GROUNDWATER MONITORING PROGRAM SAMPLING, ANALYSIS, AND REPORTING PLAN

FOR

L.V. SUTTON ENERGY COMPLEX
801 SUTTON STEAM PLANT ROAD
WILMINGTON, NORTH CAROLINA 28401
NPDES PERMIT #NC0001422

PREPARED FOR

DUKE ENERGY PROGRESS, INC.
RALEIGH, NORTH CAROLINA

SUBMITTED: JULY 2014

Howard Frank
Project Scientist

Kathy Webb, NC PG 1328
Project Manager

TABLE OF CONTENTS

SECTION **PAGE**

List of Figures

List of Tables

List of Appendices

1.0 INTRODUCTION

This Groundwater Monitoring Program Sampling, Analysis, and Reporting Plan (Plan) is developed to support the Duke Energy Progress, Inc. (Duke Energy) requirement for groundwater monitoring around the L.V. Sutton Energy Complex (Sutton Plant) ash management area operated under NPDES Permit NC0001422.

This Plan describes the groundwater monitoring network, methodologies of field sampling, record-keeping protocols, analytical procedures, data quality objectives, data validation, and reporting that will be used for the Sutton plant ash management area groundwater monitoring program.

2.0 SITE DESCRIPTION

2.1 Plant and Ash Management Area

The Sutton Plant is a former coal-fired electricity-generating facility with a capacity of 575-megawatts located in New Hanover County, North Carolina, near the City of Wilmington. The location of the plant is shown on **Figure 1**. The Sutton Plant started operations in 1954.

As of November 2013, all of the coal-fired units were retired when a new, natural gas-fired 625-megawatt combined-cycle unit began operation. The facility is located northwest of Wilmington on the west side of Highway 421. The topography around the property is relatively gentle, generally sloping downward toward the Cape Fear River.

The Sutton Plant utilizes a 1,100-acre cooling pond located adjacent to the Cape Fear River. The ash management area is located adjacent to the cooling pond, north of the power plant, as shown on **Figure 2**.

2.2 Ash Management Area Description

The power plant, cooling pond and ash management area are located on the east side of the Cape Fear River. The ash management area is located adjacent to the cooling pond, north of the power plant, as shown on **Figure 2**. The ash management area consists of:

- A former ash disposal area located south of the ash ponds, on the south side of the canal;
- An ash pond built in approximately 1971 (old ash pond); and
- A clay-lined ash pond built in approximately 1984 (new ash pond) located toward the northern portion of the ash management area.

The ash ponds are impounded by an earthen dike. The ash pond system was an integral part of the station's wastewater treatment system which received inflows from the ash removal system, station yard drain sump, and stormwater flows. During coal-fired electrical generation, inflows to the ash ponds were highly variable due to the cyclical nature of operations. The Sutton Plant NPDES permit authorizes the discharge of cooling pond blowdown, recirculation cooling water, non-contact cooling water and treated wastewater from Internal Outfalls 002, 003 and 004 via Outfall 001 from the cooling pond to the Cape Fear River. The cooling pond outfall discharges to the Cape Fear River via permitted Outfall 001. The 500 foot compliance boundary circles the ash ponds and disposal areas (**Figure 2**).

3.0 SITE GEOLOGY AND HYDROGEOLOGY

3.1 Geologic/Soil Framework

According to the Geologic Map of North Carolina, published by the North Carolina Department of Natural Resources and Community Development (1985), the Sutton Plant lies within the Coastal Plain Physiographic Province.

The North Carolina Coastal Plain is approximately 90 to 150 miles wide from the Atlantic Ocean westward to its boundary with the Piedmont province. Two natural subdivisions of the Coastal Plain were described by Stuckey (1965): the Tidewater region and the Inner Coastal Plain. The Site is located within the Tidewater region, which consists of the coastal area where large streams and many of their tributaries are affected by ocean tides (Winner, Jr. and Coble, 1989). The Sutton Plant is located on the east side of the Cape Fear River within the alluvial plain between the coastal dunes and the interior uplands (NUS Corporation, 1989).

The Coastal Plain comprises a wedge shaped sequence of stratified marine and non-marine sedimentary rocks deposited on crystalline basement. The sedimentary sequences range in age from recent to lower Cretaceous (Narkunas, 1980).

Unconformably, underlying the surficial aquifer, which has an average thickness of 35 feet, is the Castle Hayne confining unit, with an average thickness of 20 feet. The Castle Hayne aquifer is composed of fine-grained sand interbedded with gray shell limestone and shell fragments. Sand beds contain varying amounts of dark green weathered glauconite. Shells are common throughout the aquifer. The average thickness of the aquifer is 60 feet in the northern Wilmington area.

In the Wilmington area, the Peedee confining unit has an average thickness of 10 feet. The Peedee Formation, which underlies the Upper Castle Hayne Formation, contains fine to medium grained sand interbedded with gray to black marine clay and silt. Sand beds are commonly gray or greenish gray and contain varying amounts of glauconite. Thin beds of consolidated calcareous sandstone and impure limestone are interlayered with the sands in some places.

Based on monitoring well logs (**Appendix A**), the surficial aquifer at the Plant consists generally of brown to tan poorly graded sand; with gray, well to poorly graded sand at depth, with indications of gray clay lenses and fine gravel. The boring logs do not indicate that the Castle Hayne confining unit was encountered during drilling activities, indicating that in the Sutton Plant area, the surficial aquifer is at least 50 feet thick.

3.2 Hydrogeologic Framework

In the eastern part of the North Carolina Coastal Plain, groundwater is obtained from the surficial, Castle Hayne, and Peedee aquifers. The Coastal Plain groundwater system consists of aquifers comprised of permeable sands, gravels, and limestone separated by confining units of less permeable sediment.

According to Winner, Jr. and Coble (1989), the surficial aquifer consists primarily of fine sands, clays, shells, peat beds, and scattered deposits of coarse-grained material in the form of relic beach ridges and floodplain alluvium. The areal extent of the surficial aquifer in the Coastal Plain is approximately 25,000 square miles with an average thickness of 35 feet. The average estimated hydraulic conductivity is 29 feet per day (Winner, Jr. and Coble, 1989).

The surface of groundwater at the Sutton Plant is typically located at depths of less than 2 feet below land surface (BLS) to greater than 20 feet BLS based on topography. An average transmissivity value of 11,000 square feet per day (ft^2 /day) was estimated by Heath (1989) for the surficial sand aquifer in the region. Based on the results of work conducted by others (BBL, 2004), the average linear groundwater flow velocity near the Sutton site area ranges from 109 to 339 feet per year. Water level maps for the site indicate the general direction of groundwater flow appears to be radial from the ash management area with flow toward the north, east, and south. However, the water level elevation of the cooling pond is lower than the groundwater elevation measured in a number of nearby monitoring wells, indicating a component of groundwater flow from the ash management area would also be toward the west.

The average precipitation in the Wilmington, NC area is approximately 57 inches per year. Due to the high transmissivity characteristic of the surficial aquifer, recharge rates are expected to be high.

There are several water supply wells located near the ash management area, including eight active wells southeast of the ash management area along Sutton Steam Plant Road owned by Duke Energy, two active water supply wells owned by Cape Fear Public Utility Authority (CFPUA) located southeast of the ash management area along Fredrickson Road, and three active wells previously owned by Invista located east of the ash ponds along the property boundary. Water levels in the vicinity of these wells may be affected during periods of pumping, but based on the high transmissivity characteristic of the aquifer, the area of influence of the production wells is not expected to be large enough to substantially affect the compliance monitoring wells.

4.0 MONITORING PROGRAM

4.1 Regulatory Requirements for Groundwater Monitoring

The NPDES program regulates wastewater discharges to surface waters to ensure that surface water quality standards are maintained. Sutton operates under NPDES Permit NC0001422 (effective January 1, 2012) which authorizes discharge of cooling pond blowdown, recirculated cooling water, noncontact cooling water, and treated wastewater from internal Outfalls 002, 003, and 004 (via external Outfall 001); coal pile runoff, low volume wastes, ash sluice water (including wastewater generated from the Rotomix system), and stormwater runoff (Outfall 002); chemical metal cleaning waste (Outfall 003); and ash sluice water (including wastewater generated from the Rotomix system), coal pile runoff, low volume wastes, and stormwater runoff (Outfall 004).

With the operation of the natural gas fired combined cycle generation facility, the Sutton Plant also discharges from new internal Outfall 005 (ultrafilter water treatment system filter backwash, Closed Cooling Water Cooler blowdown, Reverse Osmosis/ Electrodeionization (RO/EDI) system reject wastewater, and other Low Volume wastewater) to the Cooling Pond via the new internal Outfall 006 (Low Volume wastewater including the Heat Recovery Steam Generator (HRSG) blowdown and auxiliary boiler blowdown). The NPDES permitting program requires that permits be renewed every 5 years.

In addition to surface water monitoring, the NPDES permit requires groundwater monitoring. Permit Condition A (6) Attachment XX, Version 2.0, dated October 24, 2012, lists the groundwater monitoring wells to be sampled, the parameters and constituents to be measured and analyzed, and the requirements for sampling frequency and results reporting. These requirements are provided in **Table 2**. Attachment XX also provides requirements for well location and well construction. A copy of Attachment XX is included as **Appendix B**.

The compliance boundary for groundwater quality associated with the Sutton ash management area is defined in accordance with 15A NCAC 02L .0107(a) as being established at either 500 feet from the waste boundary or at the property boundary, whichever is closer to the source.

In accordance with the October 2012 Groundwater Monitoring Plan, analytical results have been submitted to the Department of Water Resources (DWR) before the last day of the month following the date of sampling. In the future, analytical results will be submitted to the DWR within 60 days of the date of sampling.

4.2 Description of Groundwater Monitoring System

The current groundwater monitoring plan for Sutton Energy Complex includes the sampling of 17 wells. In addition, two additional wells have been added to the routine sampling on a voluntary basis since November 2013.

The 19 wells comprising the current monitoring well network at Sutton include two (2) background wells, 15 downgradient wells, and two voluntarily monitored wells. The locations of the monitoring wells, the waste boundary, and the compliance boundary are shown on **Figure 2**. Well construction data is provided in **Table 1** and **Appendix A**. **Figure 3** is an example of the construction of a typical monitoring well.

Based on water levels measured at the site, the general direction of groundwater flow is radial, away from the ash management area. The site wells provide monitoring data for the groundwater adjacent to and downgradient of the ash management area to the north, east, and south.

Monitoring wells MW-4B, MW-7C, MW-28B, and MW-28C document groundwater quality to the south of the ash management area. MW-4B is currently the designated background well for the southern area. However, road construction associated with the I-140 extension is ongoing in the area and MW-4B will need to be properly abandoned and replaced. An alternate location to the south has been identified and is shown on **Figure 4**. The proposed alternate background well location was selected based on location relative to MW-4B, accessibility, and ease of installation and monitoring. The proposed well is located southeast of MW-4B on the Sutton Plant property. Due to the location of the I-140 extension, access to the area southeast of MW-4B may not be possible from the Sutton Plant proper and would require access from the southeast, most likely from Sampson Street. The area between MW-4B and the proposed well location is hummocky with very soft sand, and would require construction to allow a drill rig access to a well location and further maintenance to keep the area accessible for monitoring. Access to the proposed well location is paved up to the Flemington-Oak Grove Cemetery, and minimal maintenance would be required for monitoring the well. In addition, other than the cemetery, the area is undeveloped and therefore, the well integrity and security would be easier to maintain than if it were located in an area of the property with difficult access.

The compliance boundary well for the north side of the ash management area is MW-27B, with MW-5C serving as the northern background monitoring well.

Eight wells (MW-19, MW-21C, MW-22B, MW-22C, MW-23B, MW-23C, MW-24B, and MW-24C) are located within the eastern compliance boundary. Three wells, MW-11,

MW-12, and MW-31C, are located beyond the compliance boundary, close to the eastern property line.

Wells MW-32C and MW-33C, which are voluntarily monitored, are also located toward the eastern property line.

4.3 Monitoring Frequency

The monitoring wells will be sampled three times per year in March, June, and October.

4.4 Sample Parameters and Methods

The monitoring program consists of sampling and analysis for parameters and constituents identified in Attachment XX of the NPDES permit (**Appendix B**).

The parameters and the analytical methods are presented in **Table 2**.

The analytical results for the detection monitoring program will be compared to the 2L Standards or the site-specific background concentrations.

4.5 Data Quality Objectives

The overall Quality Assurance (QA) objective is to ensure that reliable data of known and acceptable quality are provided. All measurements will be documented to yield results that are representative of the groundwater quality. Data will be calculated and reported in units as required by the North Carolina Department of Environment and Natural Resources (NCDENR).

The analytical QA objectives for precision, accuracy, and completeness have been established by the laboratory(s) in accordance with the Environmental Protection Agency (EPA) or other accepted agencies for each measurement variable where possible. The objectives are outlined in the Duke Energy Analytical Laboratory Procedures Manual and are available upon request.

Appropriate methods have been selected to meet applicable standards for groundwater quality. Instances may occur, however, in which the condition of the sample will not allow detection of the desired limits for various parameters either because of matrix interference or high analyte concentrations requiring sample dilution. The laboratory(s) will provide sufficient documentation with each data package to notify reviewers about any analytical problems with the data, if needed.

5.0 SAMPLING PROCEDURES

5.1 Sampling Equipment and Cleaning Procedures

Development and sampling equipment shall be selected to ensure that materials are compatible with the sample parameters and comply with state and federal regulatory requirements for sampling.

New disposable sampling equipment (peristaltic pump tubing) is used for each monitoring well sampled. For non-dedicated equipment used, such as water level tapes, the equipment will be cleaned before and after use in each well in accordance with standard EPA-approved cleaning procedures for field equipment. This standard is outlined in the Standard Operating Procedures and Quality Assurance Manual, Engineering Support Branch, EPA Region IV, February 1, 1991 as revised December 20, 2011.

5.2 Groundwater Sampling

5.2.1 Development of Monitoring Wells

Monitoring wells addressed in this sampling plan have been developed.

If new monitoring wells are installed, they will be developed prior to initial sampling. Development removes silt that has settled into the bottom of the well following installation and removes fine silt and clay particles from the well screen and sand-pack surrounding the screen. Well development is necessary to eliminate potential clogging and enhance well performance. Development involves removing an estimated ten or more well volumes from the well using a submersible pump with up-and-down agitation to loosen particles from the well screen. If the turbidity for a well increases over time, the well may be re-developed to restore conditions.

5.2.2 Groundwater Level and Total Depth Measurements

Water level measurements are collected and recorded to determine the groundwater elevation and flow direction. Site monitoring wells have been surveyed to determine the elevation of the top of well casing (TOC). Water level measurements are referenced to the TOC and recorded to the nearest one-hundredth of a foot.

Water level measurements are made with an electronic measuring device consisting of a spool of dual-conductor wire and sensor. When the sensor comes in contact with water, the circuit is closed and a meter light and/or buzzer

attached to the spool signal the contact. When the signal is sounded, the water level is recorded on the Groundwater Monitoring Data Sheet ("Low Flow Sampling Log", **Figure 5**). To minimize sample turbidity, low flow sample methods are used whenever possible. Using low-flow sampling techniques, the volume of the stagnant water in the well is not calculated and the total well depth is not routinely measured to avoid disturbing the bottom sediments. If conditions indicate a possible problem with the integrity of a well, the total well depth may be measured.

5.2.3 Well Purging and Sampling

The selection of purging technique is dependent on the hydrogeologic properties of the aquifer and hydraulic characteristics of each well. Hydraulic conductivity, water column, well volume, screen length, and other information are evaluated to select the purging technique to acquire groundwater representative of the aquifer conditions. At the Sutton Plant, a low-flow purging technique has been selected as the most appropriate technique as recharge rates for the monitoring wells are typically high and minimal sample turbidity is desired.

During low-flow purging and sampling, groundwater is pumped into a flow-through chamber at flow rates that minimize or stabilize water level drawdown within the well. At Sutton, low-flow sampling is conducted using a peristaltic pump with new tubing. The intake for the tubing is lowered to the mid-point of the screened interval. A multi-parameter water quality monitoring instrument is used to measure field indicator parameters within the flow-through chamber during purging. Measurements include pH, specific conductance, and temperature.

Indicator parameters are measured over time (usually at 3-5 minute intervals). When parameters have stabilized within ±0.2 pH units and ±10 percent for temperature and specific conductivity over three consecutive readings, representative groundwater has been achieved for sampling. Turbidity is not a required stabilization parameter, but turbidity levels of 10 NTU or less are targeted.

The Groundwater Monitoring Data Sheet ("Low Flow Sampling Log", **Figure 5**) is used to record purge data and field measurements.

Instrument calibration is performed and documented before the beginning of the sampling event, at mid-day, and after each sampling event. The pH subsystem is calibrated with two pH standards (pH 7.0 and 4.0) bracketing the expected

groundwater pH. The specific conductance subsystem is calibrated using two standards bracketing the expected groundwater conductivity. Calibration results are recorded on an Instrument Calibration Log (**Figure 6**).

5.3 Sample Collection

Groundwater samples are collected after the indicator parameters have stabilized.

Sampling personnel wear new, clean, disposable, non-powdered nitrile gloves at each location. Samples are collected in the order of the volatilization sensitivity of the parameters:

- Metals, metalloids, and selenium
- Sulfate, nitrate, and chloride
- Total dissolved solids

Groundwater samples are preserved and stored according to parameter-specific methods and delivered to the laboratory under proper Chain-of-Custody (COC) procedures. All pertinent notations, water-level measurements, removed well volumes, and indicator parameters are documented on the Groundwater Monitoring Data Sheet ("Low Flow Sampling Log", **Figure 5**).

5.4 Sample Containers, Volume, Preservation, and Holding Time

Sample containers supplied by the laboratory shall be new and pre-cleaned as approved by EPA procedures appropriate for the parameters of interest. **Table 2** summarizes the sample containers, sample volume, preservation procedures, and holding times required for each type of sample and parameter for the monitoring program. Sample containers will be kept closed until used. Sample containers will be provided by Duke Energy or vendor laboratories.

5.5 Sample Tracking

The COC procedures allow for tracing the possession and handling of individual samples from the time of field collection through laboratory analysis and report preparation. Samples are logged by the laboratory with a unique tracking number for each sample. An example of the COC Record is provided as **Figure 7**.

5.6 Sample Labeling

Sample containers shall be pre-labeled and organized prior to field activities as part of the pre-sampling staging process. As samples are collected, the sampling personnel write the following information directly on the label: sampling date and time, and

initials of sample collector. This information is also recorded on the Groundwater Monitoring Data Sheet ("Low Flow Sampling Log", **Figure 5**) and the COC Record (**Figure 7**).

5.7 Field Documentation

Field documentation from each sampling event is recorded on the Groundwater Monitoring Data Sheets ("Low Flow Sampling Log", **Figure 5**), the Instrument Calibration Log (**Figure 6**), and the Chain-of-Custody Record (**Figure 7**). Additionally, a Groundwater Sampling Site Checklist (**Figure 8**), or equivalent, is completed indicating information about the monitoring wells such as proper identification (ID) tag and condition of protective casing and pad. Field notations shall be made during the course of the field work to document the following information:

- Identification of well
- Well depth
- Static water level depth and measurement technique
- Well yield – high or low
- Purge volume or pumping rate
- Sample identification numbers
- Well evacuation procedure/equipment
- Sample withdrawal procedure/equipment
- Date and time of collection
- Types of sample containers used
- Identification of replicates or blind samples
- Preservative(s) used
- Parameters requested for analysis
- Field analysis data and methods
- Sample distribution and transporter
- Field observations during sampling event
- Name of sample collector(s)
- Climatic conditions including estimate of air temperature

This information will be entered on the Low Flow Sampling Log (**Figure 5**), the Instrument Calibration Log (**Figure 6**), or the Chain-of-Custody Record and Analysis Request Form (**Figure 7**) which are filled out for each sampling event. These documents will be filed by project and date. Recorded entries will be made on electronic forms or on paper forms in indelible ink. Errors on paper documents will be corrected by drawing a line through the error, initialing and dating the correction, and starting a new entry on the next line (if necessary).

5.8 Chain-of-Custody Record

The COC Record (**Figure 7**) accompanies the sample(s), traces sample possession from time of collection to delivery to the laboratory(s), and clearly identifies which sample containers have been designated for each requested analysis. The record includes the following types of information:

- Sample identification number
- Signature of collector
- Date and time of collection
- Sample type (e.g., groundwater, immiscible layer)
- Identification of well
- Number of containers
- Parameters requested for analysis
- Preservative(s) used
- Signature of persons involved in the chain of possession
- Inclusive dates of possession

5.9 Sample Custody, Shipment, and Laboratory Receipt

For the purpose of these procedures, a sample is considered in custody if it is:

- In actual possession of the responsible person
- In view, after being in physical possession
- Locked or sealed in a manner so that no one can tamper with it after having been in physical custody or in a secured area restricted to authorized personnel.

Samples shall be maintained in the custody of the sampling crew during the sampling event. At the end of each sampling day and prior to the transfer of the samples off site,

entries shall be completed on the COC form for all samples. Upon transfer of custody, the COC form is signed by a sampling crew member, including the date and time. If outside vendor laboratories are utilized, samples shall be delivered to these facilities by Duke Energy personnel or courier.

COC forms received by the laboratory(s) shall be signed and dated by the respective supervising scientist(s) or their designee (at the Duke Energy Analytical Lab Services lab) or the laboratory sample custodian (at vendor labs) immediately following receipt by the laboratory. The analysts at the laboratory(s) maintain a sample tracking record that will follow each sample through all stages of laboratory processing. The sample tracking records show the date of sample extraction or preparation and analysis. These records are used to determine compliance with holding time limits during lab audits and data validation.

Custody procedures followed by Duke Energy Analytical Lab Services laboratory personnel are described in detail in the Duke Energy Analytical Lab Services Procedures Manual.

6.0 ANALYTICAL PROCEDURES

The main analytical laboratory used in this program is the Duke Energy Services Laboratory: N.C. Drinking Water (NC37804) and Wastewater (#248) Certifications. The organizational structure and staff qualifications of the laboratory are discussed in its generic Quality Assurance Program (QAP). The QAP and the Analytical Laboratory Procedures Manual are available for review upon request.

Vendor laboratories that meet EPA and North Carolina certification requirements may be used for analyses with approval by Duke Energy.

The analytical procedures used for the samples analyzed for this Groundwater Monitoring Program are listed in Table 2. Specific conductance, field pH, and temperature are measured in the field according to the Duke Energy Groundwater Monitoring and Sample Collection Procedure or the instrument manufacturer instructions.

7.0 INTERNAL QUALITY CONTROL CHECKS

Internal laboratory quality control (QC) checks used by the laboratories are described in each laboratory's generic QAP and procedures manual. Using the internal laboratory QC checks, the laboratories demonstrate the ability to produce acceptable results using the methods specified.

Internal quality control checks for sampling procedures and laboratory analyses will be conducted with each sampling event. These checks will consist of the preparation and submittal of field blanks, trip (travel) blanks, and/or field replicates for analysis of all parameters at frequencies described in the laboratory(s) procedures manuals.

The field QC blanks and replicates that may be included as internal QC checks are described below. The specific type and number of blanks used may vary depending on the sampling event:

- Field Blanks: A field blank consists of a sample container filled in the field with organic free, deionized, or distilled water prepared and preserved in the same manner as the samples. The field blank is transported to the laboratory with the samples and analyzed along with the field samples for the constituents of interest to check for contamination imparted to the samples by the sample container, preservative, or other exogenous sources. Field blanks are typically utilized for each sampling event. The field blanks are typically analyzed for major anions, cations and metals.

- Trip Blanks: A trip (travel) blank is a sample container filled with organic-free water in the laboratory that travels unopened with the sample bottles. Trip blanks are typically utilized when sampling for volatile organic compounds. The trip blank is returned to the laboratory with the field samples and analyzed along with the field samples for parameters of interest.

- Equipment Blanks: If non-dedicated equipment is used, it is recommended that equipment blanks be collected. The field equipment is cleaned following documented cleaning protocols. An aliquot of the final control rinse water is passed over the cleaned equipment directly into a sample container and submitted for analyses.

- Field Replicates: A field replicate is a duplicate sample prepared at the sampling locations from equal portions of all sample aliquots combined to make the sample. Both the field replicate and the sample are collected at the same time, in the same container type, preserved in the same way, and analyzed by the same laboratory as a measure of sampling and analytical precision.

8.0 VALIDATION OF FIELD DATA PACKAGE

The field data package includes all of the field records and measurements developed by the sampling team personnel. The field data package validation will be performed by Duke Energy personnel. The procedure for validation consists of the following:

- A review of field data contained on the Groundwater Monitoring Data Sheets for completeness.
- Verification that equipment blanks, field blanks, and trip blanks were properly prepared, identified, and analyzed.
- A check of the Instrument Calibration Log for equipment calibration and instrument conditions.
- A review of the COC Record for proper completion, signatures of field personnel and the laboratory sample custodian, dates and times, and for verification that the correct analyses were specified.

9.0 VALIDATION OF LABORATORY DATA

The laboratory will perform a validation review of the submitted samples and analytical results to ensure that the laboratory QA/QC requirements are acceptable.

10.0 REPORT SUBMITTAL

Two copies of the report of the monitoring results for the compliance wells will be submitted to the DWR within 60 days of the date of sampling. The monitoring results will be submitted on NCDENR Form GW-59CCR.

The DWR will be notified in the event that vendor lab analyses have not been completed within this time frame. Groundwater Monitoring Data Sheets, Field Calibration Forms, Chain-of-Custody Records, Laboratory QA data, and Data Validation Checklists shall be kept on file by Duke Energy and are available upon request.

11.0 REFERENCES

BBL, 2004. Phase I Remedial Investigation Report for the Former Ash Disposal Area, L.V. Sutton Steam Electric Plant, Wilmington, North Carolina.

Catlin Engineers and Scientists, *Phase I Groundwater Quality Assessment for Ash Pond Impacts at the L.V. Sutton Electric Plant, Wilmington, North Carolina*. Catlin Project No. 209-100, February 11, 2011.

Catlin Engineers and Scientists, *Phase II Groundwater Quality Assessment for Ash Pond Impacts at the L.V. Sutton Electric Plant, Wilmington, North Carolina*. Catlin Project No. 209-100, July 2012.

HDR Engineering, Inc. of the Carolinas, *Groundwater Monitoring Program-Sampling, Analysis, and Reporting Plan, Riverbend Steam Station Ash Basin*, May, 14, 2014.

Heath, R.C., 1989. Preliminary Summary of Hydrogeologic Conditions in Vicinity of Lake Sutton, New Hanover County, North Carolina.

Horton, J. W. and Zullo, V. A., 1991, *The Geology of the Carolinas*, Carolina Geological Society Fiftieth Anniversary Volume, 406 pp.

Narkunas, J., 1980, Groundwater Evaluation in the Central Coastal Plain of North Carolina, North Carolina Department of Natural Resources and Community Development, 119 pp.

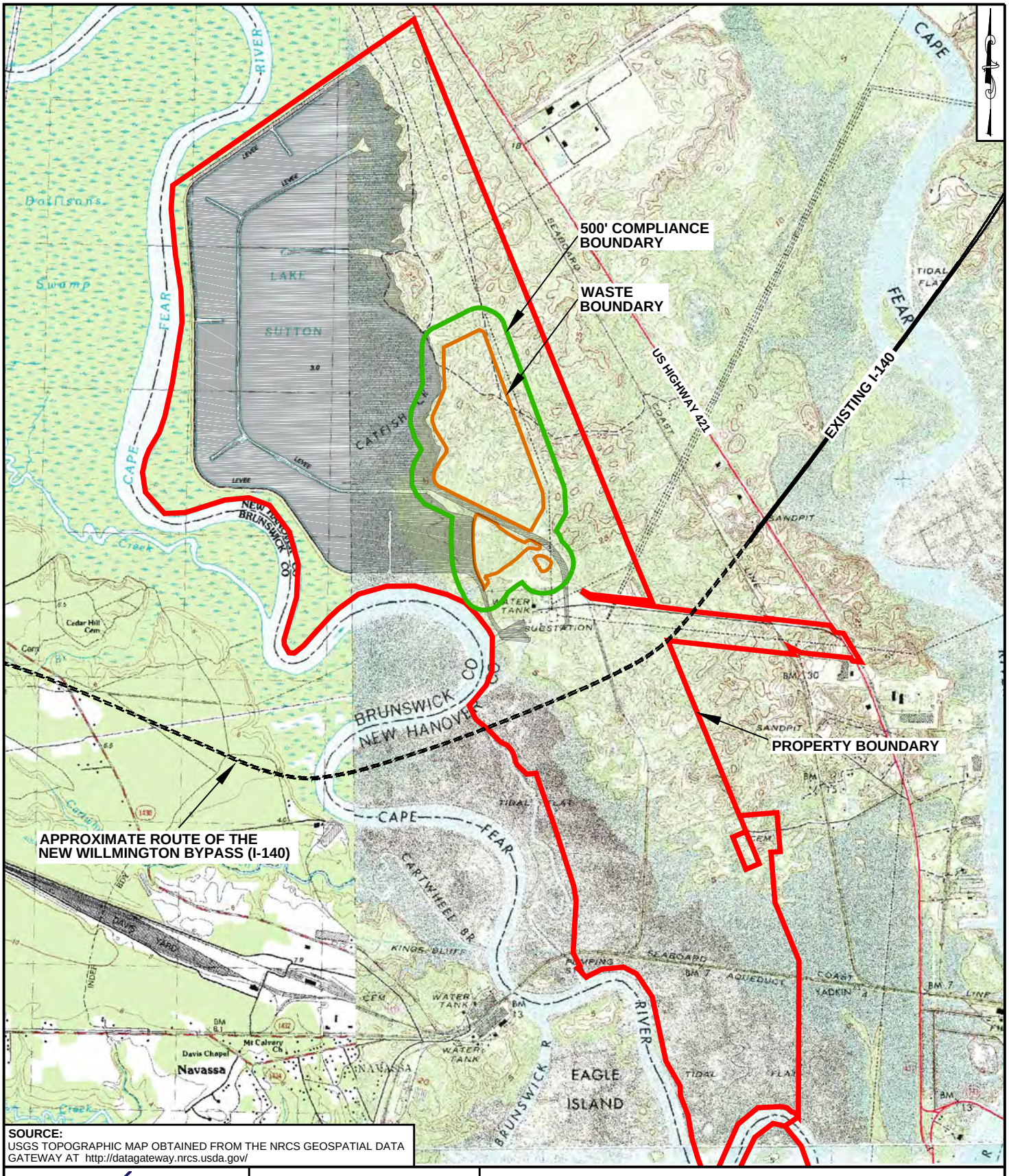
North Carolina Department of Natural Resources and Community Development, 1985, Geologic Map of North Carolina.

NUS Corporation 1989. Screening Site Inspection Phase I, Carolina Power and Lighting, Sutton Steam Plant, Wilmington, New Hanover County, North Carolina, EPA I.D. NCD000830646.

Stuckey, J.L., 1965, North Carolina: Its Geology and Mineral Resources, Raleigh, North Carolina Department of Conservation and Development, 550p.

Winner, M.D., Jr., and Coble, R.W., 1989, Hydrogeologic Framework of the North Carolina Coastal Plain Aquifer System: U.S. Geological Survey Open-File Report.

FIGURES



SOURCE:
USGS TOPOGRAPHIC MAP OBTAINED FROM THE NRCS GEOSPATIAL DATA GATEWAY AT http://datagateway.nrcs.usda.gov/

synTerra
148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA
PHONE 864-421-9999
www.synterracorp.com

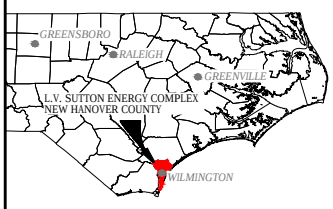


FIGURE 1
SITE LOCATION MAP
L.V. SUTTON ENERGY COMPLEX
801 SUTTON POWER PLANT RD
WILMINGTON, NORTH CAROLINA

DRAWN BY: S. ARLEDGE
PROJECT MANAGER: KATHY WEBB
LAYOUT: FIG 1 (SITE LOCATION)
DATE: 07/25/2014
CONTOUR INTERVAL: 10ft &20ft
MAP DATE: -

GRAPHIC SCALE
1500 0 1500 3000
IN FEET

MONITORING WELLS					
WELL ID	WELL STATUS	NORTHING	EASTING	MEASURING PT FEET (msl.)	GROUND SURFACE FEET (msl.)
MW 4B	BACKGROUND WELL	194233.8941	2308898.6525	18.09	16.90
MW 5C	BACKGROUND WELL	205903.1285	2303858.9505	14.35	14.19
MW 7C	WELL BEYOND COMPLIANCE BOUNDARY	196600.8144	2307567.4378	16.98	16.77
MW 11	WELL BEYOND COMPLIANCE BOUNDARY	202542.0838	2306295.0502	25.37	22.19
MW 12	WELL BEYOND COMPLIANCE BOUNDARY	199646.3130	2307508.2217	20.83	18.47
MW 19	COMPLIANCE BOUNDARY WELL	197833.5782	2307041.3442	31.38	28.39
MW 21C	COMPLIANCE BOUNDARY WELL	197773.53	2306913.73	31.47	29.0
MW 22B	COMPLIANCE BOUNDARY WELL	198349.05	2307016.96	20.34	17.8
MW 22C	COMPLIANCE BOUNDARY WELL	198349.48	2307023.29	20.40	18.0
MW 23B	COMPLIANCE BOUNDARY WELL	198967.44	2306901.76	17.50	15.3
MW 23C	COMPLIANCE BOUNDARY WELL	198972.10	2306903.52	17.94	15.5
MW 24B	COMPLIANCE BOUNDARY WELL	200712.12	2306251.09	16.67	13.9
MW 24C	COMPLIANCE BOUNDARY WELL	200716.55	2306263.90	16.32	13.7
MW 27B	COMPLIANCE BOUNDARY WELL	202585.27	2304679.45	15.59	12.7
MW 28B	WELL BEYOND COMPLIANCE BOUNDARY	197368.43	2307359.97	33.07	30.2
MW 28C	WELL BEYOND COMPLIANCE BOUNDARY	197356.57	2307354.09	32.23	29.8
MW 31C	WELL BEYOND COMPLIANCE BOUNDARY	201046.82	2306858.17	18.87	16.2
VOLUNTARY MONITORING WELLS					
MW 32C	WELL BEYOND COMPLIANCE BOUNDARY	197686.22	2307879.04	35.57	33.48
MW 33C	WELL BEYOND COMPLIANCE BOUNDARY	197598.34	2308275.70	25.45	22.28

LEGEND

- *MW-11* NPDES MONITORING WELL
- *MW-32C* VOLUNTARY MONITORING WELL
- DUKE ENERGY PROGRESS SUTTON PLANT
- WASTE BOUNDARY
- 500 ft COMPLIANCE BOUNDARY
- NEW HANOVER CO. PARCEL LINE (APPROXIMATE)

NOTE:

1. CONTOUR LINES ARE USED FOR REPRESENTATIVE PURPOSES ONLY AND ARE NOT TO BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

SOURCES:

1. 2014 AERIAL PHOTOGRAPH WAS OBTAINED FROM WSP FLOWN ON APRIL 17, 2014
2. 2013 AERIAL PHOTOGRAPH WAS OBTAINED FROM THE NRCS GEOSPATIAL DATA GATEWAY AT *http://datagateway.nrcs.usda.gov/*
3. WELL LOCATIONS AND MEASURING POINTS WERE BASED ON A SURVEY BY JAMES L. HAINES & ASSOCIATES FOR ISH, INC. DATED DECEMBER 23, 2008. ISH DRAWING IS TITLED "POTENTIAL LOCATIONS FOR PROPOSED GEOPROBE AND WELL INSTALLATIONS", DATED FEBRUARY 25, 2009 WITH A CAD FILE NAME *Figure 22.dwg*
4. NEW WELL LOCATIONS AND MEASURING POINTS WERE BASED ON A TABLE BY PARAMOUNTE ENGINEERING, WILMINGTON NC DATED 2012-03-05 SUPPLIED BY PROGRESS ENERGY. HORIZONTAL DATUM IS NAD83(NSRS2007) AND THE VERTICAL DATUM IS NGVD29.
5. THE PROPERTY BOUNDARY FOR THE L.V. SUTTON STEAM ELECTRIC PLANT WAS BASED ON A COMPOSITE MAP PREPARED BY DAVIS-MARTIN-POWELL & ASSOC., INC. THE DRAWINGS ARE DATED JUNE, 1995 WITH REVISION NOTE FOR MARCH 4, 2004. FILE NAME IS L-D-9022-7.DWG. HORIZONTAL DATUM IS NAD83 AND THE VERTICAL DATUM IS NGV 29.
6. PARCEL DATA WAS OBTAINED FROM THE NORTH CAROLINA STATE LIBRARIES AT *http://www.lib.ncsu.edu/gis/counties.html* FOR NEW HANOVER COUNTY.
7. THE LOCATION OF THE FORMER ASH DISPOSAL AREAS WAS BASED ON A FIGURE 2-2 PREPARED BY BLASLAND, BOUCK & LEE, INC. THE FIGURE IS TITLED "HORIZONTAL EXTENT OF THE ASH WITHIN THE FORMER DISPOSAL AREA".

GRAPHIC SCALE

600 0 300 600 1200

(IN FEET)

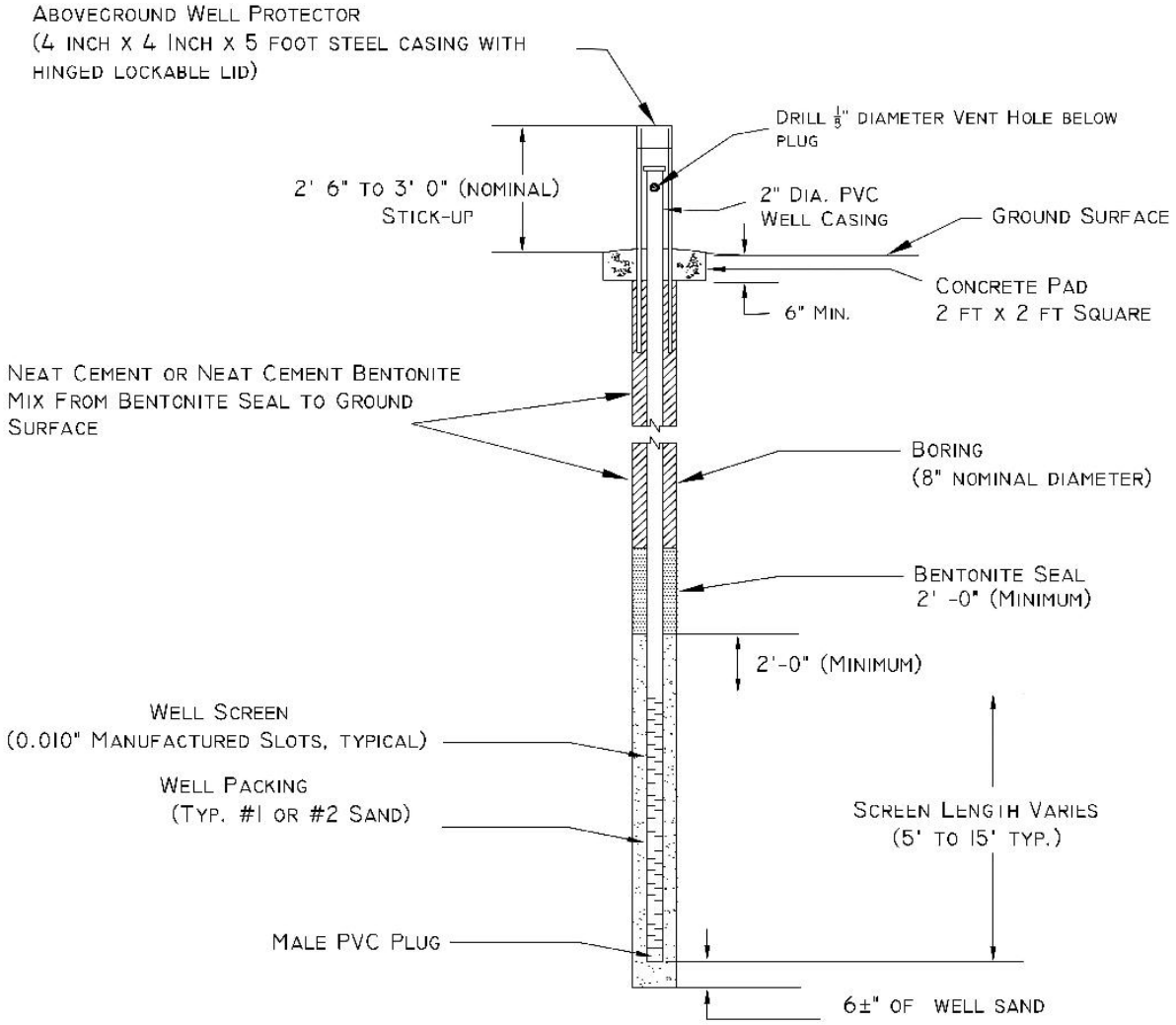
synTerra
148 River Street, Suite 220
Greenville, South Carolina 29601
864-421-9999
www.synterracorp.com

DRAWN BY:	S. ARLEDGE	DATE:	2014-07-25
CHECKED BY:	H. FRANK	DATE:	2014-07-25
PROJECT MANAGER:	KATHY WEBB		
LAYOUT NAME:	FIG 2 (SAMPLE LOCATION)		

DUKE ENERGY® PROGRESS

L.V. SUTTON ENERGY COMPLEX
801 SUTTON POWER PLANT RD
WILMINGTON, NORTH CAROLINA

FIGURE 2
SAMPLE LOCATION MAP



Typical Well Construction Details
(no scale)

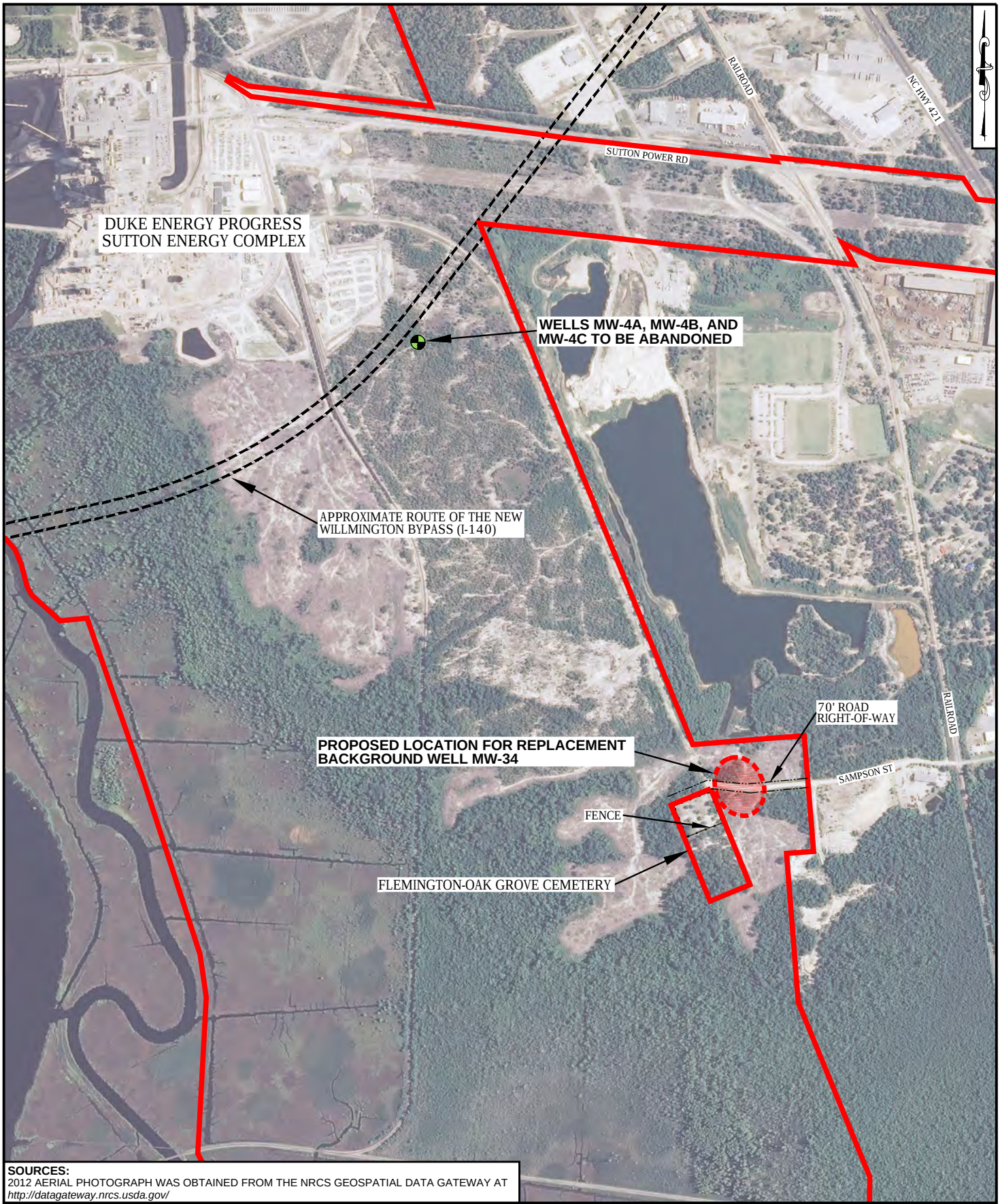
INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS, LLC

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE (864) 421-9999
http://www.synterracorp.com

DRAWN BY: H. Frank Date: 7/8/2014 PROJECT MANAGER: Kathy Webb

FIGURE 3
GENERALIZED WELL SCHEMATIC
L.V. SUTTON ENERGY COMPLEX

P:\Progress Energy.1026\08.SUTTON PLANT\08. Legal Dept. Sutton PreConsent Order Work\Groundwater Monitoring Plan\



SOURCES:
2012 AERIAL PHOTOGRAPH WAS OBTAINED FROM THE NRCS GEOSPATIAL DATA GATEWAY AT
http://datagateway.nrcs.usda.gov/

GRAPHIC SCALE
500 0 500 1000
IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: S. ARLEDGE DATE: 07/25/2014
PROJECT MANAGER: KATHY WEBB
LAYOUT: FIG 4 (WELL LOC)

FIGURE 4
PROPOSED BACKGROUND WELL LOCATION
L.V. SUTTON ENERGY COMPLEX
801 SUTTON POWER RD
WILMINGTON, NORTH CAROLINA

FIGURE 5

DUKE ENERGY PROGRESS, INC.
SUTTON

LOW FLOW SAMPLING LOG

148 River Street, Suite 220
Greenville, South Carolina 29601
(864) 421-9999 • (864) 421-9909 Fax
www.synTerracorp.com

FIELD PERSONNEL: _____

WEATHER: ☐ SUNNY ☐ OVERCAST ☐ RAIN TEMPERATURE (APPROX):

NOTES:

WELL ID:		PUMP/TUBING INTAKE DEPTH:	(FT)	START PURGE TIME:	
MEASURING POINT:		START PURGE DATE:		END PURGE TIME:	
WELL DIAMETER:	(IN)	END PURGE DATE:		FINAL READING TIME:	
WELL DEPTH:	(FT)	TOTAL VOLUME PURGED:	(GAL)		
DEPTH TO WATER:	(FT)	SAMPLE DATE:		SAMPLE COLLECTION TIME:	

PURGE METHOD: ☐ Grundfos Pump ☐ 12 Volt Pump ☐ Peristaltic Pump ☐ Dedicated Pump ☐ Teflon Bailer ☐ Polyethylene Bailer
SAMPLE METHOD: ☐ Grundfos Pump ☐ 12 Volt Pump ☐ Peristaltic Pump ☐ Dedicated Pump ☐ Teflon Bailer ☐ Polyethylene Bailer

TIME	WATER LEVEL (FT)	FLOW RATE (mL/min)	TEMPERATURE (° Celsius)	CONDUCTANCE (µS/cm)	DO (mg/L)	pH (su)	ORP* (mV)	TURBIDITY* (NTU)	NOTES

CONSTITUENTS SAMPLED	NUMBER OF CONTAINERS										PRESERVATION								
	40 ml VOA	125 ml GLASS CLEAR	250 ml GLASS CLEAR	500 ml GLASS CLEAR	1 L GLASS AMBER	125 ml POLYETHYLENE	250 mL POLYETHYLENE	500 mL POLYETHYLENE			UNPRESERVED	H_2SO_4	HNO_3	HCL	NaOH	$NA_2S_2O_3$	METHANOL	OTHER	

COMMENTS: FIELD VEHICLE ACCESSIBLE ☐ YES ☐ NO

Associated midday/end-of-day pH check within ±0.1 std unts? ☐ YES ☐ NO. If NO, pH data reported on this sheet should be considered as flagged accordingly

* SynTerra is not NC-certified for these parameters. Data collected for information purposes only

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
☐ GOOD	☐ BAD	☐ NONE	☐ GOOD	☐ BAD	☐ NONE	☐ GOOD	☐ BAD	☐ NONE	☐ GOOD	☐ BAD	☐ NONE	☐ GOOD	☐ BAD	☐ NONE

Instrument Calibration Log

SynTerra Corporation
148 River Street, Suite 220
Greenville, South Carolina 29601

NC Field Parameter Certification No. 5591

Instrument ID: YSI-556-MPS **Date:** _____
Analyst: _____ **Location:** _____

pH Initial Calibration (standard units)
Reference Method: SW846 9040C

Cal. Time	Cal. Buffer 4.0	Cal. Buffer 7.0	Cal Buffer 10.0	*Check Buffer 7.0

*pH buffer checks are to be within ± 0.1 pH units of the standards true value

4 Buffer Reference:_____ 10 Buffer Reference:_____

7 Buffer Reference:_____ Check Buffer Reference:_____

pH Calibration Check (standard units)

Time		Check Buffer True Value	*Check Buffer Measured Value
Mid-Day			
End-of-Day			
Other			

*pH buffer checks are to be within ± 0.1 pH units of the standards true value

Check Buffer Reference:_____ Action Required: _____

Specific Conductance (umhos/cm)
Reference Method: SW846 9050A

Time		Calibration Std 1413	Verification Std 1413
Initial Cal			
Mid-Day		Not Applicable	
End-of-Day		Not Applicable	

*Verification standard ± 10 percent of the standards true value

Calibration Standard Reference:_____ Verification Standard Reference:_____

Action Required: _____

Dissolved Oxygen (mg/L)
Reference Method: SM 4500 O G-2001

	Time	Temp °C	Barometric Pressure (mm Hg)	Meter DO Reading (mg/L)	Correction Factor	Theoretical DO (mg/L)
Initial						
Mid-Day						
End-of-Day						

Theoretical DO = DO from "Dissolved Oxygen Meter Calibration Verification" Table at ambient temp X Correction Factor at Barometric Pressure
Theoretical DO and Meter DO reading within ± 0.5 mg/l, if not calibrate meter.

Action Required: _____

FIGURE 6 - EXAMPLE FIELD SAMPLING CALIBRATION FORM

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy

For Detailed Instructions, see:
http://dewww/essenv/coc/

Duke Energy Analytical Lab Services
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

Analytical Laboratory Use Only

LIMS #		Samples Originating From NC √ SC ___
Logged By	Date & Time	SAMPLE PROGRAM: Groundwater √ NPDES ___ Drinking Water ___ UST ___ RCRA Waste
Vendor	Cooler Temp (C)	
PO #	[15]Preserv.:1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None	
MR #		

[19]Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer must Complete

1)Project Name		2)Phone No:
3)Client		4)Fax No:
5)Business Unit: 20036	6)Process:	7)Resp. To:
8)Project ID:	9)Activity ID:	10)Mail Code:

Customer to complete all appropriate NON-SHADED areas.

Customer to complete appropriate columns to right

LAB USE ONLY [11]Lab ID	[12]Chem Desktop No.	[13]Sample Description or ID	[14]Collection Information Date	Time	Signature	[17]Comp.	[18]Grab	[16]Analyses Required	[20]Total # of Containers
									6

Customer to sign & date below

21)Relinquished By	Date/Time	Accepted By	Date/Time
Relinquished By	Date/Time	Accepted By	Date/Time
Relinquished By	Date/Time	Accepted By	Date/Time
23)Seal/Locked By	Date/Time	Sealed/Lock Opened By	Date/Time
24)Comments			

Customer, important please indicate desired turnaround

[22]Requested Turnaround

14 Days √
*7 Days ___
* 48 Hr ___
*Other ___
* Add. Cost Will Apply

FIGURE 7

NORTH CAROLINA GROUNDWATER SAMPLING SITE CHECKLIST
DUKE ENERGY PROGRESS, INC./L.V. SUTTON ENERGY COMPLEX
PERMIT #NC0001422

LOCATION / SITE Wilmington, NC / L.V. Sutton Energy Complex
SITE CONTACT Kent Tyndall
WEATHER

SAMPLE DATE
FIELD CREW

	MW-4B	MW-5C	MW-7C	MW-11	MW-12	MW-19	MW-21C	MW-22B	MW-22C	MW-23B	MW-23C	MW-24B	MW-24C	MW-27B	MW-28B	MW-31C	MW-32C	MW-33C
ACCESS TO WELLS																		
Access cleared into well																		
Access cleared around well																		
Tall grass or weeds c needs mowing																		
Road washing out / muddy / needs grading																		
Fallen tree blocking access																		
WELL SECURITY																		
Well found locked																		
Well found unlocked																		
WELL LOCK CONDITION																		
Lock in good condition																		
Lock rusted, difficult to open / needs replacing																		
Replaced damaged lock																		
WELL CASINGS																		
Casing in good condition																		
Damaged casing / still functional																		
Damaged casing / repair required																		
CONCRETE PADS																		
Pad in good condition																		
Minor cracks																		
Major cracks / broken / repair required																		
Undermined / washing out																		
Fire ants around concrete pad																		
WELL PROTECTIVE CASINGS																		
Casing in good condition																		
Damaged casing / still functional																		
Damaged casing / repair required																		
Broken hinge on protective lid																		
Wasp nest inside protective casing																		
Ants inside protective casing																		
WELL CAPS																		
Well cap in good cond^on																		
Damaged / needs replacement																		
Replaced damaged well cap																		
FLUSH MOUNT WELLS																		
Vault in good condition																		
Water inside vault																		
Vault bolt holes broken or stripped																		
Bolts stripped																		
Vault lid cracked or broken																		
WELL ID TAGS																		
Well tag in good condition																		
Well tag missing																		
Well tag damaged / illegible																		
Lacks required information - Driller Reg #																		
Lacks required information - Completion date																		
Lacks required information - Total well depth																		
Lacks required information - Depth to screen																		
Lacks required information - Non potable tag																		

NOTE:

Figure 8. North Carolina Groundwater Sampling Checklist

TABLES

TABLE 1
MONITORING WELL INFORMATION
DUKE ENERGY PROGRESS, INC./L.V. SUTTON ENERGY COMPLEX
WILMINGTON, NORTH CAROLINA

WELL ID	DATE INSTALLED	NORTHING	EASTING	USE	TYPE OF CASING	WELL DIAMETER (inches)	TOP OF CASING ELEVATION (NGVD 29)	WELL DEPTH TOC	WELL SCREEN INTERVAL * TOC	SCREEN LENGTH (feet)
PERMITTED										
MW-4B	12/12/1986	194233.89	2308898.65	Background	PVC	2.0	18.09	44.75	39.75 - 44.75	5
MW-5C	12/15/1986	205903.13	2303858.95	Background	PVC	2.0	14.35	44.59	39.59 - 44.59	5
MW-7C	12/14/1986	196600.81	2307567.44	Beyond Compliance	PVC	2.0	16.98	44.89	39.89 - 44.89	5
MW-11	2/6/1990	202542.08	2306295.05	Beyond Compliance	PVC	2.0	25.37	52.25	42.25 - 52.25	10
MW-12	2/6/1990	199646.31	2307508.22	Beyond Compliance	PVC	2.0	20.83	45.83	35.83 - 45.83	10
MW-19	6/15/2004	197833.58	2307041.34	Compliance	PVC	2.0	31.38	52.96	47.96 - 52.96	5
MW-21C	6/16/2011	197773.53	2306913.73	Compliance	PVC	2.0	31.47	48.23	43.23 - 48.23	5
MW-22B	6/15/2011	198349.05	2307016.96	Compliance	PVC	2.0	20.34	29.74	24.74 - 29.74	5
MW-22C	9/15/2011	198349.48	2307023.29	Compliance	PVC	2.0	20.40	47.48	42.48 - 47.48	5
MW-23B	9/6/2011	198967.44	2306901.76	Compliance	PVC	2.0	17.50	29.18	24.18 - 29.18	5
MW-23C	9/7/2011	198972.10	2306903.52	Compliance	PVC	2.0	17.94	47.5	42.50 - 47.50	5
MW-24B	9/9/2011	200712.12	2306251.09	Compliance	PVC	2.0	16.67	30.51	25.51 - 30.51	5
MW-24C	9/13/2011	200716.55	2306263.90	Compliance	PVC	2.0	16.32	49.97	44.97 - 49.97	5
MW-27B	9/8/2001	202585.27	2304679.45	Compliance	PVC	2.0	15.59	30.60	25.60 - 30.60	5
MW-28B	9/28/2011	197368.43	2307359.97	Beyond Compliance	PVC	2.0	33.07	33.84	28.84 - 33.84	5
MW-28C	9/21/2011	197356.57	2307354.09	Beyond Compliance	PVC	2.0	32.23	48.42	43.42 - 48.42	5
MW-31C	9/14/2011	201046.82	2306858.17	Beyond Compliance	PVC	2.0	18.87	48.33	43.33 - 48.33	5
VOLUNTARY										
MW-32C	11/14/2013	197686.22	2307879.04	Beyond Compliance	PVC	2.0	35.57	53.02	48.02 - 53.02	5
MW-33C	11/13/2013	197598.34	2308275.70	Beyond Compliance	PVC	2.0	25.45	48.3	43.30 - 48.30	5

Prepared By: HJF Checked By: KWW

Notes:
TOC - Top of Casing
NGVD 29 - A vertical control datum in the United States by the general adjustment of 1929
* - Well depths and screen intervals are based upon field observations.

TABLE 2
SAMPLE PARAMETERS, ANALYTICAL METHODS, CONTAINERS, PRESERVATIVES, AND HOLIDNG TIMES
DUKE ENERGY PROGRESS, INC./L.V. SUTTON ENERGY COMPLEX
WILMINGTON, NORTH CAROLINA

PARAMETER	UNITS	CONTAINERS	PRESERVATIVES	HOLDING TIMES	ANALYTICAL METHOD
Field Parameters					
Field pH	SU	Flow-through Cell	None	Analyze Immediately	YSI 556 Multi-Meter
Specific Conductivity	mmhos/cm	Flow-through Cell	None	Analyze Immediately	YSI 556 Multi-Meter
Temperature	°C	Flow-through Cell	None	Analyze Immediately	YSI 556 Multi-Meter
Water Level	ft	-	-	-	Water Level Meter
Laboratory Analysis					
Antimony	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Arsenic	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Barium	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Boron	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Cadmium	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Chloride	mg/L	125 ml HDPE	Cool 4° C	28 days	EPA 300.0
Chromium (total)	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Copper	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Iron	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Lead	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Manganese	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Mercury	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	EPA 245.1
Nickel	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7
Nitrate (as Nitrogen)	mg/L	125 ml HDPE	Cool 4° C	28 days	EPA 300.0
Selenium	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Sulfate	mg/L	125 ml HDPE	Cool 4° C	28 days	EPA 300.0
Total Dissolved Solids	mg/L	250 ml HDPE	Cool 4° C	28 days	SM 2540C
Thallium	µg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.8
Zinc	mg/L	500 ml HDPE	pH < 2 $HN0_3$	6 months	TRM / EPA 200.7

Prepared By: HJF Checked By: KWW

Notes:
SU - Standard Units
mS/cm - micro siemen per centimeter
ft - feet
mv - milli volts
mg/L - milligrams per liter
µg/L - micrograms per liter
NTU - Nephelometric Turbidity Units
TRM - Total Recoverable Metals
EPA - Environmental Protection Agency
SM - Standard Method

APPENDIX A

BORING LOGS AND MONITORING WELL CONSTRUCTION LOGS

4 B

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Dale Todd Well Drilling
DRILLER REGISTRATION NUMBER 039
STATE WELL CONSTRUCTION PERMIT NUMBER: 64-0036-WM-0229

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Wilmington
Sutton Plant
(Road, Community, or Subdivision and Lot No.)
County: New Hanover

2. OWNER CP&L
ADDRESS Hwy 421 (Street or Route No.)
Wilmington (City or Town) NC (State) 28401 (Zip Code)

3. DATE DRILLED 12-12-86 USE OF WELL monitor
4. TOTAL DEPTH 45 CUTTINGS COLLECTED ☐ Yes ☒ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 10' 8" FT. ☐ above ☑ below TOP OF CASING.
TOP OF CASING IS 10" FT. ABOVE LAND SURFACE.
7. YIELD (gpm): 10 METHOD OF TEST GGS PUMP
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____

DRILLING LOG Depth From	To	Formation Description
0	45	FINE TO MEDIUM SAND

If additional space is needed use back of form.

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0	To 40	Ft.	2	SCH40	PVC
From _____	To _____	Ft.	_____	_____	_____
From _____	To _____	Ft.	_____	_____	_____

11. GROUT:

	Depth		Material	Method
From 0	To 38	Ft.	NEAT	PUMP
From _____	To _____	Ft.	_____	_____

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From 40	To 45	Ft.	2 in.	010 in.	PVC
From _____	To _____	Ft.	_____ in.	_____ in.	_____
From _____	To _____	Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

	Depth		Size	Material
From 39	To 45	Ft.	MEDIUM	SAND
From _____	To _____	Ft.	_____	_____

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)
attached

CI 04 02 0051

14. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84
Submit original to Division of Environmental Management and copy to well owner

5C

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT – GROUNDWATER SECTION
P.O. BOX 27687 – RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Dale Todd Well Drilling
DRILLER REGISTRATION NUMBER 039
STATE WELL CONSTRUCTION PERMIT NUMBER: 64-0036-WM-0229

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Wilmington
Sutton Plant
(Road, Community, or Subdivision and Lot No.)
County: New Hanover

2. OWNER CP+L
ADDRESS Hwy 421 (Street or Route No.)
Wilmington (City or Town) NC (State) 28401 (Zip Code)

3. DATE DRILLED 12-15-86 USE OF WELL monitor
4. TOTAL DEPTH 45 SPT's ~~CUTTINGS~~ COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 5 FT. ☐ above ☑ below TOP OF CASING,
TOP OF CASING IS 2" ± ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): _____
9. CHLORINATION: Type — Amount —
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	40 Ft.	2	SCH40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	38 Ft.	NEAT	PUMP
		Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	40	45 Ft.	2 in.	010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	39	45 Ft.	MEDIUM	SAND
		Ft.		

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
		ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

attached

CI 04 02 0042

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

FILE COPY

DALE TODD WELL DRILLING

319 KEATON AVENUE
WILMINGTON, N.C. 28401
919-763-1261

TEST BORING FIELD REPORT 830-21-D-6

CD PROJECT CP&L - SUTTON PLANT

CD PROJECT # _____ BORING # 5-C DATE 12-15-86

CLIENT PROJECT # _____ SURFACE ELEVATION _____

DRILLER G. BRIDGER CREW R. FOWLER

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	USCS	NO.	DEPTH FROM	DEPTH TO	1ST 6"	2ND 6"	3RD 6"	REC.
0	42	LOOSE TO FIRM TAN AND GRAY FINE TO MEDIUM SAND, MOIST TO WET	SP	1	3.5	5	3	3	4	
			SP	2	8.5	10	5	8	12	
42	45	DENSE GRAY FINE SAND - TRACE OF SILT, WET	SP	3	13.5	15	4	13	13	
			SP	4	18.5	20	5	7	9	
			SP	5	23.5	25	3	3	4	
			SP	6	28.5	30	9	12	12	
			SP	7	33.5	35	4	6	12	
			SP	9	38.5	40	8	9	12	
			SP-SM	9	43.5	45	17	18	20	

CI 04 02 0037

NON-DRILLING TIME (Hrs.) _____

BORING LAYOUT _____ MOVING _____

CLEARING _____ STANDBY _____

WATER LEVEL: @ _____ DATE _____ TIME _____

@ _____ DATE _____ TIME _____

REMARKS: _____

7C

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT – GROUNDWATER SECTION
P.O. BOX 27687 – RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Dale Todd Well Drilling
DRILLER REGISTRATION NUMBER 039
STATE WELL CONSTRUCTION PERMIT NUMBER: 64-0036-WM-0229

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Wilmington
Sutton Plant
(Road, Community, or Subdivision and Lot No.)
County: New Hanover

2. OWNER CP+L
ADDRESS Hwy 421
(Street or Route No.)
Wilmington NC 28401
City or Town State Zip Code

3. DATE DRILLED 12-14-86 USE OF WELL monitor
4. TOTAL DEPTH 45 CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 8' FT. ☐ above ☐ below TOP OF CASING,
TOP OF CASING IS 1'2" FT. ABOVE LAND SURFACE.
7. YIELD (gpm): 60 METHOD OF TEST GGS pump
8. WATER ZONES (depth): _____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	0	To 40 Ft.	2	SCH40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0	To 38 Ft.	NEAT	Pump
From		To Ft.		

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	40	To 45 Ft.	2 in.	010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	39	To 45 Ft.	MEDIUM	SAND
From		To Ft.		

14. REMARKS: _____

DRILLING LOG

Depth From	Depth To	Formation Description
		ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

attached

CI 04 02 0049

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84 Submit original to Division of Environmental Management and copy to well owner

DALE TODD WELL DRILLING

219 KEATON AVENUE
WILMINGTON, N.C. 28401
919-763-1761

TEST BORING FIELD REPORT

CD PROJECT CP&L - SUTTON PLANT

CD PROJECT # _____ BORING # 7-C DATE 12-14-86

CLIENT PROJECT # _____ SURFACE ELEVATION _____

DRILLER G. BRIDGER CREW R. FOWLER

DEPTH FROM	DEPTH TO	SOIL STRATA: SOIL DESCRIPTION AND REMARKS	USCS	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0	45	LOOSE TO FIRM DARK GRAY, GRAY AND TAN FINE TO MEDIUM SAND, MOIST TO WET	SP	1	3.5	5	4	4	6	
			SP	2	8.5	10	4	8	13	
			SP	3	13.5	15	1	5	12	
			SP	4	18.5	20	8	14	16	
			SP	5	23.5	25	3	4	5	
			SP	6	28.5	30	4	5	6	
			SP	7	33.5	35	5	3	4	
			SP	8	38.5	40	6	7	9	
			SP	9	43.5	45	3	6	9	

CI 04 02 0039

NON-DRILLING TIME (Hrs.) _____ REMARKS: _____

BORING LAYOUT _____ MOVING _____

CLEARING _____ STANDBY _____

WATER LEVEL: @ _____ DATE _____ TIME _____

@ _____ DATE _____ TIME _____

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

WELL #11

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR RICHARD CATLIN & ASSOCIATES, INC.

DRILLER REGISTRATION NUMBER 1142

STATE WELL CONSTRUCTION * PERMIT NUMBER: 64-0036-WM-0368

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: WILMINGTON
801 SUTTON STEAM PLANT ROAD
(Road, Community, or Subdivision and Lot No.)
County: NEW HANOVER

2. OWNER CAROLINA POWER AND LIGHT
ADDRESS P. O. BOX 327 (Street or Route No.)
NEW HILL, (City or Town) NC (State) 27562 (Zip Code)

3. DATE DRILLED 2/6/90 USE OF WELL MONITORING
4. TOTAL DEPTH 50' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: ±12.5 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): N/A METHOD OF TEST _____
8. WATER ZONES (depth): SURFICIAL AQUIFER
9. CHLORINATION: Type N/A Amount _____
10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.5	To 40 Ft.	2"	SCH 40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0	To 36 Ft.	NEAT	IN PLACE
From		To Ft.		

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	40	To 50 Ft.	2 in.	.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	37	To 50 Ft.	COARSE	SAND
From		To Ft.		

14. REMARKS _____

Depth From	Depth To	DRILLING LOG Formation Description
		SEE ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ATTACHED

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

WELL #12

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR RICHARD CATLIN & ASSOCIATES, INC.

DRILLER REGISTRATION NUMBER 1142

STATE WELL CONSTRUCTION * PERMIT NUMBER: 64-0036-WM-0368

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: WILMINGTON
801 SUTTON STEAM PLANT ROAD
(Road, Community, or Subdivision and Lot No.)
County: NEW HANOVER

2. OWNER CAROLINA POWER AND LIGHT
ADDRESS P. O. BOX 327 (Street or Route No.)
NEW HILL, NC 27562
City or Town State Zip Code

3. DATE DRILLED 2/6/90 USE OF WELL MONITORING

4. TOTAL DEPTH 50' CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: ±10.5 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST _____

8. WATER ZONES (depth): SURFICIAL AQUIFER

9. CHLORINATION: Type N/A Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.5	To 40 Ft.	2"	SCH 40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0	To 35.5 Ft.	NEAT	IN PLACE
From		To Ft.		

12. SCREEN

	Depth		Diameter	Slot Size	Material
From	40	To 50 Ft.	2 in.	.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	37	To 50 Ft.	COARSE	SAND
From		To Ft.		

14. REMARKS _____

Depth From	Depth To	DRILLING LOG Formation Description
		SEE ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ATTACHED

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owner.

BORING LOG

BORING NUMBER WELL #11 SITE LOCATION CP&L SUTTON DRILLED BY M. SAGE

TOTAL DEPTH 50' WILMINGTON, NORTH CAROLINA LOGGED BY J. CORNETTE

DRILLING DATE 2/6/90

SAMPLE DEPTH (ft.) FROM	TO	SAMPLE DESCRIPTION	P.I.D. SURVEY	BLOW COUNT
5.0	7.0	Medium to fine, well sorted, brown SAND. Low water content.		3,3,2,2
10.0	12.0	Medium to fine, well sorted, subrounded, brown SAND. Moderate water content.		6,5,5,6
15.0	17.0	Fine to medium grained tan SAND. High water content. Well sorted and rounded.		6,12,16,18
20.0	22.0	Medium grained, well sorted, well rounded SAND. Tan. High water content.		8,12,18,26
25.0	27.0	Fine grained, well rounded, well sorted, tan SAND. High water content.		4,16,16,24
30.0	32.0	Medium to coarse grained, subrounded, moderately sorted SAND. High water content.		8,8,8,12
33.5	35.5	Fine grained, well sorted and rounded, light tan, SAND. High water content.		6,8,12,14
38.5	40.5	Medium grained, well rounded and sorted, light grey SAND. High water content.		12,14,16,14
43.5	45.5	Medium grained, well rounded, moderately sorted, slightly silty SAND. Light grey. Center 6" of sample brownish grey sandy, clayey, SILT. High water content.		WD 12,12,16
50.0	52.0	Very poorly sorted silty SAND. SAND is subrounded and ranges from very fine grained to very coarse grained. Brown. High water content.		12,16,17,22

REMARKS

Richard Catlin & Associates, Inc.
CONSULTING ENGINEERS AND HYDROGEOLOGISTS
RC&A

BORING LOG

BORING NUMBER WELL #12 SITE LOCATION CP&L SUTTON DRILLED BY M. SAGE

TOTAL DEPTH 50' WILMINGTON, NORTH CAROLINA LOGGED BY J. CORNETTE

DRILLING DATE 2/6/90

SAMPLE DEPTH (ft.) FROM	TO	SAMPLE DESCRIPTION	P.I.D. SURVEY	BLOW COUNT
5.0	7.0	Moderately sorted, subrounded, slightly silty medium grained SAND. Moist. Light tan. No odor.	-	3,4,4,4
10.0	12.0	Moderately sorted, subrounded, medium grained SAND. Light grey. High water content.		6,8,10,12
15.0	17.0	Upper one-half of spoon moderately sorted, medium grained, subrounded SAND. Clayey lense separates finer grained, subrounded, moderately sorted, SAND. High water content.		4,10,14,8
20.0	22.0	Medium to fine grained subrounded SAND. 6" from top, 3" zone of coarse grained, subrounded, moderately sorted SAND. High water content. Light tan to light grey.		8,12,18,20
25.0	27.0	Medium to coarse grained SAND. Subrounded, poorly sorted. High water content. Iron staining in upper 3" of sample. Light tan.		4,4,8,12
30.0	32.0	Medium grained, moderately sorted SAND. Tends to fine downward. High water content. Light tan to to light grey.		8,4,4,6
35.0	37.0	Fine to medium grained, well rounded SAND! Tan. High water content.		6,12,18,20
40.0	42.0	Coarse to very coarse, subrounded, moderately sorted SAND. High water content. Tan		2,2,1,2
45.0	47.0	Coarse, subrounded, moderately sorted SAND. Tends to fine downward. Tan. High water content. Bottom 1" of sample clayey SAND with trace of gravel. Some orange staining.		2,2,WH

REMARKS

Richard Catlin & Associates, Inc.
CONSULTING ENGINEERS AND HYDROGEOLOGISTS
RC&A

BORING LOG

BORING NUMBER WELL #12 SITE LOCATION CP&L SUTTON DRILLED BY M. SAGE

TOTAL DEPTH 50' WILMINGTON, NORTH CAROLINA LOGGED BY J. CORNETTE

DRILLING DATE 2/6/90

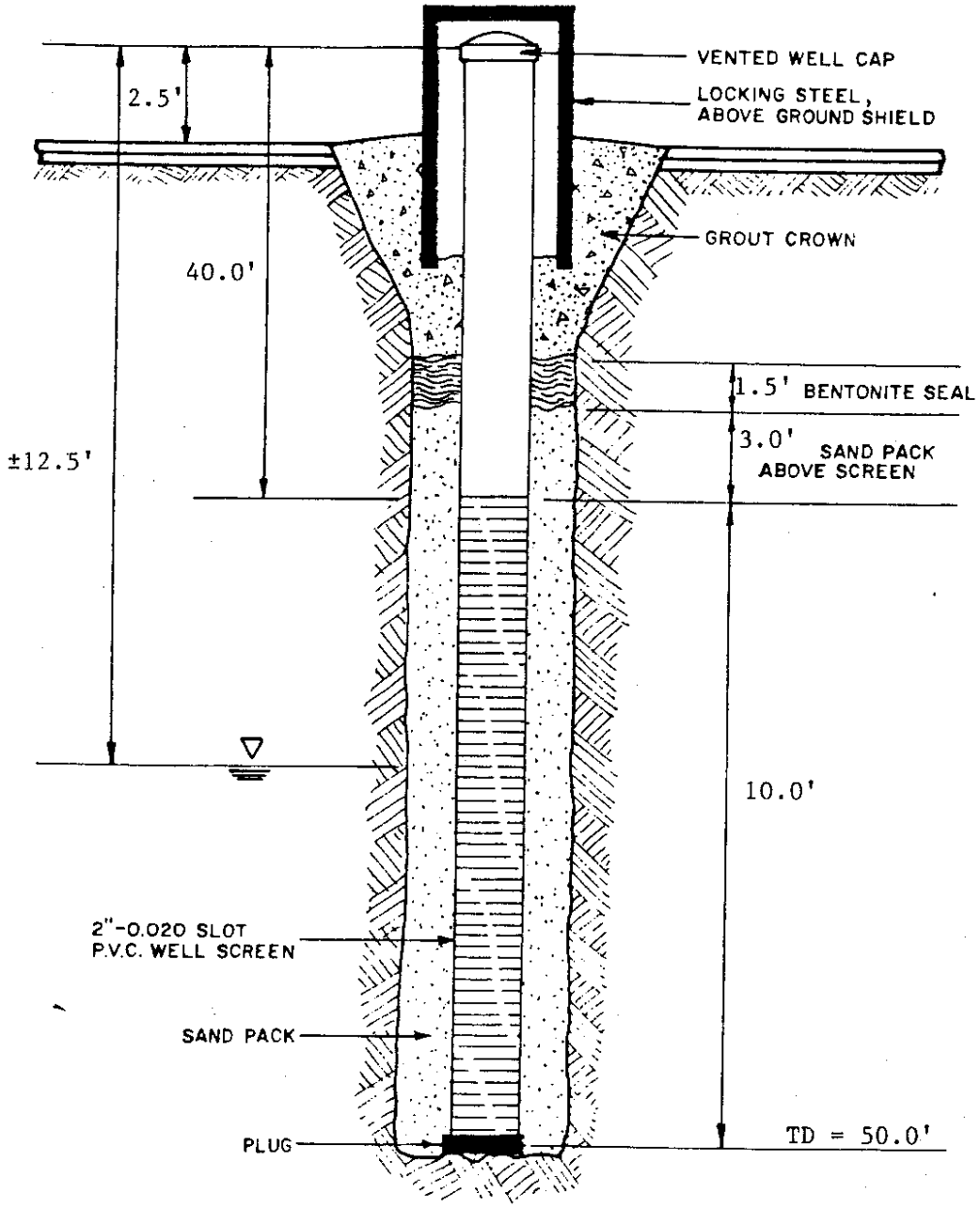
SAMPLE DEPTH(ft.) FROM	TO	SAMPLE DESCRIPTION	P.I.D. SURVEY	BLOW COUNT
50.0	52.0	Top 10" of sample represented by a very coarse subrounded, poorly sorted, gravelly, tan SAND. Sample fines downward to a medium to fine grained, moderately sorted, subrounded, clayey, grey, SAND. High water content throughout entire sample.		3,6,7,9

REMARKS

Richard Catlin & Associates, Inc.
CONSULTING ENGINEERS AND HYDROGEOLOGISTS
RC&A

AS BUILT
WELL DETAIL

WELL #11

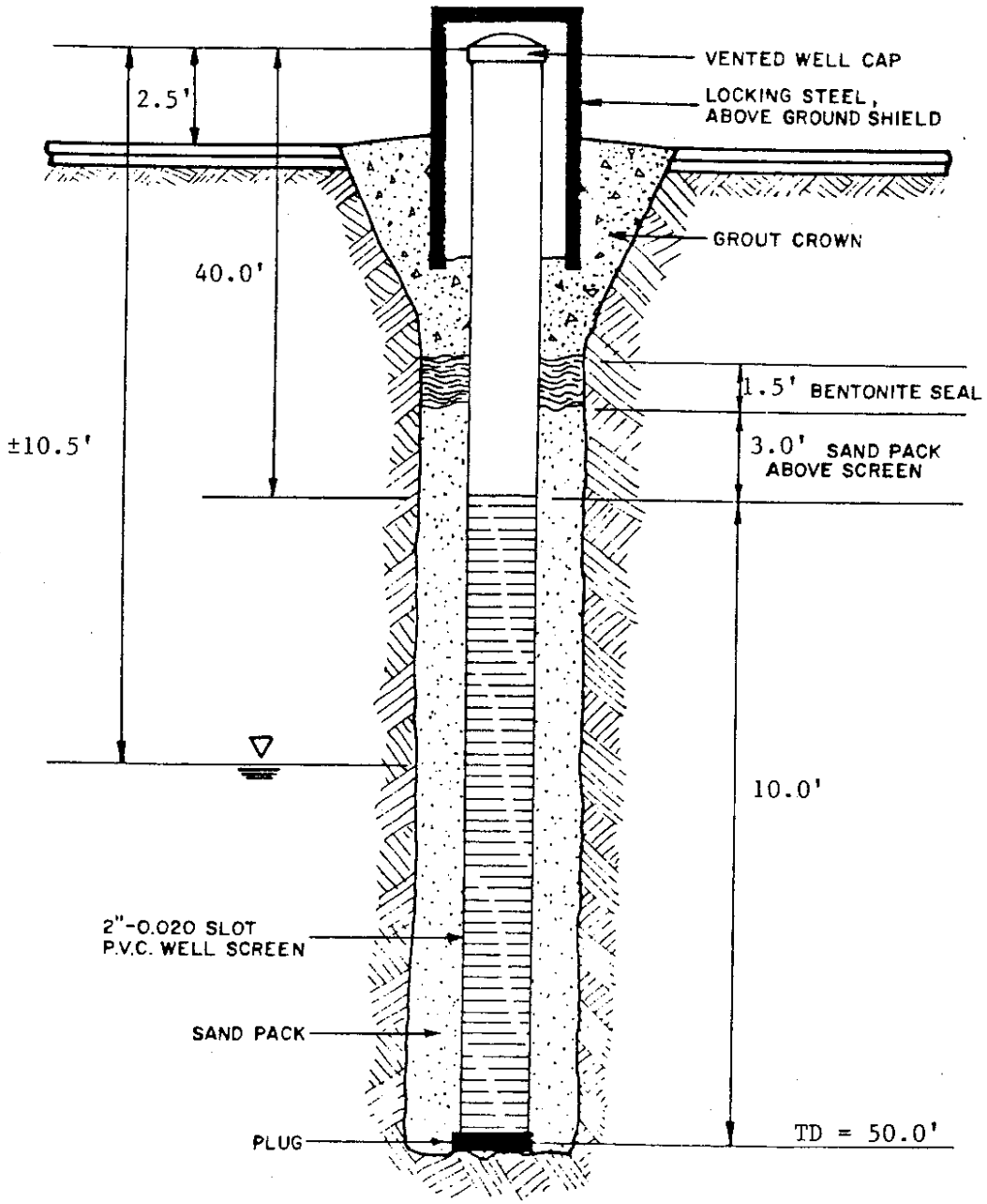


NOT TO SCALE

Richard Catlin & Associates, Inc.
CONSULTING ENGINEERS AND HYDROGEOLOGISTS
RC&A

AS BUILT
WELL DETAIL

WELL #12



NOT TO SCALE

Richard Catlin & Associates, Inc.
CONSULTING ENGINEERS AND HYDROGEOLOGISTS
RC&A

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Robert Miller CERTIFICATION # 2675

WELL CONTRACTOR COMPANY NAME SAEDACCO PHONE # (803) 548-2180

STATE WELL CONSTRUCTION PERMIT# (if applicable) ASSOCIATED WQ PERMIT# (if applicable)

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐ Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use

2. WELL LOCATION:
Nearest Town: Wilmington County Brunswick
801 Sutton Electric Steam Plant Road
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐Ridge ☐Slope ☐Valley ☐Flat
(check appropriate box)
Latitude/longitude of well location
(degrees/minutes/seconds)
Latitude/longitude source: ☐GPS ☐Topographic map
(check box)

3. OWNER: Sutton Steam Plant
Address 801 Sutton Electric Steam Plant
(Street or Route No.)
Wilmington NC
City or Town State Zip Code
( )-
Area code- Phone number

4. DATE DRILLED 6-15-2004
5. TOTAL DEPTH: 50'
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 20.6' FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3' FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
9. YIELD (gpm): METHOD OF TEST
10. WATER ZONES (depth):

DEPTH From	To	DRILLING LOG Formation Description
0	32	Sand (Fine to Medium)
32'	50'	Sand / Gravel

11. DISINFECTION: Type Amount
12. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0	To 45	Ft.	2"	Sch 40	PVC
From	To	Ft.			
From	To	Ft.			

13. GROUT:

	Depth		Material	Method
From 0	To 41	Ft.	Portland Cement	Tremmie
From	To	Ft.		

14. SCREEN:

	Depth		Diameter		Slot Size		Material
From 45	To 50	Ft.	2"	in.	.010	in	PVC
From	To	Ft.		in.		in.	

15. SAND/GRAVEL PACK:

	Depth		Size	Material
From 43	To 50	Ft.	#2	Sand
From	To	Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

See site map MW-19

16. REMARKS: Bentonite Seal fro 41' to 43'
MW-19

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Robert L. Miller 6-16-04
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001

Date Start/Finish: 6/14/04 & 6/15/04
Drilling Company: SAEDACCO
Driller's Name: Robert Miller
Drilling Method: Mud Rotary
Bit Size: 2.87-inch & 5.87-inch
Auger Size: NA
Rig Type: Diedrich D-50 Track Mounted Rig
Sampling Method: 24-inch splitspoon

Northing: 19783316
Easting: 230704138
Casing Elevation: 31.50 ft

Borehole Depth: 50 ft bls
Surface Elevation: 28.73 ft

Logged by: Daniel C.H. Peterman

Well/Boring ID: MW-19 (OAP)

Client: Progress Energy Carolinas Inc.

Location: Progress Energy L.V. Sutton Steam Electric Plant
Wilmington, NC

DEPTH / ELEVATION	Samp. Interval (ft bgs)	Recovery (inches)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Iron Staining	Geologic Column	Stratigraphic Description
30 / 0					0.0			SAND (SM), light gray to dark brown, fine grained, very loose, dry, no odor.
					0.0			SAND (SM), tan, mottled brown, fine grained, very loose, dry, no odor.
25 / -5		17	1 1 2 4	3	0.0			
		18	2 2 2 3	4	0.0			SAND (SM), tan, fine grained, very loose, dry, no odor.
		10	3 5 6 0	11	0.0			SAND (SM), tan, fine grained, medium dense, damp to moist, no odor.
20 / -10								

Well/Boring Construction

protective above ground steel casing (+3.0' - 0.5')

Cement pad (2'x2')

2-inch SCH 40 PVC riser (45' - +3')

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
HSA: Hollow Stem Auger
ft bls: feet below land surface
Air Monitoring Equipment: PID, V-RAE, and PDR-1000
PID: Photoionization Detector
V-RAE: Multi-Gas meter
PDR-1000: Particulate meter

Water Level Data

Date	Depth	Elev.
06/22/04	20.62	10.88

Depth measured from top of casing*

Client:
Progress Energy Carolinas Inc.

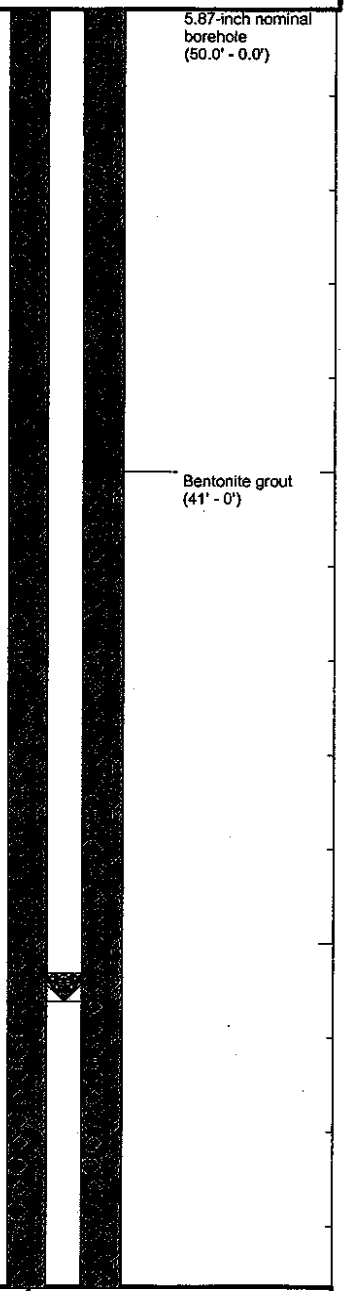
Site Location:
Progress Energy
L.V. Sutton Steam
Electric Plant

Well/Boring ID: MW-19 (OAP)

Borehole Depth: 50 ft bls

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Iron Staining	Geologic Column	Stratigraphic Description
			12	5 6 10 11	16	0.0			SAND (SM), tan, fine grained, medium dense, damp to moist, no odor.
			15	8 12 15 15	27	0.0			
15			15	8 10 11 12	21	0.0			
15			14	4 6 6 8	12	0.0			SAND (SM), tan, mottled white, fine grained, dense, moist, no odor.
			16	6 7 10 12	17	0.0			SAND (SM), tan, mottled brown, fine to medium grained, medium dense, moist, no odor.
10									
20			17	2 4 7 11	11	0.0			Clayey SAND (SC), tan, fine to medium grained, medium dense, visible iron staining, wet, no odor.
			17	7 10 12 12	22	0.0			

Well/Boring Construction



BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
HSA: Hollow Stem Auger
ft bls: feet below land surface
Air Monitoring Equipment: PID, V-RAE, and PDR-1000
PID: Photoionization Detector
V-RAE: Multi-Gas meter
PDR-1000: Particulate meter

Water Level Data

Date	Depth	Elev.
06/22/04	20.62	10.88

Depth measured from top of casing*

Client:
Progress Energy Carolinas Inc.

Site Location:
Progress Energy
L.V. Sutton Steam
Electric Plant

Well/Boring ID: MW-19 (OAP)

Borehole Depth: 50 ft bls

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Iron Staining	Geologic Column	Stratigraphic Description	Well/Boring Construction
5			15	12 17 20 27	37	0.0			SAND (SM), tan, mottled white, fine to medium grained, dense, wet, no odor.	
25			16	14 18 20 22	38	0.0				
			16	13 18 19 20	37	0.0			SAND (SM), tan, mottled white, fine to medium grained, dense, wet, no odor.	
0										
30			15	11 18 24 22	42	0.0				
									SAND (SM), light gray, mottled white, fine grained, dense, wet, no odor.	
			13	12 14 12 14	26	0.0			SAND and GRAVEL (GM), tan, mottled white, fine to medium grained (98%), trace fine gravel (2%), medium dense, visibe iron staining, wet, no odor.	
-5			15	11 15 12 11	27	0.0			SAND and GRAVEL (GM), light gray, mottled tan, fine to medium grained (90%), fine gravel (10%), medium dense, visibe iron staining, wet, no odor.	
35									Clayey SAND (SC), light gray, low plasticity, very soft, fine grained, wet, no odor.	
			16	8 9 10 14	19	0.0			SAND and GRAVEL (GM), light gray, mottled tan and white, fine to medium grained (95%), trace fine gravel (5%), medium dense, wet, no odor.	

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
HSA: Hollow Stem Auger
ft bls: feet below land surface
Air Monitoring Equipment: PID, V-RAE, and PDR-1000
PID: Photoionization Detector
V-RAE: Multi-Gas meter
PDR-1000: Particulate meter

Water Level Data

Date	Depth	Elev.
06/22/04	20.62	10.88

Depth measured from top of casing*

Client:
Progress Energy Carolinas Inc.

Site Location:
Progress Energy
L.V. Sutton Steam
Electric Plant

Well/Boring ID: MW-19 (OAP)

Borehole Depth: 50 ft bls

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Iron Staining	Geologic Column	Stratigraphic Description
-10			16	11 12 14 14	26	0.0			SAND and GRAVEL (GM), tan, mottled light gray, medium grained (95%), trace fine sand and gravel (5%), medium dense, saturated, no odor.
40			15	7 7 6 8	13	0.0			
			15	8 9 8 7	17	0.0			
-15			12	2 4 5 10	9	0.0			SAND and GRAVEL (GM), light gray, mottled tan, coarse grained (90%), fine gravel (10%), loose, saturated, no odor.
45			15	9 11 12 10	23	0.0			SAND (SM), light gray to tan, fine to medium grained, medium dense, visible iron staining, wet, no odor.
			15	10 12 12 11	24	0.0			SAND (SM), light grey to tan, fine grained, medium dense, wet, no odor.
-20									Boring terminated at 50.0 ft bls
50									

Well/Boring Construction

- Bentonite Slurry (42' - 41')
- Bentonite chips (43' - 42')
- Well Gravel Pack No. 2 (50.0' - 43.0')
- 2-inch 0.010 slot PVC screen (45.0' - 50.0')

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:
HSA: Hollow Stem Auger
ft bls: feet below land surface
Air Monitoring Equipment: PID, V-RAE, and PDR-1000
PID: Photoionization Detector
V-RAE: Multi-Gas meter
PDR-1000: Particulate meter

Water Level Data

Date	Depth	Elev.
06/22/04	20.62	10.88

Depth measured from top of casing*

WELL LOG

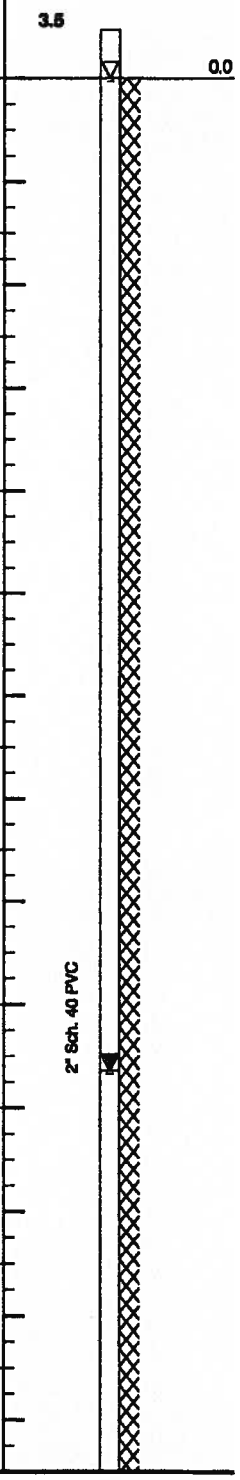
CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW21C
		DRILLER: John E. Wood, III	
NORTHING: 197771.8	EASTING: 2306915.3	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Next to power lines, former TMW03 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: >25.0	TOTAL DEPTH: 45.0
START DATE: 9/16/11	FINISH DATE: 9/16/11	24 HOUR DTW: 22.8	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION
									0.0	LAND SURFACE
3.0	3	3	3	3			M		3.0	(SM) - Dk brown, Silty SAND. High organic content. No odor.
									3.5	(SP) - Dk brown grading to orange-brown, f. SAND. Abundant organic staining. No odor.
									5.0	
8.0	3	4	5	6			M		8.0	(SP) - Orange-brown, f. to vf. SAND. Poorly graded. No odor.
									10.0	
13.0	5	7	6	8			M		13.0	(SP) - S.A.A. Tan. Massive. No odor.
									15.0	
18.0	5	9	11	13			Sat.		18.0	(SP) - Grayish-brown, vf. SAND. Poorly graded. No odor.
									20.0	
23.0	8	13	14	18			Sat.		23.0	(SP) - S.A.A. No odor.
									25.0	

WELL DETAIL



Bentonite Grout Bentonite Pellets #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW21C
		DRILLER: John E. Wood, III	
NORTHING: 197771.8	EASTING: 2306915.3	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Next to power lines, former TMW03 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: >25.0	TOTAL DEPTH: 45.0
START DATE: 9/16/11	FINISH DATE: 9/16/11	24 HOUR DTW: 22.8	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION
28.0									28.0
	11	16	21	22			Sat.		(SP) - Tan, f. to med. SAND interlayered w/ same as above. Tr. to little med. grained sand. Slight sulfur odor.
									30.0
33.0									33.0
	6	8	10	8			Sat.		(SP) - S.A.A.
									35.0
38.0									38.0
	6	10	11	13			Sat.		(SM) - Grayish-tan, Silty SAND. No odor.
40.0									40.0
	6	7	7	8		5lbs soil sample from screen interval	Sat.		(SP) - Tan, f. to med. SAND w/ tr. coarse SAND interlayered. Mod. grading. No odor.
42.0									42.0
	3	3	4	4		5lbs soil sample from screen interval	Sat.		(SP) - S.A.A. No odor.
									44.0
									Boring Terminated at Depth 45.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 40 ft.

WELL DETAIL

32.0

38.0

40.0

2" Slot .010 Sch. 40 PVC

45.0 45.0

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 1

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW22B
		DRILLER: John E. Wood, III	
NORTHING: 198353.9	EASTING: 2307025.6	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Along sandy access road, former TMW04 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: NM	TOTAL DEPTH: 27.0
START DATE: 9/15/11	FINISH DATE: 9/15/11	24 HOUR DTW: 8.7	WELL DEPTH: 27.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	3.2 / 0.0
3.0	4	6	7	8			M		3.0 (SP) - Tan, f. to vf. SAND. No odor. 5.0	
8.0	4	5	6	8			Sat.		8.0 (SP) - S.A.A. Poorly graded. No odor. 10.0	2" Sch. 40 PVC
13.0	7	8	8	11			Sat.		13.0 (SP) - S.A.A. No odor. 15.0	
18.0	8	12	10	8			Sat.		18.0 (SP) - Tan, f. to vf. SAND w/ tr. to little med. to cse. sand. Mod. grading. No odor. 20.0	17.0 / 20.0
23.0	7	10	12	13		5lbs soil sample from screen interval	Sat.		23.0 (SW) - Tan, interlayered f. to cse SAND. Tr. iron-staining in more cse-grained layering. No odor. 25.0	23.0
25.0	2	3	5	6		5lbs soil sample from screen interval	Sat.		(SW) - S.A.A. Med. dense. No odor. 27.0	2" Slot .010 Sch. 40 PVC / 27.0 / 27.0
									Boring Terminated at Depth 27.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 23 ft.	

Bentonite Grout Bentonite Pellets #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW22C
		DRILLER: John E. Wood, III	
NORTHING: 198353.9	EASTING: 2307025.6	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Along sandy access road, former TMW04 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 10.1	TOTAL DEPTH: 45.0
START DATE: 9/15/11	FINISH DATE: 9/15/11	24 HOUR DTW: 10.0	WELL DEPTH: 44.5

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0	LAND SURFACE	3.0 / 0.0
3.0	4	6	7	8			M		3.0	(SP) - Tan, f. to vf. SAND. No odor.	
									5.0		
8.0	4	5	6	8			Sat.		8.0	(SP) - S.A.A. Poorly graded. No odor.	
									10.0		
13.0	7	8	8	11			Sat.		13.0	(SP) - S.A.A. No odor.	
									15.0		
18.0	8	12	10	8			Sat.		18.0	(SP) - Tan, f. vf. SAND w/ tr. to little cse. sand. Mod. grading. No odor.	2" Sch. 40 PVC
									20.0		
23.0	3	5	4	5			Sat.		23.0	(SW) - Tan, interlayered f. to cse. SAND. Tr. white quartzite gravels. Well-graded. No odor.	
									25.0		

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

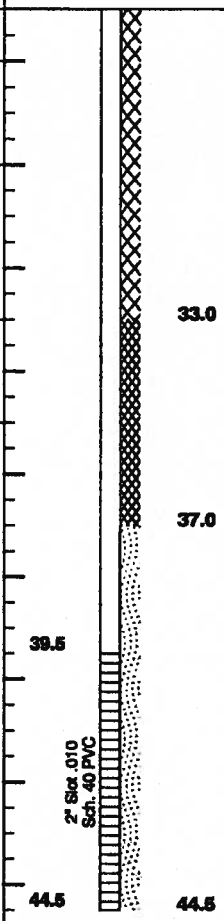
CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant	LOGGED BY: Tom Stetler	DRILLER: John E. Wood, III	WELL ID: MW22C
NORTHING: 198353.9	EASTING: 2307025.6	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Along sandy access road, former TMW04 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 10.1	TOTAL DEPTH: 45.0
START DATE: 9/15/11	FINISH DATE: 9/15/11	24 HOUR DTW: 10.0	WELL DEPTH: 44.5

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION
28.0									28.0	
	3	5	5	6			Sat.			(SP) - S.A.A. but w/ mod. grading. No odor.
									30.0	
33.0									33.0	
	4	5	7	8			Sat.			(SP) - Tan to gray, vf. SAND. Poorly graded. No odor.
									35.0	
38.0									38.0	
	4	5	5	6			Sat.			(SP) - S.A.A. No odor.
40.0									40.0	
	1	0	1	6			Sat.			(SP) - Tan, f. SAND. Tr. med. sand. Uniform. V. loose to loose. No odor.
42.0									42.0	
	5	12	15	16			Sat.			(SP) - S.A.A. No odor.
									44.0	
										Boring Terminated at Depth 45.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 40 ft.

WELL DETAIL



Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

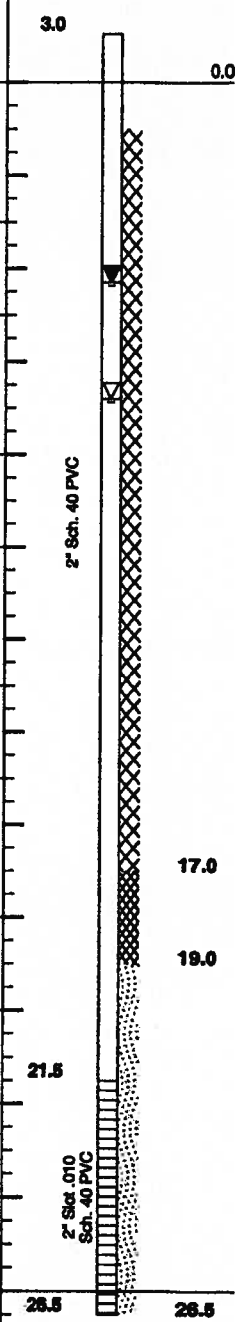
CATLIN Engineers and Scientists

209-100 SHEET 1 OF 1

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Justin Heter	WELL ID: MW23B
		DRILLER: John E. Wood, III	
NORTHING: 198966.6	EASTING: 2306895.7	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Near bend in Sutton Lake Rd, former TMW05 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 9.8	TOTAL DEPTH: 26.0
START DATE: 9/6/11	FINISH DATE: 9/6/11	24 HOUR DTW: 7.3	WELL DEPTH: 26.5

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION
									0.0	LAND SURFACE
3.0	5	6	7	8			Sat.		3.0	(SP) - Tan, f. to vf. SAND. Uniform. No odor.
									5.0	
8.0	1	1	3	4			Sat.		8.0	(SP) - Tan to lt. brown, f. SAND. Grades to brown color w/ depth. Tr. silt at base. No odor.
									10.0	
13.0	5	8	9	10			Sat.		13.0	(SP) - Tan, f. to med. SAND. Tr.cse. sand along moderately graded layering. No odor.
									15.0	
18.0	3	5	4	4			Sat.		18.0	(SW) - Tan, cse. to f. SAND. Mod. to well graded. No odor.
									20.0	
22.0	2	2	3	3		5lbs soil sample from screen interval	Sat.		22.0	(SP) - Brown f. SAND. Uniform. Loose.
24.0	2	3	2	3		5lbs soil sample from screen interval	Sat.		24.0	(SP) - S.A.A. No odor
									26.0	Boring Terminated at Depth 26.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 22 ft.

WELL DETAIL



Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Justin Heter	WELL ID: MW23C
		DRILLER: John E. Wood, III	
NORTHING: 198966.6	EASTING: 2306895.7	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Near bend in Sutton Lake Rd, former TMW05 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 8.1	TOTAL DEPTH: 46.0
START DATE: 9/7/11	FINISH DATE: 9/7/11	24 HOUR DTW: 7.0	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	3.5 / 0.0
3.0	5	6	7	8			Sat.		3.0 (SP) - Tan, f. to vf. SAND. Uniform. No odor. 5.0	
8.0	1	1	3	4			Sat.		8.0 (SP) - Tan to lt. brown, f. SAND. Grades to a brown color w/ depth. Tr. silt at base. No odor. 10.0	
13.0	5	8	9	10			Sat.		13.0 (SP) - Tan, f. to med. SAND. Tr. cse. sand along moderately graded layering. No odor. 15.0	
18.0	3	5	4	4			Sat.		18.0 (SP) - Tan, cse. to f. SAND. Mod.to well-graded. No odor. 20.0	2" Sch. 40 PVC
23.0	5	5	6	7			Sat.		23.0 (SP) - Tan, vf. SAND. Uniform. No odor. 25.0	

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Justin Heter	WELL ID: MW23C
		DRILLER: John E. Wood, III	
NORTHING: 198966.6	EASTING: 2306895.7	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Near bend in Sutton Lake Rd, former TMW05 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 8.1	TOTAL DEPTH: 46.0
START DATE: 9/7/11	FINISH DATE: 9/7/11	24 HOUR DTW: 7.0	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
28.0									28.0	
	4	7	7	8			Sat.		(SP) - S.A.A. Tan to gray. No odor.	
									30.0	
33.0									33.0	
	2	5	8	8		*Iron-oxide Sample	Sat.		(SP) - Brown, f. SAND. Uniform. Loose. Tr. iron-oxide staining. Tr. gravels. No odor.	
									35.0	
									38.0	36.0
									(SP) - Orange-brown to tan, f. to med. SAND. Tr. cse. sand and white quarzite gravels. Mod. grading. No odor.	38.0
									40.0	40.0
42.0									42.0	
	2	2	6	7		5lbs soil sample from screen interval	Sat.		(SP) - Brown, f. SAND. Tr. gravels. Uniform. Med. dense. No odor.	2" Sch .010 Scn. 40 PVC
44.0									44.0	
	3	6	7	7		5lbs soil sample from screen interval	Sat.		(SW) - S.A.A. Some Gravel.	45.0
									46.0	45.0
									Boring Terminated at Depth 46.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 33 ft.	

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

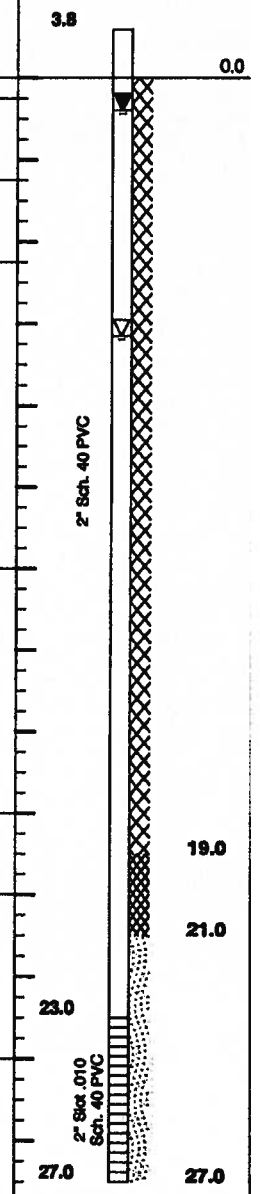
WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 1

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant	LOGGED BY: Justin Heter	DRILLER: John E. Wood, III	WELL ID: MW24B
NORTHING: 200696.4	EASTING: 2306245.4	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: E. of ash pond 500' boundary, TMW06 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 10.1	TOTAL DEPTH: 30.0
START DATE: 9/9/11	FINISH DATE: 9/9/11	24 HOUR DTW: 4.6	WELL DEPTH: 27.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION
0.0									0.0 LAND SURFACE
0.0	0	2	2	2			M		0.5 (SM) - Dk. brown, organic debris.
2.0									(SP) - Gray, f. SAND. Uniform. No odor.
	1	2	2	1			Sat.		2.5 (SM) - Dk. brown to brown, Silty SAND w/ organic silts and tr. wood fragments. Lightens in color w/ depth.
4.0	1	2	3	2			Sat.		4.5
6.0	2	2	4	5			Sat.		(SP) - Tan, f. to vf. SAND w/ tr. wood fragments between 8-10' BLS. No odor.
8.0	2	3	7	8			Sat.		
10.0	5	7	8	8			Sat.		
12.0	3	6	8	10			Sat.		12.0
14.0	5	10	13	13			Sat.		(SP) - Tan, f. to med. SAND. Larger grain size than above. Tr. cse sand. No odor.
16.0	6	8	8	8			Sat.		
18.0	4	5	6	7			Sat.		18.0 (SW) - Tan, f. SAND w/ abundant interlayered well-graded, med. to cse. SAND. No odor.
20.0	3	3	4	5			Sat.		20.0 (SP) - Tan, f. SAND w/ tr. to little interlayered med. to cse. sand. Loose. No odor.
22.0	3	5	8	13		5lbs soil sample from screen interval	Sat.		
24.0	4	5	5	8		5lbs soil sample from screen interval	Sat.		24.0 (SP) - Tan, f. to vf. SAND. Uniform. No odor.
									28.0 (SW) - Tan, cse. to f. SAND. Mod. to well-graded. No odor.
									30.0 Boring Terminated at Depth 30.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 22 ft.



Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant	LOGGED BY: Rick Garrett	DRILLER: John E. Wood, III	WELL ID: MW24C
NORTHING: 200696.4	EASTING: 2306245.4	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: E. of ash pond 500' boundary, TMW06 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: NM	TOTAL DEPTH: 45.0
START DATE: 9/12/11	FINISH DATE: 9/13/11	24 HOUR DTW: 3.7	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	3.0
0.0	0	2	2	2			M		0.5 (SM) - Dark brown, organi debris.	0.0
2.0									(SP) - Gray, f. SAND. Uniform. No odor. 2.5	
	1	2	2	1			Sat.		(SM) - Dk. brown to brown, Silty SAND w/ organic silts, and tr. wood fragments. Lightens in color w/ depth. 4.5	
4.0	1	2	3	2			Sat.			
6.0	2	2	4	5			Sat.			
8.0	2	3	7	8			Sat.		(SP) - Tan, f. to vf. SAND w/ tr. wood fragments between 8-10' BLS. No odor.	
10.0	5	7	8	8			Sat.		12.0	
12.0	3	6	8	10			Sat.			
14.0	5	10	13	13			Sat.		(SP) - Tan, f. to med. SAND. Larger grain-size than above. Tr. cse. sand. No odor.	
16.0	6	8	8	8			Sat.			
18.0	4	5	6	7			Sat.		18.0 (SW) - Tan, f. SAND w/ abundant interlayered well-graded, med. to cse. SAND. No odor. 20.0	2" Sch. 40 PVC
20.0	3	3	4	5			Sat.		(SP) - Tan, f. SAND w/ tr. to little interlayered med. to cse. sand. Loose. No odor.	
22.0	2	3	3	3			Sat.		24.0	24.0

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Rick Garrett	WELL ID: MW24C
		DRILLER: John E. Wood, III	
NORTHING: 200696.4	EASTING: 2306245.4	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: E. of ash pond 500' boundary, TMW06 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: NM	TOTAL DEPTH: 45.0
START DATE: 9/12/11	FINISH DATE: 9/13/11	24 HOUR DTW: 3.7	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
24.0										
	2	2	3	3			Sat.		(SP) - Tan, f. to vf. SAND. Uniform. No odor.	
26.0										
	1	2	3	3			Sat.			
28.0									28.0	
	2	2	2	2			Sat.		(SW) - Tan, cse. to f. SAND. Mod. to well-graded. No odor.	
30.0									30.0	
	2	1	2	1			Sat.		(SP) - S.A.A. Mod. grading. Tr. sub-rounded, gravel-sized quartzite grains. Loose.	
32.0										
	1	0	1	0			Sat.			
34.0										
	1	3	3	3			Sat.		35.0	
36.0										
	2	3	5	6			Sat.			
38.0										38.0
	7	7	8	6			Sat.		(SP) - Gray, f. to med. SAND. Sub-rounded. Uniform. Tr. wood fragments and tr. clay.	
40.0										40.0
	3	5	6	8		5lbs soil sample from screen interval	Sat.			
42.0									42.5	
	5	5	7	7		5lbs soil sample from screen interval	Sat.		(SW) - Gray, med. SAND. Sub-rounded. Tr. sub-rounded gravel ~1/4". Well-graded. No odor.	
									45.0	45.0
									Boring Terminated at Depth 45.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 40 ft.	

2" Slot .010 Sch. 40 PVC

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 1

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Justin Heter	WELL ID: MW27B
		DRILLER: John E. Wood, III	
NORTHING: 202583.3	EASTING: 2304678.4	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Along gravel road, former TMW07 cluster		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 7.1	TOTAL DEPTH: 30.0
START DATE: 9/8/11	FINISH DATE: 9/8/11	24 HOUR DTW:	WELL DEPTH: 27.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	3.0
3.0	2	2	2	3			Sat.		3.0 (SP) - Tan, f. to med. SAND. No odor. 5.0	
8.0	3	5	6	7			Sat.		8.0 (SP) - Tan, vf. to f. SAND. Tr. greenish-tan horizons w/ silt. Uniform. No HCO odor. 10.0	2" Sch. 40 PVC
13.0	3	3	5	6			Sat.		13.0 (SP) - Tan, f. to med. SAND. Tr. cse. grains. Mod. grading. No odor. 15.0	
18.0	3	4	5	5			Sat.		18.0 (SP) - S.A.A. Mod. grading. No odor. 20.0	18.0 20.0
22.0	3	5	8	15		5lbs soil sample from screen interval	Sat.		22.0 23.0 (SW) - Tan to orange-brown, f. to cse. SAND. Sub-angular. Well-graded. Iron-oxide staining.	22.0
24.0	3	4	5	6		5lbs soil sample from screen interval	Sat.		24.5 Mostly med. grains. 25.0 (SP) - Tan, vf. to f. SAND. Uniform. 28.0	2" Slot .010 Sch. 40 PVC 27.0 27.0
									(SP) - Lt. tan, f. to vf. SAND w/ tr. silt at top of interval. Uniform. No odor. 30.0	
									Boring Terminated at Depth 30.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 22 ft.	

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

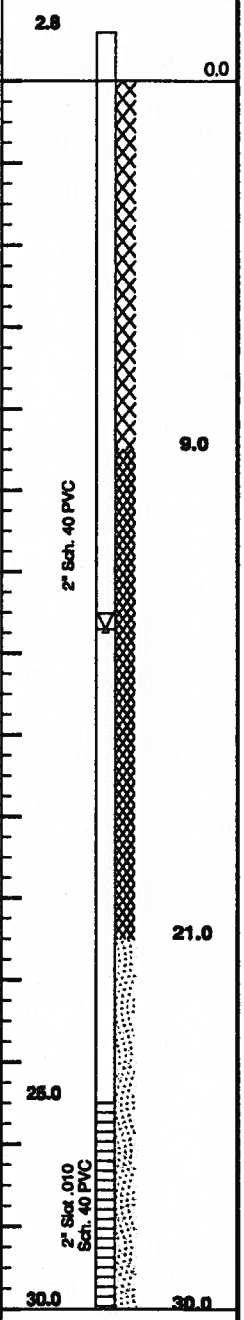
CATLIN Engineers and Scientists

209-100 SHEET 1 OF 1

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW28B
		DRILLER: John E. Wood, III	
NORTHING: 197595.4	EASTING: 2307530.6	CREW: Josh O'Connell	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Hill above solar farmr		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 16.2	TOTAL DEPTH: 30.0
START DATE: 9/28/11	FINISH DATE: 9/28/11	24 HOUR DTW:	WELL DEPTH: 30.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION
									0.0 LAND SURFACE
3.0	2	2	3	3			M		3.0 (SP) - Lt. oragne-brown, f. SAND. Uniform. Loose. No odor. 5.0
8.0	3	4	5	7			M		8.0 (SP) - S.A.A. Loose to med. dense. No odor. 10.0
13.0	9	12	13	13			M		13.0 (SP) - Tan, f. SAND. Med. dense. Uniform. Slight sulfur odor. 15.0
18.0	6	7	7	8			Sat.		18.0 (SP) - S.A.A. No odor. 20.0
23.0	9	16	22	25			Sat.		23.0 (SP) - Tan, f. to vf. SAND. Uniform. Slight sulfur odor. More fine-grained than above. 25.0
26.0	9	30	41	50		5lbs soil sample from screen interval	Sat.		26.0 (SP) - Tan, f. SAND. Tr. vf. and med. sand. No odor. 28.0
28.0	13	17	24	30		5lbs soil sample from screen interval	Sat.		30.0 (SP) - S.A.A.
									Boring Terminated at Depth 30.0 ft Lithology and SPT data from previous temporary monitoring well to depth of 26 ft.

WELL DETAIL



Bentonite Grout · Bentonite Pellets · #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW28C
		DRILLER: John E. Wood, III	
NORTHING: 197595.4	EASTING: 2307530.6	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Hill above solar farm		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: NM	TOTAL DEPTH: 46.
START DATE: 9/21/11	FINISH DATE: 9/21/11	24 HOUR DTW:	WELL DEPTH: 45.

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	2.8
3.0	2	2	3	3			M		3.0 (SP) - Lt. orange-brown, f. SAND. Uniform. Loose. No odor. 5.0	
8.0	3	4	5	7			M		8.0 (SP) - S.A.A. Loose to med. dense. Uniform. No odor. 10.0	
13.0	9	12	13	13			M		13.0 (SP) - Tan, f. SAND. Med. dense. Uniform. Slight sulfur odor. 15.0	
18.0	6	7	7	8			Sat.		18.0 (SP) - S.A.A. No odor. 20.0	2" Sch. 40 PVC
23.0	9	16	22	25			Sat.		23.0 (SP) - Tan, f. to vf. SAND. Uniform. Slight sulfur odor. More fine-grained than above. 25.0	

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant	LOGGED BY: Tom Stetler		WELL ID: MW28C
	DRILLER: John E. Wood, III		
NORTHING: 197595.4	EASTING: 2307530.6	CREW: Roger Caulder	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Hill above solar farm		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: NM	TOTAL DEPTH: 46.0
START DATE: 9/21/11	FINISH DATE: 9/21/11	24 HOUR DTW:	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
28.0									28.0	
	9	11	15	17			Sat.		(SP) - S.A.A. No odor.	
									30.0	
33.0									33.0	
	8	10	12	15			Sat.		(SP) - S.A.A. No odor.	
									35.0	35.0
										38.0
										40.0
42.0									42.0	
	2	3	4	6		5lbs soil sample from screen interval	Sat.		(SP) - Tan, interlayered f. to vf. SAND. Med. dense. No odor.	2" Slot .010 Sch. 40 PVC
44.0									44.0	
	3	4	3	4		5lbs soil sample from screen interval	Sat.		(SP) - Tan, f. SAND. Loose. No odor.	45.0
									46.0	
									Boring Terminated at Depth 46.0 ft	

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 1 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW31C
		DRILLER: John E. Wood, III	
NORTHING:	EASTING:	CREW: Roger Caulder	
SYSTEM:	BORING LOCATION: Near NE property line		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 8.0	TOTAL DEPTH: 46.0
START DATE: 9/14/11	FINISH DATE: 9/14/11	24 HOUR DTW: 7.7	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0	LAND SURFACE	2.7 / 0.0
3.0	1	2	3				Sat.		3.0 / 4.5	(SP) - Brown, f. SAND. Uniform. Loose. Tr. iron-oxide staining.	
8.0	3	4	4				Sat.		8.0 / 9.5	(SP) - S.A.A. No iron-staining.	
13.0	5	10	14				Sat.		13.0 / 14.5	(SP) - S.A.A.	
18.0	4	4	5				Sat.		18.0 / 19.5	(SP) - S.A.A. w/ some med. grains and gravels. Quartz grains.	2" Sch. 40 PVC
23.0	2	5	5				Sat.		23.0 / 24.5	(SP) - S.A.A. Tr. med. grains. No gravels.	
									28.0		

Bentonite Grout | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

WELL LOG

CATLIN Engineers and Scientists

209-100 SHEET 2 OF 2

PROJECT NO.: 209-100	STATE: NC	COUNTY: New Hanover	LOCATION: Wilmington
PROJECT NAME: LV Sutton Electric Plant		LOGGED BY: Tom Stetler	WELL ID: MW31C
		DRILLER: John E. Wood, III	
NORTHING:	EASTING:	CREW: Roger Caulder	
SYSTEM:	BORING LOCATION: Near NE property line		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: Mud Rotary	0 HOUR DTW: 8.0	TOTAL DEPTH: 46.0
START DATE: 9/14/11	FINISH DATE: 9/14/11	24 HOUR DTW: 7.7	WELL DEPTH: 45.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	MOIS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	WELL DETAIL
28.0	1	3	5	5			Sat.		30.0	(SP) - Lt. brown to tan, f. to med. SAND. Tr. cse. sand and shell fragments. Mod. grading. No odor.	
									33.0		
33.0	4	5	6	8			Sat.		35.0	(SP) - Tan, f. to med. SAND. Uniform. No odor.	33.0
									38.0		37.0
38.0	6	7	12	15			W		40.0	(SW) - Tan, f. to cse. SAND. Tr. silt to clay. Well-graded.	40.0
									42.0		
42.0	3	2	4	12		5lbs soil sample from screen interval	W		44.0	(SM) - Gray, interlayered f. SAND and Silty SAND. No odor.	2" Slot .010 Sch. 40 PVC
44.0	2	7	8	10		5lbs soil sample from screen interval	W		46.0	(SM) - Gray, f. to med. SAND w. tr. silt. No odor. Uniform.	45.0 46.0
										Boring Terminated at Depth 46.0 ft	

Bentonite Grout Bentonite Pellets #2 Medium Sand

CATLIN BORING LOG - 209-100 PROGRESS ENERGY LV SUTTON PLANT.GPJ CATLIN.GDT 10/7/11

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW21C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 16, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Wilmington COUNTY: New Hanover

TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other: _____

LATITUDE: 34.289077111 DD
LONGITUDE: -77.983949564 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. TOTAL DEPTH: 45
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 22.78 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.50 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. YIELD (gpm): N/A METHOD OF TEST: N/A
f. DISINFECTION: Type N/A Amount: N/A
g. WATER ZONES (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 40 Ft.	2 in.	Sch. 40	PVC
Top	Bottom Ft.	in.		
Top	Bottom Ft.	in.		

8. GROUT:

	Depth	Material	Method
Top	Bottom Ft.		
Top 32	Bottom 38 Ft.	Bent. Pellets	Surface Pour
Top	Bottom Ft.		

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 40	Bottom 45 Ft.	2 in.	Slot .010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 38	Bottom 45 Ft.	#2 Medium	Torpedo Sand
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for _____ 10-11-11
SIGNATURE OF CERTIFIED WELL CONTRACTOR | DATE
John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW22B

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 15, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____
LATITUDE: 34.290673455 DD
LONGITUDE: -77.983564881 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 27
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 8.67 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.20 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):

Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 23 Ft.	2 in.	Sch. 40	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____	_____
Top _____	Bottom _____ Ft.	_____ in.	_____	_____

8. GROUT:

	Depth	Material	Method
Top _____	Bottom _____ Ft.	_____	_____
Top 17	Bottom 20 Ft.	Bent. Pellets	Surface Pour
Top _____	Bottom _____ Ft.	_____	_____

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 23	Bottom 27 Ft.	2 in.	Slot .010 in.	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 20	Bottom 27 Ft.	#2 Medium	Torpedo Sand
Top _____	Bottom _____ Ft.	_____	_____
Top _____	Bottom _____ Ft.	_____	_____

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for _____ 10-11-11
SIGNATURE OF CERTIFIED WELL CONTRACTOR | DATE
John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION

WELL CONSTRUCTION PERMIT #: N/A

OTHER ASSOCIATED PERMIT # (if applicable): N/A

SITE WELL ID # (if applicable) MW22C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 15, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Wilmington COUNTY: New Hanover

TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____

LATITUDE: 34.290673455 DD

LONGITUDE: -77.983564881 DD

Latitude/longitude source: ☒ GPS ☐ Topo. map

(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 44.5
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 9.99 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):

Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____

7. CASING:

	Depth		Diameter	Thickness/ Weight	Material
Top 0	Bottom 39.5	Ft.	2 in.	Sch. 40	PVC
Top _____	Bottom _____	Ft.	_____ in.	_____	_____
Top _____	Bottom _____	Ft.	_____ in.	_____	_____

8. GROUT:

	Depth		Material	Method
Top _____	Bottom _____	Ft.	_____	_____
Top 33	Bottom 37	Ft.	Bent. Pellets	Surface Pour
Top _____	Bottom _____	Ft.	_____	_____

9. SCREEN:

	Depth		Diameter	Slot Size	Material
Top 39.5	Bottom 44.5	Ft.	2 in.	Slot .010 in.	PVC
Top _____	Bottom _____	Ft.	_____ in.	_____ in.	_____
Top _____	Bottom _____	Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 37	Bottom 44.5	Ft.	#2 Medium	Torpedo Sand
Top _____	Bottom _____	Ft.	_____	_____
Top _____	Bottom _____	Ft.	_____	_____

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for John E. Wood, III
SIGNATURE OF CERTIFIED WELL CONTRACTOR

10-11-11
DATE

PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW23B

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 6, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____
LATITUDE: 34.292360533 DD
LONGITUDE: -77.983973927 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. TOTAL DEPTH: 26.5
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 7.3 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.00 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. YIELD (gpm): N/A METHOD OF TEST: N/A
f. DISINFECTION: Type N/A Amount: N/A
g. WATER ZONES (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 21.5 Ft.	2 in.	Sch. 40	PVC
Top	Bottom Ft.	in.		
Top	Bottom Ft.	in.		

8. GROUT:

	Depth	Material	Method
Top	Bottom Ft.		
Top 17	Bottom 19 Ft.	Bent. Pellets	Surface Pour
Top	Bottom Ft.		

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 21.5	Bottom 26.5 Ft.	2 in.	Slot .010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 19	Bottom 26.5 Ft.	#2 Medium	Torpedo Sand
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for: _____ 10-14-11
SIGNATURE OF CERTIFIED WELL CONTRACTOR | DATE
John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION

WELL CONSTRUCTION PERMIT #: N/A

OTHER ASSOCIATED PERMIT # (if applicable): N/A

SITE WELL ID # (if applicable) MW23C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 7, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Wilmington COUNTY: New Hanover

TOPOGRAPHIC / LAND SETTING (check appropriate box)

☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____

LATITUDE: 34.292360533 DD

LONGITUDE: -77.983973927 DD

Latitude/longitude source: ☒ GPS ☐ Topo. map

(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)

LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 45

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒

c. **WATER LEVEL Below Top of Casing:** 7 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.50 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A

f. **DISINFECTION: Type** N/A **Amount:** N/A

g. **WATER ZONES** (depth):

Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth		Diameter		Thickness/ Weight	Material
Top 0	Bottom	40 Ft.	2	in.	Sch. 40	PVC
Top	Bottom	Ft.		in.		
Top	Bottom	Ft.		in.		

8. GROUT:

	Depth		Material	Method
Top	Bottom	Ft.		
Top 36	Bottom	38 Ft.	Bent. Pellets	Surface Pour
Top	Bottom	Ft.		

9. SCREEN:

	Depth		Diameter		Slot Size		Material
Top 40	Bottom	45 Ft.	2	in.	Slot .010	in.	PVC
Top	Bottom	Ft.		in.		in.	
Top	Bottom	Ft.		in.		in.	

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 38	Bottom	45 Ft.	#2 Medium	Torpedo Sand
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

For _____ 10-11-11
SIGNATURE OF CERTIFIED WELL CONTRACTOR | DATE

John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW24B

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 9, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____
LATITUDE: 34.297131597 DD
LONGITUDE: -77.986068382 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. TOTAL DEPTH: 27
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 4.59 FT.
(Use "+" If Above Top of Casing)

d. TOP OF CASING IS 3.80 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. YIELD (gpm): N/A METHOD OF TEST: N/A
f. DISINFECTION: Type N/A Amount: N/A
g. WATER ZONES (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth		Diameter	Thickness/ Weight	Material
Top 0	Bottom 23	Ft.	2 in.	Sch. 40	PVC
Top	Bottom	Ft.	in.		
Top	Bottom	Ft.	in.		

8. GROUT:

	Depth		Material	Method
Top	Bottom	Ft.		
Top 19	Bottom 21	Ft.	Bent. Pellets	Surface Pour
Top	Bottom	Ft.		

9. SCREEN:

	Depth		Diameter	Slot Size	Material
Top 23	Bottom 27	Ft.	2 in.	Slot .010 in.	PVC
Top	Bottom	Ft.	in.	in.	
Top	Bottom	Ft.	in.	in.	

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 21	Bottom 27	Ft.	#2 Medium	Torpedo Sand
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 10/6-11

John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW24C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 13, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____
LATITUDE: 34.297131597 DD
LONGITUDE: -77.986068382 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 45
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 3.66 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):

Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 40 Ft.	2 in.	Sch. 40	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____	_____
Top _____	Bottom _____ Ft.	_____ in.	_____	_____

8. GROUT:

	Depth	Material	Method
Top _____	Bottom _____ Ft.	_____	_____
Top 24	Bottom 38 Ft.	Bent. Pellets	Surface Pour
Top _____	Bottom _____ Ft.	_____	_____

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 40	Bottom 45 Ft.	2 in.	Slot .010 in.	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 38	Bottom 45 Ft.	#2 Medium	Torpedo Sand
Top _____	Bottom _____ Ft.	_____	_____
Top _____	Bottom _____ Ft.	_____	_____

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE: 10-11-11

John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW27B

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 8, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐Slope ☐Valley ☒Flat ☐Ridge ☐Other: _____
LATITUDE: 34.302359737 DD
LONGITUDE: -77.991192727 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 27
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 7.1 FT.
(Use "+" If Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth		Diameter		Thickness/ Weight	Material
Top 0	Bottom	22 Ft.	2	in.	Sch. 40	PVC
Top	Bottom	Ft.		in.		
Top	Bottom	Ft.		in.		

8. GROUT:

	Depth		Material	Method
Top	Bottom	Ft.		
Top 18	Bottom	20 Ft.	Bent. Pellets	Surface Pour
Top	Bottom	Ft.		

9. SCREEN:

	Depth		Diameter		Slot Size		Material
Top 22	Bottom	27 Ft.	2	in.	Slot .010	in.	PVC
Top	Bottom	Ft.		in.		in.	
Top	Bottom	Ft.		in.		in.	

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 20	Bottom	27 Ft.	#2 Medium	Torpedo Sand
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE: 10-11-11

John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW28B

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 28, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other: _____
LATITUDE: 34.288575356 DD
LONGITUDE: -77.981918844 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 30
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 16.21 FT.
(Use "+" If Above Top of Casing)

d. **TOP OF CASING IS** 2.80 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):

Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____
Top _____	Bottom _____	Top _____	Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 25 Ft.	2 in.	Sch. 40	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____	_____
Top _____	Bottom _____ Ft.	_____ in.	_____	_____

8. GROUT:

	Depth	Material	Method
Top _____	Bottom _____ Ft.	_____	_____
Top 9	Bottom 21 Ft.	Bent. Pellets	Surface Pour
Top _____	Bottom _____ Ft.	_____	_____

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 25	Bottom 30 Ft.	2 in.	Slot .010 in.	PVC
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____
Top _____	Bottom _____ Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 21	Bottom 30 Ft.	#2 Medium	Torpedo Sand
Top _____	Bottom _____ Ft.	_____	_____
Top _____	Bottom _____ Ft.	_____	_____

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

for
SIGNATURE OF CERTIFIED WELL CONTRACTOR | DATE 10-11-11
John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW28C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 21, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY: New Hanover
TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other: _____
LATITUDE: 34.288575356 DD
LONGITUDE: -77.981918844 DD
Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 45
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** NM FT.
(Use "+" If Above Top of Casing)

d. **TOP OF CASING IS** 2.80 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION:** Type N/A Amount: N/A
g. **WATER ZONES** (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth		Diameter	Thickness/ Weight	Material
Top 0	Bottom	40 Ft.	2 in.	Sch. 40	PVC
Top	Bottom	Ft.	in.		
Top	Bottom	Ft.	in.		

8. GROUT:

	Depth		Material	Method
Top	Bottom	Ft.		
Top 35	Bottom	38 Ft.	Bent. Pellets	Surface Pour
Top	Bottom	Ft.		

9. SCREEN:

	Depth		Diameter	Slot Size	Material
Top 40	Bottom	45 Ft.	2 in.	Slot .010 in.	PVC
Top	Bottom	Ft.	in.	in.	
Top	Bottom	Ft.	in.	in.	

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 38	Bottom	45 Ft.	#2 Medium	Torpedo Sand
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE: 10-11-11

for John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION #: 2799-A

1. WELL CONTRACTOR:
John E. Wood, III
Well Contractor (Individual) Name
CATLIN Engineers and Scientists
Well Contractor Company Name
220 Old Dairy Road
Street Address
Wilmington | North Carolina | 28405
City or Town | State | Zip Code
(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION
WELL CONSTRUCTION PERMIT #: N/A
OTHER ASSOCIATED PERMIT # (if applicable): N/A
SITE WELL ID # (if applicable) MW31C

3. WELL USE (Check One Box): Monitoring ☒ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use): _____

DATE DRILLED: September 14, 2011

4. WELL LOCATION:
801 Sutton Steam Plant Road, 28401
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Wilmington COUNTY: New Hanover

TOPOGRAPHIC / LAND SETTING (check appropriate box)
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other: _____

LATITUDE: 34.297253 DD
LONGITUDE: -77.985077 DD
Latitude/longitude source: ☐ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

5. FACILITY (Name of the business where the well is located.)
LV Sutton Electric Plant | N/A
Facility Name | Facility ID # (if applicable)
801 Sutton Steam Plant Road
Street Address
Wilmington | NC | 28401
City or Town | State | Zip Code
John Topher, P.E.
Contact Name
410 South Wilmington Street
Mailing Address
Raleigh | NC | 27601
City or Town | State | Zip Code
(919)- 546-4505
Area code - Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 45
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☒
c. **WATER LEVEL Below Top of Casing:** 7.65 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.70 FT. Above Land Surface*
* Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C.0118.
e. **YIELD (gpm):** N/A **METHOD OF TEST:** N/A
f. **DISINFECTION: Type** N/A **Amount:** N/A
g. **WATER ZONES** (depth):
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____
Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:

	Depth	Diameter	Thickness/ Weight	Material
Top 0	Bottom 40 Ft.	2 in.	Sch. 40	PVC
Top	Bottom Ft.	in.		
Top	Bottom Ft.	in.		

8. GROUT:

	Depth	Material	Method
Top	Bottom Ft.		
Top 33	Bottom 37 Ft.	Bent. Pellets	Surface Pour
Top	Bottom Ft.		

9. SCREEN:

	Depth	Diameter	Slot Size	Material
Top 40	Bottom 45 Ft.	2 in.	Slot .010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

	Depth	Size	Material
Top 37	Bottom 45 Ft.	#2 Medium	Torpedo Sand
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
		SEE ATTACHED

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 10-11-11

for: John E. Wood, III
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-1617, Phone No. (919) 807-6300

Modified from Form GW-1b Rev. 2/09

PROJECT:	Sutton Plant	WELL / BORING NO:	**MW-32C**
PROJECT NO:	1026.08.06	STARTED: 11/14/13	COMPLETED: 11/14/13
DRILLING COMPANY:	SAEDACCO	NORTHING: 197686.22	EASTING: 2307879.04
DRILLING METHOD:	Hollow Stem Augers	ELEVATION 33.48 ft	M.P. ELEV: 35.57 ft
BOREHOLE DIAMETER:	8.5 IN	WATER: 22.16 ft TOC	TOTAL DEPTH: 50.0 ft BGS
NOTES:		LOGGED BY: K. Webb	CHECKED BY: A. Yonkofski

DEPTH (ft)	USCS	DESCRIPTION
0	SW	SAND. yellow/brown
5	SW	SAND. yellow/brown
10	SW	SAND. yellow/brown
15	SW	SAND. tan, medium grain
20	SW	SAND. tan, medium grain
25	SW	SAND. tan, medium grain
30	SW	SAND. tan, medium grain
35	SW	SAND. tan, medium grain, dark organic fines
40	SW	SAND. tan, medium grain, dark organic fines
45	SC	SAND, CLAYEY. gray
	SW	SAND. tan, clean, wet
50		

WELL CONSTRUCTION

- Cement grout. 0'-41' bgs
- 2" PVC Riser
- Bentonite pellets. 41'-43' bgs
- Sand. 43'-50' bgs
- 2" PVC Screen

SynTerra
148 River Street, Suite 220
Phone: 864-421-9999
Fax: 864-679-3711

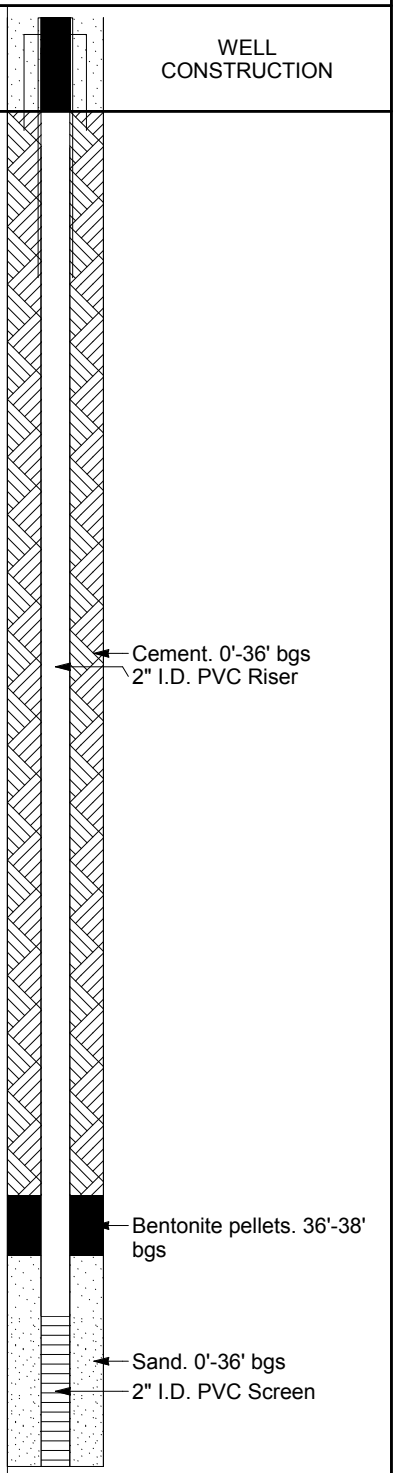
CLIENT: Duke Energy Progress
PROJECT LOCATION: Wilmington, NC

PROJECT:	Sutton Plant	WELL / BORING NO:	**MW-33C**
PROJECT NO:	1026.08.06	STARTED: 11/13/13	COMPLETED: 11/13/13
DRILLING COMPANY:	SAEDACCO	NORTHING: 197598.34	EASTING: 2308275.7
DRILLING METHOD:	Hollow Stem Augers	ELEVATION 22.28 ft	M.P. ELEV: 25.45 ft
BOREHOLE DIAMETER:	8.5 IN	WATER: 16.34 ft TOC	TOTAL DEPTH: 45.0 ft BGS
NOTES:		LOGGED BY: K. Webb	CHECKED BY: A. Yonkofski

DEPTH (ft)	USCS	DESCRIPTION
0	ML	SILT. brown, medium grain
5	SW	SAND. yellow/brown, medium grain
10	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
15	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
20	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
25	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
30	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
35	SW	SAND. tan/brown, medium grain, very clean, with iron and quartz
40	SW	
45		
50		

SAMPLE | RECOV. (%) | BLOW COUNTS | PID (ppm)

WELL CONSTRUCTION



SynTerra
148 River Street, Suite 220
Phone: 864-421-9999
Fax: 864-679-3711

CLIENT: Duke Energy Progress

PROJECT LOCATION: Wilmington, NC

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3576-A

1. WELL CONTRACTOR:
Stefan Smith
Well Contractor (Individual) Name
SAEDACCO Inc
Well Contractor Company Name
9088 Northfield Drive
Street Address
Fort Mill SC 29707
City or Town State Zip Code
( ) (803)548-2180
Area code Phone number

2. WELL INFORMATION:
WELL CONSTRUCTION PERMIT#
OTHER ASSOCIATED PERMIT#(if applicable)
SITE WELL ID #(if applicable) MW 32 C

3. WELL USE (Check One Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED 11-14-13

4. WELL LOCATION:
801 Sutton Lake Road Wilmington
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY BRUNSWICK
TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐Slope ☐Valley [X]Flat ☐Ridge ☐Other
LATITUDE 34.284032 " DMS **OR** 3x.xxxxxxxxx DD
LONGITUDE -77.983792 " DMS **OR** 7x.xxxxxxxxx DD
Latitude/longitude source: [X]GPS ☐Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)
DUKE ENERGY - SUTTON PLANT
Facility Name Facility ID# (if applicable)
801 Sutton Lake Rd.
Street Address
Wilmington NC 28401
City or Town State Zip Code
KATHY WEBB
Contact Name
148 RIVER ST,
Mailing Address
GREENVILLE SC 29601
City or Town State Zip Code
(864) 421-9999
Area code Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 50
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO [X]
c. **WATER LEVEL** Below Top of Casing: 22.16 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.09 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. **YIELD (gpm):** **METHOD OF TEST**
f. **DISINFECTION: Type** **Amount**
g. **WATER ZONES** (depth):
Top Bottom Top Bottom
Top Bottom Top Bottom
Top Bottom Top Bottom

7. CASING:	Depth		Diameter	Thickness/ Weight	Material
Top 0	Bottom 45	Ft.	2"	SHC 40	PVC
Top	Bottom	Ft.			
Top	Bottom	Ft.			

8. GROUT:	Depth		Material	Method
Top 0	Bottom 41	Ft.	PORTLAND/Bentonite	TREMIE
Top	Bottom	Ft.		
Top	Bottom	Ft.		

9. SCREEN:	Depth		Diameter		Slot Size		Material
Top 45'	Bottom 50	Ft.	2"	in.	10	in.	PVC
Top	Bottom	Ft.		in.		in.	
Top	Bottom	Ft.		in.		in.	

10. SAND/GRAVEL PACK:	Depth		Size	Material
Top 43	Bottom 50	Ft.	#2	SAND
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0	50	Sand, tan, medium grain

12. REMARKS:
2 foot bentonite seal from 41' to 43''

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 12/5/2013 DATE

Stefan Smith
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3351-A

1. WELL CONTRACTOR:
Michael Wilson
Well Contractor (Individual) Name
SAEDACCO Inc
Well Contractor Company Name
9088 Northfield Drive
Street Address
Fort Mill SC 29707
City or Town State Zip Code
( ) (803)548-2180
Area code Phone number

2. WELL INFORMATION:
WELL CONSTRUCTION PERMIT#
OTHER ASSOCIATED PERMIT#(if applicable)
SITE WELL ID #(if applicable) MW 33C

3. WELL USE (Check One Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED 11-13 13

4. WELL LOCATION:
801 Sutton Steam Plant Road Wilmington
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
CITY: Wilmington COUNTY BRUNSWICK
TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐Slope ☐Valley [X]Flat ☐Ridge ☐Other
LATITUDE 34.284032 " DMS OR 3x.xxxxxxxx DD
LONGITUDE -77.983792 " DMS OR 7x.xxxxxxxx DD
Latitude/longitude source: [X]GPS ☐Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)
DUKE ENERGY - SUTTON PLANT
Facility Name Facility ID# (if applicable)
801 SUTTON STRAM PLANT RD.
Street Address
Wilmington NC 28401
City or Town State Zip Code
KATHY WEBB
Contact Name
148 RIVER ST,
Mailing Address
GREENVILLE SC 29601
City or Town State Zip Code
(864) 421-9999
Area code Phone number

6. WELL DETAILS:
a. **TOTAL DEPTH:** 45'
b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO [X]
c. **WATER LEVEL** Below Top of Casing: 16.34 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.17 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. **YIELD (gpm):** **METHOD OF TEST**
f. **DISINFECTION: Type** **Amount**
g. **WATER ZONES** (depth):
Top Bottom Top Bottom
Top Bottom Top Bottom
Top Bottom Top Bottom

7. CASING:	Depth			Diameter	Thickness/ Weight	Material
Top 40'	Bottom 0	Ft.		2"	SHC 40	PVC
Top	Bottom	Ft.				
Top	Bottom	Ft.				

8. GROUT:	Depth			Material	Method
Top 36'	Bottom 0	Ft.		PORTLAND	TREMIE
Top	Bottom	Ft.			
Top	Bottom	Ft.			

9. SCREEN:	Depth			Diameter	Slot Size	Material
Top 45'	Bottom 40'	Ft.		2" in.	10 in.	PVC
Top	Bottom	Ft.	in.		in.	
Top	Bottom	Ft.	in.		in.	

10. SAND/GRAVEL PACK:	Depth			Size	Material
Top 45'	Bottom 38'	Ft.		#2	SAND
Top	Bottom	Ft.			
Top	Bottom	Ft.			

11. DRILLING LOG

Top	Bottom	Formation Description
0	5'	BROWN SILT
5'	45'	TAN /BROWN MEDIUM GRAIN SANDY
	45'	

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Michael Wilson 11/13/2013
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

MICHEAL WILSON
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b
Rev. 2/09

APPENDIX B

L.V. SUTTON ENERGY COMPLEX

PERMIT CONDITION A (6) ATTACHMENT XX, VERSION 2.0

OCTOBER 24, 2012

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Charles Wakild, P. E.
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

October 24, 2012

Mr. John Toepfer
Senior Environmental Technical Specialist
Progress Energy Service Company, LLC
410 South Wilmington Street
PEB 4
Raleigh, North Carolina 27601

Subject: Sutton Steam Station
Revised Final Groundwater Monitoring Plans and Maps

Dear Mr. Toepfer:

Attached is the revised final Groundwater Monitoring Plan for the Sutton Steam Station. This plan will supersede the final Groundwater Monitoring Plan for Sutton dated 3/17/11.

If you have any questions, please feel free to contact Eric Smith at (919) 807-6407 or me at (919) 807-6338.

Sincerely,

Debra J. Watts
Supervisor – Groundwater Protection Unit

Attachments

cc: APS Central Office Files w/ attachments
SWP – NPDES (Sergei Chernikov) w/ attachments
Wilmington Regional Office – APS w/ attachments

AQUIFER PROTECTION SECTION
1636 Mail Service Center, Raleigh, North Carolina 27699-1636
Location: 512 N. Salisbury St., Raleigh, North Carolina 27604
Phone: 919-807-6464 \ FAX: 919-807-6496
Internet: www.ncwaterquality.org
An Equal Opportunity \ Affirmative Action Employer

A. (6) GROUNDWATER MONITORING, WELL CONSTRUCTION, AND SAMPLING

1. The permittee shall conduct groundwater monitoring as may be required to determine the compliance of this NPDES permitted facility with the current groundwater Standards found under 15A NCAC 2L .0200

2. NEW MONITORING WELL CONSTRUCTION.

   a. Monitoring wells shall be constructed in accordance with 15A NCAC 02C .0108 (Standards of Construction for Wells Other than Water Supply) and any other jurisdictional laws and regulations pertaining to well construction. The general locations for all existing monitoring wells are indicated on Attachment XX.

   b. Within 30 days of completion of well construction, a completed Well Construction Record (Form GW-1) must be submitted for each monitoring well to Division of Water Quality, Aquifer Protection Section, 1636 Mail Service Center, Raleigh, NC 27699-1636.

   c. The Wilmington Regional Office, telephone number (910) 796-7215 shall approve the location of new monitoring wells prior to installation. The regional office shall be notified at least 48 hours prior to the construction of any monitoring well and such notification to the Aquifer Protection Section's regional supervisor shall be made from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays.

   d. Within 60 days of completion of the monitoring wells, the Permittee shall submit two original copies of a site map with a scale no greater than 1-inch equals 500 feet. At a minimum, the map shall include the following information:

      i. The location and identity of each monitoring well.
      ii. The location of major components of the waste disposal system.
      iii. The location of property boundaries within 500 feet of the disposal areas.
      iv. The latitude and longitude of the established horizontal control monument.
      v. The elevation of the top of the well casing (i.e., measuring point) relative to a common datum.
      vi. The depth of water below the measuring point at the time the measuring point is established.
      vii. The location of compliance and review boundaries.
      viii. The date the map is prepared and/or revised.
      ix. Topographic contours in no more than ten (10) foot intervals

   e. The above information should be overlaid on the most recent aerial photograph taken of the site. Control monuments shall be installed in such a manner and made of such materials that the monument will not be destroyed due to activities taking place on the property. The map and any supporting documentation shall be sent to the Division of Water Quality, Aquifer Protection Section, 1636 Mail Service Center, Raleigh, NC 27699-1636.

   f. The well(s) must be constructed by a North Carolina Certified Well Contractor, the property owner, or the property lessee according to General Statutes 87-98.4. If the construction is not performed by a certified well contractor, the property owner or lessee, provided they are a natural person, must physically perform the actual well construction activities.

g. The monitoring wells shall be regularly maintained. Such maintenance shall include ensuring that the well caps are rust-free and locked at all times, the outer casing is upright and undamaged, and the well does not serve as a conduit for contamination.

3. GROUNDWATER SAMPLING AND COMPLIANCE. Monitoring wells shall be sampled after construction and thereafter at the frequencies and for the parameters as specified in Attachment XX. All maps, well construction forms, well abandonment forms and monitoring data shall refer to the permit number and the well nomenclature as provided on Attachment XX.

a. Per 15A NCAC 02H .0800, a Division certified laboratory shall conduct all laboratory analyses for the required effluent, groundwater or surface water parameters.

b. The measurement of water levels shall be made prior to purging the wells. The depth to water in each well shall be measured from the surveyed point on the top of the casing. The measurement of pH shall be made after purging and prior to sampling for the remaining parameters.

c. The measuring points (top of well casing) of all monitoring wells shall be surveyed to provide the relative elevation of the measuring point for each monitoring well. The measuring points (top of casing) of all monitoring wells shall be surveyed relative to a common datum.

d. For monitoring wells that are not located at the Compliance Boundary, the Compliance Monitoring Form (GW-59CCR) is not required. However, predictive calculations or modeling shall be submitted to the Regional Office annually (i.e. 12 months after permit issuance) demonstrating groundwater quality standards at the Compliance Boundary.

e. Two copies of the monitoring well sampling shall be submitted on a Compliance Monitoring Form (GW-59CCR), and received no later than the last working day of the month following the sampling month. Copies of the laboratory analyses shall be kept on site, and made available upon request. The Compliance Monitoring Form (GW-59CCR) shall include this permit number and the appropriate well identification number. All information shall be submitted to the following address:

Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

f. For groundwater samples that exceed the ground water quality standards in 15A NCAC 02L .0202, the Regional Office shall be contacted within 30 days after submission of the groundwater monitoring report; an evaluation may be required to determine the impact of the waste disposal activities. Failure to do so may subject the permittee to a Notice of Violation, fines, and/or penalties.

4. COMPLIANCE BOUNDARY. The compliance boundary for the disposal system shall be specified in accordance with 15A NCAC 02L .0107(a). This disposal system was individually permitted prior to December 30, 1983; therefore, the compliance boundary is established at either 500 feet from the effluent disposal area, or at the property boundary, whichever is closest to the effluent disposal area. An exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L .0106(c) as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

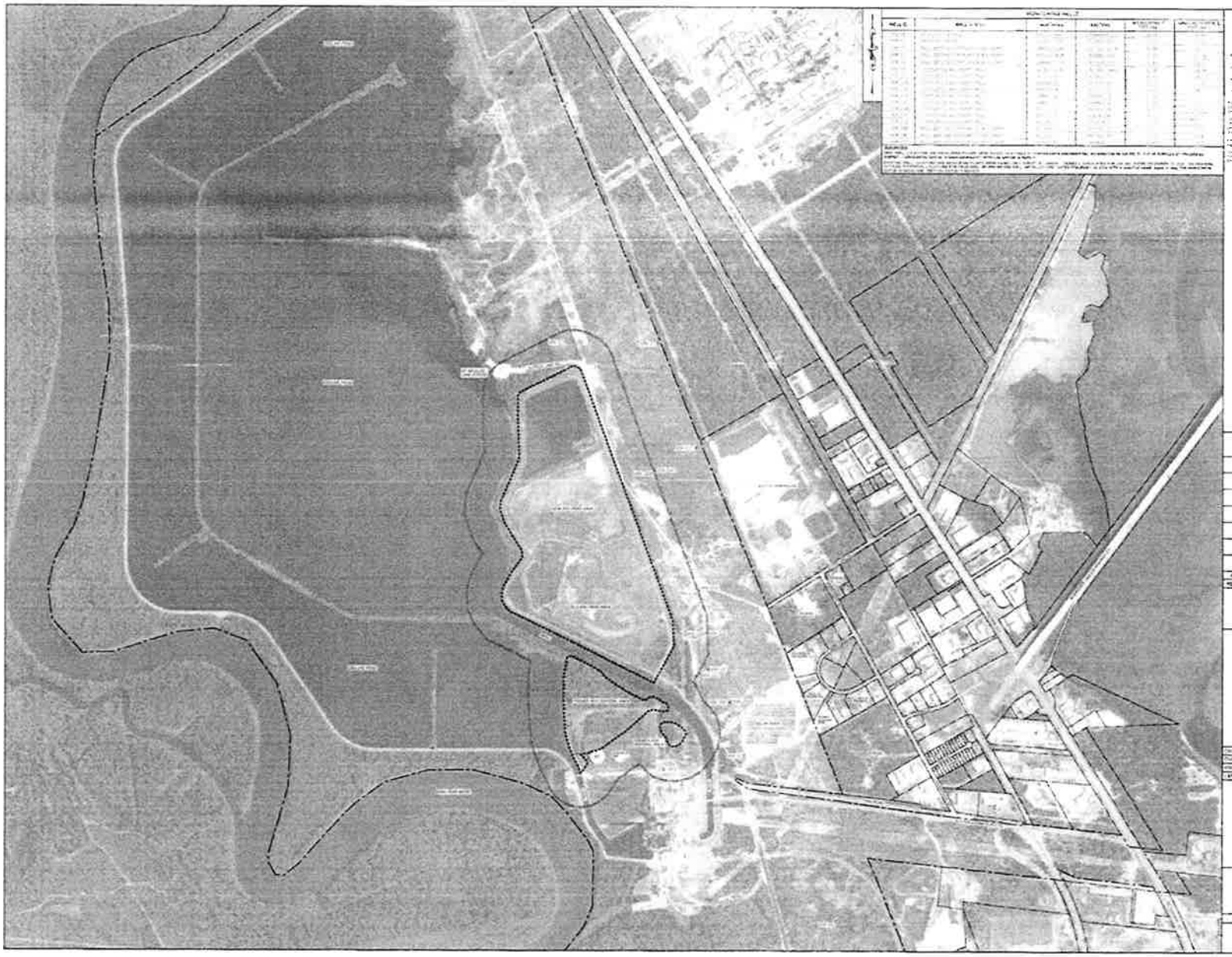
ATTACHMENT XX – GROUNDWATER MONITORING PLAN

Permit Number: NC0001422 **Version 2.0**

WELL NOMENCLATURE	PARAMETER DESCRIPTION				FREQUENCY
Monitoring Wells: MW-4B, MW-5C, MW-7C, MW-11, MW-12, MW-19, MW-21C, MW-22B, MW-22C, MW-23B, MW-23C, MW-24B, MW-24C, MW-27B, MW-28B, MW-28C and MW-31C	**Antimony**	**Chloride**	**Manganese**	**Sulfate**	March, June, October
	Arsenic	**Chromium**	**Mercury**	**TDS**	
	Barium	**Copper**	**Nickel**	**Thallium**	
	Boron	**Iron**	**Nitrate**	**Water Level**	
	Cadmium	**Lead**	**pH**	**Zinc**	
			Selenium		

Note 1: For locations of monitoring wells, see attached map.

Note 2: Monitoring revisions may be considered, as applicable, if there are no significant detections prior to permit renewal.



LEGEND

FOR CLIENT REVIEW

GRAPHIC SCALE

SCALE 1" = 500'

synTerra

Progress Energy

PROGRESS ENERGY CAROLINAS, INC.
POWER OPERATIONS GROUP
L.V. SUTTON STEAM ELECTRIC PLANT
801 SUTTON POWER PLANT RD
WILMINGTON, NORTH CAROLINA

FIGURE 1
NPDES PERMIT WELLS
OCTOBER 2012

DRAWING	SHEET	REVISION
-	1 OF 1	A