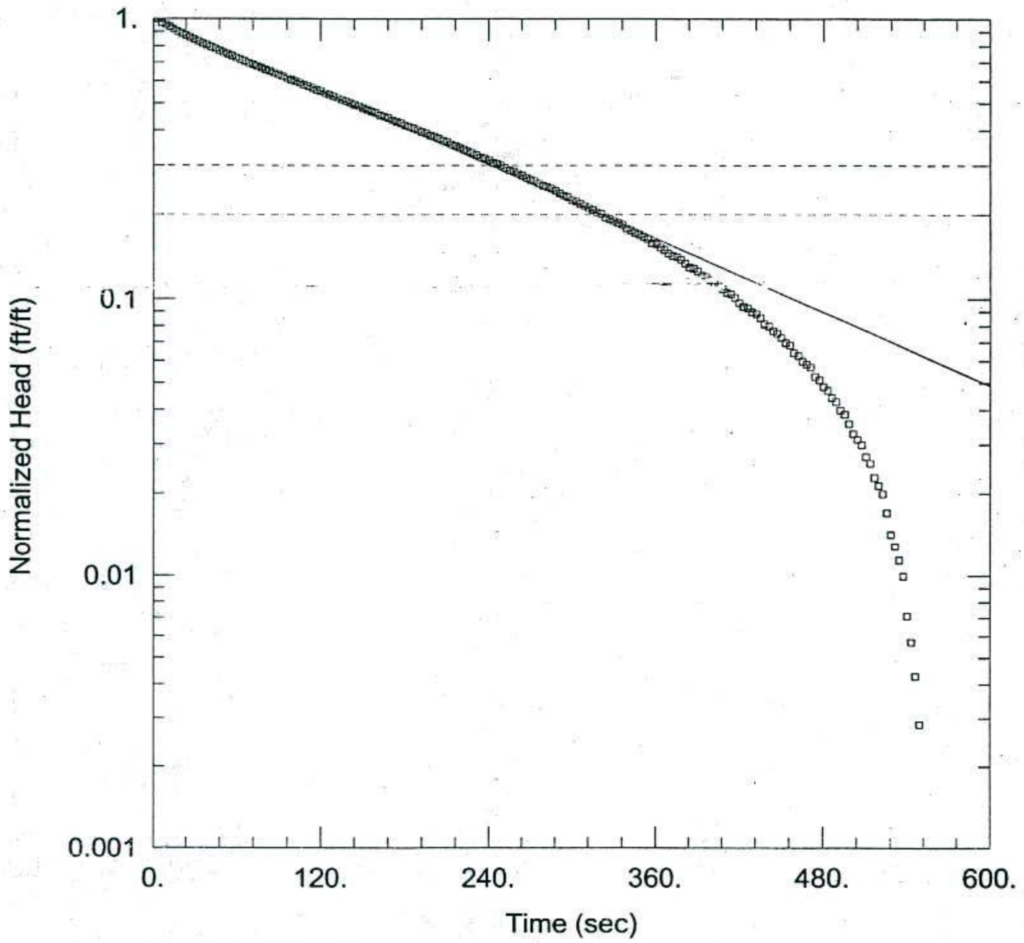
**Remarks**

Specific Gravity - 2.62
Permebility - 9.9x10-5
Dry Density - 91.9pcf - @ 22.7% Moisture

**Sample No.:** UD **Source of Sample:** **Date:** 12/09/06
**Location:** GYP-4 **Elev./Depth:** 10.0 - 12.0

**SOUTHERN COMPANY**

**Client:** SCS - Terri Hartsfield
**Project:** Plant Wansley Gypsum Disposal Facility
**Project No:** EWO - 3186DE **Lab#** 36




WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS3in.aqt
Date: 12/07/06 Time: 13:00:08

PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

AQUIFER DATA

Saturated Thickness: 23.2 ft
Anisotropy Ratio (Kz/Kr): 1.

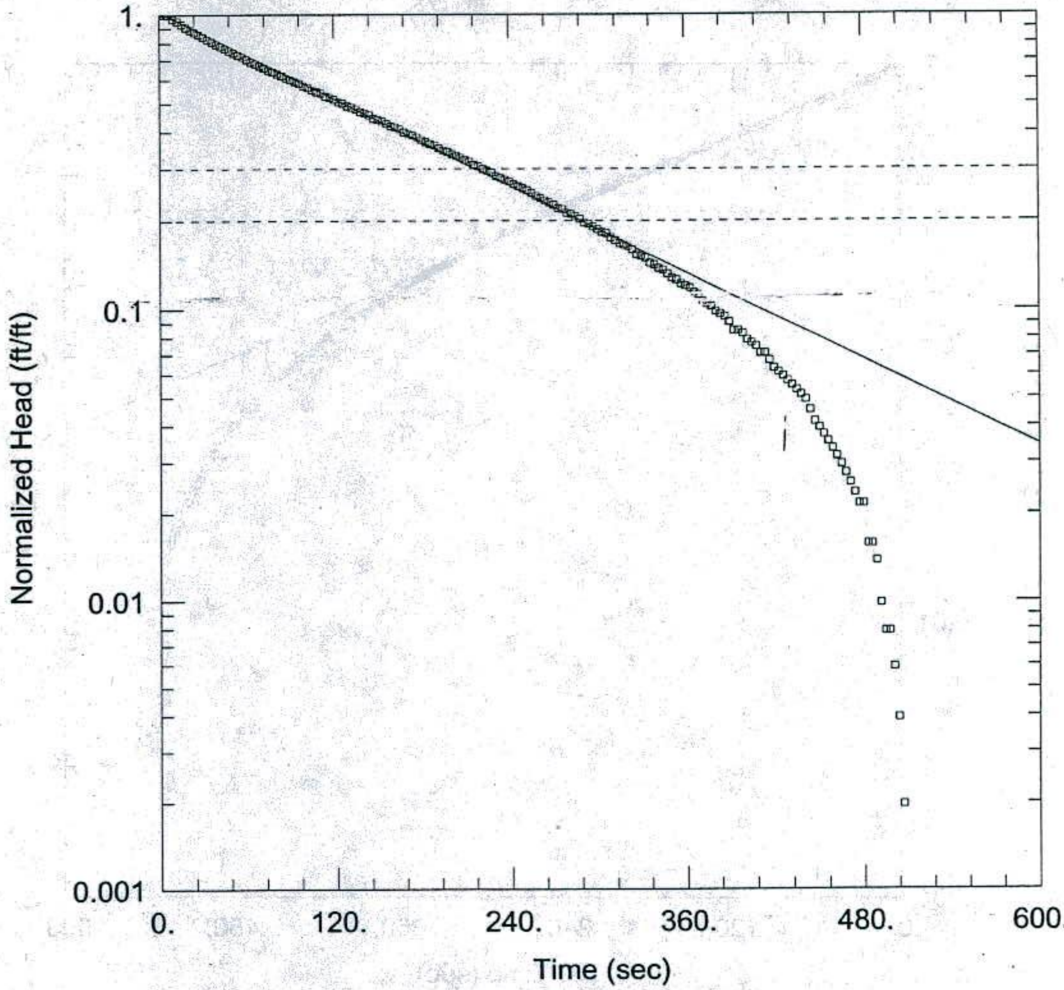
WELL DATA (GS3in)

Initial Displacement: 1.622 ft
Total Well Penetration Depth: 22.7 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 23.2 ft
Screen Length: 9. ft
Wellbore Radius: 0.3333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001681 cm/sec
y0 = 1.644 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS3out.aqt
Date: 12/07/06 Time: 13:02:30

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

Saturated Thickness: 23.2 ft Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS3out)

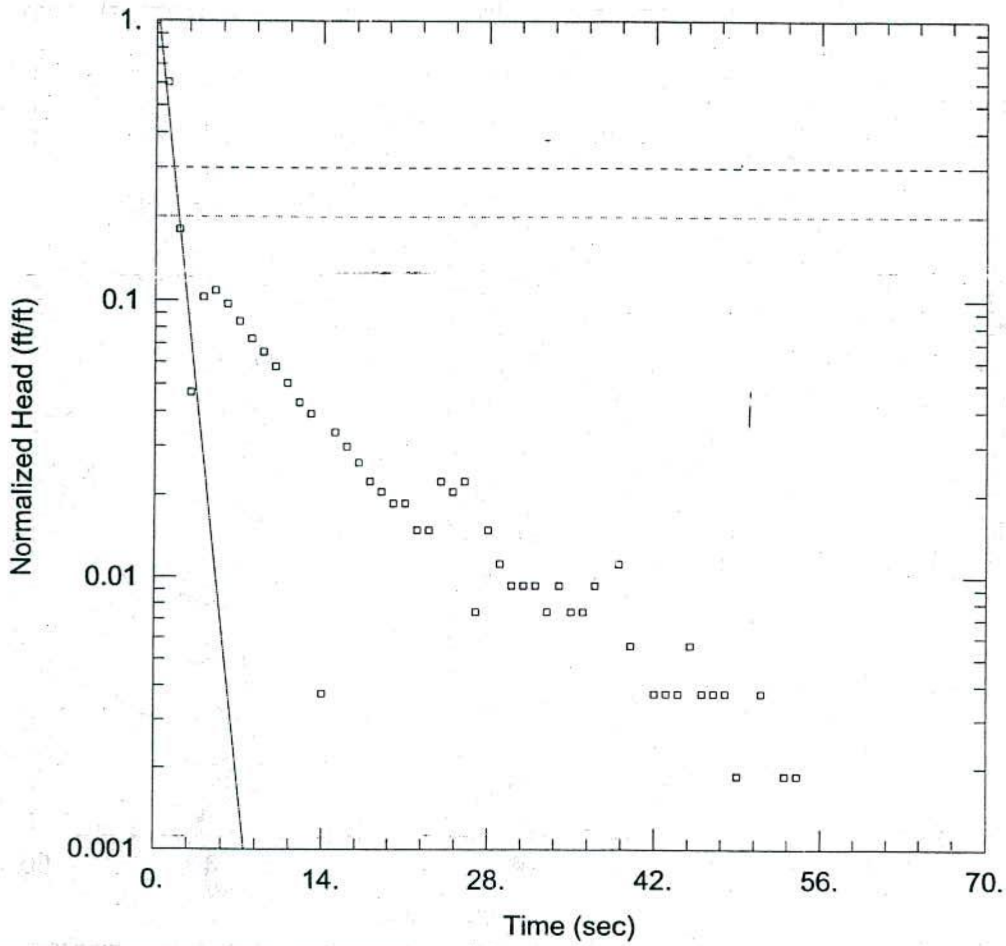
Initial Displacement: 1.173 ft
Total Well Penetration Depth: 22.7 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 23.2 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

## SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001879 cm/sec y0 = 1.199 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS4in.aqt
Date: 12/08/06 Time: 10:12:47

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

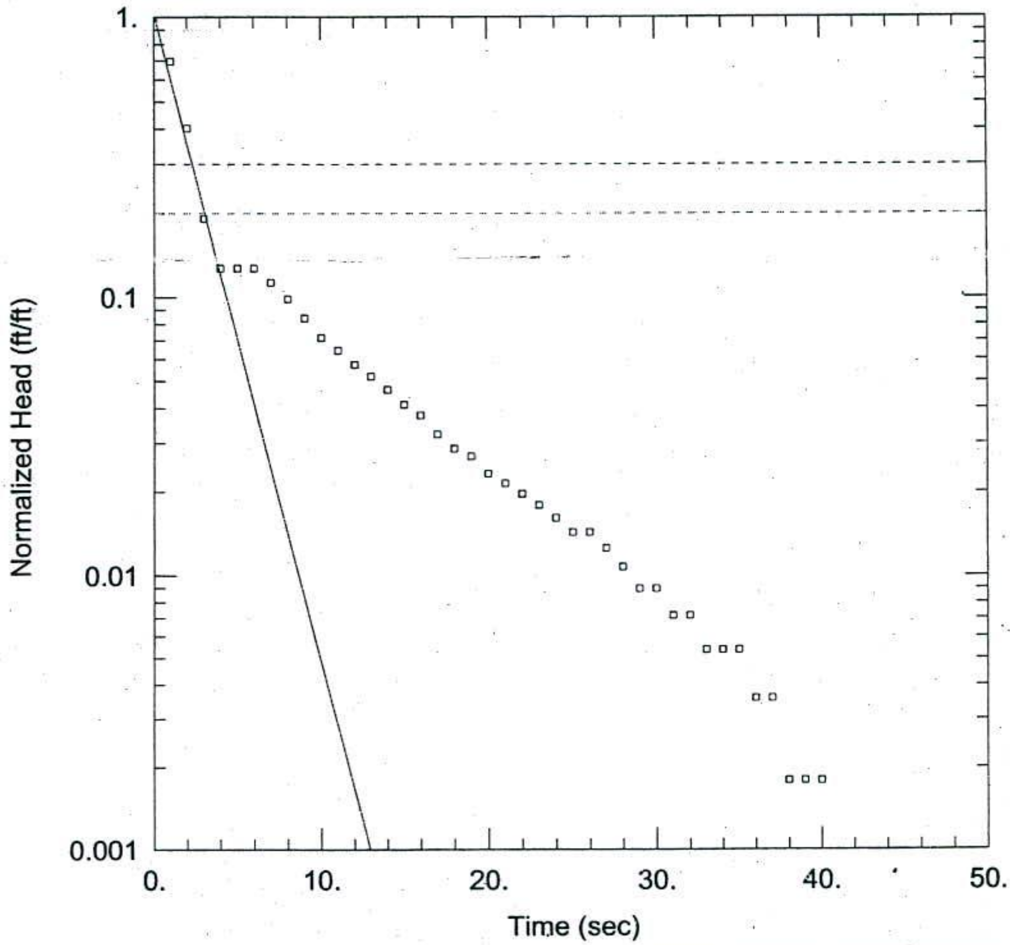
Saturated Thickness: 11.99 ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS4in)

Initial Displacement: 0.535 ft
Total Well Penetration Depth: 11.49 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 11.99 ft
Screen Length: 9. ft
Wellbore Radius: 0.125 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03621 cm/sec
y0 = 0.6561 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS4out.aqt
Date: 12/05/06 Time: 14:22:20

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

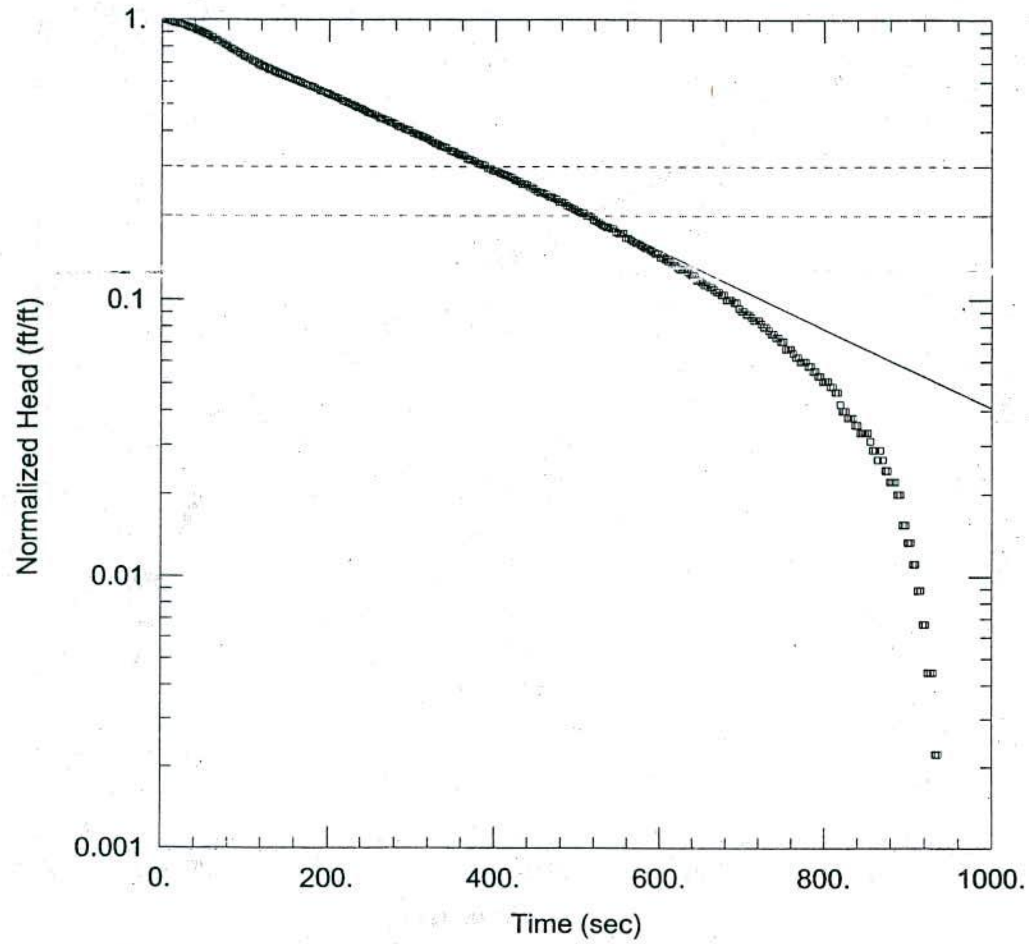
Saturated Thickness: 11.99 ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS4out)

Initial Displacement: 0.558 ft
Total Well Penetration Depth: 11.49 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 11.99 ft
Screen Length: 9. ft
Wellbore Radius: 0.125 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02057 cm/sec
y0 = 0.5764 ft




WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS18in.aqt
Date: 12/07/06 Time: 12:52:58

PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

AQUIFER DATA

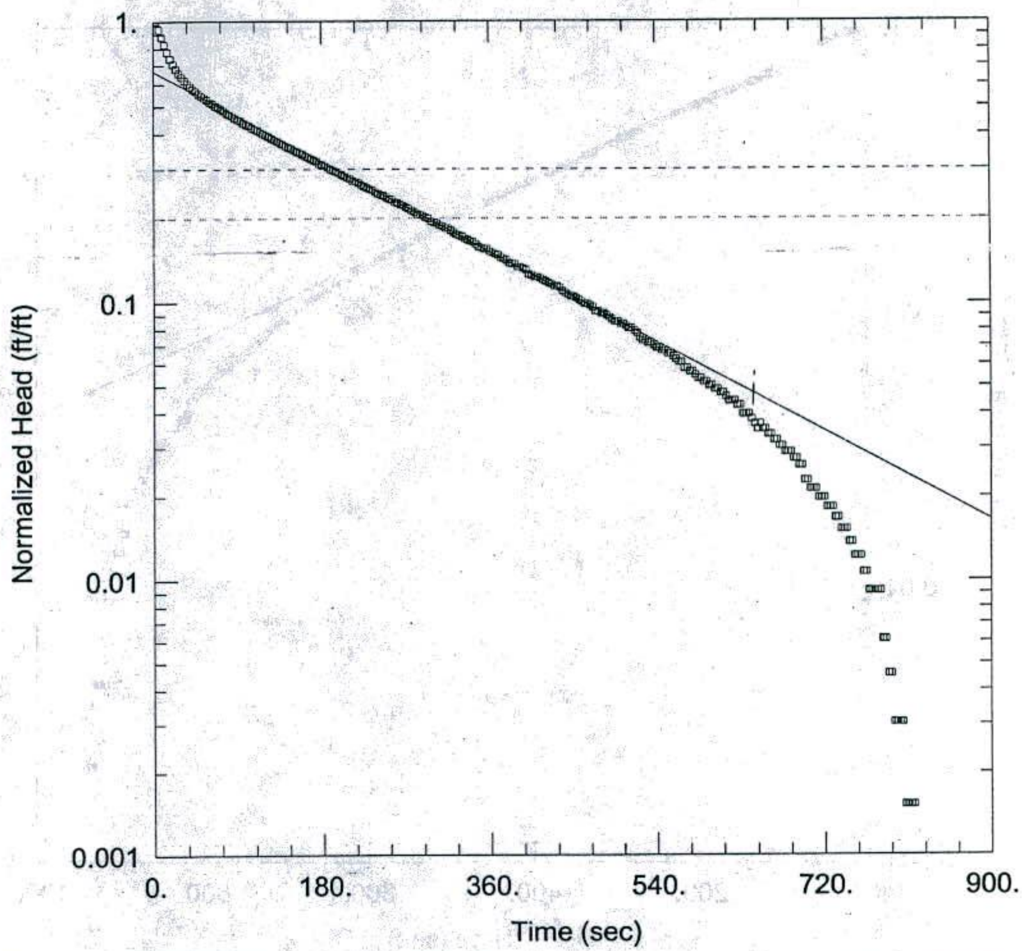
Saturated Thickness: 3.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GS18in)

Initial Displacement: 1.04 ft
Total Well Penetration Depth: 3.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 3.1 ft
Screen Length: 3.1 ft
Wellbore Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002672 cm/sec
y0 = 1.099 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS18out.aqt
Date: 12/07/06 Time: 09:44:02

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

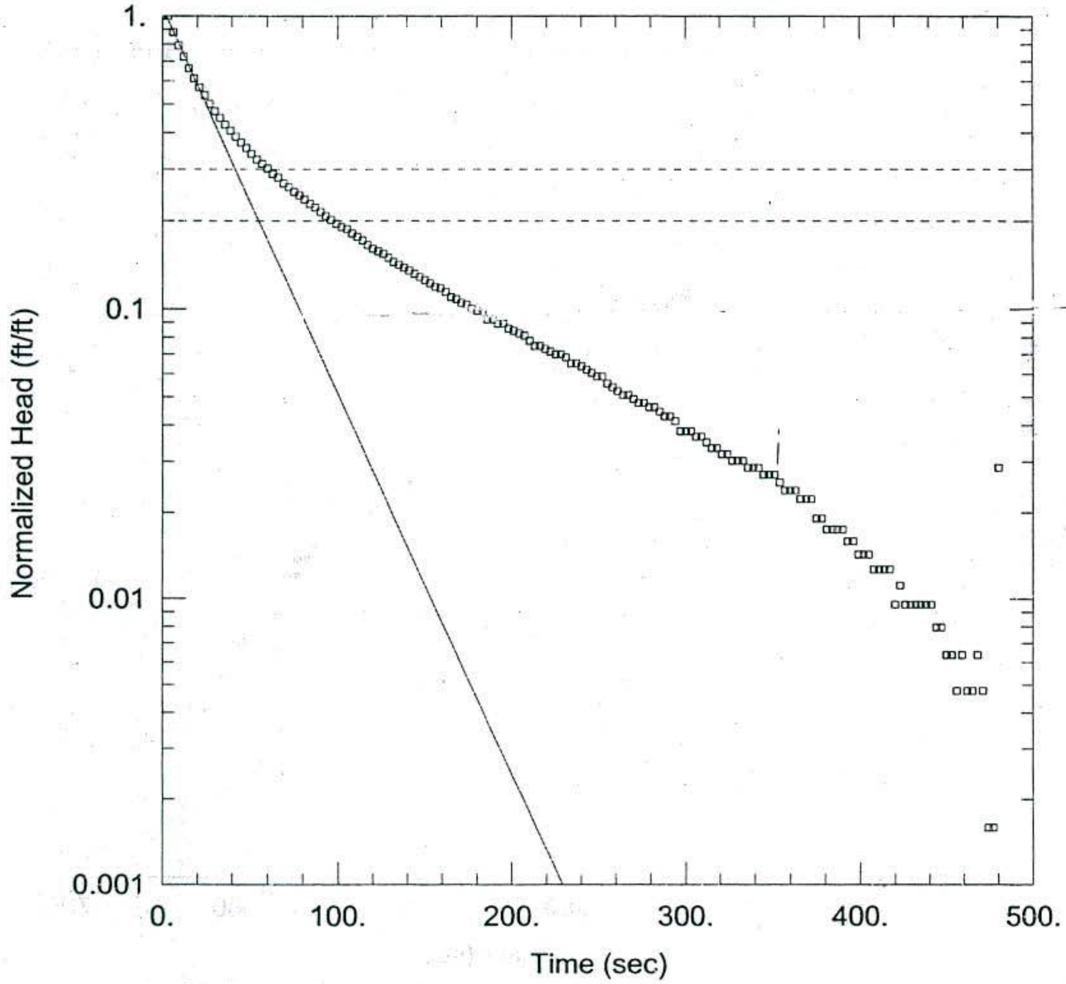
Saturated Thickness: 3.1 ft Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS3out)

Initial Displacement: 1.515 ft
Total Well Penetration Depth: 3.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 18.73 ft
Screen Length: 3.1 ft
Wellbore Radius: 0.125 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0003378 cm/sec
y0 = 1.012 ft




WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS21in.aqt
Date: 12/07/06 Time: 12:55:33

PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

AQUIFER DATA

Saturated Thickness: 40.49 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GS21in)

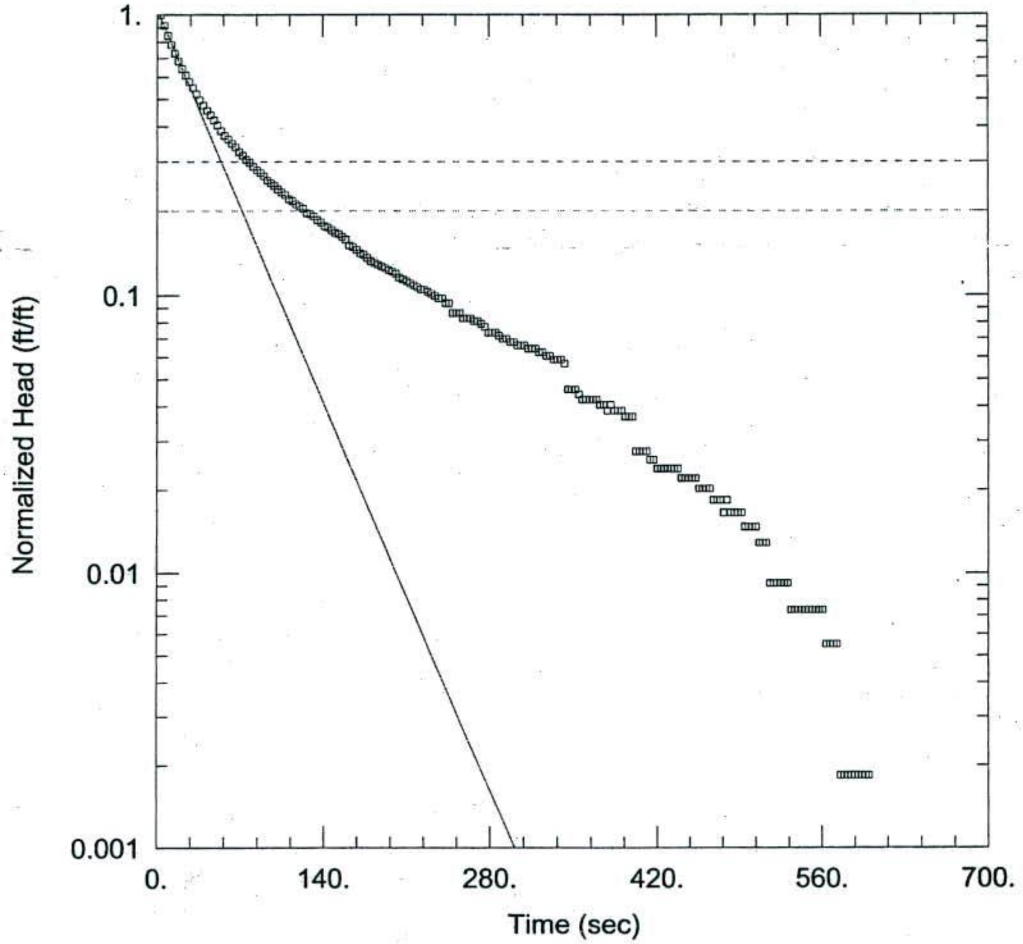
Initial Displacement: 1.453 ft
Total Well Penetration Depth: 39.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 40.49 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001108 cm/sec y0 = 1.547 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS21out.aqt
Date: 12/07/06 Time: 12:56:39

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

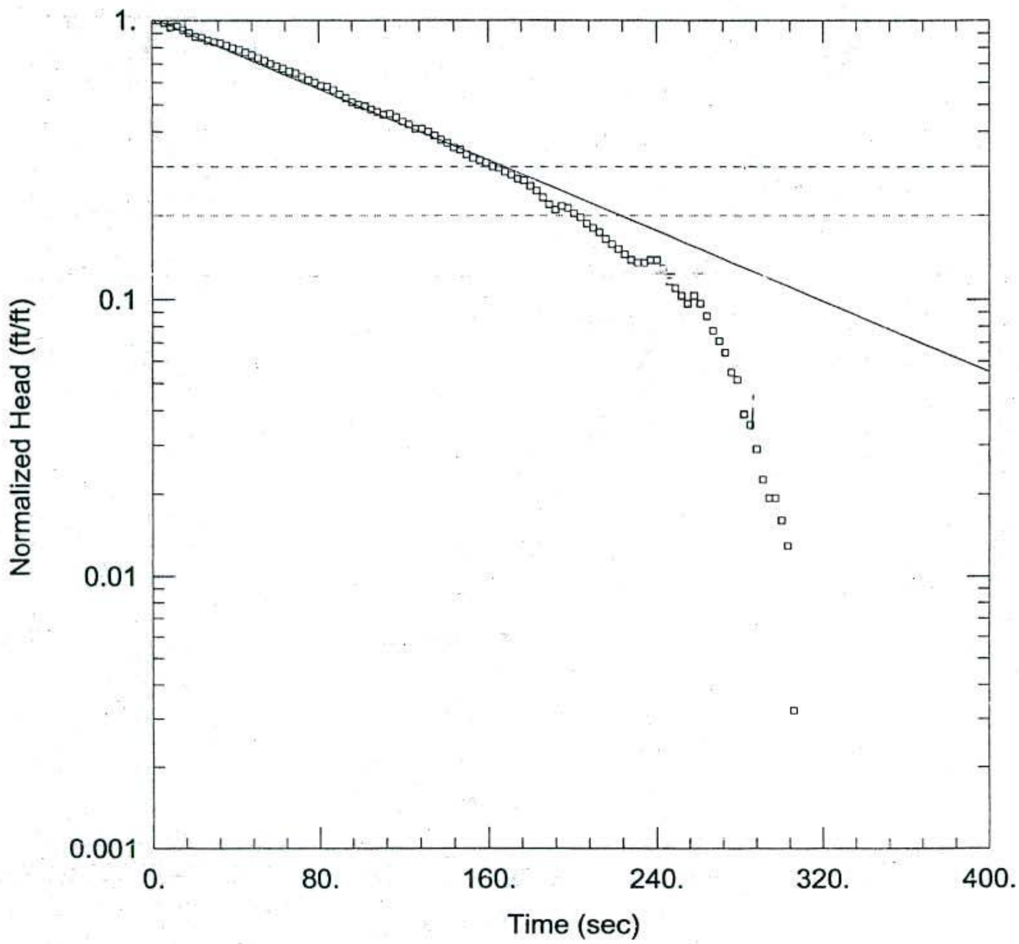
Saturated Thickness: 40.49 ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS21out)

Initial Displacement: 1.257 ft
Total Well Penetration Depth: 39.99 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.49 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0008414 cm/sec
y0 = 1.31 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS25in.aqt
Date: 12/07/06 Time: 12:57:51

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

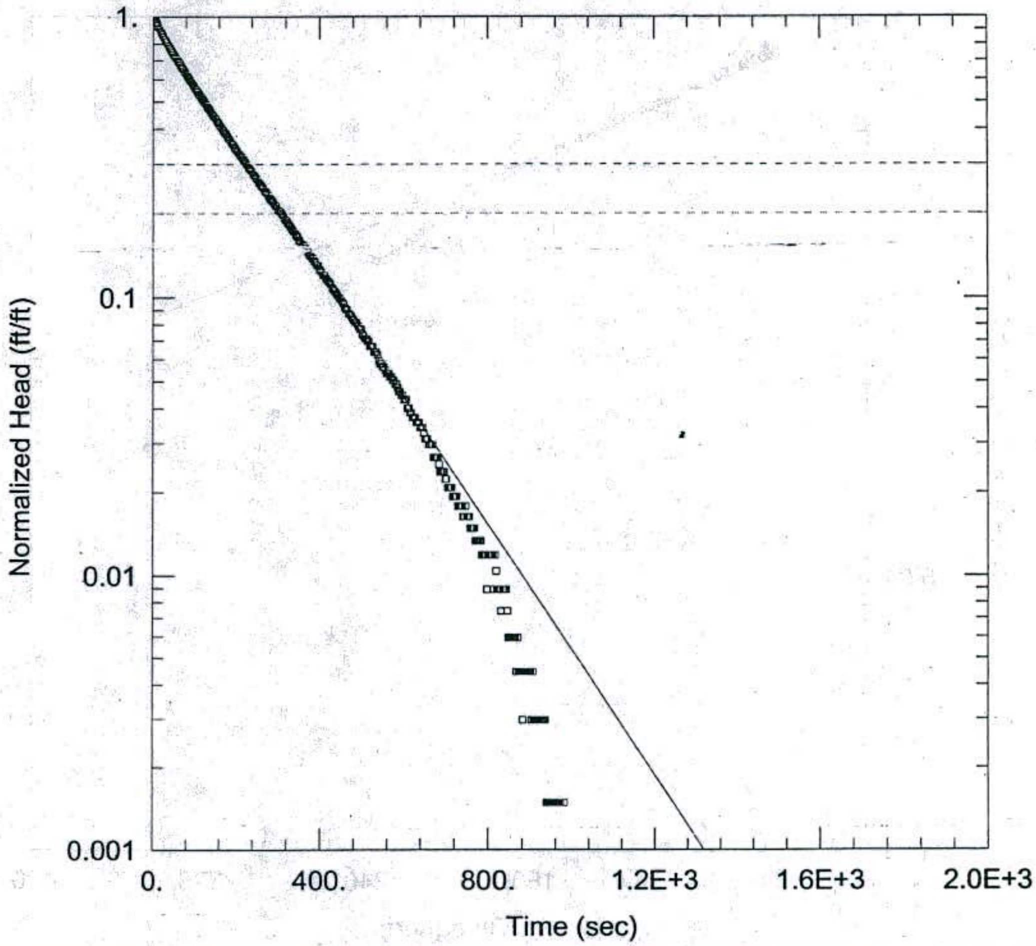
Saturated Thickness: 24.67 ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS25in)

Initial Displacement: 0.7161 ft
Total Well Penetration Depth: 24.17 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 24.67 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002454 cm/sec
y0 = 0.7298 ft




WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS25out.aqt
Date: 12/07/06 Time: 12:58:36

PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

AQUIFER DATA

Saturated Thickness: 24.67 ft Anisotropy Ratio (Kz/Kr): 1.

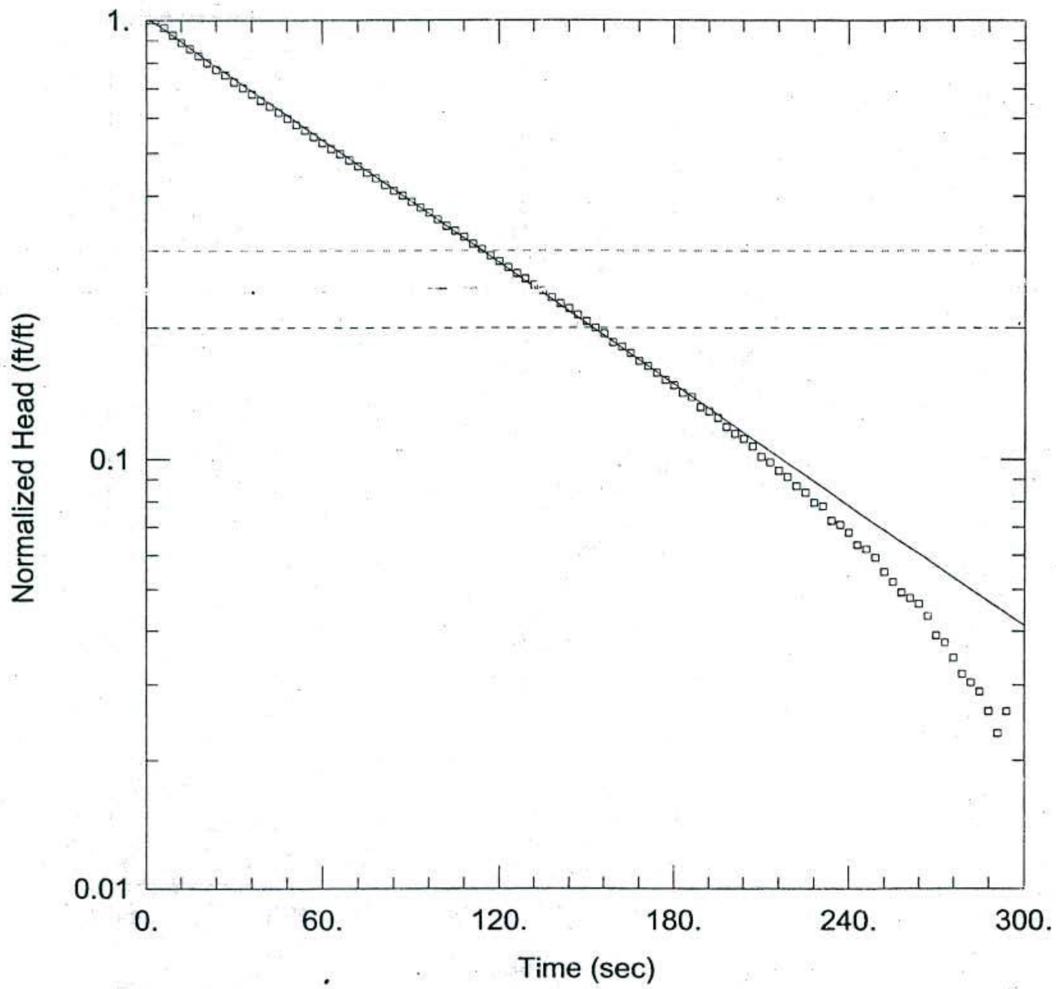
WELL DATA (GS25out)

Initial Displacement: 1.557 ft
Total Well Penetration Depth: 24.17 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 24.67 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001764 cm/sec y0 = 1.584 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS27in.aqt
Date: 12/07/06 Time: 13:06:13

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

Saturated Thickness: 28.7 ft
Anisotropy Ratio (Kz/Kr): 1.

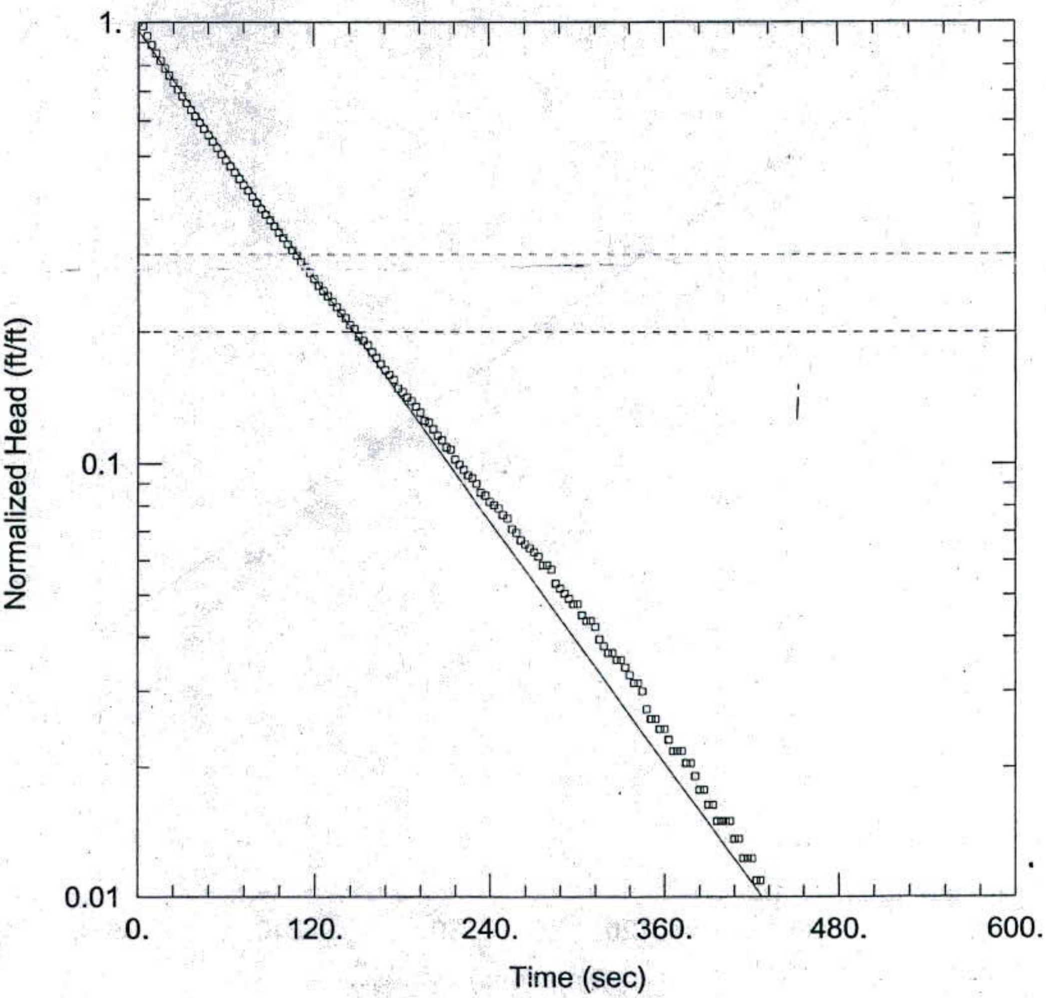
## WELL DATA (GS27in)

Initial Displacement: 1.596 ft
Total Well Penetration Depth: 23.2 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 23.7 ft
Screen Length: 9. ft
Wellbore Radius: 0.3333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003252 cm/sec
y0 = 1.621 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS27out.aqt
Date: 12/08/06 Time: 10:42:28

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

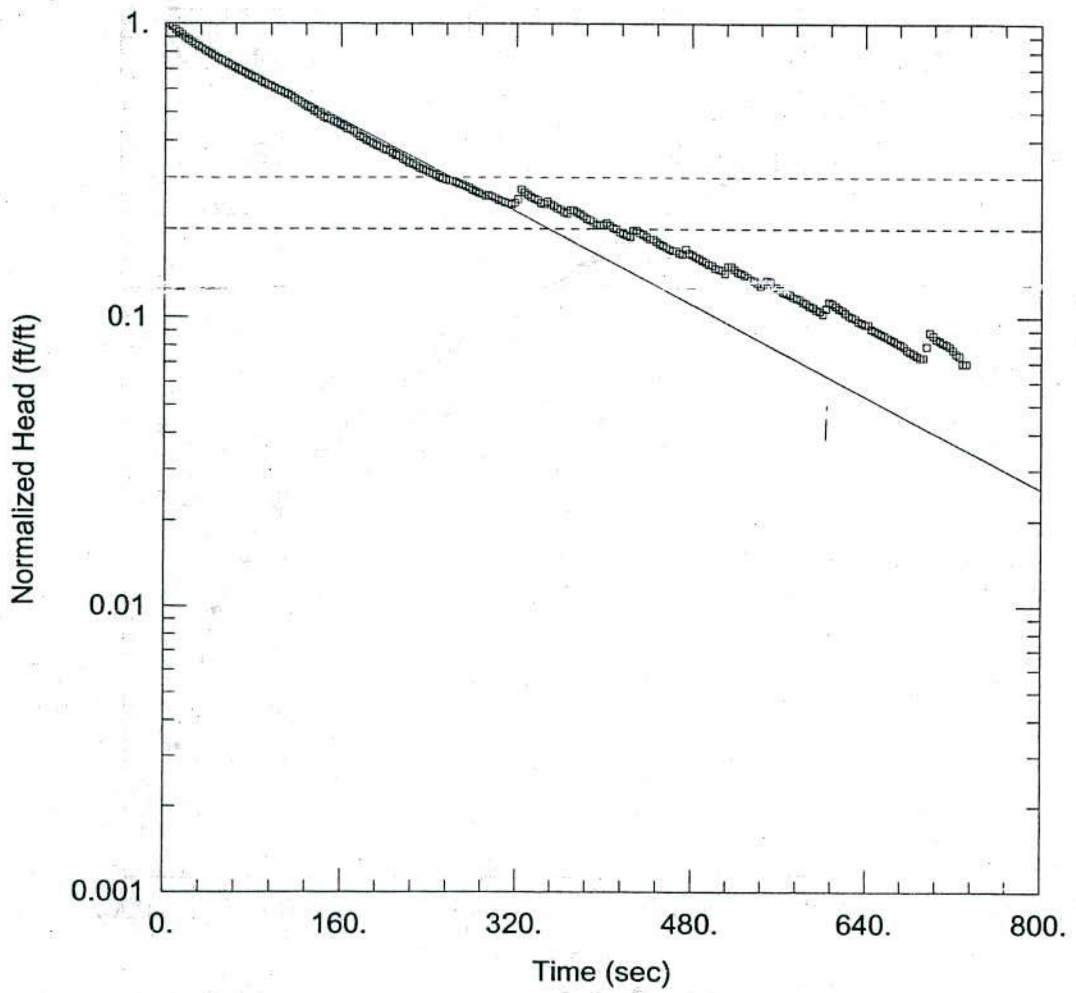
Saturated Thickness: 28.7 ft Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS27out)

Initial Displacement: 1.696 ft Static Water Column Height: 23.7 ft
Total Well Penetration Depth: 23.2 ft Screen Length: 9. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.3333 ft

## SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.0003252 cm/sec y0 = 1.621 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS29in.aqt
Date: 12/08/06 Time: 10:56:04

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

Saturated Thickness: 30.6 ft
Anisotropy Ratio (Kz/Kr): 1.

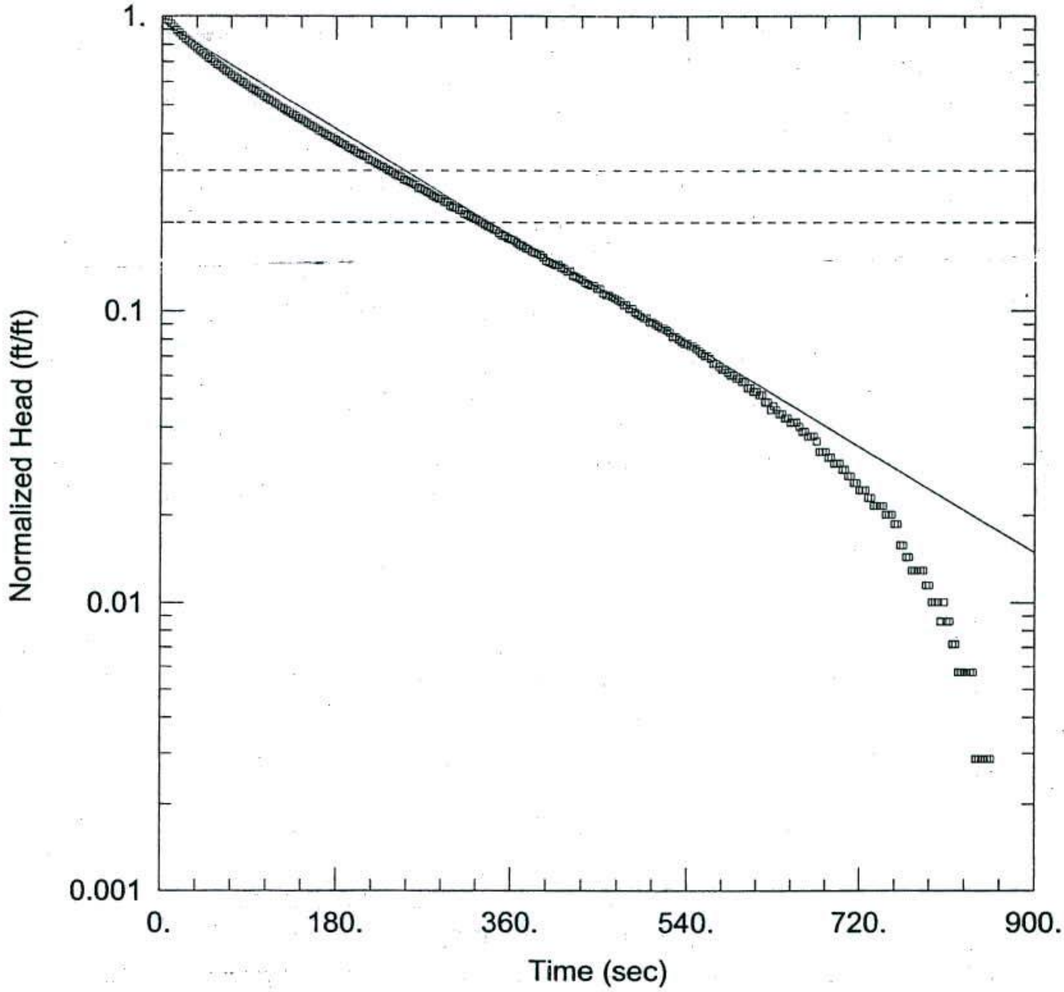
## WELL DATA (GS29in)

Initial Displacement: 2.026 ft
Total Well Penetration Depth: 30.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 30.6 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001586 cm/sec
y0 = 1.983 ft




## WELL TEST ANALYSIS

Data Set: T:\ESEE MAJOR PROJECTS\PROJECTS\WANSLEY\2006\slugtests\GS29out.aqt
Date: 12/08/06 Time: 10:57:25

## PROJECT INFORMATION

Company: SCS
Client: GPC
Project: 3186DE
Location: Plant Wansley
Test Well: GS27in
Test Date: 11/8/2006

## AQUIFER DATA

Saturated Thickness: 30.6 ft Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (GS29out)

Initial Displacement: 1.61 ft
Total Well Penetration Depth: 30.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 30.6 ft
Screen Length: 9. ft
Wellbore Radius: 0.333 ft

## SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.0001612 cm/sec y0 = 1.536 ft

```
*************************************************************************************
*****                                                                     *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL
ENVIRONMENTS      *****
*****                                                                     *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871
*****
*****        J. WAGNER    ,DIS/ADLPIPE, INC.     ,(617)492-1991,X5820          *****
*****                                                                     *****
***** MODIFIED EXTENSIVELY BY:                                                  *****
***** D.M. HETRICK                                                   *****
***** OAK RIDGE NATIONAL LABORATORY                                                  *****
***** (615) 576-7556                                                  *****
***** VERSION  : JANUARY 1995                                                 *****
*****                                                                     *****
*************************************************************************************
```

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium
WASHLOAD DATA :
APPLICATION AREA: Wansley Gypsum Basic Run

GENERAL INPUT PARAMETERS
========================

-- SOIL INPUT PARAMETERS --

| | |
|---|---|
| SOIL DENSITY (G/CM**3): | 1.36 |
| INTRINSIC PERMEABILITY (CM**2): | .000 |
| DISCONNECTEDNESS INDEX (-): | 12.0 |
| POROSITY (-): | .100 |
| ORGANIC CARBON CONTENT (%): | .000 |
| CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): | .000 |
| FREUNDLICH EXPONENT (-): | 1.00 |

-- CHEMICAL INPUT PARAMETERS --

| | |
|---|---|
| SOLUBILITY (UG/ML): | .384E+06 |
| DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): | .000 |
| HENRYS LAW CONSTANT (M**3-ATM/MOLE): | .000 |
| ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): | .000 |
| ADSORPTION COEFFICIENT ON SOIL (K): | 1.00 |
| MOLECULAR WEIGHT (G/MOL): | 79.0 |
| VALENCE (-): | .000 |
| NEUTRAL HYDROLYSIS CONSTANT (/DAY): | .000 |
| BASE HYDROLYSIS CONSTANT (L/MOL-DAY): | .000 |
| ACID HYDROLYSIS CONSTANT (L/MOL-DAY): | .000 |
| DEGRADATION RATE IN MOISTURE (/DAY): | .000 |
| DEGRADATION RATE ON SOIL (/DAY): | .000 |
| LIGAND-POLLUTANT STABILITY CONSTANT (-): | .000 |
| NO. MOLES LIGAND/MOLE POLLUTANT (-): | .000 |

LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-08 0.50E-08 0.50E-08 0.50E-08
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+04
1
1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

---

UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.031E-08
ADSORBED SOIL (UG/G) 1.031E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.413E-08
ADSORBED SOIL (UG/G) 2.413E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.366E-08
ADSORBED SOIL (UG/G) 4.366E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 6.603E-08
ADSORBED SOIL (UG/G) 6.603E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.689E-07
ADSORBED SOIL (UG/G) 1.689E-07

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.741E-07

ADSORBED SOIL (UG/G) 9.741E-07

SUBLAYER 7

SOIL MOISTURE (UG/ML) 5.450E-06
ADSORBED SOIL (UG/G) 5.450E-06

SUBLAYER 8

SOIL MOISTURE (UG/ML) 2.620E-05
ADSORBED SOIL (UG/G) 2.620E-05

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.092E-04
ADSORBED SOIL (UG/G) 1.092E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.015E-04
ADSORBED SOIL (UG/G) 4.015E-04

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.016E-04
ADSORBED SOIL (UG/G) 4.016E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.018E-04
ADSORBED SOIL (UG/G) 4.018E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.019E-04
ADSORBED SOIL (UG/G) 4.019E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.020E-04
ADSORBED SOIL (UG/G) 4.020E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.021E-04
ADSORBED SOIL (UG/G) 4.021E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.022E-04
ADSORBED SOIL (UG/G) 4.022E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.023E-04
ADSORBED SOIL (UG/G) 4.023E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.024E-04
ADSORBED SOIL (UG/G) 4.024E-04

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.025E-04
ADSORBED SOIL (UG/G) 4.025E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.026E-04
ADSORBED SOIL (UG/G) 4.026E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.027E-04
ADSORBED SOIL (UG/G) 4.027E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.028E-04
ADSORBED SOIL (UG/G) 4.028E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.029E-04
ADSORBED SOIL (UG/G) 4.029E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.030E-04
ADSORBED SOIL (UG/G) 4.030E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.031E-04
ADSORBED SOIL (UG/G) 4.031E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.032E-04
ADSORBED SOIL (UG/G) 4.032E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.033E-04
ADSORBED SOIL (UG/G) 4.033E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.034E-04
ADSORBED SOIL (UG/G) 4.034E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 5.945E-01
ADSORBED SOIL (UG/G) 1.394E+03

MAX. POLL. DEPTH (M) 3.051E+01

****************************************EXECUTION COMPLETED**********

************************************************************************************
***** *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****
***** *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871 *****
***** J. WAGNER ,DIS/ADLPIPE, INC. ,(617)492-1991,X5820 *****
***** *****
***** MODIFIED EXTENSIVELY BY: *****
***** D.M. HETRICK *****
***** OAK RIDGE NATIONAL LABORATORY *****
***** (615) 576-7556 *****
***** VERSION : JANUARY 1995 *****
***** *****

************************************************************************************

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium
WASHLOAD DATA :
APPLICATION AREA: Wansley Gypsum Basic Run - 1000 yr

GENERAL INPUT PARAMETERS

-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3): 1.36
INTRINSIC PERMEABILITY (CM**2): .000
DISCONNECTEDNESS INDEX (-): 12.0
POROSITY (-): .100
ORGANIC CARBON CONTENT (%): .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): .000
FREUNDLICH EXPONENT (-): 1.00

-- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML): .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE): .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): .000
ADSORPTION COEFFICIENT ON SOIL (K): 1.00
MOLECULAR WEIGHT (G/MOL): 79.0
VALENCE (-): .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY): .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY): .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY): .000
DEGRADATION RATE IN MOISTURE (/DAY): .000
DEGRADATION RATE ON SOIL (/DAY): .000
LIGAND-POLLUTANT STABILITY CONSTANT (-): .000
NO. MOLES LIGAND/MOLE POLLUTANT (-): .000
LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 1000
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-08 0.50E-08 0.50E-08 0.50E-08
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+04
1 1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.010E-08
ADSORBED SOIL (UG/G) 1.010E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.340E-08
ADSORBED SOIL (UG/G) 1.340E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.450E-08
ADSORBED SOIL (UG/G) 1.450E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.480E-08
ADSORBED SOIL (UG/G) 1.480E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SUBLAYER 7

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.490E-08
ADSORBED SOIL (UG/G) 1.490E-08

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 7

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 7

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.000E-08
ADSORBED SOIL (UG/G) 1.000E-08

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 5.944E-01
ADSORBED SOIL (UG/G) 1.394E+03

MAX. POLL. DEPTH (M) 3.057E+01

****************************************EXECUTION **********************************

*************************************************************************************
***** *****

***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****
***** *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871 *****
***** J. WAGNER ,DIS/ADLPIPE, INC. ,(617)492-1991,X5820 *****
***** *****
***** MODIFIED EXTENSIVELY BY: *****
***** D.M. HETRICK *****
***** OAK RIDGE NATIONAL LABORATORY *****
***** (615) 576-7556 *****
***** VERSION : JANUARY 1995 *****
***** *****

*******************************************************************************************

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium
WASHLOAD DATA :
APPLICATION AREA: Wansley Gypsum Basic Run

GENERAL INPUT PARAMETERS
========================

-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3): 1.36
INTRINSIC PERMEABILITY (CM**2): .000
DISCONNECTEDNESS INDEX (-): 12.0
POROSITY (-): .100
ORGANIC CARBON CONTENT (%): .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): .000
FREUNDLICH EXPONENT (-): 1.00
1

-- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML): .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE): .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): .000
ADSORPTION COEFFICIENT ON SOIL (K): 1.00
MOLECULAR WEIGHT (G/MOL): 79.0
VALENCE (-): .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY): .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY): .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY): .000
DEGRADATION RATE IN MOISTURE (/DAY): .000
DEGRADATION RATE ON SOIL (/DAY): .000
LIGAND-POLLUTANT STABILITY CONSTANT (-): .000

NO. MOLES LIGAND/MOLE POLLUTANT (-): .000
LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-08 0.50E-08 0.50E-08 0.50E-08
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.47E+04

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.031E-08
ADSORBED SOIL (UG/G) 1.031E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.413E-08
ADSORBED SOIL (UG/G) 2.413E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.366E-08
ADSORBED SOIL (UG/G) 4.366E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 6.603E-08
ADSORBED SOIL (UG/G) 6.603E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.689E-07
ADSORBED SOIL (UG/G) 1.689E-07

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.741E-07
ADSORBED SOIL (UG/G) 9.741E-07

SUBLAYER 7

SOIL MOISTURE (UG/ML) 5.450E-06
ADSORBED SOIL (UG/G) 5.450E-06

SUBLAYER 8

SOIL MOISTURE (UG/ML) 2.620E-05
ADSORBED SOIL (UG/G) 2.620E-05

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.092E-04
ADSORBED SOIL (UG/G) 1.092E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.015E-04
ADSORBED SOIL (UG/G) 4.015E-04

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.016E-04
ADSORBED SOIL (UG/G) 4.016E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.018E-04
ADSORBED SOIL (UG/G) 4.018E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.019E-04
ADSORBED SOIL (UG/G) 4.019E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.020E-04
ADSORBED SOIL (UG/G) 4.020E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.021E-04
ADSORBED SOIL (UG/G) 4.021E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.022E-04
ADSORBED SOIL (UG/G) 4.022E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.023E-04
ADSORBED SOIL (UG/G) 4.023E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.024E-04
ADSORBED SOIL (UG/G) 4.024E-04

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.025E-04
ADSORBED SOIL (UG/G) 4.025E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.026E-04
ADSORBED SOIL (UG/G) 4.026E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.027E-04
ADSORBED SOIL (UG/G) 4.027E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.028E-04
ADSORBED SOIL (UG/G) 4.028E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.029E-04
ADSORBED SOIL (UG/G) 4.029E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.030E-04
ADSORBED SOIL (UG/G) 4.030E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.031E-04
ADSORBED SOIL (UG/G) 4.031E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.032E-04
ADSORBED SOIL (UG/G) 4.032E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.033E-04
ADSORBED SOIL (UG/G) 4.033E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.034E-04
ADSORBED SOIL (UG/G) 4.034E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 2.968E-01
ADSORBED SOIL (UG/G) 1.392E+03

MAX. POLL. DEPTH (M) 3.050E+01

****************************************EXECUTION COMPLETE************************

************************************************************************************
***** *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****
***** *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871 *****
***** J. WAGNER ,DIS/ADLPIPE, INC. ,(617)492-1991,X5820 *****
***** *****
***** MODIFIED EXTENSIVELY BY: *****
***** D.M. HETRICK *****
***** OAK RIDGE NATIONAL LABORATORY *****
***** (615) 576-7556 *****
***** VERSION : JANUARY 1995 *****
***** *****
************************************************************************************

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium
WASHLOAD DATA :

APPLICATION AREA: Wansley Gypsum Low Kd

GENERAL INPUT PARAMETERS
========================

-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3): 1.36
INTRINSIC PERMEABILITY (CM**2): .000
DISCONNECTEDNESS INDEX (-): 12.0
POROSITY (-): .100
ORGANIC CARBON CONTENT (%): .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): .000
FREUNDLICH EXPONENT (-): 1.00
1

-- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML): .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE): .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): .000
ADSORPTION COEFFICIENT ON SOIL (K): 1.00
MOLECULAR WEIGHT (G/MOL): 79.0
VALENCE (-): .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY): .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY): .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY): .000
DEGRADATION RATE IN MOISTURE (/DAY): .000
DEGRADATION RATE ON SOIL (/DAY): .000
LIGAND-POLLUTANT STABILITY CONSTANT (-): .000
NO. MOLES LIGAND/MOLE POLLUTANT (-): .000
LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-08 0.50E-08 0.50E-08 0.50E-08
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+03

1

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.031E-08
ADSORBED SOIL (UG/G) 1.031E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.413E-08
ADSORBED SOIL (UG/G) 2.413E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.366E-08
ADSORBED SOIL (UG/G) 4.366E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 6.603E-08
ADSORBED SOIL (UG/G) 6.603E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.689E-07
ADSORBED SOIL (UG/G) 1.689E-07

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.741E-07
ADSORBED SOIL (UG/G) 9.741E-07

SUBLAYER 7

SOIL MOISTURE (UG/ML) 5.450E-06
ADSORBED SOIL (UG/G) 5.450E-06

SUBLAYER 8

SOIL MOISTURE (UG/ML) 2.620E-05
ADSORBED SOIL (UG/G) 2.620E-05

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.092E-04
ADSORBED SOIL (UG/G) 1.092E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.015E-04
ADSORBED SOIL (UG/G) 4.015E-04

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.016E-04
ADSORBED SOIL (UG/G) 4.016E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.017E-04
ADSORBED SOIL (UG/G) 4.017E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.018E-04
ADSORBED SOIL (UG/G) 4.018E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.019E-04
ADSORBED SOIL (UG/G) 4.019E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.020E-04
ADSORBED SOIL (UG/G) 4.020E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.021E-04
ADSORBED SOIL (UG/G) 4.021E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.022E-04
ADSORBED SOIL (UG/G) 4.022E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.023E-04
ADSORBED SOIL (UG/G) 4.023E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.024E-04
ADSORBED SOIL (UG/G) 4.024E-04

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.025E-04
ADSORBED SOIL (UG/G) 4.025E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.026E-04
ADSORBED SOIL (UG/G) 4.026E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.027E-04
ADSORBED SOIL (UG/G) 4.027E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.028E-04
ADSORBED SOIL (UG/G) 4.028E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.029E-04
ADSORBED SOIL (UG/G) 4.029E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.030E-04
ADSORBED SOIL (UG/G) 4.030E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.031E-04
ADSORBED SOIL (UG/G) 4.031E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.032E-04
ADSORBED SOIL (UG/G) 4.032E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.033E-04
ADSORBED SOIL (UG/G) 4.033E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.034E-04
ADSORBED SOIL (UG/G) 4.034E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.862E+00

ADSORBED SOIL (UG/G) 1.143E+03

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.068E+00
ADSORBED SOIL (UG/G) 2.510E+02

MAX. POLL. DEPTH (M) 3.087E+01

**********************************EXECUTION COMPLETED*******************
*************************************************************************************
***** *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****
***** *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871 *****
***** J. WAGNER ,DIS/ADLPIPE, INC. ,(617)492-1991,X5820 *****
***** *****
***** MODIFIED EXTENSIVELY BY: *****
***** D.M. HETRICK *****
***** OAK RIDGE NATIONAL LABORATORY *****
***** (615) 576-7556 *****
***** VERSION : JANUARY 1995 *****
***** *****

*************************************************************************************
*****************

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium
WASHLOAD DATA :
APPLICATION AREA: Wansley Gypsum High Perm Run

GENERAL INPUT PARAMETERS
========================

-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3): 1.36
INTRINSIC PERMEABILITY (CM**2): .000
DISCONNECTEDNESS INDEX (-): 12.0
POROSITY (-): .100
ORGANIC CARBON CONTENT (%): .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): .000

FREUNDLICH EXPONENT (-): 1.00
1

-- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML): .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE): .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): .000
ADSORPTION COEFFICIENT ON SOIL (K): 1.00
MOLECULAR WEIGHT (G/MOL): 79.0
VALENCE (-): .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY): .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY): .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY): .000
DEGRADATION RATE IN MOISTURE (/DAY): .000
DEGRADATION RATE ON SOIL (/DAY): .000
LIGAND-POLLUTANT STABILITY CONSTANT (-): .000
NO. MOLES LIGAND/MOLE POLLUTANT (-): .000
LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-07 0.50E-07 0.50E-07 0.50E-07
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+04
1

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.081E-08
ADSORBED SOIL (UG/G) 1.081E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.284E-08
ADSORBED SOIL (UG/G) 2.284E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.086E-08
ADSORBED SOIL (UG/G) 4.086E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 6.046E-08
ADSORBED SOIL (UG/G) 6.046E-08

SUBLAYER 5

SOIL MOISTURE (UG/ML) 9.167E-08
ADSORBED SOIL (UG/G) 9.167E-08

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.016E-07
ADSORBED SOIL (UG/G) 4.016E-07

SUBLAYER 7

SOIL MOISTURE (UG/ML) 2.205E-06
ADSORBED SOIL (UG/G) 2.205E-06

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.072E-05
ADSORBED SOIL (UG/G) 1.072E-05

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.544E-05
ADSORBED SOIL (UG/G) 4.544E-05

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.701E-04
ADSORBED SOIL (UG/G) 1.701E-04

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.702E-04
ADSORBED SOIL (UG/G) 1.702E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.702E-04
ADSORBED SOIL (UG/G) 1.702E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.702E-04
ADSORBED SOIL (UG/G) 1.702E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.702E-04
ADSORBED SOIL (UG/G) 1.702E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.703E-04
ADSORBED SOIL (UG/G) 1.703E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.703E-04
ADSORBED SOIL (UG/G) 1.703E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 1.703E-04
ADSORBED SOIL (UG/G) 1.703E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.704E-04
ADSORBED SOIL (UG/G) 1.704E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.704E-04
ADSORBED SOIL (UG/G) 1.704E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.704E-04
ADSORBED SOIL (UG/G) 1.704E-04

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.704E-04
ADSORBED SOIL (UG/G) 1.704E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.705E-04
ADSORBED SOIL (UG/G) 1.705E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.705E-04
ADSORBED SOIL (UG/G) 1.705E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.705E-04
ADSORBED SOIL (UG/G) 1.705E-04

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.706E-04
ADSORBED SOIL (UG/G) 1.706E-04

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.706E-04
ADSORBED SOIL (UG/G) 1.706E-04

SUBLAYER 7

SOIL MOISTURE (UG/ML) 1.706E-04
ADSORBED SOIL (UG/G) 1.706E-04

SUBLAYER 8

SOIL MOISTURE (UG/ML) 1.706E-04
ADSORBED SOIL (UG/G) 1.706E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.707E-04
ADSORBED SOIL (UG/G) 1.707E-04

SUBLAYER 10

SOIL MOISTURE (UG/ML) 1.707E-04
ADSORBED SOIL (UG/G) 1.707E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 5.946E-01
ADSORBED SOIL (UG/G) 1.394E+03

MAX. POLL. DEPTH (M) 3.051E+01

****************************************EXECUTION COMPLETED*********************

************************************************************************************
*****                                                                    *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****

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*****                                                    *****
***** DEVELOPERS:  M. BONAZOUNTAS,ARTHUR D. LITTLE INC.  ,(617)864-5770,X5871
*****
*****        J. WAGNER    ,DIS/ADLPIPE, INC.     ,(617)492-1991,X5820        *****
*****                                                    *****
***** MODIFIED EXTENSIVELY BY:                                      *****
***** D.M. HETRICK                                            *****
***** OAK RIDGE NATIONAL LABORATORY                                      *****
***** (615) 576-7556                                         *****
***** VERSION  : JANUARY 1995                                     *****
*****                                                    *****

*****************************************************************************************
          ****** MONTHLY SESOIL MODEL OPERATION ******
             MONTHLY SITE SPECIFIC SIMULATION


REGION         :   CARROLLTON
SOIL TYPE      :   Gypsum
COMPOUND       :   Selenium
WASHLOAD DATA  :
APPLICATION AREA:   Wansley Gypsum Low Perm Run


   GENERAL INPUT PARAMETERS
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   -- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3):                           1.36
INTRINSIC PERMEABILITY (CM**2):                       .000
DISCONNECTEDNESS INDEX (-):                         12.0
POROSITY (-):                             .100
ORGANIC CARBON CONTENT (%):                           .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL):       .000
FREUNDLICH EXPONENT (-):                            1.00
1

   -- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML):                              .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC):               .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE):                     .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC):             .000
ADSORPTION COEFFICIENT ON SOIL (K):                  1.00
MOLECULAR  WEIGHT (G/MOL):                        79.0
VALENCE (-):                              .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY):                    .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY):                   .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY):                   .000
DEGRADATION RATE IN MOISTURE (/DAY):                   .000
DEGRADATION RATE ON SOIL (/DAY):                    .000
LIGAND-POLLUTANT STABILITY CONSTANT (-):                 .000
NO. MOLES LIGAND/MOLE POLLUTANT (-):                   .000
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LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-09 0.50E-09 0.50E-09 0.50E-09
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0
FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+04
1

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 7.386E-04
ADSORBED SOIL (UG/G) 7.386E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 9.074E-03
ADSORBED SOIL (UG/G) 9.074E-03

SUBLAYER 3

SOIL MOISTURE (UG/ML) 5.504E-02
ADSORBED SOIL (UG/G) 5.504E-02

SUBLAYER 4

SOIL MOISTURE (UG/ML) 2.200E-01
ADSORBED SOIL (UG/G) 2.200E-01

SUBLAYER 5

SOIL MOISTURE (UG/ML) 6.527E-01
ADSORBED SOIL (UG/G) 6.527E-01

SUBLAYER 6

SOIL MOISTURE (UG/ML) 1.539E+00
ADSORBED SOIL (UG/G) 1.539E+00

SUBLAYER 7

SOIL MOISTURE (UG/ML) 3.014E+00
ADSORBED SOIL (UG/G) 3.014E+00

SUBLAYER 8

SOIL MOISTURE (UG/ML) 5.057E+00
ADSORBED SOIL (UG/G) 5.057E+00

SUBLAYER 9

SOIL MOISTURE (UG/ML) 7.463E+00
ADSORBED SOIL (UG/G) 7.463E+00

SUBLAYER 10

SOIL MOISTURE (UG/ML) 9.903E+00
ADSORBED SOIL (UG/G) 9.903E+00

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 9.903E+00
ADSORBED SOIL (UG/G) 9.903E+00

SUBLAYER 2

SOIL MOISTURE (UG/ML) 9.904E+00
ADSORBED SOIL (UG/G) 9.904E+00

SUBLAYER 3

SOIL MOISTURE (UG/ML) 9.905E+00
ADSORBED SOIL (UG/G) 9.905E+00

SUBLAYER 4

SOIL MOISTURE (UG/ML) 9.906E+00
ADSORBED SOIL (UG/G) 9.906E+00

SUBLAYER 5

SOIL MOISTURE (UG/ML) 9.907E+00
ADSORBED SOIL (UG/G) 9.907E+00

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.908E+00
ADSORBED SOIL (UG/G) 9.908E+00

SUBLAYER 7

SOIL MOISTURE (UG/ML) 9.908E+00
ADSORBED SOIL (UG/G) 9.908E+00

SUBLAYER 8

SOIL MOISTURE (UG/ML) 9.909E+00
ADSORBED SOIL (UG/G) 9.909E+00

SUBLAYER 9

SOIL MOISTURE (UG/ML) 9.910E+00
ADSORBED SOIL (UG/G) 9.910E+00

SUBLAYER 10

SOIL MOISTURE (UG/ML) 9.911E+00
ADSORBED SOIL (UG/G) 9.911E+00

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 9.912E+00
ADSORBED SOIL (UG/G) 9.912E+00

SUBLAYER 2

SOIL MOISTURE (UG/ML) 9.912E+00
ADSORBED SOIL (UG/G) 9.912E+00

SUBLAYER 3

SOIL MOISTURE (UG/ML) 9.913E+00
ADSORBED SOIL (UG/G) 9.913E+00

SUBLAYER 4

SOIL MOISTURE (UG/ML) 9.914E+00
ADSORBED SOIL (UG/G) 9.914E+00

SUBLAYER 5

SOIL MOISTURE (UG/ML) 9.915E+00
ADSORBED SOIL (UG/G) 9.915E+00

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.916E+00
ADSORBED SOIL (UG/G) 9.916E+00

SUBLAYER 7

SOIL MOISTURE (UG/ML) 9.917E+00

ADSORBED SOIL (UG/G) 9.917E+00

SUBLAYER 8

SOIL MOISTURE (UG/ML) 9.917E+00
ADSORBED SOIL (UG/G) 9.917E+00

SUBLAYER 9

SOIL MOISTURE (UG/ML) 9.918E+00
ADSORBED SOIL (UG/G) 9.918E+00

SUBLAYER 10

SOIL MOISTURE (UG/ML) 9.919E+00
ADSORBED SOIL (UG/G) 9.919E+00

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.662E-01
ADSORBED SOIL (UG/G) 1.093E+03

MAX. POLL. DEPTH (M) 3.050E+01

****************************************EXECUTION COMPLETED********************

*************************************************************************************
***** *****
***** SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS IN SOIL ENVIRONMENTS *****
***** *****
***** DEVELOPERS: M. BONAZOUNTAS,ARTHUR D. LITTLE INC. ,(617)864-5770,X5871 *****
***** J. WAGNER ,DIS/ADLPIPE, INC. ,(617)492-1991,X5820 *****
***** *****
***** MODIFIED EXTENSIVELY BY: *****
***** D.M. HETRICK *****
***** OAK RIDGE NATIONAL LABORATORY *****
***** (615) 576-7556 *****
***** VERSION : JANUARY 1995 *****
***** *****
*************************************************************************************

****** MONTHLY SESOIL MODEL OPERATION ******
MONTHLY SITE SPECIFIC SIMULATION

REGION : CARROLLTON
SOIL TYPE : Gypsum
COMPOUND : Selenium

WASHLOAD DATA :
APPLICATION AREA: Wansley Gypsum High Selenium

GENERAL INPUT PARAMETERS
========================

-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM**3): 1.36
INTRINSIC PERMEABILITY (CM**2): .000
DISCONNECTEDNESS INDEX (-): 12.0
POROSITY (-): .100
ORGANIC CARBON CONTENT (%): .000
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL): .000
FREUNDLICH EXPONENT (-): 1.00
1

-- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML): .384E+06
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC): .000
HENRYS LAW CONSTANT (M**3-ATM/MOLE): .000
ADSORPTION COEFFICIENT ON ORGANIC CARBON(KOC): .000
ADSORPTION COEFFICIENT ON SOIL (K): 1.00
MOLECULAR WEIGHT (G/MOL): 79.0
VALENCE (-): .000
NEUTRAL HYDROLYSIS CONSTANT (/DAY): .000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY): .000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY): .000
DEGRADATION RATE IN MOISTURE (/DAY): .000
DEGRADATION RATE ON SOIL (/DAY): .000
LIGAND-POLLUTANT STABILITY CONSTANT (-): .000
NO. MOLES LIGAND/MOLE POLLUTANT (-): .000
LIGAND MOLECULAR WEIGHT (G/MOL): .000

-- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS: 4
YEARS TO BE SIMULATED: 100
AREA (CM**2): 0.810E+08
APPLICATION AREA LATITUDE (DEG.): 33.6
SPILL (1) OR STEADY APPLICATION (0): 0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.: 0
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0) 1
DEPTHS (CM): 0.30E+04 1.0 1.0 0.30E+03
NUMBER OF SUBLAYERS/LAYER 10 10 10 10
PH (CM): 0.00 0.00 0.00 0.00
INTRINSIC PERMEABILITIES (CM**2): 0.50E-08 0.50E-08 0.50E-08 0.50E-08
KDEL RATIOS (-): 1.0 1.0 1.0
KDES RATIOS (-): 1.0 1.0 1.0
OC RATIOS (-): 1.0 1.0 1.0
CEC RATIOS (-): 1.0 1.0 1.0

FRN RATIOS(-): 1.0 1.0 1.0
ADS RATIOS(-): 1.0 1.0 0.23E+04
1

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE: ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.182E-08
ADSORBED SOIL (UG/G) 1.182E-08

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.846E-08
ADSORBED SOIL (UG/G) 2.846E-08

SUBLAYER 3

SOIL MOISTURE (UG/ML) 5.043E-08
ADSORBED SOIL (UG/G) 5.043E-08

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.815E-07
ADSORBED SOIL (UG/G) 1.815E-07

SUBLAYER 5

SOIL MOISTURE (UG/ML) 1.412E-06
ADSORBED SOIL (UG/G) 1.412E-06

SUBLAYER 6

SOIL MOISTURE (UG/ML) 9.649E-06
ADSORBED SOIL (UG/G) 9.649E-06

SUBLAYER 7

SOIL MOISTURE (UG/ML) 5.457E-05
ADSORBED SOIL (UG/G) 5.457E-05

SUBLAYER 8

SOIL MOISTURE (UG/ML) 2.621E-04
ADSORBED SOIL (UG/G) 2.621E-04

SUBLAYER 9

SOIL MOISTURE (UG/ML) 1.092E-03
ADSORBED SOIL (UG/G) 1.092E-03

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.014E-03
ADSORBED SOIL (UG/G) 4.014E-03

SOIL ZONE 2:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.015E-03
ADSORBED SOIL (UG/G) 4.015E-03

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.016E-03
ADSORBED SOIL (UG/G) 4.016E-03

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.017E-03
ADSORBED SOIL (UG/G) 4.017E-03

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.018E-03
ADSORBED SOIL (UG/G) 4.018E-03

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.019E-03
ADSORBED SOIL (UG/G) 4.019E-03

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.020E-03
ADSORBED SOIL (UG/G) 4.020E-03

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.021E-03
ADSORBED SOIL (UG/G) 4.021E-03

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.022E-03
ADSORBED SOIL (UG/G) 4.022E-03

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.023E-03
ADSORBED SOIL (UG/G) 4.023E-03

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.024E-03
ADSORBED SOIL (UG/G) 4.024E-03

SOIL ZONE 3:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.025E-03
ADSORBED SOIL (UG/G) 4.025E-03

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.026E-03
ADSORBED SOIL (UG/G) 4.026E-03

SUBLAYER 3

SOIL MOISTURE (UG/ML) 4.027E-03
ADSORBED SOIL (UG/G) 4.027E-03

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.027E-03
ADSORBED SOIL (UG/G) 4.027E-03

SUBLAYER 5

SOIL MOISTURE (UG/ML) 4.028E-03
ADSORBED SOIL (UG/G) 4.028E-03

SUBLAYER 6

SOIL MOISTURE (UG/ML) 4.029E-03
ADSORBED SOIL (UG/G) 4.029E-03

SUBLAYER 7

SOIL MOISTURE (UG/ML) 4.030E-03
ADSORBED SOIL (UG/G) 4.030E-03

SUBLAYER 8

SOIL MOISTURE (UG/ML) 4.031E-03
ADSORBED SOIL (UG/G) 4.031E-03

SUBLAYER 9

SOIL MOISTURE (UG/ML) 4.032E-03
ADSORBED SOIL (UG/G) 4.032E-03

SUBLAYER 10

SOIL MOISTURE (UG/ML) 4.033E-03
ADSORBED SOIL (UG/G) 4.033E-03

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 5.943E+00
ADSORBED SOIL (UG/G) 1.394E+04

MAX. POLL. DEPTH (M) 3.051E+01

****************************************EXECUTION COMPLETED*********************