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Duke Power Company
Fossil and Hydro Generation Department
P.O. Box 1006
Charlotte, NC 28201-1006

December 11, 2002

North Carolina Department of
Environment and Natural Resources
Division of Waste Management
Solid Waste Section
401 Oberlin Road
Suite 150
Raleigh, NC 27605-1350

Attention: Ms. Ellen Lorscheider
Hydrogeologist, Solid Waste Section

Subject: Duke Energy – Belews Creek Steam Station
Industrial Landfill Permit Application
Permit Number 85-03, Stokes County

Dear Ms. Lorscheider:

As requested in your October 25, 2002 letter, a revised groundwater sampling and analysis plan for the proposed Belews Creek landfill expansion is attached. The newly installed monitoring wells have also been sampled and analyzed. If a copy of these analytical results is desired, please notify me.

Duke Energy urgently requests issuance of the permit to operate for the proposed landfill expansion area as quickly as possible. If additional information is needed to ensure a timely response, please contact me at (704) 382-4309.

Sincerely,

Allen Stowe (wmm)

Allen Stowe, Scientist
Fossil-Hydro Operations

Attachments

cc: Jim Barber – NC DENR, Solid Waste Section

DUKE ENERGY CORPORATION

BELEWS CREEK STEAM STATION
STOKES COUNTY, NC

ASH LANDFILL EXPANSION 8503

GROUND WATER MONITORING PROGRAM
SAMPLING AND ANALYSIS PLAN

Revision 1
December 26, 2002

Prepared By:

William M. Miller, P.E.
December 26, 2002

Duke Energy Corporation
PO Box 1006
Charlotte, NC 28201-1006

REVISION DESCRIPTION SHEET

Revision Number	Issue Date and Description
0	Initial Release, December 11, 2002.
1	Revised, December 26, 2002. Revised to add monitoring well MW2-8 and to delete MW2-7.

1.0 PROGRAM DESCRIPTION

1.1 SCOPE OF WORK

This Ground-Water Monitoring Program is designed to detect the effects of the Ash Landfill Expansion at Belews Creek Steam Station (BCSS) on the groundwater in the area. This plan has been prepared according to the guidelines set forth by the North Carolina Water Quality Guidance Document for Solid Waste Facilities (SW-1001-87), and by the EPA in "Interim Guidelines and Specifications for Preparing Quality Assurance Plans" (QAMS-500/80), and documents the methodologies of field sampling, record-keeping protocols, data quality objectives, and data validation procedures that will be used in this program.

1.2 BACKGROUND AND SITE HYDROGEOLOGICAL DESCRIPTION

This sampling and analysis plan (SAP) covers the expansion of the existing ash landfill. The landfill expansion will be permitted to accept (only) fly ash from Belews Creek Steam Station operations.

The landfill expansion area is located to the north of the surface water divide that runs along Pine Hall Road. This surface water divide also serves as the groundwater divide for the area near the landfill. Groundwater flow beneath the landfill is from Pine Hall Road, generally northward, towards the Ash Basin. The Ash Basin is operated as a water treatment facility and is permitted by the NPDES program (NPDES Permit #NC0024406).

The discharge area for groundwater flow in the landfill area is the Ash Basin. The only surface water discharge in the landfill area is a small spring, located east of the landfill footprint. This surface water feature drains to a sediment basin and then on to the Ash Basin.

Volume 2 of Duke Energy Belews Creek Steam Station, Stokes County, NC, Landfill Permit Application – Siting Package, October 2, 2001 contains a description of typical groundwater systems located in the piedmont region. In most cases in the Piedmont, the groundwater system is a two medium system, restricted to the local drainage basin. The groundwater occurs in a system composed of two interconnected layers: residuum/saprolite and weathered rock overlying fractured crystalline rock. Typically, the residuum/saprolite is partly saturated and the water table fluctuates within it. Water movement is generally through the fractured bedrock. The ash landfill expansion site is typical of a piedmont groundwater system.

As described in the Siting Package, based on the boring data, the material in the subsurface at the site is divided into four layers:

- Layer 1 – Residual soil and saprolite consisting primarily of sandy silts (ML) and silty sands (SM) with a Standard Penetration Resistance of N<30. It ranges in thickness from 10.6 to 43.3 feet with an average thickness of 25.24 feet.
- Layer 2 – Saprolite and weathered rock consisting of sandy silts (ML) and silty sands (SM) with layers of moderately to very severely weathered rock. It has Standard Penetration Resistance of N>30. Its thickness ranges from 1.2 feet to 30.0 feet with an average thickness of 17.64 feet.
- Weathered rock/fractured rock – consists of very severely weathered to slightly weathered rock and fractured rock. This layer is defined as the material below auger refusal and rock with Recovery of less than 90% and Rock Quality Designation (RQD) of less than 50%. The weathered rock/fractured rock layer below auger refusal ranges from 0 feet up to 40 feet in thickness. The thickness of weathered rock above auger refusal (in Layer 2) is estimated at 5 to 11 feet based on site and local boring data.
- Sound Rock – defined as rock with Recovery > 90 and RQD > 50.

1.3 WELL LOCATIONS AND INSTALLATION

Monitoring will be performed by five groundwater monitoring wells and by one surface water sampling location (See Figure 1).

The landfill expansion will be monitored through a series of five monitoring wells identified as MW2-1, MW2-2, MW2-5, MW2-8, MW-3 and one surface water sampling location, SW-1 (See Figure 1). Monitoring well information is detailed in Table 1.

Each of the wells is screened near the water table. These wells are constructed of two-inch diameter PVC well screen and casing. Each well intercepts the aquifer with section of PVC well screen with a slot size of 0.010 inch. The length of the screened section varies. The screen lengths are shown in Table 1. The wells were installed by a North Carolina registered well driller in accordance with applicable NCDENR regulations. Figure 2 shows a typical construction diagram for the wells. All wells are equipped with dedicated pump systems (Figure 3). Well construction records for these wells are included in Appendix B.

A brief description of the monitoring locations and their monitoring function is provided below.

Monitoring Well MW-3

Monitoring well MW-3 was installed as part of the groundwater monitoring system for the initial permitted landfill and is located side gradient to the landfill. Since there is insufficient room to install an upgradient well between the landfill and groundwater divide along Pine Hall Rd., well MW-3 and will serve the purpose of an upgradient monitoring well. This well is screened to monitor groundwater in Layer 2.

Monitoring Well MW2-1

This well is located north of the landfill and downgradient of the landfill. This well is screened to monitor groundwater in Layer 2. The boring log indicates that the lower portion of the screen is in weathered rock.

Monitoring Well MW2-2

This well is located north of the landfill and downgradient of the landfill. This well is screened to monitor groundwater in Layer 1. The boring log indicates that the lower portion of the screen is in weathered rock.

Monitoring Well MW2-5

This well is located south of the landfill, across Pine Hall Rd. and is screened to monitor groundwater in Layer 2 and in the weathered rock/fractured rock layer.

Monitoring Well MW2-8

This well is located east of the landfill. This well is screened to monitor groundwater in Layer 1.

Surface Water Sampling Location SW-1

This surface water sampling location is located in the drainage feature located to the east of the landfill.

1.4 MONITORING FREQUENCY

The wells are sampled semi-annually in April and October. Sampling results will be submitted to the State within 90 days of sampling. The monitoring wells and the surface water sampling location will be sampled prior to placement of waste in the landfill expansion.

1.5 PARAMETERS

Proposed parameters, units of measure, methods, and detection limits are presented in Table 2.

1.5 DATA QUALITY OBJECTIVES

The overall quality assurance (QA) objective is to ensure that data of known and acceptable quality are provided. All measurements will be made so as to yield results that are representative of the groundwater. All data will be calculated and reported in units consistent with those of other agencies and organizations to allow comparability of data.

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

Detection limits for the water analyses presented in Table 2 are generally specified by the analytical methods. As stated above, appropriate methods have been selected to meet applicable standards for groundwater quality or the requirements of applicable permits. 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 information with each data package to allow reviewers of the data to be aware of encountered sample problems.

2.0 SAMPLING PROCEDURES

2.1 SAMPLING EQUIPMENT

Development, purging and sampling equipment are chosen to ensure the materials making up the equipment are compatible with the sample parameters and also comply with state and federal regulatory requirements for sampling. Positive-gas-displacement fluorocarbon resin bladder pumps are installed in each monitoring well as dedicated purging and sampling systems.

2.1.1 Equipment Cleaning Procedures

Dedicated sampling equipment is installed in each monitoring well. However, in the event non-dedicated equipment is used, reusable water level meters, development pumps, purging and sampling equipment are cleaned between wells in accordance with standard EPA approved cleaning procedures for field equipment. This standard is outlined in "Standard Operating Procedures and Quality Assurance Manual", Engineering Support Branch, EPA Region IV, February 1, 1991.

2.2 GROUND-WATER SAMPLING

2.2.1 Development of Wells

After installation of new wells, and prior to initial sampling, the monitoring wells are 'developed'. 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 sandpack surrounding the screen, to avoid future clogging of the well or poor well performance. Development involves removing an estimated ten or more well volumes from the well using a positive-gas-displacement fluorocarbon resin bladder pump with an up-and-down agitation to loosen particles from the well screen. After development of a well, a true well depth is recorded.

2.2.2 Ground-Water Level and Total Depth Measurements

Water-level measurements are performed to determine the ground-water flow elevations and to calculate the volume of standing water in the well. All monitoring wells have been surveyed by a registered surveyor to determine the elevation of the top of each well casing. All depth and water-level measurements are referenced to the top of the well casing and recorded to the nearest one-hundredth of a foot.

In non-dedicated systems, water-level measurements are made with the use of an electronic measuring device which consists of a spool of dual conductor wire, a probe attached to the end, and an indicator. When the probe comes in contact with water, the circuit is closed and a meter light and/or buzzer attached to the spool signal the contact. The probe is lowered further until it rests on the bottom of the well to determine the depth of the well. The depth and water level are used to determine that the well has not filled with silt and to calculate the volume of standing well water. The volume of well water (in liters) is calculated using the following equation:

$$V = h \times \pi r^2 \times (28.32\ l/ft^3)$$

where V = volume of standing water (liters)
h = height of standing water (feet)= casing depth - water level
r = radius of well casing (feet)

In dedicated systems, an accurate well depth is determined, as indicated above, after development of the well and prior to installation of the dedicated water level probe and pump. This well depth is referenced until replacement of the dedicated water level probe and/or pump is necessary. The dedicated water level probe consists of a pressure transducer and electronic meter. The height of water above the probe is measured and subtracted from the depth to which the probe was placed in the well to yield the depth of the water (example: the dedicated probe is positioned 15 ft down from the top of the casing, the meter reads 6 feet of water above the probe, the water level is thus 9 feet below the top of the casing). The calculation of standing water is the same for non-dedicated systems. The total depth, water-level measurements, and calculated well volume are recorded on the Groundwater Monitoring Data Sheet (Figure 4).

2.2.3 Well Purging and Sampling

A Hydrolab® Multi-parameter Water Quality Monitoring Instrument (Hydrolab), used to determine when to sample groundwater, is calibrated with reference standards prior to and after each sampling day as described in the Environmental Chemistry Procedure 3210 or manufacturers specifications (available upon request). The pH subsystem is calibrated with two different pH standards which usually bracket the expected groundwater pH (pH standards 7.0 and 4.0). The conductivity subsystem is calibrated with a standard nearest the expected ground-water conductivity. The dissolved oxygen (DO) subsystem is calibrated using either a Winkler calibration or an air calibration procedure. Oxidation-reduction potential (ORP) subsystem is calibrated against a known ORP solution. Calibration results are recorded on the Field Sampling Calibration Form (Figure 5). The sample readings are recorded on the Groundwater Monitoring Data Sheet (Figure 4).

Wells will be purged and samples collected using low-flow sampling methods. Low-flow well purging and sampling technology allows the well to be purged in a shorter period of time, with less purge water being generated, and maintains the same level of accuracy and reproducibility as conventional purging techniques. The technique is particularly suited for low yielding wells where conventional purging evacuates the well to dryness.

Low-flow technology involves the use of dedicated pumps, a flow through cell and a water quality monitor that continually measures pH, turbidity, specific conductance, temperature and dissolved oxygen. Water is purged from the screened interval of the well at low flow rates (100 ml/min or less) through a flow cell connected to a Hydrolab. The intake velocity will be maintained in an attempt to match the natural groundwater flow velocity as closely as possible during purging and

sampling. The Hydrolab continually measures and records pH, turbidity, specific conductance, ORP dissolved oxygen (DO) and temperature. When three consecutive measurements for temperature, turbidity ORP, DO and specific conductance are within 10% +/-, and pH is within 0.2 units the well is sampled. Samples are then collected in the order of the parameters' volatilization sensitivity (Section 2.2.4).

2.2.4 Sample Collection

After sufficient purging and stable field measurements, the wells are sampled for the parameters of interest. If non-dedicated or non-disposable equipment is used (i.e. cleaned in the field between wells), background wells are sampled before downgradient wells. Sampling personnel wear clean, disposable, non-powdered latex gloves at each well. Samples are collected in the order of the volatilization sensitivity of the parameters:

- Total metals
- Sulfate and chloride
- Nitrate
- TDS

If groundwater samples for which metals analysis will be conducted have a turbidity of higher than 50 NTU, the sample is collected unpreserved. The unpreserved sample is stored at 4°C until delivered to the laboratory. The laboratory will filter and digest the sample within 72 hours of sample collection.

2.2.5 Sample Containers, Volume, Preservative, and Holding Time

All sample containers supplied for the collection of ground-water samples by the laboratory are new, precleaned and/or prebaked as approved by EPA procedures appropriate for the parameters of interest. Table 3 summarizes the sample containers, sample volume, preservation procedures and holding times required for each type of sample and parameter. Sample containers are kept closed until used. All sample containers are provided by Duke Energy or vendor laboratories.

3.0 SAMPLE TRACKING

The chain of custody program allows for the tracing of possession and handling of individual samples from the time of field collection through laboratory analysis and report preparation.

3.1 SAMPLE LABELING

Sample containers are labeled at the time of sampling with the following information: sampling date and time, sample identification number, and initials of sample collector.

3.2 FIELD LOG BOOK

A Field Log Book is maintained during the course of the field work to document the following:

- Identification of well
- Well depth
- Static water level depth and measurement technique
- Presence of immiscible layers and detection method
- 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 on sampling event
- Name of collector(s)
- Climatic conditions including estimate of air temperature

This information is contained on the Groundwater Monitoring Data Sheets, the Field Sampling Calibration Form, or the Chain-of-Custody Record and Analysis Request Form (See Section 3.3) which are filled out for each sampling event. These loose-leaf sheets are arranged in sequential order and filed by project and date. All recorded entries are made in indelible ink. Errors are corrected by drawing a line through the error, initialing and dating the correction, and starting a new entry on the next line (if necessary).

3.3 CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST FORM (CCRARF)

The CCRARF (Figure 6) 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 parameter. 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 used
- Signature of persons involved in the chain of possession
- Inclusive dates of possession

3.4 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 so that no one can tamper with it, after having been in physical custody; or in a secured area, restricted to authorized personnel. All samples are 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, chain-of-custody entries are completed on the CCRARF for all samples. Upon transfer of custody, the chain-of-custody form is signed by a sampling crew member, including the date and time. Samples are delivered to outside laboratories by Duke Energy personnel or courier.

All chain-of-custody forms received by the laboratory(s) are signed and dated by the respective Supervising Scientist(s) or their designee (at the Duke Energy 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 laboratory personnel are described in detail in the Duke Energy Laboratory Services Procedures Manual.

4.0 ANALYTICAL PROCEDURES

The main analytical laboratory used in this program is the Duke Energy Laboratory 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 Laboratory Services Procedures Manual are available for review upon request.

Vendor laboratories that meet EPA and North Carolina certification requirements may be used for analyses which cannot be performed in-house.

The analytical procedures used for this Ground-Water Monitoring Program are briefly described in Table 2. Conductivity, pH, ORP and turbidity are measured in the field according to Duke Energy Scientific Services Section Quality Assurance Plan.

5.0 INTERNAL QUALITY CONTROL CHECKS

Internal laboratory control checks used by the laboratories are described in their generic QAP and procedures manual. 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 above field QC blanks and replicates included as internal QC checks are described as follows:

- **Field Blanks**: A field blank consists of sample containers 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.

- **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. It is returned to the laboratory with the field samples, and analyzed along with the field samples for parameters of interest.

- **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.

6.0 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 procedure consists of:

- 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 Field Sampling Calibration Form for equipment calibration and instrument condition.
- A review of the Chain-Of-Custody Record and Analysis Request Form for proper completion, signatures of field personnel and the laboratory sample custodian, and dates, and for verification that the correct analyses were specified.

7.0 REPORT SUBMITTAL

A summary table of the field and laboratory data and a cover letter describing trends will be submitted to the North Carolina Department of Environment and Natural Resources within 90 days of sampling. The State will be notified in the event that vendor lab analyses have not been completed within this time frame. All Groundwater Monitoring Data Sheets, Field Calibration Forms, Chain-of-Custody Record and Analysis Request Forms, Laboratory(s) QA data, and Data Validation Checklists are kept in fire-proof file cabinets or microfiche, and are available upon request.

APPENDIX A

FIGURES & TABLES

Table 1. Monitoring Well Construction Information

	MW-3	MW2-1	MW2-2	MW2-5	MW2-8
North (ft)	923,706.55	924,381.02	925,603.05	923,292.18	923,727.73
East (ft)	1,683,901.47	1,682,003.02	1,682,530.45	1,683,587.62	1,683,026.83
Well Diameter	2"	2"	2"	2"	2"
Well Stick-up	2.3'	2.5'	2.5'	2.5'	2.3'
Type of Casing	PVC	PVC	PVC	PVC	PVC
Top Of Casing Elevation (ft)	843.19	789.32	787.23	849.32	821.40
Total Depth (ft) (from TOC)	49.48	44.11	39.63	56.55	26.56
Screen Length (ft)	10	10	10	20	10
Screen Interval (ft)	803.89 - 793.89	755.32 - 745.32	757.73 – 747.73	812.82 - 792.82	805.10 – 795.10

Coordinates: NC State Plane Grid, NAD83.

Table 2. Sample Parameters, Analytical Methods and Detection Limits

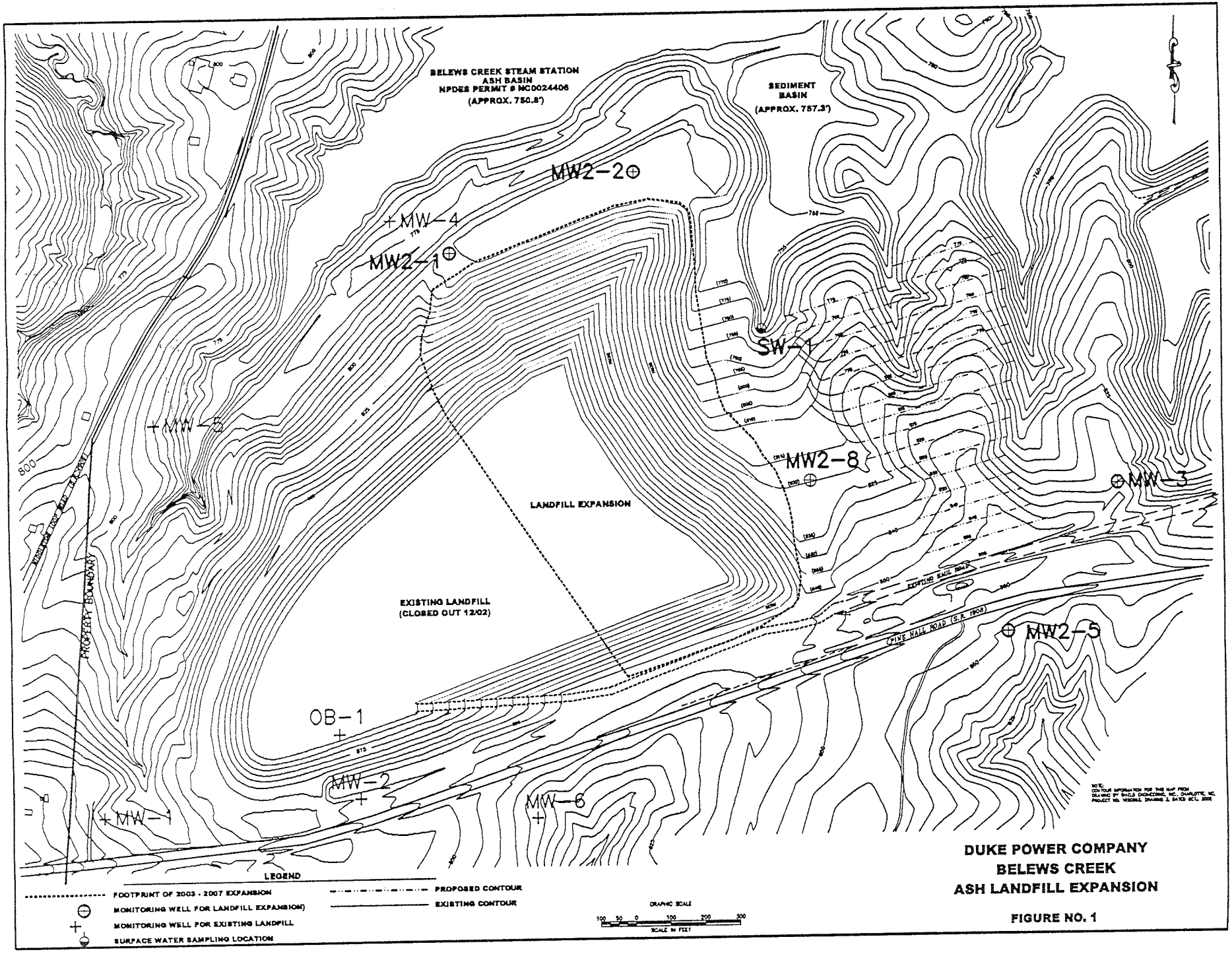
PARAMETER	UNITS	ANALYTICAL METHOD	DETECTION LIMITS
Insitu Parameters			
Field pH	pH Units	Hydrolab	NA
Specific Conductance	umhos/cm	Hydrolab	NA
Temperature	°C	Hydrolab	NA
Turbidity	NTU	Hydrolab	NA
ORP	MV	Hydrolab	NA
Water Level	ft	Water Level Meter	0.01 ft
Laboratory Analyses			
Nitrate	mg/l	EPA 353.2	0.05
Chloride	mg/l	EPA 300.0	0.1
Arsenic	ug/l	EPA 200.8	2 (Note 1)
Barium	mg/l	EPA 200.7	0.0050
Cadmium	ug/l	EPA 200.8	0.5
Chromium	ug/l	EPA 200.8	1
Copper	ug/l	EPA 200.8	2
Iron	mg/l	EPA 200.7	0.010
Lead	ug/l	EPA 200.8	2
Manganese	mg/l	EPA 200.7	0.0050
Mercury	ug/l	EPA 245.1	0.1
Nickel	ug/l	EPA 200.7	40
Selenium	ug/l	EPA 200.8	2
Silver	ug/l	EPA 200.8	0.5
Zinc	ug/l	EPA 200.7	0.02
Sulfate	mg/l	EPA 300.0	0.1
Fluoride	mg/l	EPA 300.0	0.10
TDS	mg/l	EPA 160.1	10

Note 1: The Environmental Management Commission has adopted a temporary rule to change the Groundwater Quality Standard for Arsenic from the current standard of 0.050 mg/L to 0.010 mg/L. The Division of Public Health has recommended that the Groundwater Quality Standard for Arsenic be lowered to 0.00002 mg/L. The EMC previously directed that staff proceed with permanent rulemaking to change the Groundwater Quality Standard for Arsenic. The permanent rule published for hearing will propose a concentration level for Arsenic at the much lower concentration of 0.00002 milligrams per liter.

Duke is evaluating methods to achieve detection at this lower concentration.

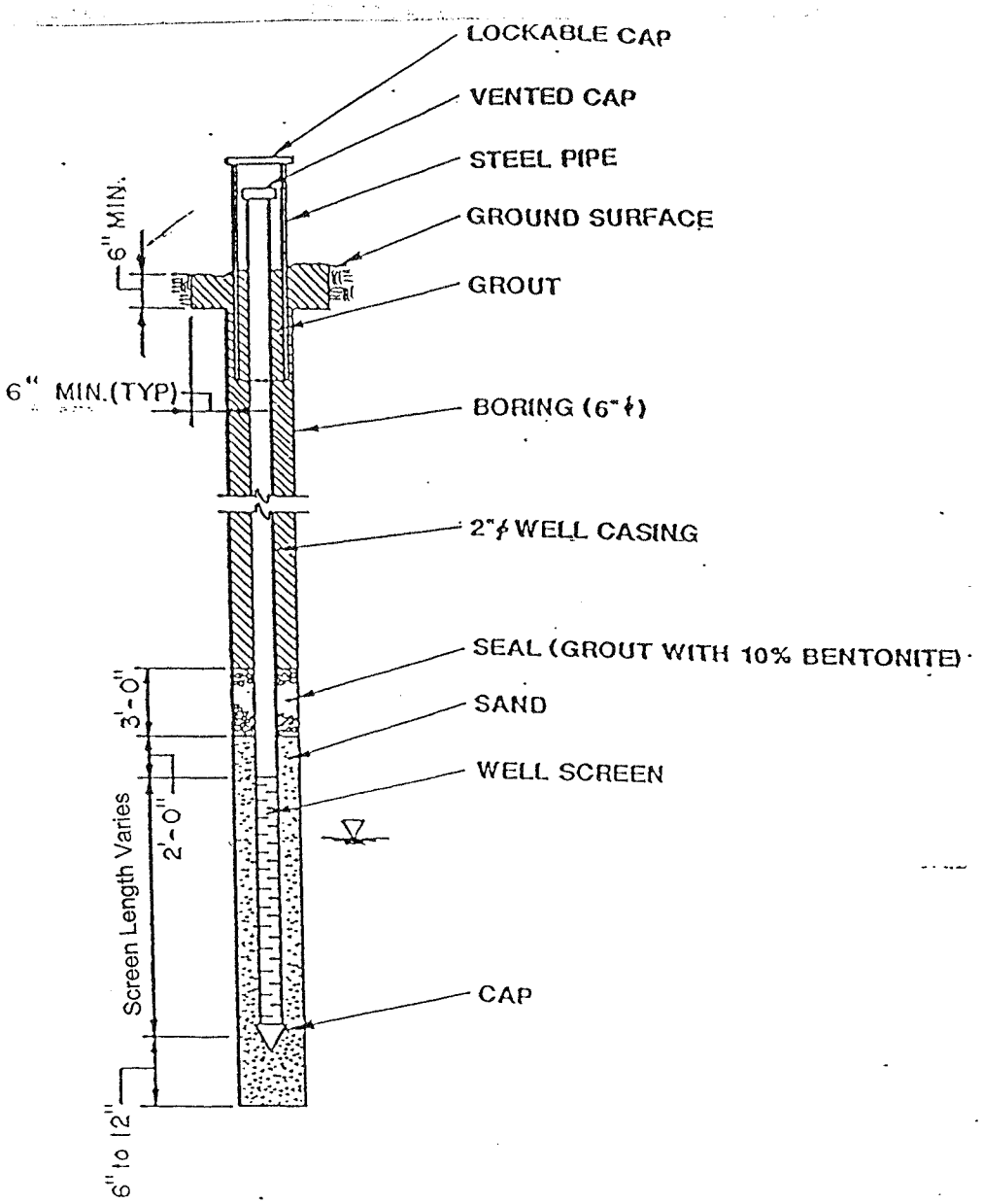
Table 3. Sample Containers, Preservatives and Holding Times.

PARAMETER	CONTAINERS	PRESERVATIVES	HOLDING TIMES
Insitu Parameters			
Field pH	Insitu	None	Analyze Immediately
Specific Conductance	Insitu	None	Analyze Immediately
Temperature	Insitu	None	Analyze Immediately
Turbidity	Insitu	None	Analyze Immediately
ORP	Insitu	None	Analyze Immediately
Laboratory Analyses			
Nitrate	500 ml HDPE	Cool 4°C	48 hrs
Chloride	500 ml HDPE	Cool 4°C	28 days
Arsenic	500 ml HDPE	pH<2 HNO_3	6 months
Barium	500 ml HDPE	pH<2 HNO_3	6 months
Cadmium	500 ml HDPE	pH<2 HNO_3	6 months
Chromium	500 ml HDPE	pH<2 HNO_3	6 months
Copper	500 ml HDPE	pH<2 HNO_3	6 months
Iron	500 ml HDPE	pH<2 HNO_3	6 months
Lead	500 ml HDPE	pH<2 HNO_3	6 months
Manganese	500 ml HDPE	pH<2 HNO_3	6 months
Nickel	500 ml HDPE	pH<2 HNO_3	6 months
Mercury	500 ml HDPE	pH<2 HNO_3	6 months
Selenium	500 ml HDPE	pH<2 HNO_3	6 months
Silver	500 ml HDPE	pH<2 HNO_3	6 months
Zinc	500 ml HDPE	pH<2 HNO_3	6 months
Sulfate	500 ml HDPE	Cool 4°C	28 days
Fluoride	500 ml HDPE	pH<2 HNO_3	6 months
Total Dissolved Solids	500 ml HDPE	Cool 4°C	7 days



DUKE POWER COMPANY
BELEWS CREEK
ASH LANDFILL EXPANSION

FIGURE NO. 1



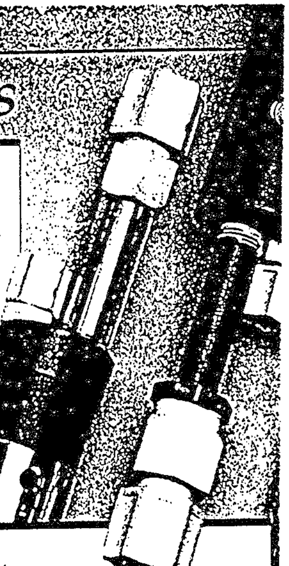
NOTES: 1.ALL DIMENSIONS ARE APPROXIMATE.
2.ALL CASING MATERIAL SHALL BE Sch 40 PVC.
3.WELL SCREEN MATERIAL SHALL BE Sch 40 PVC.

DUKE POWER CO.

GROUNDWATER MONITORING WELL DETAIL

WELL WIZARD®

Sampling Pumps



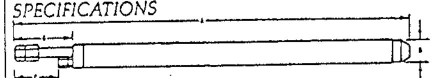
Choose the system that gives you the superior performance you deserve.

The whole reason you're selecting a dedicated bladder pump system for groundwater monitoring is because of its accuracy and long-term reliability. Don't settle for second best—get the high quality you deserve.

QED built the business of dedicated bladder pump systems. Our pumps are the heart of the system, so we spare no effort to make them the best.

Many of the details that make a superior pump are subtle modifications resulting from years of experience. They may not be obvious at first glance, but check the specs of our pumps. You'll find flow rates, pumping lifts, material quality, durability, and selection that clearly show our commitment to supplying you with the best pumps possible.

SPECIFICATIONS



MODEL NO.	BODY MATERIAL	BLADDER MATERIAL	TUBE FITTINGS †	MAXIMUM LIFT (Ft.)	A (Dimension in Inches)	B	C	D	PUMP WEIGHT (Lbs)
P-1100	PVC	PVC	Polypropylene	300	40.85	4.65	3.70	1.66	3
T-1100	Teflon	Teflon	Teflon	250	40.33	4.13	2.96	1.66	4
P-1101	PVC	Teflon	Polypropylene	300	40.85	4.65	3.70	1.66	3
P-1101H	PVC	Teflon	316 S.S.	600	40.75	4.50	3.70	1.66	3
ST-1101P	316 S.S.	Teflon	316 S.S.	1000	40.50	4.12	3.12	1.66	10
T-1200	Teflon/316 S.S.	Teflon	316 S.S.	300	41.14	3.93	3.06	1.50	5
P-1201	PVC/316 S.S.	Teflon	Polypropylene	300	41.23	4.02	3.06	1.50	4
P-1201H	PVC/316 S.S.	Teflon	316 S.S.	600	41.37	4.16	3.20	1.50	4
T-1300	Teflon/316 S.S.	Teflon	316 S.S.	200	15.87	3.87	2.87	1.00	3

† All Air Supply Tube Fittings: 0.25" O.D. Discharge Tube Fittings: 0.5" O.D. (Except T-1300: 0.375" O.D.)

* T-1300 requires Clamp Tool No. 35188 for field attachment of tubing. Clamps are provided with pump.

PLEASE NOTE: Intake Screens are standard on T-1300, and are optional on other models. Please consult QED.

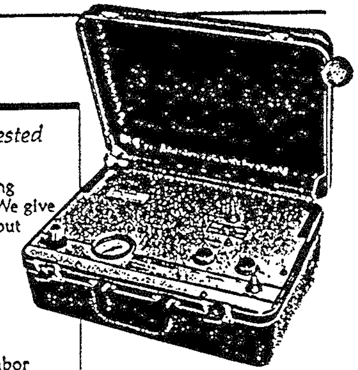
Field Replaceable Bladders

For Pumps	W/ Hand Tool	W/O Hand Tool
T-1100	14055	14063
P-1101	14057	14067
T-1200	35315	35320
P-1201	35315	35320

Note: All kits contain 2 bladder sleeves and seal replacement sets. 35315 includes pin punch.

WELL WIZARD®

Controllers



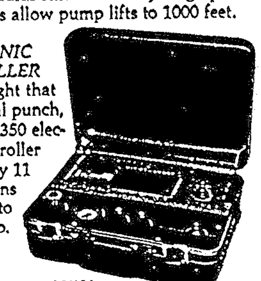
State-of-the-art, 100% performance-tested units cycle pumps automatically.

QED has more experience designing and building pneumatic controller devices than anyoneelse. We give you a better choice of controllers, with or without drivers—all field-proven performers. Versatile QED controllers are fully adjustable, can operate high-rate purge pumps and still be throttled down to 0 psi for TEGD-recommended low flow rates for sample vial filling. One-person portability, fast set-up, and unattended cycling greatly reduce labor requirements.

STANDARD & HIGH-PRESSURE CONTROLLER

All 3013 series models are compatible with a wide range of external gas sources and use sophisticated pneumatic design that requires no batteries or electrical supply. Optional Pump Manifold (Model 3000) lets one controller operate three sampling pumps within a 20-foot radius simultaneously. High pressure models allow pump lifts to 1000 feet.

ELECTRONIC CONTROLLER



A lightweight that packs a real punch, the Model 350 electronic controller weighs only 11 pounds, runs pumps up to 250 ft. deep. Complete with flow throttle, pressure gauge, and other environmentally-sealed, weather-resistant components, enclosed in a tough, protective carrying case.

SPECIFICATIONS

Model No.	Logic	Maximum Supply Pressure	Maximum Pump Depth	Wt.
3013	Pneumatic	125	250	22
3013-H	Pneumatic	300	600	28
3013-UH	Pneumatic	500	1000	32
350	Electronic	125	250	11

3013 Series size: 18"L x 14-1/2"W x 6-3/4"H
350 size: 15" x 12" x 6-1/2"

Extra performance built right in

Pneumatic power
3013 series controllers have all-pneumatic design for [illegible] maximum reliability. No battery to drain, no long waits for recharging or replacement batteries—if you've got pressure, you've got power. Third-generation pneumatic logic controls provide inherent shock and moisture resistance for real field ruggedness.

Electronic efficiency
Model 350 has uniquely efficient circuits that work for 100 hours on one set of cheap, readily available AA batteries. Warning light shows a full day's power left, so you won't get left out in the field.

Stay in the driver's seat
Field-proven compressor carts roll easily on high-flotation pneumatic tires, for true one-person portability even in heavy mud or snow. Constructed to take long hours, tough terrain—and big payloads are QED's reliable high-power engine/compressor combinations that can operate pumps to 300 feet [illegible]

No hidden charges
QED systems come complete, no extra costs for hoses, batteries, chargers or other necessary equipment. For example, all units have two 20 foot, heavy-duty industrial air supply hoses with quick-connect fittings—standard, no additional [illegible]

Belews Creek Steam Station Landfill Expansion
Ground Water Monitoring Sampling & Analysis Plan

Figure 3

DUKE POWER COMPANY
GROUNDWATER MONITORING DATA SHEET

LOCATION:			
PROJECT NAME:			
PROCEDURE NUMBER:	3500		
SAMPLING DATE:		FIELD CREW:	

MONITORING WELL NUMBER: ____ WATER LEVEL METER #: ____

TIME SAMPLE COLLECTED: ____

WELL VOLUME CALCULATION:

WELL DIAMETER (in)	WELL DEPTH (ft)		DEPTH TO WATER (ft)		WATER COLUMN (ft)		CONVERSION FACTOR		WELL VOLUME (gal)
2"		-		=		X	0.1631	=	
4"		-		=		X	0.6530	=	
6"		-		=		X	1.4684	=	

METHOD (Pump/Bail):	
MICROPURGE (Yes/No):	
PID READING:	ppm

FOR DEDICATED SAMPLING SYSTEMS ONLY		
REFERENCE PROBE DEPTH:		(ft)
SUBMERSION DEPTH:	-	(ft)
DEPTH TO WATER:	=	(ft)

BAROMETRIC PRESSURE		
	TIME	mmHg
PRE CAL		
POST CAL		

DETECTED ODORS	FREE PRODUCT MEASUREMENT
TYPE:	METHOD:
STRONG:	THICKNESS: (ft)
MINOR:	OTHER:
NONE:	

VOLUME (gal)	EVACUATED VOLUME (gal)	TEMP (deg C)	SPECIFIC CONDUCTANCE (umho/cm)	TURBIDITY (NTU)	pH (unit)	ORP (mV)	DISSOLVED OXYGEN (mg/l)		COMPLETE EVACUATION (Yes/No)

COMMENTS: WATER LEVEL AND WELL DEPTH REFERENCED TO THE TOP OF WELL CASING.

FIELD SAMPLING CALIBRATION DATA FORM

STUDY:

DATE: WEATHER CONDITIONS:

COLLECTORS: SURFACE UNIT READER:

HYDROLAB SERIAL #: COMPUTER:

OTHER EQUIPMENT: SURVEYOR SERIAL #:

Procedure Number 3210

Calibration Time		Time		Time		Time	
Barometric Pressure			mmHg		mmHg		mmHg
Parameter	Calib.	Instrument Value	Standard Value	Instrument Value	Standard Value	Instrument Value	Standard Value
Thermometer No.							
TEMP (deg C)		_____ -/-> _____		_____ -/-> _____		_____ -/-> _____	
		_____ -/-> _____		_____ -/-> _____		_____ -/-> _____	
DO (mg/l)	W		_____		_____		_____
	W		_____		_____		_____
	W		_____		_____		_____
	AW	_____ --> _____		_____ --> _____		_____ --> _____	
pH (units)	B	_____ -->	7.00	_____ -->	7.00	_____ -->	7.00
	B	_____ -->	4.00	_____ -->	4.00	_____ -->	4.00
	B	_____ -->	10.00	_____ -->	10.00	_____ -->	10.00
SP COND (uS/cm)	SS	_____ -->	0.00	_____ -->	0.00	_____ -->	0.00
	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____
	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____
ORP (mV)	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____
	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____
TURBIDITY (ntu)	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____
	SS	_____ -->	_____	_____ -->	_____	_____ -->	_____

KEY:
B = Buffer
SS = Standard Solution
--> = Adjusted To
W = Winkler
AW = Average Winkler
-/-> = Not Adjusted To
NA = Not Applicable

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Form 82962 (9-97)
Previously Form 35226

Duke Power's Analytical Laboratory
MNS Bldg. # 7405 (MG03A2)
13339 Hagers Ferry Road
Huntersville, NC 28078
Phone: (704) 875-5209/875-5245
Fax: (704) 875-5038

LAB USE[8]

LIMS #			Sample Class
Logged By (Ini.)	Time	Date	Vendored Samples

Vendor	Analysis

Vendor	P.O. #

CLIENT[2]: _____ Report to/Ph.[4] _____
Project Name[3]: _____ Mail Code: _____
FMIS #
Business Unit[5]: _____ Resp. Center To: _____
Project ID[3]: _____
Activity ID[4]: _____
Process[5]: _____

Container Type: ( )Glass ( )Plastic[13]

Preservative Added[14]														TOTAL # OF CONTAINERS[15]
HNO_3														
H_2SO_4														
Ice														
Other														
None														
Analysis Required[16]														

Sample #[9]	Lab PROFS #[10]	Sample Description or ID[11]	Collection Information[12]			GRAB[6]	COMP[7]
			Date	Time	Signature		

Relinquished by:[19]	Date/Time	Accepted By:	Date/Time
Relinquished by:	Date/Time	Accepted By:	Date/Time
Seal/Locked by[20]	Date/Time	Seal/Lock Opened By:	Date/Time

Turnaround Requested[21]
- ☐ Routine (2 weeks)
- ☐ Rush (1 week)
- ☐ Emergency Rush (24-48 Hrs.)*

Date Results Requested: _____
*Additional Charges Will Apply

Sample Matrix[22] NC ☐ SC ☐
Ground Water ☐ NPDES ☐
Drinking Water ☐ UST ☐
RCRA Waste ☐ Other ☐

TEMP:[23]

Comments:[24] _____

Original – AL Files[25] Copy 1– AL Files Copy 2 – Client Copy

See Instructions on the back of this form.

Figure 6
Belews Creek Steam Station Landfill Expansion
Ground Water Monitoring Sampling & Analysis Plan

APPENDIX B

Monitoring Well Construction Records

N. C. Department of Human Resources
Division of Health Services

WELL COMPLETION RECORD

MPLETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THI
PARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRA
P. O. BOX 2091, RALEIGH, N.C. 27602

NAME OF SITE:	PERMIT NO.:
BELEWS CREEK STEAM STATION	85-03
ADDRESS:	**OWNER (print):**
P.O. BOX 557, WALNUT COVE, NC 27052	DUKE POWER CO.
DRILLING CONTRACTOR:	**REGISTRATION NO.:**
DUKE POWER CO.	921

Casing Type: THREADED TRICOC PVC dia. 2 in.
Casing Depth: from 0 to 37.0 ft. - dia. 2 in.
Screen Type: SLOT..010 TRICOC PVC dia. 2 in.
Screen Depth: from 37.0 to 47.0 ft. - dia. 2 in.

Grout Depth: from 0 to 32.0 ft. - dia.
Bentonite Seal: from 32.0 to 35.0 ft. - dia.
Sand/Gravel PK: from 35.0 to 47.8 ft. - dia.
Total Well Depth: from 0 to 47.8 ft. - dia.

Static Water Level: 38.8 feet from top of casing Date Measured 8/9

Yield (gpm): N/A Method of Testing: N/A Casing is 2.3 feet above land

DRILLING LOG

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
		MW-3
		SEE ATTACHED SOIL TEST
		BORING FIELD REPORT FOR
		MW-3 @ FLYASH
		LANDFILL.

LOCATION SKETCH

(show distance to numbered roads, or other map reference p

REMARKS: SCREEN WAS PLACED IN MOST HYDRAULICALLY CONDUCTIVE AQUIFER PER RALPH ROBERTS

DATE: 8-11-89 SIGNATURE: Harold L. Dickson

Form 25630 (R3-87)

FORM M-26C | REVISION 2 | PAGE 1 OF 2

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 7-27-89 WEATHER HOT

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-3

SAMPLING					SCALE	UD	SOIL CLASSIFICATION AND REMARKS
		1ST 6"	2ND 6"	3RD 6"			
					0		AD-2 DRILL RIG #2554 BORING WITH 6" AUGER
1	3.0						YELLOWISH RED MICA. SILTY
	4.5	3	3	4			FINE TO MEDIUM SAND
					5		
2	8.0						REDDISH YELLOW MICA. FINE
	9.5	3	4	4			TO MEDIUM SANDY SILT.
					10		
3	13.0						REDDISH YELLOW FINE TO
	14.5	3	5	6			MEDIUM SANDY SILT.
					15		
4	18.0						PALE YELLOW FINE TO MEDIUM
	19.5	5	6	8			SANDY SILT.
					20		
5	23.0	24	50=5"				LT. GRAY MICA. SILTY FINE TO
	23.9						COARSE SAND
					25		
6	28.0						LT - GRAY MICA. SILTY FINE TO
	28.5	50=6"					COARSE SAND.
					30		
7	33.0						PALE OCNE MICA. SILTY FINE
	34.5	12	16	17			TO MEDIUM SAND
					35		
8	38.0						PALE YELLOW MICA. SILTY FINE
	39.5	7	10	11			TO MEDIUM SAND.
					40		

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED @ 47.8'
BORING REFUSAL AUGER @ 47.8'
WATER TOB DEPTH 47.0 @ 4:00 P.M. 7-27-89
WATER 24 HR: DEPTH 36.1 @ 7:30 A.M. 7-28-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 47.8
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

Form 25630 (R3-87)

FORM M-26C | REVISION 2 | PAGE 2 OF 2

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLY ASH LANDFILL MW's
DATE 7-27-89 WEATHER HOT
STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-3

SAMPLING					SCALE	UD	SOIL CLASSIFICATION AND REMARKS
		1ST 6"	2ND 6"	3RD 6"			
					40		
9	43.0						
	44.4	12	32	50-5"			PALE OLIVE MICA. SILTY FINE TO MEDIUM SAND.
					45		
							AUGER REFUSAL @ 47.8'
					50		BORING TERMINATED
							SET MONITOR WELL PER ATTACHED SKETCH
					55		
					60		
					65		
					70		
					75		
					80		

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED @ 47.8
BORING REFUSAL AUGER @ 47.8'
WATER TOB DEPTH 47.0' @ 4:00 P.M. 7-27-89
WATER 24 HR: DEPTH 36.1 @ 7:30 A.M. 7-28-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 47.8
~~HAND CHOP: W/MUD: W/WATER~~	TO
~~ROTARY DRILL: W/MUD: W/WATER~~	TO
~~DIAMOND CORE~~	TO

DUKE POWER COMPANY — BELEWS CREEK STEAM STATION

AS-BUILT INSTALLATION SKETCH

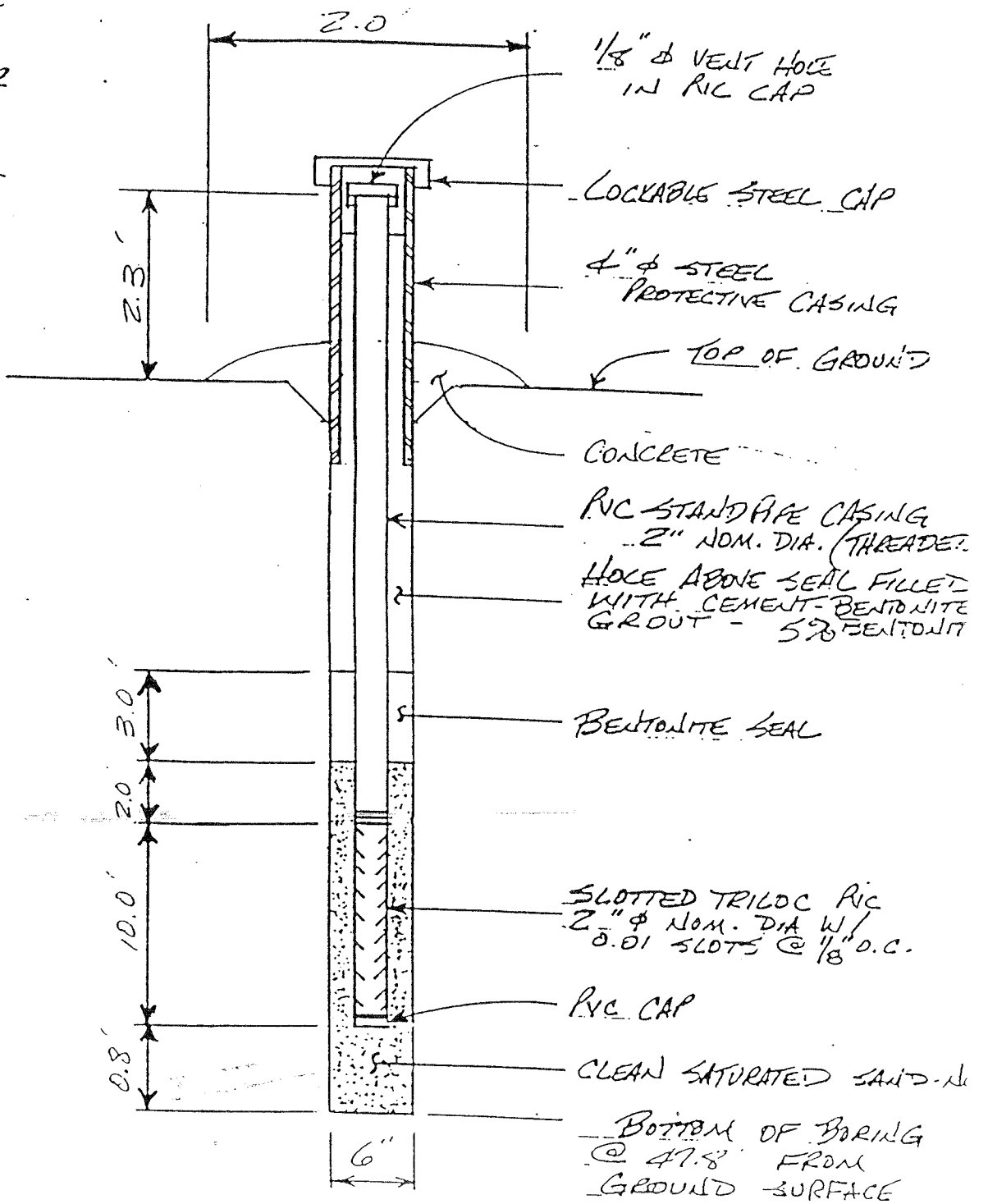
Instrument No. MW-3 Station = N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL RDG @ 38.8' FROM TOP/PIPE ON 8-9-89

T/PIPE ELEV. IS



North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

WELL CONTRACTOR: Duke Engineering & Services — Charles A. Medlin
WELL CONTRACTOR CERTIFICATION #: 2172
STATE WELL CONSTRUCTION PERMIT#:

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☑
   Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use:
2. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: Walnut Cove County: Stokes
   (Road Name and Numbers, Community, or Subdivision and Lot No.)
3. OWNER Duke Power Co.
   Address 422 South Church St. (Street or Route No.)
   Charlotte, N.C. 28242
   City or Town, State, Zip Code
4. DATE DRILLED 5-3-00
5. TOTAL DEPTH 51.5'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 37 FT.
   (Use "+" If Above Top of Casing)
9. TOP OF CASING IS 2.5' FT. Above Land Surface*

*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118

10. YIELD (gpm): N/A METHOD OF TEST N/A
11. WATER ZONES (depth): N/A
12. CHLORINATION: Type N/A Amount N/A
13. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0'	31.5'	2"	Sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	27.0'	Neat Cement	Pumped

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	31.5'	41.5'	2" in.	.010 in.	PVC
			in.	in.	
			in.	in.	

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	30.0'	51.5'	#1	Clean Sand

17. REMARKS: Note: there is A Bentonite Seal from 27.0' TO 30.0'

DRILLING LOG

From	To	Formation Description
		See Attached Soil test Boring field Report for MW-2-1
		MW-2-1

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)

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.

Charles A. Medlin — 5-29-00
SIGNATURE OF PERSON CONSTRUCTING THE WELL — DATE

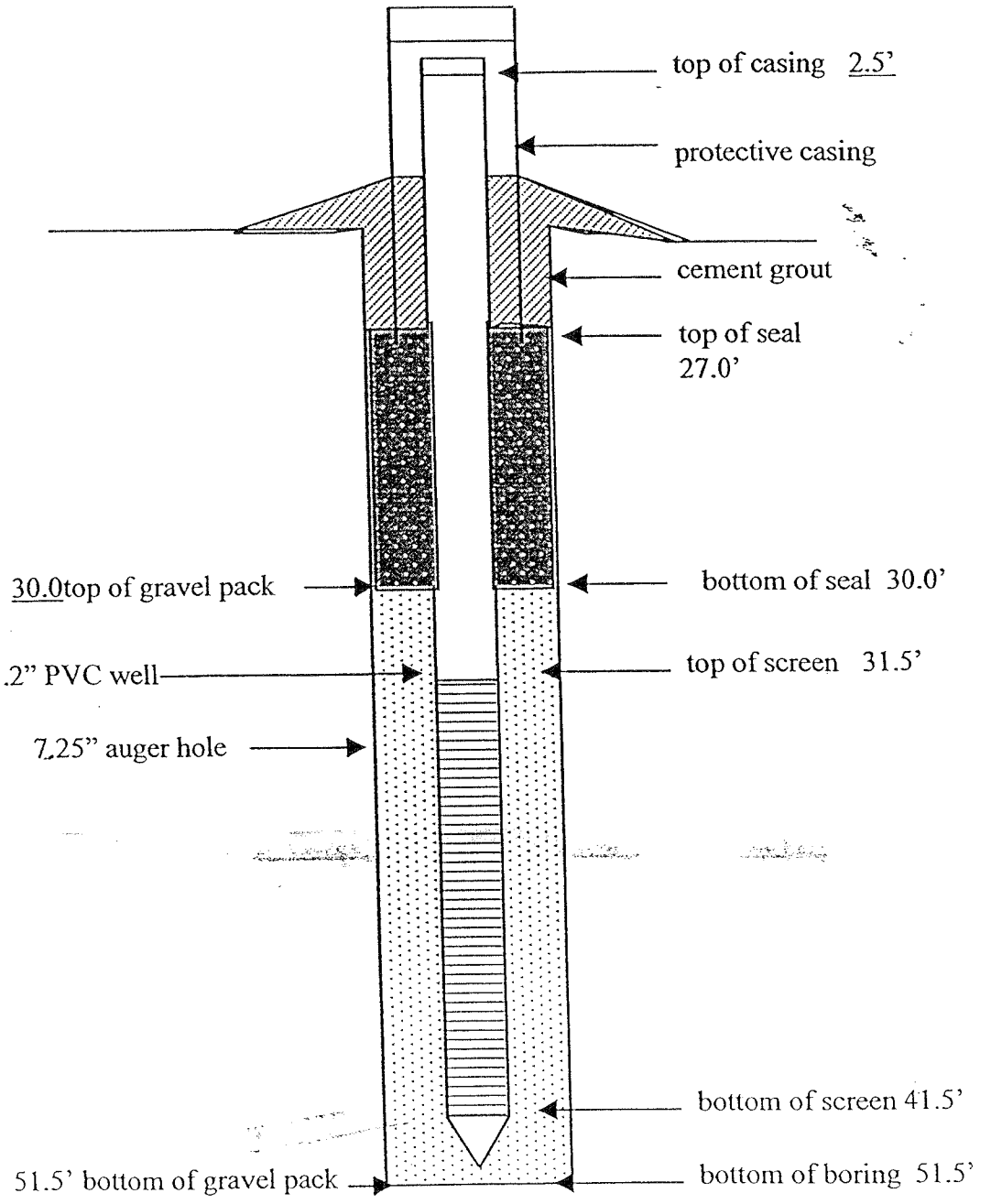
Submit original to Division of Water Quality, Groundwater Section within 30 days

FOR OFFICE USE ONLY
Quad No:
Serial No.

GW-1 REV. 12/99

MONITORING WELL INSTALLATON RECORD

JOB NAME: Belews Creek Steam Station



DATE INSTALLED: 05-03-00
INSPECTOR: C A Medlin
MONITORING WELL: MW-2-1

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
	PAGE 1 OF 2

N: 924384.932
E: 1682007.138

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-1 STARTING TIME
JOB NO. GROUND SURFACE ELEV. 786.40
JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING
DATE 5-2-00 WEATHER P.Cloudy INSPECTOR/DRILLER C.A.Medlin / Tim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		* Note: A Large Bag Sample Taken From 5' to 15'
							* Fly Ash From 0.0' to 5.0'
							4.5' Pushed UD #1 2.0' Rec = 1.9'
1	6.5' 8.0'	2	3	3	5		6.5' Yellow BRN, Slightly MICA, Very Fine Sandy Silt
							9.5' Pushed UD #2 2.0' Rec = 2.0'
2	11.5' 13.0'	3	4	4	10		11.5' BRN, Slightly MICA, Very Fine Sandy Silt
3	14.5' 16.0'	2	4	9	15		Yellowish BRN, Slightly MICA, Very Fine Sandy Silt
							* Note: Took A Large Bag Sample from 15.0' to 25.0'
					20		19.5' Pushed UD #3 2.0' Rec = 2.0' Loss UD in hole, But Got it out
4	21.5' 23.0'	10	13	19			21.5' NO Sample To Test
							Yellowish BRN, Slightly MICA, Very Fine Sandy Silt
5	24.5' 26.0'	13	18	20	25		Yellowish BRN, Slightly MICA, Very Fine Sandy Silt
							* Note: Took A Large Bag Sample From 25.0' to 35.0'
6	29.5' 30.5'	19	50=6"		30		Yellowish BRN, Slightly MICA, Very Silty Very Fine Sand
7	34.5' 35.7'	11	22	50=3"	35		Yellowish BRN, Slightly MICA, Very Silty Very Fine Sandy Weathered Rock
							* Note: Took A Large Bag Sample from 35.0' to 45.0'
8	39.5' 39.9'	50=5"			40		Yellowish BRN, Slightly MICA, Silty Fine Sandy Weathered Rock

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED 51.5'
BORING REFUSAL 51.5'
WATER TOB DEPTH N/A
WATER 24 HR:DEPTH 34.5' 5-3-00
WATER LOSSES None used
CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER W/7¼" OD Auger	0.0' TO 51.5
~~HARD CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
	PAGE 2 OF 2

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-1 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-2-00 WEATHER Clear warm INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING				SCALE	UD	SOIL CLASSIFICATION AND REMARKS
		1ST 6"	2ND 6"	3RD 6"			
					40		
9	44.5' 44.9'	50=5"			45		yellowish BRN, slightly moist, silty, fine SANDY Weathered Rock
10	49.5' 49.6'	50=2"			50		NO Recovery in Split spoon — Auger Refusal @ 51.5'
					55		
					60		
					65		
					70		
					75		
					80		

* STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED 51.5'

BORING REFUSAL 51.5'

WATER TOB DEPTH N/A

WATER 24 HR:DEPTH 34.5' 5-3-00

WATER LOSSES N/A

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" O.D. Auger	0.0' TO 51.5'
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

Duke Engineering & Services
WELL CONTRACTOR: Charles A. Medlin
WELL CONTRACTOR CERTIFICATION #: 2172
STATE WELL CONSTRUCTION PERMIT#: _____

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

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Walnut Cove County: Stokes
(Road Name and Numbers, Community, or Subdivision and Lot No.)

3. OWNER Duke Power Co.
Address 422 South Church St. (Street or Route No.)
Charlotte, N.C. 28242
City or Town State Zip Code

4. DATE DRILLED 5-3-00
5. TOTAL DEPTH 65.6'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 22.7' FT.
(Use "+" if Above Top of Casing)
9. TOP OF CASING IS 2.5' FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118
10. YIELD (gpm): N/A METHOD OF TEST N/A
11. WATER ZONES (depth): N/A
12. CHLORINATION: Type N/A Amount N/A

DRILLING LOG From	To	DEPTH Formation Description
See Attached Boring field Report for MW-2-2		Soil test

If additional space is needed use back of form

13. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0'	To 22.0'	Ft.	2"	Sch.40	PVC
From ____	To ____	Ft.			
From ____	To ____	Ft.			

14. GROUT:

	Depth		Material	Method
From 0.0'	To 23.0'	Ft.	Neat Cement	Pumped
From ____	To ____	Ft.		

15. SCREEN:

	Depth		Diameter	Slot Size	Material
From 22.0'	To 32.0'	Ft	2"	in. .010	in. PVC
From ____	To ____	Ft.	in.	in.	
From ____	To ____	Ft.	in.	in.	

16. SAND/GRAVEL PACK:

	Depth		Size	Material
From 26.0'	To 65.6'	Ft.	#1	Clean Sand
From ____	To ____	Ft.		

17. REMARKS: Note: There is A Bentonite seal From 23.0' TO 26.0'

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

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.

Charles A. Medlin 5-29-00
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

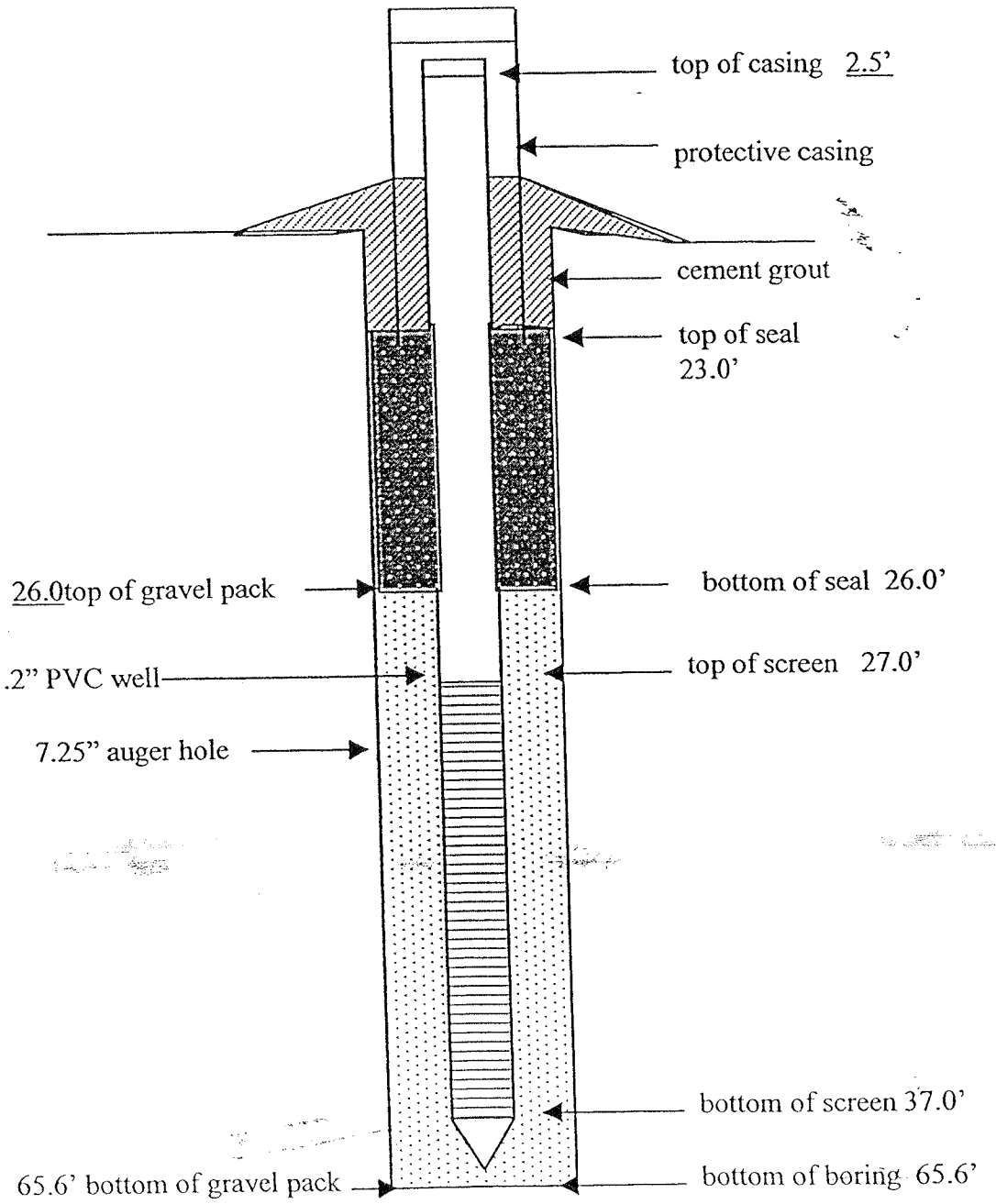
Submit original to Division of Water Quality, Groundwater Section within 30 days

FOR OFFICE USE ONLY
Quad No: _____
Serial No. _____

GW-1 REV. 12/99

MONITORING WELL INSTALLATON RECORD

JOB NAME: Belews Creek Steam Station



DATE INSTALLED: 05-03-00
INSPECTOR: C A Medlin
MONITORING WELL: MW-2-2

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
	PAGE 1 OF 2

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-2 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Land Fill HRS. DRILLING HRS. MOVING

DATE 5-2-00 WEATHER Clear warm INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
						0		* Note: Taking A Large Bag Sample From 10' to 20'
1	4.1'	6.1'	2	3	1-12"			Lt. Gray Very Fine wet Fly Ash
						5		* Note: Fly Ash From 0.6' TO @ 9.4'
2	9.1'	10.6'	3	5	6			Yellowish BRN, Slightly Micay Very Fine-Sandy Silt
						10		
								14.1' Pushed UD #1 2.0' Rec.= 2.0'
						15		
3	16.1'	17.6'	9	5	6			16.1' Yellowish BRN, Slightly Mica, Very Fine Sandy Silt
								19.1' Pushed UD #2 2.0' Rec.= 2.0'
						20		
4	21.1'	22.6'	2	6	10			21.1' Yellowish BRN, Slightly Micay Very Silty Fine Sandy Weathered Rock
								* Note: taking A Large Bag Sample From 20.8' to 30.8'
								24.1' Pushed UD # 3 1.4' Rec.= 1.4'
						25		
5	25.5'	27.0'	24	23	20			25.5' Yellowish BRN. Slightly Micay. Very Silty Fine Sandy Weathered ROCK
								29.1' Pushed UD # 4 2.0' Rec.= 1.1'
						30		
6	31.1'	32.6'	3	4	6			31.1' Yellowish BRN, Slightly Micay, Very Fine Sandy Silt
								* Note: took A Large Bag Sample From 30.8' to 40.8'
						35		34.1' Pushed UD # 5 2.0' Rec.= 2.0'
7	36.1'	37.6'	8	12	14			36.1' BRN, Slightly Micay Very Fine Sandy Silty Weathered Rock
						40		39.1' Pushed UD # 6 0.4' Rec.= 0
		39.5'						

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6". TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED 65.6'

BORING REFUSAL Stopped Drilling @ 64.1'

WATER TOB DEPTH 30.7'

WATER 24 HR:DEPTH 30.2' 5-3-00

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER W/ 7¼" OD Auger	0.0' TO 65.6'
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIXMOND CORE~~	— TO —

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-2 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-2-00 WEATHER Clear Warm INSPECTOR/DRILLER CA. Medlin / Tim Barker Rocky Dickard

	SAMPLING				SCALE	UD	SOIL CLASSIFICATION AND REMARKS
		1ST 6"	2ND 6"	3RD 6"			
B	39.5 41.0'	29	14	11	40		BRN, slightly MICA, very silty very FINE SANDY Weathered ROCK
9	44.1' 45.6'	7	12	17	45		Olive Gray slightly MICA, very FINE SANDY SILT
10	49.1' 49.6'	50=6"			50		Olive BRN, slightly MICA, very FINE SANDY Silty Weathered ROCK
11	54.1' 55.6'	15	25	35	55		Yellowish BRN, slightly MICA, very FINE SANDY SILT
12	59.1' 60.0'	34	50=5"		60		Yellowish BRN, slightly MICA, very FINE SANDY SILT
13	64.1' 65.6'	7	40	48	65		BRN, slightly MICA, ~~clay~~ very FINE SANDY Silty Weathered ROCK
							Stopped Drilling on this Hole @ 64.1'
					70		* Set 2" well in this Hole
					75		
					80		

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED 65.6'
BORING REFUSAL Stopped Drilling @ 64.1'
WATER TOB DEPTH 30.7'
WATER 24 HR:DEPTH 30.2' 5-3-00
WATER LOSSES NONE Used
CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER w/ 7¼" Auger	0.0' TO 65.6'
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

WELL CONTRACTOR: Duke Engineering & Services Charles A. Medlin
WELL CONTRACTOR CERTIFICATION #: 2172
STATE WELL CONSTRUCTION PERMIT#: _____

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

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Walnut Cove County: Stokes
(Road Name and Numbers, Community, or Subdivision and Lot No.)

3. OWNER Duke Power Co.
Address 422 South Church St. (Street or Route No.)
Charlotte, N.C. 28242
City or Town State Zip Code

4. DATE DRILLED 5-15-00
5. TOTAL DEPTH 58.3'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 39.5' FT.
(Use "+" If Above Top of Casing)
9. TOP OF CASING IS 2.5' FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118
10. YIELD (gpm): N/A METHOD OF TEST N/A
11. WATER ZONES (depth): N/A
12. CHLORINATION: Type N/A Amount N/A

DRILLING LOG

From	To	Formation Description	DEPTH
See Attached Soil test Boring field Report for MW-2-5			

If additional space is needed use back of form

13. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0'	34.0' Ft.	2"	Sch 40	PVC
		Ft.			
		Ft.			

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	30.0' Ft.	Neat Cement	Pumped
		Ft.		

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	34.0'	54.0' Ft	2"	in. .010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	33.0'	58.3' Ft.	#1	Clean Sand
		Ft.		

17. REMARKS: Note: There is A Bentonite seal From 30.0' TO 33.0'

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

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.

Charles A Medlin 5-29-00
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

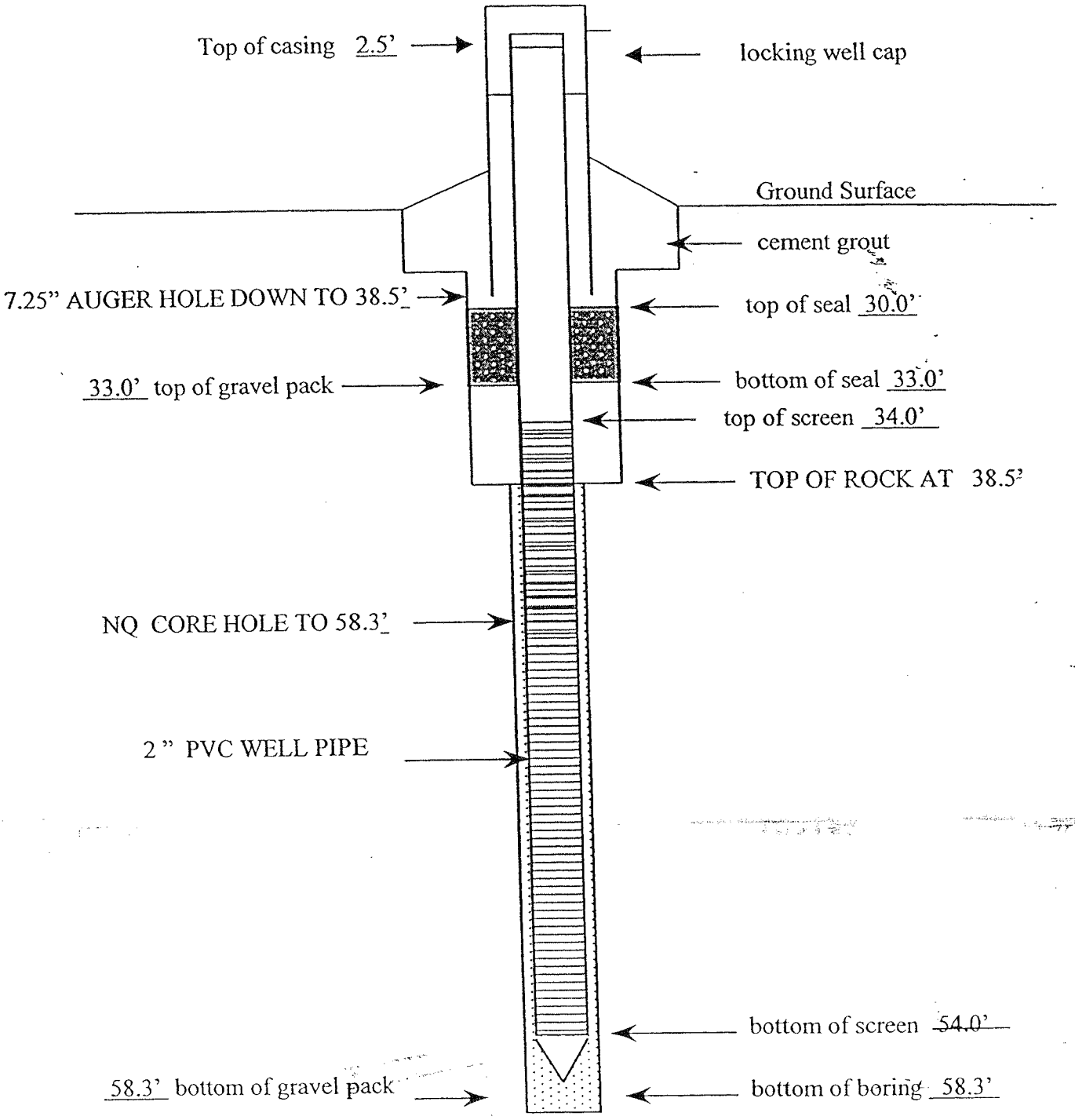
Submit original to Division of Water Quality, Groundwater Section within 30 days

FOR OFFICE USE ONLY
Quad No: _____
Serial No. _____

GW-1 REV. 12/99

MONITORING WELL INSTALLATON RECORD

JOB NAME: Belews Creek Steam Station



DATE INSTALLED: 05-15-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: MW-2-5

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
	PAGE 1 OF 2

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-5 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-9-00 WEATHER Clear Hot INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		
1	4.0' 5.5'	3	5	7			Yellowish Red slightly MICA, FINE SANDY SILTY CLAY
					5		
2	9.0' 10.5'	3	3	5			Yellow / Lt. Red slightly MICA, Very FINE SANDY SILT
					10		
						*	TOOK A LARGE BAG SAMPLE FROM 10.0' TO 20.0'
3	14.0' 15.5'	2	4	6			yellowish Lt. Red slightly MICA, Very FINE SANDY SILT, small AMOUNT of WEATHERED ROCK IN SAMPLE
					15		
4	19.0' 20.5'	7	12	13			YELLOWISH BRN, slightly MICA, Very FINE SANDY SILT
					20		
						*	TOOK A LARGE BAG SAMPLE FROM 20.0' TO 30.0'
5	24.0' 25.5'	9	15	18			YELLOWISH BRN, slightly MICA, Very FINE SANDY SILT
					25		
6	29.0' 30.0'	25	50=6"				YELLOWISH BRN, slightly MICA, Very FINE SANDY SILT W/ SOME WEATHERED ROCK IN SAMPLE
					30		
7	34.0' 34.5'	50=6"					YELLOWISH BRN, slightly MICA, Very SILTY FINE / MEDIUM SAND
					35		
X	~~38.5~~	50=0"					NO PENETRATION ON SPLIT SPOON. REFUSAL @ 38.5', WENT AHEAD AND TRIED A SPOON
					40		

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED ~~38.5'~~ 68.3'

BORING REFUSAL 38.5'

WATER TOB DEPTH Dry hole @ Auger Refusal

WATER 24 HR:DEPTH Dry hole 5-10-00 See Page 2

WATER LOSSES NONE used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" Auger	0.0' TO 38.5'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:W/MUD:W/WATER	— TO —
~~DIAMOND CORE~~	38.8' TO 68.3'

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
	PAGE 2 OF 2

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-5 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-11-00 WEATHER Clear/warm INSPECTOR/DRILLER C.A. Medlin / Jimmy Barker, Ricky Dickard

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			40		Set CASING down Auger hole and on down TO 38.8' AND started Coring there
RQD=1.8'=19 %					Mod. Hard / Hard
Rec=9.2'=95 %			45		severe weathering
RUN=9.7'					Joints Are spaced Close / Very Close
					+ Water Loss water @ 47.3' But it came back
					— End of 9.7' RUN @ 48.5' —
			50		
RQD=8.6'=88 %					Hard
Rec=9.8'=100 %					Slight / Fresh weathering
RUN=9.8'					Joints Are spaced Close
			55		
					— End of A 9.8' RUN @ 58.3' —
			60		Hole terminated @ 58.3'
					Set 2" well w/ 20' screen in this hole
			65		
			70		
			75		
			80		

+ STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

BORING TERMINATED 58.3'

BORING REFUSAL 38.5'

WATER TOB DEPTH 33.82' Right After Coring

WATER 24 HR. DEPTH 37.00' (over weekend) 5-15-00

WATER LOSSES Slight if Any

CASING SIZE NW LENGTH 38.8'

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7 1/4" OD Auger	0.0' TO 38.5'
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
DIAMOND CORE	38.8' TO 58.3'

WELL CONSTRUCTION RECORD - MW2-8

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Ricky Morrison CERTIFICATION # 2375

WELL CONTRACTOR COMPANY NAME Cochamen Well Drilling INC PHONE # (910) 673-2921

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: Walnut Cove County Stokes
SR 1908 (Pine Hall Rd) Duke Power ~~Flyash~~ Landfill
(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: Duke Power - Belews Creek Steam Station
Address 3195 Pine Hall Road
(Street or Route No.)
Belews Creek NC 27009
City or Town State Zip Code
(336) 427-0274
Area code - Phone number

4. DATE DRILLED 12-18-02
5. TOTAL DEPTH: 24'
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: + 13.8 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.5' 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): 3gpm METHOD OF TEST sub. pump
10. WATER ZONES (depth): 17.0' bgs
11. DISINFECTION: Type N/A Amount
12. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	24 Ft.	2"	40	PVC
		Ft.			
		Ft.			

13. GROUT:

	Depth From	Depth To	Material	Method
	0	10 Ft.	Cement	Pour
		Ft.		

14. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	14	24 Ft.	2" in.	.10 in.	PVC
		Ft.	in.	in.	

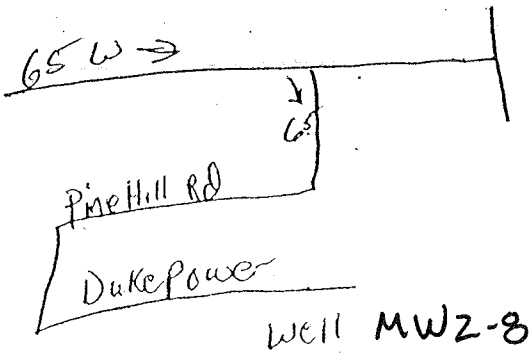
15. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	12	24 Ft.	#2	Sand
		Ft.		

16. REMARKS: 10'-0-12' - Hole plug

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	10	Clay
10	20	Silty/Clay Sand
20	24	Clay Silt, Rock

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.



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 PERSON CONSTRUCTING THE WELL — DATE 12/19/02

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

BORING LOG MW-2-8

PROJECT:	Duke Power - Belews Creek	WATER LEVEL TOB (FT.):	
PROJECT NO:	1264-02-576A	WATER LEVEL 24 HRS (FT.):	15.34
PROJECT LOCATION:	Belews Creek, NC	TOP OF CASING ELEVATION (FT.):	821.40
DRILLING CONTRACTOR:	Graham & Currie	BORING DEPTH (FT.):	24
DRILLING METHOD:	4¼" H.S.A.	LOGGED BY:	S. Watts
DATE DRILLED:	12/18/2002		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	RECOVERY (inches)	PID (ppm)
Ground Surface							821.40		
Light brown to orange fine silty SAND, dry, medium stiff (SM).		0.0					816.40		
		5.0				16		13	
							811.40		
Grayish orange to dark yellow orange SAND, some relict structures w/clay minerals, slightly moist, stiff (SM).		10.0		10	CG	50/4		8	
				12.3	BS		806.40		
				14	FP				
Pale yellow to moderate yellow brown silty gravelly SAND w/weathered rock fragments and albite crystals, slightly moist (SM, SP).		15.0				31			
							801.40		
Olive brown to moderate yellow brown silty SAND, moist, loose (SM).		20.0				50/2			
Grayish green to dusky blue, dark green gray weathered GRANITE.									
Orange to olive SAPROLITE with Iron and Manganese staining, slightly moist, loose and crumbly (SP, SM).				24	BSC				
Auger Refusal - Boring Terminated at 24.0 ft.									

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
- Diameter: 4.0 in.
- Type: Stick-Up
- Interval: 2.3 ft.

OUTER CASING
- Diameter: N/A
- Type: N/A
- Length: N/A

RISER CASING
- Diameter: 2.0 in.
- Type: Schedule 40 PVC
- Interval: 0.0 - 14.0 ft.

GROUT
- Type: Portland Cement
- Interval: 0.0 - 10.0 ft.

SEAL
- Type: Bentonite Pellets
- Interval: 10.0 - 12.3 ft.

FILTERPACK
- Type: Filter Sand #2
- Interval: 12.3 - 24.0 ft.

SCREEN
- Diameter: 2.0 in.
- Type: Schedule 40 PVC
- Interval: 14.0 - 24.0 ft.

LEGEND
- ▽ = Water Level At Termination of Boring (TOB)
- ▼ = Water Level After 24 Hours
- BS = Bentonite Seal
- FP = Filter Pack
- CG = Cement Grout
- BSC = Bottom of Screen

NOTES:

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES
3118 Spring Forest Road
Raleigh, NC 27616