85-03

FRAMATOME ANP

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Carmen Johnson 4/12/12

Fac/Perm/Co ID # 85-03 Date ID#

October 4, 2002

William M. Miller, P.E.
Duke Energy Corporation
Environmental Engineering
P. O. Box 1006
Charlotte, NC 28201-1006

Subject: Belews Creek Ash Landfill

Dear Mr. Miller:

As requested, I have redrawn the groundwater contours for the existing Belews Creek Ash Landfill (Permit #85-03) and for the proposed extension area using the data on springs provided by Duke Energy in August 2002. The redrawn groundwater contours are shown on Drawing BCK-01. This drawing was updated from the original in the geologic report submitted to you on September 18, 2001. I have included four copies of this drawing. Please replace the older version in the geologic report.

Attached is new drawing BCK-02 (four copies) showing the groundwater contours, auger refusal (top of weathered/fractured rock), the cut slope for the Area 1 landfill expansion, and related cross-sections as requested by Duke Energy. The bottom of the landfill extension must be 4 feet above seasonal groundwater high according to state regulations. The depth of the allowable cut was determined by evaluating ground water data (see Attachment A) for the landfill site. To determine the fluctuation (range) of groundwater elevation over time, only the data from the older wells (MW-2, MW-3, MW-4, and MW-5) that go back to 1989 were used; the more recent data has been collected during the present, on-going drought. Using this data from the older wells, the ground water range was plotted versus ground elevation and a regression line was fitted (see Attachment A). It was assumed that the 13 years of data overlaps both the high and low groundwater levels. From the regression line, the range of groundwater levels versus ground elevation was estimated. This information is shown on the Table included in Attachment A. The lowest groundwater levels in the data has occurred within the last couple of years and is represented by the groundwater contours on Drawings BCK-01 and -02. The bottom of the proposed excavation was kept above this groundwater level by the amounts shown on the Table. The contours of auger refusal (top of weathered/ fractured rock) are based on the drill hole data and the interpreted cross-sections from the geologic report dated September 18, 2001.

If additional information is required or you have any questions, please contact me at 704-382-8647 or by e-mail at malcolm.schaeffer@framatome-anp.com.

Sincerely,

Malcolm F. Schaeffer, P.G.
Senior Scientist
Hydropower and Natural Resources
FRAMATOME ANP DE&S

Attachment

Attachment A

9/20/2002
12:09:12 PM

LANDFILL

Location (column) and Date (row)

Date Range: 10/25/1989 to 04/24/2002
Parameter: Water level, relative to mean sea level, ft

	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	OB-1
10/25/1989	821.870	808.290	801.240	750.560			
10/2/1990	824.020	813.990	803.390	748.060	757.670		820.320
10/8/1991	823.170	816.190	803.690	751.710			
10/19/1992	820.340	811.650	802.500	751.630			
4/13/1993	823.630	811.980	807.550	750.620	760.580		837.270
10/25/1993	823.110	813.940	803.400	750.380			
4/20/1994	824.390	813.190	806.480	750.970	760.500		842.170
10/17/1994	823.130	813.450	802.930				
10/19/1994				750.880			
4/17/1995	822.310	812.370	803.010	750.930	759.690		842.920
10/2/1995	820.880	811.760	801.840	750.310	759.340		
4/11/1996	821.420	811.560	804.610	750.670	760.070		844.630
10/16/1996	823.180	813.230	805.730	751.050	760.290		846.810
4/16/1997	826.530	815.010	806.510	751.110	761.840		848.950
10/14/1997	824.020	815.840	803.580	750.660	760.600		
4/20/1998	824.400	815.030	806.390	751.620	760.850		847.190
10/26/1998	822.290	815.190	802.710	750.960	759.210		
4/5/1999	820.490	813.300	803.110	752.030	759.670		843.220
10/25/1999	819.240	812.360	802.040	751.370	759.590		
4/11/2000	824.400	815.030	806.390	751.620	760.850		
6/20/2000						807.220	
10/10/2000	810.500	810.500	800.960	751.360	758.840	806.170	841.640
4/24/2001	817.120		801.380	751.510	759.460	806.450	
4/24/2002	814.950	807.830	799.250	751.640	758.630	803.880	

* The collection period lasted more than a day, date listed is the first survey date.

MANAGES

Well #	Elevation	Elevation	24 Hour	6/6/2000	7/3/2000	8/8/2000	########	4/19/2001	7/11/2001	########	1/16/2002	4/24,25/02	7/1/2002
MW2-5	849.32	846.82	812.32	812.4	809.81	809.69	809.32	808.32	808.28	807.92	807.36	806.91	806.6
MW2-4	814.7	812.2	769.33	781.75	766.45	766.23	766.03	766.42	766.22	765.56	765.37	765.62	765.12
MW2-3	796.69	794.19	749.18	756.83	756.61	756.43	756.73	757.11	756.7	756.67	756.82	756.94	756.28
MW2-2	787.23	784.73	757.03	739.12	753.97	753.53	753.78	754.33	753.94	753.47	754.07	754.13	753.33
MW2-1	789.32	786.82	754.82	749.88	752.21	752.06	752.36	752.63	752.62	752.42	752.88	752.54	752.47
BC-6A	843.94	841.44	817.54	806.8	815.22	815.09	814.41	815.21	815.48	814.2	813.92	815.28	814.67
BC-5	822.34	819.84	800.24	790	797.44	797.12	796.67	796.7	796.41	795.82	795.52	796.37	796.14
BC-4A	806.17	803.67	762.49	758.77	758.64	758.45	758.71	758.91	758.54	758.47	758.43	758.58	758.27
BC-3	844.22	802.62	788.82	796.8	786.8	786.73	786.43	Note 1	-	-	-	-	-
BC-2	843.65	830.15	812.65	819.01	811.13	810.97	810.6	Note 1	-	-	-	-	-
BC-1A	848.24	845.74	813.44	819.42	811	810.81	810.42	809.56	809.56	809.24	808.7	808.53	808.32

	MW2-5	MW2-4	MW2-3	MW2-2	MW2-1	BC-6A	BC-5	BC-4A	BC-1A
7/3/2000	809.81	766.45	756.61	753.97	752.21	815.22	797.44	758.64	811
8/8/2000	809.69	766.23	756.43	753.53	752.06	815.09	797.12	758.45	810.81
10/10/2000	809.32	766.03	756.73	753.78	752.36	814.41	796.67	758.71	810.42
4/19/2001	808.32	766.42	757.11	754.33	752.63	815.21	796.7	758.91	809.56
7/11/2001	808.28	766.22	756.7	753.94	752.62	815.48	796.41	758.54	809.56
10/30/2001	807.92	765.56	756.67	753.47	752.42	814.2	795.82	758.47	809.24
1/16/2002	807.36	765.37	756.82	754.07	752.88	813.92	795.52	758.43	808.7
4/24,25/02	806.91	765.62	756.94	754.13	752.54	815.28	796.37	758.58	808.53
7/1/2002	806.6	765.12	756.28	753.33	752.47	814.67	796.14	758.27	808.32

GroundWater Levels at Belew Creek Ash Landfill - New Monitoting Wells (July 2000)

Belews Creek Ash Landfill - Groundwater Level Data

MW2-5	846.82 - GE	MW2-4	812.2 - GE	MW2-3	794.19 - GE	MW2-2	784.73 - GE
Arit. Mean	808.2456	Arit. Mean	765.8911	Arit. Mean	756.6989	Arit. Mean	753.8389
Count	9	Count	9	Count	9	Count	9
Maximum	809.81	Maximum	766.45	Maximum	757.11	Maximum	754.33
Minimum	806.6	Minimum	765.12	Minimum	756.28	Minimum	753.33
Median	808.28	Median	766.03	Median	756.7	Median	753.94
Range	3.21	Range	1.33	Range	0.83	Range	1
Std. Dev.	1.176691	Std. Dev.	0.4852434	Std. Dev.	0.2498222	Std. Dev.	0.3355385

MW2-1	786.82 - GE	BC-6A	841.44 - GE	BC-5	819.84 - BC	BC-4A	803.67
Arit. Mean	752.4656	Arit. Mean	814.8311	Arit. Mean	796.4656	Arit. Mean	758.5556
Count	9	Count	9	Count	9	Count	9
Maximum	752.88	Maximum	815.48	Maximum	797.44	Maximum	758.91
Minimum	752.06	Minimum	813.92	Minimum	795.52	Minimum	758.27
Median	752.47	Median	815.09	Median	796.41	Median	758.54
Range	0.82	Range	1.56	Range	1.92	Range	0.64
Std. Dev.	0.2426989	Std. Dev.	0.5495554	Std. Dev.	0.6024556	Std. Dev.	0.1848047

BC-1A	845.74 - GE	MW-1	849.5	MW-2	852	MW-3	840
Arit. Mean	809.5711	Arit. Mean	821.6086	Arit. Mean	812.9376	Arit. Mean	803.5768
Count	9	Count	22	Count	21	Count	22
Maximum	811	Maximum	826.53	Maximum	816.19	Maximum	807.55
Minimum	808.32	Minimum	810.5	Minimum	807.83	Minimum	799.25
Median	809.56	Median	822.71	Median	813.23	Median	803.25
Range	2.68	Range	16.03	Range	8.36	Range	8.3
Std. Dev.	0.9883755	Std. Dev.	3.590195	Std. Dev.	2.235249	Std. Dev.	2.166097

MW-4	765.5	MW-5	785.5	MW-6	834	OB-1	854
Arit. Mean	750.9841	Arit. Mean	759.8635	Arit. Mean	805.93	Arit. Mean	841.512
Count	22	Count	17	Count	4	Count	10
Maximum	752.03	Maximum	761.84	Maximum	807.22	Maximum	848.95
Minimum	748.06	Minimum	757.67	Minimum	803.88	Minimum	820.32
Median	751.01	Median	759.69	Median	806.31	Median	843.07
Range	3.97	Range	4.17	Range	3.34	Range	28.63
Std. Dev.	0.8095952	Std. Dev.	0.9976594	Std. Dev.	1.436964	Std. Dev.	8.149975

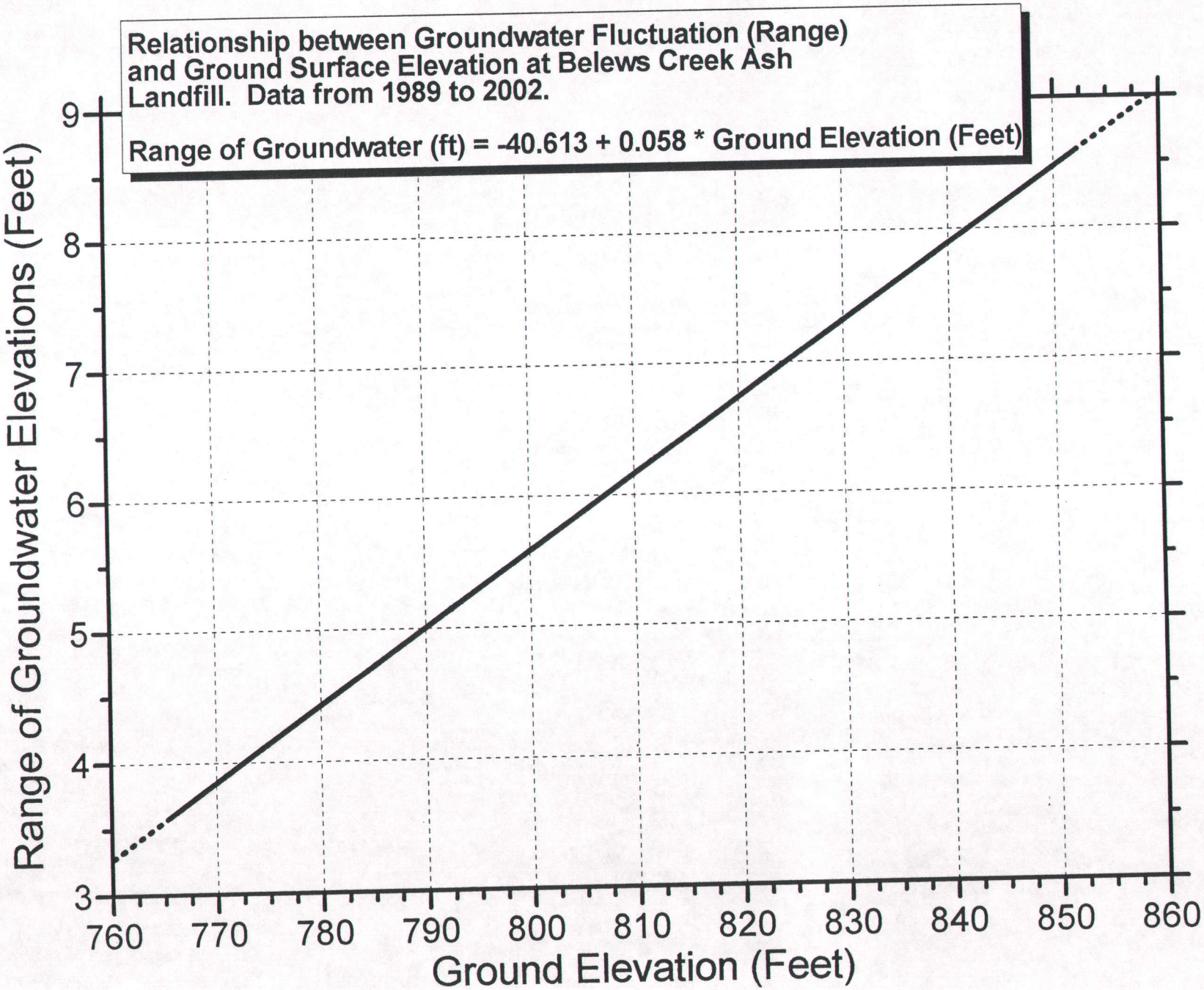
Relationship between Groundwater Fluctuation (Range) and Ground Surface Elevation at Belews Creek Ash Landfill. Data from 1989 to 2002.
Range of Groundwater (ft) = -40.613 + 0.058 * Ground Elevation (Feet)
Range of Groundwater Elevations (Feet)
9
8
7
6
5
4
3
760
770
780
790
800
810
820
830
840
850
860
Ground Elevation (Feet)

TABLE – Estimated Range of Groundwater Fluctuations versus Ground Elevation.

Ground Elevation (Feet)	**Estimated Range of Groundwater Fluctuations (Feet)**	**Recommended distance above Groundwater Contours on Drawing BCK-02 for bottom of cut (feet)**
775	3.6	8
780	3.9	8
785	4.1	9
790	4.4	9
795	4.7	9
800	5.0	10
805	5.3	10
810	5.6	10
815	5.8	10
820	6.1	11
825	6.4	11
830	6.7	11
835	7.0	11
840	7.3	12
845	7.6	12

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Carmen Johnson 4/12/12
85-03

APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
DATE 12-20-02 BY EL

Duke Energy

Belews Creek Steam Station

Stokes County, N.C.

Landfill Permit Application – Siting Package

October 2, 2001

Volume 2

Attachment .0504(1)(c)

Geological and Hydrological Study for Proposed Landfill Site

85-03

Attachment .0504(1)(c)

Geological and Hydrological Study for Proposed Landfill Site

APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
DATE 12-20-02 BY EL

GEOLOGY/HYDROGEOLOGY OF THE EXISTING BELEWS CREEK ASH LANFDILL (PERMIT #85-03) AND PROPOSED ASH LANDFILL EXPANSION SITE, STOKES COUNTY, NORTH CAROLINA

September 18, 2001

Duke Engineering & Services
A Duke Energy Company

Prepared By

Malcolm F. Schaeffer
North Carolina Licensed Geologist No. 546

NORTH CAROLINA LICENSED SEAL 546 GEOLOGIST MALCOLM FRANCIS SCHAEFFER

EXECUTIVE SUMMARY

The geology/groundwater conditions at the Belews Creek Ash Landfill Expansion Site, Stokes County, North Carolina are consistent with the characteristics of the conceptual groundwater model developed by LeGrand for the Piedmont region (1988, 1989). As such, there is nothing geologically or hydrologically unusual about the site that would preclude its use as an ash landfill. The subsurface geologic/hydrologic conditions at the site are described and hydraulic conductivity values have been calculated for the subsurface materials.

PROJECT INFORMATION

The proposed expansion of the Belews Creek Ash landfill will receive fly ash from Duke Power's Belews Creek Steam Station. Belews Creek Steam Station, located in Stokes County, is owned and operated by Duke Power. The proposed flyash landfill expansion is located on property owned by Duke Power. The proposed expansion is located adjacent to the existing ash landfill, operated under Permit # 85-03. The footprint for the proposed expansion is approximately 33.4 acres. Surface water drainage is to the ash basin, an NPDES permitted discharge (Permit # NC0024406).

REGIONAL GEOLOGY/HYDROGEOLOGY

The Belews Creek Ash Landfill is located in North Carolina within the Milton belt, one of several northeast-trending geologic belts of the southern crystalline Appalachians (Figure 1). The Milton belt is characterized by strongly foliated gneiss and schist, commonly with distinct compositional layering and having felsic composition; quartzite, calc-silicate gneiss, and marble are minor units (Carpenter, 1982). The available evidence suggest that the rocks of the Milton belt are mainly Precambrian in age and were metamorphosed and deformed during the early to late Paleozoic (Butler and Secor, 1991). The majority of the rocks in the belt are metamorphosed to the sillimanite and kyanite grade of amphibolite metamorphism. A steep metamorphic gradient occurs along the southeastern boundary where the grade decreases to the chlorite zone of greenschist metamorphism in the adjacent Carolina slate belt (Butler and Secor, 1991).

This boundary with the Carolina slate belt is also a lithologic discontinuity and is marked locally with sheared rocks (Carpenter, 1982). The southwestern boundary of the belt is placed where the gneiss and schist units give way to the dominant non-layered mafic and felsic intrusive rocks of the Charlotte belt (Butler, 1980). The Sauratown Mountains Anitclinorium and the Dan River Triassic Basin lie to the northwest of the Milton belt

The Dan River Triassic Basin (Danville Basin in Virginia) lies approximately 2 km northwest of the site (Figures 1 and 2). The basin is one of a series of tilted fault block basins comprising the Late Triassic and Early Jurassic rift system of eastern North America. The Dan River basin is bounded on the northwest by the Chatham fault zone, a southeast dipping normal fault system. The fault zone strikes N30E to N40E and dips at approximately 45 degrees (Thayer and Robbins, 1992). Movement along the fault zone occurred during and after basin filling with a total displacement along the zone of as much as 4500 meters (Thayer, 1970). The fault is approximately 2 km from the site. The contact between the Triassic rocks of the basin and the crystalline rocks of the Milton belt along the southeast basin margin is an unconformity, but several minor, northwest dipping normal faults are present locally (Thayer, 1970). The sedimentary rocks of the basin consist of interbedded conglomerate, sandstone, mudstone, and thin coal beds (Olsen and others, 1991; Thayer and Robbins, 1992). The rocks dip moderately to steeply northwest toward the Chatham fault zone (Thayer, 1970)

Rock units mapped in the vicinity of the Belews Creek Ash Landfill include alluvium, terrace deposits, sedimentary rocks of the Triassic Dan River Basin, diabase dikes, and felsic gneisses and schists of the Milton belt (Figure 2). Other map units on Figure 2 are Coal Ash – Landfill and Disturbed Ground. The disturbed ground includes areas affected by excavation or covered by fill materials (ud on Figure 2). Excavated areas in the Dan River basin are mainly borrow pits, while in the Milton belt, the disturbed areas are cuts, fills, and borrow areas related to the construction of the Belews Creek Steam Plant and lake. The alluvium (Qal on Figure 2) consists of unconsolidated sand, silt, and clay with occasional subhedral to well-rounded pebbles and cobbles. The terrace deposits (Qt on Figure 2) consist of unconsolidated sand, silt, and clay, with pebbles and cobbles of quartz. In places, the terrace deposits are comprised of large

angular quartz fragments in a red matrix of sand, silt, and clay. The diabase (JrD on Figure 2) occurs in long, relatively thin dikes of fine- to medium-grained diabase. The sedimentary rocks of the Dan River Triassic basin are divided into three formations in the area covered by Figure 2. They are, from oldest to youngest, the Pine Hall Formation (TrPH on Figure 2), the Cow Branch Formation (TrCB on Figure 2), and the Stoneville Formation (TrS on Figure 2). The Pine Hall Formation consists of medium- to coarse-grained arkosic sandstone that grades into massive siltstone and mudstone. A basal conglomerate is present in some localities. The Cow Branch Formation is a massive to thinly-laminated, thin- to medium-bedded siltstone, claystone, and mud shale with minor amounts of very fine- to medium-grained, medium-bedded sandstones. Thin, lenticular layers of coal occur in the lower 60 meters of the formation. The Stoneville Formation consists of interlayered mudstone, sandstone, and conglomerate. The metamorphic rocks of the Milton belt include interlayered augen gneiss, quartzo-feldspathic gneiss, flaser gneiss, "button" mica schist, and mica schist with minor, thin interlayers of hornblende gneiss and schist (fsg on Figure 2).

The hydrogeology of the Piedmont region is different from and has to be considered in a different way from conventional sedimentary aquifer systems (LeGrand, 1988). LeGrand (1988, 1989) has developed a conceptual groundwater model for the Piedmont Province. In the Piedmont region, a thoroughly weathered and structureless material termed residuum occurs near the ground surface with the degree of weathering decreasing with depth. The residuum grades into a coarser-grained material that retains the structure of the parent bedrock and is termed saprolite. Beneath the saprolite, partially weathered bedrock occurs with depth until sound bedrock is encountered. This mantle of residual soil, saprolite, and weathered rock (regolith) is a special hydrogeologic unit that covers and crosses various types of rock. (LeGrand, 1988). It provides an intergranular medium through which the recharge and discharge of water from fractured rock commonly occurs. A transition zone at the base of the regolith is present in many areas of the Piedmont (Harned and Daniel, 1989). In this zone the unconsolidated material grades into the bedrock. It consists of partially weathered bedrock and lesser amounts of saprolite. This zone may serve as a channel for rapid movement of groundwater toward

the discharge points. The fractured nonporous bedrock is the most abundant lithologic unit underlying the Piedmont region (LeGrand, 1988). It includes many different types of igneous and metamorphic rocks. The fractures control both the hydraulic conductivity and the storage capacity of the rock mass (Trainer, 1988). Fractures tend to be more extensive and permeable in homogenous aluminum-deficient rocks than in micaeous rocks (Randall and others, 1988). The latter are less brittle and their weathering products have a high clay content that tends to reduce fracture permeability (Randall and others, 1988). Fracture permeability tends to be greater in alkalic igneous rocks (granites/quartz diorites) than in calcic igneous rocks (gabbros/ultramafics/diorites) because potassium and sodium-rich feldspars tend to produce about half as much clay as calcium-rich feldspars (Randall and others, 1988). Micaeous rich rocks underlie a large portion of the Belews Creek site.

LeGrand's (1988,1989) conceptual model of the groundwater setting in the Piedmont incorporates the above two medium system into an entity that is useful for the description of groundwater conditions. That entity is the surface drainage basin that contains a perennial stream (LeGrand, 1988; see Figure 3). Each basin is similar to adjacent basins and the conditions are generally repetitive from basin to basin. Within a basin, movement of groundwater is generally restricted to the area extending from the drainage divides to a perennial stream (Slope-Aquifer System; LeGrand, 1988, 1989). Rarely does groundwater move beneath a perennial stream to another more distant stream (LeGrand, 1989).

Therefore, in most cases in the Piedmont, the groundwater system is a two medium system (LeGrand, 1988) 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 near-surface fractured crystalline rocks can form extensive aquifers. The character of such aquifers results from the combined effects of the rock type, fracture system, topography, and weathering. Topography exerts an

influence on both weathering and the opening of fractures, while the weathering of the crystalline rock modifies both transmissive and storage characteristics.

FIELD ACTIVITIES

Test Borings

Six soil test borings, MW-1, MW-2, MW-3, MW-4, MW-5, and OB-1 were drilled at the site between July 27, 1989 and August 9, 1989 for the existing ash landfill. These borings were converted to monitoring wells and their locations are shown on Figures 2 and 3 as well as Drawing BCK-010. Soil test boring field reports (Inspector/Driller's logs) and well completion records for these borings are included in Appendix A.

Seventeen additional soil and rock test borings, BC-1, BC-1A, BC-2, BC-2A, BC-3, BC-4A, BC-4A, BC-5, BC-6, BC-6A, MW2-1, MW2-2, MW2-2A, MW2-3, MW2-4, MW2-5, and MW-6 were drilled at the site between April 14, 2000 and May 16, 2000 for the geology/hydrogeology studies for the new ash landfill permit. Ten to twenty feet of rock was cored below auger refusal in borings BC-1A, BC-2A, BC-4A, BC-6A, NW2-2A, MW2-3, MW2-4, and MW2-5. The rock coring was performed in general accordance with ASTM 2113. Monitoring wells were installed in MW2-1, MW2-2, MW2-3, MW2-4, MW2-5, and MW-6. Temporary monitoring wells were installed in BC-1A, BC-2, BC-3, BC-4A, BC-5, and BC-6A. The locations of the additional borings are shown on Figures 2 and 3 and Drawing BCK-01. The soil test boring reports (Inspector/Driller's Logs) and permanent and temporary well construction records are in Appendix B and geologic logs are in Appendix C.

Borings MW-1, MW-2, MW-3, MW-4, MW-5, OB-1, BC-1, BC-2, BC-3, BC-4, BC-5, BC-6, MW2-1, MW2-2, MW2-3, MW2-4, MW2-5, MW2-6, and MW-6 were drilled by mechanically advanced, hollow-stem steel augers (6" OD augers for the borings drilled in 1989 and 7.25" OD augers for the borings drilled in 2000). Borings BC-1A, BC-2A, BC-4A, BC-6A, and MW2-2A were advanced using a carbide bit and N-size rod with the hole cased to auger refusal using NW-size casing (3" ID). Soil sampling and penetration testing (SPT) were performed in general accordance with ASTM D1586. At

regular intervals, soil samples were obtained with a standard 1.4" ID, 2.0" OD split-spoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of ~~an~~ a 140 pound hammer falling 30 inches for the borings drilled in 1989 and with an automatic hammer for the borings drilled in 2000. The number of hammer blows for the final 12 inches is the 'Standard Penetration Resistance (SPT)'. Representative portions of the split-spoon samples were placed in containers or plastic bags and later examined by the geologist to verify the Inspector's field classification. Undisturbed samples for laboratory testing were taken during the additional drilling in 2000 in accordance with procedures in ASTM 1587. Bulk samples were taken from most boreholes at selected intervals for laboratory testing. Split-spoon, undisturbed, and bulk samples were selected for laboratory testing. 140#/30" ✓

Monitoring Well Installation

Monitoring wells were installed in all of the six-inch holes drilled in 1989 and in six of the 7.1/4" inch holes drilled in the spring of 2000. In addition to these permanent wells, six temporary wells were installed in the spring of 2000. The permanent monitoring wells are Type II. The casing consists of two-inch diameter, Schedule 40 PVC pipe with flush-threaded joints. The bottom sections (10 to 20 feet depending on the well) of the PVC pipe consists of manufactured well screen with 0.010 inch wide openings. The screens were set such that the 24-hour groundwater levels were within the screened intervals. Sand backfill was placed around the screen intervals to stabilize the hole and to help yield a less turbid groundwater sample. An approximate 2-foot bentonite seal was installed on top of the sand backfill to seal the observation well from water influx down the borehole. The remainder of the borehole was filled with grout to the ground surface. Well covers and concrete collars complete the monitoring wells. Well construction records are included in Appendices A and B. A summary of monitoring well information is presented in Table 1.

The temporary monitoring wells were constructed using either 1 or 2 inch diameter, Schedule 40 PVC pipe with a 10 foot section at the bottom with slots. The

borehole was back-filled with sand and a 2 to 3 foot bentonite seal was placed at the ground surface. The temporary monitoring well construction records are in Appendix B.

		MW2-1	MW2-2	MW2-3	MW2-4	MW2-5	MW-6
North	(ft)	924,381.02	924,603.05	924,288.25	924,165.74	923,292.18	922,825.80
East	(ft)	1,682,003.02	1,682,530.45	1,683,114.76	1,683,469.80	1,683,587.62	1,682,168.25
	Note: All coordinates NC State Plane NAD 83.						
Ground Elevation	(ft)	786.8	784.7	794.2	812.2	846.8	835.2
Stick-up	(ft)	2.5	2.5	2.5	2.5	2.5	2.5
Top of Casing Elevation	(ft)	789.32	787.23	796.69	814.70	849.32	837.67
Total Depth	(ft)	51.5	65.6	59.3	58.0	58.3	48.4
Screen length	(ft)	10.0	10.0	20.0	20.0	20.0	10.0
Depth to:							
Top of Screen	(ft)	31.5	27.0	39.3	38.0	38 ~~38.5~~	24.0
Bottom of Screen	(ft)	41.5	37.0	59.3	58.0	54.0	34.0
Bottom of Boring	(ft)	51.5	65.6	59.3	58.0	58.3	48.4
Depth to Water	(ft)						
24 Hour		34.5	30.2	47.5[1]	45.4	37.0[2]	27.3

[1]Hole initially dry at 24 hours (after augering). Water level is at 24 hours after coring.
[2]Hole initially dry at 24 hours (after augering). Water level is after weekend (at 4 days).

		BC-1A	BC-2	BC-3	BC-4	BC-4A	BC-5	BC-6	BC-6A
North	(ft)	923,321.64	923,451.50	923,876.38	N/A	924,188.99	923,689.01	N/A	923,713.83
East	(ft)	1,683,033.6	1,682,612.9	1,682,104.6	N/A	1,682,742.4	1,682,908.5	N/A	1,683,389.0
	Note: All coordinates NC State Plane NAD 83.								
Ground Elevation	(ft)	845.7	830.2	802.6	N/A	803.7	819.8	N/A	841.4
stick-up	(ft)	2.50	2.50	2.50	N/A	2.50	2.50	N/A	2.5
Top of Casing Elevation	(ft)	848.24	843.65	844.22	N/A	806.17	822.34	N/A	843.94
Total Depth	(ft)	75.7	58.3	67.3	~~53.5~~ 38.5	53.5	30.2	24.2	28.5
Screen length	(ft)	10.0	10.0	10.0	-	10.0	10.0	-	10.0
Depth to:									
Top of Screen	(ft)	65.7	48.3	57.3	-	~~34.0~~ 43.5	20.2	-	18.5
Bottom of Screen	(ft)	75.7	58.3	67.3	-	53.5	30.2	-	28.5
Depth to Water									
24 Hour	(ft)	34.8	31.0	55.4	Dry	43.7	22.1	Dry	26.4

Table 1: Monitoring Well Information – Permanent and Temporary

Water Table Elevations

The depth to the water table was, at a minimum, recorded at each boring immediately after completion of the hole, at 24 hours, and at 7 days. The water levels in the permanent and temporary monitoring wells are presently being recorded on a monthly basis. Ground water levels are presented in Table 2.

Well #	Top Of Casing Elevation	Ground Elevation	Elevation of Groundwater (Depth to Groundwater) 24 Hour	06/06/00	07/03/00	08/08/00	10/09/00
MW-6	837.67'	835.2'	810.37' (24.83')	807.59' (27.61')	807.07' (28.13')	n/a	806.17' (29.03')
MW2-1	789.32'	786.8'	754.82' (31.98')	752.40' (34.40')	752.21' (34.59')	752.06' (34.74')	752.36' (34.44')
MW2-2	787.23'	784.7'	757.03' (27.67')	754.28' (30.42')	753.97' (30.73')	753.53' (31.17')	753.78' (30.92')
MW2-3	796.69'	794.2'	749.18' (45.02')	756.83' (37.37')	756.61' (37.59')	756.43' (37.77')	756.73' (37.47')
MW2-4	814.70'	812.2'	769.33' (42.87')	766.59' (45.61')	766.45' (45.75')	766.23' (45.97')	766.03' (46.17)
MW2-5	849.32'	846.8'	812.32' (34.48')	809.88' (36.92')	809.81' (36.99')	809.69' (37.11')	809.32' (37.48')
BC-1A	848.24'	845.7'	813.44' (32.26')	811.10' (34.60')	811.00' (34.70')	810.81' (34.89')	810.42' (35.28')
BC-2	833.65'	830.2'	812.65' (17.55')	811.31' (18.89')	811.13' (19.07')	810.97' (19.32')	810.60' (19.60')
BC-3	804.22'	802.6'	788.82' (13.78')	786.82' (15.78')	786.80' (15.80')	786.73' (15.87')	786.43' (16.17')
BC-4A	806.17'	803.7'	762.49' (41.21')	758.75' (44.95')	758.64' (45.96')	758.45' (45.25')	758.71' (44.49')
BC-5	822.34'	819.8'	800.24' (19.56)	797.70' (22.10')	797.44' (21.36')	797.12' (22.68')	796.67' (23.13')
BC-6A	843.94'	841.4'	817.54' (23.86')	815.12' (26.28')	815.22' (26.18')	815.09' (26.31')	814.41' (26.99')

Table 2: Groundwater Levels in Monitoring Wells/Temporary Wells at Belews Creek.

Groundwater levels fluctuate several feet with seasonal and rainfall variations and with changes in the water levels in nearby drainage features. Normally the highest groundwater levels occur in late winter and spring and the lowest levels in late summer and fall. A potentiometric map of the groundwater is presented on Drawing BCK-01. Water levels recorded in October 2000 were used to prepare this map.

Borehole and Well Permeability Testing

Falling head permeability tests were conducted in boreholes BC-1A, BC-2A, BC-4A, BC-6A, and MW2-2A. Out-flow type permeability tests (slug tests) were conducted in MW2-1, MW2-2, MW2-3, MW2-4, MW2-5, and MW-6 and had been conducted earlier in MW-1, MW-2, MW-4, and MW-5. These field tests were conducted to

determine the in-situ hydraulic conductivity, k, of the material through which groundwater circulates. The hydraulic conductivity is a constant of proportionality relating to the ease with which a fluid passes through a porous medium. The falling head procedure involves filling the borehole with water and measuring the rate the water drops in the borehole. The out-flow permeability test involves the placing of a cylinder of known volume into the well, measuring the level of the water table, rapidly removing the cylinder, and measuring the flow of water out of the hole. In both methods, the hydraulic conductivity is then computed by the variable head method. A summary of the in-situ permeability tests is presented in Table 3 and data sheets related to the in-situ permeability tests are in Appendix D.

Boring/ Monitoring Well	Depth (Feet)	Elevation (Feet)	Hydraulic Conductivity K (cm/sec)	Material	N – Average SPT Value (Soil)	REC/RQD (Rock)
Field Permeability Measurements – Falling Head Method – Flush Bottom in Soils						
MW2-2A	28.5	756.2	1.3E-05	ML	~40	-
BC-1A	8.9	836.8	1.3E-05	ML	~12	-
BC-1A	23.8	821.9	5.7E-06	SM	~70	-
BC-2A	18.6	822.6	2.5E-06	ML	~6	-
BC-2A	38.2	803.0	5.0E-04	SM	~80	-
BC-4A	9.5	794.2	1.4E-05	SM	~50	-
BC-4A	19.5	784.2	5.0E-06	SM-GM	~60	-
BC-4A	29.5	774.2	1.1E-05	SM	~80	-
BC-6A	8.4	833.0	1.1E-05	ML	N/A	-
Field Permeability Measurements – Falling Head Method – Well Point/Filter in Rock						
MW2-2A	73.5-89.9	711.2-694.8	5.5E-06	Rock	-	83/32
BC-1A	66.0-75.7	779.7-770.0	2.9E-05	Rock	-	81/27
Field Permeability Measurements – Slug Tests – New Monitoring Wells						
MW2-1	37.1-41.5	752.2-747.8	9.7E-05	ML-SM	~100 (WR)	-
MW2-2	33.2-37.0	754.2-750.2	3.1E-04	ML-SM	~18	-
MW2-3	39.9-59.3	756.8-737.4	7.8E-05	Rock	-	96/65
MW2-4	48.2-58.0	766.5-756.7	7.4E-04	Rock	-	93/16
MW2-5	39.5-54.0	809.8-795.3	9.9E-04	Rock	-	98/54
MW-6	30.2-34.0	907.5-903.7	2.1E-04	ML	~7	-
Field Permeability Measurements – Slug Tests – Existing Monitoring Wells						
MW-1	33.1-43.1	816.9-806.9	8.9E-05	ML	~16	-
MW-2	43.2-47.9	806.8-802.1	2.7E-04	SM	~60	-
MW-4	28.2-38.2	741.8-731.8	1.5E-04	SM	~100 (WR)	-
MW-5	48.3-58.3	731.8-721.8	9.2E-05	ML-SM	~30	-
Laboratory Permeability Measurements – Saturated Hydraulic Conductivity - Undisturbed Samples						
MW2-1(UD2)	9.5-11.5	777.3-775.3	2.9E-06	CH	~7	-

MW2-2(UD3)	24.1-25.5	760.6-759.2	1.8E-04	ML	~30	-
MW2-3(UD4)	29.0-30.6	765.2-763.6	5.5E-05	ML	~60	-
MW2-2(UD5)	34.1-36.1	750.6-748.6	6.6E-05	ML	~18	-
BC-4(UD1)	5.0-6.7	798.7-797.0	2.5E-04	ML	~30	-
BC-5(UD1)	9.5-11.5	810.3-808.3	3.6E-04	ML	~40	-
Laboratory Permeability Measurements – Saturated Hydraulic Conductivity – Remolded Samples						
BC-1	0.0-10.0	845.7-835.7	5.5E-05	ML	-	-
BC-3	40.0-50.0	801.7-791.7	3.5E-04	SM	-	-
BC-4	0.0-10.0	803.7-793.7	5.5E-05	ML	-	-
BC-5	0.0-10.0	819.8-809.8	6.5E-05	ML	-	-
BC-6	0.0-10.0	841.8-831.4	5.3E-05	ML	-	-

Table 3: Summary of All Hydraulic Conductivity/Permeability Tests, In-Situ and Laboratory.

LABORATORY TESTING OF SOIL SAMPLES

Split-spoon, undisturbed, and bulk soil samples were tested in the laboratory to determine their engineering and hydrologic properties using the following procedures:

*ASTM D2216 – Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures,

*ASTM D854 – Specific Gravity of Soils,

*ASTM D4318 – Liquid Limit, Plastic Limit, and Plasticity Index of Soils,

*ASTM D422 – Particle Size Analysis of Soils,

*ASTM D698 – Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12-inch (305-mm) Drop, and

*USCOE, EM110-2-1906 Appendix VIII – Constant Head Permeability.

The results of the laboratory testing are included in Appendix E and summarized in Tables 3, 4 and 5 (Tables 4 and 5 can be found after the Figures). A description of the methods and results follow.

Natural Moisture Content – The natural moisture content of selected samples was determined in accordance with ASTM D2216. The moisture content of the soil is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the soil particles. A summary of the results is presented in Tables 4 and 5.

Soil Plasticity – Atterburg Limit tests were performed on all samples taken to the laboratory. The test determines the soils plasticity characteristics. The soil's Plasticity Index (PI) is representative of this characteristic and is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). These characteristics, LL and PL, are determined in accordance with ASTM D4318. The LL is the moisture content at which the soil will flow as a heavy viscous fluid. The PL is the moisture content at which the soil begins to lose its plasticity. The PI is equal to the PL minus the LL.

Certain soils swell and shrink with increases and decrease in soil moisture. The PI is related to this potential volume change ability. Past experience has shown that soils having a PI of less than 30 are only slightly susceptible to volume changes. Soils having a PI greater than 50 are generally very susceptible to these volume changes. Soils with a PI between these limits have moderate volume change potential. As seen on Tables 4 and 5, all the soil samples tested except one, has a PI less than 19. These non-plastic soils are primarily ML and SM soils. A CH soil from 9.5 to 11.5 in depth in MW2-1 has a PI of 38.

Grain Size Distribution – Grain size tests were performed on representative soil samples to determine the particle size distribution of these materials. After initial drying, the samples were washed over a U. S. standard No. 200 sieve to remove fines (particles finer than a No. 200 mesh sieve). The samples were then dried and sieved through a standard set of nested sieves. This test was performed in accordance with ASTM D422. The results are presented as percent finer by weight versus particle size curves on the attached Grain Size Distribution sheets (Appendix E). From this data, the USCS Soil Classification is determined and is included in Tables 4 and 5.

Compaction – Representative bulk samples of soils were collected from the auger cuttings of the boreholes, placed in cloth sacks and returned to the laboratory for compaction testing. Standard Proctor compaction tests (ASTM D698) were performed on selected samples to determine their compaction characteristics, including their maximum dry density and optimum moisture content. Test results are presented in Appendix E and are summarized on Table 5.

Laboratory Permeability – Permeability testing was conducted on undisturbed samples as well as on remolded soil collected at various depths from auger cuttings. The results of the permeability testing are included on Tables 3, 4 and 5.

SITE GEOLOGY/HYDROGEOLOGY

This section is based on a review of pre-existing data, the recently acquired field data, and a vicinity/site reconnaissance. The pre-existing data includes soil logs for the installed monitoring/ observation wells, soil/rock logs from the geotechnical studies for the Belews Creek Steam Plant, and groundwater data for both the landfill and steam plant sites. The recently acquired data has been discussed in the Sections on 'Field Activities" and 'Laboratory Testing of Soil Samples'.

There are 18 monitoring/observation wells at the site (12 permanent, 6 temporary; see Figures 2 and 3, Drawing BCK-01). The soils encountered during the drilling of the boreholes are the product of the in-place weathering of the underlying bedrock. In the areas not altered by excessive erosion or the activities of men, the typical residual profile consists of clayey soils near the surface overlying sandy silts to silty sands to sands (ML-SM; see Appendices A, B, and C). The residuum (residual soil; thoroughly weathered and structureless material) is very thin in the area and over much of the landfill it has been removed. The residuum is underlain by saprolite followed by weathered/fractured rock overlying sound rock.

Based on the boring data, the material in the subsurface at the site is divided into four layers:

1. Layer 1 – Residual soil and saprolite consisting primarily of sandy silts (ML) and silty sands (SM) with a Standard Penetration Resistance of $N \leq 30$. It ranges in thickness from 10.6 to 43.3 feet with an average thickness of 25.24 feet (Figure 4).
2. 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 (Figure 4).

3. 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 (in one borehole MW2-3) 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.
4. Sound Rock – defined as rock with Recovery $\geq$ 90 and RQD $\geq$ 50.

The weathering of the bedrock is facilitated by fractures, joints, and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and sound rock can be quite irregular and erratic, even over short distances. This can be seen on cross-section D on Drawing BCK-01 where the difference between auger and carbide refusal in boreholes about 3 feet apart is greater than 25 feet (BC-1 and BC-1A; BC-2 and BC-2A). It is possible to find lenses and/or boulders of hard rock and zones of partially weathered rock within the soil/ saprolite mantel, well above the sound bedrock level. The cross-sections presented in Drawing BCK-01 are based on the above-defined subsurface layers.

The main rock types underlying the Belews Creek Landfill are mica schist, schistose mica gneiss, augen gneiss, flaser gneiss, quartz-feldspathic gneiss, biotite gneiss and minor hornblende schist/gneiss (fsg on Figure 2). Diabase dikes were not noted within the footprint of the landfill, however, some may be present. The mica schist is a coarse-grained, well-foliated, "button" schist composed of muscovite and quartz with pinhead garnets. Interlayered with the "button" schist are thin layers of mica schist (non-"buttoned") and fine- to medium-grained schistose mica gneiss. The augen gneiss is a fine- to medium-grained rock with a well-developed foliation wrapping around conspicuous pods or "eyes" of feldspar. They are comprised primarily of quartz, feldspar, and mica. The flaser gneiss consists of small lenses of granular materials (quartz-feldspar-mica) separated by wavy ribbons and streaks of finely crystalline, foliated materials (primarily mica). The quartzo-feldspathic gneiss is a medium- to coarse-grained, foliated, normally mica-poor rock, although some massive varieties have up to

15% muscovite. The hornblende schist/gneiss is a fine- to coarse-grained, dark colored rock composed of hornblende, biotite, and plagioclase. It is semi-massive to well-foliated and occurs in thin layers. Based on the borehole data summarized in Table 6, the flaser gneiss is the most common rock type underlying the site followed by mica schist-schistose mica gneiss.

ROCK TYPE	Core length (ft)	Percent of Total
Flaser Gneiss	53.6	43.1
Augen Gneiss	8.7	7.0
Quartz-Feldspar-Mica Gneiss	13.3	10.7
Mica Schist/ Schistose Mica Gneiss	31.7	25.5
Biotite Gneiss	13.4	10.7
Hornblende Gneiss	3.7	3.0
TOTAL	124.4	100

Table 6: Rock Types in Cored Boreholes.

All the rock types are interlayered and the felsic rocks grade laterally into each other. The contacts of the hornblende schist/gneiss with the felsic rocks are generally sharp. The compositional layering is parallel to the strongly developed foliation. The orientation of the foliation is relatively consistent throughout the area (N72E; 67SE, Figure 5). The presence of "button" schist, augen gneiss, and flaser gneiss indicates that the rocks have been strongly deformed and sheared, probably during at least two episodes of isoclinal folding ("buttons" are formed by the intersection of two, nearly parallel, foliation planes). The deformation was ductile, although the presence of thin layers of flaser gneiss suggests that some of the deformation occurred under semi-brittle to brittle conditions.

Data on the orientation of fractures in the bedrock underlying the fill is sparse due to few and relatively poor bedrock exposures. Three joint sets have been observed in

outcrops: 1) N20-40W with steep dips (>70°), 2) NS to N20E with steep dips (>70°), and 3) a set parallel to layering/foliation (about N60–70E with dips ranging from 30° to vertical). In mica schists, very few joints are present and are generally filled with clay (Figures 6a, 6b, and 7). The gneissic rocks tend to have more fractures (Figures 8a and 8b), but they are generally limited to the width of the gneissic layer. The are generally clay-filled in the saprolite/weathered rock zone (Figures 8a and 8b). The hornblende-rich rocks have very few fractures associated with them (Figures 6a and 6b). These observations are consistent with those of Randall and others (1988) discussed earlier.

Steeply dipping joints and joints parallel to layering/foliation were encountered in all eight boreholes in which rock coring was performed (Appendix C; Geologic Logs). A zone of iron/manganese (Fe/Mn) stained joints is present in seven of the boreholes (Table 7). Joints in MW2-3 are not stained. The presence of Fe/Mn staining on joints indicates past percolation of groundwater through the rockmass. The data suggest that the fractured bedrock aquifer (as defined by LeGrand, 1988, 1989) is relatively thick (at least 20 feet).

Boring Number	**Depth**	**Staining on Joints**
BC-1A	65.7' to 75.7'	Fe/Mn-staining.
BC-2A	44.5' to 64.5'	Fe/Mn-staining.
BC-4A	38.5' to 51.0' 51.0' to 53.5'	Fe/Mn-staining. No staining.
BC-6A	18.5' to 28.5'	Fe/Mn staining.
MW2-2A	72.8' to 80.1' 80.1' to 89.9'	Fe/Mn-staining. No staining.
MW2-3	40.4' to 59.3'	No staining.
MW2-4	38.0' to 58.0'	Fe/Mn-staining.
MW2-5	38.8' to 58.3'	Fe/Mn-staining.

Table 7: Coating and staining on joint surfaces in the rock core.

Groundwater data from October 2000 was used to prepare a contour map of the groundwater table (potentiometric surface; Drawing BCK-01). The water table contours were controlled by the groundwater elevation in the monitoring well and the assumption that the topography of the water table is a subdued replica of the land surface. The path of water movement is restricted to the zone underlying the gross topographic slope extending from the surface divides to the streams (Figure 3 and Drawing BCK-01). The

altered topography associated with the existing ash landfill has changed the drainage and groundwater conditions in the southwest corner of the drainage basin. The groundwater near the drainage divide spreads divergently according to the water table gradients. The groundwater from that area of the existing landfill is flowing toward West Belews Creek south of Pine Hall Road.

Hydraulic conductivity values, k, for the soils and rock at the site are summarized in Table 3. This data has been grouped according to its subsurface layer in which the tests were made, except for rock where Layers 3 (weathered rock/fractured rock) and 4 (sound rock) were combined, and the mean and median k values calculated and they are presented in Table 8. These values should be used in the hydrologic model of the site.

	Mean (cm/sec)	**Count - N**	**Maximum (cm/sec)**	**Minimum (cm/sec)**	**Median (cm/sec)**	**Std. Dev. (cm/sec)**
Layer 1	9.1E-05	11	3.6E-04	2.5E-06	1.4E-05	1.2E-04
Layer 2	1.5E-04	11	5.0E-04	5.0E-06	9.7E-05	1.5E-04
Rock	3.7E-04	5	9.9E-04	5.5E-06	7.8E-05	4.6E-04

Table 8: Hydraulic Conductivity Values 'k' for Defined Layers at the Belews Creek Site.

Note that the highest permeability values are found in Layer 2- Saprolite and weathered rock within the transition zone between the regolith and the sound bedrock. This zone may serve as a conduit for more rapid movement of groundwater to discharge points in the drainage basin (as suggested by Harned and Daniel, 1989) with less infiltration of the bedrock. Three of the rock permeability measurements were made in the weathered rock/fractured rock layer and two of the rock permeability measurements were made in the sound rock layer (Table 3). The values for the sound rock are higher than for the weathered/fractured rock layer. Because of this, all five values were used to arrive at a value to use for both of the rock layers in a hydrologic model.

All of the data has been combined to produce eight geologic cross-sections of the site. These form the basis for the geologic model of the site. They are presented on Drawing BCK-01.

CONCLUSIONS

The geology/groundwater conditions at the Belews Creek site are consistent with the characteristics of the conceptual groundwater model developed by LeGrand for the Piedmont region (1988, 1989). The subsurface conditions at the site have been described and hydraulic conductivity values have been calculated for the subsurface materials. Geologic cross-sections have been developed that form the basis for the hydrologic model of the site.

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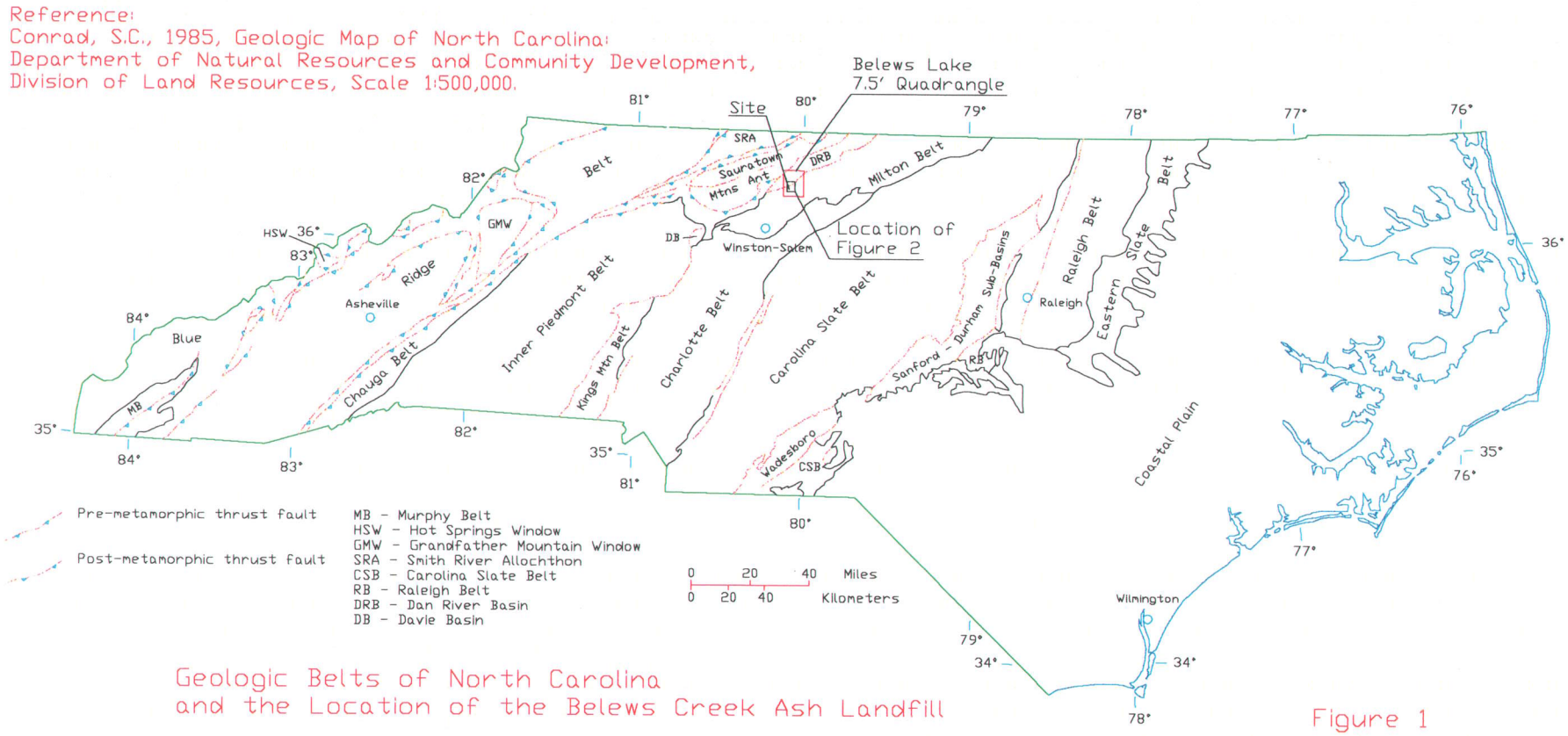
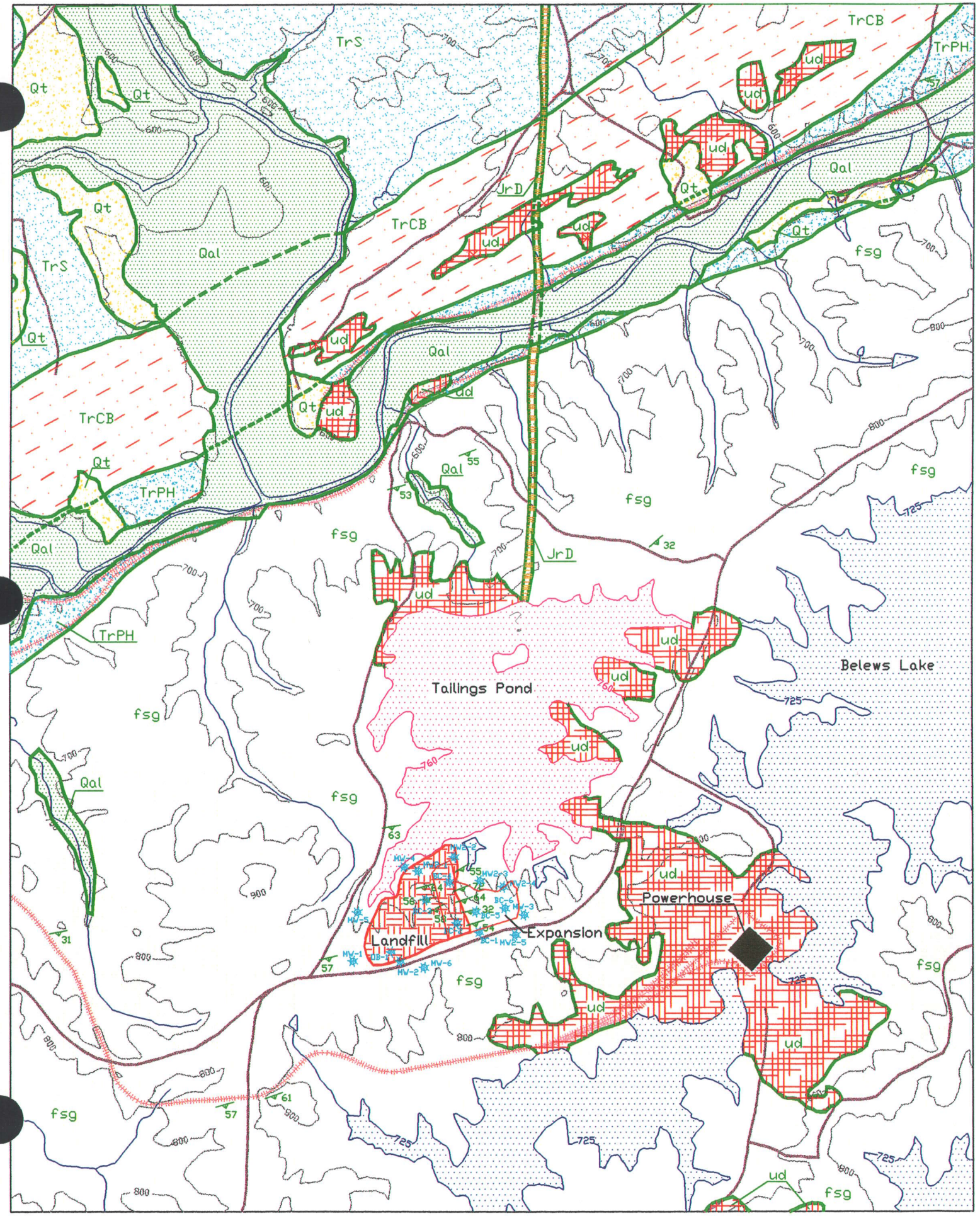


Figure 1: Geologic Belts of North Carolina and the Location of the Belews Creek Ash Landfill and the Proposed Addition.

GEOLOGIC MAP OF AN AREA AROUND THE BELEWS CREEK ASH LANDFILL AND EXPANSION SITE, STOKES COUNTY, NORTH CAROLINA



EXPLANATION

Rock Type and Structure

- **ud** — COAL ASH - LANDFILL.
- **ud** — DISTURBED GROUND. Area disturbed by excavation or covered by fill materials. Excavated areas are mainly borrow pits, but includes some cut and fill areas.
- **Qal** — ALLUVIUM. Unconsolidate sand, silt, and clay with occasional subhedral to well-rounded pebbles and cobbles.
- **Qt** — TERRACE DEPOSITS. Unconsolidated alluvial terrace deposits consisting of sand, silt, and clay, in places contained pebbles and cobbles of quartz; also, deposits of large angular quartz in a red matrix of sand, silt, and clay.
- **JrD** — DIABASE. Medium- to fine-grained diabase dike.
- **TrS** — STONEVILLE FORMATION. Mudstone, sandstone, and comglomerate.
- **TrCB** — COW BRANCH FORMATION. Massive to thinly laminated, thin- to medium-bedded siltstone, claystone, and mud shale with minor amounts of very fine- to medium-grained, medium-bedded sandstone; thin lenticular layers of coal in lower 60 meters of the Formation.
- **TrPH** — PINE HALL FORMATION. Medium- to coarse-grained arkosic sandstone grading into massive siltstone and mudstone. A basal conglomerate is present in some localities.
- **fsg** — FELSIC GNEISS AND SCHIST. Interlayered augen gneiss, quartzo-feldspathic gneiss, flaser gneiss, mica schist, and "button" mica schist.
- CONTACT. Dashed where concealed.
- 63 — STRIKE AND DIP. Foliation.
- MW-1 — MONITORING WELL.
- MW2-5 — NEW MONITORING WELL
- × — MINE/CLAY PIT/QUARRY.
- BC-2 — BORING - TEMPORARY WELL

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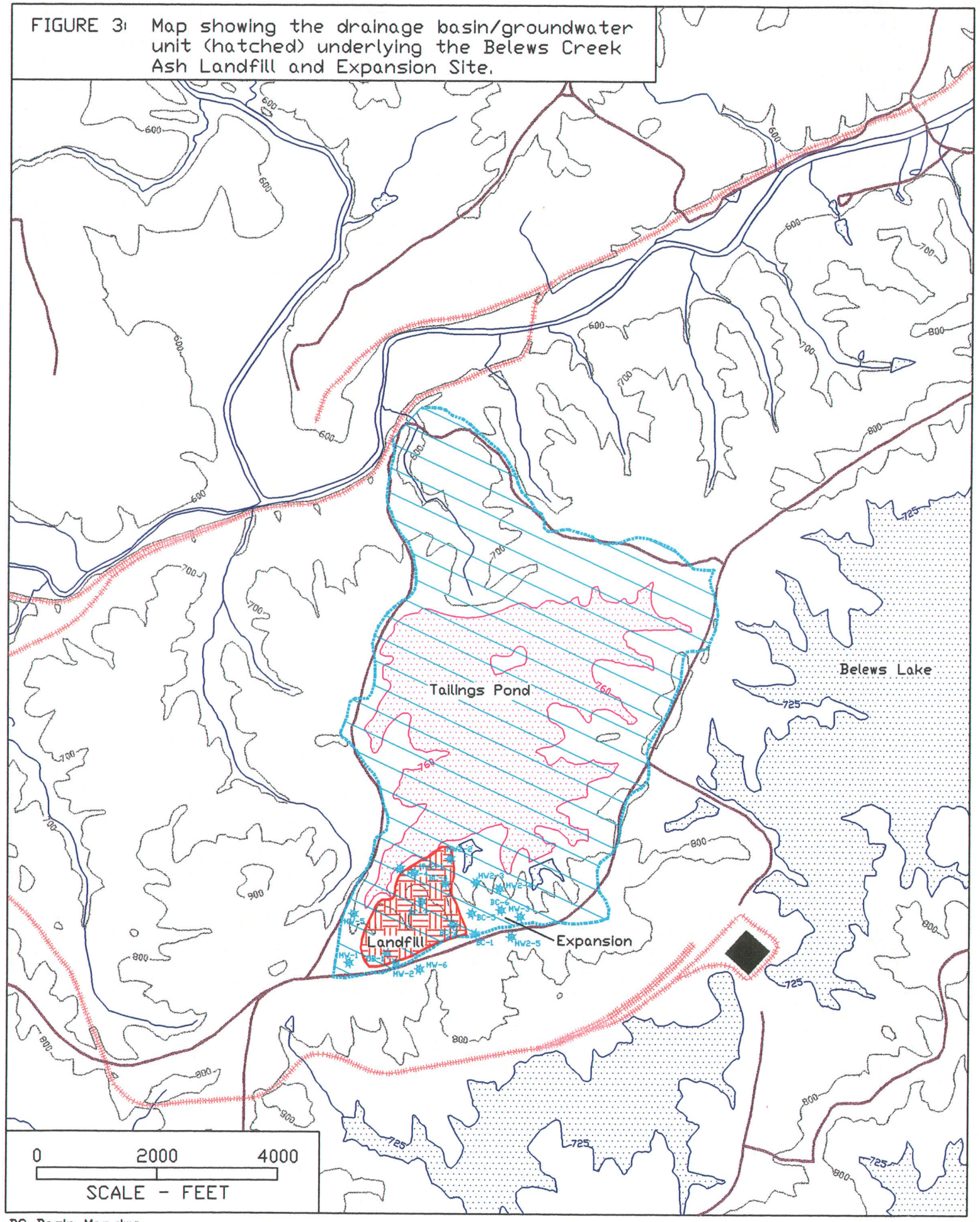
0 2000 4000

SCALE - FEET

FIGURE 2

BC Geology Map.dwg

FIGURE 3: Map showing the drainage basin/groundwater unit (hatched) underlying the Belews Creek Ash Landfill and Expansion Site.



BC Basin Map.dwg

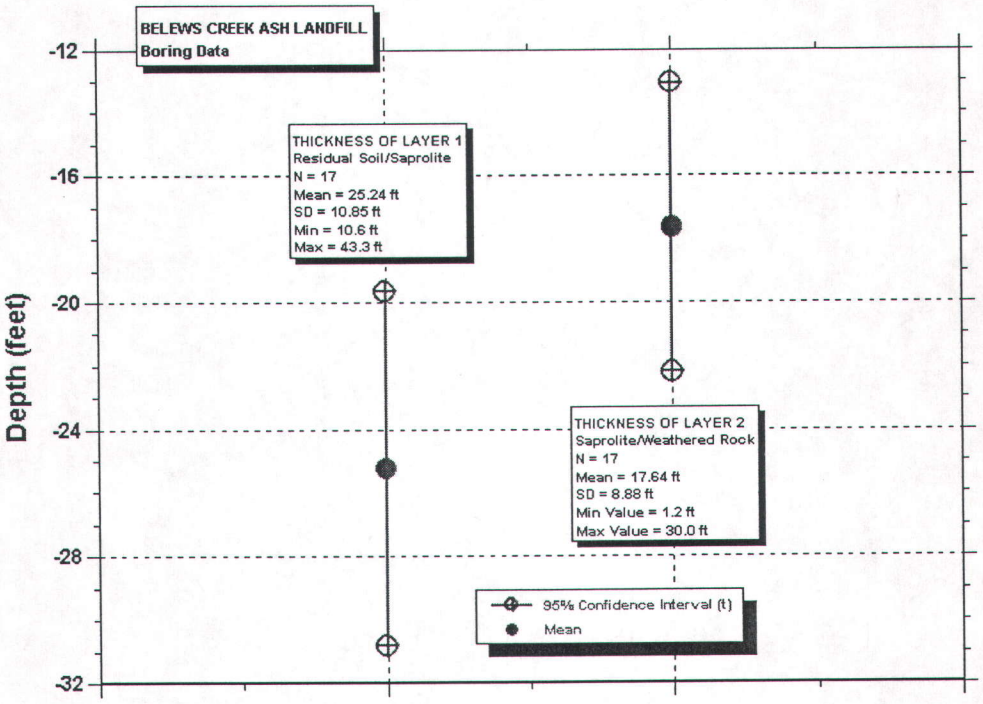


Figure 4: Average depths of Layers 1 and 2 at the Belews Creek Ash Landfill and Proposed Extension.

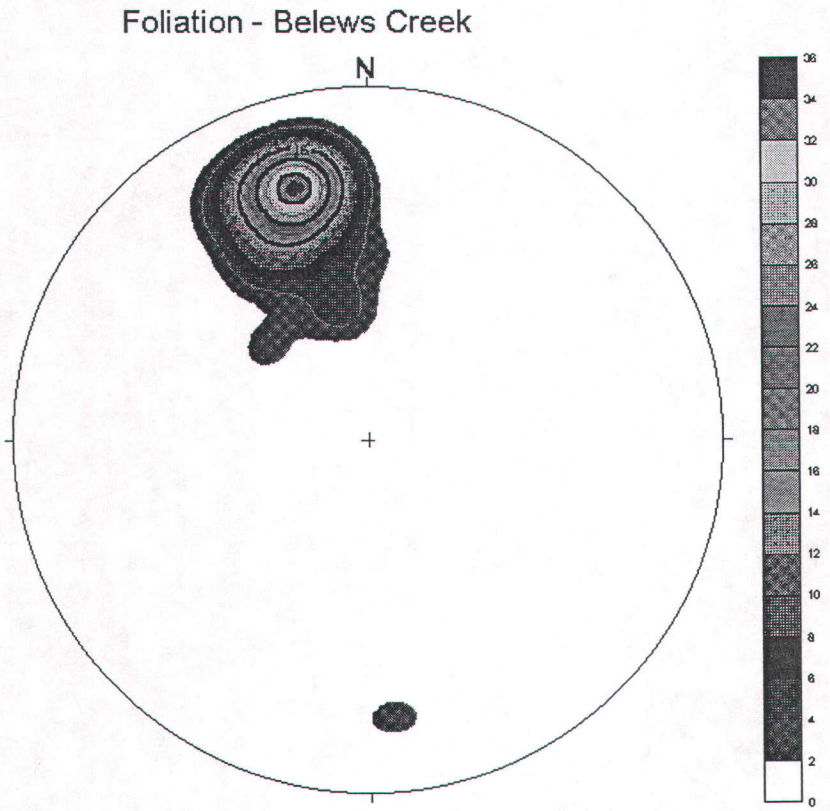
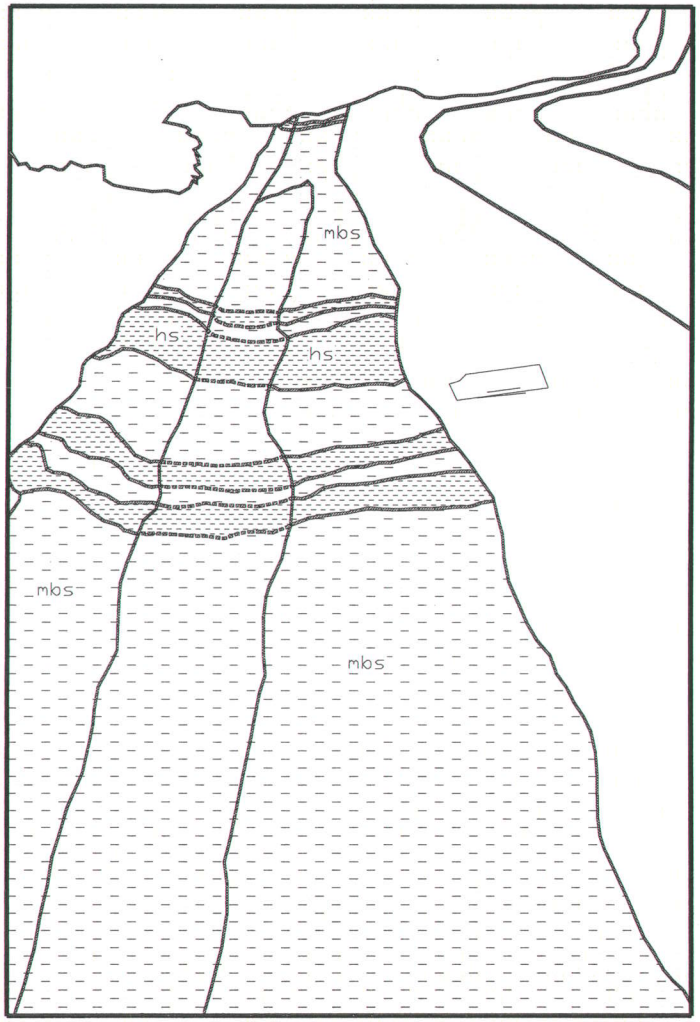


Figure 5: Lower hemisphere – Equal Area Projection of poles to foliation planes, N = 37, Statistical Maximum at N72E; 61SE.

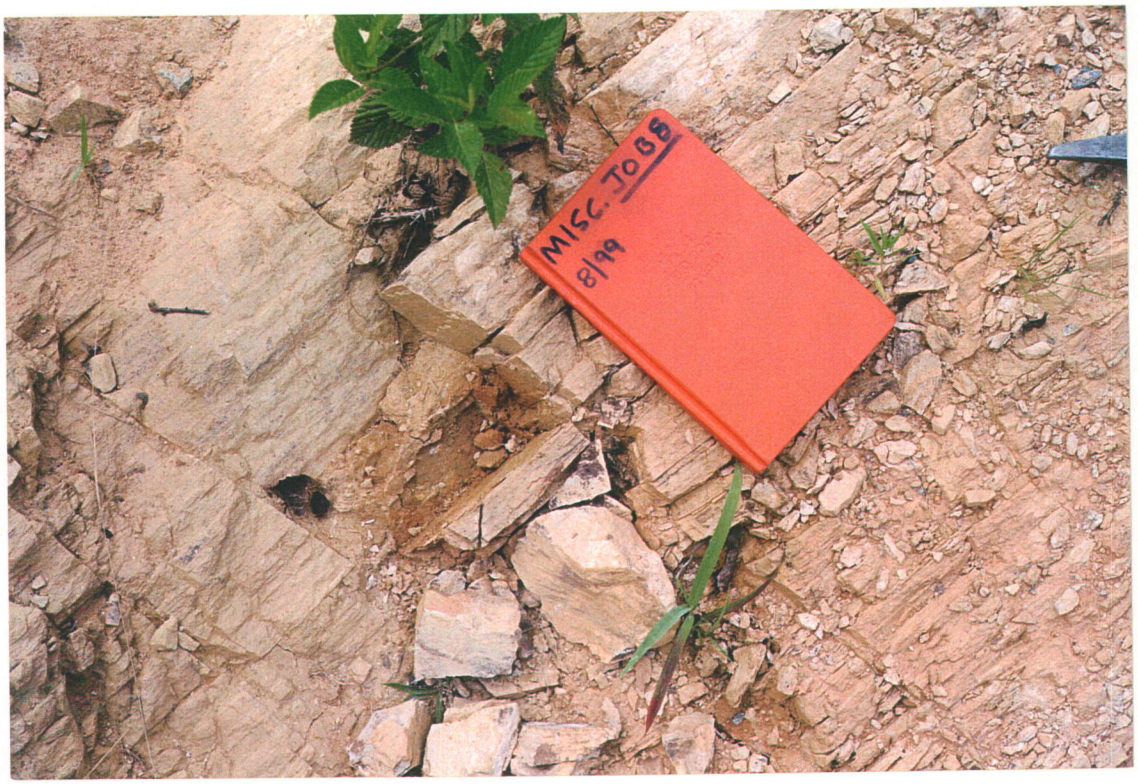


(a)

(b)

FIGURE 6. Saprolitic "button" mica schist with thin interlayers of hornblende schist/gneiss. Note the absence of jointing/fractures and the well-developed foliation in these units at this location. On (a) mbs = "button" mica schist and hs = hornblende schist/gneiss.

FIGURE 7: Clay-filled N30W joint in mica schist.



FIGURES 8a and 8b: Interlayered flaser gneiss in "button" mica schist. Note the closely spaced fractures in the gneiss which do not continue into the mica schist. Note the fractures parallel to foliation in the close-up photograph and the clay infilling along the foliation and the steep N30W joints.

TABLE 4 - LABORATORY DATA SUMMARY
FOR UNDISTURBED SAMPLES
DUKE POWER COMPANY- BELEWS CREEK ASH LANDFILL

S&ME Project No. 1264-00-157

SAMPLE ID	DEPTH (feet)		USCS Classif.	ATTERBURG LIMITS		GRAIN SIZE DISTRIB.		Standard Proctor Compaction ASTM (D-698)		IN-SITU CONDITIONS			Porosity	Hydraulic Conductivity k (cm/sec)
	From	To		LL	PI	% Finer than #200	% Coarser than #200	Max. Dry Dens. (pcf)	Optimum M.C. (%)	Unit Weight (pcf)	Natural Moist. (%)	Specific Gravity		
MW 2-1	9.5	11.5	CH	51	38	94.4	5.6	----	----	64.7	30.7	2.88	0.64	2.80×10^{-6}
MW 2-4	19.0	21.0	ML	NP	NP	70.6	29.4	----	----	82.1	21.1	2.67	0.51	BAD SAMPLE
MW 2-2	24.1	25.5	ML	NP	NP	58.3	41.7	----	----	89.8	18.0	2.65	0.46	1.81×10^{-4}
MW 2-3	29.0	30.6	ML	NP	NP	64.1	35.9	----	----	93.8	17.5	2.72	0.45	5.58×10^{-5}
MW 2-2	34.1	36.1	ML	48	19	59.5	40.5	----	----	86.1	33.1	2.73	0.49	6.63×10^{-5}
BC-4 UD-1	5.0	6.7						----	----	79.4	16.1	2.73	0.53	2.51×10^{-4}
BC-5 UD-1	9.5	11.5						----	----	72.5	23.4	2.64	0.56	3.61×10^{-4}

LEGEND

[1]According to Unified Soil Classification System.

NP - Indicates Non-Plastic

---- Indicates not analyzed

TABLE 5 - LABORATORY DATA SUMMARY
FOR BULK AND SPLIT SPOON SAMPLES
DUKE POWER COMPANY- BELEWS CREEK ASH LANDFILL

S&ME Project No. 1264-00-157

SAMPLE ID	DEPTH (feet)		USCS Classif.	ATTERBURG LIMITS		GRAIN SIZE DISTRIB.		Standard Proctor Compaction ASTM (D-698)		REMOLDED CONDITIONS				Porosity	Hydraulic Conductivity, k (cm/sec)
	From	To		LL	PI	% Finer than #200	% Coarser than #200	Max. Dry Dens. (pcf)	Optimum M.C. (%)	Unit Weight (pcf)	Natural Moist. (%)	% M.C. from optimum	Specific Gravity		
BC-1	0.0	10.0	ML	29	4	57.8	42.2	105.5	17.5	94.8	17.6	+0.1	2.69	0.44	5.64×10^{-5}
BC-3	40.0	50.0	SM	20	2	43.5	56.5	115.0	12.0	103.4	11.9	-0.1	2.63	0.37	3.47×10^{-4}
BC-4	0.0	10.0	ML	29	6	62.0	38.0	107.0	15.0	96.1	14.9	-0.1	2.66	0.42	5.54×10^{-5}
BC-5	0.0	10.0	ML	32	4	58.3	41.7	104.0	18.5	93.0	18.3	-0.2	2.66	0.44	6.47×10^{-5}
BC-6	0.0	10.0	ML	39	4	64.9	35.1	98.0	22.5	87.7	23.2	+0.7	2.73	0.49	5.31×10^{-5}
BC-1A SS#2	54.2	55.1	SM	27.0	2.0	34.1	65.9	----	----	----	----	----	----	----	----
BC-2 SS#9	29.5	31.0	SM	32.0	2.0	42.4	57.6	----	----	----	----	----	----	----	----
BC-4 SS#3	15.0	16.5	GM	NP	NP	14.8	85.2	----	----	----	----	----	----	----	----
BC-4 SS#5	25.0	25.5	SC	33.0	12.0	39.0	61.0	----	----	----	----	----	----	----	----
BC-5 SS#3	14.5	16.0	SM	31.0	5.0	46.6	53.4	----	----	----	----	----	----	----	----
BC-6 SS#3	14.3	15.8	SM	31.0	2.0	39.7	60.3	----	----	----	----	----	----	----	----
MW 2-1 SS#7	34.5	35.7	SM	30.0	2.0	45.5	54.5	----	----	----	----	----	----	----	----
MW 2-2 SS#9	44.1	45.6	SM	36.0	5.0	49.2	50.8	----	----	----	----	----	----	----	----
MW 2-3 SS#1	4.0	5.5	ML	34.0	8.0	71.8	28.2	----	----	----	----	----	----	----	----
MW 2-3 SS#7	34.0	35.4	SM	32.0	3.0	46.6	53.4	----	----	----	----	----	----	----	----
MW 2-4 SS#1	4.0	5.5	MH	53.0	15.0	79.5	20.5	----	----	----	----	----	----	----	----
MW 2-4 SS#5	26.0	27.5	ML	32.0	4.0	59.3	40.7	----	----	----	----	----	----	----	----

LEGEND

[1]According to Unified Soil Classification System.
NP - Indicates Non-Plastic
---- Indicates not analyzed

Appendix A

Soil Test Boring Field Reports and Well Completion Records from 1989

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 THE 'ARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN . . O. BOX 2091, RALEIGH, N.C. 27602

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

Casing Type: THREADED PVC dia. 2" in.
Casing Depth: from 0 to 33.1 ft. - dia. 2" in.
Screen Type: SLOT.010: TRILOC PVC dia. 2" in.
Screen Depth: from 33.1 to 43.1 ft. - dia. 2" in.

Grout Depth: from 0 to 28.1 ft. - dia. 6.2
Bentonite Seal: from 28.1 to 31.1 ft. - dia. 6.2
Sand/Gravel PK: from 31.1 to 44.5 ft. - dia. 6.2
Total Well Depth: from 0 to 44.5 ft. - dia. 6.2

Static Water Level: 31.4 feet from top of casing
Date Measured 8 / 9 /
Yield (gpm): N/A Method of Testing: N/A
Casing is 1.9' feet above land su

DRILLING LOG		
DEPTH OM	TO	FORMATION DESCRIPTION
		MW-1
		SEE SOIL TEST BORING
		FIELD REPORT FOR MW-1
		@ FLYASH LANDFILL.

LOCATION SKETCH
(show distance to numbered roads, or other map reference po

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

DATE: 8-11 89 SIGNATURE: [signature]

HS 3342 (6/85)

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
STARTING TIME N/A
JOB NAME FLYASH LANDFILL MW'S
GROUND SURFACE ELEV.
DATE 8-3-89 WEATHER HOT
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-1

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG # 2555
							USING 6" ⌀ AUGER
1	3.3						REDDISH YELLOW MICA. SILTY
	4.8	3	4	4			FINE TO MEDIUM SAND
					5		
2	8.3						
	9.8	3	4	4			REDDISH YELLOW MICA. SILTY FINE
					10		TO MEDIUM SAND
							—12—
3	13.3						
	14.8	4	5	6			RED MICA. FINE TO MEDIUM
					15		[redacted]
4	18.3						
	19.8	3	4	5			RED MICA. FINE TO MEDIUM
					20		[redacted]
5	23.3						
	24.8	10	18	17			BROWNISH YELLOW MICA. FINE TO
					25		[redacted]
6	28.3						
	29.8	4	6	7			REDDISH YELLOW MICA. FINE TO
					30		[redacted]
							—32—
7	33.3						
	34.8	6	8	9			REDDISH YELLOW MICA SILTY
					35		FINE TO MEDIUM SAND.
8	38.3						
	39.8	3	6	8			YELLOW MICA. SILTY FINE TO
					40		MEDIUM SAND.

BORING TERMINATED @ 44.5'
BORING REFUSAL AUGER @ 44.5'
WATER TOB DEPTH 42.0' on 8-3-89
WATER 24 HR: DEPTH 29.5' on 8-9-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 44.5
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELLOWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 8-3-89 WEATHER HOT

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-1

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
							-43
9	43.3						OLIVE YELLOW MICA. SILTY FINE TO
	44.1	8	50+	4"	45		COARSE SAND AND SEVERELY WEATHERED ROCK
							AUGER REFUSAL @ 44.5'
							BORING TERMINATED
							SET MONITOR WELL PER ATTACHED SKETCH.
					50		
					55		
					60		
					65		
					70		
					5		
					0		

+ 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 @ 44.5'
BORING REFUSAL AUGER @ 44.5'
WATER TOB DEPTH 42.0' on 8-3-89
WATER 24 HR: DEPTH 29.5' on 8-9-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 44.5
~~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

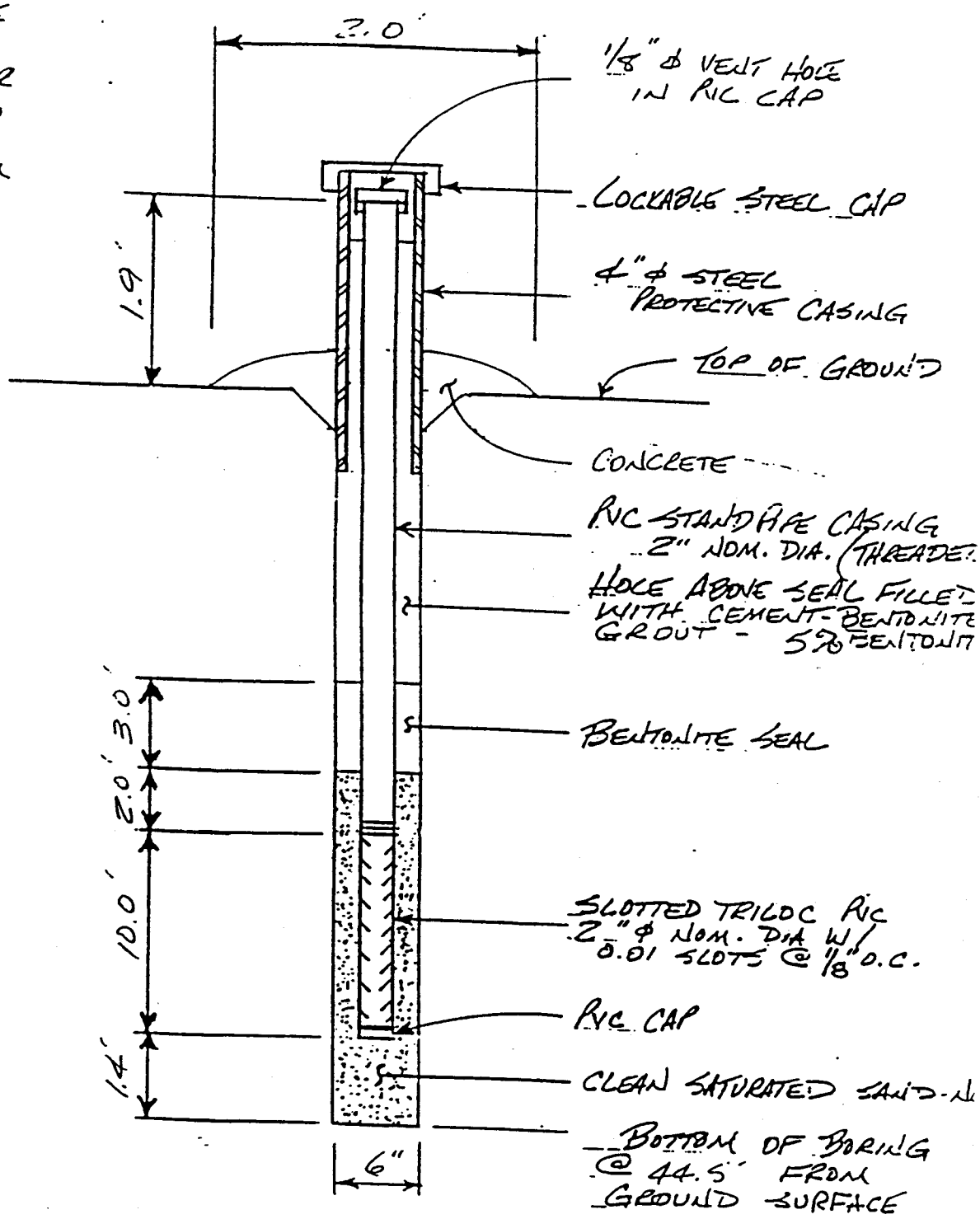
Instrument No. MW-1 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL RDG @ 31.4' FROM TOP/PIPE ON 8-9-89

T/PIPE ELEV. IS



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 THE
PARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN
P. O. BOX 2091, RALEIGH, N.C. 27602

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

Casing Type: THREADED TRILOC PVC dia. 2 in.
Casing Depth: from 0 to 37.9 ft. - dia. 2 in.
Screen Type: SLOT .010 TRILOC PVC dia. 2 in.
Screen Depth: from 37.9 to 47.9 ft. - dia. 2 in.

Grout Depth: from 0 to 32.9 ft. - dia. [illegible]
Bentonite Seal: from 32.9 to 35.9 ft. - dia. [illegible]
Sand/Gravel PK: from 35.9 to 50.5 ft. - dia. [illegible]
Total Well Depth: from 0 to 50.5 ft. - dia. [illegible]

Static Water Level: 43.2 feet from top of casing
Date Measured 8/89
Yield (gpm): N/A Method of Testing: N/A
Casing is 2.1 feet above land s

DRILLING LOG		
DEPTH FROM	TO	FORMATION DESCRIPTION
		MW-2
		SEE SOIL TEST BORING
		FIELD REPORT FOR
		MW-2 @ FLYASH
		LANDFILL.

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

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

DATE: 8-11-89 SIGNATURE: David L. Nickson

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BEARS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 8-8-89 WEATHER WARM

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-2

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG + 2555 USING 6" ϕ AUGER
1	4.6 / 6.1	3	3	6	5		YELLOWISH BROWN SILTY FINE TO MEDIUM SAND.
							7.5
2	9.6 / 11.1	4	4	5	10		REDDISH YELLOW FINE TO MEDIUM SANDY SILT.
							12.5
3	14.6 / 16.1	3	5	3	15		PALE YELLOW SILTY FINE TO MEDIUM SAND.
4	19.6 / 21.1	3	3	6	20		REDDISH YELLOW SILTY FINE TO MEDIUM SAND.
5	24.6 / 26.1	4	4	5	25		YELLOW MICA. SILTY FINE TO MEDIUM SAND
6	29.6 / 31.1	4	5	5	30		YELLOW SILTY FINE TO MEDIUM SAND
7	34.6 / 36.1	6	8	10	35		OLIVE YELLOW MICA. SILTY FINE TO MEDIUM SAND
8	39.6 / 41.1	13	20	18	40		YELLOW SILTY FINE TO MEDIUM SAND

BORING TERMINATED @ 50.5'
BORING REFUSAL AUGER @ 50.5'
WATER TOB DEPTH 48.0' @ 4:30 P.M. 8-8-89
WATER 24 HR: DEPTH 41.1' @ 12:00 NOON 8-9-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 50.5
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 8-8-89 WEATHER WARM

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-2

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
9	44.6 46.1	16	21	22	45		LT. OLIVE BRN. MICA. SILTY FINE TO MEDIUM SAND.
10	49.6 50.2	23	50=2"		50		LT. OLIVE BRN. MICA. SILTY FINE TO COARSE SAND. AUGER REFUSAL @ 50.5' BORING TERMINATED SET MONITOR WELL PER ATTACHED SKETCH
					55		
					60		
					65		
					70		
					5		
					0		

+ 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 @ 50.5'
BORING REFUSAL AUGER @ 50.5'
WATER TOB DEPTH 48.0 ON 8-8-89 4:30 P.M.
WATER 24 HR: DEPTH 41.1' ON 8-9-89 12:00 NOON
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 50.5
~~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

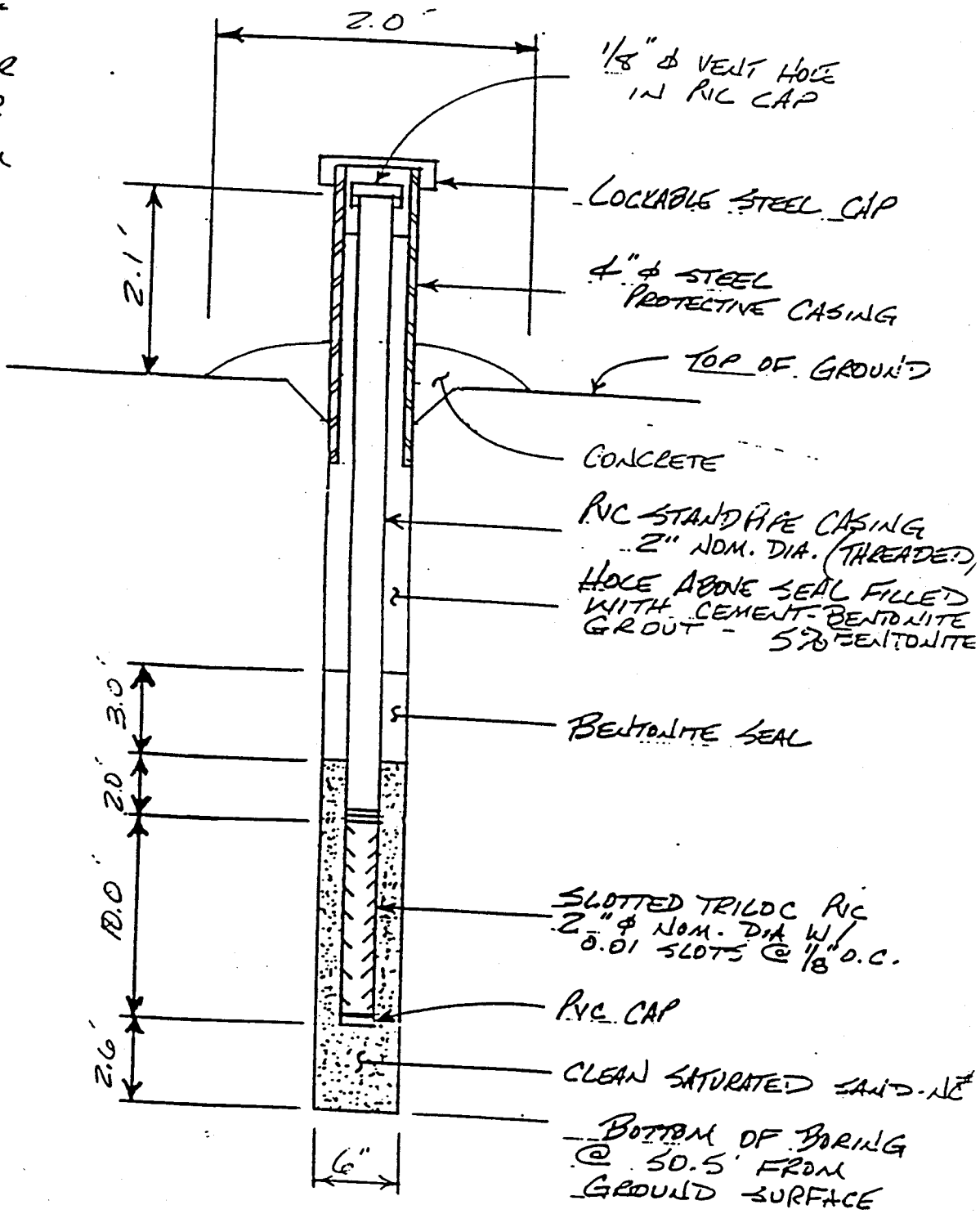
Instrument No. MW-2 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL RDG @ 43.2' FROM TOP/PIPE ON 8.9.89

T/PIPE ELEV. IS



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 THE PARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN P. O. BOX 2091, RALEIGH, N.C. 27602

NAME OF SITE: BELEWS CREEK STEAM STATION	PERMIT NO.: 85-03
ADDRESS: P.O. BOX 557, WALNUT COVE, NC 27052	OWNER (print): DUKE POWER CO.
DRILLING CONTRACTOR: DUKE POWER CO.	REGISTRATION NO.: 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. 6.2
Bentonite Seal: from 32.0 to 35.0 ft. - dia. 6.2
Sand/Gravel PK: from 35.0 to 47.8 ft. - dia. 6.2
Total Well Depth: from 0 to 47.8 ft. - dia. 6.2

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 s

DRILLING LOG

DEPTH FROM	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 pc

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

DATE: 8-11-89 SIGNATURE: [signature]

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		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG #2555
							BORING WITH 6" AUGER
1	3.0						YELLOWISH RED MICA. SILTY
	4.5	3	3	4			FINE TO MEDIUM SAND
					5		
							-6.0-
2	8.0						
	9.5	3	4	4			REDDISH YELLOW MICA. FINE TO MEDIUM SANDY SILT.
					10		
3	13.0						
	14.5	3	5	6			REDDISH YELLOW FINE TO MEDIUM SANDY SILT.
					15		
4	18.0						
	19.5	5	6	8			PALE YELLOW FINE TO MEDIUM SANDY SILT.
					20		
							-21-
5	23.0	24	50=5"				LT. GRAY MICA. SILTY FINE TO COARSE SAND
	23.9						
					25		
6	28.0						
	28.5	50=6"					LT. GRAY MICA. SILTY FINE TO COARSE SAND.
					30		
7	33.0						
	34.5	12	16	17			PALE OCNE MICA. SILTY FINE TO MEDIUM SAND
					35		
8	38.0						
	39.5	7	10	11			PALE YELLOW MICA. SILTY FINE 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 AM. 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)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

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

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					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		

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 AM 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 —

+ 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

DUKE POWER COMPANY - BELEWS CREEK STEAM STATION

AS-BUILT INSTALLATION SKETCH

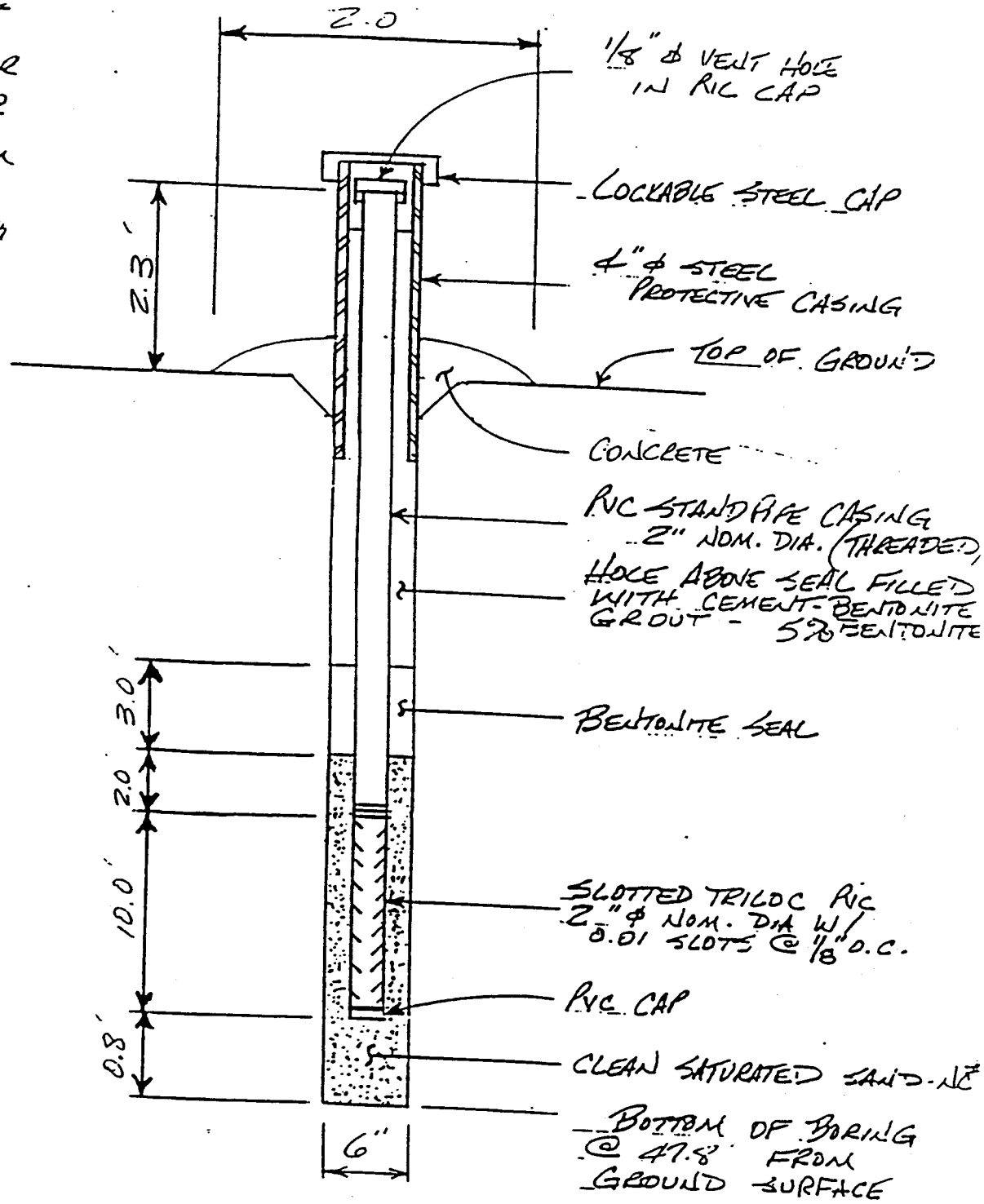
Instrument No. MW-3 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

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

T/PIPE ELEV. IS



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 THE
PARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN
P. O. BOX 2091, RALEIGH, N.C. 27602

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

Casing Type: THREADED TRILOC PVC dia. 2 in.
Casing Depth: from 0 to 28.2 ft. - dia. 2 in.
Screen Type: SLOT.010 . TRILOC PVC dia. 2 in.
Screen Depth: from 28.2 to 38.2 ft. - dia. 2 in.

Grout Depth: from 0 to 23.2 ft. - dia. 6.2
Bentonite Seal: from 23.2 to 26.2 ft. - dia. 6.2
Sand/Gravel PK: from 26.2 to 39.5 ft. - dia. 6.2
Total Well Depth: from 0 to 39.5 ft. - dia. 6.2

Static Water Level: 17.5 feet from top of casing Date Measured 8/9

Yield (gpm): N/A Method of Testing: N/A Casing is 1.8 feet above land s

DRILLING LOG		
DEPTH FROM	TO	FORMATION DESCRIPTION
		MW-1
		SEE ATTACHED SOIL TEST
		BORING FIELD REPORT FOR
		MW-4 @ 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: David L. Nichols

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 8-3-89 WEATHER HOT

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-4

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG #2555
							USING 6" ϕ AUGER
1	3.5						REDDISH YELLOW FINE TO MEDIUM
	5.0	8	9	10	5		SANDY SILT.
							-7-
2	8.5						YELLOW SILTY FINE TO MEDIUM SAND
	10.0	23	26	16	10		
3	13.5						YELLOW SILTY FINE TO COARSE SAND
XD	~~15.0~~	22	50=3"		15		
	14.3						-17-
4	18.5						OLIVE FINE TO MEDIUM SANDY SILT
	20.0	11	23	23	20		
5	23.5						OLIVE FINE TO MEDIUM SANDY SILT
	25.0	6	17	31	25		SPLIT BARREL SAMPLER RETURNED WET.
6	28.5						OLIVE BRN. SILTY FINE TO MEDIUM SAND
	30.0	13	18	28	30		
							-32-
7	33.5						OLIVE BRN. SILTY FINE TO MEDIUM
	34.5	25	50=6"		35		SAND
							-38
8	38.5						DARK OLIVE SILTY FINE TO COARSE
	38.9	50=5"			40		SAND AND FLAKY SLIGHTLY WEATHERED
*							ROCK FRAGMENTS

+ 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 @ 39.5'
BORING REFUSAL AUGER @ 39.5'
WATER TOB DEPTH 34.5' ON 8-3-89
WATER 24 HR: DEPTH 15.7' ON 8-9-87
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 39.5
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

* AUGER REFUSAL @ 39.5' - BORING TERMINATED - SEE ATTACHED SKE.

DUKE POWER COMPANY — BELEWS CREEK STEAM STATION

AS-BUILT INSTALLATION SKETCH

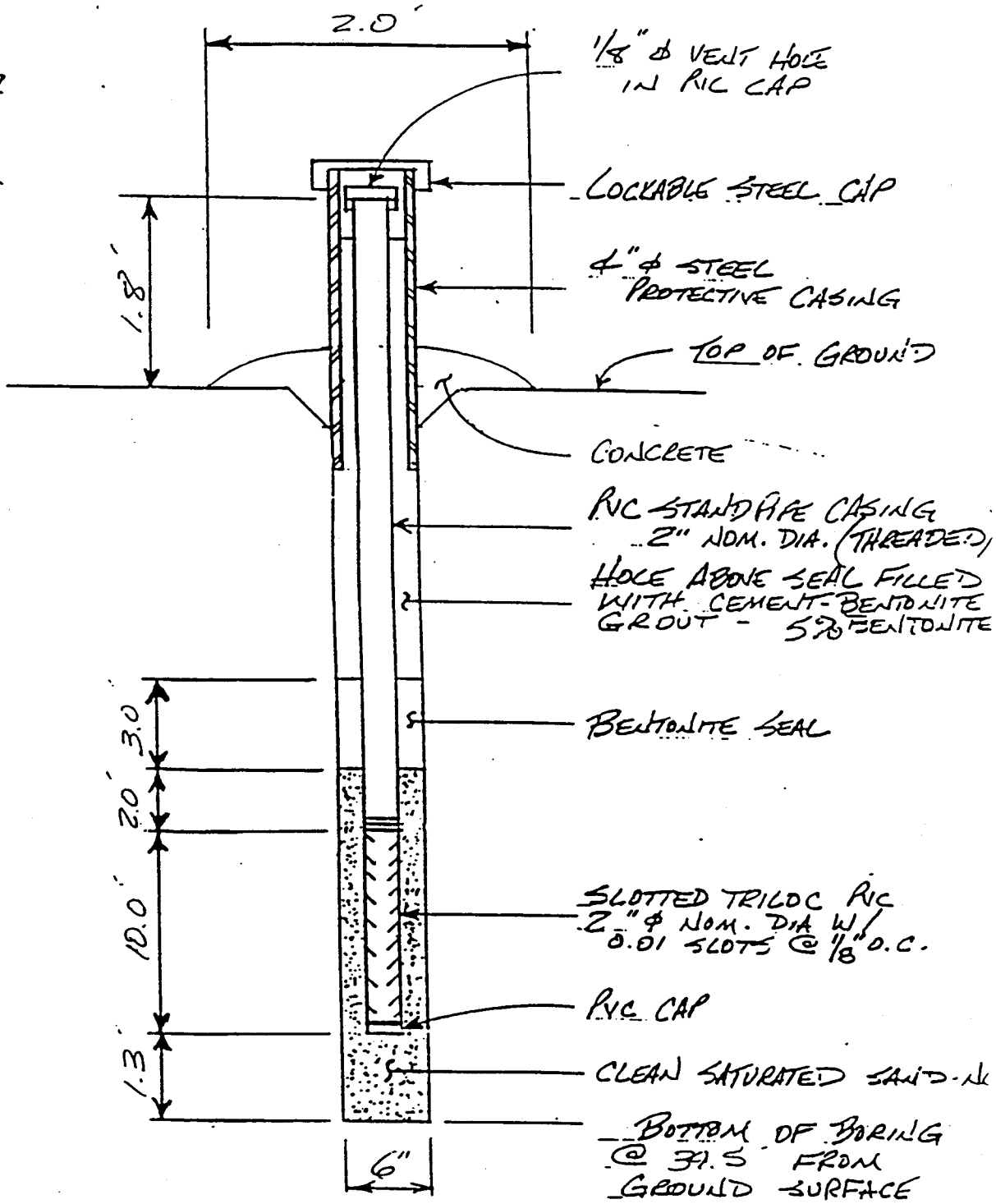
Instrument No. MW-4 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL RDG @ 17.5' FROM TOP/PIPE ON 8-9-89

T/PIPE ELEV. 15



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 THE
PARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN
. O. BOX 2091, RALEIGH, N.C. 27602

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

Casing Type: THREADED TRIOC PVC dia. 2 in.
Casing Depth: from 0 to 48.3 ft. - dia. 2 in.
Screen Type: SLOT.010 TRIOC PVC dia. 2 in.
Screen Depth: from 48.3 to 58.3 ft. - dia. 2 in.

Grout Depth: from 0 to 43.3 ft. - dia. 6.
Bentonite Seal: from 43.3 to 46.3 ft. - dia. 6.
Sand/Gravel PK: from 46.3 to 60.5 ft. - dia. 6.
Total Well Depth: from 0 to 60.5 ft. - dia. 6.

Static Water Level: 28.2 feet from top of casing

Date Measured 8/9

Yield (gpm): N/A Method of Testing: N/A Casing is 1.7 feet above land s

DRILLING LOG		
DEPTH FROM	TO	FORMATION DESCRIPTION
		MW-5
		SEE ATTACHED SOIL TEST
		BORING FIELD REPORT FOR
		MW-5 @ FLYASH
		LANDFILL.

LOCATION SKETCH
(show distance to numbered roads, or other map reference pc

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

DATE: 8-11-89 SIGNATURE: David L. Nelson

HS 3342 (6/85)

Form 25630 (R3-87)

FORM M-26C	REVISION 2
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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW's
DATE 8-8-89 WEATHER WARM

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-5

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG #2555 USING 6" ϕ AUGER
1	3.7 5.2	6	8	7	5		YELLOWISH RED FINE TO MEDIUM SANDY SILT.
2	8.7 10.2	6	10	10	10		YELLOWISH RED FINE TO MEDIUM SANDY SILT
3	13.7 15.2	4	5	6	15		BROWNISH YELLOW FINE TO MEDIUM SANDY SILT.
4	18.7 20.2	3	5	5	20		YELLOWISH BROWN FINE TO MEDIUM SANDY SILT.
5	23.7 25.2	3	5	6	25		LT. OLIVE BROWN FINE TO MEDIUM SANDY SILT
6	28.7 30.2	7	10	10	30		LT. GRAY FINE TO MEDIUM SANDY SILT
7	33.7 35.2	5	8	14	35		LT. GRAY FINE TO MEDIUM SANDY SILT
							37
8	38.7 40.2	17	28	29	40		OLIVE YELLOW SILTY FINE TO MEDIUM SAND.

BORING TERMINATED @ 60.5'
BORING REFUSAL AUGER @ 60.5'
WATER TOB DEPTH 54.0' @ 10:30 A.M. 8-8-89
WATER 24 HR: DEPTH 26.5' @ 2:00 P.M. 8-9-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 60.5
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL MW'S
DATE 8-8-89 WEATHER WARM

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. MW-5

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
9	43.7 45.2	14	17	25	45		LT. OLIVE BRN. SILTY FINE TO MEDIUM SAND
							47
10	48.7 50.2	8	15	13	50		LT. OLIVE BRN. FINE TO MEDIUM SANDY SILT.
11	53.7 55.2	5	8	9	55		LT. OLIVE BRN. FINE TO MEDIUM SANDY SILT.
							DLD
12	58.7 60.0	18	23	50=3"	60		LT. OLIVE BRN. SILTY FINE TO ~~MEDIUM SAND~~. COARSE SAND WITH SEVERELY WEATHERED ROCK GRAVELS.
							AUGER REFUSAL @ 60.5'
							BORING TERMINATED
					65		SET MONITOR WELL PER ATTACHED SKETCH.
					0		
					5		
					0		

+ 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 @60.5'
BORING REFUSAL AUGER @ 60.5'
WATER TOB DEPTH 54.0 @10:30 A.M. 8-8-89
WATER 24 HR: DEPTH 26.5 @ 2:00 P.M. 8-9-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 60.5
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

Revision 0 | Page —

DUKE POWER COMPANY — BELEWS CREEK STEAM STATION

AS-BUILT INSTALLATION SKETCH

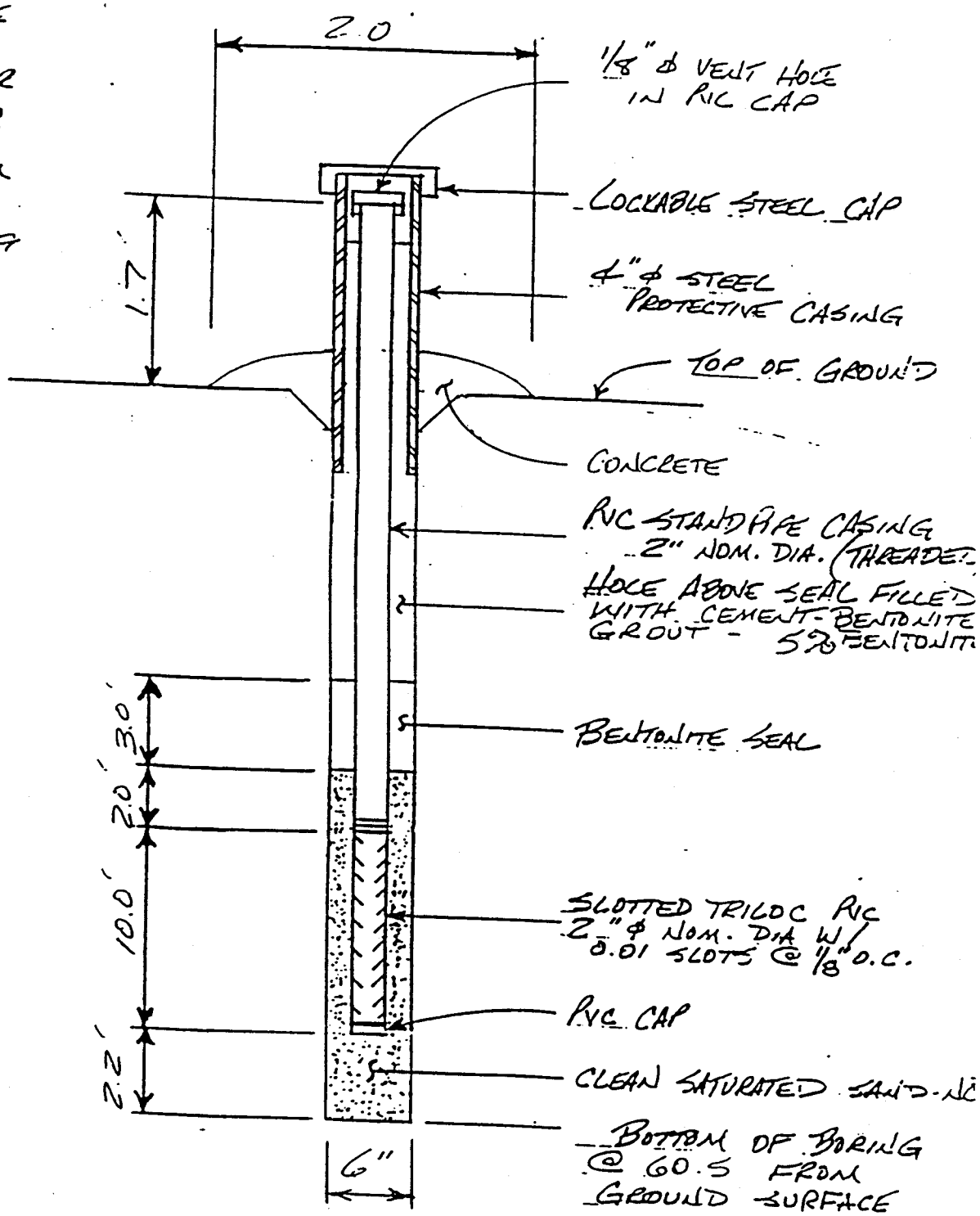
Instrument No. MW-5 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL RDG @ 28.2' FROM TOP/PIPE ON 8-9-89

T/PIPE ELEV. IS



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 THE
'ARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRAN
.. O. BOX 2091, RALEIGH, N.C. 27602

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

Casing Type: ~~THREADED~~ TRILOC PVC dia. 2 in.
Casing Depth: from 0 to 35.0 ft. - dia. 2 in.
Screen Type: SLOT .010 TRILOC PVC dia. 2 in.
Screen Depth: from 35.0 to 85.0 ft. - dia. 2 in.

Grout Depth: from 0 to 30.0 ft. - dia. 6.2
Bentonite Seal: from 30.0 to 33.0 ft. - dia. 6.2
Sand/Gravel PK: from 33.0 to 86.9 ft. - dia. 6.2
Total Well Depth: from 0 to 86.9 ft. - dia. 6.2

Static Water Level: 74.5 feet from top of casing

Date Measured 8/10/

Yield (gpm): N/A Method of Testing: N/A Casing is 2.5 feet above land su

DRILLING LOG		
DEPTH FROM	TO	FORMATION DESCRIPTION
		OB-1
		SEE ATTACHED SOIL TEST
		BORING FIELD REPORT
		FOR OB-1 @
		FLYASH LANDFILL.

LOCATION SKETCH

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

REMARKS: THIS WELL IS FOR DETERMINATION OF WATER TABLE ONLY.

DATE: 8-11-89 SIGNATURE: [signature]

HS 3342 (6/85)

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
STARTING TIME N/A
JOB NAME FLYASH LANDFILL MW'S
GROUND SURFACE ELEV.
DATE 8-9-89 WEATHER WARM
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. OB-1

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		AD-2 DRILL RIG #2555 USING 6" ϕ AUGER
1	4.1						DARK GRAY ASH.
	5.6	8	7	10	5		
2	9.1						DARK GRAY ASH
	10.6	6	5	5	10		
3	14.1						DARK GRAY ASH
	15.6	8	9	10	15		
4	19.1						DARK GRAY ASH
	20.6	8	8	8	20		
5	24.1						DARK GRAY ASH
	25.6	7	7	8	25		
6	29.1						DARK GRAY ASH.
	30.6	8	8	9	30		
7	34.1						DARK GRAY ASH
	35.6	9	17	22	35		
8	39.1						DARK GRAY ASH
	40.6	4	7	8	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 @ 86.9
BORING REFUSAL *AUGER @ 86.9'
WATER TOB DEPTH 83.5 @ 5:00 P.M. 8-9-89
WATER 24 HR: DEPTH 72.0 @ 7:30 AM. 8-10-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 86.9
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
STARTING TIME N/A
JOB NAME FLYASH LANDFILL NW'S
GROUND SURFACE ELEV.
DATE 8-9-89 WEATHER WARM
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. 23-1

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
9	44.1 45.6	5	2	3	45		DARK GRAY ASH. SAMPLE #9 IS DAMP.
10	49.1 50.6	5	3	6	50		DARK GRAY ASH 53.5
11	54.1 55.6	5	6	8	55		YELLOWISH RED MICA: SILTY FINE TO MED. SAND
12	59.1 60.6	6	7	10	60		YELLOWISH RED MICA. SILTY FINE TO MEDIUM SAND.
13	64.1 65.6	5	7	9	65		REDDISH YELLOW MICA. SILTY FINE TO MEDIUM SAND.
14	69.1 70.6	4	6	9	70		YELLOW SILTY FINE TO MEDIUM SAND
15	74.1 75.6	3	4	7	75		BROWNISH YELLOW SILTY FINE TO MEDIUM SAND
16	79.1 80.6	6	7	10	80		YELLOWISH BROWN SILTY FINE TO MEDIUM SAND.

B.T

BORING TERMINATED @ 86.9
BORING REFUSAL AUGER @ 86.9
WATER TOB DEPTH ~~64.5 @ 11:00 A.M. 8-9-89~~
WATER 24 HR: DEPTH 72.0 @ 7:30 A.M. 8-10-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 86.9
~~HAND CHOP: W/MUD: W/WATER~~	— TO —
~~ROTARY DRILL: W/MUD: W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 25630 (R3-87)

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DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT BELEWS CREEK

SOIL TEST BORING FIELD REPORT

JOB NO. N/A
JOB NAME FLYASH LANDFILL AREA'S
DATE 4-9-89 WEATHER WARM

STARTING TIME N/A
GROUND SURFACE ELEV.
HRS. DRILLING N/A HRS. MOVING N/A
INSPECTOR D. DICKSON BORING NO. OB-1

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					80		
1	84.1 SS	4	17	22	36	85	PALE YELLOW MICA SILTY FINE TO COARSE SAND.
86.9							AUGER REFUSAL @ 86.9' BORING TERMINATED
18	89.1						
					90		SET OBSERVATION WELL PER ATTACHED SKETCH.
					95		
					0		
					5		
					0		
					5		
					0		

+ 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 @ 86.9
BORING REFUSAL AUGER @ 86.9'
WATER TOB DEPTH 83.5' @ 5:00 P.M. 8-9-89
WATER 24 HR: DEPTH 72.0' @ 7:30 A.M. 8-10-89
WATER LOSSES N/A
CASING SIZE N/A LENGTH 0

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0 TO 86.9
~~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

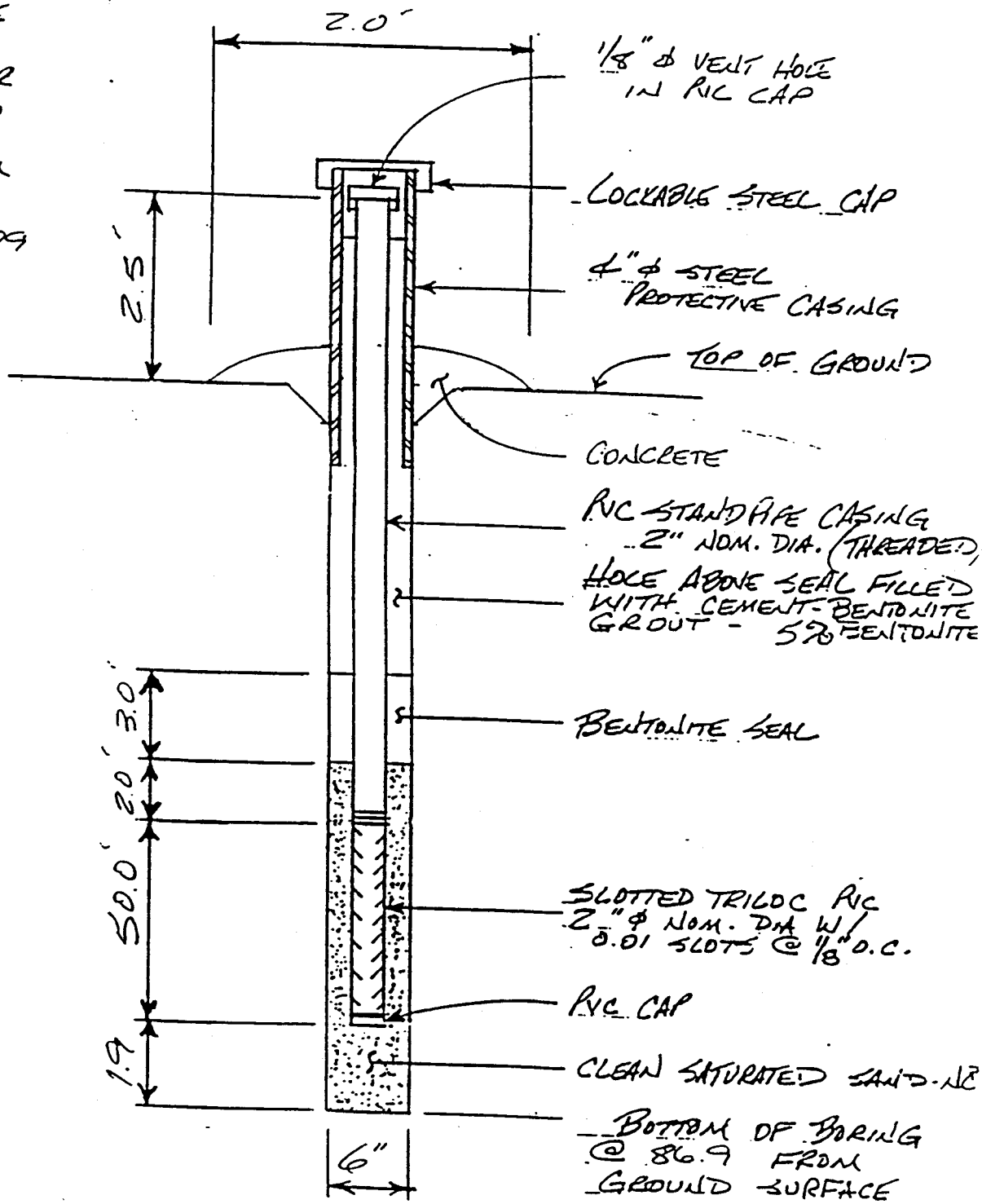
Instrument No. OB-1 Station N/A Offset N/A

By D. DICKSON Date 8-11-89

NOTE:
NOT TO SCALE

INITIAL WATER LEVEL ROG @ 74.5' FROM TOP/PIPE ON 8-10-89

T/PIPE ELEV. IS



Appendix B

Soil Test Boring Field Reports
Well Construction Records
Monitoring Well Installation Records
from 2000

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

DRILLING LOG From	To	DEPTH Formation Description
See Attached Soil test Boring field Report for		
[redacted]		
MW-2-1		

If additional space is needed use back of form

13. CASING:

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

14. GROUT:

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

15. SCREEN:

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

16. SAND/GRAVEL PACK:

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

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

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

Should this be 54? 25 TOC 51.5, 10 RK

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

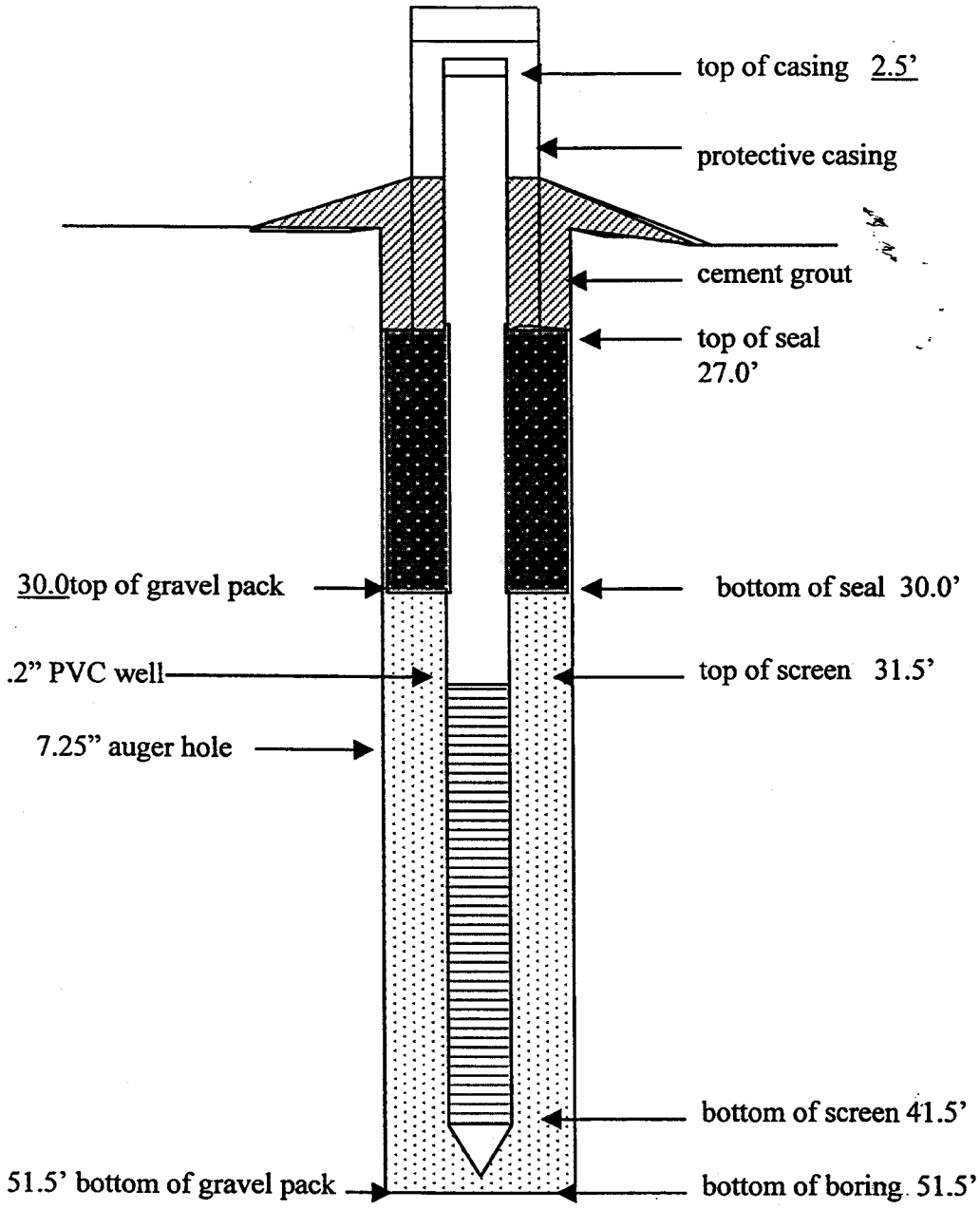
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: [redacted]

Form 269683 (R11-92) • Previously Form 25630

FORM M-26C	REVISION 3
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N: 924384.932
E: 1682007.138

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. [redacted]
JOB NO.
JOB NAME Ash Landfill
DATE 5-2-00 WEATHER P. Cloudy INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

STARTING TIME
GROUND SURFACE ELEV. 786.40
HRS. DRILLING HRS. MOVING

	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'
					5	X	4.5' Pushed UD #1 2.0' Rec = 1.9'
1	6.5' 8.0'	2	3	3			6.5' Yellow BRN, slightly MICA, Very Fine Sandy Silt
					10	X	9.5' Pushed UD #2 2.0' Rec = 2.0'
2	11.5' 13.0'	3	4	4			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	X	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

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/7 1/4" OD Auger	0.0' TO 51.5
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 269683 (R11-92) • Previously Form 25630

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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		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					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		

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 —

+ 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

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 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
13. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0'	27.0'	2"	Sch.40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	23.0'	Neat Cement	Pumped

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	27.0'	37.0'	2"	.010	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	26.0'	65.6'	#1	Clean sand

17. REMARKS: Note: there is A Bentonite seal from 23.0' TO 26.0'

DRILLING LOG / DEPTH

From	To	Formation Description
See Attached Soil test Boring field Report for		
~~Mw 2-2~~		

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

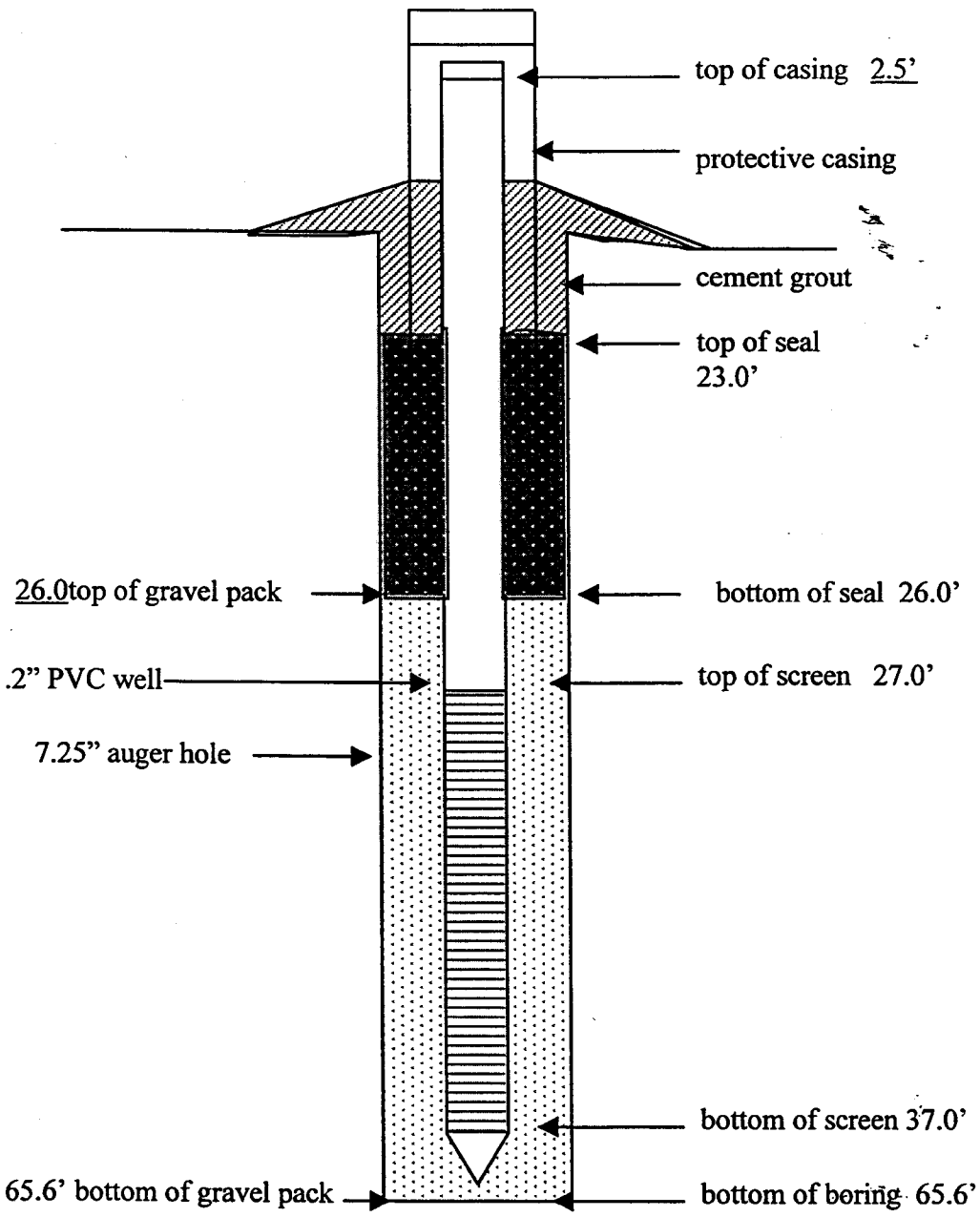
Submit original to Division of Water Quality, Groundwater Section within 30 days

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-2-2~~

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2 [redacted]
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 MICA, very fine sandy silt
					10		
					15		14.1' Pushed UD #1 2.0' Rec.= 2.0'
3	16.1' 17.6'	9	5	6			16.1' Yellowish BRN, slightly MICA, very fine sandy silt
					20		19.1' Pushed UD #2 2.0' Rec.= 2.0'
4	21.1' 22.6'	2	6	10			21.1' Yellowish BRN, slightly MICA, very silty fine sandy weathered Rock
							* Note: taking A Large Bag sample from 20.0' to 30.0'
					25		24.1' Pushed UD #3 1.4' Rec = 1.4'
5	25.5' 27.0'	24	23	20			25.5' Yellowish BRN, slightly MICA, very silty fine sandy weathered Rock
					30		29.1' Pushed UD # 4 2.0' Rec.= 1.1'
6	31.1' 32.6'	3	4	6			31.1' Yellowish BRN, slightly MICA, very fine sandy silt
							* Note: took A Large Bag sample from 30.0' to 40.0'
					35		34.1' Pushed UD # 5 2.0' Rec = 2.0'
7	36.1' 37.6'	8	12	14			36.1' BRN, slightly MICA, very fine sandy silty weathered Rock
					40		39.1' 39.5' Pushed UD #6 0.4' Rec = 0

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/ 7 1/4" OD Auger	0.0' TO 65.0'
~~HAND CHOP W/MUD W/WATER~~	— TO —
ROTARY DRILL W/MUD W/WATER	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 269683 (R11-92) • Previously Form 25630

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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 / Jim Barker Rocky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
8	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, very fine sandy silty weathered Rock
							Stopped Drilling on this Hole @ 64.1'
					70		* Set 2" well in this Hole
					75		
					80		

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 —

+ 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

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 5-11-00
5. TOTAL DEPTH 59.3'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 50.01' 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'	39.3'	2"	Sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	35.0'	Neat Cement	Pumped

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	39.3'	59.3'	2"	.010	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	38.0'	59.3'	#1	Clean Sand

17. REMARKS: Note: there is A Bentonite seal from 35.0' TO 38.0'

DRILLING LOG From	To	DEPTH Formation Description
See Attached Soil test Boring field Report for		
[redacted]		

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

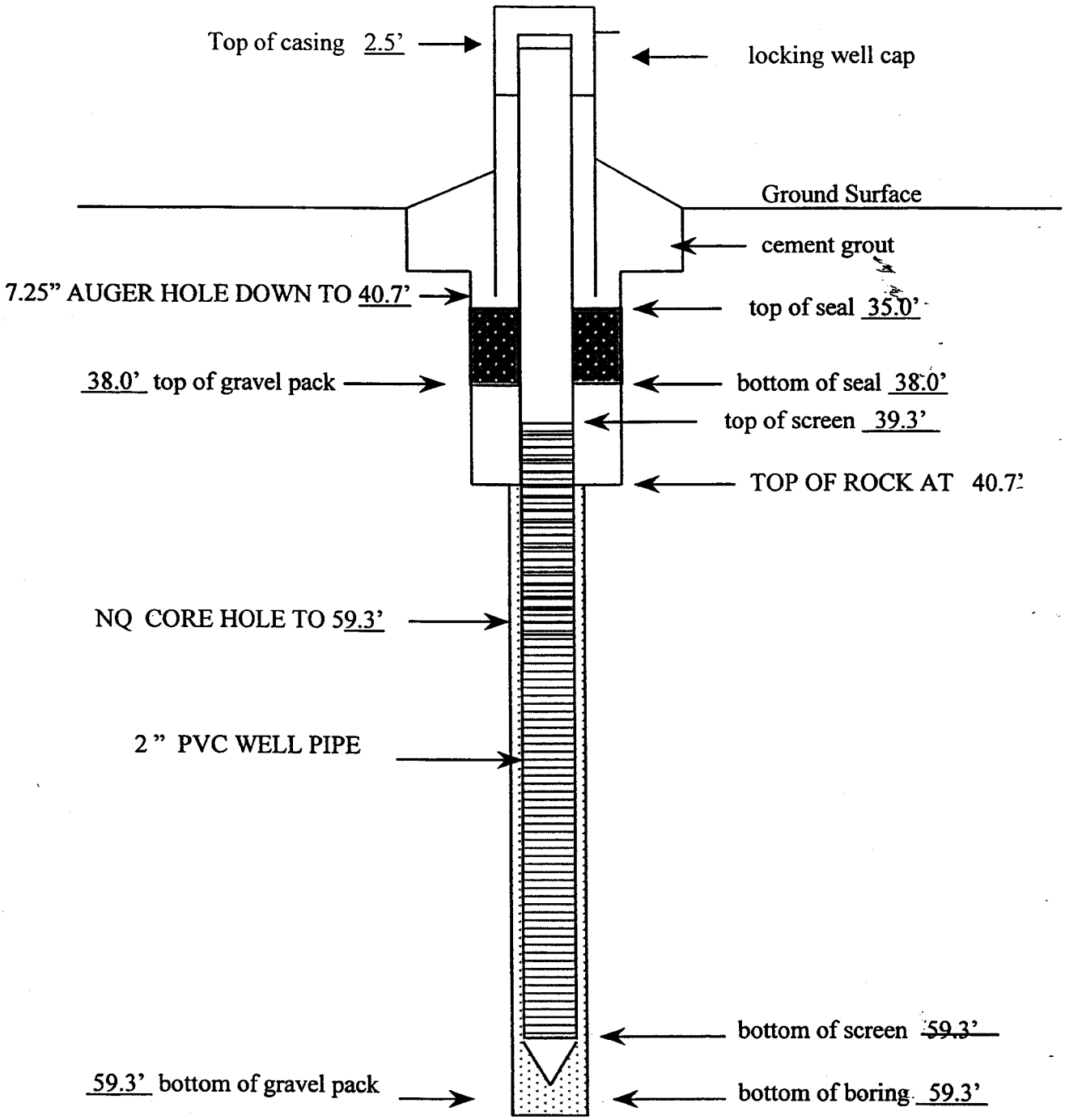
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 05-11-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: MW-2-3

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-3 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-8-00 WEATHER Clear Hot INSPECTOR/DRILLER C.A. Medlin / Jim Barker Bicky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0	*	Took A Large Bag Sample From 0.0'-10.0'
1	4.0' 5.5'	2	3	5	5		yellowish BRN, slightly Micay Fine sandy silt
							9.0' Pushed UD #1 0.9' Rec = 0.7'
2	9.9' 11.4'	4	13	13	10	X	9.9' Bent tube on its End yellowish BRN, slightly Micay Fine sandy silt w/ some weathered Rock in sample
						*	Took A Large Bag Sample From 10.0'-20.0'
						X	14.0' Pushed UD # 2 2.0' Rec = 2.0' Bent Tube some
3	16.0' 17.5'	21	32	35	15	X	16.0' yellowish BRN, slightly Micay very Fine Sandy silt
						X	19.0' Pushed UD # 3 1.0' Rec = 1.0'
4	20.0' 20.5'	50=6"			20	X	20.0' yellowish BRN, slightly Mica, silty Fine/Med. Sandy weathered Rock
						*	Took A Large Bag Sample From 20.0'-30.0'
5	24.0' 25.5'	8	12	16	25		yellowish BRN, slightly Mica, very silty Fine Sand
						X	29.0' Pushed UD # 4 1.6' Rec = 1.6'
6	30.6' 31.5'	13	50=5"		30	X	30.6' yellowish BRN. slightly Mica, very silty Fine sandy
						*	Took A Large Bag Sample From 30.0'-40.0'
7	34.0' 35.4'	16	18	50=5"	35		yellowish BRN, slightly Micay Fine sandy silt
8	39.0' 39.7'	12	50=3"		40		yellowish BRN, slightly Micay Fine sandy silt

Base grade soil sample

BORING TERMINATED ~~40.7'~~ 59.3'

BORING REFUSAL 40.7'

WATER TOB DEPTH Dry hole @ Depth 31.5' (overnite)

WATER 24 HR:DEPTH Dry hole @ Depth 40.7'/after casing 47.51'

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" Auger	0.0' TO 40.7'
~~HAND CHOP:W/MUD:W/WATER~~	___ TO ___
~~ROTARY DRILL:W/MUD:W/WATER~~	___ TO ___
~~DIAMOND CORE~~	___ TO ___
	40.7' TO 59.3

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-3 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-10-00 WEATHER Clear/Nice INSPECTOR/DRILLER C.A. Medlin / Jimy Barker Billy Dickard

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			40		set casing down Auger Hole & on down to 40.9'
					started Coring @ 40.9'
					* Note: No water Return
RQD = 4.0 = 48 %					
Rec = 7.7' = 92 %			45		Mod. Hard / Hard
Run = 8.4'					Mod. / very slight weathering
					Joints Are spaced very close / close
					Note: Last 2.8' of this Run very Good Rock
			50		— End of A 8.4' Run @ 49.3'
RQD = 8.1' = 81 %					Hard
Rec = 10.0' = 100 %					Slight / fresh weathering
Run = 10.0'					Joints Are close / wide
			55		Note: A severe weathered seam from 53.3' to 53.6'
					Also from 54.7' to 54.9', Rest of
					Rock in this Run is Good stuff.
			60		— End of A 10.0' Run @ 59.3'
					Hole terminated @ 59.3'
					set 2" well in this Boring
			65		w/ A 20.0' screen
			70		
			75		
			80		

BORING TERMINATED 59.3'

BORING REFUSAL 40.7' w/ Auger, 40.9' w/ CASING

WATER TOB DEPTH 35.2' - (After Coring)

WATER 24 HR:DEPTH After Coring 24hr 47.51'

WATER LOSSES Complete Loss @ 40.9'

CASING SIZE NW LENGTH 40.9'

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7 1/4" Auger	0.0' TO 40.7'
~~HAND CHOP:W/MUD:W/WATER~~	TO
ROTARY DRILL:~~W/MUD~~:W/WATER	40.7' TO 40.9'
DIAMOND CORE	40.9' TO 59.3'

+ 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

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 5-11-00
5. TOTAL DEPTH 58.0'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 47.87 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'	38.0'	2"	Sch.40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	33.0'	Neat Cement	Pumped

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	38.0'	58.0'	2"	.010	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	36.5'	58.0'	#1	Clean Sand

17. REMARKS: Note: there is A Bentonite Seal from 33.0' TO 36.5'

DRILLING LOG From	To	Formation Description	DEPTH
See Attached Boring field Report for MW[redacted]		soil test	

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

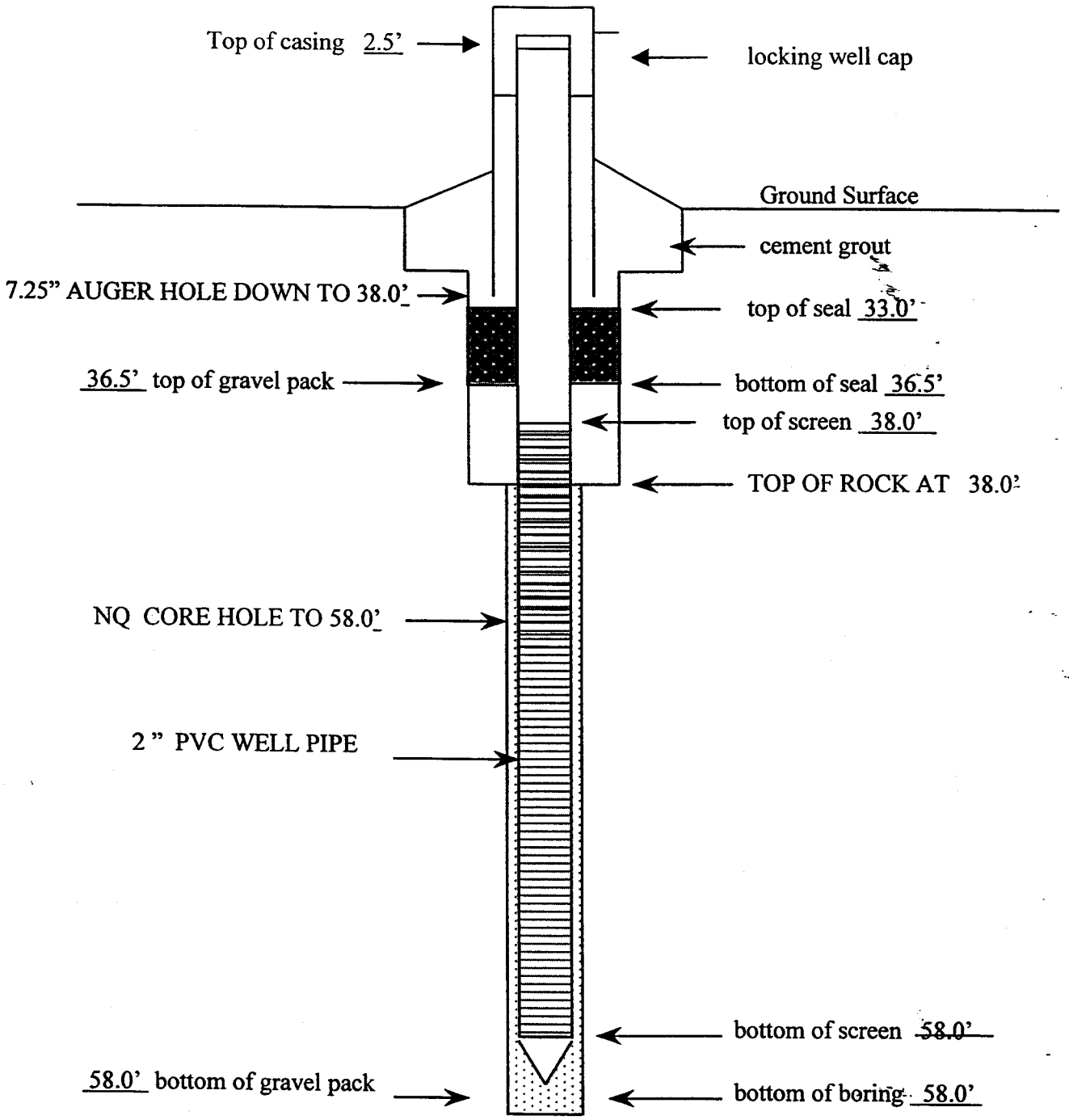
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 05-11-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: MW-2-4

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-2-4 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'	2	2	3	5		yellowish BRN, slightly MICA, Fine Sandy Silt
							9.0' Pushed UD #1 2.0' Rec.= 2.0'
2	11.0' 12.5'	2	3	4	10	X	11.0' yellowish BRN, slightly MICA, Fine Sandy Silt
						*	Took A Large Bag Sample From 10.0'-20.0'
3	14.0' 15.5'	3	4	5	15		yellowish BRN, slightly MICA, Fine Sandy Silt
							19.0' Pushed UD #2 2.0' Rec.= 1.6'
4	21.0' 22.5'	4	5	6	20	X	21.0' yellowish BRN, slightly MICA, Fine Sandy Silt
						*	Took A Large Bag Sample From 20.0'-30.0'
							24.0' Pushed UD #3 2.0' Rec.= 2.0' Rock Bent UD tube along side
5	26.0' 27.5'	11	18	19	25	X	26.0' yellowish BRN, slightly MICA, Fine Sandy Silt w/ A Seam of Quartz @ End
							29.0' UD Refused to Push any @ all
~~6~~	29.0' 29.2'	50=3"			30		NO Recovery in Split Spoon
						*	Took A Large Bag Sample From 30.0' to 38.0'
6	34.0' 35.2'	16	30	50=3"	35		yellowish BRN, slightly MICA, Fine Sandy Silt w/ Some Weathered Rock
							~~Auger Refusal @ 38.0'~~
					40		Setting NW Casing down Auger hole to 38.0' and then Coring

base grade

BORING TERMINATED ~~[illegible]~~ 58.0'

BORING REFUSAL 38.0' w/ Auger

WATER TOB DEPTH Dry hole

WATER 24 HR:DEPTH 45.37 (After Coring 24 hr)

WATER LOSSES ~~[illegible]~~ Never Returned @38.0'

CASING SIZE NW ~~N/A~~ LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" Auger	0.0' TO 38.0
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-4 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-10-00 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
			40		
RQD=1.5'=18 %					Mod. Hard
Rec=7.1'=85 %					Severe / Mod. Severe Weathering
Run=8.4'					Joints Are spaced Very Close
			45		
					— End of A 8.4' Run @ 46.4' —
RQD=.7'=9 %					Mod. Hard
Rec=6.6'=88 %					Severe / Mod. Severe Weathering
Run=7.5'			50		Joints Are spaced ~~Very~~ Close/Very Close
					— End of A 7.5' Run @ 53.9' —
RQD=.7'=17 %					Mod. Hard / Hard
Rec=4.1'=110 %			55		Mod. Severe / Mod. Weathering
Run=4.1'					Joints Are spaced Very Close / Close
					— End of A 4.1' Run @ 58.0' —
			60		
					Hole terminated @ 58.0'
					Set A 2" well w/ 20' screen
			65		
			70		
			75		
			80		

BORING TERMINATED 58.0'

BORING REFUSAL ~~[illegible]~~ 38.0'

WATER TOB DEPTH 44.83'

WATER 24 HR:DEPTH ~~[illegible]~~ 45.37' 5-11-00

WATER LOSSES Never Returned @ 38.0'

CASING SIZE N W LENGTH 38.0'

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7 1/4" Auger	0.0' TO 38.0
~~HAND CHOP:W/MUD:W/WATER~~	TO
ROTARY DRILL:~~W/MUD~~:W/WATER	TO
DIAMOND CORE	38.0' TO 58.0

+ 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

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
13. CASING:

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

14. GROUT:

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

15. SCREEN:

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

16. SAND/GRAVEL PACK:

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

17. REMARKS: Note: there is A Bentonite Seal from 30.0' TO 33.0'

DRILLING LOG From	To	DEPTH Formation Description
See Attached Soil test Boring field Report For		

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

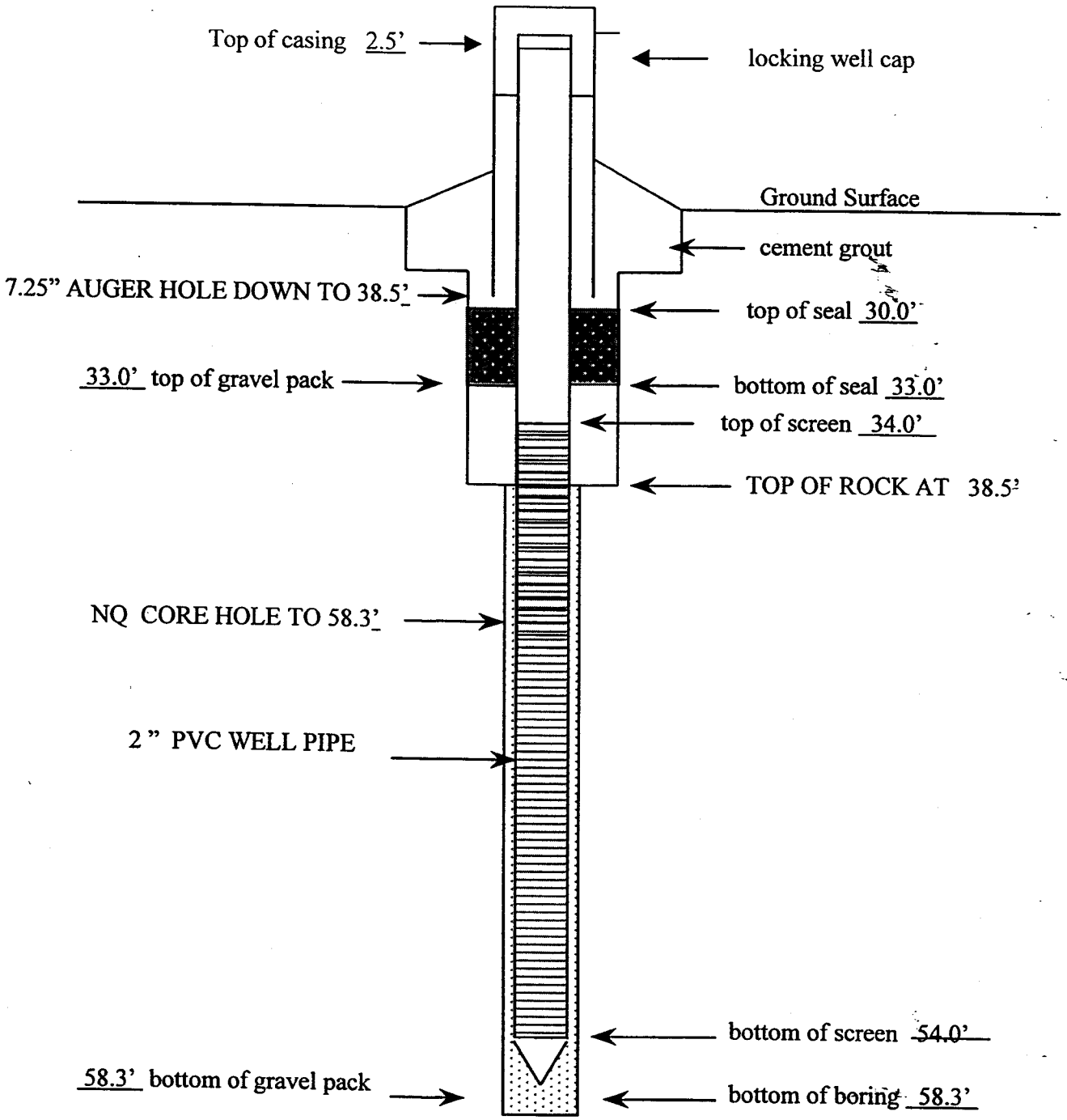
Submit original to Division of Water Quality, Groundwater Section within 30 days

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

Form 269683 (R11-92) • Previously Form 25630

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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	5		Yellowish Red slightly mica, fine sandy silty clay
2	9.0' 10.5'	3	3	5	10		yellow / Lt. Red slightly mica, very fine sandy silt
							* Took a large bag sample from 10.0' to 20.0'
3	14.0' 15.5'	2	4	6	15		yellowish Lt. Red slightly mica, very fine sandy silt, small amount of weathered rock in sample
4	19.0' 20.5'	7	12	13	20		yellowish brn., slightly mica, very fine sandy silt
							* Took a large bag sample from 20.0' to 30.0'
5	24.0' 25.5'	9	15	18	25		yellowish brn., slightly mica, very fine sandy silt
6	29.0' 30.0'	25	50=6"		30		yellowish brn., slightly mica, very fine sandy silt w/ some weathered rock in sample
7	34.0' 34.5'	50=6"			35		yellowish brn., slightly mica, very silty fine / med. sand
~~8~~	~~38.5~~	50=0"			40		No penetraction on split spoon ~~refusal @ 38.5'~~, went ahead and tried a spoon

BORING TERMINATED ~~38.5'~~ 58.3'

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~~	— TO —
	38.8' 58.3'

+ 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

Form 269683 (R11-92) • Previously Form 25630

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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 / Jim 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
					* Notes Loss water @ 47.3' but it came back
					— End of 9.7' Run @ 48.5' —
RQD=8.6'=88 %			50		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		

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'

+ 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

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 5-4-00
5. TOTAL DEPTH 48.4'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: — 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:

From	To	Diameter	Wall Thickness or Weight/Ft.	Material
0.0'	24.0'	2"	Sch 40	PVC

14. GROUT:

From	To	Material	Method
0.0'	20.0'	Neat Cement	Pumped

15. SCREEN:

From	To	Diameter	Slot Size	Material
24.0'	34.0'	2" in.	.010 in.	PVC
		in.	in.	
		in.	in.	

16. SAND/GRAVEL PACK:

From	To	Size	Material
23.0'	48.4'	#1	clean sand

17. REMARKS: Note: there is A Bentonite seal from 20.0' TO 23.0'

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

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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. ~~MW-8~~ STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-3-00 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		
1	3.0' 4.5'	2	6	8	5		yellowish Red, slightly Mica, Fine sandy silty clay
2	8.0' 9.5'	2	5	6	10		yellowish Red, slightly Mica, Fine sandy silty clay
3	13.0' 14.5'	2	5	7	15		yellowish Red, slightly Mica, Fine sandy silty clay
						*	TOOK A Large Bag Sample FROM 8.0' TO 18.0'
4	18.0' 19.5'	2	3	4	20		yellowish BRN, slightly Mica, Fine sandy silt
5	23.0' 24.5'	2	3	4	25		yellowish BRN, slightly Mica, Fine sandy silt
						*	TOOK A Large Bag Sample from 18.0'-28.0'
6	28.0' 29.5'	2	2	5	30		yellowish BRN, slightly Mica, Fine sandy silt
7	33.0' 34.5'	8	14	23	35		yellowish BRN, slightly Mica, very silty Fine sand w/ some Quartz Particles
						*	TOOK A Large Bag Sample FROM 28.0'-38.0'
8	38.0' 39.5'	3	6	9	40		yellowish BRN, slightly Mica, Fine sandy silt

BORING TERMINATED 48.4'
BORING REFUSAL 48.4'
WATER TOB DEPTH 28.77' 5-3-00
WATER 24 HR:DEPTH 27.32' 5-4-00
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 48.4'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
DIAMOND CORE	— TO —

+ 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

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-6 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 5-3-00 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
					40		
9	43.0' 44.5'	5	13	29	45		Yellowish BRN, Slightly Micaceous, Fine sandy silt Saprolite
							* Took A Large Bag Sample From 38.0'-48.0'
10	48.0' 48.1'	50/2"			50		Yellowish BRN, slightly Micaceous silty Fine sandy weathered Rock
							Auger Refusal @ 48.4'
					55		* Set well in this Hole
					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 48.4'

BORING REFUSAL 48.4'

WATER TOB DEPTH 28.77' 5-3-00

WATER 24 HR:DEPTH 27.32' 5-4-00

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER w/ 7 1/2" Auger	0.0' TO 48.4'
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: Temporary Well

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 4-26-00
5. TOTAL DEPTH 75.7'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 37.34 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'	65.7'	1"	Sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	6"	Concrete Mix	Poured

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	65.7'	75.7'	1" ~~1.010~~ CAM	.010 in.	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	N/A	N/A	N/A	N/A

17. REMARKS: Note: there is a Bentonite seal from 0.5' TO 3.0'

DRILLING LOG From	To	DEPTH Formation Description
See Attached Soil test Boring field Report for BC-1A		

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)

Temporary Well Only

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

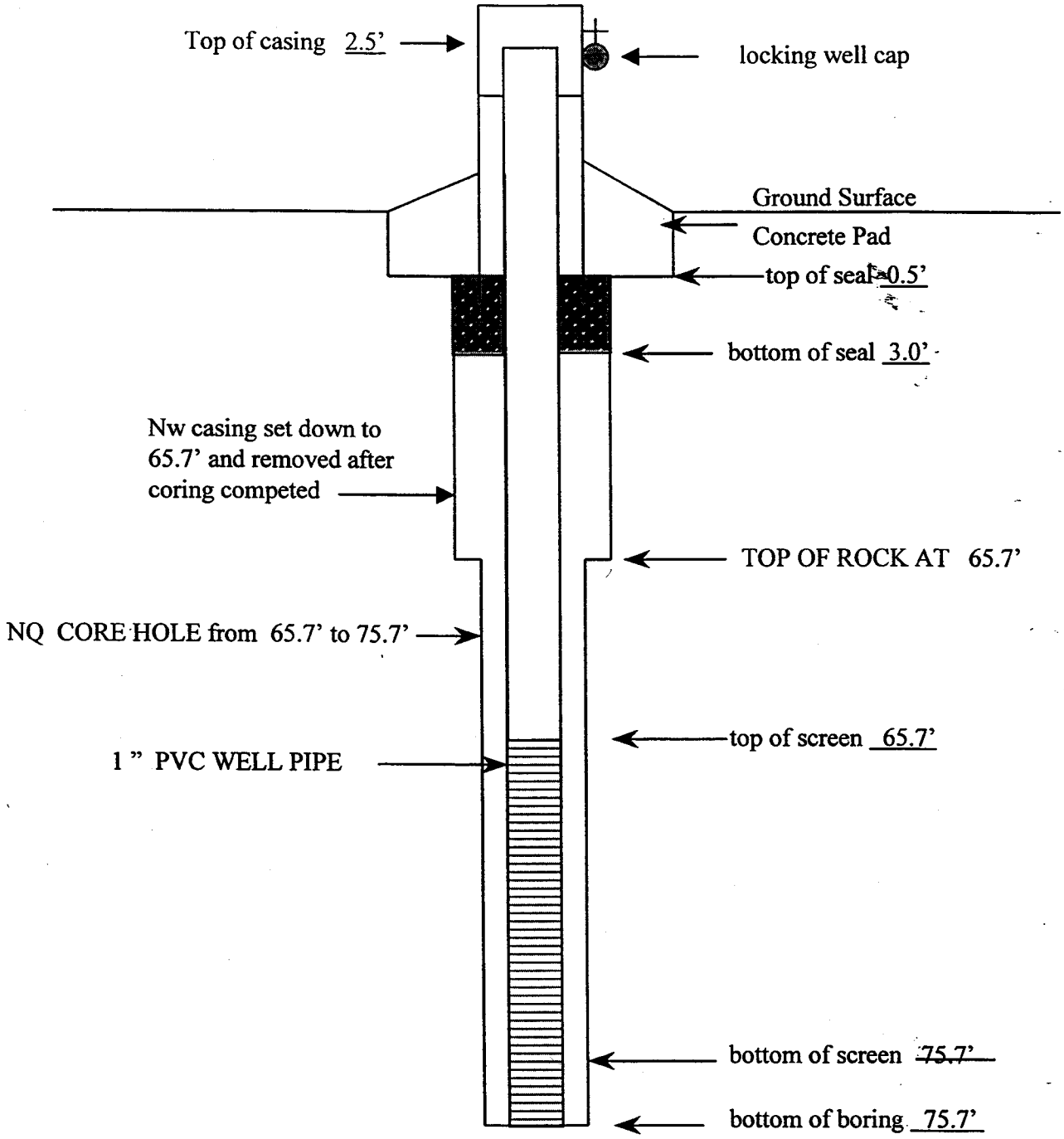
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 04-26-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: [redacted]

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-LA

JOB NO.

JOB NAME Ash Landfill

DATE 4-24-00 WEATHER Cloudy INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

STARTING TIME

GROUND SURFACE ELEV.

HRS. DRILLING HRS. MOVING

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			0		
			5		
					Set NW casing down to 8.9' and
					Ran a falling head perm. @ 8.9'
			10		
			15		
			20		
					Set NW casing down to 23.8' and
			25		Ran a falling head perm. @ 23.8'
			30		
			35		
			40		

BORING TERMINATED 75.7'

BORING REFUSAL 65.7'

WATER TOB DEPTH 37.35' 4-26-00

WATER 24 HR:DEPTH 34.84' 4-27-00

WATER LOSSES slight if any

CASING SIZE NW LENGTH 65.7'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 65.7'
DIAMOND CORE	65.7' TO 75.7'

+ 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

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. BC-1A
STARTING TIME
JOB NO.
GROUND SURFACE ELEV.
JOB NAME Ash Land fill
HRS. DRILLING HRS. MOVING
DATE 4-26-00 WEATHER Cloudy wet INSPECTOR/DRILLER CA. Medlin / Jim Barker Ricky Dickard

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
					45		
1	48.8' 49.4'	39	50=2"		50		yellowish BRN, slightly Micay silty Fine sandy weathered Rock (saprolite) note: Drilling hard (5000 PSI down Press) @54.2
							* Note: Tried to Run a falling head Perm. But water fall out of casing to Quick.
2	54.2' 55.1'	28	50=5"		55		yellowish BRN, slightly Mica, silty Fine sandy weathered Rock (saprolite)
3	58.8' 58.9'	50=2"					NO Recovery in split spoon
					60		
							Didn't Try a split spoon because, it was Drilling to hard
					65		— Carbide Refusal @ 65.7' —
	RQD=2.7'=27 % Rec=8.1=81 % RUN=10.0'						Hard / Mod. Hard Mod. Severe / Severe weathering Joints Are spaced close / Very close
					70		
							Note: RAN a falling head Perm. From 65.7'-75.7' just in the Rock core.
					75		— End of A 10.0' RUN @ 75.7' —
							Hole terminated @ 75.7'
					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 75.7'
BORING REFUSAL 65.7'
WATER TOB DEPTH 37.35' 4-26-00
WATER 24 HR:DEPTH 34.84' 4-27-00
WATER LOSSES Slight If any
CASING SIZE NW LENGTH 65.7'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP W/MUD W/WATER~~	— TO —
ROTARY DRILL ~~W/MUD~~ W/WATER	0.0' TO 65.7'
DIAMOND CORE	65.7' TO 75.7'

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: temporary well

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 4-18-00
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: 33.5' 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
13. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0'	To 48.3	Ft.	2"	sch 40	PVC
From	To	Ft.			
From	To	Ft.			

14. GROUT:

	Depth		Material	Method
From 0.0'	To 6"	Ft.	Concrete Mix	Poured
From	To	Ft.		

15. SCREEN:

	Depth		Diameter	Slot Size	Material
From 48.3	To 58.3	Ft	2" in.	.010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

16. SAND/GRAVEL PACK:

	Depth		Size	Material
From N/A	To N/A	Ft.	N/A	N/A
From	To	Ft.		

17. REMARKS: Note: there is A Bentonite seal from 0.5' TO 3.5'

DRILLING LOG

From	To	DEPTH Formation Description
See Attached Soil test Boring field Report for BCR		

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)

Temporary well only

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

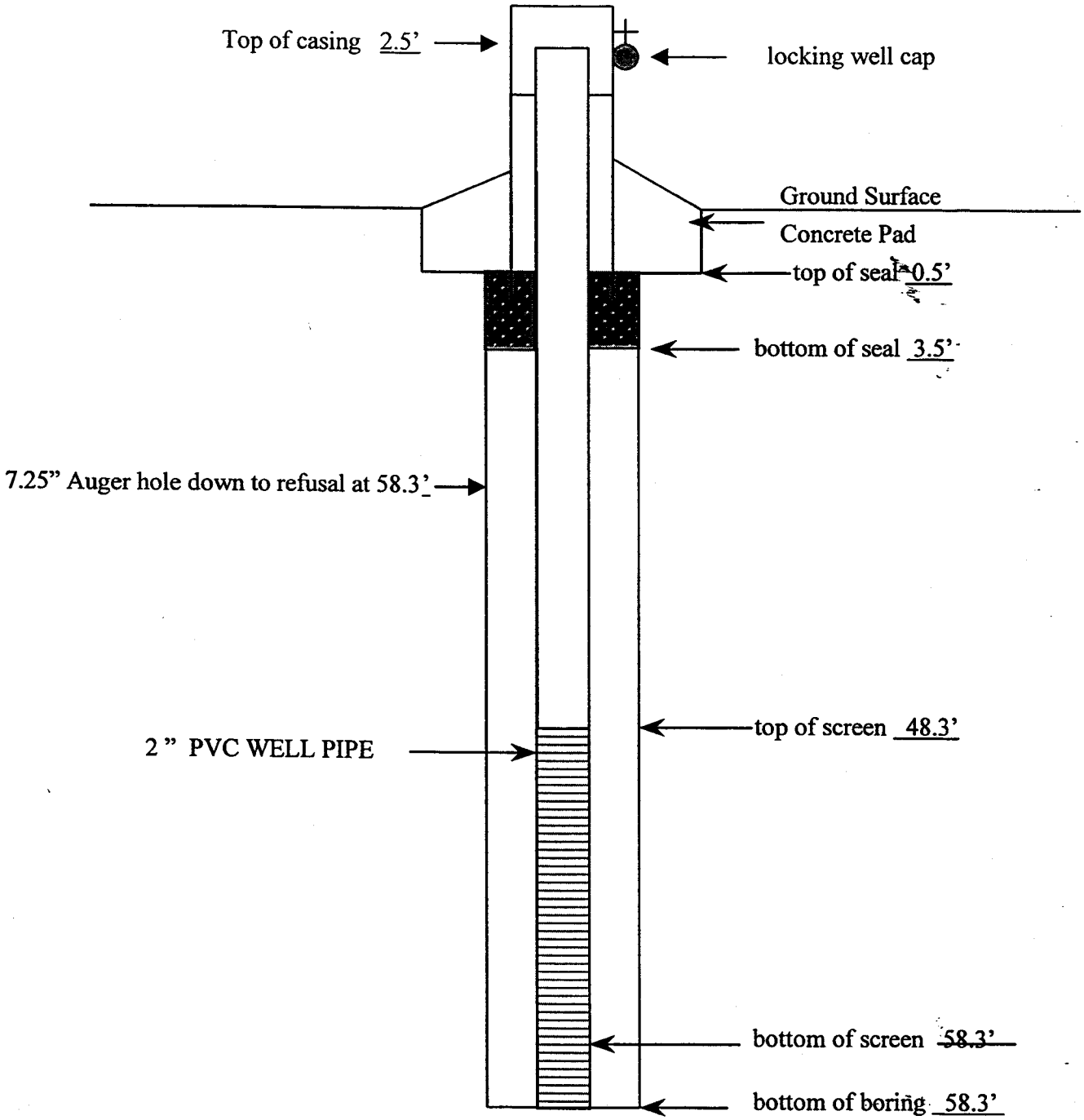
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 04-18-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: BC-2

Form 269683 (R11-92) • Previously Form 25630

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N - 923450.631
E - 1682612.452

DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-2 STARTING TIME 10:00
JOB NO. GROUND SURFACE ELEV. 841.73
JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING
DATE 4-18-00 WEATHER Cloudy wet cool INSPECTOR/DRILLER CA. Medlin / Jim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
1	1.0' 2.5'	6	20	16	0		Lt. Gray very Fine Fly Ash
2	4.5' 6.0'	9	13	20	5		Lt. Gray very Fine Fly Ash
3	7.0' 8.5'	7	15	20			Lt. Gray very Fine Fly Ash
							** Note: Ash/Soil
4	9.5' 11.0'	4	7	7	10		Lt. Gray very Fine Fly Ash Interface at 10.17'
							* Note: Last 3" was soil yellowish BRN, slightly mica, very Fine sandy silt
5	12.0' 13.5'	2	3	5			Pale yellowish BRN, slightly mica, very Fine sandy silt
6	14.5' 16.0'	1	2	3	15		Pale yellow, slightly mica, very Fine sandy silt
7	19.5' 21.0'	1	3	4	20		Pale yellowish Gray, slightly mica, very Fine sandy silt
8	24.5' 26.0'	1	3	4	25		Pale yellowish Gray, slightly mica, very Fine sandy silt
9	29.5' 31.0'	2	6	12	30		yellowish BRN, slightly mica, very Fine sandy silt
10	34.5' 36.0'	31	33	35	35		yellowish BRN, slightly mica, silty Fine sand
							* H_2O showed up in sample #10
11	39.5' 41.0'	22	40	50-6"	40		yellowish BRN, slightly mica, silty Fine/Med. sandy weathered Rock (saprolite)

BORING TERMINATED 58.3'
BORING REFUSAL 58.3'
WATER TOB DEPTH 47.3' inside 2" Pipe 27.0' outside Pipe
WATER 24 HR:DEPTH 31.0' 4-19-00
WATER LOSSES None used
CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER w/ 7¼" Auger	0.0' TO 58.3'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-2 STARTING TIME 11:30

JOB NO. GROUND SURFACE ELEV. 841.73

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-18-00 WEATHER Cloudy wet Cold INSPECTOR/DRILLER C.A. Medlin / Tim Barker Ricky Dickard

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
12	44.5' 46.0'	4	12	43	45		Yellowish BRN, slightly micaceous silty Fine/Med. Sandy weathered Rock (Saprolite)
						~~Wet~~	Note: Augered to 49.5' had 3'of 4' to come up inside Auger could get spoon, but were going to do another hole w/ NW casing to get Rock core and to do Perms. so we will start w/ split spoons @ 49.5'
					50		
					55		Ran on down to Refusal @ 58.3'
							— Auger Refusal @ 58.3' —
					60		set a 2" temp. well
					65		Note: Checked H_2O inside 2" Pipe before Pulling Auger and H_2O @ 47.3'
							Also Note: Checked H_2O Between hole and Pipe (outside of 2" Pipe) and H_2O @ 27.0'
					70		
					75		
					80		

Finished 2:47

BORING TERMINATED 58.3'

BORING REFUSAL 58.3'

WATER TOB DEPTH 47.3' inside 2" Pipe, 27.0' outside Pipe

WATER 24 HR:DEPTH 31.0' 4-19-00

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER	0.0' TO 58.3'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

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: Temporary well

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 4-19-00
5. TOTAL DEPTH 67.3'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 57.9' 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

DRILLING LOG From	To	DEPTH Formation Description
See Attached Soil test Boring field Report for BC-3		

If additional space is needed use back of form

12. CHLORINATION: Type N/A Amount N/A
13. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0'	57.3' Ft.	1"	Sch 40	PVC
		Ft.			
		Ft.			

14. GROUT:

	Depth From	To	Material	Method
	0.0'	6" Ft.	Concrete Mix	Poured
		Ft.		

15. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	57.3'	67.3' Ft	1" in.	.010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

16. SAND/GRAVEL PACK:

	Depth From	To	Size	Material
	N/A	N/A Ft.	N/A	N/A
		Ft.		

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

Temporary Well Only

17. REMARKS: Note: there is A Bentonite seal from TO

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

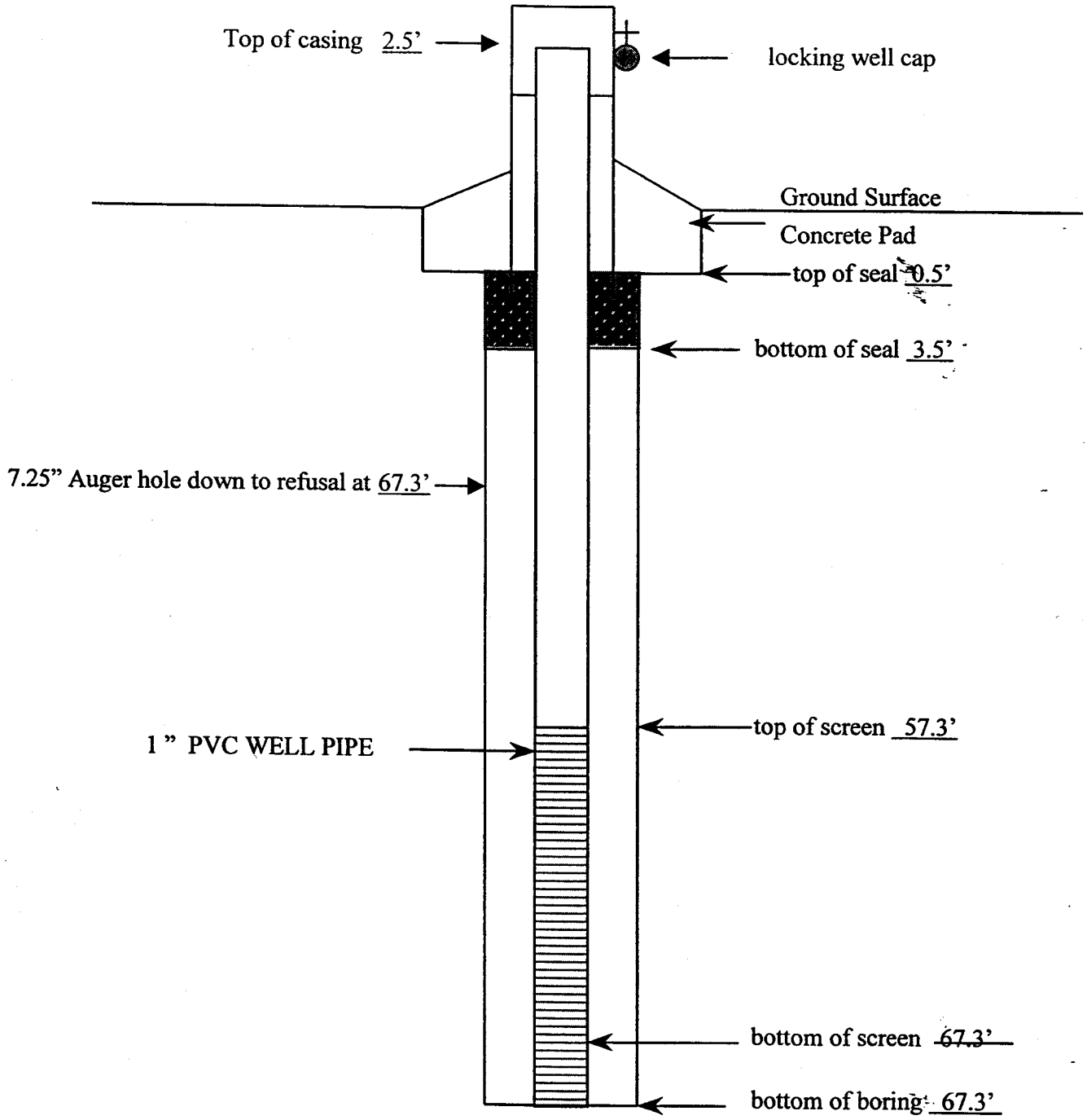
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 04-19-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: BC-3

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-3 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-19-00 WEATHER Clear/Nice 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'	1	1	6			Lt. Gray, very fine fly ash
					5		
2	9.0' 10.5'	2	4	4			Lt. Gray, very fine fly ash
					10		
3	14.0' 15.5'	3	12	12			Lt. Gray, very fine fly ash
					15		
4	19.0' 20.5'	3	4	4			Lt. Gray, very fine fly ash
					20		
5	24.0' 25.5'	2	11	15			Lt. Gray, very fine fly ash
					25		
6	29.0' 30.5'	1	2	2			Lt. Gray, very fine fly ash
					30		
7	34.0' 35.5'	1 = 18"					Lt. Gray, very fine, very wet fly ash
					35		
8	39.0' 39.5'	50 = 6"					* Note: fly ash / soil interface @ 39.1' yellowish brn, slightly micr, silty fine sand
					40		

BORING TERMINATED 67.3'
BORING REFUSAL 67.3'
WATER TOB DEPTH 61.2' 4-19-00
WATER 24 HR:DEPTH 55.4' 4-20-00
WATER LOSSES None used
CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7 1/4" Auger	0.0' TO 67.3'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
DIAMOND CORE	— TO —

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-3 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-19-00 WEATHER Clear/nice INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		* Note: We took 2 Large Bag samples from 40.0' to 50.0'
9	44.0' 45.0'	21	50=6"		45		Gray, slightly mica, silty fine/med. sandy weathered Rock (Saprolite)
10	49.0' 49.3'	50=4"			50		Yellowish Brn, slightly mica, silty fine sand (Saprolite)
							* Note: We took 1 Large Bag sample from 50.0' to 60.0'
11	54.0' 54.8'	16	50=4"		55		Brn, slightly mica, silty fine sandy weathered Rock (Saprolite)
12	59.0' 59.3'	50=4"			60		Brn, slightly mica, silty fine sandy weathered Rock (Saprolite)
13	64.0' 64.1'	50=2"			65		Brn/Gray slightly mica, silty fine sandy weathered Rock (Saprolite) H2O in this sample
							— Auger Refusal @ 67.3' —
					70		
					75		
					80		

BORING TERMINATED 67.3'

BORING REFUSAL 67.3'

WATER TOB DEPTH 61.2' 4-19-00

WATER 24 HR:DEPTH 55.4' 4-20-00

WATER LOSSES NONE used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" Auger	0.0' TO 67.3
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

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: Termporary Well

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 5-16-00
5. TOTAL DEPTH 53.5'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 46.18' 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'	43.5'	1"	sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	0.5'	Concrete Mix	Poured

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	43.5	53.5'	1"	.010 in.	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	N/A	N/A	N/A	N/A

17. REMARKS: Note: there is A Bentonite seal from 0.5' TO 3.5'

DRILLING LOG / DEPTH

From	To	Formation Description
See Attached Soil test Boring field Report for BC-4A		

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)

Temporary Well only

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

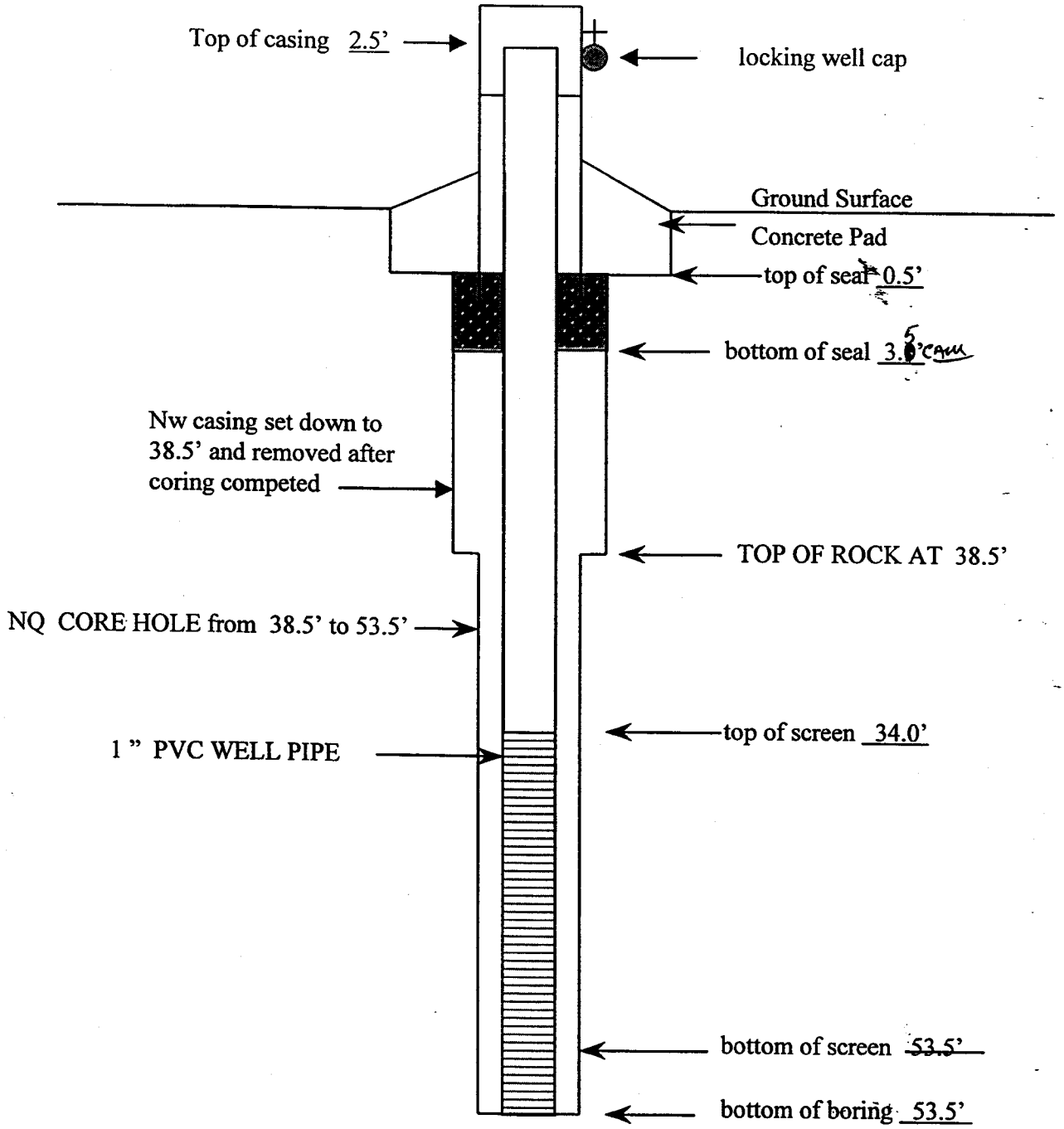
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 05-16-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: BC-4A

FAX - 382 - 2778

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-4A
STARTING TIME
JOB NO.
GROUND SURFACE ELEV.
JOB NAME Ash Landfill
HRS. DRILLING HRS. MOVING
DATE 5-16-00 WEATHER Clear/Nice INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			0		
			5		
					Set NW casing down to 9.5'
			10		And ran a falling head perm.
			15		
					Set NW casing down to 19.5'
			20		And ran a falling head perm.
					Loss water @ 22.2'
			25		
					set NW casing down to 29.5'
			30		And ran a falling head perm.
			35		
					Carbide Refusal @ 38.5'
			40		

BORING TERMINATED 53.5'
BORING REFUSAL 38.5'
WATER TOB DEPTH 39.2' 5-16-00
WATER 24 HR:DEPTH 43.68' 5-17-00
WATER LOSSES 22.2' Complete Loss
CASING SIZE NW LENGTH 38.5'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 38.5'
DIAMOND CORE	38.5' TO 53.5'

+ 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

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. BC-4A
STARTING TIME
JOB NO.
GROUND SURFACE ELEV.
JOB NAME Ash Land Fill
HRS. DRILLING HRS. MOVING
DATE 5-16-00 WEATHER Clear NICE INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			40		
RQD=1.7'=17 %					Medium / Mod. Hard
Rec=7.0'=70 %					Severe / Mod. Severe Weathering
RUN=10.0'					Joints are spaced very close / close
			45		
					— End of A 10.0' RUN @ 48.5' —
RQD=2.5'=50 %			50		Mod. Hard / Hard
Rec=5.0'=100 %					Mod. Weathering
RUN=5.0'					Joints are spaced very close / close
					— End of A 5.0' RUN @ 53.5' —
			55		Hole terminated @ 53.5'
					53.5'
					Note! We tried to run a Falling Head Perm. in the Rock but couldn't fill the casing up with water.
			60		
					Also: we had a complete water loss @ 22.2' and it never returned
			65		
			70		
			75		
			80		

BORING TERMINATED 53.5'
BORING REFUSAL 38.5'
WATER TOB DEPTH 39.2' 5-16-00
WATER 24 HR:DEPTH 43.68' 5-17-00
WATER LOSSES 22.2' Complete Loss
CASING SIZE NW LENGTH 38.5'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD:~~W/WATER	0.0' TO 38.5'
DIAMOND CORE	38.5' TO 53.5'

+ 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

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: Temporary Well

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 4-18-00
5. TOTAL DEPTH 30.2'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing: 24.6' 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'	20.2'	1"	Sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	6"	Concrete Mix	Poured

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	20.2'	30.2'	1"	.010	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	N/A	N/A	N/A	N/A

17. REMARKS: Note: there is A Bentonite seal from 0.5' TO 3.5'

DRILLING LOG / DEPTH

From	To	Formation Description
See Attached Soil test Boring field Report for BC-5		

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)

Temporary Well only

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

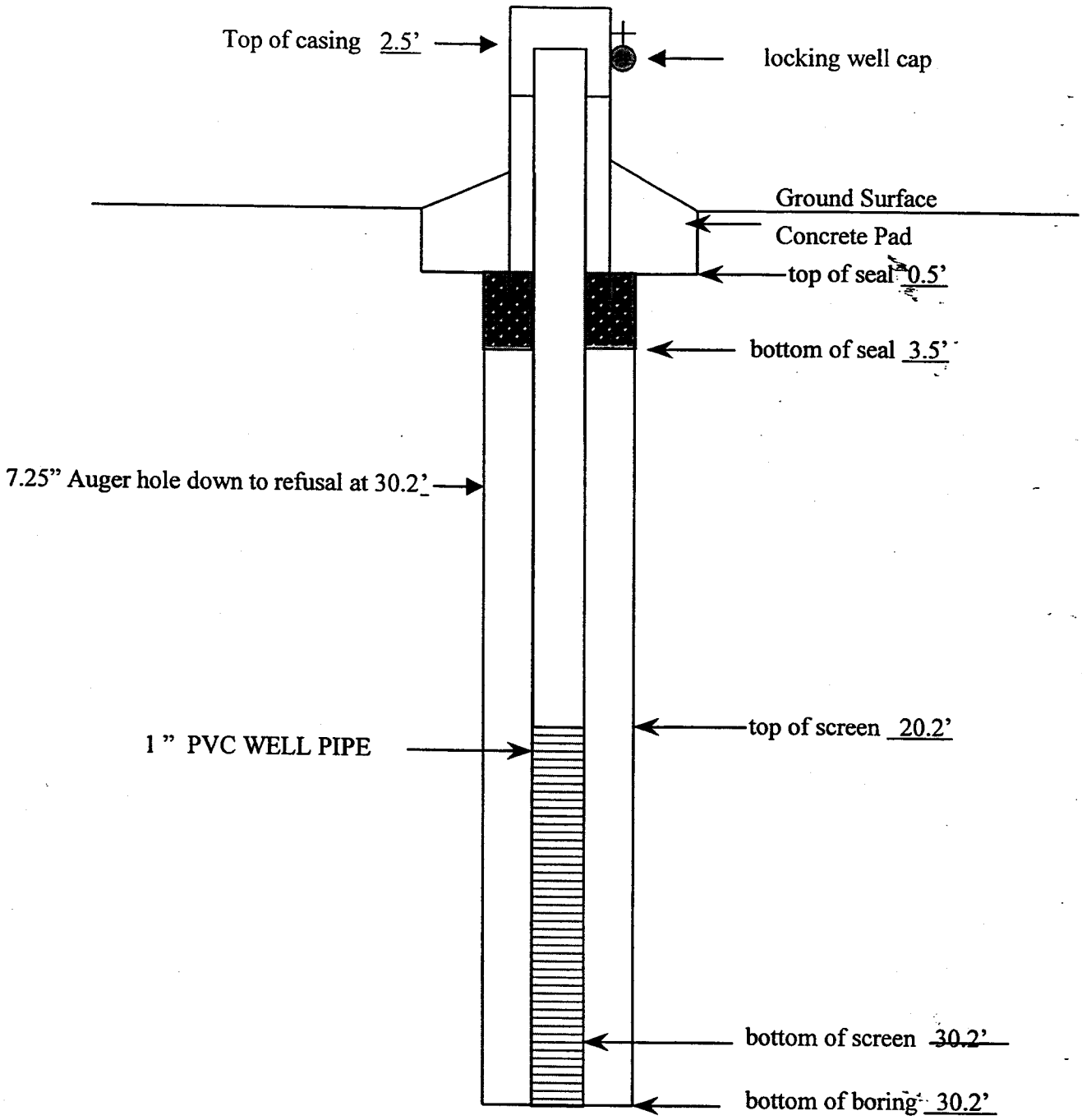
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 04-18-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: BC-5

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-5 STARTING TIME 3:15

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-18-00 WEATHER Cloudy Cold INSPECTOR/DRILLER CA. Medlin / Jim Barker Ricky Dickard

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		* Note: we took 2 Large Bag samples From 0.0' TO 10.0' From the cuttings
1	4.5' 6.0'	2	4	4	5		Lt. BRN, slightly MICA, very fine sandy silt
					10		9.5' Pushed UD #1 2.0' Rec = 2.0'
2	11.5' 13.0'	2	13	27			11.5' yellow / BRN slightly MICA, very fine sandy silt
3	14.5' 16.0'	15	32	43	15		Lt. BRN, slightly MICA, very fine sandy silt
							* Note: we took 1 Large Bag sample From 10.0' TO 20.0' From the cuttings
4	19.9' 21.4'	20	11	20	20		19.5' Pushed UD #2 0.4' Rec = 0.4' Bent UD tube NO sample to test
							yellowish BRN, slightly MICA, very fine sandy silt
5	24.5'	50=5"			25		yellowish BRN, slightly MICA, Silty Fine/Med. sandy weathered Rock (Saprolite)
							* Note: we took 1 Bag sample (Large) From 20.0' to 30.0' From the cuttings
6	29.5' 29.7'	50=3"			30		** NO Recovery in spoon, but we took a small Bag sample From the cuttings
							Auger Refusal @ 30.2'
					35		
					40		

BORING TERMINATED 30.2'

BORING REFUSAL 30.2'

WATER TOB DEPTH 27.4' 4-18-00

WATER 24 HR:DEPTH 22.1' 4-19-00

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" Auger	0.0' TO 30.2'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

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: Temporary Well

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 4-23-00
5. TOTAL DEPTH 28.5'
6. CUTTINGS COLLECTED YES ☑ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
8. STATIC WATER LEVEL Below Top of Casing ___ 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'	18.5'	1"	Sch 40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0.0'	6"	Concrete Mix	Poured

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	18.5'	28.5'	1"	.010	PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	N/A	N/A	N/A	N/A

17. REMARKS: Note: there is a Bentonite seal from 0.5' to 3.5'

DRILLING LOG

From	To	Formation Description
See Attached Boring field Report for BC-6A		soil test

DEPTH

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)

Temporary Well Only

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

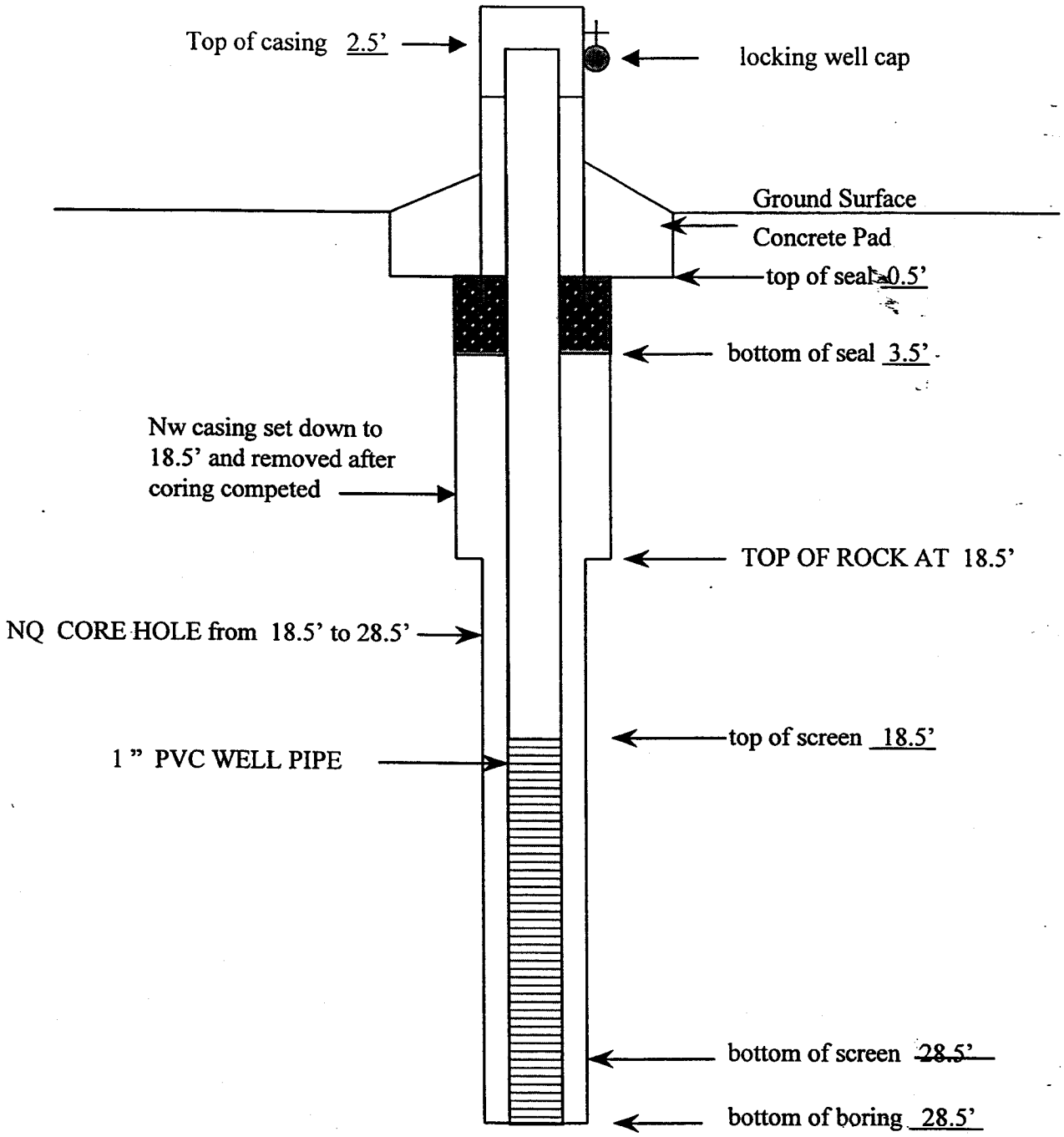
Submit original to Division of Water Quality, Groundwater Section within 30 days

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: 04-20-00
INSPECTOR: C.A. MEDLIN
MONITORING WELL: BC-6A

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-6A

JOB NO.

JOB NAME Ash Landfill

DATE 4-20-00 WEATHER Clear Nice INSPECTOR/DRILLER C.A. Medlin / Tim Barker Ricky Dickard

STARTING TIME

GROUND SURFACE ELEV.

HRS. DRILLING HRS. MOVING

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			0		
			5		
					Set NW casing down to 8.4' and Ran a falling head Permeability @ 8.4'
			10		
			15		
					— Refusal @ 18.5' —
RQD=4.6'=46 %			20		Mod. Hard / Hard
Rec=8.1'=81 %					Severe / Fresh Weathering
RUN=10.0'					Joints Are Spaced Very Close / Close
			25		* Note: Loss all water @ 22.0'
					Also Drilling was soft from 22.0' to 24.0'
					— End of a 10.0' Run @ 28.5' —
			30		Hole terminated @ 28.5'
					* Set a temp. well in this Hole
			35		
			40		

BORING TERMINATED 28.5'

BORING REFUSAL 18.5'

WATER TOB DEPTH 24.4' 4-20-00

WATER 24 HR:DEPTH 26.4' 4-24-00

WATER LOSSES 22.0'

CASING SIZE NW LENGTH

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	TO
~~HAND CHOP W/MUD W/WATER~~	TO
ROTARY DRILL: ~~W/MUD~~ W/WATER	0.0' TO 18.5'
DIAMOND CORE	18.5' TO 28.5'

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-1 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Land fill HRS. DRILLING HRS. MOVING

DATE 4-17-00 WEATHER P.Cloudy/Hot INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		* Note: We took 2 Large Bag samples from 0.0' to 10.0'
1	4.3' 5.8'	2	3	3	5		Pale yellow slightly mica, very fine sandy silt
2	9.3' 10.8'	2	6	6	10		Pale yellow slightly if any mica, very fine sandy silt
3	14.3' 15.8'	2	4	4	15		Pale yellow slightly mica, very fine sandy silt
4	19.3' 20.8'	15	31	40	20		Pale yellow slightly mica, very silty very fine sand
5	24.3' 25.8'	18	31	40	25		Pale yellow slightly mica, very silty fine sand
6	29.3' 30.8'	21	37	33	30		Pale yellow slightly mica, very silty fine sand
7	34.3' 35.2'	17	50/5"		35		Pale yellow slightly mica, very silty fine sand
8	39.3' 39.4'	50/2"			40		Light gray slightly mica, silty fine sandy weathered rock

BORING TERMINATED 39.4'

BORING REFUSAL 39.3'

WATER TOB DEPTH 35.5' 4-17-00

WATER 24 HR:DEPTH 34.7' 4-18-00

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER w/ 7 1/4" Auger	0.0' TO 39.4'
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
~~ROTARY DRILL:W/MUD:W/WATER~~	— TO —
DIAMOND CORE	— TO —

+ 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

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. BC-2A

JOB NO.

JOB NAME Ash Landfill

DATE 4-27-00 WEATHER Cloudy INSPECTOR/DRILLER C.A. Medlin / Jimmy Barker Ricky Dickard

STARTING TIME

GROUND SURFACE ELEV.

HRS. DRILLING HRS. MOVING

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			0		
			5		
			10		
			15		
					Set NW casing down to 18.6' and Ran a Falling head Perm. @ 18.6'
			20		
			25		
			30		
			35		
					Set NW casing down to 38.2' and Ran a Falling Head Perm. @ 38.2'
			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 64.5'

BORING REFUSAL 44.5'

WATER TOB DEPTH 30.25 over weekend 5-1-00

WATER 24 HR:DEPTH 30.25 5-2-00

WATER LOSSES N/A

CASING SIZE NW LENGTH 44.5'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 44.5'
DIAMOND CORE	44.5' TO 64.5'

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-2A
JOB NO.
JOB NAME Ash Landfill
DATE 4-27-00 WEATHER Cloudy INSPECTOR/DRILLER CA. Medlin / Jim Baker Ricky Dickard

STARTING TIME
GROUND SURFACE ELEV.
HRS. DRILLING HRS. MOVING

SAMPLING 1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
			40		
					Carbide stopped cutting @ 44.5'
			45		— Started Coring @ 44.5' —
RQD=.4=8 %					Mod. Hard / Medium
Rec=2.5=50 %					Mod. Severe / Severe Weathering
Run=5.0'					Joints Are Spaced Very Close
			50		— End of A 5.0' Run @ 49.5' —
RQD=.8=16 %					Mod. Hard / Medium
Rec=3.9=78 %					Severe / Very Severe Weathering
Run=5.0'					Joints Are Spaced Very Close
			55		— End of A 5.0' Run @ 54.5' —
RQD=1.9=19 %					Medium / Mod. Hard
Rec=8.4=84 %					Very Severe / Mod. Severe Weathering
Run=10.0'					Joints Are Spaced Close / Very Close
			60		
			65		— End of A 10.0' Run @ 64.5' —
					Hole terminated @ 64.5'
			70		
			75		
			80		

44.5

BORING TERMINATED 64.5'
BORING REFUSAL 44.5'
WATER TOB DEPTH 30.25' over weekend 5-1-00
WATER 24 HR:DEPTH 30.25' 5-2-00
WATER LOSSES N/A
CASING SIZE NW LENGTH 44.5'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CROP W/MUD W/WATER~~	— TO —
ROTARY DRILL: ~~W/MUD~~ W/WATER	0.0' TO 44.5'
DIAMOND CORE	44.5' TO 64.5'

+ 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

Form 269683 (R11-92) • Previously Form 25630

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-4 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-19-00 WEATHER Clear INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		* Note: We took 2 ~~Large~~ Large Bag Samples from 0.0' to 10.0'
					5	X	5.0' Pushed UD #1 1.7' Rec = 1.7' Bent End of UD Tube
1	6.7' 8.2'	34	17	15			6.7' Yellowish Brn, slightly mica, silty Fine Sand
					10	X	10.0' Pushed UD #2 only 0.6' Rec = 0.5'
2	10.6' 11.5'	18	50=5"				10.6' Bent UD tube, To bad to test Yellowish Brn, slightly micay silty Fine Sand
							* Note: We took A Large Bag Sample From 10.0' to 20.0'
3	15.0' 16.5'	48	19	12	15		Yellowish Brn, slightly mica, silty Fine/Med. sandy weathered Rock (Saprolite)
4	20.0' 21.5'	17	27	40	20		Yellowish Brn, slightly mica, silty Fine Sand
							* Note: We took A Large Bag Sample From 20.0' to 30.0'
5	25.0' 26.5'	6	11	18	25		Yellowish Brn, slightly mica, Fine sandy silt
					30	X	30.0' Pushed UD #3 1.0' Rec = 1.0'
6	31.0' 31.7'	44	50=3"				31.0' Yellowish Brn, slightly mica, silty Fine Sand
7	35.0' 36.0'	11	50=6"		35		Yellowish Brn, slightly mica, silty Fine Sand
							* Note: We took A Small Bag Sample from Auger Cuttings @ 38.5' — Auger Refusal @ 38.5'
					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'
BORING REFUSAL 38.5'
WATER TOB DEPTH Dry hole 4-19-00
WATER 24 HR:DEPTH Dry hole 4-20-00
WATER LOSSES None used
CASING SIZE N/A LENGTH N/A

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

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. BC-6 STARTING TIME

JOB NO. GROUND SURFACE ELEV.

JOB NAME Ash Landfill HRS. DRILLING HRS. MOVING

DATE 4-20-00 WEATHER Clear Nice INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

	SAMPLING	1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		* Note: We took 1 Large Bag sample (#1) From 0.0' to 10.0' (Couldn't Get 2)
						X	3.8' Pushed UD #1 2.0' Rec = 1.4'
1	5.8' 7.3'	2	5	5	5	X	5.8' Yellowish BRN, slightly mica, Very Fine Sandy silt
2	8.8' 10.3'	2	5	6			Yellowish BRN, slightly mica, Very Fine Sandy silt
					10		* Note: We took 1 Large Bag sample (#2) From 10.0' to 20.0'
						X	13.8' Pushed UD #2 only 0.5' Rec = 0.3'
3	14.3' 15.8'	10	9	7	15	X	14.3' Bent UD tube, no sample to test; Yellowish BRN, slightly mica, Fine sandy silt w/ weathered Rock
						X	18.8' Pushed UD #3 only 0.4' Rec = 0.4'
4	19.2' 19.8'	36	50 = 2"		20		19.2' Bent UD Tube, no sample to test BRN, slightly mica, Fine sandy silt w/ some weathered Rock
5	23.8' 24.0'	50 = 3"					BRN/Gray, slightly mica, silty Fine sandy weathered Rock
					25		Auger Refusal @ 24.2'
							* Note: We took 1 Large Bag sample (#3) From 20.0' to 24.2'
					30		
					35		
					40		

BORING TERMINATED 24.2'

BORING REFUSAL 24.2'

WATER TOB DEPTH Dry hole

WATER 24 HR:DEPTH ~~[illegible]~~ Fill Back up

WATER LOSSES None used

CASING SIZE N/A LENGTH N/A

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 7¼" OD Auger	0.0' TO 24.2
~~HAND CHOP W/MUD W/WATER~~	— TO —
~~ROTARY DRILL W/MUD W/WATER~~	— TO —
~~DIAMOND CORE~~	— TO —

+ 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

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-2A
STARTING TIME 4:43
JOB NO.
GROUND SURFACE ELEV.
JOB NAME Ash Landfill
HRS. DRILLING HRS. MOVING
DATE 5-16-00 WEATHER Clear Hot INSPECTOR/DRILLER CA. Medlin / Jim Barker Ricky Dickard

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					0		
					5		
					10		
					15		
					20		
5-16-00					25		
							set NW CASING down to 28.5'
							+ AND RAN A perm. @ 28.5' (Falling Head)
					30		
					35		
					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 89.9'
BORING REFUSAL 72.8'
WATER TOB DEPTH N/A
WATER 24 HR:DEPTH 30.48 5-18-00
WATER LOSSES Slight Loss If Any
CASING SIZE NW LENGTH 72.8'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 72.8
DIAMOND CORE	72.8 TO 89.9

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-2A
STARTING TIME
JOB NO.
GROUND SURFACE ELEV.
JOB NAME Ash Landfill
HRS. DRILLING HRS. MOVING
DATE 5-17-00 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
			80		
RQD=65'=65%					Hard
Rec=100'=100%					Slight / Fresh weathering
Run=100'					Joints Are spaced Close / Mod. close
			85		
			90		— End of A 10.0' Run @ 89.9' —
					Hole terminated @ 89.9'
			95		
			100		
			105		
			110		
			115		
			120		

BORING TERMINATED 89.9'
BORING REFUSAL 72.8'
WATER TOB DEPTH N/A
WATER 24 HR:DEPTH 30.48' 5-18-00
WATER LOSSES Slight Loss if Any
CASING SIZE NW LENGTH 72.8'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 72.8'
DIAMOND CORE	72.8' TO 89.9'

+ 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

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DUKE POWER COMPANY

PROJECT Belews Creek

SOIL TEST BORING FIELD REPORT

BORING NO. MW-2-2A
JOB NO.
JOB NAME Ash Landfill
DATE 5-17-00 WEATHER Clear Nice INSPECTOR/DRILLER C.A. Medlin / Jim Barker Ricky Dickard

STARTING TIME
GROUND SURFACE ELEV.
HRS. DRILLING HRS. MOVING

SAMPLING		1ST 6"	2ND 6"	3RD 6"	SCALE	UD	SOIL CLASSIFICATION AND REMARKS
					40		
					45		
					50		
					55		
					60		
							Note: We Took Split Spoons every Five Feet down to 64.0' in Boring # MW-2-2
					65		
14	68.6' 70.1'	5	25	31	70		Olive slightly micay silty fine/coarse sandy weathered Rock
							— ~~End of~~ Refusal @ 72.8' —
	RQD=0=0 % Rec=2.7=38 % Run=7.1'				75		Medium / Mod. Hard Very severe / severe weathering Joints are spaced very close
					80		— End of A 7.1' Run @ 79.9' —

+ 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 89.9'
BORING REFUSAL 72.8'
WATER TOB DEPTH N/A
WATER 24 HR:DEPTH 30.48 5-18-00
WATER LOSSES Slight Loss if Any
CASING SIZE NW LENGTH 72.8'

METHOD OF ADVANCING BORING	DEPTH
~~POWER AUGER~~	— TO —
~~HAND CHOP:W/MUD:W/WATER~~	— TO —
ROTARY DRILL:~~W/MUD~~:W/WATER	0.0' TO 72.8
DIAMOND CORE	72.8' TO 89.9'

Appendix C
Geologic Logs of Boreholes from 2000

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				845.7
						Advanced with 7-1/4" OD Augers.			
			4.3'						
5				2					840.7
		S1		3		S1, N=6, Pale yellow, slightly micaeous, very fine **SANDY SILT**.	ML		
			5.8'	3					
						2 bag samples collected from auger cuttings, 0' to 10'. Lab tests performed on bag sample include			
						G-Grain Size, Soil Classification (USCS), A-Atterburg Limits, Standard Proctor, Remolded Total Porosity	ML		
						and Saturated Hydraulic Conductivity. LL=29, PI=4; UW=94.8pcf; SG=2.69; Por=0.44	(G)		
						K=5.64E-05 cm/sec for Remolded Sample.			
			9.3'						
10				2					835.7
		S2		6		S2, N=12, Pale yellow, slightly micaeous, very fine **SANDY SILT**.	ML		
			10.8'	6					
			14.3'						
15				2					830.7
		S3		4		S3, N=8, Pale yellow, slightly micaeous, very fine **SANDY SILT**.	ML		
			15.8'	4					
			19.3'						
20				15					825.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings

Date	Time	Depth of (ft) Casing	Hole	Water
04/17/00	5:00p	0.0	39.3'	35.5'
04/18/00	5:00p	0.0	39.3'	34.7'
04/26/00	10:00a	0.0	39.3'	34.6'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	04/17/00
AUGER REFUSAL @	39.3'
Total Depth of Hole:	39.3'

Duke Engineering & Services
A Duke Energy Company

BORING BC-1

Page 1 of 2

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a				n/a				825.7
		S4		31		S4, N=71, Pale yellow, slightly micaeous, very fine **SILTY SAND**.	SM		
			20.8'	40					
			24.3'						
25				18					820.7
		S5		31		S5, N=71, Pale yellow, slightly micaeous, very fine **SILTY SAND**.	SM		
			25.8'	40					
			29.3'						
30				21					815.7
		S6		37		S6, N=70,Pale yellow, slightly micaeous, very fine **SILTY SAND**.	SM		
			30.8'	33					
			34.3'						
		S7		17		S7, N=50/5", Pale yellow, slightly micaeous, very fine **SILTY SAND**.	SM		
35			35.2'	50/5"					810.7
			39.3'						
		S8	39.4'	50/2"		S8, N=50/2", Light gray, fine **SILTY SAND**, weathered rock.	SM		
40						Auger Refusal @ 39.3'			805.7
						Boring Terminated @ 39.4'			
45									800.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	845.70
Date Boring Completed:	04/17/00
Boring Logged By:	CAM?MFS

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A Duke Energy Company

BORING BC-1

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				845.7
						Rotary Drill with Water			
5									840.7
						Set NW Casing to 8.9'. Run a Falling Head PERMEABILITY Test @8.9'. **K=1.15E-05 cm/sec.**			
10									835.7
15									830.7
20									825.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings

Date	Time	Depth of (ft) Casing	Hole	Water
04/24/00	4:00p	0.0	75.7'	37.4'
04/26/00	8:00a	75.7'	75.7'	34.6'
05/03/00	2:00p	75.7'	75.7'	34.8'
05/10/00	8:00a	75.7'	75.7'	34.9'

Date Boring Completed:	April 24, 2000
CARBIDE REFUSAL @	65.7'
Total Depth of Hole:	75.7'

Project Information

Client: Duke Power Company
Project: Belews Creek Ash Landfill - Permit
Project No.: 00003.08.0080.00.00000
Location: Belews Creek, North Carolina
Drilling Contractor: DE&S
Drillers: Jim Barker/Ricky Dickard
Drill Rig: CMS

Equipment	ID	Hammer/Drop
Casing:	3"	n/a
Split spoon 1:		Automatic
Split spoon 2:		Automatic
Core Barrel ID:	Not Available	
Core Barrel Type:	NQ	
Boring Logged By:	CAMedlin/MFS	

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BORING BC-1A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a				n/a				825.7
						Set NW Casing to 23.8'. Run Falling Head PERMEABILITY Test @23.8. K=5.69E-06 cm/sec.			
25									820.7
30									815.7
35									810.7
40									805.7
45									800.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	845.70	Duke Engineering & Services. A Duke Energy Company	BORING BC-1A
Date Boring Completed:	04/26/2000		Page 2 of 5
Boring Logged By:	CAM/MFS		

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
	n/a								800.7
45									
			48.8'						
50		S1		39-50/2		S1, N=50/2"Yellowish brown, slightly micaeous, fine SILTY SAND, saprolite/weathered rock.	SM		795.7
			49.4						
			54.2'			Drilling hard at 54.2' (5000psi pressure). Tried to run falling head permeability test, but water fell too quickly to measure.			
		S2		28		S2, N=50/5", Yellowish brown, slightly micaeous, fine SILTY SAND, weathered rock/saprolite.	SM		
55				50/5"		(G,A) LL=27.0, PI=2.0.	(G)		790.7
			55.1'						
			58.8'						
		S3		50/2"		S3, N=50/2", No recovery in Split Spoon.			
			58.9'						
60									785.7
65									780.7
						Total NW Casing = 65.7'			
						CARBIDE REFUSAL @ 65.7' Rock Core from 65.7' to 75.7' (Pages 4 and 5). Set Temporary Well after Coring. Screened Interval from 65.7' to 75.7'.			
70									775.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	845.70
Date Boring Completed:	04/26/2000
Boring Logged By:	CAM/MFS

Duke Engineering & Services.
A Duke Energy Company

BORING BC-1A

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
65.7	0.0		780.0		Light brownish gray to light gray to grayish orange (streaked), Moderately hard to hard, fine-grained **FLASER GNEISS** (primarily quartz-mica, trace feldspar and biotite; recovered rock only).	Run 10' from 65.7' to 75.7', REC=8.1'; RQD=2.7' 65.7' to 69.9', Moderate weathering.	
	0.5						
						66.4', JOINT paralllel to S (foliation), low dip. 66.5' to 66.9', Core broken along S and high angle JOINTS. Fe/Mn-s\taining present.	
66.7	1.0		781.0				
						67.0', JOINT, steep dip, Fe-stained. 67.1', JOINT parallel to S, low dip, Fe-stained. 67.2', JOINT parallel to S, low dip, Fe-stained.	
	1.5						
						67.4', JOINT, steep dip, Fe/Mn-stained. 67.5', JOINT parallel to S, low dip, Fe/Mn-stained.	
67.7	2.0		782.0			67.7', JOINT parallel to S. low dip, Fe/Mn-stained.	
						67.9', JOINT, steep dip, Fe/Mn-stained.	
	2.5					68.2', JOINT parallel to S, low dip, Fe/Mn-stained.	
						68.4', JOINT parallel to S, low dip, Fe/Mn-stained. 68.5', JOINT parallel to S, low dip, Fe/Mn-stained.	
68.7	3.0		783.0				
						68.8', JOINT, parallel to S, low dip, Fe/Mn-stained.	
						69.0', JOINT, steep dip, Fe/Mn-stained.	
	3.5					69.2' to 69.4', 4 JOINTS parallel to S, low dip, Fe/Mn-stained.	
69.7	4.0		784.0				
						69.9', JOINT, steep dip, tight, quartz-filled. 69.9', JOINT parallel to S, low dip, Fe/Mn-stained.	
	4.5					70.2', JOINT parallel to S, low dip, Fe/Mn-stained.	
				NQ 81		70.6', JOINT parallel to S. low dip, Fe/Mn-stained. 70.6' to 72.5', Zone of Core Loss.	
70.7	5.0		785.0				27

Client: Duke Power Company	**Coring Terminated @ 75.7'**	**BORING BC-1A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/24-26/00	**DEPTH INTERVAL 65.7' to 70.7'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Loss During Core? Very slight.		Page 4 of 5

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
70.7	5.0		785.0				
	5.5						
71.7	6.0	No Recovery - Soft	786.0				
	6.5						
					72.5' Light gray to very light gray, very hard, fine-grained AUGEN GNEISS (quartz-feldspar-mica, trace biotite, feldspar augen) with mica-rich layers parallel to S.	72.5' to 73.2', Moderate weathering.	
72.7	7.0	core broken	787.0				
	7.5					73.2' to 75.7', Slight weathering.	
						73.4', JOINT parallel to S, low dip, Fe/Mn-stained.	
73.7	8.0		788.0				
						73.9', JOINT, medium dip, Fe/Mn-stained.	
	8.5					74.1', JOINT parallel to S, Fe/Mn-stained.	
74.7	9.0		789.0			74.6', JOINT parallel to S, Fe/Mn-stained. 74.7', JOINT parallel to S, Fe/Mn-stained.	
						75.0', JOINT parallel to S, Fe/Mn-stained.	
	9.5					75.2', JOINT parallel to S, Fe/Mn-stained.	
					Advance Casing to 66.0'. Run Falling Head PERMEABILITY Test from 66.0' to 75.7'. **K=2.33E-05 cm/sec.**		
75.7	10.0		790.0		Coring Terminated @ 75.7'	75.7', JOINT parallel to S, Fe/Mn-stained.	

Client: Duke Power Company	**Coring Terminated @ 75.7'**	**BORING BC-1A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/24-26/200	**DEPTH INTERVAL 70.7' to 75.7'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	Page 5 of 5
Water Loss During Core? Very slight.		

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				841.2
						Advanced with 7-1/4" OD Augers.			
			1.0'						
		S1		6					
				20		S1, N=86, Light gray, very fine **FLY ASH**.			
			2.5'	66					
			4.5'						
5				9					836.2
		S2		13		S2, N=33, Light gray, very fine **FLY ASH**.			
			6.0'	20					
			7.0'						
				7					
		S3		15		S3, N=35, Light gray, very fine **FLY ASH**.			
			8.5'	20					
			9.5'						
10				4					831.2
		S4		7		S4, N=14, Light gray, very fine **FLY ASH**.			
			11.0'	7		In S4 at 10.7', Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			12.0'						
				2					
		S5		3		S5, N=8, Pale yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			13.5'	5					
			14.5'						
15				1					826.2
		S6		2		S6, N=5, Pale yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			16.0'	3					
			19.5'						
20				1					821.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
04/18/00	4:00p	58.3'	58.3'	47.3'/27.0'
04/19/00	8:00a	58.3'	58.3'	31.0'
04/26/00	8:00a	58.3'	58.3'	30.5'
05/03/00	2:00p	58.3'	58.3'	30.4'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	04/18/00
AUGER REFUSAL @	58.3'
Total Depth of Hole:	58.3'

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BORING BC-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								821.2
		S7		3		S7, N=7, Pale yellowish gray, slightly micaeous, very fine **SANDY SILT**.	ML		
			21.0'	4					
			24.5'						
25				1					816.2
		S8		3		S8, N=7, Pale yellowish gray, slightly micaeous, very fine **SANDY SILT**.	ML		
			26.0'	4					
			29.5'						
30				2					811.2
		S9		6		S9, N=18, Pale yellowish brown, slightly micaeous, very fine **SILTY SAND. (G,A)**	SM		
			31.0'	12		LL=32.0, PI=2.0	(G)		
			34.5'						
35				31					806.2
		S10		33		S10, N=68, Yellowish brown, slightly micaeous, very fine **SILTY SAND**. Sample is wet.	SM		
			36.0'	35					
			39.5'						
40				22					801.2
		S11		40		S11, N=90,Yellowishg brown, slightly micaeous, fine to medium **SILTY SAND**.	SM		
			41.0'	50					
			44.5'						
45				4					796.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	841.20
Date Boring Completed:	04/18/2000
Boring Logged By:	CAM/MFS

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BORING BC-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a								796.2
		S12		12		S12, N=55, Yellowish brown, slightly micaeous, fine to medium **SILTY SAND**, weathered rock.	SM		
			46.0'	43					
50						Augered to 49.5' and had 3 to 4 feet of material inside the auger. Since a hole with NW casing for rock core will be done nearby, will sample that hole with Split Spoons starting around 49.5'.			791.2
55									786.2
						Auger Refusal @ 58.3'			
						Boring Terminated @ 58.3'			
60						Set Temporary Well. Screened Interval from 48.3' to 58.3'.			781.2
65									776.2
70									771.2

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	
Date Boring Completed:	04/18/2000
Boring Logged By:	CAM/MFS

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BORING BC-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				841.2
						Advanced with Rotary Drill with Water.			
5									836.2
10									831.2
15									826.2
						Set NW Casing to 18.6'. Run a Falling Head Permeability Test @ 18.6'. K=2.65E-06 cm/sec.			
20									821.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Cas-ing	Hole	Water
04/27/00	5:00p	44.5'	64.5'	30.3'
05/02/00	5:00p	44.5'	64.5'	30.3'

Date Boring Completed:	04/27/00
CARBIDE REFUSAL @	44.5'
Total Depth of Hole:	64.5'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing:	3"	n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:	n/a	n/a
Project No.: 00003.08.0080.00.00000		Split spoon 2:	n/a	n/a
Location: Belews Creek, North Carolina		Core Barrel ID:		
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

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BORING BC-2A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								821.2
25									816.2
30									811.2
35									806.2
						Set NW Casing to 38.2'. Run a Falling Head PERMEABILITY Test @ 38.2'.			
						K=4.68E-04 cm/sec.			
40									801.2
						Rock Core from 44.5' to 64.5' (Pages 3 to 6).			
45						Carbide Refusal @ 44.5'			796.2

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	841.20
Date Boring Completed:	04/27/2000
Boring Logged By:	CAM/MFS

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BORING BC-2A

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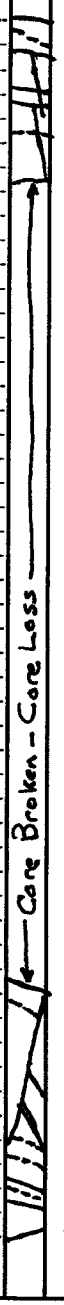
Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 5' from 44.5' to 49.5', REC=2.5'; RQD=0.4'.	
44.5	0.0		796.7		Very pale orange to very light gray, moderately hard, fine- to medium-grained **QUARTZ GNEISS**, (Flaser Gneiss?). Foliation not well-developed. [Recovered Rock Only.]	44.5' to 48.5', Moderate to moderately severe weathering. 44.6' to 45.2', JOINT, steep dip, Fe/Mn-stained.	
	0.5					45.2' to 48.5', Core broken along JOINTS and the Foliation, Fe/Mn-stained.	
45.5	1.0		795.7				
	1.5						
46.5	2.0		794.7				
	2.5			NQ 50			8
47.5	3.0		793.7				
	3.5						
48.5	4.0		792.7			48.5' to 49.1', JOINT, steep dip, Fe/Mn-stained.	
	4.5					49.0', JOINTS (2), steep dip, tight, quartz.	
						49.3', JOINT parallel to S, low dip, Fe/Mn-stained.	
49.5	5.0		791.7			49.4', JOINT parallel to S, low dip, Fe/Mn-stained.	

Core Broken - Core Loss

Client: Duke Power Company	**Coring Terminated @ 64.5'**	**BORING BC-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/27/2000	**DEPTH INTERVAL 44.5' to 49.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Loss During Core? no		Page 3 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
49.5	5.0		791.7		49.5' Very pale orange to very light gray, moderately hard to hard, fine-grained **QUARTZ-MICA GNEISS**, with well-developed foliation.	Run 5' from 49.5' to 54.5'; REC=3.9', RQD=0.8'. 49.5' to 52.3', Moderate weathering. 49.6', JOINT, steep dip, Fe/Mn-stained.	
	5.5					50.1', JOINT, steep dip, Fe/Mn-stained. 50.3', JOINT, steep dip, Fe/Mn-stained.	
50.5	6.0	Core broken	790.7				
	6.5					51.1', JOINT parallel to S, Fe/Mn-stained. 51.3', JOINT parallel to S, Fe/Mn-stained.	
51.5	7.0		789.7			51.7', JOINT parallel to S, Fe/Mn-stained.	
	7.5			NQ 78			16
52.5	8.0		788.7			52.3' to 59.2', Moderate to moderately severe weathering. 52.5' to 54.2', Core broken along S and steeply dipping JOINTS. Core loss occurred in this Interval.	
	8.5						
53.5	9.0	Core loss	787.7				
	9.5						
54.5	10.0		786.7				

Client: Duke Power Company	**Coring Terminated @ 64.5'**	**BORING BC-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/27/2000	**DEPTH INTERVAL 49.5' to 54.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Loss During Core? no		Page 4 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
54.5	10.0		786.7		54.5'---------- Pale orange to very light gray, hard, fine- to medium-grained **FLASER GNEISS** (quartz-mica-feldspar).	Run 10' from 54.5' to 64.5', REC=8.4'; RQD=1.9'. 54.5' to 56.5', Core broken along S.	
	10.5						
55.5	11.0	core broken-core loss zone	785.7				
	11.5						
56.5	12.0		784.7				
	12.5					56.9' to 59.6', Core broken along S and steeply dipping JOINTS, Fe/Mn-stained. Zone of core loss.	
57.5	13.0		783.7				
	13.5	core broken-core loss zone					
58.5	14.0		782.7				
	14.5					59.2' to 60.5', Moderate weathering.	
59.5	15.0		781.7	NQ 84			19

Client: Duke Power Company	**Coring Terminated @ 64.5'**	**BORING BC-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/27/2000	**DEPTH INTERVAL 54.5' to 59.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	Page 5 of 6
Water Loss During Core? no		

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
59.5	15.0		781.7				
	15.5					60.1', JOINT parallel to S, Fe/Mn-stained.	
60.5	16.0		780.7		60.5'---------- Very pale orange to very light gray, hard to very hard, fine-grained QUARTZ-FELDSPAR GNEISS, some medium- to coarse-grained interlayers.	60.5' to 64.5', Moderate to slight weathering. 60.7', JOINT parallel to S, Fe/Mn-stained.	
	16.5						
61.5	17.0		779.7			61.4', JOINT parallel to S, Fe/Mn-stained.	
	17.5						
62.5	18.0		778.7			62.7', JOINT, steep dip, Fe/Mn-stained.	
	18.5					63.0', JOINT, steep dip, tight, quartz.	
63.5	19.0		777.7		63.4'---------- Very light gray to white, medium- to coarse-grained **QUARTZ-FELDSPAR GNEISS**, undulatory foliation.		
	19.5						
64.5	20.0		776.7		**Coring Terminated @ 64.5'**----------		

Client: Duke Power Company

Project: Belews Creek Ash Landfill - Permit

Date Drilled: 04/27/2000

Project No.: 00003.08.0080.00.00000

Logged By: MFSchaeffer/CAMedlin

Lab Sample No:

Sample Interval:

Comments:

Water Loss During Core? no

BORING BC-2A

DEPTH INTERVAL 59.5' to 64.5'

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a								841.7
						Advanced with 7-1/4" OD Augers.			
			4.0'						
		S1		1					
5				1		S1, N=7, Light gray, very fine FLY ASH..			836.7
			5.5'	6					
			9.0'						
		S2		2					
10				4		S2, N=8, Light gray, very fine FLY ASH..			831.7
			10.5'	4					
			14.0'						
		S3		2					
15				12		S2, N=24, Light gray, very fine FLY ASH..			826.7
			15.5'	12					
			19.0'						
		S4		3					
20				4		S3, N=8, Light gray, very fine FLY ASH..			821.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
04/18/00	5:00p	67.3'	67.3'	61.2'
04/20/00	5:00p	67.3'	67.3'	55.4'
04/26/00	8:30a	67.3'	67.3'	55.2'
05/03/00	2:30p	67.3'	67.3'	55.4'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig:	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	04/19/00
AUGER REFUSAL @	67.3'
Total Depth of Hole:	67.3'

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BORING BC-3

Page 1 of 3

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								821.7
			20.5'	4					
			24.0'						
				2					
25		S5		11		S5, N=26, Light gray, very fine **FLY ASH**.			816.7
			25.5'	15					
			29.0'						
				1					
30		S6		2		S6, N=4, Light gray, very fine **FLY ASH**.			811.7
			30.5'	2					
			34.0'						
35		S7		1=18"		S7. N=1/18", Light gray, very fine **FLY ASH**, very wet, very soft.			806.7
			35.5'						
			39.0'						
		S8	39.5'	50/6"		S8, N=50/6", **FLY ASH/SOIL** Interface at 39.1.	SM		
40						Yellowish brown, slightly micaeous, fine SILTY SAND.			801.7
						2 bag samples collected from auger cuttings, 40' to 50'. Lab tests performed on bag sample include	SM		
						G-Grain Size, Soil Classification (USCS), A-Atterburg Limits, Standard Proctor, Remolded	(G)		
						Total Porosity and Saturated Hydraulic Conductivity. LL=20, PI=2; UW=103.4pcf; SG=2.63;			
						Por=0.37; K=-3.47E-04 cm/sec.			
			44.0'						
				21					
45		S9	45.0'	50/6"		S9, N=50/6", Gray, slightly micaeous, fine to medium **SILTY SAND**, weathered rock.	SM		796.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	841.70
Date Boring Completed:	04/19/2000
Boring Logged By:	CAM/MFS

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BORING BC-3

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a								796.7
			49.0'						
		S10	49.3'	50/4"		S10, N=50/4", Yellowish brown, slightly micaeous, fine **SILTY SAND**, saprolitic.	SM		
50									791.7
			54.0'						
		S11		16		S11, N=50/4", Brown, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		
55			54.8'	50/4"					786.7
						Bag sample collected from auger cuttings, 50' to 60'.			
			59.0'						
		S12	59.3'	50/4"		S12, N=50/4", Brown, slightly micaeous, fine SILTY SAND, saprolite/weathered rock.	SM		
60									781.7
			64.0'						
		S13	64.1'	50/2"		S13, N=50/2", Brown to gray, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		
65									776.7
						Auger Refusal @ 67.3'			
						Boring Terminated @ 67.3'			
						Set Temporary Well.			
						Screened Interval from 57.3' to 67.3.'			
70									771.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	841.70
Date Boring Completed:	04/19/2000
Boring Logged By:	CAM/MFS

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BORING BC-3

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (In.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a								803.7
						Advanced with 7-1/4" OD Augers.			
						2 bag samples collected from auger cuttings, 0' to 10'. Lab tests performed on bag sample includes G-Grain Size, Soil Classification (USCS), A-Atterburg Limits, Standard Proctor, Remolded Total Porosity and Saturated Hydraulic Conductivity. LL=29, PI=6; UW=96.1pcf; Por=0.42; **k=5.54E-05 cm/sec.**	ML (G)		
5			5.0'						798.7
		UD1	3.3' 5.0'			UD1, Pushed 1.7', REC=1.7'. End of tube bent. Lab Tests include G-Grain Size, Soil Classification (USCS), A-Atterburg Limits, Total Porosity, and Saturated Hydraulic Conductivity. LL=NP, PI=NP; UW=79.4pcf; SG=2.73; Por=0.53; **k=2.51E-04 cm/sec**.	ML (G)		
		S1	8.2'	34 17 15		S1, N=32, Yellowish brown, slightly micaeous, fine **SILTY SAND**.	ML		
10			10.0'						793.7
		UD2	10.6'			UD2. Pushed 0.6', REC=0.5'. Bent tube (do not test).			
		S2	11.5'	18 50/5"		S2, N=50/5", Yellowish brown, slightly micaeous, fine **SILTY SAND. (G,A)**, LL=NP, PI=NP.	GM (G)		
15			15.0'						788.7
		S3	16.5'	48 19 12		Large bag sample of auger cuttings from 10' to 20'. S3, N=31, Yellowish brown, slightly micaeous, fine to coarse **SILTY SAND**. (G,A) LL=NP, PI=NP.	GM (G)		
20									783.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings

Date	Time	Depth of (ft) Casing	Hole	Water
4/19/200	6:00p	38.5'	38.5'	DRY
04/20/00	5:00p	38.5'	38.5'	DRY
04/26/00	9:00a	38.5'	38.5'	DRY
05/03/00	2:15p	38.5'	38.5'	DRY

Date Boring Completed:	04/19/00
AUGER REFUSAL @	38.5'
Total Depth of Hole:	38.5'

Project Information

Client: Duke Power Company
Project: Belews Creek Ash Landfill - Permit
Project No.: 00003.08.0080.00.00000
Location: Belews Creek, North Carolina
Drilling Contractor: DE&S
Drillers: Jim Barker/Ricky Dickard
Drill Rig:

Equipment	ID	Hammer/Drop
Augers:		n/a
Split spoon 1:		Automatic
Split spoon 2:		Automatic
Core Barrel ID:	n/a	
Core Barrel Type:	n/a	
Boring Logged By: CAMedlin/MFS		

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BORING BC-4

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a		20.0'						783.7
				17					
		S4		27		S4, N=67, Yellowish brown, slightly micaeous, fine **SILTY SAND.**	SM		
			21.5'	40					
25			25.0'			Large bag sample of auger cuttings from 20' to 30'.			778.7
				6					
		S5		11		S5, N=29, Yellowish brown, slightly micaeous, fine CLAYEY **SAND. (G,A)**, LL=31, PI=5.	SC (G)		
			26.5'	18					
30			30.0'						773.7
		UD3				UD3, Pushed 1.0', REC=1.0'.			
			31.0'						
		S6		44		S6, N=50/3", Yellowish brown, slightly micaeous, fine **SILTY SAND.**	SM		
			31.7'	50/3"					
35			35.0'						768.7
		S7		11		S7, N=50/6", Yellowish brown, slightly micaeous, fine **SILTY SAND.**	SM		
			36.0'	50/6"					
						Collected small bag sample of Auger Cuttings at 38.5'.			
						Auger Refusal @ 38.5'			
						Boring Terminated @ 38.5'			
40									763.7
45									758.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	803.7
Date Boring Completed:	04/19/2000
Boring Logged By:	CAM/MFS

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BORING BC-4

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0									803.7
						Rotary Drill with Water.			
5									798.7
						Set NW Casing down to 9.5'. Run a Falling Head Permeability Test @ 9.5'. **k=1.31E-05 cm/sec.**			
10									793.7
15									788.7
20						Set NW Casing down to 19.5'. Run a Falling Head Permeability Test @ 19.5'. **k=4.05E-06 cm/sec.**			783.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Water Level Readings

Date	Time	Depth of (ft) Casing	Hole	Water
05/16/00	8:00a	40.0'	53.5'	39.2'
05/17/00	5:00p	0.0	53.5'	43.7'

Date Boring Completed:	05/16/00
CARBIDE REFUSAL @	38.5'
Total Depth of Hole:	53.5'

Project Information

Client: Duke Power Company
Project: Belews Creek Ash Landfill - Permit
Project No.: 00003.08.0080.00.00000
Location: Belews Creek, North Carolina
Drilling Contractor: DE&S
Drillers: Jim Barker/Ricky Dickard
Drill Rig: CMS

Equipment	ID	Hammer/Drop
Casing / Augers:		
Split spoon 1:		
Split spoon 2:		
Core Barrel ID:	n/a	
Core Barrel Type:	NQ	
Boring Logged By:	CAMedlin/MFS	

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BORING BC-4A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20									783.7
25									778.7
30						Set NW Casing down to 39.5'. Run a Falling Head Permeability Test @ 29.5'. **k=9.61E-06 cm/sec.**			773.8
35									768.7
40						Carbide Refusal @ 38.5' Rock Core from 38.5' to 53.5' Set Temporary Well after rock coring. Screened Interval from 43.5' to 53.5.			763.7
45									758.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	803.7
Date Boring Completed:	05/16/2000
Boring Logged By:	CAM/MFS

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BORING BC-4A

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 38.5' to 48.5', Rec=7.0', RQD=1.7'.	
38.5	0.0		765.2		Light greeniish gray to light gray, moderately hard, medium- to coarse-grained **MICA SCHIST** (button).	38.5' to 39.1', Moderate to slight weathering.	
	0.5				39.1'---------- Light brownish gray, soft to medium hard, medium- to coarse-grained **MICA SCHIST** (button). Recovered material only.	39.1' to 41.8', Core loss. Complete to moderately severe weathering.	
39.5	1.0		764.2				
	1.5						
40.5	2.0		763.2				
	2.5						
41.5	3.0		762.2			41.6', JOINT parallel to S, low dip, no stain.	
					41.8'---------- Medium light gray, moderately hard to hard, coarse-grained **BIOTITE-MICA SCHIST**.	41.8' to 45.3', Moderate to slight weathering.	
	3.5					42.2', JOINT, low dip, open, Fe/Mn-stained.	
42.5	4.0		761.2			42.4', JOINT, low dip, open, Fe/Mn-stained.	
					42.8'---------- Light gray to very light gray, hard, micaceous **FLASER GNEISS** (schistose in places).	42.7' to 42.8', 3 JOINTS, low dip, open, Fe/Mn-stained.	
	4.5			NQ 70		43.3' to 43.4', 3 JOINTS, low dip, open, Fe/Mn-stained.	
43.5	5.0		760.2				17

Core loss ← Core broken mb <2" pieces

Client: Duke Power Company	**Coring Terminated @ 53.5'**	**BORING BC-4A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/2\16/2000	**DEPTH INTERVAL 38.5' to 43.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? yes, lost water at 22.2 (ft)		Page 3 of 5

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
43.5	5.0		760.2				
						43.8', JOINT, low dip, open, Fe/Mn-stained.	
						43.9', JOINT, low dip, open, Fe/Mn-stained.	
	5.5					44.0', JOINT, low dip, open, Fe/Mn-stained.	
						44.1', JOINT, steep dip, open, slight staining.	
						44.2', JOINT, low dip, open, Fe/Mn-stained.	
44.5	6.0		759.2			44.5', JOINT, low dip, open, Fe/Mn-stained.	
						44.6', JOINT, low dip, open, Fe/Mn-stained.	
	6.5					45.0', JOINT, low dip, open, Fe/Mn-stained.	
						45.2', JOINT, low dip, open, Fe/Mn-stained.	
					45.3'----------	45.3' to 47.4', Complete to moderately	
45.5	7.0		758.2		Light brownish gray, soft to moderately hard, medium- to coarse-grained **MICA SCHIST** (button). Recovered material only.	severe weathering. 45.3', JOINT, low dip, open, Fe/Mn-stained.	
	7.5	core broken <.2'					
46.5	8.0		757.2				
	8.5	core loss					
					47.4'----------	47.4' to 53.0', Moderate to slight weathering.	
47.5	9.0		756.2		Light gray to very light gray, hard, micaeous **FLASER GNEISS** (schistose in places).		
	9.5					47.9', JOINT, low dip, open, Fe/Mn-stained.	
						48.1', JOINT, low dip, open,Fe/Mn-stained.	
						48.3', JONT, low dip, open, Fe/Mn-stained.	
48.5	10.0		755.2			48.5', JOINT, low dip, open, Fe/stained.	

Client: Duke Power Company	**Coring Terminated @ 53.5'**	**BORING BC-4A**
Project: Belews Creek Ash Landfill - permit	**Date Drilled:** 05/16/2000	**DEPTH INTERVAL 43.5' to 48.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? yes, lost water at 22.2 (ft)		Page 4 of 5

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 48.5' to 53.5', Rec=5.0', RQD=2.5'.	
48.5	10.0		755.2			48.6', JOINT, low dip, open, Fe/Mn-stained.	
						48.7', JOINT, low dip, open, Fe/Mn-stained.	
						48.8', JOINT, low dip, open, Fe/Mn-stained.	
	10.5					49.0', JOINT, low dip, open, Fe/Mn-stained.	
						49.3', JOINT, low dip, open, Fe/Mn-stained.	
49.5	11.0		754.2				
	11.5						
						50.3', JOINT, steep dip, open, slight Fe/Mn-staining.	
50.5	12.0		753.2				
						50.6', JOINT, low dip, open, slight Fe/Mn-staining.	
	12.5					51.0', 2 JOINTS, low dip, open, no staining.	
				NQ 100			50
51.5	13.0	C	752.2		51.5'---------- Medium light gray, moderately hard to hard, coarse-grained **MICA SCHIST**.	51.5' to 52.0', 7 Open foliation planes (S), no staining.	
	13.5	C			52.0'---------- Light gray to very light gray, hard, micaeous **FLASER GNEISS** (schistose in places).		
52.5	14.0		751.2				
		c			52.7'---------- Medium light gray, moderately hard to hard, coarse-grained **MICA SCHIST**.		
	14.5	c			53.0'---------- Light gray to very light gray, hard, micaeous **FLASER GNEISS** (schistose in places).	53.0' to 53.5', Slight to very slight weathering.	
53.5	15.0		750.2		Coring Terminated @ 53.5'----------		

Client: Duke Power Company	**Coring Terminated @ 53.5**	**BORING BC-4A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/16/2000	**DEPTH INTERVAL 48.5' to 53.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? yes, lost water at 22.2 (ft)		Page 5 of 5

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				829.8
						Advanced with 7-1/4" OD Augers.			
			4.5'						
5				2					824.8
		S1		4		S1, N=8, Light brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			6.0'	4					
						2 bag samples collected from auger cuttings, 0' to 10'. Lab tests performed on bag sample includes **G**-Grain Size, Soil Classification (USCS), **A**-Atterburg Limits, Standard Proctor, Remolded Total Porosity and Saturated Hydraulic Conductivity. LL+32, PI=4; UW=93.6pcf; Por=0.44, **k=6.47E-05 cm/sec**.	ML (G)		
			9.5'						
10									819.8
		UD1				UD1, Pushed 2.0', REC=2.0'. Lab Tests include **G**-Grain Size, **A**-Atterburg Limits, Total Porosity and Saturataed Hydraulic Conductivity. LL=NP, PI=NP; UW=72.5pcf; SG=2.64; Por=0.56; **k=3.61E-04 cm/sec**.	ML (G)		
			11.5'						
				2					
		S2		13		S2, N=40, Yellow brown, slightly micaeous, very fine **SANDY SILT**.	SM		
			13.0'	27					
			14.5'						
15				15					814.8
		S3		32		S3, N=75, Light brown, slightly micaeous, very fine **SANDY SILT**. (G,A), LL=31, PI=5.	SM (G)		
			16.0'	43					
						Bag sample collected from auger cuttings, 10' to 20'.			
			19.5'						
20		UD2	19.9'			UD2, Pushed 0.4', REC=0.4'. Tube bent.			809.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
04/18/00	11:00a	30.2'	30.2'	27.4'
04/19/00	8:00a	30.2'	30.2'	22.1'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	04/18/00
AUGER REFUSAL @	30.2'
Total Depth of Hole:	30.2'

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BORING BC-5

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a		19.9'						809.8
				20		Screened Interval from 20.2' to 30.2'.			
		S4		11		S4, N=31, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	SM		
			21.4'	20					
			24.5'						
25		S5	24.9'	50/5"		S5, N=50/5", Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	SM		804.8
						Bag sample taken from auger cuttings, 20' to 30'.			
			29.5'						
30		S6	29.7'	50/3"		S6, N=50/3", No Recovery in Split Spoon. Took samll bag sample from the the auger cuttings at 30.2'.			799.8
						Auger Refusal @ 30.2'----------			
						Boring Terminated @ 30.2'			
						Set Temporary Well.			
						Screened Interval form 20.2' to 30.2'.			
35									794.8
40									789.8
									784.8
45									774.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	819.8
Date Boring Completed:	04/18/2000
Boring Logged By:	CAM/MFS

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BORING BC-5

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				841.4
						Advanced with 7-1/4" OD Augers.			
						2 bag samples collected from auger cuttings, 0' to 10'. Lab tests performed on bag sample includes G-Grain Size, Soil Classification (USCS), A-Atterburg Limits, Standard Proctor, Remolded Total Porosity and Saturated Hydraulic Conductivity. LL=39, PI=4; UW=87.7pcf; Por=0.49; k=5.31E-05 cm/sec.	ML (G)		
			3.8'						
		UD1				UD1, Pushed 2.0', REC=1.4'.			
5									836.4
				2					
		S1		5		S1, N=10: Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			7.3'	5					
			8.8'						
				2					
10		S2		5		S2, N=11: Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		831.4
			10.3'	6					
			13.8'						
		UD2				UD2, Pushed 0.5', REC=0.3'. Tube bent.			
				10					
15		S3		9		S3, N=16: Yellowish brown, slightly micaeous, very fine **SILTY SAND. (G,A)**, LL=31, PI=2.	SM (G)		826.4
			15.8'	7					
			18.8'						
		UD3				UD3, Pushed 0.4', REC=0.3'. Tube bent.			
		S4		36		S4, N=50/2": Brown, slightly micaeous, fine **SANDY SILT** with some weathered rock fragments.	ML		
20			19.8'	50/2"		Bag sample from auger cuttings, 10' to 20'.			821.4

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
04/20/00	4:00p	0.0	24.2'	DRY
04/21/00	5:00p	0.0	24.2'	DRY

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/.a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n\a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	04/20/00
AUGER REFUSAL @	24.2'
Total Depth of Hole:	24.2'

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BORING BC-6

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								821.4
						Bag sample from auger cuttings, 20.0' to 24.2'.			
			23.8'						
		S5	24.0'	50/3"		S5, N=50/3": Brown to gray, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		
						Auger Refusal @ 24.2'			
25						Boring Terminated @ 24.2'			816.4
30									811.4
35									806.4
40									801.4
45									796.4

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	
Date Boring Completed:	04/20/2000
Boring Logged By:	CAM/MFS

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BORING BC-6

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0									841.4
5									836.4
						Set NW Casing to 8.4'. Fun a Falling Head Permeability Test. k=1.02E-05 cm/sec.			
10									831.4
15									826.4
						Carbide Refusal @ 18.5'			
						Rock Core from 18.5' to 28.5' (Pages 2 and 3).			
						Set Temporary Well after completion of rock coring.			
20						Screened Interval from 18.5' to 28.5'.			821.4

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
04/20/00	4:00p	18.5'	28.5'	24.4'
04/26/00	9:00a	28.5'	28.5'	21.7'
05/24/00	5:00p	28.5'	28.5'	26.8'

Date Boring Completed:	04/20/00
CARBIDE REFUSAL @	18.5'
Total Depth of Hole:	28.5'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing:	3"	n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		n/a
Project No.: 00003.08.0080.00.00000		Split spoon 2:		n/a
Location: Belews Creek, North Carolina		Core Barrel ID:		
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig:	Boring Logged By: CAMedlin/MFS		

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BORING BC-6A

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 10' from 18.5' to 28.5', REC=8.1'; RQD=4.6'.	
18.5	0.0		823.0		18.5' Very light gray to very light brownish gray, hard to very hard, fine-grained **BIOTITE GNEISS** (Flaser/augen).	18.5' to 19.7', Moderate weathering.	
	0.5						
19.5	1.0		822.0		19.7' NO RECOVERY.		
	1.5						
20.5	2.0	no recovery, soft	821.0				
	2.5						
21.5	3.0		820.0		21.6' Light gray to very light gray, moderately hard to hard, fine- to medium-grained **AUGEN BIOTITE GNEISS**, feldspar augen.	21.6' to 24.3', Core broken along medium to steeply dipping JOINTS, majority are Fe/Mn-stained. 21.6' to 24.9', Moderate to slight weathering.	
	3.5						
22.5	4.0		819.0				
	4.5					22.9', JOINT, steep dip, Fe/Mn-stained.	
23.5	5.0		818.0	NQ 81			46

Client: Duke Power Company	**Coring Terminated @ 28.5'**	**BORING BC-6A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 04/20/2000	**DEPTH INTERVAL 18.5' to 23.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Loss During Core? yes, complete @ 22.0'		Page 2 of 3

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
23.5	5.0		818.0				
						23.7', JOINT, steep dip, Fe/Mn-stained.	
	5.5						
24.5	6.0		817.0			24.5', Mechanical Break.	
						24.7', Mechanical Break.	
					24.9'----------	24.9' to 28.5', Very slight weathering.	
	6.5				Very light gray, hard to very hard, fine-grained **BIOTITE GNEISS**.		
25.5	7.0		816.0			25.5', JOINT, low dip, Fe-stained.	
	7.5						
26.5	8.0		815.0			26.5', JOINT, steep dip, tight, quartz.	
	8.5					27.0', JOINT, medium dip, Fe/Mn-stained.	
27.5	9.0		814.0				
	9.5					27.9', Mechanical Break along S.	
28.5	10.0		813.0		Coring Terminated @ 28.5'----------	28.5', JOINT parallel to S, Fe/Mn-stained.	
					Boring Terminated @ 28.5'		
					Set Temporary Well.		

Client: Duke Power Company	**Coring Terminated @ 28.5'**	**BORING BC-6A**
Project:	**Date Drilled:** 04/20/2000	**DEPTH INTERVAL 23.5' to 28.5'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Loss During Core? yes, complete @ 22.0'		Page 3 of 3

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0					n/a				786.8
						Advanced with 7-1/4" OD Augers.			
						FLY ASH from 0 to 4.5'.			
			4.5'						
5									781.8
		UD1				UD1, Pushed 2.0', REC=1.9'.			
			6.5'						
				2					
		S1		3		S1, N=6, Brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			8.0'	3					
			9.5'						
10									776.8
		UD2				UD2, Pushed 2.0', REC=2.0'. Lab tests include G-Grain Size, Soil Classification (USCS),	CH		
						A-Atterburg Limits, Total Porosity, and Saturated Hydraulic Conductivity. LL=51, PI=38; UW=64.7pcf;	(G)		
						SG=2.86; Por=0.64; k=2.86E-06 cm/sec.			
				3					
		S2		4		S2, N=8, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			13.0'	4					
			14.5'						
15				2					771.8
		S3		4		S3, N=13, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			16.0'	9					
			19.5'						
20						Large bag sample taken from auger cuttings, 15.0' to 25.0'.			766.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
05/03/00	2:00p	0.0	51.5'	34.5'
05/10/00	8:00a	44.0'	51.5'	34.3'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	05/02/00
AUGER REFUSAL @	51.5'
Total Depth of Hole:	51.5'

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BORING MW2-1

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								766.8
		UD3				UD3, Pushed 2.0', REC=2.0'			
			21.5'						
				10					
		S4		13		S4, N=32, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			23.0'	19					
			24.5'						
25				13					761.8
		S5		18		S5, N=38, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			26.0'	20					
			29.5'						
30		S6		19		S6, N=50/6", Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		756.8
			30.5'	50/6"					
						Large bag samlple taken from auger cuttings, 25.0' to 35.0'.			
						Screened Interval from 31.5' to 41.5'.			
						Result of Slug Test: **k=9.7E-05 cm/sec**			
			34.5'						
35				11					751.8
		S7		22		S7, N=77/9", Yellowish brown, slightly micaeous, very fine **SAND. (G,A)**	SM		
			35.7'	50/3"		LL=30, PI=2	(G)		
			39.5'						
40		S8	39.9'	50/3"		S8, N=50/3", Yellowish brown, slightly micaeous, very fine **SILTY SAND**, weathered rock.	SM		746.8
						Large bag sample taken from auger cuttings, 35.0' to 45.0'.			
			44.5'						
45		S9	44.9'	50/5"		S9, N=50/5", Yellowish brown, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		741.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	786.8
Date Boring Completed:	05/02/2000
Boring Logged By:	CAM/MFS

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BORING MW2-1

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a								741.8
			49.5'						
50		S10	49.6'	50/2"		S10, N=50/2", No recovery in split spoon.			736.8
						Auger Refusal @ 51.5'			
						Boring Terminated @ 51.5'			
						Monitoring Well Installed. See Installation Sheet for Details.			
						Screened Interval from 31.5' to 41.5'.			
55									731.8
60									726.8
65									721.8
70									716.8

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	786.8
Date Boring Completed:	05/02/2000
Boring Logged By:	CAM/MFS

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BORING MW2-1

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a								784.7
			4.1'						
				2					
5		S1		3		S1, N=4/18", Light gray, very fine, wet **FLY ASH.**			779.7
				1/12"					
			6.1'	"					
			9.1'			Fly ash from 0' to ~9.4'.			
				3					
10		S2		5		S2, N=11, Yellowish brown, slightly micaeous, very fine **SANDY SILT.**	ML		774.7
			10.6'	6					
			14.1'			Large bag sample collected from auger cuttings, 10.0' to 20.0'.			
15		UD1				UD1, Pushed 2.0', REC=2.0'.			769.7
				9					
		S3		5		S3, N=11, Yellowish brown, slightly micaeous, very fine **SANDY SILT.**	ML		
			17.6'	6					
			19.1'						
20		UD2				UD2, Pushed 2.0', REC=2.0'.			764.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
05/03/00	9:00a	0.0	64.1'	
05/10/00	9:00a	39.5'	64.1	30.4'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig:	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	05/02/00
AUGER REFUSAL @	n/a
Total Depth of Hole:	65.6'

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BORING MW2-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								764.7
				2					
		S4		6		S4, N=16, Yellowish brown, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		
			22.6'	10					
			24.1'			Large bag sample collected from auger cuttings, 20.0' to 30.0'.			
25		UD3				UD3, Pushed 1.4', REC=1.4'. Lab Tests include G-Grain Size, Soil Classification (USCS). A-Atterburg Limits, Total Porosity, and Saturated Hydraulic Conductivity. LL=NP, PI=NP; UW=89.8pcf; SG=2.65; Por=0.46; **k=1.81E-04 cm/sec**.	ML (G)		759.7
		S5		24		S5, N=43, Yellowish brown, slightly micaeous, fine **SILTY SAND**, weathered rock.			
			27.0'	23					
				20		Screened Interval from 27.0' to 37.0'. Result of Slug Test: **k=3.1E-04 cm/sec.**			
			29.1'						
30		UD4				UD4, Pushed 2.0', REC=1.1'.			754.7
		S6		3					
				4		S6, N=10, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			32.6'	6					
			34.1'						
35		UD5				UD5, Pushed 2.0', REC=2.0'. Lab Test include G-Grain Size, soil Classification (USCS). A-Atterburg Limits, Total Porosity, and Saturated Hydraulic Conductivity. LL=48, PI=19; UW=86.1pcf; SG=2.73; Por=0.49; **k=6.63E-05 cm/sec**.	ML (G)		749.7
		S7		8		S7, N=26, Brown, slightly micaeous, vrry fine **SANDY SILT**, weathered rock.	ML		
				12					
			37.6'	14					
			39.1'			Large bag sample taken from auger cuttings, 30.0' to 40.0'.			
		UD6				UD6, Pushed 0.4', REC=0.0'.			
40		S8		29					744.7
				14		S8, N=25, Brown, slightly micaeous, very fine **SILTY SAND**, weathered rock.	SM		
			41.0'	11					
			44.1'						
				1			SM		
45		S9		12		S9, N=29, Olive gray, slightly micaeous, very fine **SANDY SILT. (G,A)**, LL=36, PI=5.	(G)		739.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	
Date Boring Completed:	05/02/2000
Boring Logged By:	CAM/MFS

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BORING MW2-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a								739.7
				17					
			49.1'						
		S10	49.6'	50/6"		S10, N=50/6", Olive brown, slightly micaeous, very fine SANDY SILT, weathered rock.	ML		
50									
			54.1'						
				15					
55		S11		25		S11, N=60, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		
			55.6'	35					
			59.1'						
		S12		34		S12, N=50/5", Yelllowish brown, slightly micaeous, very fine **SANDY SILT**, weathered rock.	ML		
60			60.0'	50/5"					
			64.1'						
				7		Augering Terminated @ 64.1'————————————————			
65		S13		40		S13, N=88, Brown, slightly micaeous, very fine SANDY SILT, weathered rock.	ML		
			65.6'	48		Boring Terminated @ 65.6'————————————————			
						Monitoring Well Installed. See Installatiom Sheet for Details.			
						Screened Interval from 27.0' to 37.0'.			
70									

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	
Date Boring Completed:	05/02/2000
Boring Logged By:	CAM/MFS

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BORING MW2-2

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0									784.7
						Rotary Drill with Water.			
5									779.7
10									774.7
15									769.7
20									764.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
05/16/00	4:00p	74.0'	89.9'	30.5'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing / Augers:		
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	05/16/00
REFUSAL @	72.8'
Total Depth of Hole:	89.9'

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BORING MW2-2A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a				n/a				764.7
25									759.7
						Set NW Casing down to 28.5'. Run Fallling Head Permeability at 28.5'. k=1.07E-05 cm/sec.			
30									754.7
35									749.7
40									744.7
45									739.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	784.7
Date Boring Completed:	05/16/2000
Boring Logged By:	CAM/MFS

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BORING MW2-2A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a				n/a				739.7
50									734.7
55									729.7
60									724.7
65									719.7
						Note: Split Spoons taken every 5' down to 64.0' in Boring # MW2-2.			
			68.6'						
		S14		5					
				25		S14, N= 56, Olive, slightly micaeous, fine ot coarse **SILTY SAND**.	SM		
70			70.1'	31					714.7

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	784.7
Date Boring Completed:	05/16/2000
Boring Logged By:	CAM/MFS

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BORING MW2-2A

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
70									714.7
						Rotary/Carbide Refusal @ 72.8' Rock Core from 72.8' to 89.9'. Set NW Casing to 73.5'. Run Falling Head Permeability from 73.5' to 89.9'. k=5.45E-06 cm/sec.			
75									709.7
80									704.7
85									699.7
90									694.7
95									689.7

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	784.7
Date Boring Completed:	05/16/2000
Boring Logged By:	CAM/MFS

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BORING MW2-2A

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 7.1' from 72.8' to 79.9'. Rec=2.7', RQD=0.	
72.8	0.0		711.9		72.8', Carbide refusal---------- Light brownish gray, medium to moderately hard, fine-grained, micaeous **FLASER GNEISS**. (Recovered material only).	72.8' to 80.1', Severe to complete weathering. Recovered material moderate to moderately severe weathering.	
	0.5						
73.8	1.0		710.9				
	1.5						
74.8	2.0	no recovery	709.9				
	2.5						
75.8	3.0		708.9				
	3.5						
76.8	4.0		707.9				
	4.5					77.2', JOINT, low dip, open, Sl Fe/Mn-staining.	
				NQ 38		77.4', JOINT, low dip, open, Sl Fe/Mn-staining. 77.5', JOINT, low dip, open, Sl Fe/Mn-Staining. 77.6', JOINT, steep dip, open, Sl Fe/Mn-staining. 77.6', JOINT, low dip, open, Sl Fe/Mn-staining.	0
77.8	5.0		706.9			77.8', JOINT, low dip, open, Sl Fe/Mn-staining.	

Client: Duke Power Company	**Coring Terminated @ 89.9'**	**BORING MW2-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/17/2000	**DEPTH INTERVAL 72.8' to 77.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	Page 5 of 8
Water Return During Core? No		

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
77.8	5.0		706.9				
	5.5					78.1', JOINT, low dip, open, Fe/Mn-staining. 78.3', JOINT, low dip, open, Fe/Mn-staining. 78.4', JONT, low dip, open, Fe/Mn-staining. 78.4', JOINT, steep dip, open, Sl Fe-staining. 78.5', JOINT, low dip, open, Fe/Mn-staining. 78.6', JOINT, low dip, open, Fe/Mn-staining. 78.7', JOINT, low dip, open, Fe/Mn-staining.	
78.8	6.0		705.9				
	6.5					79.0', JOINT, steep dip, open, no staining. 79.1', JOINT, low dip, open, Fe/Mn-staining. 79.2', JOINT, low dip, open, Fe/Mn-staining. 79.3', JOINT, low dip, open, Fe/Mn-staining. 79.3', JOINT, steep dip, open, no staining. 79.4', JOINT, low dip, open, Fe/Mn-staining. 79.6' JOINT, steep dip, open, no staining. 79.7' to 79.9', 4 JOINTs, low dip, open, stained.	
79.8	7.0		704.9			Run !0' from 79.9' to 89.9', Rec=10.0', RQD=6.5'.	
	7.5				80.1'---------- Very light gray to light gray, hard to very hard, fine- to medium-grained **BIOTITE GNEISS** (biotite-quartz-feldspar).	80.0', JOINT, low dip, open, Fe/Mn-staining. 80.1', JOINT, low dip, open, Fe/Mn-staining. 80.1' to 89.9', Slight to very slight weathering.	
80.8	8.0		703.9				
	8.5						
81.8	9.0		702.9				
	9.5						
82.8	10.0		701.9				

Client: Duke Power Company	**Coring Terminated @ 89.9'**	**BORING MW2-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/17/2000	**DEPTH INTERVAL 77.8' to 82.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no		Page 6 of 8

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
82.8	10.0		701.9				
	10.5					83.2', JOINT, Steep dip, open, no staining, quartz-calcite. 83.4', JOINT, low dip, open, no staining, calcite-quartz.	
83.8	11.0		700.9			83.8', JOINT, low dip, open, no staining.	
	11.5					84.3', JOINT, steep dip, open, no staining.	
84.8	12.0		699.9				
	12.5			NQ 100		85.3', JOINT, low dip, open, no staining. 85.4', JOINT, low dip, open, no staining.	65
85.8	13.0		698.9			85.8', JOINT, low dip, open, no staining.	
						86.1' JOINT, low dip, open, no staining.	
	13.5	qtz.					
86.8	14.0		697.9				
	14.5						
						87.5', JOINT, Steep dip, open, no staining.	
87.8	15.0		696.9			87.7' JOINT, Medium dip, open, no staining.	

Client: Duke Power Company	**Coring Terminated @ 89.9'**	**BORING MW2-2A**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/17/2000	**DEPTH INTERVAL 82.8' to 87.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no		Page 7 of 8

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
87.8	15.0		696.9				
	15.5						
			qtz			88.6' to 89.8', QUARTZ VEIN, steep dip.	
88.8	16.0		695.9			88.9', JOINT, low dip, open, no staining.	
	16.5					89.3', JOINT, steep dip, open, no staining.	
						89.7', 2 JOINTs, low dip, open, no staining.	
89.8	17.0		694.9		Coring Terminated @ 89.9'----------		
					Set NW Casing to 73.5'. Run Falling Head Permeability from 73.5' to 89.9'. k=5.45E-06 cm/sec		
	17.5						
90.8	18.0		693.9				
	18.5						
91.8	19.0		692.9				
	19.5						
92.8	20.0		691.9				

Client: Duke Power Company	Coring Terminated @ 89.9'	BORING MW2-2A
Project: Belews Creek Ash Landfill - Permit	Date Drilled: 05/17/2000	DEPTH INTERVAL 87.8' to 89.9'
Project No.: 00003.08.0080.00.00000	Logged By: MFSchaeffer/CAMedlin	
Lab Sample No: Sample Interval:	Comments:	Duke Engineering & Services A Duke Energy Company
Water Return During Core? no		Page 8 of 8

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				794.2
			4.0'						
		S1		2					
5				3		S1, Yellowish brown, slightly micaeous, fine **SANDY SILT. (G,A),** LL=34.0, PI=8.0.	ML		789.2
			5.5'	5			(G)		
			9.0'						
		UD1				UD1, Pushed 0.9', Rec=0.7'. End of Tube bent.			
10						Bag sample collected from auger cuttings, 0' to 10'.			784.2
		S2		4					
				13		S2, Yellowish brown, slightly micaeous, fine **SANDY SILT** with some weathered rock fragments.	ML		
			11.4'	13					
			14.0'						
15		UD2				UD2, Pushed 2.0', REC=2.0'.			779.2
		S3		21					
				32		S3, Yellowish brown, slightly micaeous, fine **SANDY SILT.**	ML		
			17.5'	35					
			19.0'						
		UD3				UD3, Pushed 1.0', REC=1.0'.			
20			20.0'			Bag sample collected from auger cuttings, 10' to 20'.			774.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
05/09/00	8:00a	none	40.7'	DRY
05/10/00	5:00p	none	40.7'	DRY
05/11/00	5:00p	61.8'	59.3'	47.5'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing / Augers:	3.25"	n/a
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By:	CAMedlin/MFS	

Date Boring Completed:	05/10/00
AUGER REFUSAL @	40.7'
Total Depth of Hole:	59.3'

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BORING MW2-3

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (In.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20 #	n/a		20.0'		n/a				774.2
		S4	20.5'	50/6"		S4, Yellowish brown, slightly micaeous, fine to medium, **SILTY SAND** (weathered rock).	SM		
			24.0'						
				8					
25		S5		12		S5, Yellowish brown, slightly micaeousl, fine **SILTY SAND**.			769.2
			25.5'	16			SM		
			29.0'			Large bag sample of auger cuttings from 20' to 30'.			
						UD4, Pushed 1.6', REC=1.6'. Lab tests include G-Grain Size, Soil Classification (USCS)	ML		
30		UD4				A-Atterburg Limits, Total Porosity, and Saturated Hydraulic Conductivity. LL=NP, PI=38;	(G)		764.2
						UW=93.8pcf; SG=2.72; Por=0.45; **k=5.58E-05 cm/sec**.			
		S6		13		S6, Yelllowish brown, slightly micaeous, very fine **SILTY SAND**.	SM		
			31.5'	50/5"					
			34.0'						
				16					
35		S7		18		S7, Yellowish brown, slightly micaeous, fine **SILTY SAND**. (G,A), LL=32, PI=3.	SM		759.2
			35.4'	50/5"			(G)		
			39.0'						
		S8		12		S8, Yellowish brown, slighlty micaeous, fine **SANDY SILT**.	ML		
40			39.7'	50/3"					754.2
						Bag sample collected from auger cuttings, 30' to 40'.			
						Auger Refusal @ 40.7'			
						Set NW Casing down auger hole to 40.9'. Start coring with NQ barrel at 40.9'			
						Rock Core from 40.9' to 59.3'.			
						Monitoring Well Installed. See installation sheet for details.			
						Screened Interval from 39.3' to 59.3'.			
						Result of Slug Test: **k=7.8E-05 cm/sec.**			
45									749.2

Sample Types S:split spoon **UD**:2" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	794.2
Date Boring Completed:	05/10/2000
Boring Logged By:	CAM/MFS

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BORING MW2-3

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
					Auger Refusal at 40.7'----------		
40.9	0.0		753.3		Set NW Casing to 40.9'.	Run 8.4' from 40.9' to 49.3', Rec=7.7', RQD=4.0'	
					Pinkish gray to light brownish gray, moderately hard to hard, fine- to medium-grained **AUGEN GNEISS** (feldspar augen).	40.9' to 42.9', Moderate to slight weathering.	
						41.2', Fracture parallel to S, no staining.	
	0.5					41.4', Fracture parallet to S, no staining.	
						41.5', JOINT, steep dip, open, no staining.	
						41.6', Fracture parallel to S, no staining.	
						41.8', Fracture parallell to S, no staining.	
41.9	1.0		752.3			41.9', Fracture parallel to S, no staining.	
						42.0', Fracture parallel to S, no staining.	
	1.5						
						42.7', Fracture parallel to S, no staining.	
42.9	2.0		751.3		42.9'----------	42.9' to 44.0', Core loss and core broken along medium to high angle joints.	
					Light brownish gray, moderately hard, medium- to coarse-grained **MICA SCHIST** (recovered material only).		
	2.5	Core loss / broken					
43.9	3.0		750.3		44.0'----------		
					Light gray to medium light gray, hard, fine- to medium-grained schistose **MICA GNEISS** (muscovite/biotite-quartz-feldspar).	44.3', Fracture parallel to S, no staining.	
	3.5					44.4', Fracture paralllel to S, no staining.	
						44.5', JOINT, steep dip, open, no staining.	
				NQ		44.7' to 44.9', 4 Fractures parallel to S.	
44.9	4.0		749.3	92			48
						45.2', Fracture parallel to S, no staining.	
	4.5					45.3' to 45.5', 3 Fractures parallel to S.	
						45.6' to 45.7', 3 Fractures parallel to S.	
45.9	5.0		748.3				

Client: Duke Power Company	**Coring Terminated @ 59.3'**	**BORING MW2-3**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/10/2000	**DEPTH INTERVAL 40.9' to 45.9'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no, lost water at 40.9'		Page 3 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
45.9	5.0		748.3				
						46.2' to 46.6', 8 Fractures parallel to S.	
	5.5						
					46.6' Light gray to medium light gray, hard to very hard, fine- to medium-grained schistose **MICA GNEISS** (muscovite/biotite-quartz-feldspar).		
46.9	6.0		747.3				
						47.2', Fracture parallel to S, no staining.	
	6.5						
47.9	7.0		746.3				
						48.1', Fracture parallel to S, no staining.	
	7.5					48.5', Fracture parallel to S, no staining.	
48.9	8.0		745.3				
						49.3', Fracture parallel to S, no staining. Run 10' from 49.3' to 59.3', Rec=10.0', RQD=8.1'.	
	8.5						
49.9	9.0		744.3			49.9', Fracture parallel to S, no staining.	
						50.3', Fracture parallel to S, no staining.	
	9.5						
						50.6' to 50.9, 3 Fractures parallel to S, no staining.	
50.9	10.0		743.3				

Client: Duke Power Company	**Coring Terminated @ 59.3'**	**BORING MW2-3**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/10/2000	**DEPTH INTERVAL 45.9' to 50.9'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no, lost water at 40.9 (ft)		Page 4 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
50.9	10.0		743.3				
	10.5					51.6', Fracture parallel to S, no staining.	
51.9	11.0		742.3			52.1', Fracture parallel to S, no staining.	
	11.5						
52.9	12.0		741.3			53.0' to 53.8', Copre broken along medium and steeply dipping JOINTS, no staining.	
	12.5	core broken					
53.9	13.0		740.3				
	13.5			NQ 100			81
54.9	14.0		739.3			54.8' to 55.1', 4 Fractures parallel to S.	
	14.5						
55.9	15.0		738.3				

Client: Duke Power Company	**Coring Terminated @ 59.3'**	**BORING MW2-3**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/10/2000	**DEPTH INTERVAL 50.9' to 55.9'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no, lost water at 40.9 (ft)		Page 5 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
55.9	15.0		738.3				
	15.5						
56.9	16.0		737.3			57.1', Fracture parallel to S, no staining.	
	16.5						
57.9	17.0		736.3				
	17.5						
58.9	18.0		735.3				
					Coring Terminated @ 59.3'		
	18.5				Rock Core from 40.7' to 59.3'. Monitoring Well Installed. See installation sheet for details. Screened Interval from 39.3' to 59.3'.		
59.9	19.0		734.3				
	19.5						
60.9	20.0		733.3				

Client: Duke Power Company	**Coring Terminated @ 59.3'**	**BORING MW2-3**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/10/2000	**DEPTH INTERVAL 55.9' to 59.3'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no, lost water at 40.9 (ft)		Page 6 of 6

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				812.2
			4.0'						
		S1		2					
5				2		S1, Yellowish brown, slightly micaeous, fine **SANDY SILT. (G,A)**, LL=53, PI=15.	MH		807.2
			5.5'	3			(G)		
			9.0'						
						Bag sample from auger cuttings, 0' to 10'.			
10		UD1				UD!, Pushed 2.0', REC=2.0'.			802.2
		S2		2					
				3		S2, Yellowish brown, slightly micaeous, fine **SANDY SILT.**	ML		
			12.5'	4					
			14.0'						
		S3		3					
15				4		S3, Yellowish brown, slightly micaeous, fine **SANDY SILT.**	ML		797.2
			15.5'	5					
			19.0'						
						Bag sample from auger cuttings, 10' to 20'.			
20		UD2				UD2, Pushed 2.0', REC=1.6'. Lab tests include G-Grain Size. Soil Classification (USCS),	ML		792.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water
05/09/00	4:00p	0.0	38.0'	DRY
05/10/00	7:30a	0.0	38.0'	DRY
05/11/00	5:00p	60.0'	58.0'	45.4'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing / Augers:	3.25"	
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/MFS		

Date Boring Completed:	05/10/00
AUGER REFUSAL @	38.0'
Total Depth of Hole:	58.0'

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BORING MW2-4

Page 1 of 6

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a				n/a				792.2
						A-Atterburg Limits, and Total Porosity. LL=NP, PI=NP; UW=82.1pcf, SG=2.88; Por=0.51.	(G)		
				4					
		S4		5		S4, Yellowish brown, slightly micaeous, fine **SANDY SILT**.	ML		
			22.5'	6					
			24.0'						
25						UD3, Pushed 2.0', REC=1.6'. UD tube bent along side by a rock.			787.2
				11					
		S5		18		S5, Yellowish brown, slightly micaeous, fine SANDY SILT with a seam of quartz near 27.5'.	ML		
			27.5'	19		**(G,A)**, LL=NP, PI=NP.	(G)		
			29.0'			UD refused to push at 29.0'.			
		SS	29.3'	50/3"		SS, No reccvery.			
30						Large bag sample from auger cuttings, 20' to 30'.			782.2
			34.0'						
				16					
35		S6		30		S6, Yellowish brown, slightly micaeous, fine SANDY SILT with some weathered rock fragments.	ML		777.2
			35.2'	50/3"					
						Large bag sample from auger cuttings, 30' to 38'.			
						Auger Refusal @ 38.0'			
						Set NW Casing to 38.0'. Start coring with NQ barrel at 38.0'			
						Rock core from 38.0' to 58.0'.			
						Monitoring Well Installed. See Installation Sheet for Details.			
40						Screened Interval from 38.0' to 58.0'.			772.2
						Result of Slug Test: **k=7.4E-04 cm/sec**.			
45									767.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	812.2
Date Boring Completed:	05/11/2000
Boring Logged By:	CAM/MFS

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BORING MW2-4

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Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
						Run 8.4' from 38.0' to 46.4'. Rec=7.1', RQD=1.5'.	
38.0	0.0		774.2		Auger Refusal @ 38.0'		
					Light brownish gray to medium light gray, moderately hard, coarse-grained **MICA SCHIST** (with quartz-rich layers).	38.0' to 42.4', Moderately severe to moderate weathering.	
						38.3', JOINT, steep dip, open, sl Fe/Mn-staining.	
	0.5						
						38.6', JOINT, low dip, open, Fe/Mn-staining.	
						38.7', JOINT, low dip, open, Fe/Mn-staining.	
39.0	1.0		773.2			39.0', JOINT, low dip, open, Fe/Mn-staining.	
						39.1', JOINT, low dip, open, Fe/Mn-staining.	
						39.2' to 40.0', Core broken.	
					39.4'		
	1.5	Core broken			Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.		
					39.7'		
					Light brownish gray to medium light gray, moderately hard, coarse-grained **MICA SCHIST** (with quartz-rich layers).		
40.0	2.0		772.2				
						40.2' to 40.5', Core broken.	
	2.5	cb			40.5'	40.5', JOINT, low dip, open, Fe/Mn-staining.	
					Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.	40.7', JOINT, steep dip, open, sl Fe/Mn-staining.	
						40.8', JOINT, low dip, open, Fe/Mn-staining.	
41.0	3.0		771.2				
						41.1', JOINT, low dip, open, Fe/Mn-staining.	
	3.5						
					41.7'		
					Light brownish gray to medium light gray, moderately hard, coarse-grained **MICA SCHIST** (with quartz-rich layers).	41.8', JOINT, low dip, open, Fe/Mn-staining.	
						41.9' to 43.0', Core broken along medium to steeply dipping JOINTS, Fe/Mn-staining.	
42.0	4.0		770.2				
					42.4'	42.4' to 44.7', Moderate weathering.	
	4.5	Core broken		NQ 85	Light gray to very light gray, moderately hard, fine-grained **QUARTZ-FELDSPAR GNEISS**, schistose. [1]		18
43.0	5.0		769.2				

Client: Duke Power Company	**Coring Terminated @ 58.0'**	**BORING MW2-4**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/09/2000	**DEPTH INTERVAL 38.0' to 43.0'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no, lost water at 38.0 (ft)		Page 3 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
43.0	5.0		769.2			43.0', JOINT, low dip, open, Fe/mn-staining.	
	5.5					43.5', JOINT, low dip, open, Fe/Mn-staining.	
						43.8', JOINT, medium dip, open, sl-staining.	
						43.9', JOINT, low dip, open, Fe/Mn-staining.	
44.0	6.0		768.2			44.0', JOINT, low dip, open, Fe/Mn-staining.	
						44.1', JOINT, low dip, open, Fe/Mn-staining.	
						44.2', JOINT, low dip, open, Fe/Mn-staining.	
	6.5						
						44.7' to 47.6', Moderately severe to moderate weathering.	
45.0	7.0		767.2			44.7' to 46.4', Core broken/loss.	
	7.5	Core broken / loss					
46.0	8.0		766.2				
					46.4'	46.4' to 46.5', Core broken.	
	8.5				Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.	Run 7.5' from 46.4' to 53.9', Rec=6.6', RQD=0.7'.	
					46.8' [1]		
47.0	9.0		765.2		47.1'		
					Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.	47.2', JOINT, steep dip, open, sl-staining. 47.3' to 47.5', Core broken.	
	9.5				47.6'	47.6' to 50.3', Moderate to slight weathering.	
					Light gray to very light gray, moderately hard to hard, fine- to medium-grained schistose **MICA GNEISS** (muscovite/biotite-quartz-feldspar).	47.8', JOINT, steep dip, open, sl-staining.	
48.0	10.0		764.2				

Client: Duke Power Company	**Coring Terminated @ 58.0'**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/09/2000
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin
Lab Sample No: **Sample Interval:**	**Comments:**
Water Return During Core? no, lost water at 38.0 (ft)	

BORING MW2-4

DEPTH INTERVAL 43.0' to 48.0'

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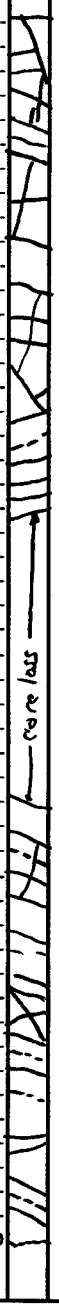
Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
48.0	10.0		764.2			48.0', JOINT, low dip, open, Fe/Mn-staining. 48.2', JOINT, low dip, open, Fe/Mn-staining. 48.2', JOINT, steep dip, open, sl-staining. 48.3', JOINT, low dip, open, Fe/Mn-staining. 48.4' to 48.5', 3 JOINTs, low dip, staining.	
	10.5					48.7', JOINT, low dip, open, Fe/Mn-staining. 48.7', JOINT, steep dip, open, sl-staining. 48.9', JONT, low dip, open, Fe/Mn-staining.	
49.0	11.0		763.2			49.1', JOINT, low dip, open, Fe/Mn-staining. 49.2', JOINT, low dip, open, Fe/Mn-staining. 49.3', JOINT, low dip, open, Fe/Mn-staining. 49.3', JONT, steep dip, open, sl-staining. 49.5', JOINT, medium dip, open, sl-staining. 49.6', JOINT, low dip, open, Fe/Mn-staining.	
	11.5					49.8' to 50.0', 4 JOINTs, low dip, staining.	
50.0	12.0		762.2				
	12.5				50.3'---------- Medium light gray, soft to medium hard, medium- to coarse-grained **MICA SCHIST**.	50.3' to 51.2', Complete to very severe weathering.	
51.0	13.0		761.2			51.2' to 58.0', Moderate to slight weathering.	
					51.2'---------- Light gray to very light gray, hard, fine- to medium-grained, schistose **MICA GNEISS**. [2]	51.2', JONT, low dip, open, Fe/Mn-staining. 51.3', JOINT, low dip, open, Fe/Mn-staining. 51.4', JOINT, steep dip, open, sl-staining. 51.5', JOINT, low dip, open, Fe/Mn-staining. 51.6', JOINT, low dip, open, Fe/Mn-staining. 51.7', JOINT, low dip, open, Fe/Mn-staining.	
	13.5					51.9' to 52.1', 4 JOINTs, low dip, open, staining.	
52.0	14.0		760.2				
	14.5					52.6', 2 JOINTs, low dip, open, Fe/Mn-staining.	
						52.8', JOINT, low dip, open, Fe/Mn-staining. 52.9', JONT, low dip, open, Fe/Mn-staining.	
53.0	15.0		759.2				

core lost

Client: Duke Power Company	**Coring Terminated @ 58.0'**	**BORING MW2-4**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/09/2000	**DEPTH INTERVAL 48.0' to 53.0'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	
Lab Sample No: **Sample Interval:**	**Comments:**	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no, lost water at 38.0 (ft)		Page 5 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
53.0	15.0		759.2				
						53.3', JOINT, low dip, open, Fe/Mn-staining.	
	15.5						
						53.7', JOINT, low dip, open, Fe/Mn-staining. 53.8' to 53.9', 3 JOINTs, low dip, open. Run 4.1' from 53.9' to 58.0', Run=4.1', RQD=0.7'.	
54.0	16.0		758.2				
						54.3', JOINT, low dip, open, Fe/Mn-staining.	
	16.5					54.5', JOINT, low dip, open, Fe/Mn-staining.	
					54.6'---------- Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.		
55.0	17.0		757.2		55.0'---------- [2] 55.2'---------- Medium dark gray, moderately hard, medium-grained **HORNBLENDE GNEISS**.		
						55.4', 2 JOINTs, low dip, open, staining. 55.5', JOINT, low dip, open, Fe/Mn-staining.	
	17.5						
				NQ 100	55.8'---------- Very light gray to light gray, hard to very hard, fine- to medium-grained, schistose **MICA GNEISS**.	55.7' to 55.8', 3 JOINTs, low dip, open.	17
56.0	18.0		756.2				
						56.1', JOINT, low dip, open, Fe/Mn-staining.	
						56.3', JOINT, low dip, open, Fe/Mn-staining. 56.4', JOINT, low dip, open, Fe/Mn staining.	
	18.5						
						56.6', 3 JOINTs, low dip, open, staining.	
						56.8' to 57.9', JOINT, steep dip, open, sl Fe/Mn-staining, calcite-fquartz.	
57.0	19.0		755.2				
	19.5						
58.0	20.0		754.2		Coring Terminated @ 58.0'----------		

Client: Duke Power Company	**Coring Terminated @ 58.0'**	**BORING MW2-4**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/09/2000	**DEPTH INTERVAL 53.0' to 58.0'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no, lost water at 38.0 (ft)		Page 6 of 6

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a				n/a				846.8
			4.0'						
5		S1	5.5'	3 5 7		S1, Yellowish red, slightly micaeouls, fine **SILTY CLAY**.	CL		841.8
			9.0'						
10		S2	10.5'	3 3 5		S2, Yellowish to light red, slightly micaeous, very fine **SANDY SILT**.	ML		836.8
			14.0'						
15		S3	15.5'	2 4 6		S3, Yellowish to light red, slightly micaeous, very fine **SANDY SILT** with some rock fragments.	ML		831.8
			19.0'						
				7		Large bag sample from auger cuttings, 10' to 20'.			
20		S4		12		S4, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		826.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Casing	Hole	Water

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Casing / Augers:	3.25"	
Project: Belews Creek Ash Landfill - Permit		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	NQ	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By:	CAMedlin/MFS	

Date Boring Completed:	05/11/00
REFUSAL @	38.5'
Total Depth of Hole:	58.3'

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BORING MW2-5

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Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a				n/a				826.8
			20.5'	13					
			24.0'						
				9					
25		S5		15		S5, Yellowish brown, slightly micaeous, very fine **SANDY SILT**.	ML		821.8
			25.5'	18					
			29.0'						
		S6		25		S6, Yellowish brown, slightly micaeous, very fine **SANDY SILT** with some rock fragments.	ML		
30			30.0'	50/6"					816.8
			34.0'						
		S7	34.5'	50/6"		S7, Yellowish brown, slightly micaeous, very fine **SILTY SAND**.	SM		
35									811.8
			38.5'			SS. No penetration.			
		SS	38.5'	50/0"		Auger refusal @ 38.5'————————————————			
						Set NW Casing to 38.8'. Start coring with NQ barrel at 38.8'			
						Rock Core form 38.8 to 58.3'.			
40						Install Monitoring Well. See Installation Sheet for Details.			806.8
						Screened Interval from 34.0' to 54.0'.			
						Result of Slug Test: **k=9.9E-04 cm/sec.**			
45									801.8

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	846.8
Date Boring Completed:	05/11/2000
Boring Logged By:	CAM/MFS

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BORING MW2-5

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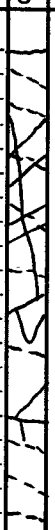
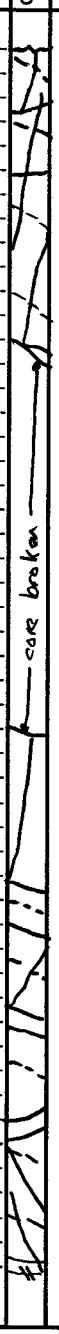
Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
					Auger Refusal @ 38.5'.		
38.8	0.0		788.0		NW Casing Set to 38.8'.---------- Pinkish gray to very pale orange to very light gray, hard, fine-grained **FLASER GNEISS** (quartz-feldspar-mica).	Run 9.7' from 38.8' to 48.5', Rec=9.2', RQD=1.8'. 38.8' to 46.6', Moderate weathering. 39.1', JOINT, medium dip, open, Fe/Mn-staining. 39.1' to 39.6', JOINT, steep dip, open, stained. 39.3', JOINT, medium dip, open, Fe/Mn-staining.	
	0.5					39.5', JOINT, low dip, open, Fe/Mn-staining. 39.6', JOINT, low dip, open, Fe/Mn-staining. 39.7', JOINT, medium dip, open, Fe/Mn-staining.	
39.8	1.0		787.0			39.8', JOINT, medium dip, open, Fe/Mn-staining.	
	1.5					40.3', JOINT, low dip, open, Mn-staining.	
40.8	2.0		786.0			40.8', JOINT, low dip, open, Mn-staining. 40.8' to 41.5', JOINT, steep dip, partially open, Fe/mn-staining.	
	2.5					41.2', JOINT, low dip, open, Fe/Mn-staining.	
						41.5', JONT, low dip, open, sl Fe-staining. 41.5' to 43.4', Core broken along steeply dipping JOINTs, heavy Fe/Mn-staining.	
41.8	3.0		785.0				
	3.5	Core broken					
42.8	4.0		784.0				
						43.0', 2 JOINTs, steep dip, open, heavy Fe/Mn-staining. 43.2', JOINT, low dip, open, Fe/Mn-staining.	
	4.5						
						43.6', JOINT, low dip, open, Fe/Mn-staining. 43.7' JOINT, low dip, open, Fe/Mn-staining.	
43.8	5.0		783.0				

Client: Duke Power Company	**Coring Terminated @ 58.3'**	**BORING MW2-5**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/11/2000	**DEPTH INTERVAL 38.8' to 43.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no		Page 3 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
43.8	5.0		783.0	NQ 95			19
						44.1', JOINT, low dip, open, Fe/Mn-staining. 44.1' to 44.5', JOINT, steep dip, open, Fe/Mn-staining.	
	5.5						
						44.6' to 45.0', JOINT, steep dip, open, Fe/Mn-staining.	
44.8	6.0		782.0				
						45.0' to 46.6', Core broken along several low angle and medium dipping JOINTs, Fe/Mn-staining.	
	6.5						
45.8	7.0	core broken	781.0				
	7.5						
					46.6'---------- Very light gray to light gray, hard to very hard, fine-grained **FLASER GNEISS** (quartz-feldspar-mica).	46.6' to 58.3', Slight weathering. 46.6' to 47.2', JOINT, steep dip, tight, calcite.	
46.8	8.0		780.0			46.9', JOINT, low dip, tight, calcite.	
	8.5						
						47.4', JOINT, low dip, open, Fe/Mn-staining. 47.5', JOINT, medium dip, open, Fe/Mn-stain. 47.6', JOINT, low dip, open, Fe/Mn-staining. 47.7', JOINT, low dip, open, sl Fe/Mn-staining. 47.8', JOINT, low dip, open, sl Fe/Mn-staining.	
47.8	9.0		779.0				
						48.1', JOINT, low dip, open, Fe/Mn-staining. 48.2', JOINT, low dip, open, Fe/Mn-staining.	
	9.5						
						48.4', JOINT, steep dip, open, Fe/Mn-staining. 48.4' to 49.3', JOINT, steep dip, open, Fe/Mn-staining.	
48.8	10.0		778.0			Run 9.8' from 48.5' to 58.3', Rec=9.8', RQD=8.6'.	

Client: Duke Power Company	**Coring Terminated @ 58.3'**	**BORING MW2-5**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/11/2000	**DEPTH INTERVAL 43.8 to 48.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no		Page 4 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
48.8	10.0		778.0				
	10.5					49.3', JOINT, steep dip, tight, calcite.	
						49.7', JOINT, steep dip, open, sl Fe-staining.	
49.8	11.0		777.0				
						50.0', JOINT, low dip, open, sl Fe-staining.	
	11.5						
50.8	12.0		776.0			50.8', JOINT, steep dip, open, calcite, no stain.	
	12.5					51.3', JOINT, steep dip, tight, calcite, vuggy. 51.3', JOINT, low dip, open, no staining.	
						51.6', 2 JOINTs, steep dip, partially open, calcite, vuggy, no staining.	
51.8	13.0		775.0				
	13.5					52.4', JOINT, low dip, open, no staining.	
						52.6', JOINT, steep dip, open, sl Fe-staining.	
52.8	14.0		774.0			52.9', JOINT, steep dip, open, sl Fe-staining.	
	14.5			NQ 100			88
						53.6', JOINT, low dip, open, vsl Fe-staining.	
53.8	15.0		773.0				

Client: Duke Power Company	**Coring Terminated @ 58.3'**	**BORING MW2-5**
Project: Belews Creek Ash Landfill - Permit	**Date Drilled:** 05/11/2000	**DEPTH INTERVAL 48.8' to 53.8'**
Project No.: 00003.08.0080.00.00000	**Logged By:** MFSchaeffer/CAMedlin	Duke Engineering & Services. A Duke Energy Company
Lab Sample No: **Sample Interval:**	**Comments:**	
Water Return During Core? no		Page 5 of 6

Boring Depth (ft)	Rock Core (ft)	Core Sketch	Elev. (ft)	REC	ROCK DESCRIPTION	REMARKS	RQD
53.8	15.0		773.0				
	15.5						
54.8	16.0		772.0			54.7', JOINT, medium dip, open, no staining.	
	16.5						
55.8	17.0		771.0				
	17.5					56.4', JOINT, low dip, open, calcite, sl Fe-staining.	
56.8	18.0		770.0			56.8', JOINT, low dip, open, vsl Fe-staining.	
	18.5					57.3', JOINT, low dip, open, vsl Fe-staining.	
57.8	19.0		769.0			57.7', JOINT, low dip, open, vsl Fe-staining. 57.9', JOINT, medium dip, open, vsl Fe-staining. 57.9', JOINT, low dip, open, vsl Fe-staining.	
	19.5				Coring Terminated @ 58.3'----------		
58.8	20.0		768.0				

Client: Duke Power Company	Coring Terminated @ 58.3'	BORING MW2-5
Project: Belews Creek Ash Landfill - Permit	Date Drilled: 05/11/2000	DEPTH INTERVAL 53.8' to 58.3'
Project No.: 00003.08.0080.00.00000	Logged By: MFSchaeffer/CAMedlin	
Lab Sample No: Sample Interval:	Comments:	Duke Engineering & Services. A Duke Energy Company
Water Return During Core? no		Page 6 of 6

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
0	n/a								835.2
						Advanced with 7-1/4" OD Augers.			
			3.0'						
		S1		2 6 8		S1, N=14, Yellowish red, slightly micaeous, fine **SILTY-SANDY CLAY**.	CL		
			4.5'						
5									830.2
			8.0'						
		S2		2 5 6		S2, N=11, Yellowish red, slightly micaeous, fine **SILTY-SANDY CLAY**.	CL		
			9.5'						
10									825.2
						Large bag sample taken from auger cuttings, 8.0' to 18.0".			
			13.0'						
		S3		2 5 7		S3, N=12, Yellowish red, slightly micaeous, fine **SILTY-SANDY CLAY**.	CL		
			14.5'						
15									820.2
			18.0'						
		S4		2 3 4		S4, N-7, Yellowish brown, slightly micaeous, fine **SANDY SILT**.	ML		
			19.5'						
20									815.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Water Level Readings				
		Depth of (ft)		
Date	Time	Cas-ing	Hole	Water
05/03/00	4:00p	0.0	48.4'	28.8'
05/10/00	8:00a	36.5'	48.4'	27.3'

Project Information		Equipment	ID	Hammer/Drop
Client: Duke Power Company		Augers:		n/a
Project: Belews Creek Ash Landfill		Split spoon 1:		Automatic
Project No.: 00003.08.0080.00.00000		Split spoon 2:		Automatic
Location: Belews Creek, North Carolina		Core Barrel ID:	n/a	
Drilling Contractor: DE&S		Core Barrel Type:	n/a	
Drillers: Jim Barker/Ricky Dickard	Drill Rig: CMS	Boring Logged By: CAMedlin/ MFS		

Date Boring Completed:	05/03/00
AUGER REFUSAL @	48.4'
Total Depth of Hole:	48.4'

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BORING MW-6

Page 1 of 3

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
20	n/a								815.2
						Large Bag Sample from auger cuttings, 18.0' to 28.0'.			
			23.0'						
		S5		2					
				3		S5, N=7, Yellowish brown, slightly micaeous, fine **SANDY SILT**.	ML		
			24.5'	4					
25									810.2
						Screened Interval from 24.0' to 34.0'.			
						Result of Slug Test: **k=2.1E-04 cm/sec.**			
			28.0'						
		S6		2					
				2		S6, N=7, Yellowish brown, sligthly micaeous, fine **SANDY SILT**.	ML		
			29.5'	5					
30									805.2
						Large Bag Sample from auger cuttings, 28.0' to 38.0'.			
			33.0'						
		S7		8					
				14		S7, N=37, Yellowish brown, slightly micaeous, fine **SANDY SILT**.	ML		
			34.5'	23					
35									800.2
			38.0'						
		S8		3					
				6		S8, N=15, Yellowish brown, slightly micaeous, fine **SANDY SILT**.	ML		
			39.5'	9					
40									795.2
			43.0'						
		S9		5					
				13		S9, N=42, Yellowish brown, slight;y miceous, fine **SANDY SILT**.	ML		
			44.5'	29					
45									790.2

Sample Types S:split spoon UD:3" dia. thin wall tube **Lab Tests** G:grain size A:Atterberg Limit U:unconfined compressive strength test

Ground Surface Elev. (ft)	935.2
Date Boring Completed:	05/03/2000
Boring Logged By:	CAM/MFS

Duke Engineering & Services.
A Duke Energy Company

BORING MW-6

Page 2 of 3

Depth (ft)	Casing Blows/ft	Sample No.	Sample Depth (ft)	Blows / 6"	Recovery (in.)	SOIL DESCRIPTION	USCS	Piez. Data	Elev. (ft)
45	n/a								790.2
			48.0'						
		S9	48.1'	50/2"		S9, N=50/2", Yellowish brown, slightly micaeous, fine **SILTY SAND**, weathered rock.	SM		
						Auger Refusal @ 48.4'			
						Boring Terminated @ 48.4'			
50									785.2
						Monitoring Well Installed. See Installation Sheet for Details.			
						Screened Interval from 24.0' to 34.0'.			
55									780.2
60									775.2
65									770.2
70									765.2

Sample Types S:split spoon **UD**:3" dia. thin wall tube **Lab Tests G**:grain size **A**:Atterberg Limit **U**:unconfined compressive strength test

Ground Surface Elev. (ft)	935.2
Date Boring Completed:	05/03/2000
Boring Logged By:	CAMedlin/MFS

Duke Engineering & Services
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BORING MW-6

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Appendix D

Field Permeability Tests

1. **Falling Head from 2000**
2. **Slug Tests from 2000**
3. **Slug Tests from 1989**

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **04/20/2000**

BC-1A @ 8.9'

LENGTH OF PIPE = **11.7** **Feet** **Soil Type =** Sandy Silt (ML)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	356.616	356.616	
60	0.005	0.1524	356.616	356.4636	1.55E-05
120	0.015	0.4572	356.616	356.1588	3.10E-05
180	0.03	0.9144	356.616	355.7016	4.66E-05
240	0.04	1.2192	356.616	355.3968	3.11E-05
300	0.05	1.524	356.616	355.092	3.11E-05
360	0.06	1.8288	356.616	354.7872	3.11E-05
420	0.07	2.1336	356.616	354.4824	3.12E-05
480	0.075	2.286	356.616	354.33	1.56E-05
540	0.08	2.4384	356.616	354.1776	1.56E-05
600	0.085	2.5908	356.616	354.0252	1.56E-05
900	0.105	3.2004	356.616	353.4156	1.25E-05
1200	0.125	3.81	356.616	352.806	1.25E-05
1500	0.14	4.2672	356.616	352.3488	9.41E-06
1800	0.165	5.0292	356.616	351.5868	1.57E-05
2400	0.18	5.4864	356.616	351.1296	4.72E-06
3000	0.2	6.096	356.616	350.52	6.30E-06
3600	0.22	6.7056	356.616	349.9104	6.31E-06

Mean Permeability (cm/sec)
1.27E-05

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-24-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-1A DEPTH 8.9'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
3:48	0	0.0'	
3:49	1	0.005'	
3:50	2	0.015'	
3:51	3	0.03'	
3:52	4	0.04'	
3:53	5	0.05'	
3:54	6	0.06'	
3:55	7	0.07'	
3:56	8	0.075'	
3:57	9	0.08'	
3:58	10	0.085'	
4:03	15	0.105'	
4:08	20	0.125'	
4:13	25	0.14'	
4:18	30	0.165'	
4:28	40	0.18'	
4:38	50	0.20'	
4:48	60	0.22'	

CASING SIZE: NW (3" ID) DEPTH: 8.9' HEIGHT ABOVE GROUND (HEAD): 2.8'

REMARKS:

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-24-00

JOB NAME Ash Landfill INSPECTOR CA.Medlin

BORING NO. BC-1A DEPTH 8.9'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
3:48	0	0.0'	
3:49	1	0.005'	
3:50	2	0.015'	
3:51	3	0.03'	
3:52	4	0.04'	
3:53	5	0.05'	
3:54	6	0.06'	
3:55	7	0.07'	
3:56	8	0.075'	
3:57	9	0.08'	
3:58	10	0.085'	
4:03	15	0.105'	
4:08	20	0.125'	
4:13	25	0.14'	
4:18	30	0.165'	
4:28	40	0.18'	
4:38	50	0.20'	
4:48	60	0.22'	

CASING SIZE: NW (3" ID) DEPTH: 8.9' HEIGHT ABOVE GROUND (HEAD): 2.8'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **04/20/2000**

BC-1A @ 23.8'

LENGTH OF PIPE = 26.7 Feet **Soil Type =** Silty Sand (SM)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	813.816	813.816	
60	0.02	0.6096	813.816	813.2064	2.72E-05
120	0.04	1.2192	813.816	812.5968	2.72E-05
180	0.055	1.6764	813.816	812.1396	2.04E-05
240	0.065	1.9812	813.816	811.8348	1.36E-05
300	0.07	2.1336	813.816	811.6824	6.81E-06
360	0.075	2.286	813.816	811.53	6.81E-06
420	0.08	2.4384	813.816	811.3776	6.81E-06
480	0.085	2.5908	813.816	811.2252	6.81E-06
540	0.09	2.7432	813.816	811.0728	6.81E-06
600	0.1	3.048	813.816	810.768	1.36E-05
900	0.13	3.9624	813.816	809.8536	8.19E-06
1200	0.15	4.572	813.816	809.244	5.46E-06
1500	0.17	5.1816	813.816	808.6344	5.47E-06
1800	0.18	5.4864	813.816	808.3296	2.73E-06
2400	0.21	6.4008	813.816	807.4152	4.11E-06
3000	0.23	7.0104	813.816	806.8056	2.74E-06
3600	0.25	7.62	813.816	806.196	2.74E-06

Mean Permeability (cm/sec)
5.72E-06

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-26-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-1A DEPTH 23.8'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
7:33	0	0.0'	
7:34	1	.02'	
7:35	2	.04'	
7:36	3	.055'	
7:37	4	.065'	
7:38	5	.07'	
7:39	6	.075'	
7:40	7	.08'	
7:41	8	.085'	
7:42	9	.09'	
7:43	10	.10'	
7:48	15	.13'	
7:53	20	.15'	
7:58	25	.17'	
~~8:08~~ 8:03 CAM	30	.18'	
8:13	40	.21'	
~~8:18~~ 8:23 CAM	50	.23'	
8:33	60	.25'	

CASING SIZE: NW (3" ID) DEPTH: 23.8' HEIGHT ABOVE GROUND (HEAD): 2.9'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
Well Point - Filter in Uniform Material

Belews Creek Ash Landfill **04/26/2000**

BC-1A @ 66.0' to 75.7' **Rock Type = Flaser Gneiss; R=81, RQD=27.**

LENGTH OF PIPE = 68.7 Feet **m= 1**

LENGTH OF OPEN HOLE = 9.7 Feet

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	2093.976	2093.976	
60	3.6	109.728	2093.976	1984.248	9.58E-05
120	7.3	222.504	2093.976	1871.472	1.04E-04
180	10.7	326.136	2093.976	1767.84	1.01E-04
240	12.77	389.2296	2093.976	1704.7464	6.47E-05
300	15.6	475.488	2093.976	1618.488	9.24E-05
360	17.55	534.924	2093.976	1559.052	6.66E-05
420	19.26	587.0448	2093.976	1506.9312	6.05E-05
480	20.74	632.1552	2093.976	1461.8208	5.41E-05
540	23	701.04	2093.976	1392.936	8.59E-05
600	24.48	746.1504	2093.976	1347.8256	5.86E-05
900	29.86	910.1328	2093.976	1183.8432	4.62E-05
1200	33.04	1007.059	2093.976	1086.9168	3.04E-05
1500	34.88	1063.142	2093.976	1030.8336	1.89E-05
1800	35.81	1091.489	2093.976	1002.4872	9.93E-06
2400	36.82	1122.274	2093.976	971.7024	5.55E-06
3000	37.27	1135.99	2093.976	957.9864	2.53E-06
3600	37.35	1138.428	2093.976	955.548	4.54E-07

1. Spreadsheet assumes 3" ID Pipe; NQ Hole, OD = 3"

Horizontal Permeability (cm/sec)
2.88E-05

2. Formula: $$K_h = \frac{d^2 \cdot \ln\left(\frac{2mL}{D}\right)}{8 \cdot L \cdot (t_2 - t_1)} \cdot \ln\frac{H_1}{H_2}$$ for $\frac{mL}{D} \rangle 4$

3. Where K_h is the Horizontal Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

d is the diameter of the Open Length (cm), L is the Open Length of Hole (cm)

m is the Transformation Ratio, Where $m = \sqrt{K_h / K_v}$, K_h is the Horizontal Permeability

K_v is the Vertical Permeability

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-26-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-1A DEPTH 23.8'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
7:33	0	0.0'	
7:34	1	.02'	
7:35	2	.04'	
7:36	3	.055'	
7:37	4	.065'	
7:38	5	.07'	
7:39	6	.075'	
7:40	7	.08'	
7:41	8	.085'	
7:42	9	.09'	
7:43	10	.10'	
7:48	15	.13'	
7:53	20	.15'	
7:58	25	.17'	
~~8:08~~ 8:03 CAM	30	.18'	
8:13	40	.21'	
~~8:18~~ 8:23 CAM	50	.23'	
8:33	60	.25'	

CASING SIZE: NW (3" ID) DEPTH: 23.8' HEIGHT ABOVE GROUND (HEAD): 2.9'

REMARKS:

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-26-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-1A DEPTH 66.0'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
4:55	0	0.0'	
4:56	1	3.60'	
4:57	2	7.30'	
4:58	3	10.71'	
4:59	4	12.77'	
5:00	5	15.60'	
5:01	6	17.55'	
5:02	7	19.26'	
5:03	8	20.74'	
5:04	9	23.00'	
5:05	10	24.48'	
5:10	15	29.86'	
5:15	20	33.04'	
5:20	25	34.88'	
5:25	30	35.81'	
5:35	40	36.82'	
5:45	50	37.27'	
5:55	60	37.35'	

CASING SIZE: NW (3" ID) DEPTH: 66.0' HEIGHT ABOVE GROUND (HEAD): 2.7'

REMARKS:

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-26-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-1A DEPTH 66.0'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
4:55	0	0.0'	
4:56	1	3.60'	
4:57	2	7.30'	
4:58	3	10.71'	
4:59	4	12.77'	
5:00	5	15.60'	
5:01	6	17.55'	
5:02	7	19.26'	
5:03	8	20.74'	
5:04	9	23.00'	
5:05	10	24.48'	
5:10	15	29.86'	
5:15	20	33.04'	
5:20	25	34.88'	
5:25	30	35.81'	
5:35	40	36.82'	
5:45	50	37.27'	
5:55	60	37.35'	

CASING SIZE: NW (3" ID) DEPTH: 66.0' HEIGHT ABOVE GROUND (HEAD): 2.7'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **04/27/2000**
BC-2A @ 18.6'
LENGTH OF PIPE = 21.7 Feet **Soil Type =** Sandy Silt (ML)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	661.416	661.416	
60	0.0005	0.01524	661.416	661.40076	8.36E-07
120	0.0005	0.01524	661.416	661.40076	0.00E+00
180	0.01	0.3048	661.416	661.1112	1.59E-05
240	0.01	0.3048	661.416	661.1112	0.00E+00
300	0.015	0.4572	661.416	660.9588	8.36E-06
360	0.015	0.4572	661.416	660.9588	0.00E+00
420	0.02	0.6096	661.416	660.8064	8.36E-06
480	0.02	0.6096	661.416	660.8064	0.00E+00
540	0.02	0.6096	661.416	660.8064	0.00E+00
600	0.025	0.762	661.416	660.654	8.37E-06
900	0.03	0.9144	661.416	660.5016	1.67E-06
1200	0.04	1.2192	661.416	660.1968	3.35E-06
1500	0.04	1.2192	661.416	660.1968	0.00E+00
1800	0.05	1.524	661.416	659.892	3.35E-06
2400	0.065	1.9812	661.416	659.4348	2.51E-06
3000	0.08	2.4384	661.416	658.9776	2.52E-06
3600	0.095	2.8956	661.416	658.5204	2.52E-06

Mean Permeability (cm/sec)
2.49E-06

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-27-00

JOB NAME Ash Landfill INSPECTOR CA. Medlin

BORING NO. BC-2A DEPTH 18.6'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
8:47	0	0.0'	
8:48	1	0.005'	
8:49	2	0.005'	
8:50	3	0.01'	
8:51	4	0.01'	
8:52	5	0.015'	
8:53	6	0.015'	
8:54	7	0.02'	
8:55	8	0.02'	
8:56	9	0.02'	
8:57	10	0.025'	
9:02	15	0.03'	
9:07	20	0.04'	
9:12	25	0.04'	
9:17	30	0.05'	
9:27	40	0.065'	
9:37	50	0.08'	
9:47	60	0.095'	

CASING SIZE: NW (3" ID) DEPTH: 18.6' HEIGHT ABOVE GROUND (HEAD): 3.1'

REMARKS:

Form 04436 (2-89)

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DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station

DAY/DATE 4-27-00

JOB NAME Ash Landfill

INSPECTOR CA. Medlin

BORING NO. BC-2A

DEPTH 18.6'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
8:47	0	0.0'	
8:48	1	0.005'	
8:49	2	0.005'	
8:50	3	0.01'	
8:51	4	0.01'	
8:52	5	0.015'	
8:53	6	0.015'	
8:54	7	0.02'	
8:55	8	0.02'	
8:56	9	0.02'	
8:57	10	0.025'	
9:02	15	0.03'	
9:07	20	0.04'	
9:12	25	0.04'	
9:17	30	0.05'	
9:27	40	0.065'	
9:37	50	0.08'	
9:47	60	0.095'	

CASING SIZE: NW (3" ID) DEPTH: 18.6' HEIGHT ABOVE GROUND (HEAD): 3.1'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **04/27/2000**

BC-2A @ 38.2'

LENGTH OF PIPE = 41.7 Feet **Soil Type =** Silty Sand (SM)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	1271.016	1271.016	
60	0.64	19.5072	1271.016	1251.5088	5.61E-04
120	1.26	38.4048	1271.016	1232.6112	5.52E-04
180	1.95	59.436	1271.016	1211.58	6.24E-04
240	2.69	81.9912	1271.016	1189.0248	6.82E-04
300	3.19	97.2312	1271.016	1173.7848	4.68E-04
360	3.7	112.776	1271.016	1158.24	4.84E-04
420	4.28	130.4544	1271.016	1140.5616	5.58E-04
480	4.83	147.2184	1271.016	1123.7976	5.37E-04
540	5.62	171.2976	1271.016	1099.7184	7.86E-04
600	6.11	186.2328	1271.016	1084.7832	4.96E-04
900	7.95	242.316	1271.016	1028.7	3.85E-04
1200	10.79	328.8792	1271.016	942.1368	6.38E-04
1500	12.77	389.2296	1271.016	881.7864	4.80E-04
1800	14.56	443.7888	1271.016	827.2272	4.63E-04
2400	17.72	540.1056	1271.016	730.9104	4.49E-04
3000	20.25	617.22	1271.016	653.796	4.04E-04
3600	22.47	684.8856	1271.016	586.1304	3.96E-04

Mean Permeability (cm/sec)
4.95E-04

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-27-00

JOB NAME Ash Landfill INSPECTOR CA Medlin

BORING NO. BC-2A DEPTH 38.2'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
11:01	0	0.0'	
11:02	1	.64'	
11:03	2	1.26'	
11:04	3	1.95'	
11:05	4	2.69'	
11:06	5	3.19'	
11:07	6	3.70'	
11:08	7	4.28'	
11:09	8	4.83'	
11:10	9	5.62'	
11:11	10	6.11'	
11:16	15	7.95'	
11:21	20	10.79'	
11:26	25	12.77'	
11:31	30	14.56'	
11:41	40	17.72'	
11:51	50	20.25'	
12:01	60	22.47'	

CASING SIZE: NW (3" ID) DEPTH: 38.2' HEIGHT ABOVE GROUND (HEAD): 3.5'

REMARKS:

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE 4-27-00

JOB NAME Ash Landfill INSPECTOR CA. Medlin

BORING NO. BC-2A DEPTH 38.2'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
11:01	0	0.0'	
11:02	1	.64'	
11:03	2	1.26'	
11:04	3	1.95'	
11:05	4	2.69'	
11:06	5	3.19'	
11:07	6	3.70'	
11:08	7	4.28'	
11:09	8	4.83'	
11:10	9	5.62'	
11:11	10	6.11'	
11:16	15	7.95'	
11:21	20	10.79'	
11:26	25	12.77'	
11:31	30	14.56'	
11:41	40	17.72'	
11:51	50	20.25'	
12:01	60	22.47'	

CASING SIZE: NW (3" ID) DEPTH: 38.2' HEIGHT ABOVE GROUND (HEAD): 3.5'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **05/16/2000**

BC-4A @ 9.5'

LENGTH OF PIPE = 11.7 Feet **Soil Type =** Silty Sand (SM)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	356.616	356.616	
60	0	0	356.616	356.616	0.00E+00
120	0	0	356.616	356.616	0.00E+00
180	0.005	0.1524	356.616	356.4636	1.55E-05
240	0.01	0.3048	356.616	356.3112	1.55E-05
300	0.02	0.6096	356.616	356.0064	3.10E-05
360	0.025	0.762	356.616	355.854	1.55E-05
420	0.03	0.9144	356.616	355.7016	1.55E-05
480	0.35	10.668	356.616	345.948	1.01E-03
540	0.45	13.716	356.616	342.9	3.21E-04
600	0.05	1.524	356.616	355.092	-1.27E-03
900	0.075	2.286	356.616	354.33	1.56E-05
1200	0.095	2.8956	356.616	353.7204	1.25E-05
1500	0.12	3.6576	356.616	352.9584	1.56E-05
1800	0.135	4.1148	356.616	352.5012	9.40E-06
2400	0.17	5.1816	356.616	351.4344	1.10E-05
3000	0.205	6.2484	356.616	350.3676	1.10E-05
3600	0.25	7.62	356.616	348.996	1.42E-05

Mean Permeability (cm/sec)
1.39E-05

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT: Belews Creek Steam Station
DAY/DATE: Tuesday 5-16-00
JOB NAME: Ash Landfill
INSPECTOR: CA. Medlin
BORING NO.: BC-4A
DEPTH: 9.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
8:25	0	0.0'	
8:26	1	0.0'	
8:27	2	0.0'	
8:28	3	0.005'	
8:29	4	0.01'	
8:30	5	0.02'	
8:31	6	0.025'	
8:32	7	0.03'	
8:33	8	0.035'	
8:34	9	0.045'	
8:35	10	0.05'	
8:40	15	0.075'	
8:45	20	0.095'	
8:50	25	0.12'	
8:55	30	0.135'	
9:05	40	0.17'	
9:15	50	0.205'	
9:25	60	0.25'	

CASING SIZE: NW DEPTH: 9.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE Tuesday 5-16-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-4A DEPTH 9.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
8:25	0	0.0'	
8:26	1	0.0'	
8:27	2	0.0'	
8:28	3	0.005'	
8:29	4	0.01'	
8:30	5	0.02'	
8:31	6	0.025'	
8:32	7	0.03'	
8:33	8	0.035'	
8:34	9	0.045'	
8:35	10	0.05'	
8:40	15	0.075'	
8:45	20	0.095'	
8:50	25	0.12'	
8:55	30	0.135'	
9:05	40	0.17'	
9:15	50	0.205'	
9:25	60	0.25'	

CASING SIZE: NW DEPTH: 9.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **05/16/2000**
BC-4A @ 19.5'
LENGTH OF PIPE = 21.7 Feet **Soil Type =** Sand (SM-GM)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	661.416	661.416	
60	0	0	661.416	661.416	0.00E+00
120	0	0	661.416	661.416	0.00E+00
180	0	0	661.416	661.416	0.00E+00
240	0	0	661.416	661.416	0.00E+00
300	0.005	0.1524	661.416	661.2636	8.36E-06
360	0.01	0.3048	661.416	661.1112	8.36E-06
420	0.015	0.4572	661.416	660.9588	8.36E-06
480	0.02	0.6096	661.416	660.8064	8.36E-06
540	0.025	0.762	661.416	660.654	8.37E-06
600	0.03	0.9144	661.416	660.5016	8.37E-06
900	0.05	1.524	661.416	659.892	6.70E-06
1200	0.065	1.9812	661.416	659.4348	5.03E-06
1500	0.08	2.4384	661.416	658.9776	5.03E-06
1800	0.09	2.7432	661.416	658.6728	3.36E-06
2400	0.11	3.3528	661.416	658.0632	3.36E-06
3000	0.13	3.9624	661.416	657.4536	3.36E-06
3600	0.145	4.4196	661.416	656.9964	2.52E-06

Mean Permeability (cm/sec)
4.98E-06

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT: Belews Creek Steam Sta. DAY/DATE: Tuesday 5-16-00

JOB NAME: Ash Landfill INSPECTOR: C.A. Medlin

BORING NO.: BC-4A DEPTH: 19.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
9:35	0	0.0'	
9:36	1	0.0'	
9:37	2	0.0'	
9:38	3	0.0'	
9:39	4	0.0'	
9:40	5	0.005'	
9:41	6	0.01'	
9:42	7	0.015'	
9:43	8	0.02'	
9:44	9	0.025'	
9:45	10	0.03'	
9:50	15	0.05'	
9:55 ~~10:00~~ CAM	20	0.065'	
10:00	25	0.08'	
10:05	30	0.09'	
10:15	40	0.11'	
10:25	50	0.13'	
10:35	60	0.145'	

CASING SIZE: NW DEPTH: 19.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Sta. DAY/DATE Tuesday 5-16-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-4A DEPTH 19.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
9:35	0	0.0'	
9:36	1	0.0'	
9:37	2	0.0'	
9:38	3	0.0'	
9:39	4	0.0'	
9:40	5	0.005'	
9:41	6	0.01'	
9:42	7	0.015'	
9:43	8	0.02'	
9:44	9	0.025'	
9:45	10	0.03'	
9:50	15	0.05'	
9:55 ~~10:00~~ CAM	20	0.065'	
10:00	25	0.08'	
10:05	30	0.09'	
10:15	40	0.11'	
10:25	50	0.13'	
10:35	60	0.145'	

CASING SIZE: NW DEPTH: 19.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **05/16/2000**

BC-4A @ 29.5

LENGTH OF PIPE = 31.7 Feet **Soil Type =** Silty Sand (SM)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	966.216	966.216	
60	0.005	0.1524	966.216	966.0636	5.72E-06
120	0.02	0.6096	966.216	965.6064	1.72E-05
180	0.04	1.2192	966.216	964.9968	2.29E-05
240	0.055	1.6764	966.216	964.5396	1.72E-05
300	0.065	1.9812	966.216	964.2348	1.15E-05
360	0.08	2.4384	966.216	963.7776	1.72E-05
420	0.095	2.8956	966.216	963.3204	1.72E-05
480	0.105	3.2004	966.216	963.0156	1.15E-05
540	0.12	3.6576	966.216	962.5584	1.72E-05
600	0.13	3.9624	966.216	962.2536	1.15E-05
900	0.185	5.6388	966.216	960.5772	1.26E-05
1200	0.22	6.7056	966.216	959.5104	8.06E-06
1500	0.27	8.2296	966.216	957.9864	1.15E-05
1800	0.315	9.6012	966.216	956.6148	1.04E-05
2400	0.385	11.7348	966.216	954.4812	8.10E-06
3000	0.44	13.4112	966.216	952.8048	6.38E-06
3600	0.5	15.24	966.216	950.976	6.97E-06

Mean Permeability (cm/sec)
1.07E-05

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station

DAY/DATE Tuesday 5-16-00

JOB NAME Ash Landfill

INSPECTOR CA. Medlin

BORING NO. BC-4A

DEPTH 29.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
11:10	0	0.0'	
11:11	1	0.005'	
11:12	2	0.02'	
11:13	3	0.04'	
11:14	4	0.055'	
11:15	5	0.065'	
11:16	6	0.08'	
11:17	7	0.095'	
11:18	8	0.105'	
11:19	9	0.12'	
11:20	10	0.13'	
11:25	15	0.185'	
11:30	20	0.22'	
11:35	25	0.27'	
11:40	30	0.315'	
11:50	40	0.385'	
12:00	50	0.44'	
12:10	60	0.50'	

CASING SIZE: NW DEPTH: 29.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE Tuesday 5-16-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-4A DEPTH 29.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
11:10	0	0.0'	
11:11	1	0.005'	
11:12	2	0.02'	
11:13	3	0.04'	
11:14	4	0.055'	
11:15	5	0.065'	
11:16	6	0.08'	
11:17	7	0.095'	
11:18	8	0.105'	
11:19	9	0.12'	
11:20	10	0.13'	
11:25	15	0.185'	
11:30	20	0.22'	
11:35	25	0.27'	
11:40	30	0.315'	
11:50	40	0.385'	
12:00	50	0.44'	
12:10	60	0.50'	

CASING SIZE: NW DEPTH: 29.5' HEIGHT ABOVE GROUND (HEAD): 2.2'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **04/20/2000**

BC-6A @ 8.4'

LENGTH OF PIPE = 11.7 Feet **Soil Type =** Sandy Silt (ML)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	356.616	356.616	
60	0	0	356.616	356.616	0.00E+00
120	0.01	0.3048	356.616	356.3112	3.10E-05
180	0.015	0.4572	356.616	356.1588	1.55E-05
240	0.02	0.6096	356.616	356.0064	1.55E-05
300	0.02	0.6096	356.616	356.0064	0.00E+00
360	0.025	0.762	356.616	355.854	1.55E-05
420	0.03	0.9144	356.616	355.7016	1.55E-05
480	0.03	0.9144	356.616	355.7016	0.00E+00
540	0.035	1.0668	356.616	355.5492	1.55E-05
600	0.04	1.2192	356.616	355.3968	1.56E-05
900	0.06	1.8288	356.616	354.7872	1.25E-05
1200	0.08	2.4384	356.616	354.1776	1.25E-05
1500	0.09	2.7432	356.616	353.8728	6.25E-06
1800	0.105	3.2004	356.616	353.4156	9.38E-06
2400	0.14	4.2672	356.616	352.3488	1.10E-05
3000	0.17	5.1816	356.616	351.4344	9.43E-06
3600	0.195	5.9436	356.616	350.6724	7.87E-06

Mean Permeability (cm/sec)
1.05E-05

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek DAY/DATE 4-20-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. BC-6 A DEPTH 8.4'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
10:37	0	0.0'	
10:38	1	0.0'	
10:39	2	0.01'	
10:40	3	0.015'	
10:41	4	0.02'	
10:42	5	0.02'	
10:43	6	0.025'	
10:44	7	0.03'	
10:45	8	0.03'	
10:46	9	0.035'	
10:47	10	0.04'	
10:52	15	0.06'	
10:57	20	0.08'	
11:02	25	0.09'	
11:07	30	0.105'	
11:17	40	0.14'	
11:27	50	0.17'	
11:37	60	0.195'	

CASING SIZE: NW (3" ID) DEPTH: 8.4' HEIGHT ABOVE GROUND (HEAD): 3.3'

REMARKS:

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT: Belews Creek

DAY/DATE: 4-20-00

JOB NAME: Ash Landfill

INSPECTOR: C.A. Medlin

BORING NO.: BC-6 A

DEPTH: 8.4'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
10:37	0	0.0'	
10:38	1	0.0'	
10:39	2	0.01'	
10:40	3	0.015'	
10:41	4	0.02'	
10:42	5	0.02'	
10:43	6	0.025'	
10:44	7	0.03'	
10:45	8	0.03'	
10:46	9	0.035'	
10:47	10	0.04'	
10:52	15	0.06'	
10:57	20	0.08'	
11:02	25	0.09'	
11:07	30	0.105'	
11:17	40	0.14'	
11:27	50	0.17'	
11:37	60	0.195'	

CASING SIZE: NW (3" ID) DEPTH: 8.4' HEIGHT ABOVE GROUND (HEAD): 3.3'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD
[Flush Bottom in Uniform Soil]

Belews Creek Ash Landfill **05/17/2000**

MW2-2A @ 28.5'

LENGTH OF PIPE = 31.7 Feet **Soil Type =** Silty Sand (ML)

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	966.216	966.216	
60	0.02	0.6096	966.216	965.6064	2.29E-05
120	0.04	1.2192	966.216	964.9968	2.29E-05
180	0.06	1.8288	966.216	964.3872	2.29E-05
240	0.075	2.286	966.216	963.93	1.72E-05
300	0.085	2.5908	966.216	963.6252	1.15E-05
360	0.095	2.8956	966.216	963.3204	1.15E-05
420	0.115	3.5052	966.216	962.7108	2.30E-05
480	0.125	3.81	966.216	962.406	1.15E-05
540	0.14	4.2672	966.216	961.9488	1.72E-05
600	0.15	4.572	966.216	961.644	1.15E-05
900	0.22	6.7056	966.216	959.5104	1.61E-05
1200	0.29	8.8392	966.216	957.3768	1.61E-05
1500	0.335	10.2108	966.216	956.0052	1.04E-05
1800	0.39	11.8872	966.216	954.3288	1.27E-05
2400	0.46	14.0208	966.216	952.1952	8.12E-06
3000	0.515	15.6972	966.216	950.5188	6.39E-06
3600	0.555	16.9164	966.216	949.2996	4.66E-06

Mean Permeability (cm/sec)
1.25E-05

1. Spreadsheet assumes 3" ID Pipe
2. Formula

$$K_m = \frac{\pi \cdot D}{11(t_2 - t_1)} \cdot \ln \frac{H_1}{H_2}$$

3. Where

K_m is the Mean Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

Form 04436 (2-89)

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DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE Wed. 5-17-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. MW-2-2A DEPTH 28.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
7:45	0	0.0'	
7:46	1	0.02'	
7:47	2	0.04'	
7:48	3	0.06'	
7:49	4	0.075'	
7:50	5	0.085'	
7:51	6	0.095'	
7:52	7	0.115'	
7:53	8	0.125'	
7:54	9	0.14'	
7:55	10	0.15'	
8:00	15	0.22'	
8:05	20	0.29'	
8:10	25	0.335'	
8:15	30	0.39'	
8:25	40	0.46'	
8:35	50	0.515'	
8:45	60	0.555'	

CASING SIZE: NW - DEPTH: 28.5' HEIGHT ABOVE GROUND (HEAD): 3.2'

REMARKS:

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DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE Wed. 5-17-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. MW-2-2A DEPTH 28.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
7:45	0	0.0'	
7:46	1	0.02'	
7:47	2	0.04'	
7:48	3	0.06'	
7:49	4	0.075'	
7:50	5	0.085'	
7:51	6	0.095'	
7:52	7	0.115'	
7:53	8	0.125'	
7:54	9	0.14'	
7:55	10	0.15'	
8:00	15	0.22'	
8:05	20	0.29'	
8:10	25	0.335'	
8:15	30	0.39'	
8:25	40	0.46'	
8:35	50	0.515'	
8:45	60	0.555'	

CASING SIZE: NW - DEPTH: 28.5' HEIGHT ABOVE GROUND (HEAD): 3.2'

REMARKS:

CALCULATION OF PERMEABILITY BY THE FALLING HEAD METHOD

Well Point - Filter in Uniform Material

Belews Creek Ash Landfill **05/17/2000**

MW2-2A @ 73.5' to 89.9' **Rock Type =** Flaser Gneiss; R=74,RQD=38

LENGTH OF PIPE = 73.7 Feet **m= 1**

LENGTH OF OPEN HOLE = 16.4 Feet

Time (sec)	Drop (ft)	Drop (cm)	Length of Pipe (cm)	Head (cm)	Permeability (cm/sec)
0	0	0	2246.376	2246.376	
60	0.94	28.6512	2246.376	2217.7248	1.51E-05
120	1.22	37.1856	2246.376	2209.1904	4.55E-06
180	1.42	43.2816	2246.376	2203.0944	3.26E-06
240	1.75	53.34	2246.376	2193.036	5.40E-06
300	2.22	67.6656	2246.376	2178.7104	7.73E-06
360	2.53	77.1144	2246.376	2169.2616	5.13E-06
420	2.79	85.0392	2246.376	2161.3368	4.32E-06
480	2.99	91.1352	2246.376	2155.2408	3.33E-06
540	3.18	96.9264	2246.376	2149.4496	3.18E-06
600	3.23	98.4504	2246.376	2147.9256	8.37E-07
900	4.82	146.9136	2246.376	2099.4624	5.39E-06
1200	5.81	177.0888	2246.376	2069.2872	3.42E-06
1500	7.58	231.0384	2246.376	2015.3376	6.24E-06
1800	9.43	287.4264	2246.376	1958.9496	6.70E-06
2400	12.93	394.1064	2246.376	1852.2696	6.61E-06
3000	15.6	475.488	2246.376	1770.888	5.30E-06
3600	17.85	544.068	2246.376	1702.308	4.66E-06

1. Spreadsheet assumes 3" ID Pipe; NQ Hole, OD = 3"

Mean Permeability (cm/sec)
5.53E-06

2. Formula: $$K_h = \frac{d^2 \cdot \ln\left(\frac{2mL}{D}\right)}{8 \cdot L \cdot (t_2 - t_1)} \cdot \ln\frac{H_1}{H_2}$$ for $\frac{mL}{D} \rangle 4$

3. Where K_h is the Horizontal Coefficient of Permeability (cm/sec)

H_1 is the Piezometric Head for time; $t = t_1$,cm

H_2 is the Piezometric Head for time; $t = t_2$,cm

D is the Diameter of the Standpipe (cm)

d is the diameter of the Open Length (cm), L is the Open Length of Hole (cm)

m is the Transformation Ratio, Where $m = \sqrt{K_h / K_v}$, K_h is the Horizontal Permeability

K_v is the Vertical Permeability

Form 04436 (2-89)

Form GC-5D	Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT Belews Creek Steam Station DAY/DATE Wed. 5-17-00

JOB NAME Ash Landfill INSPECTOR C.A. Medlin

BORING NO. MW-2-2A DEPTH 73.5'

CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
3:46	0	0.0'	we was Able to push the
3:47	1	0.94'	casing on down to 73.5'
3:48	2	1.22'	0.7' Past Refusal.
3:49	3	1.42'	
3:50	4	1.75'	Ran in Rock
3:51	5	2.22'	
3:52	6	2.53'	
3:53	7	2.79'	
3:54	8	2.99'	
3:55	9	3.18'	
3:56	10	3.23'	
4:01	15	4.82'	
4:06	20	5.81'	
4:11	25	7.58'	
4:16	30	9.43'	
4:26	40	12.93'	
4:36	50	15.60'	
4:46	60	17.85'	

CASING SIZE: NW DEPTH: 73.5' HEIGHT ABOVE GROUND (HEAD): 0.2'

REMARKS:

Form 04436 (2-89) | Form GC-5D | Rev. 0

DUKE POWER COMPANY
CONSTRUCTION AND MAINTENANCE DEPARTMENT

FIELD FALLING HEAD PERMEABILITY

PROJECT: Belews Creek Steam Station DAY/DATE: Wed. 5-17-00

JOB NAME: Ash Landfill INSPECTOR: C.A. Medlin

BORING NO.: MW-2-2A DEPTH: 73.5'

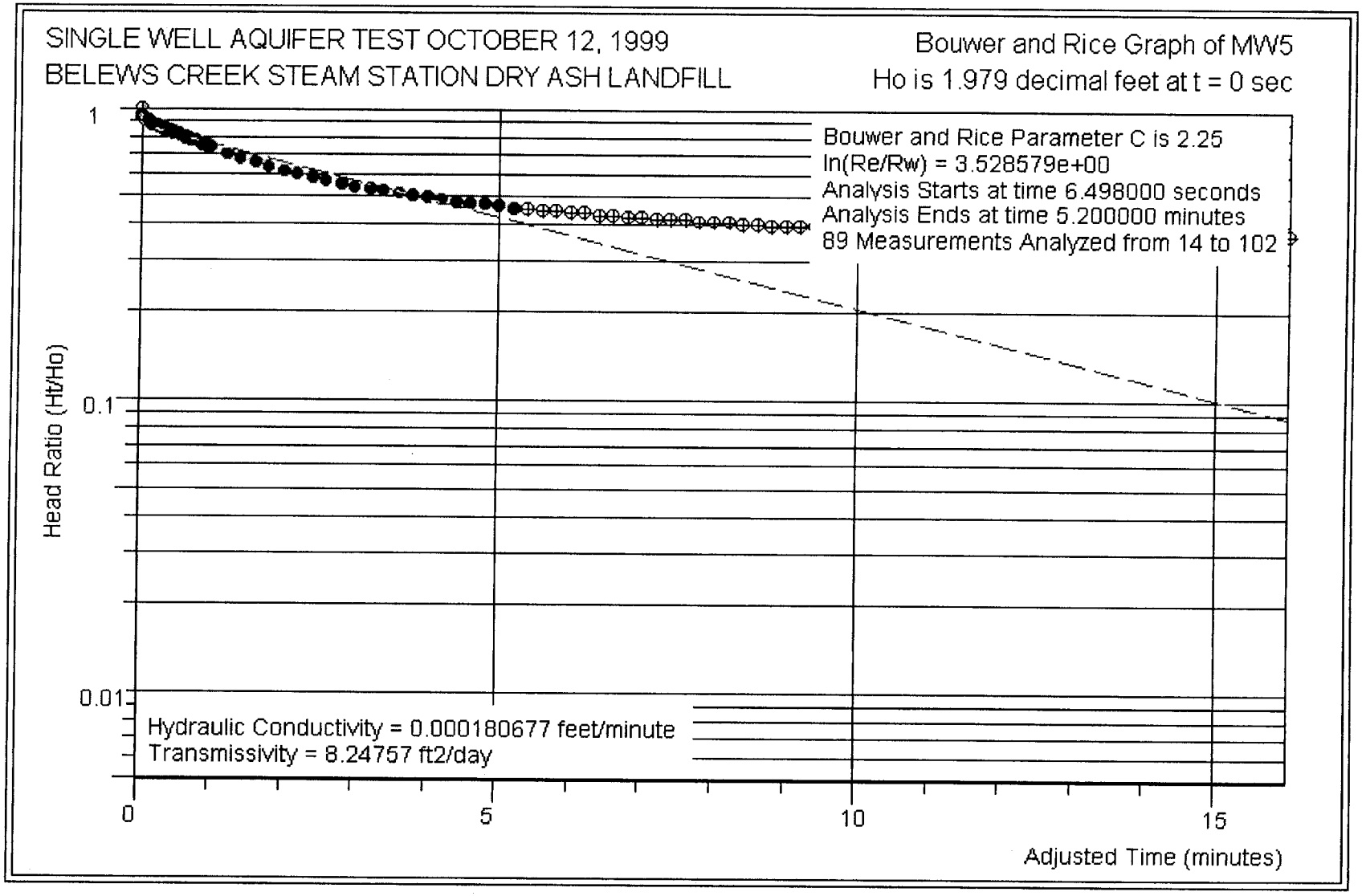
CLOCK TIME Hr:Min	ELAPSED TIME Min.	DROP IN WATER LEVEL Ft. Tenths, or Inches	COMMENTS
3:46	0	0.0'	We was Able to push the
3:47	1	0.94'	casing on down to 73.5'
3:48	2	1.22'	0.7' Past Refusal
3:49	3	1.42'	
3:50	4	1.75'	Ran in Rock
3:51	5	2.22'	
3:52	6	2.53'	
3:53	7	2.79'	
3:54	8	2.99'	
3:55	9	3.18'	
3:56	10	3.23'	
4:01	15	4.82'	
4:06	20	5.81'	
4:11	25	7.58'	
4:16	30	9.43'	
4:26	40	12.93'	
4:36	50	15.60'	
4:46	60	17.85'	

CASING SIZE: NW DEPTH: 73.5' HEIGHT ABOVE GROUND (HEAD): 0.2'

REMARKS:

Belews Creek Ash Landfill
Proposed Expansion - Monitoring Wells

		MW2-1	MW2-2	MW2-3	MW2-4	MW2-5	MW-6
Top of Casing Elevation	(ft)	789.32	787.23	796.69	814.70	849.32	937.67
Total Depth	(ft)	51.5	65.6	59.3	58.0	58.3	48.4
Screen length	(ft)	10.0	10.0	20.0	20.0	20.0	10.0
Casing in Rock?		No	No	Yes	Yes	Yes	No
Depth to Auger or Carbide Refusal	(ft)	51.5	N/A	40.7	38.0	38.5	N/A
Depth to Water (6/09/00)	(ft)	37.12	33.06	39.92	48.21	39.49	30.19
Depth to:							
Top of Screen	(ft)	31.5	27.0	39.3	38.0	38.5	24.0
Bottom of Screen	(ft)	41.5	37.0	59.3	58.0	54.0	34.0
Bottom of Boring	(ft)	51.5	65.6	59.3	58.0	58.3	48.4
r, Radius of well (inside)	(ft)	0.086	0.086	0.086	0.086	0.086	0.086
R, Radius of boring	(ft)	0.302	0.302	0.302	0.302	0.302	0.302
Aquitest Input Values							
b							
(water level to bottom of screen)	(ft)	4.38	3.94	19.38	9.79	14.51	3.81
D							
Thickness of aquifer	(ft)	14.38	32.54	19.38	9.79	18.81	18.21
Aquitest Results							
K							
cm/sec		9.7E-05	3.1E-04	7.8E-05	7.5E-04	9.9E-04	2.1E-04

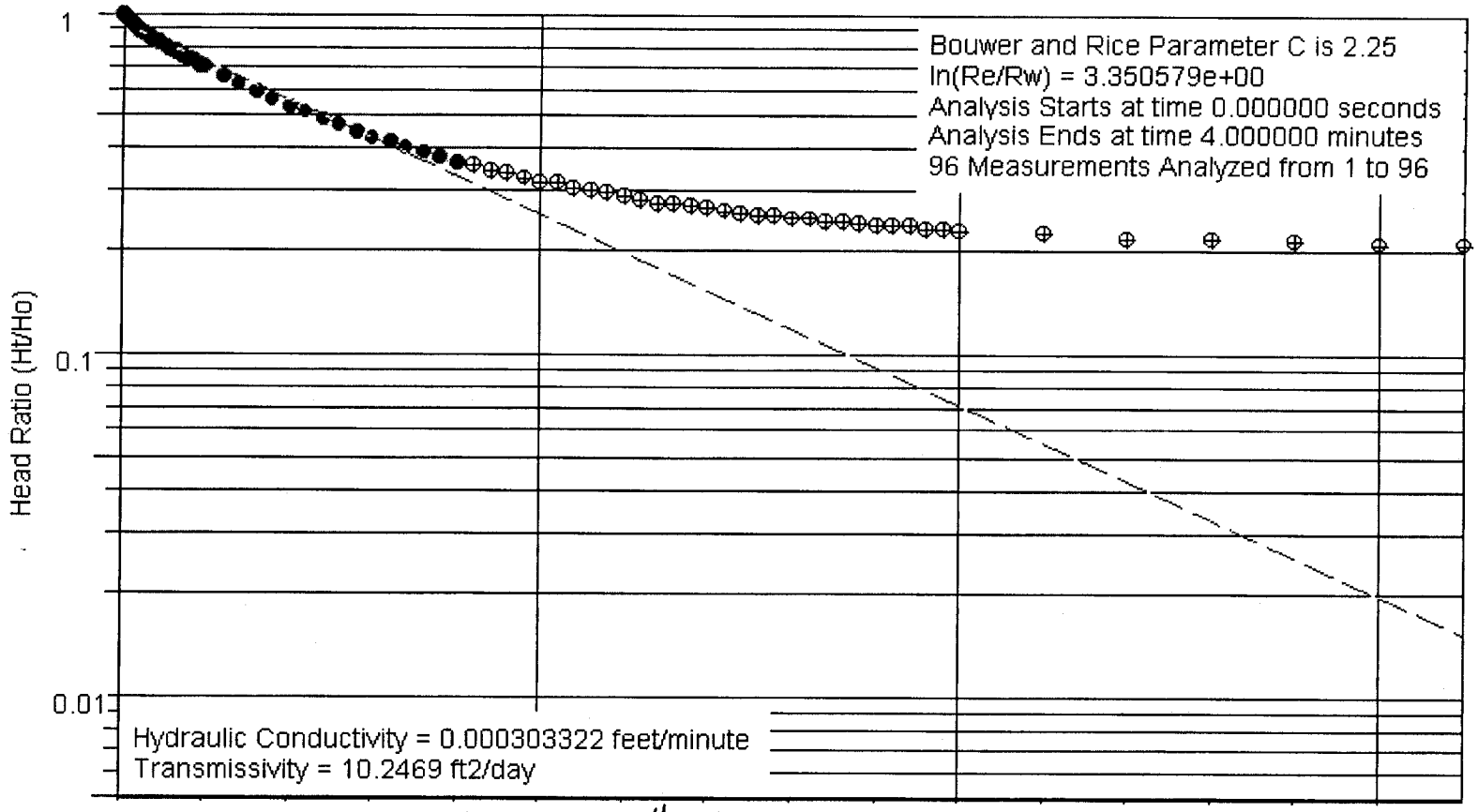


1 ft/min = .5083 cm/sec

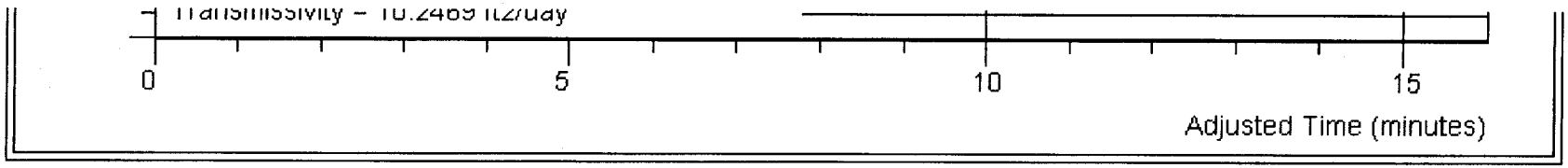
K = 9.18 x 10^-5 cm/sec

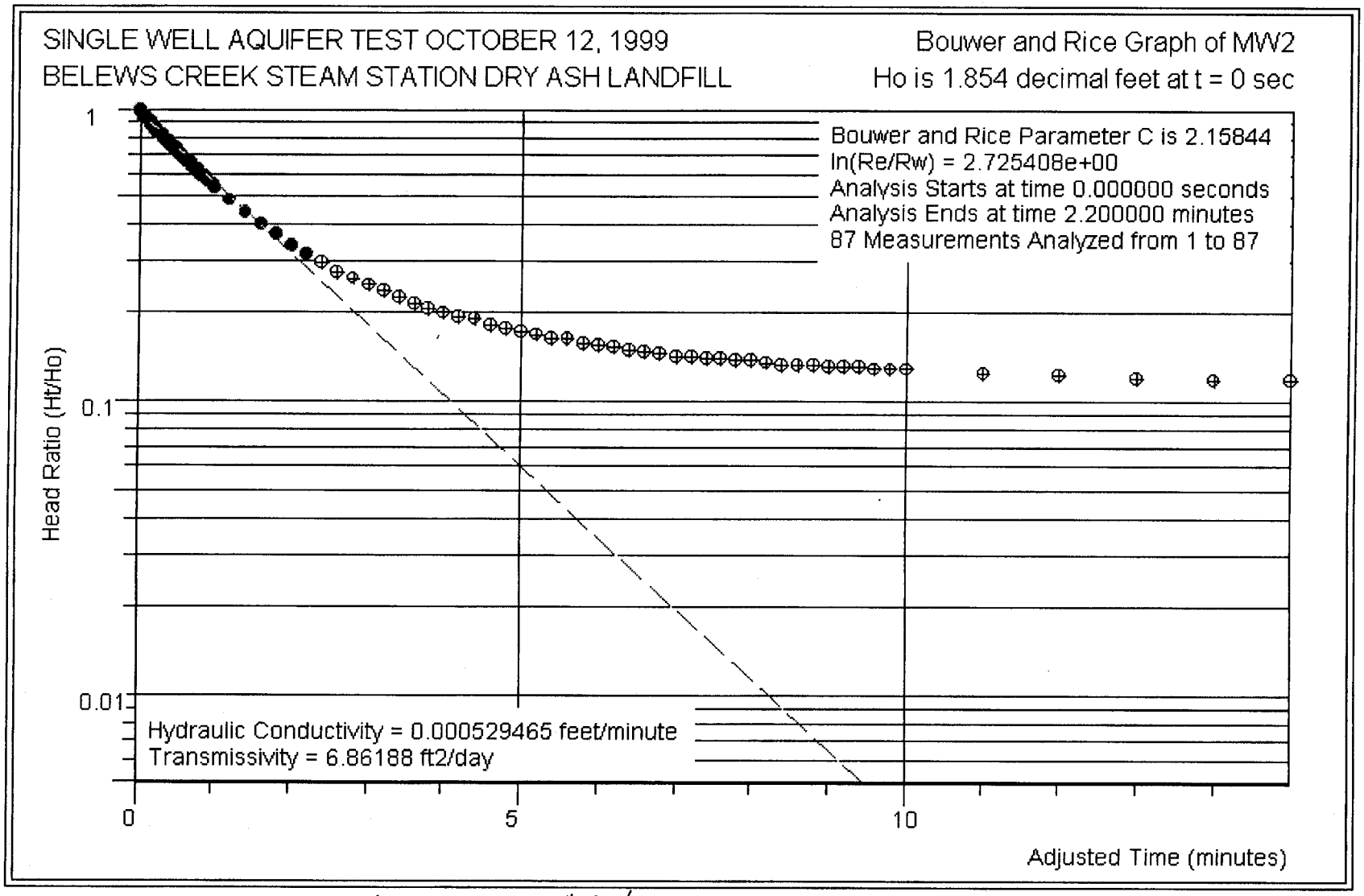
SINGLE WELL AQUIFER TEST OCTOBER 12, 1999
BELEWS CREEK STEAM STATION DRY ASH LANDFILL

Bouwer and Rice Graph of MW4
Ho is 1.956 decimal feet at t = 0 sec



$k = 1.54 \times 10^{-4}$ cm/sec


Transmissivity = 10.2469 ft2/day
0
5
10
15
Adjusted Time (minutes)



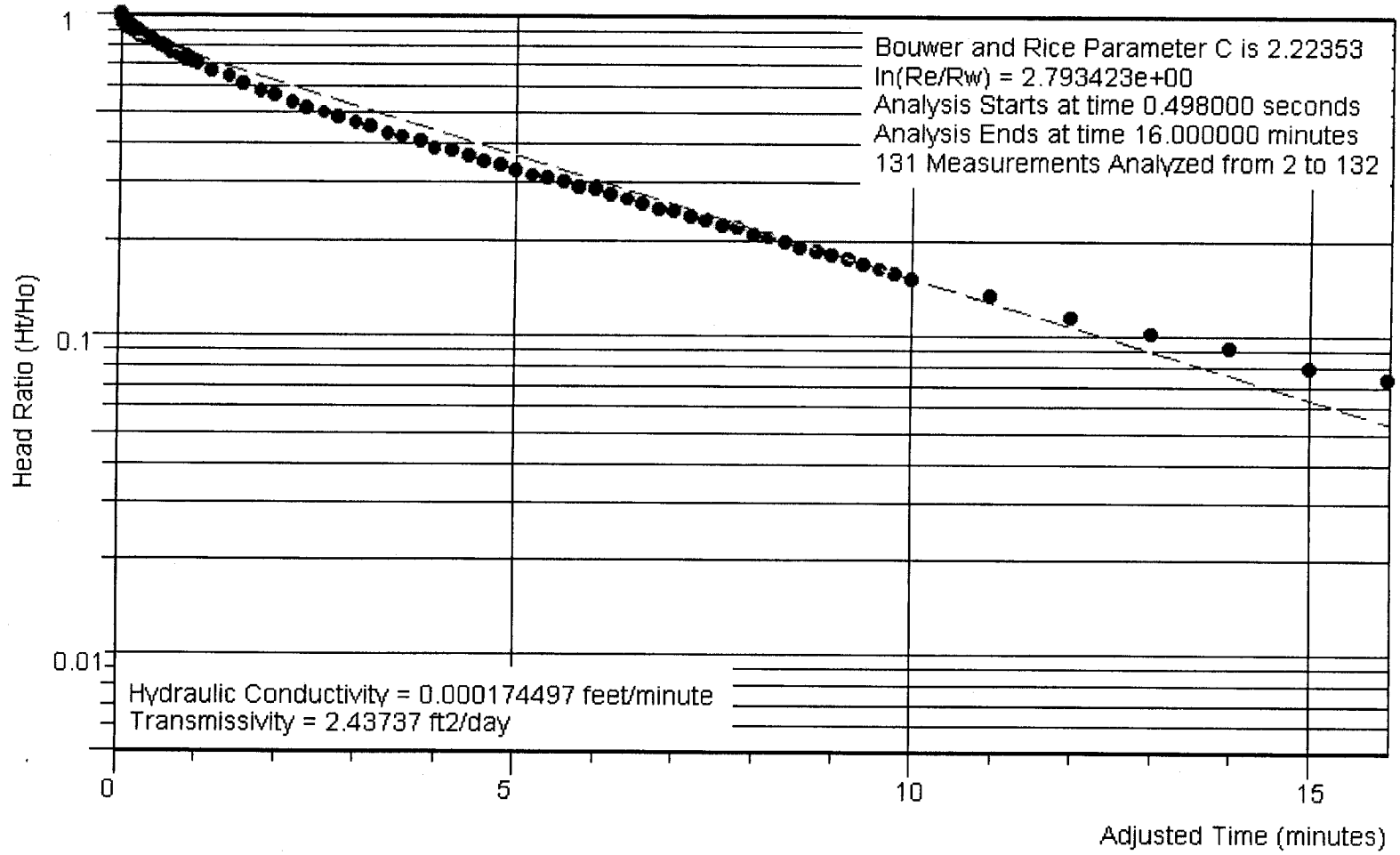
$k = 2.69 \times 10^{-4}$ cm/sec

SINGLE WELL AQUIFER TESTS OCTOBER 12, 1999

BELEWS CREEK STEAM STATION DRY ASH LANDFILL

Bouwer and Rice Graph of MW1

Ho is 1.807 decimal feet at t = 0.498 sec



$k = 8.86 \times 10^{-5}$ cm/sec

Ronald A Santini

03/14/2000 07:43:25 AM

To: Malcolm F Schaeffer/Pwr/DukeEngineering@DukePower
cc:
Subject: Re: McGuire Landfill Report

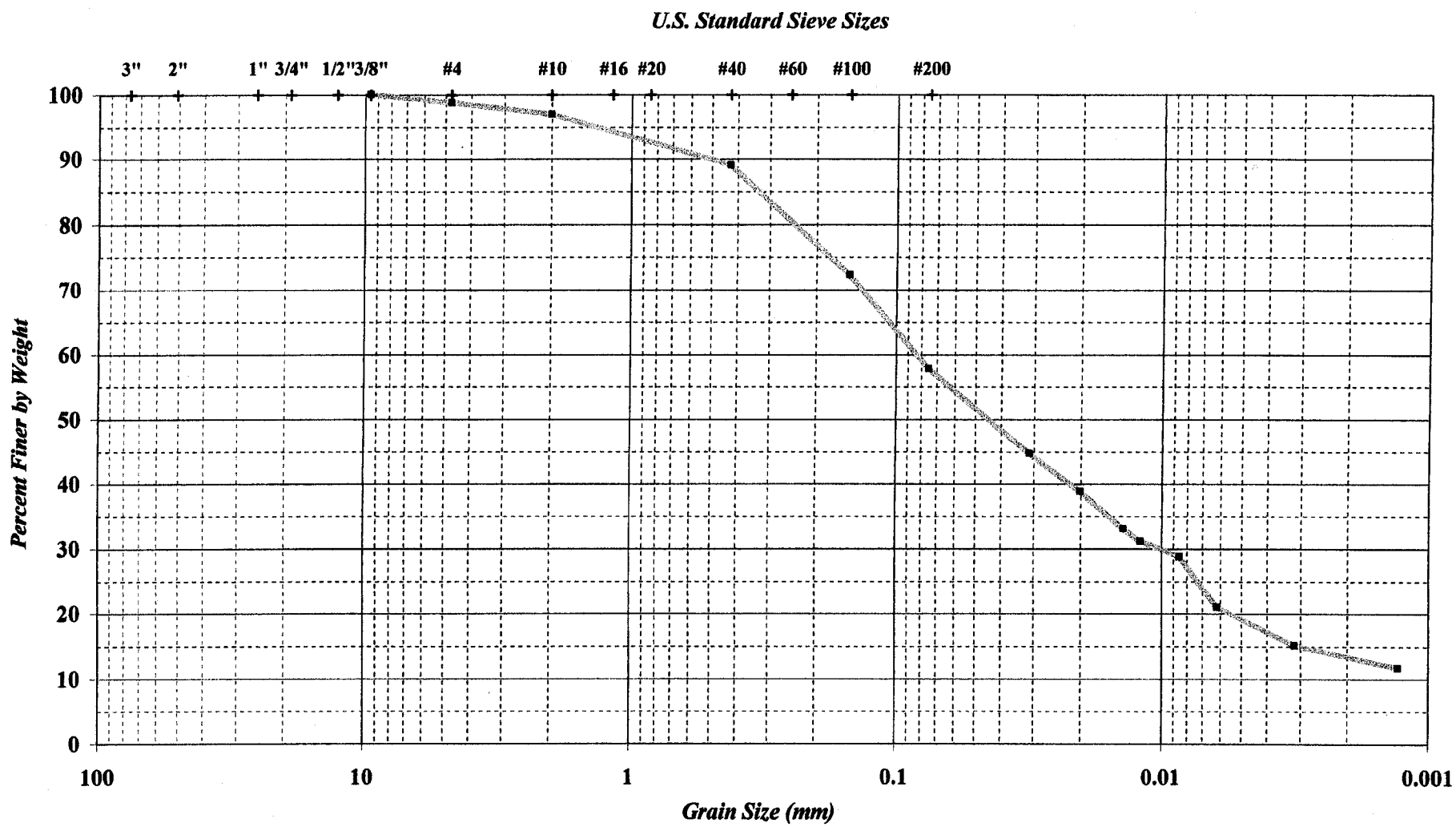
Malcolm: Thanks, I look forward to it. When you do Belews, pay particular attention to the area around monitoring well MW4. It's the downgradient monitoring well that has high iron load. We have determined the iron is related to particulates that enter the well between samplings and during sampling. Even when using low-flow sampling techniques we get a fine particualte load. We did some work last year that isolated the most turbid zone near the top of the screened interval. Our plan is to use a packer to isolate this zone from the cleaner zone below when we sample in April.

Appendix E

1. Grain Size Distribution Sheets

2. Standard Proctor Curves

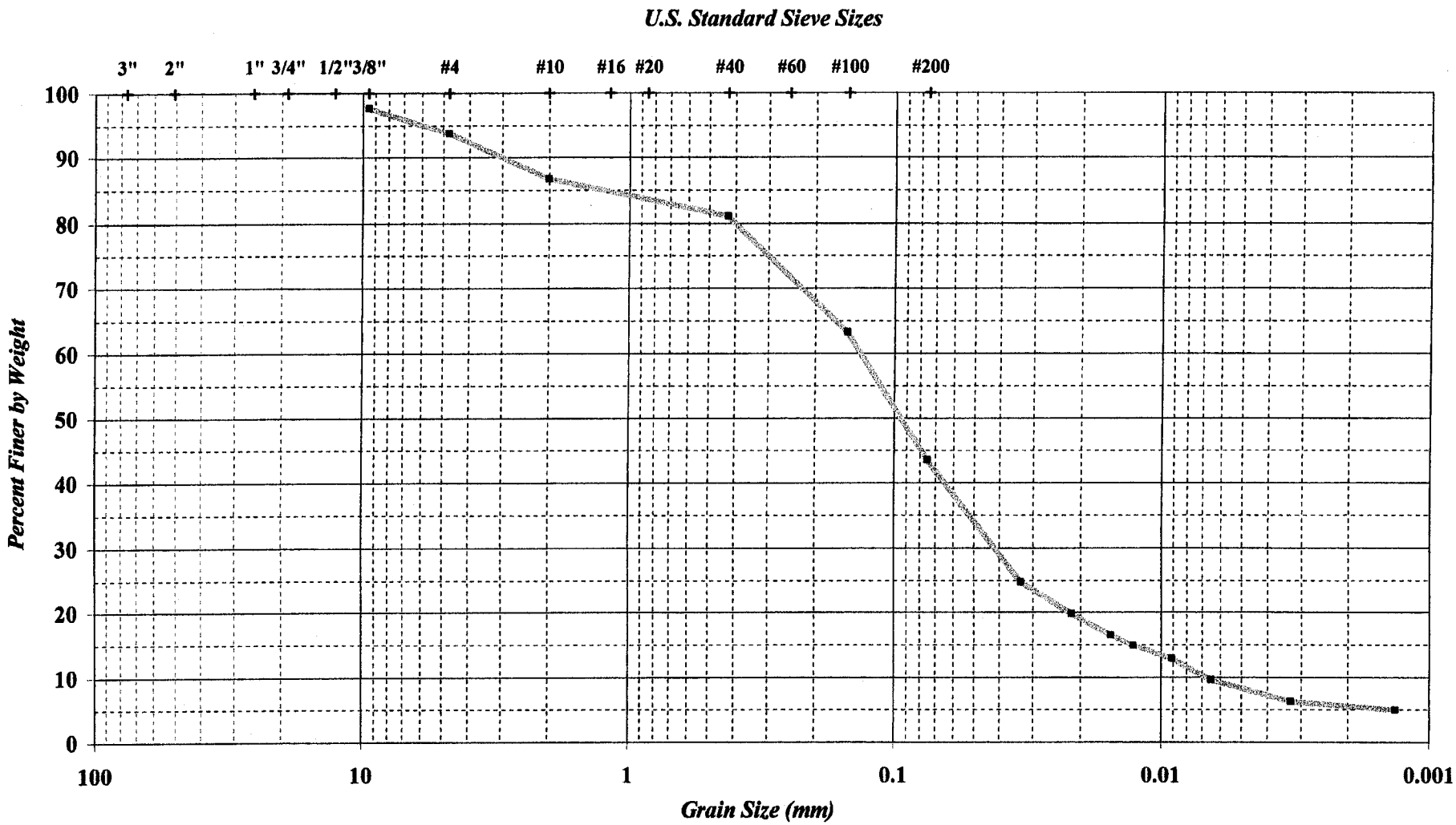
Filename: Bc-1



Job Name	Belew's Creek Ash Landfill	Depth	0-10 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.69	
Job Location	Greensboro, North Carolina	% Finer #200	57.8	
		LL	29	
Job Number	1264-00-157	PI	4	
Boring No.	Soil Description/Classification			
BC-1	Tan coarse to fine sandy SILT (ML)			

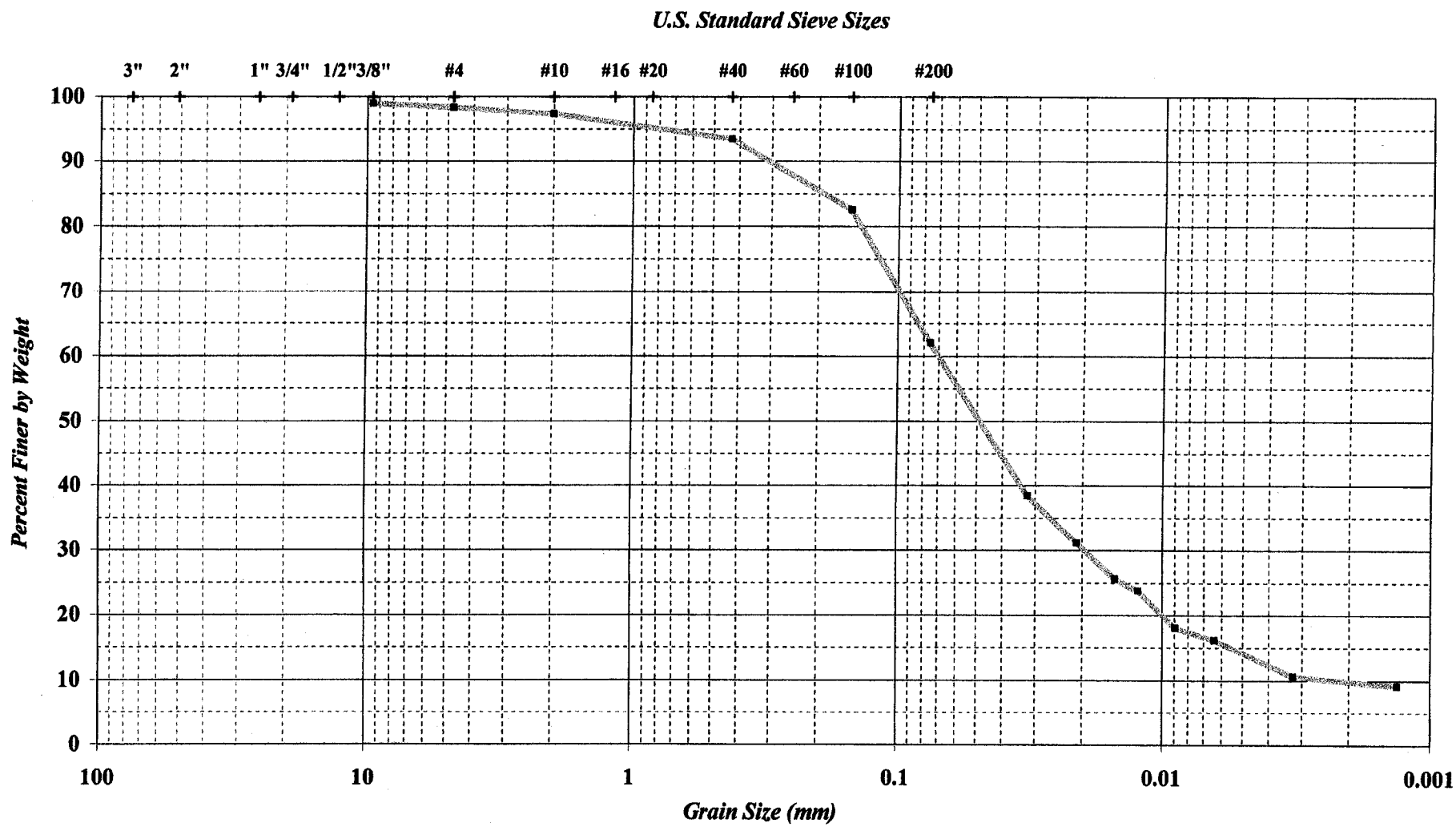
S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: Bc-3



Job Name	Belew's Creek Ash Landfill	Depth	0-10 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.63	
Job Location	Greensboro, North Carolina	% Finer #200	43.5	S&ME
		LL	20	
Job Number	1264-00-157	PI	2	ENVIRONMENTAL SERVICES ENGINEERING • TESTING
Boring No.	Soil Description/Classification			
BC-3	Tan green silty coarse to fine SAND (SM) with fine gravel			

Filename: Bc-4



Job Name	Belew's Creek Ash Landfill	Depth	0-10 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	ASTM D-421 and 422
		Gs	2.66	
Job Location	Greensboro, North Carolina	% Finer #200	62	
		LL	29	
Job Number	1264-00-157	PI	6	
Boring No.	Soil Description/Classification			
BC-4	Tan coarse to fine sandy SILT (ML)			

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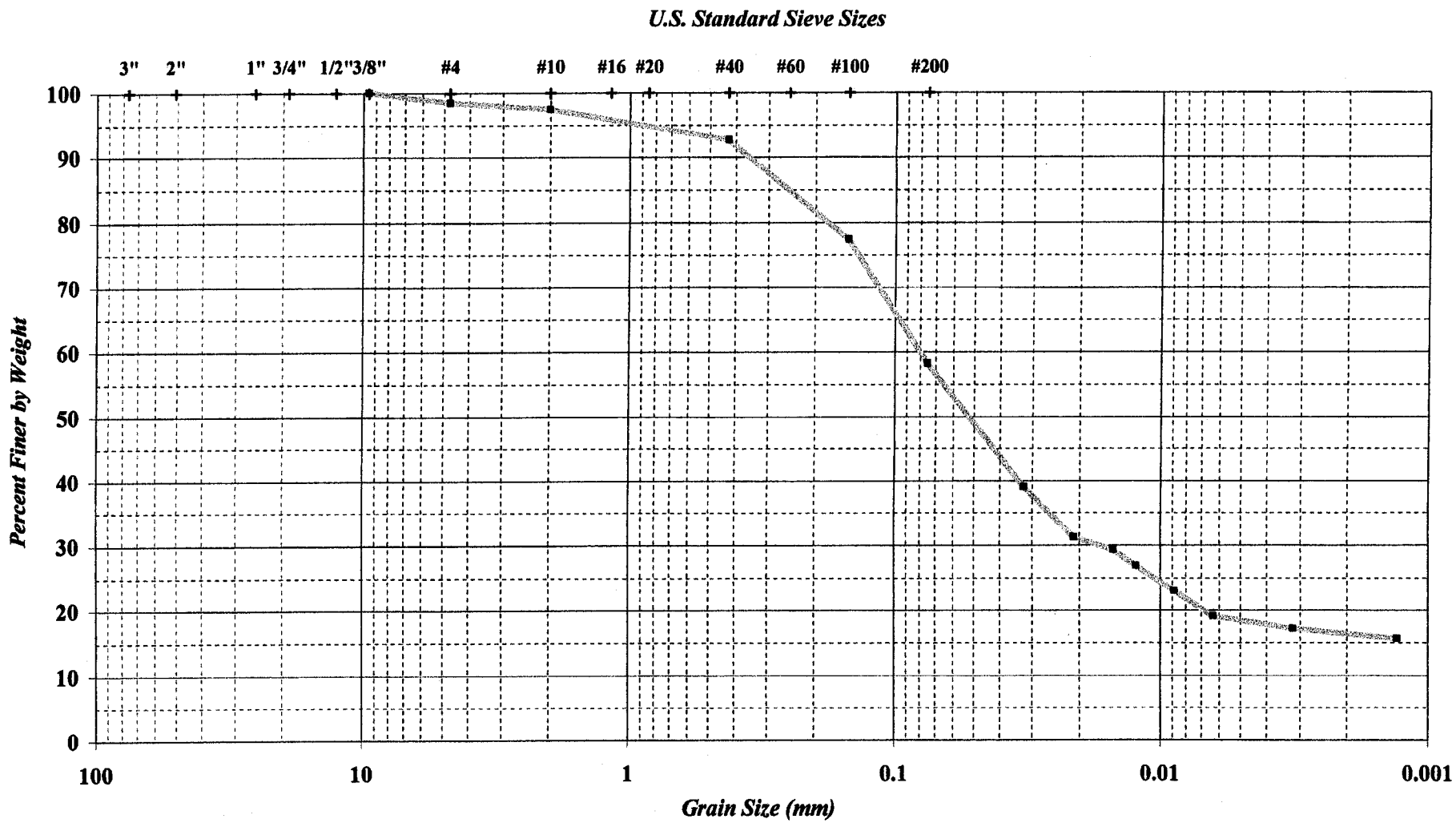
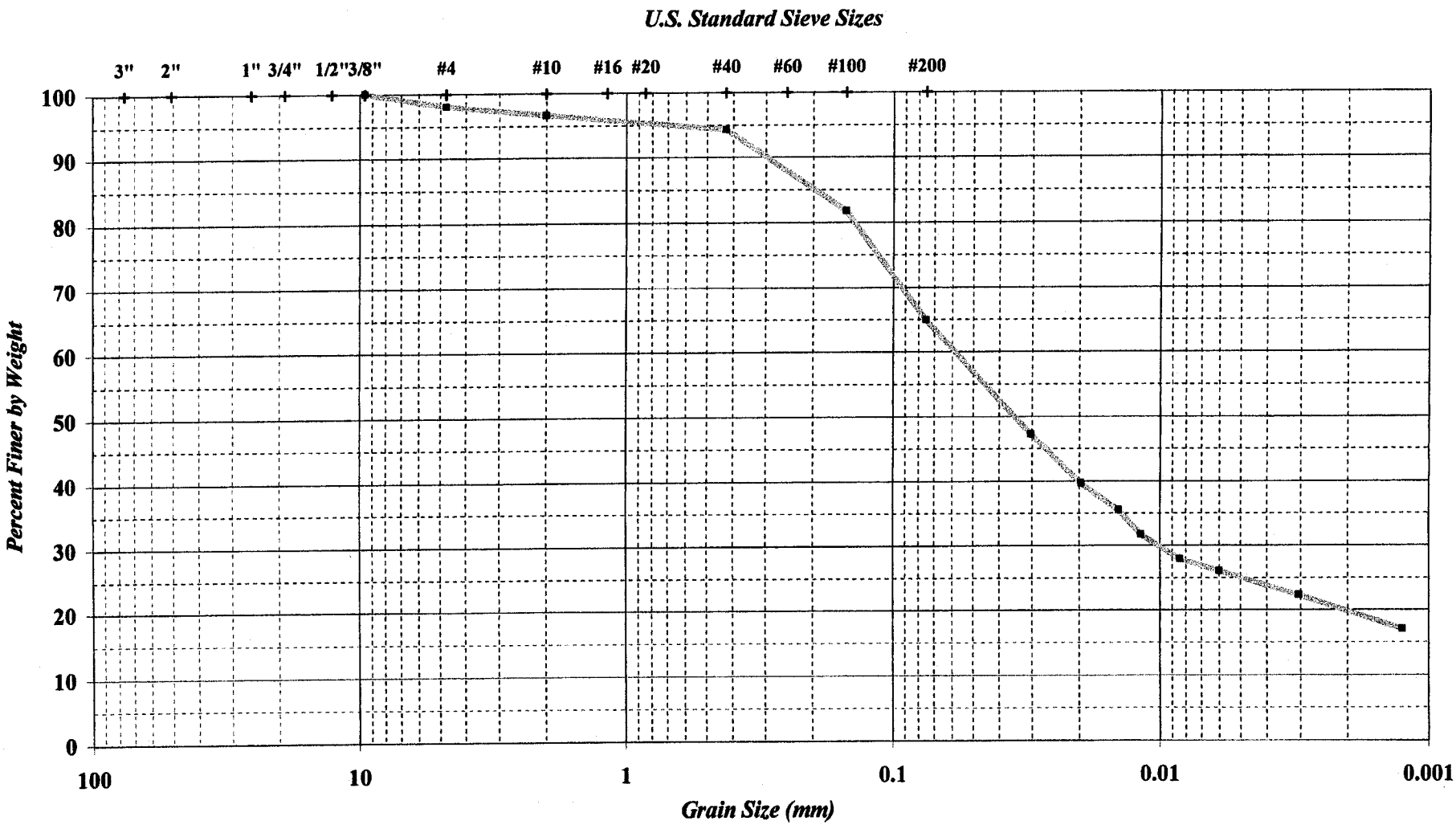
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: Bc-5



Job Name	Belew's Creek Ash Landfill	Depth	0-10 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.66	
		% Finer #200	58.3	S&ME
Job Number	1264-00-157	LL	32	ENVIRONMENTAL SERVICES
		PI	4	ENGINEERING · TESTING
Boring No.	Soil Description/Classification			
BC-5	Tan coarse to fine sandy SILT (ML)			

Filename: Bc-6



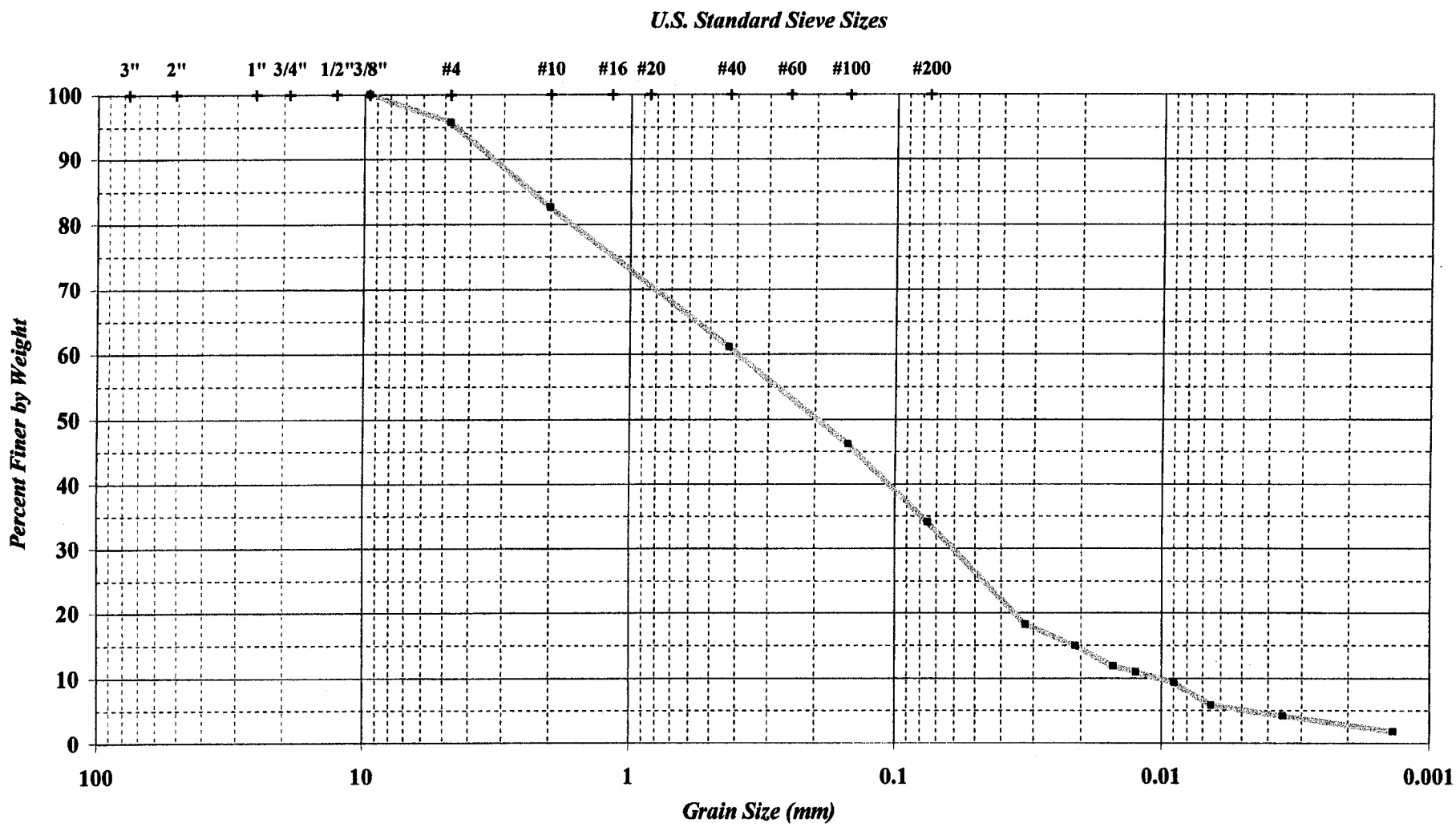
Job Name	Belew's Creek Ash Landfill	Depth	0-10 *feet*
		Nat. Moist.	na %
		Gs	2.73
Job Location	Greensboro, North Carolina	% Finer #200	64.9
		LL	39
Job Number	1264-00-157	PI	4
Boring No.	Soil Description/Classification		
BC-6	Orange Tan coarse to fine sandy SILT (ML)		

GRAIN SIZE DISTRIBUTION

ASTM D-421 and 422

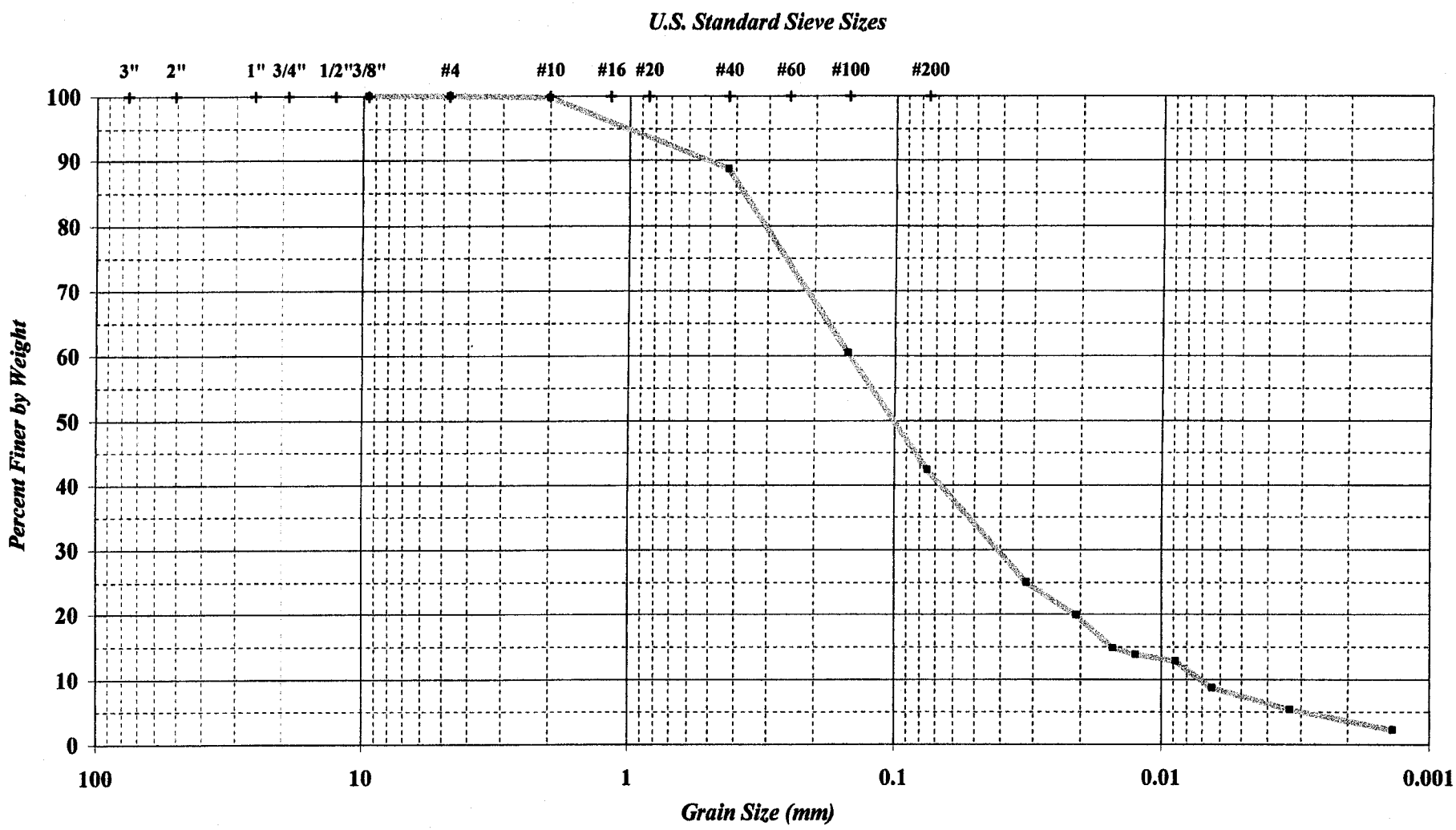
S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: BC-1A SS#2



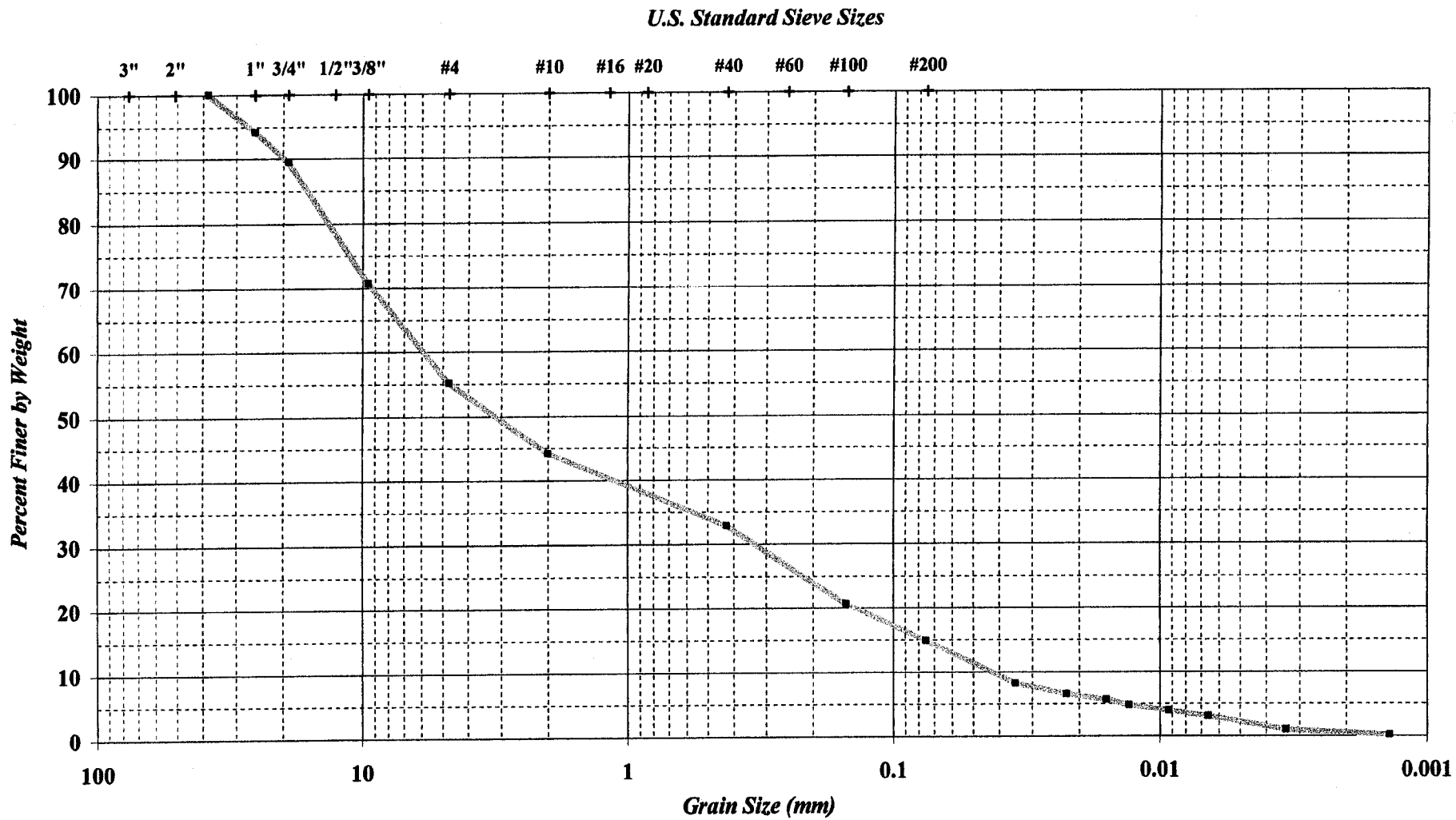
Job Name	Belew's Creek Ash Landfill	Depth	54.2-55.1 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.62	
		% Finer #200	34.1	S&ME
Job Number	1264-00-157	LL	27	ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		PI	2	
Boring No.	Soil Description/Classification			
BC-1A SS#2	Light Brown silty coarse to fine SAND (SM)			

Filename: BC-2 SS#9



Job Name	Belew's Creek Ash Landfill	Depth	29.5-31 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.6	
Job Location	Greensboro, North Carolina	% Finer #200	42.4	S&ME
		LL	32	
Job Number	1264-00-157	PI	2	ENVIRONMENTAL SERVICES ENGINEERING • TESTING
Boring No.	Soil Description/Classification			
BC-2 SS#9	Light Yellow-Tan silty medium to fine SAND (SM)			

Filename: BC-4 SS#3



Job Name	Belew's Creek Ash Landfill	Depth	15-16.5 *feet*
		Nat. Moist.	na %
		Gs	2.6
Job Location	Greensboro, North Carolina	% Finer #200	14.8
		LL	NP
Job Number	1264-00-157	PI	NP
Boring No.	Soil Description/Classification		
BC-4 SS#3	Orange-Tan slightly silty coarse to fine sandy GRAVEL (GM)		

GRAIN SIZE DISTRIBUTION

ASTM D-421 and 422

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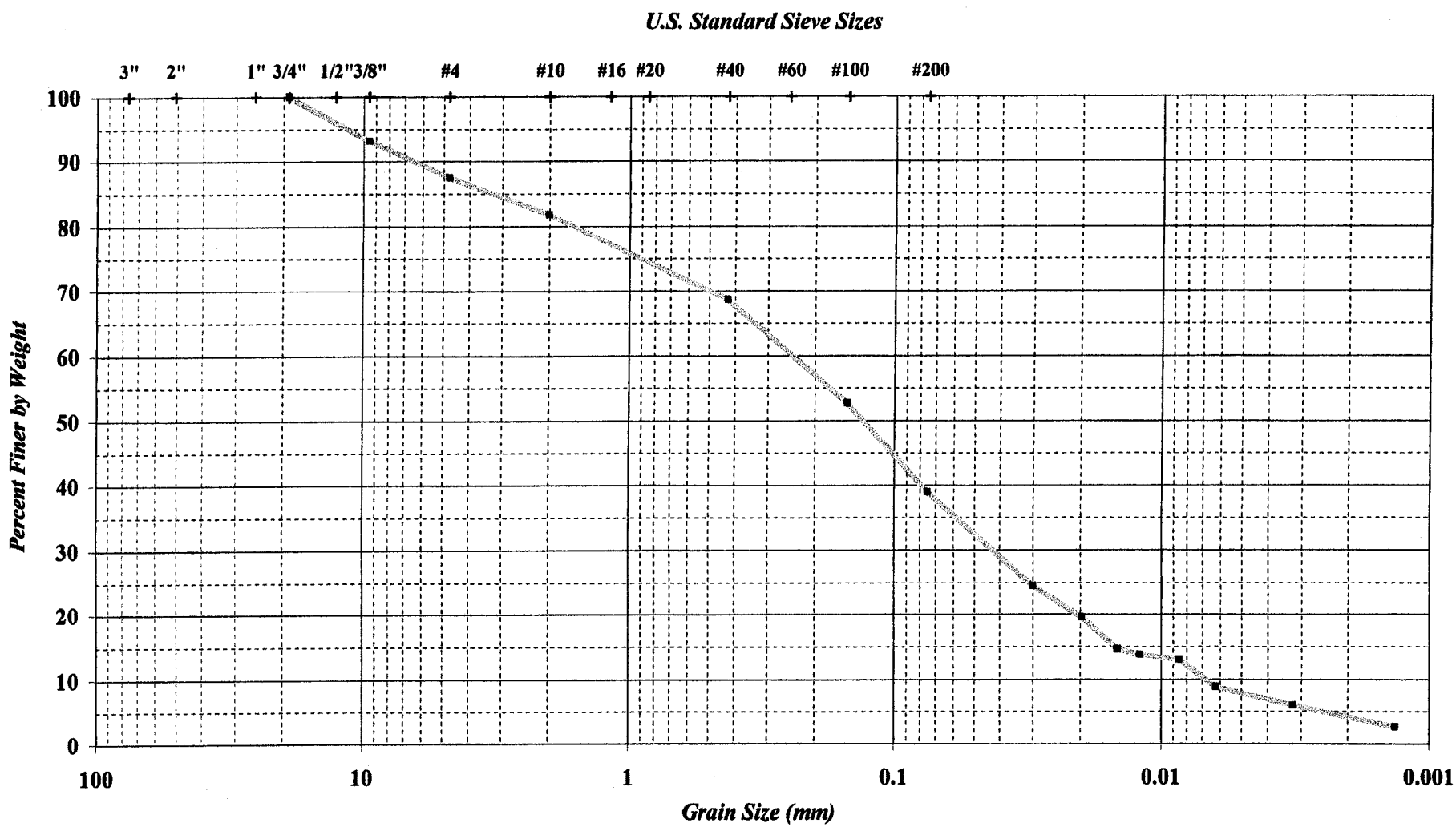
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: BC-4 SS#5



Job Name	Belew's Creek Ash Landfill	Depth	25-25.5 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.64	
		% Finer #200	39	
Job Number	1264-00-157	LL	33	
		PI	12	
Boring No.	Soil Description/Classification			
BC-4 SS#5	Yellow-Tan clayey coarse to fine SAND (SC) with some gravel			

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ENVIRONMENTAL SERVICES
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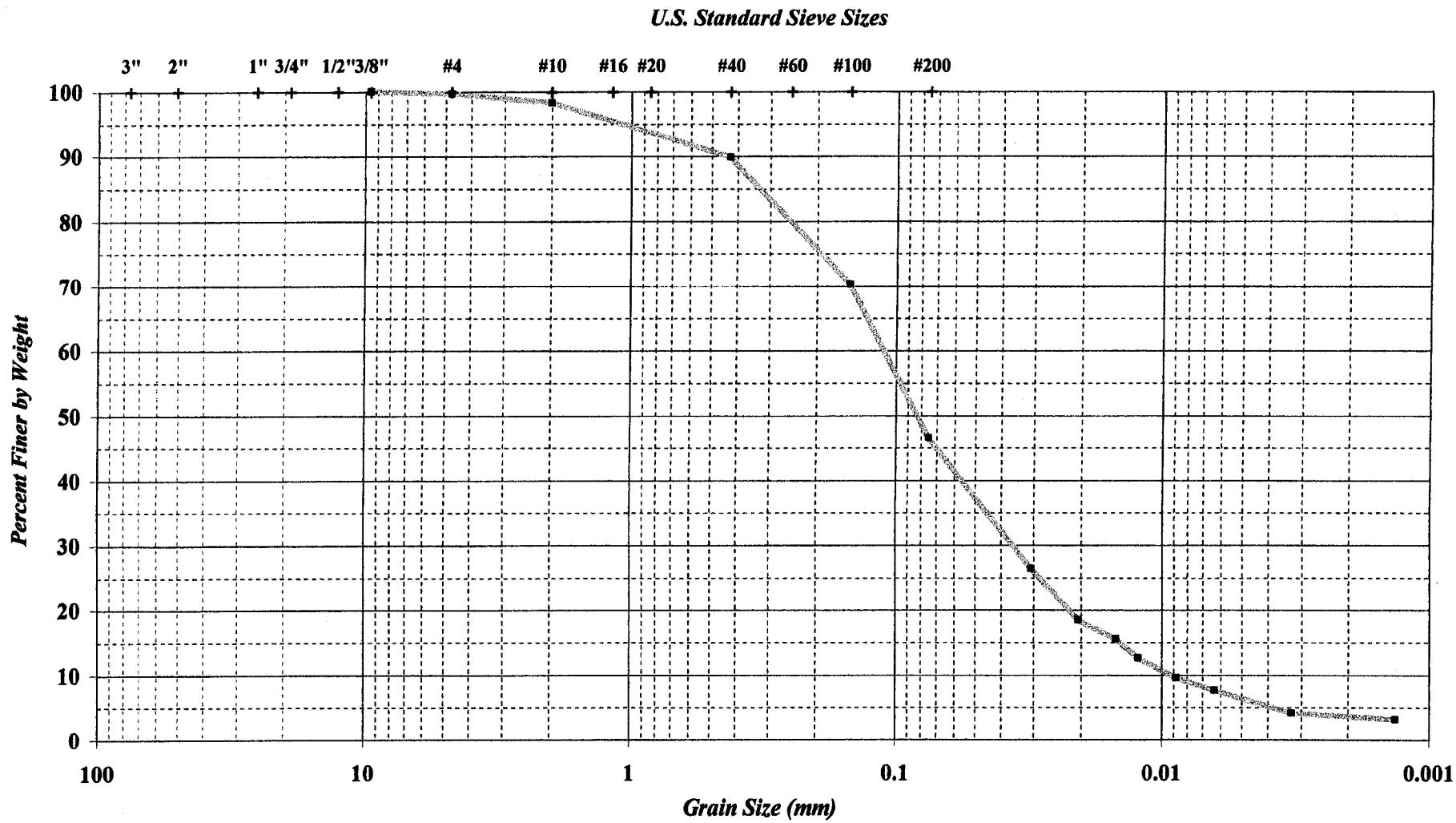
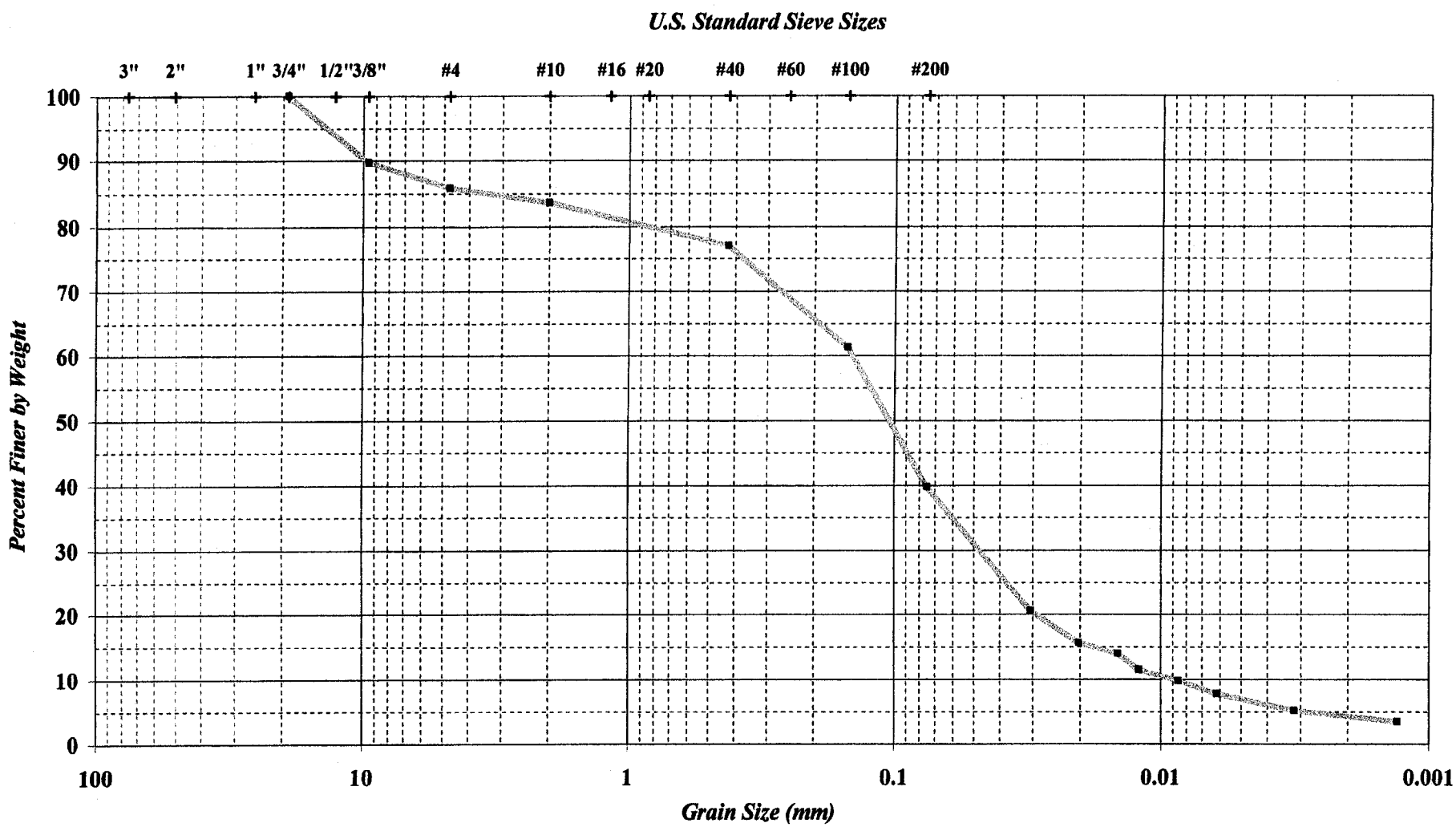
Filename: BC-5 SS#3



Job Name	Belew's Creek Ash Landfill	Depth	14.5-16 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.63	
		% Finer #200	46.6	S&ME
Job Number	1264-00-157	LL	31	ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		PI	5	
Boring No.	Soil Description/Classification			
BC-5 SS#3	Light Green-Tan silty medium to fine SAND (SM)			

Filename: BC-6 SS#3



Job Name	Belew's Creek Ash Landfill	Depth	14.3-15.8 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.68	
Job Location	Greensboro, North Carolina	% Finer #200	39.7	
		LL	31	
Job Number	1264-00-157	PI	2	
Boring No.	Soil Description/Classification			
BC-6 SS#3	Dark Grey silty coarse to fine SAND (SM) with some gravel			

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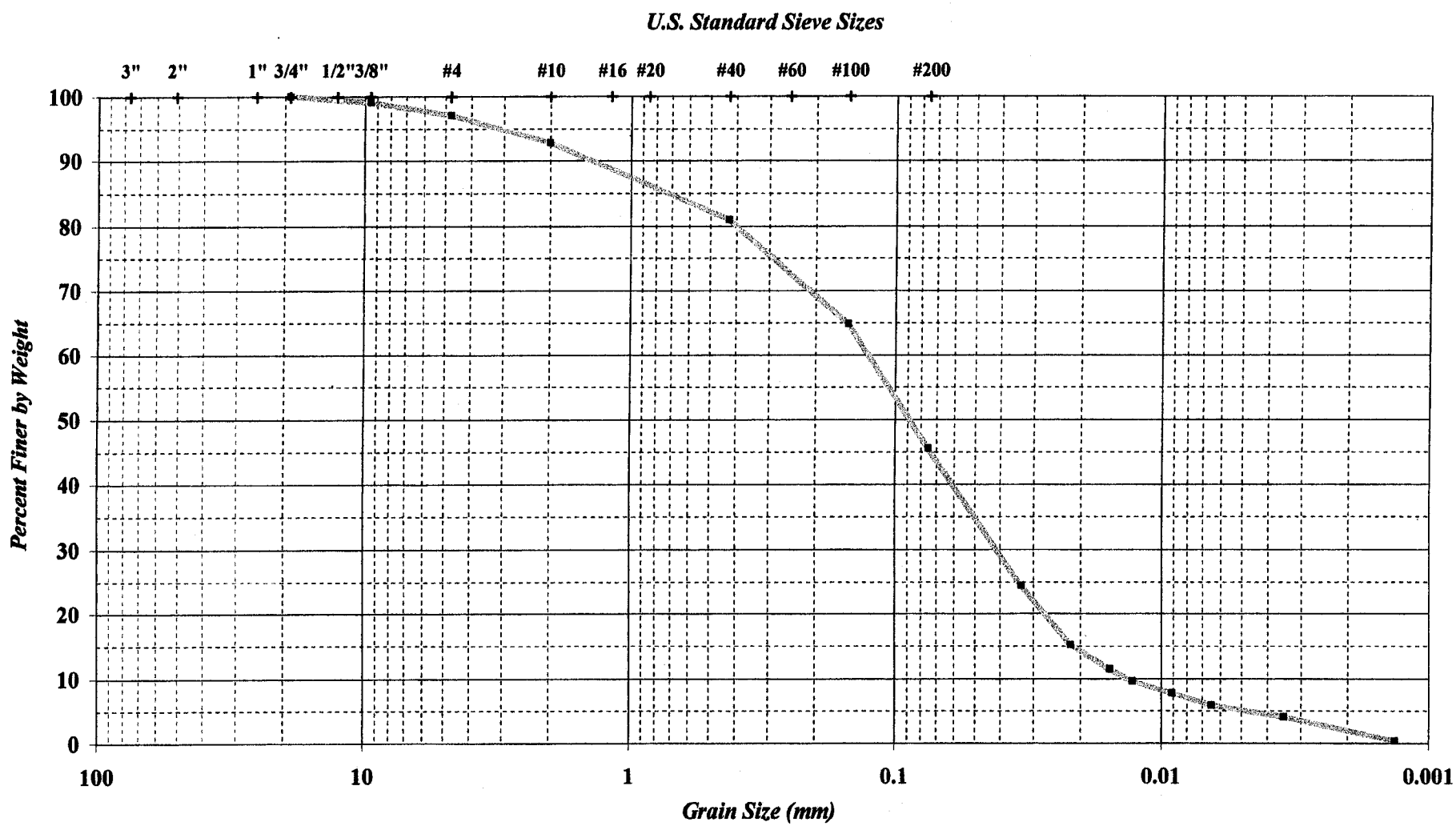
ENGINEERING • TESTING

Filename: MW 2-1 SS#7



Job Name	Belew's Creek Ash Landfill	Depth	34.5-35.7 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.68	
Job Location	Greensboro, North Carolina	% Finer #200	45.5	
		LL	30	
Job Number	1264-00-157	PI	2	
Boring No.	Soil Description/Classification			
MW 2-1 SS#7	Tan silty coarse to fine SAND (SM)			

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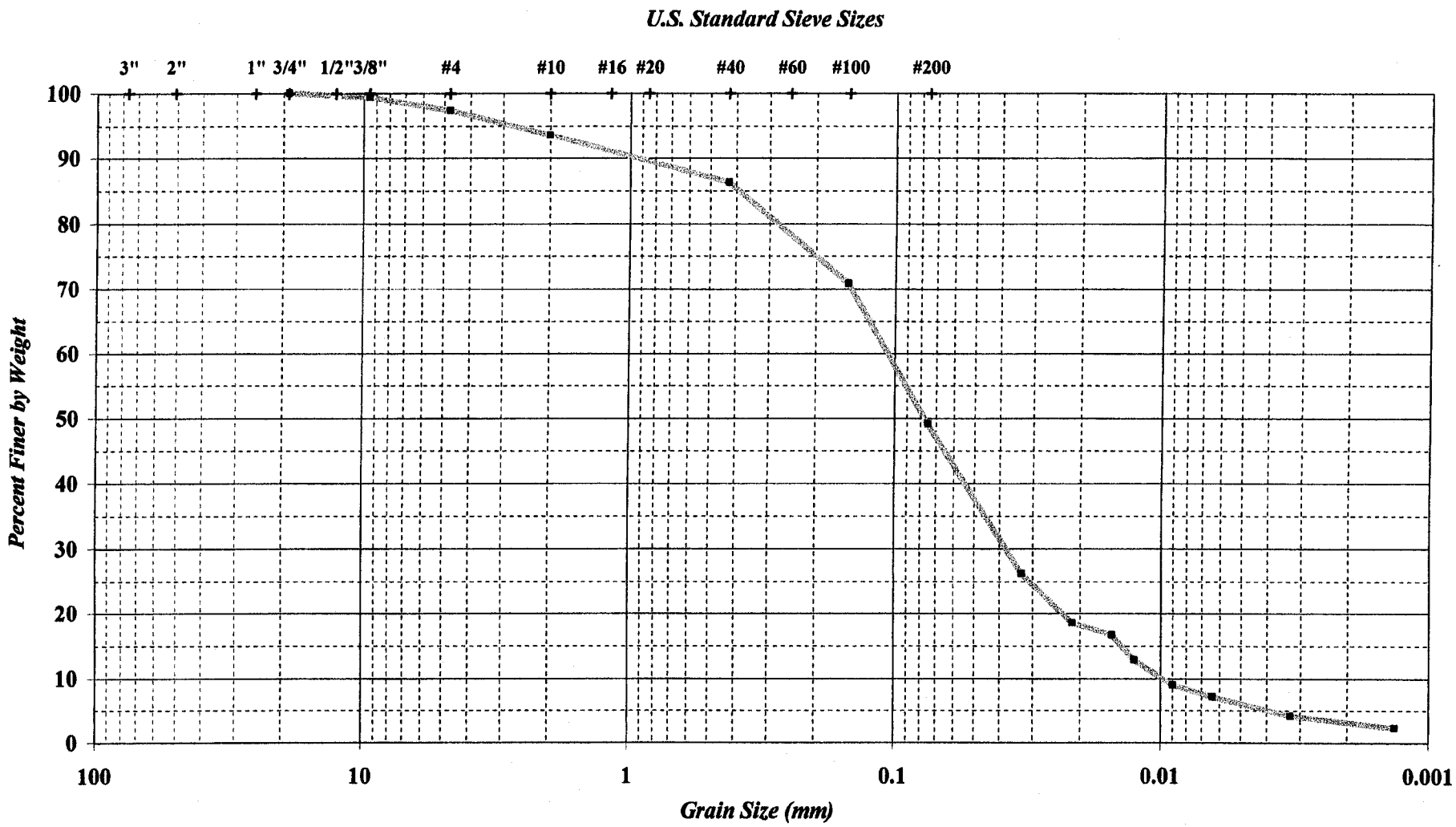
ENGINEERING • TESTING

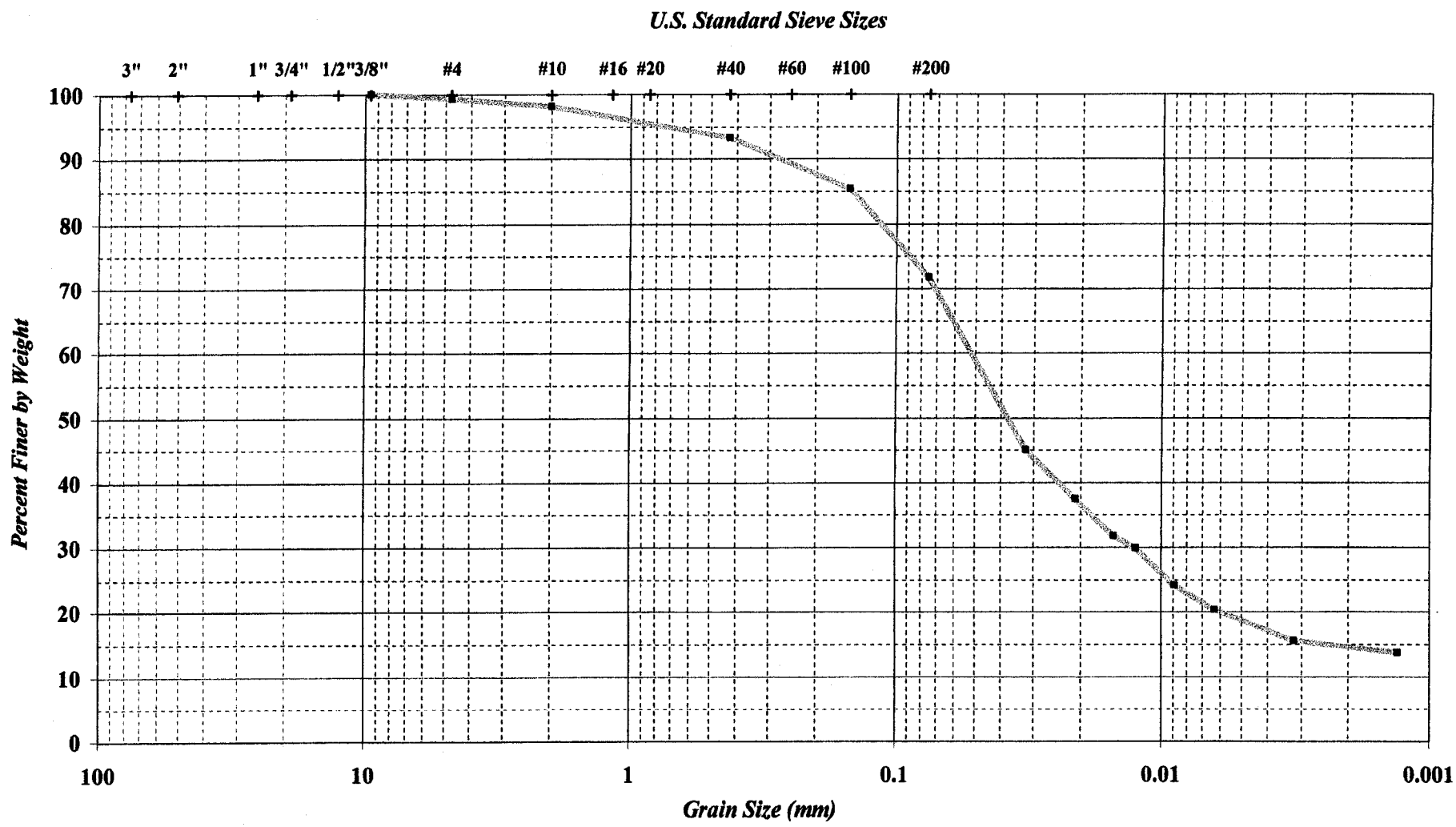
Filename: MW 2-2 SS#9



Job Name	Belew's Creek Ash Landfill	Depth	44.1-45.6 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
		Gs	2.71	
Job Location	Greensboro, North Carolina	% Finer #200	49.2	S&ME
		LL	36	
Job Number	1264-00-157	PI	5	
Boring No.	Soil Description/Classification			
MW 2-2 SS#9	Green-Tan very silty coarse to fine SAND (SM)			

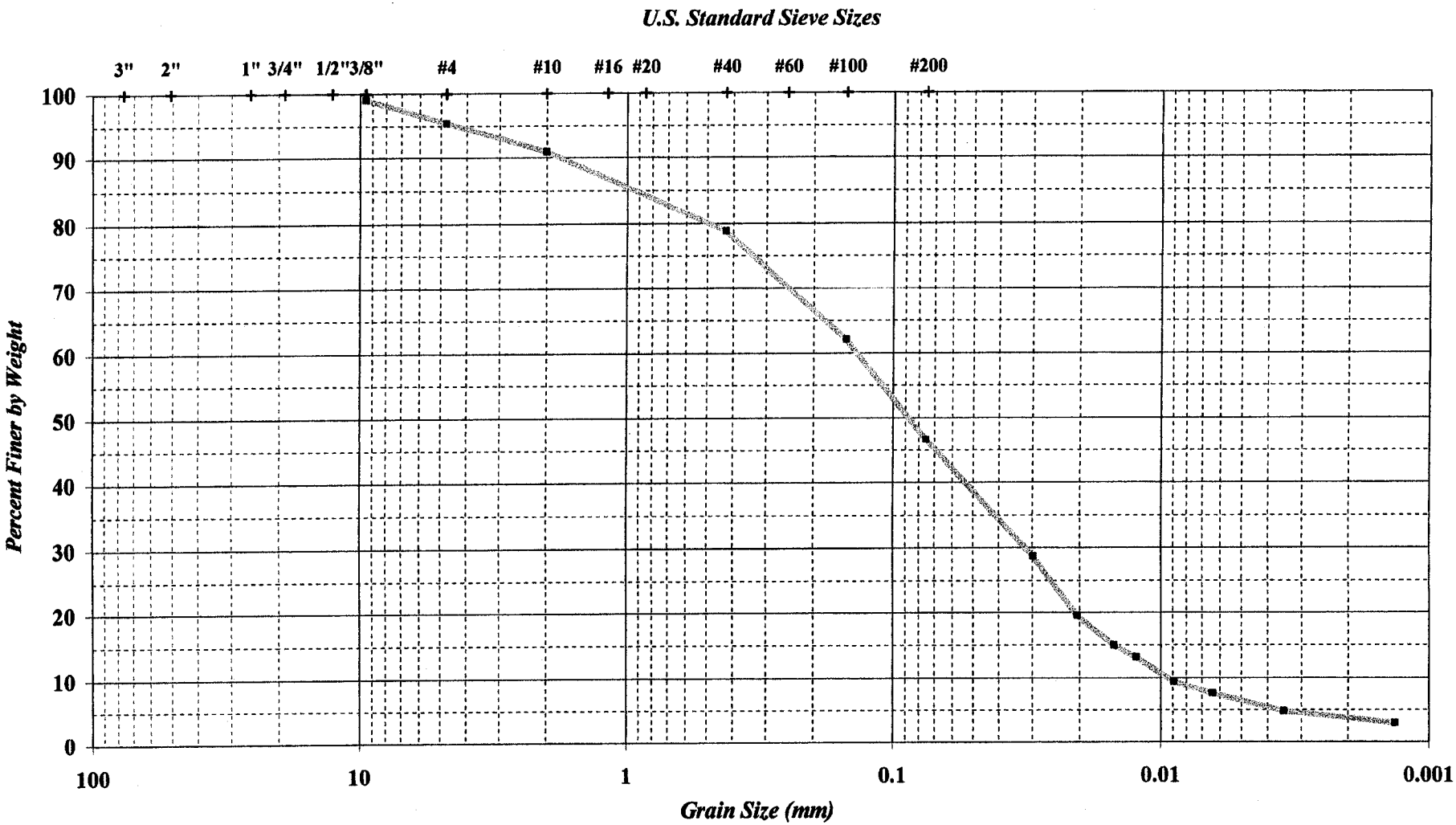
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: MW 2-3 SS#1



Job Name	Belew's Creek Ash Landfill	Depth	4-5.5 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	na %	*ASTM D 421 and 422*
		Gs	2.6	
Job Location	Greensboro, North Carolina	% Finer #200	71.8	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		LL	34	
Job Number	1264-00-157	PI	8	
Boring No.	Soil Description/Classification			
MW 2-3 SS#1	Dark Yellow-Tan medium to fine sandy SILT (ML)			

Filename: MW 2-3 SS#7



Job Name	Belew's Creek Ash Landfill	Depth	34-35.4 *feet*
		Nat. Moist.	na %
		G_s	2.67
Job Location	Greensboro, North Carolina	% Finer #200	46.6
		LL	32
Job Number	1264-00-157	PI	3
Boring No.	Soil Description/Classification		
MW 2-3 SS#7	Light Brown silty coarse to fine SAND (SM)		

GRAIN SIZE DISTRIBUTION

ASTM D-421 and 422

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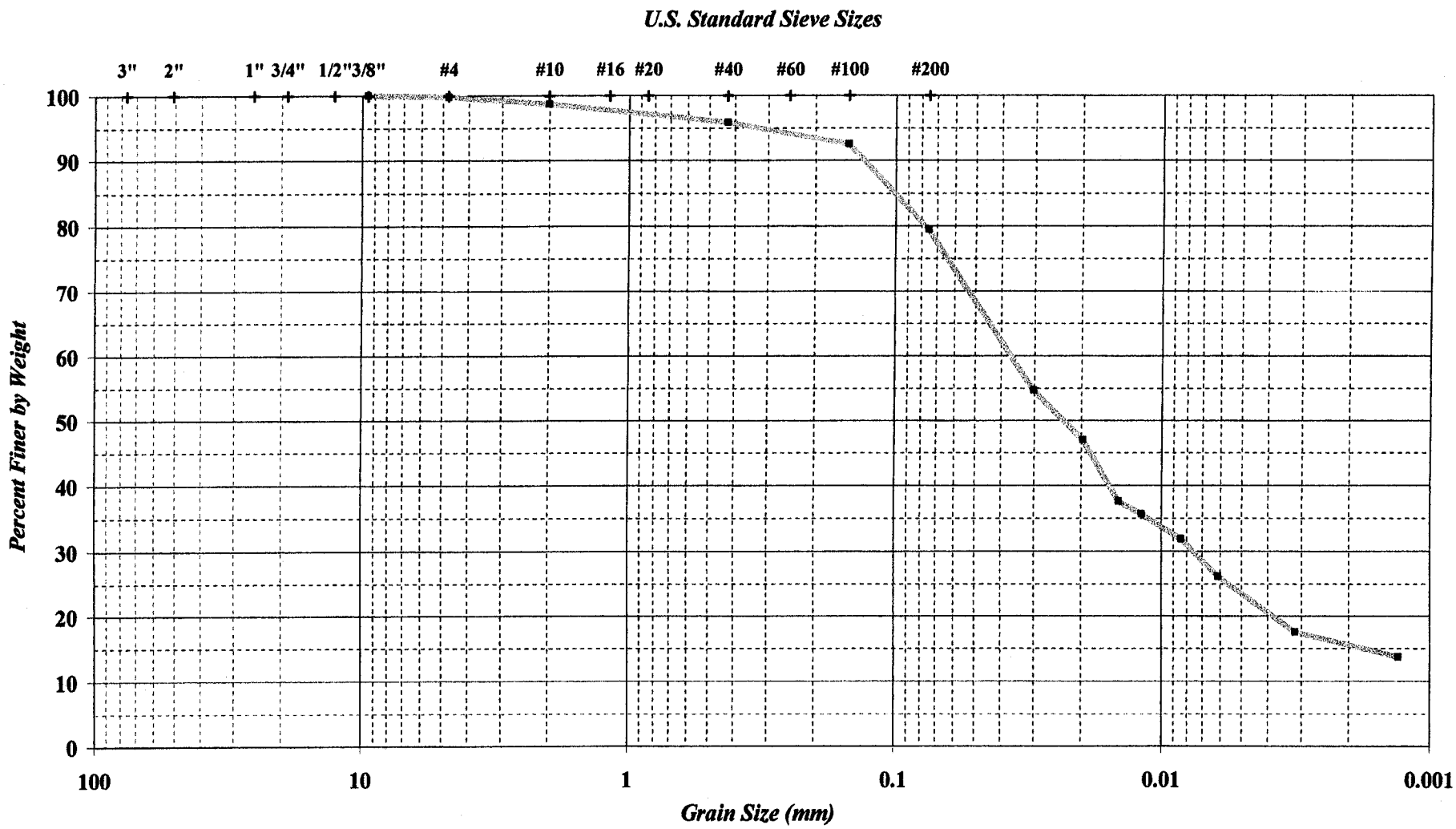
ENGINEERING • TESTING

Filename: MW 2-4 SS#1



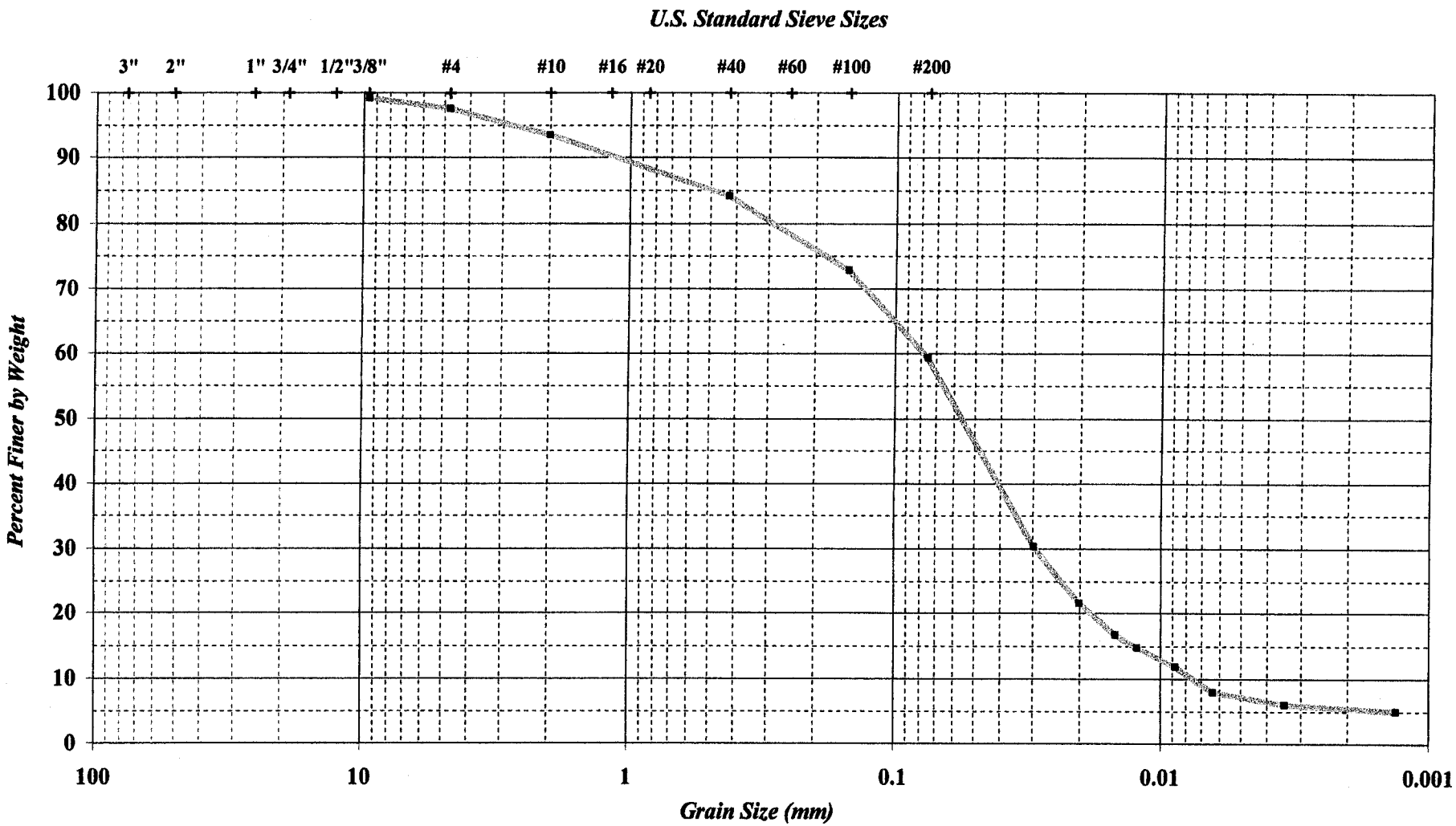
Job Name	Belew's Creek Ash Landfill	Depth	4-5.5 *feet*
		Nat. Moist.	na %
		Gs	2.64
Job Location	Greensboro, North Carolina	% Finer #200	79.5
		LL	53
Job Number	1264-00-157	PI	15
Boring No.	Soil Description/Classification		
MW 2-4 SS#1	Light Orange-Brown medium to fine sandy elastic SILT (MH)		

GRAIN SIZE DISTRIBUTION

ASTM D-421 and 422

S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

Filename: MW 2-4 SS#5



Job Name	Belew's Creek Ash Landfill	Depth	26-27.5 *feet*	GRAIN SIZE DISTRIBUTION
		Nat. Moist.	na %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.64	
		% Finer #200	59.3	
Job Number	1264-00-157	LL	32	
		PI	4	
Boring No.	Soil Description/Classification			
MW 2-4 SS#5	Tan coarse to fine sandy SILT (ML)			

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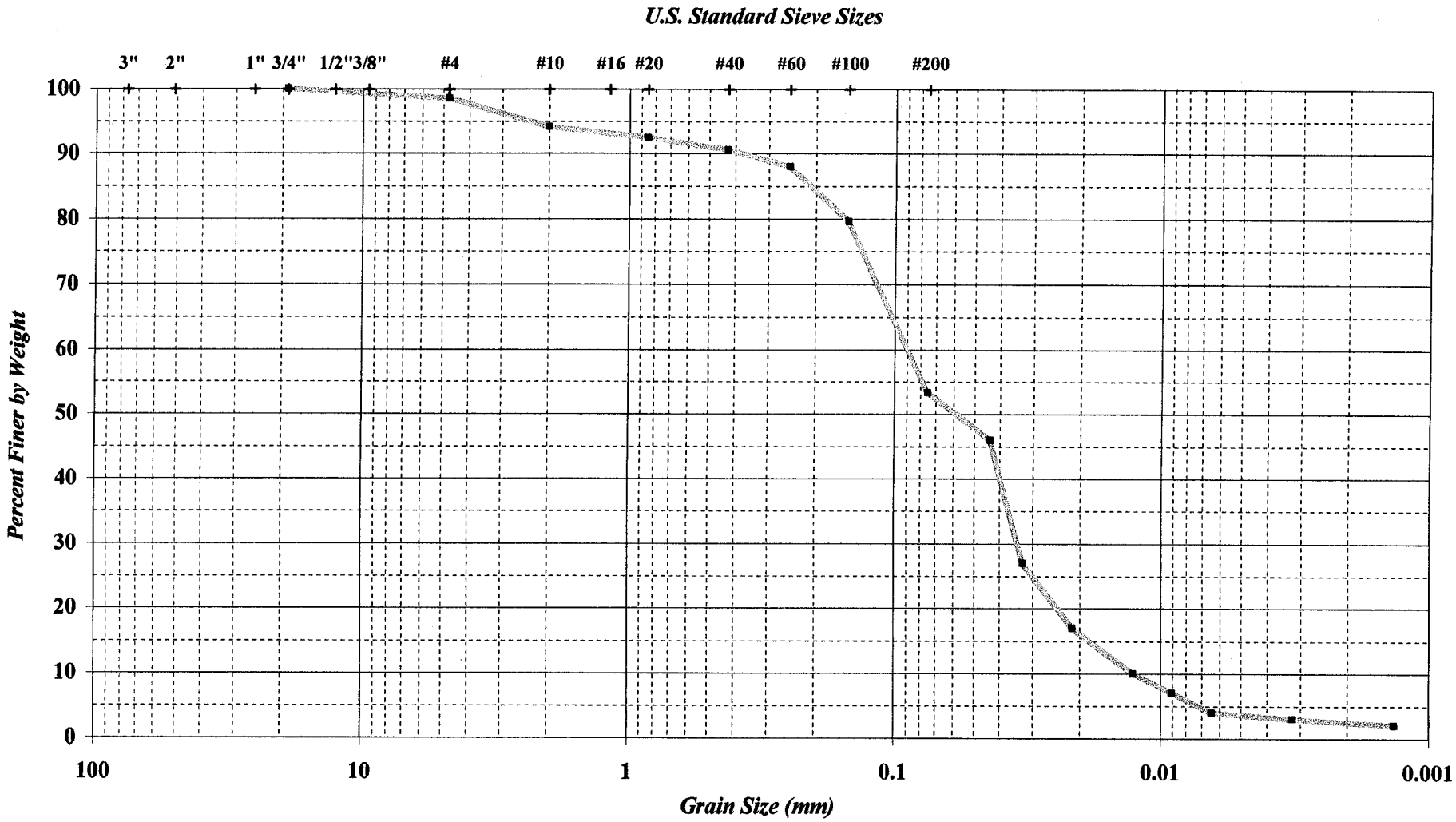
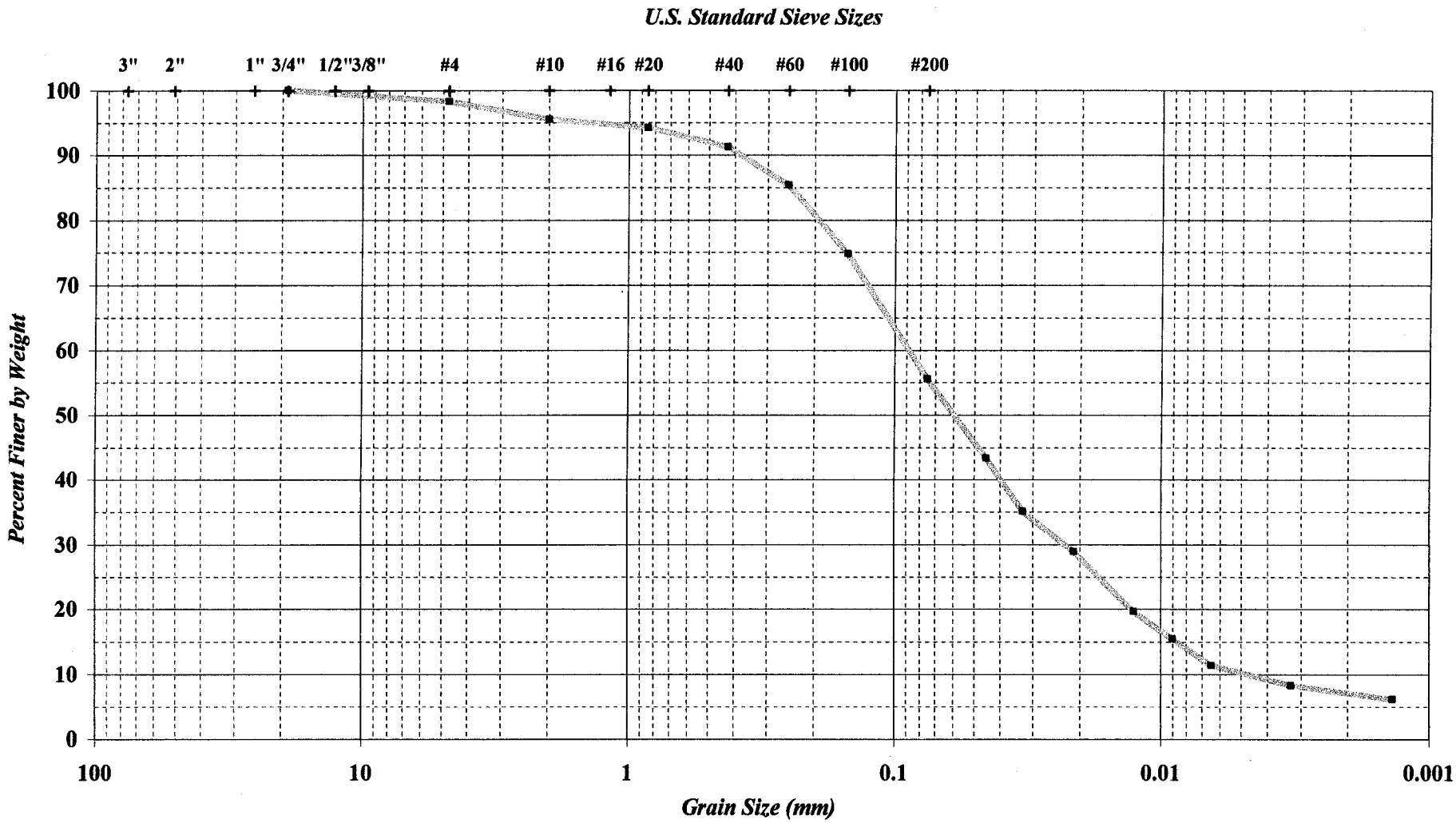
Filename: BC-4 UD#1



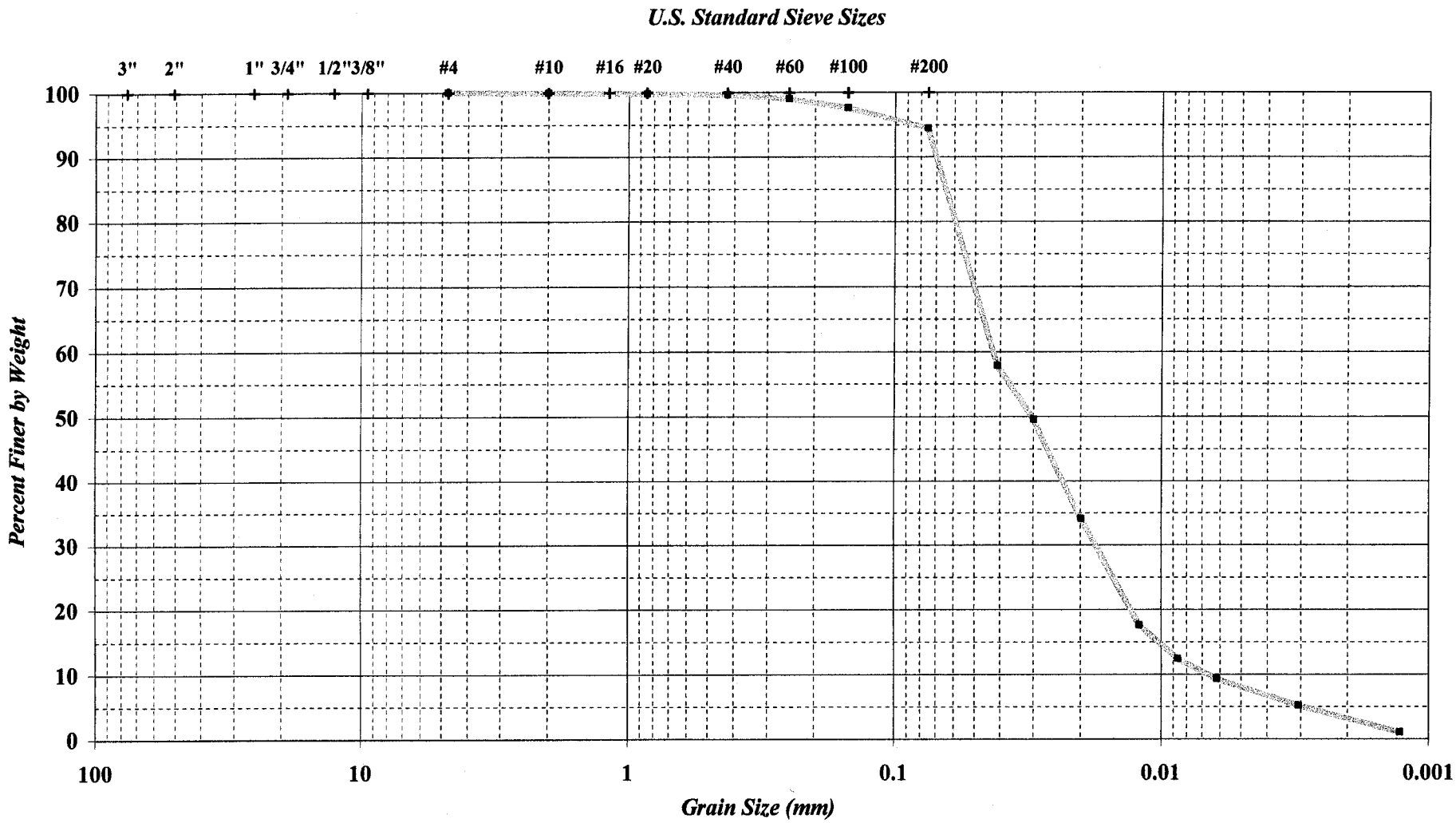
Job Name	Belew's Creek Ash Landfill	Depth	5-6.7' *feet*	**GRAIN SIZE DISTRIBUTION** *ASTM D-421 and 422*
		Nat. Moist.	16.1 %	
		Gs	2.73	
Job Location	Greensboro, North Carolina	% Finer #200	53.3	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		LL	NP	
Job Number	1264-00-157	PI	NP	
Boring No.	Soil Description/Classification			
BC-4 UD#1	Black Tan fine to medium sandy SILT (ML)			

Filename: BC-5 UD#1



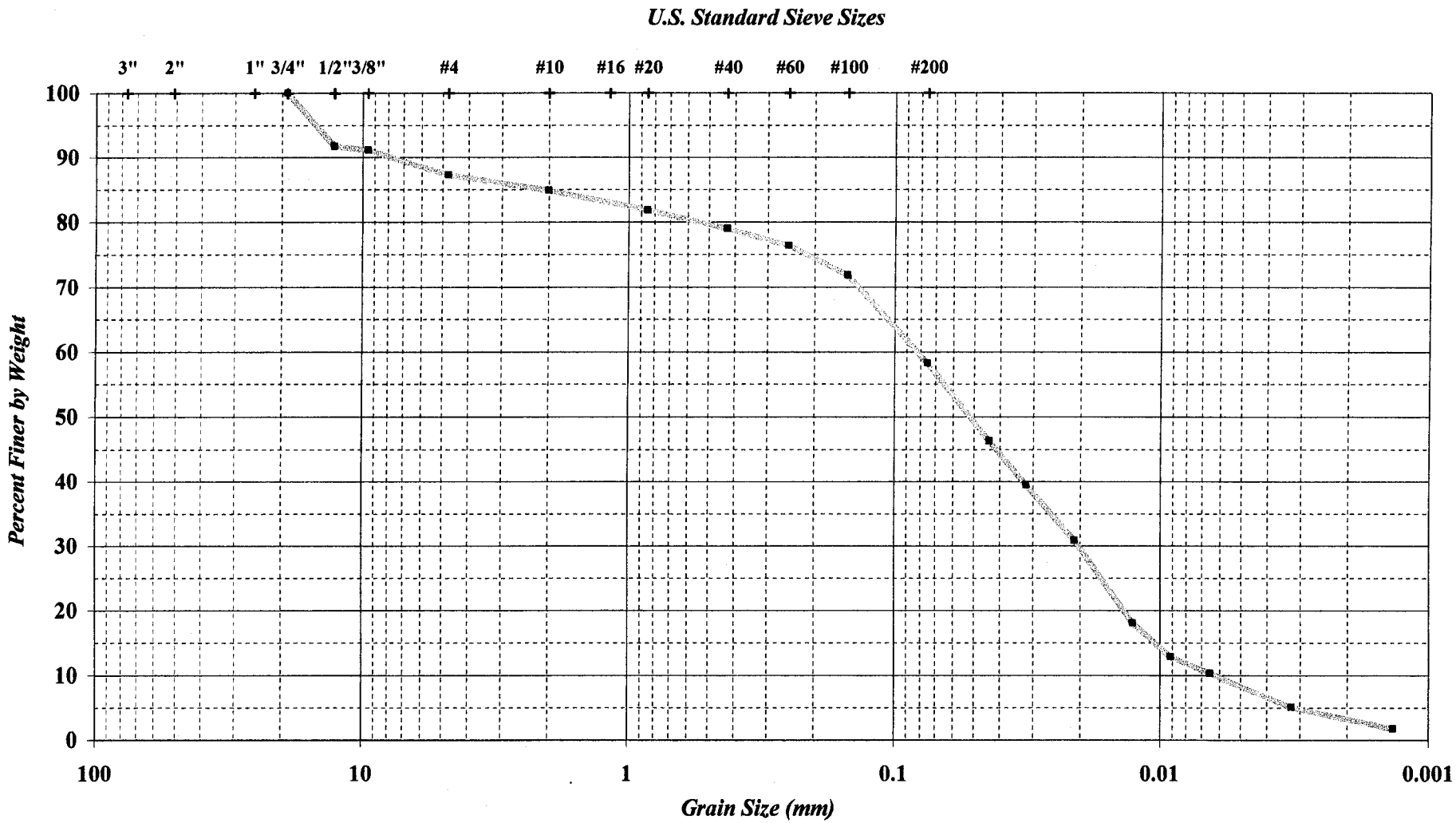
Job Name	Belew's Creek Ash Landfill	Depth	9.5-11.5 *feet*	**GRAIN SIZE DISTRIBUTION** *ASTM D-421 and 422*
		Nat. Moist.	23.4 %	
		Gs	2.64	
Job Location	Greensboro, North Carolina	% Finer #200	55.6	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		LL	NP	
Job Number	1264-00-157	PI	NP	
Boring No.	Soil Description/Classification			
BC-5 UD#1	Black Tan fine to medium sandy SILT (ML)			

Filename: MW 2-1, UD#2



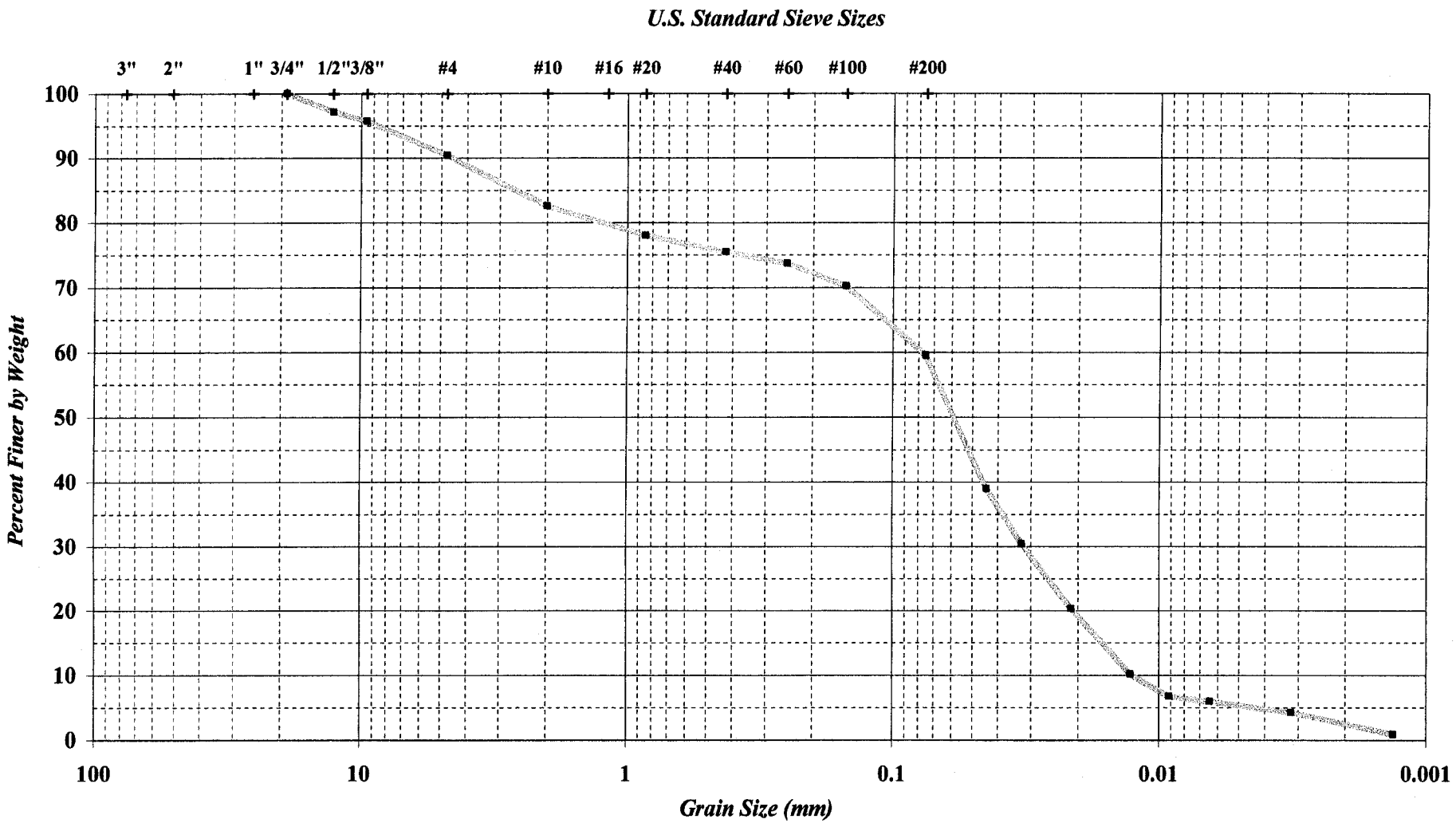
Job Name	Belew's Creek Ash Landfill	**Depth**	9.5-11.5 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	30.7 %	*ASTM D-421 and 422*
		Gs	2.88	
Job Location	Greensboro, North Carolina	**% Finer #200**	94.4	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		LL	51	
Job Number	1264-00-157	**PI**	38	
Boring No.	**Soil Description/Classification**			
MW 2-1; UD#2	Orange Tan Gray fat CLAY (CH)			

Filename: MW 2-2, UD#3



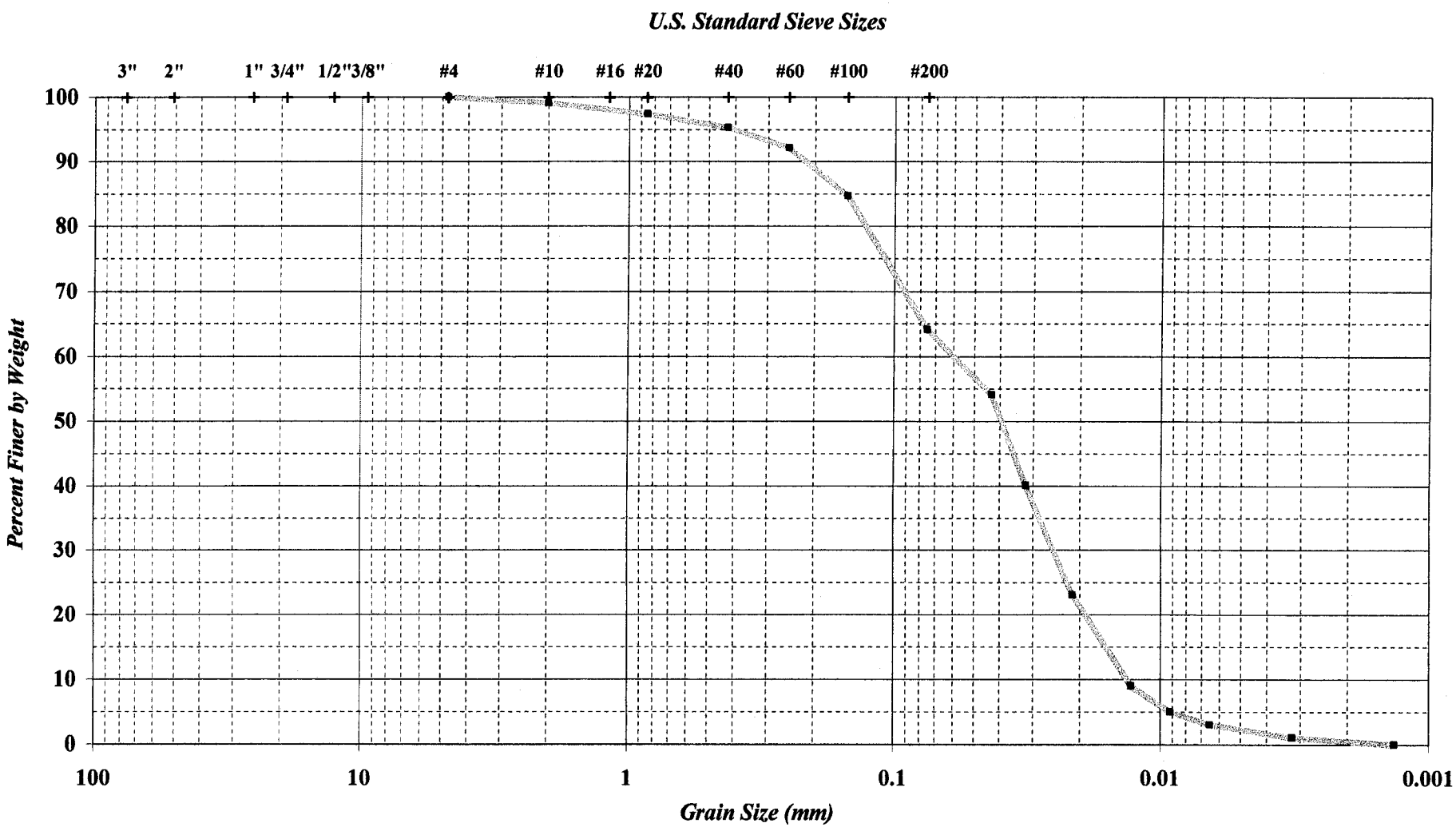
Job Name	Belew's Creek Ash Landfill	**Depth**	24.1-25.5 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	18 %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	**Gs**	2.65	
		% Finer #200	58.3	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
Job Number	1264-00-157	**LL**	NP	
		PI	NP	
Boring No.	**Soil Description/Classification**			
MW 2-2; UD#3	Black Yellow Orange sandy SILT (ML)			

Filename: MW 2-2,UD#5



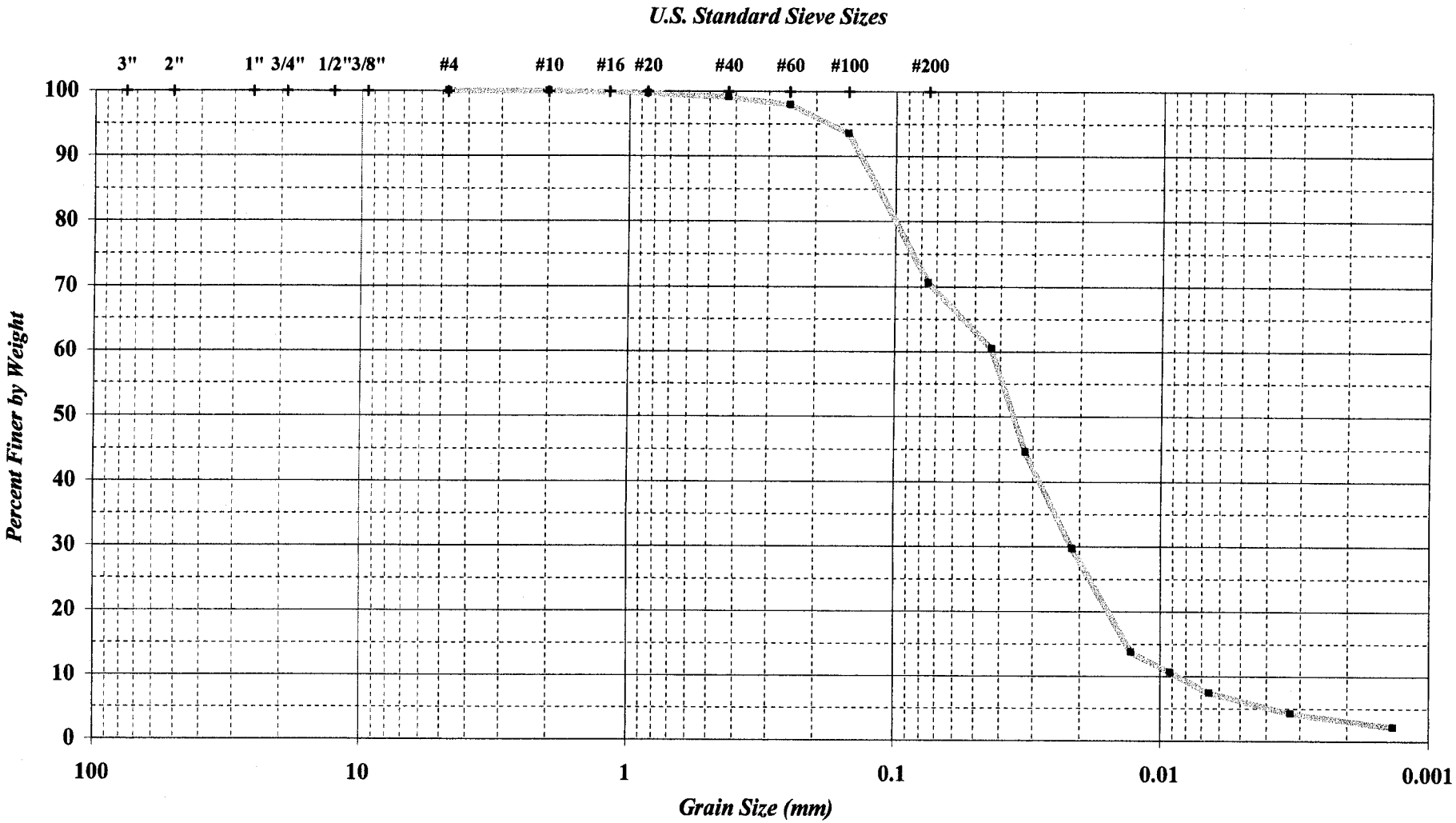
Job Name	Belew's Creek Ash Landfill	Depth	34.1-36.1 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	33.1 %	*ASTM D-421 and 422*
		Gs	2.73	
Job Location	Greensboro, North Carolina	% Finer #200	59.5	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
		LL	48	
Job Number	1264-00-157	PI	19	
Boring No.	Soil Description/Classification			
MW 2-2; UD#5	Black Orange Tan sandy SILT (ML)			

Filename: MW 2-3,UD#4

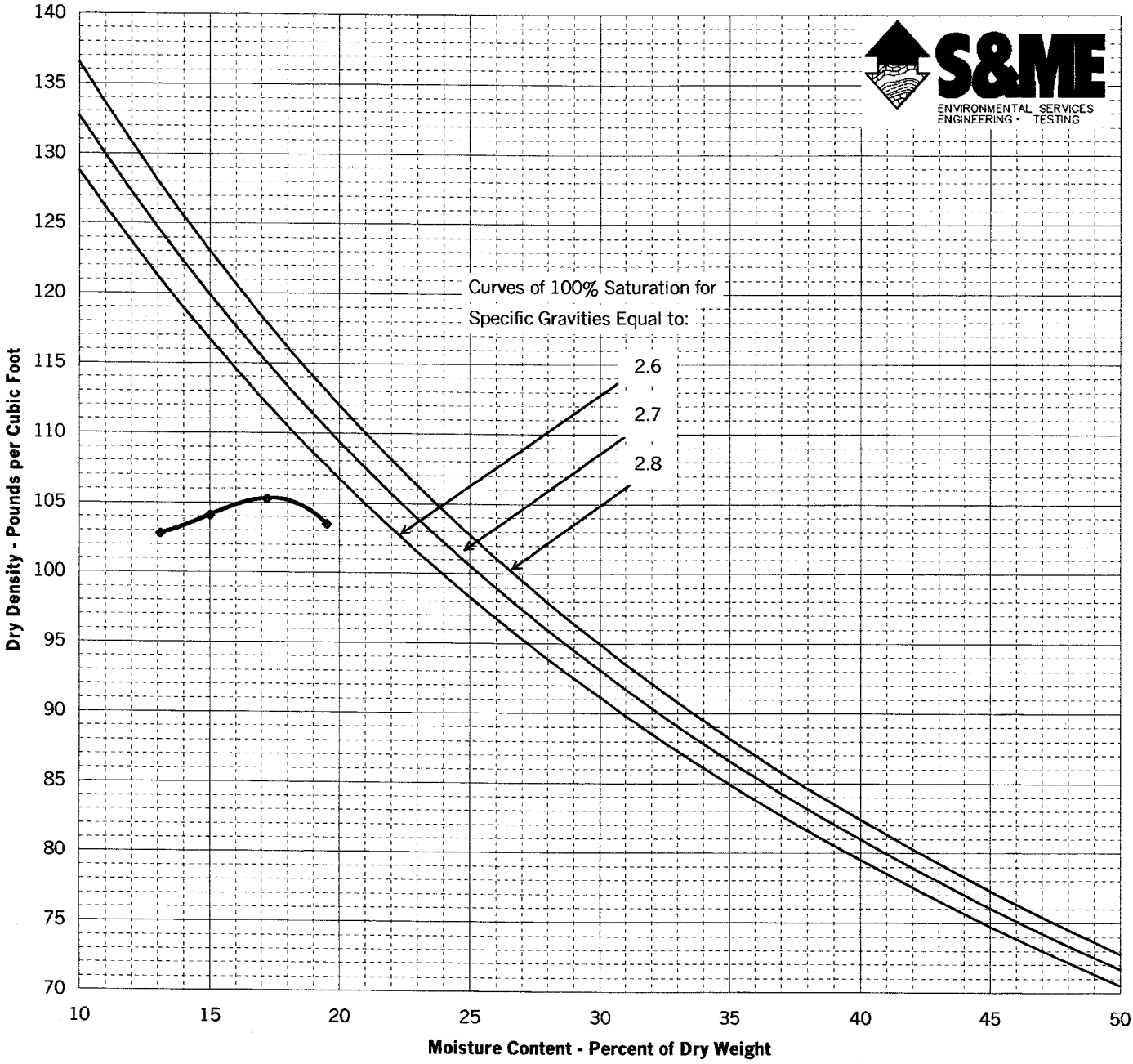


Job Name	Belew's Creek Ash Landfill	Depth	29.0-30.6 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	17.5 %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	Gs	2.72	
		% Finer #200	64.1	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
Job Number	1264-00-157	LL	NP	
		PI	NP	
Boring No.	**Soil Description/Classification**			
MW 2-3; UD#4	Orange Gray Tan sandy SILT (ML)			

Filename: MW 2-4, UD#2

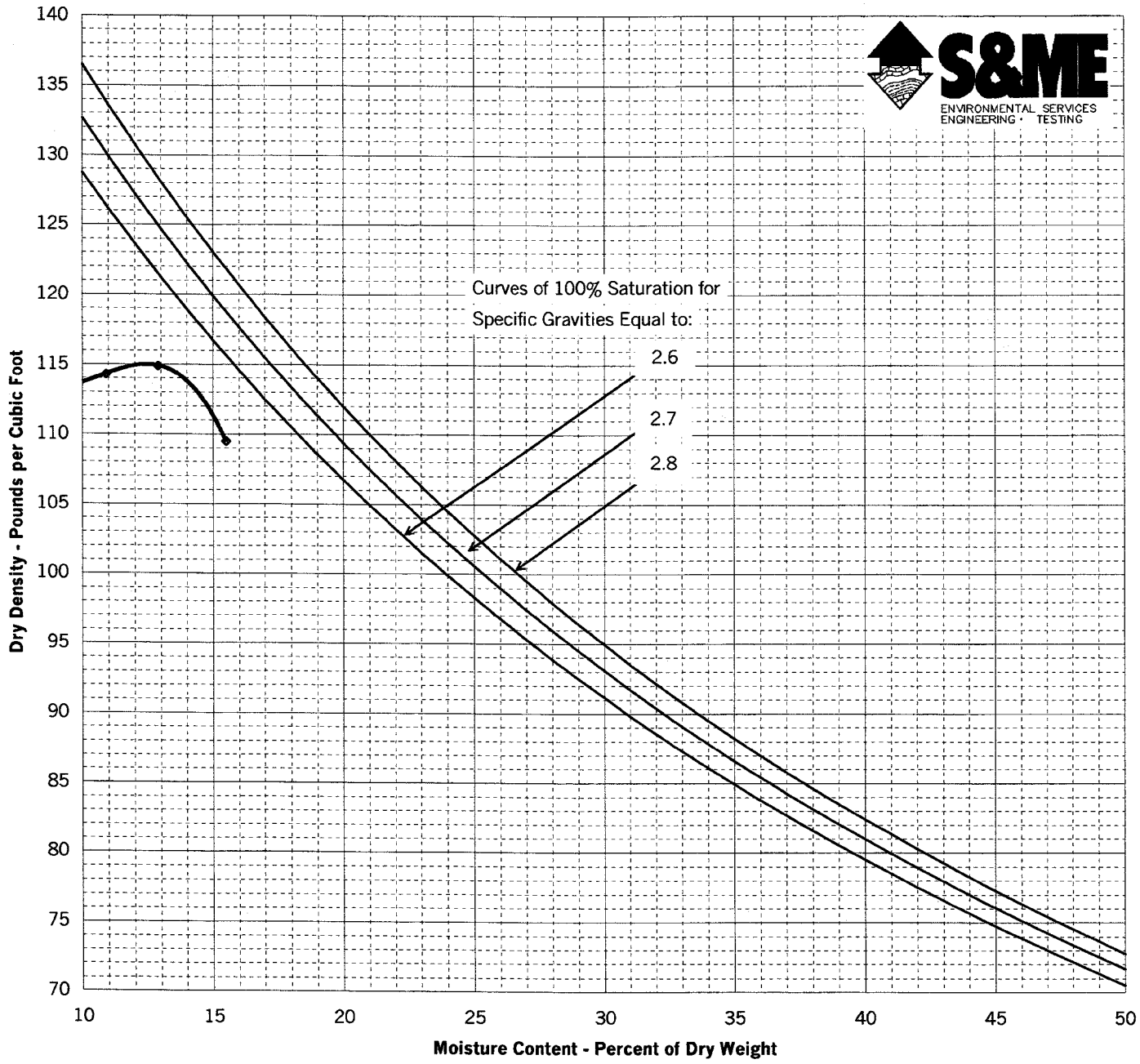


Job Name	Belew's Creek Ash Landfill	**Depth**	19-21 *feet*	**GRAIN SIZE DISTRIBUTION**
		Nat. Moist.	21.1 %	*ASTM D-421 and 422*
Job Location	Greensboro, North Carolina	**Gs**	2.67	
		% Finer #200	70.6	S&ME ENVIRONMENTAL SERVICES ENGINEERING • TESTING
Job Number	1264-00-157	**LL**	NP	
		PI	NP	
Boring No.	**Soil Description/Classification**			
MW 2-4; UD#2	Orange Tan Gray SILT with sand (ML)			



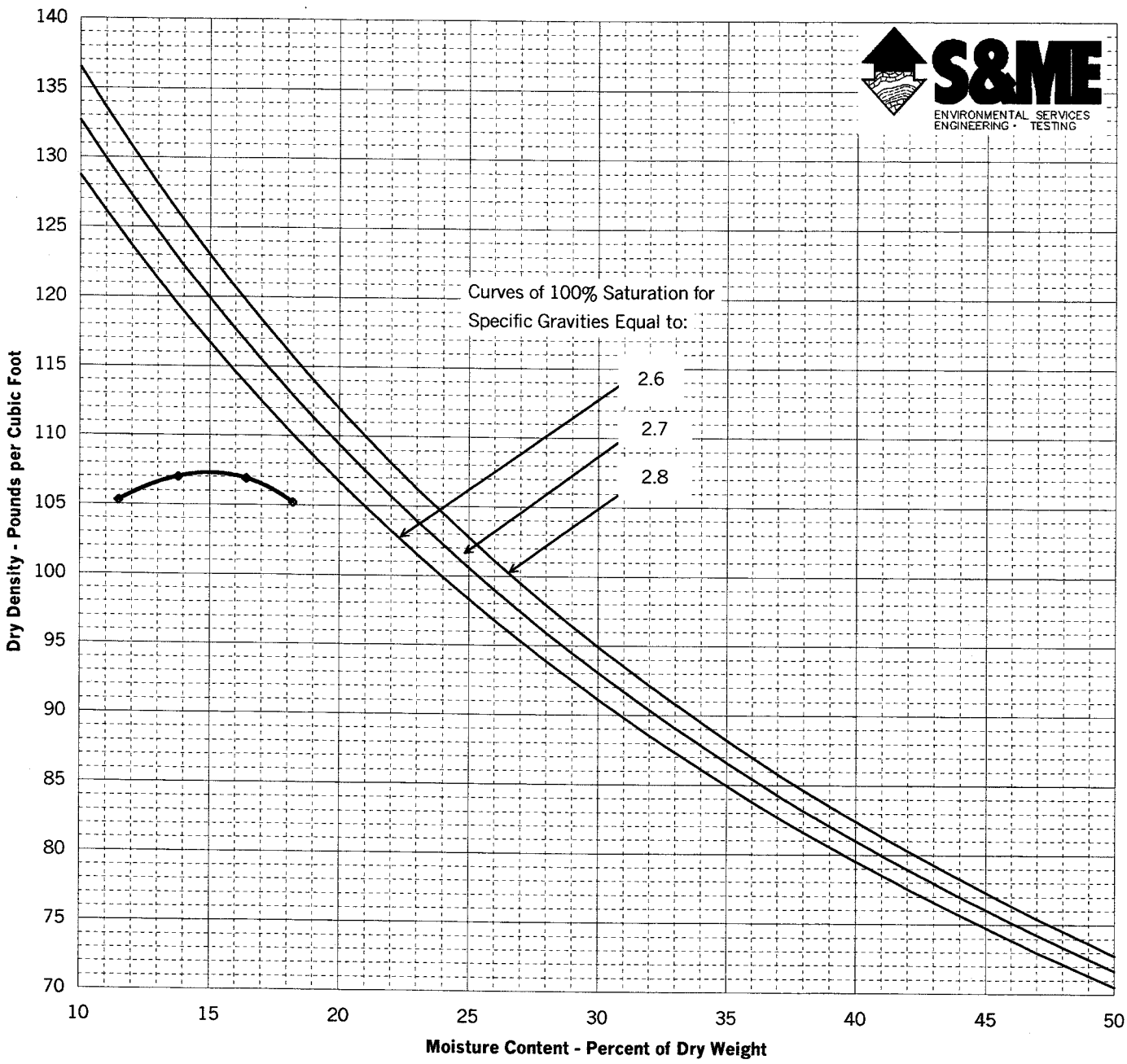
S&ME, Inc. Job Name	Belew's Creek Ash Landfill	Date Performed	4/28/00	
		S&ME Lab No.	169	
S&ME, Inc. Job Number	1264-00-157	LL	29	
		PI	4	
Sample ID	BC-1 0-10'	% finer #200	57.8	%
		Max. Dry Density	105.5	pcf
Soil Description	Tan coarse to fine sandy SILT (ML)	Opt. Moist. Content	17.5	%
		Nat. Moist. Content	na	%

Filename: 1264-00-157 (169)



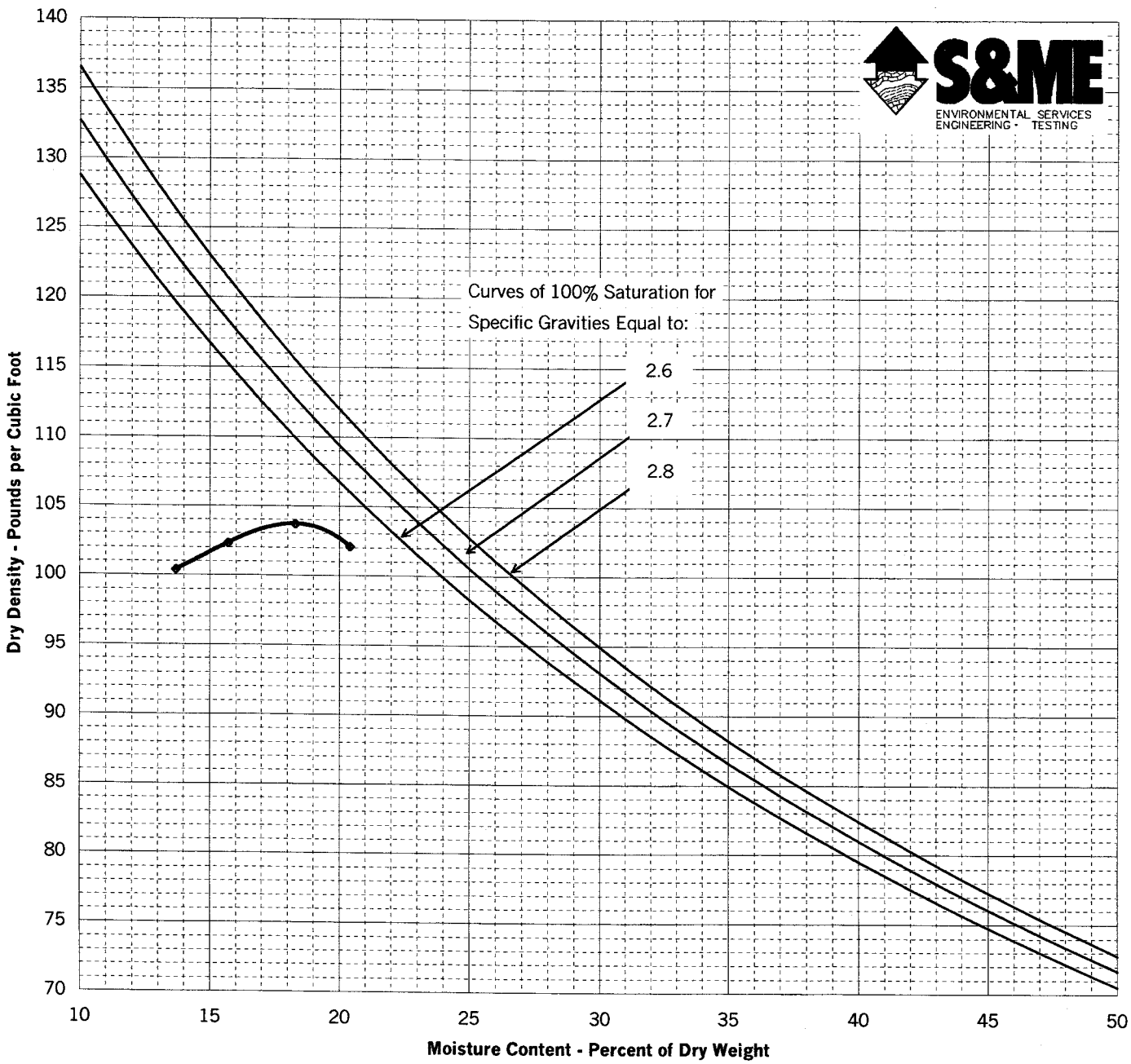
S&ME, Inc. Job Name	Belew's Creek Ash Landfill	Date Performed	4/28/00	
		S&ME Lab No.	170	
S&ME, Inc. Job Number	1264-00-157	LL	20	
		PI	2	
Sample ID	BC-3	% finer #200	43.5	%
		Max. Dry Density	115.0	pcf
Soil Description	Tan green silty coarse to fine SAND (SM) with fine gravel	Opt. Moist. Content	12.0	%
		Nat. Moist. Content	na	%

Filename: 1264-00-157 (170)



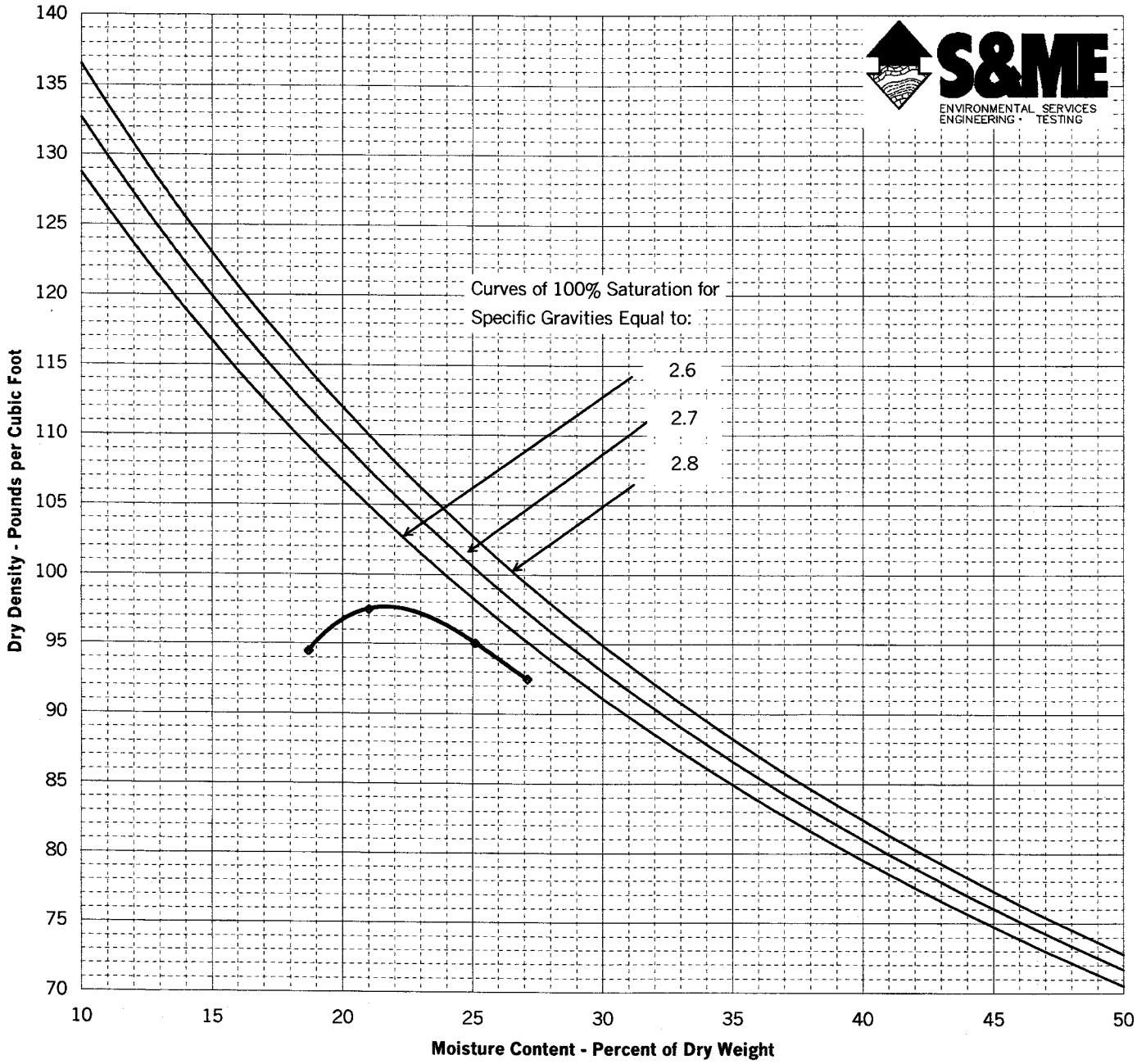
S&ME, Inc. Job Name	Belew's Creek Ash Landfill	Date Performed	5/1/00	
		S&ME Lab No.	171	
S&ME, Inc. Job Number	1264-00-157	LL	29	
		PI	6	
Sample ID	BC-4	% finer #200	62	%
		Max. Dry Density	107.0	pcf
Soil Description	Tan coarse to fine sandy SILT (ML)	Opt. Moist. Content	15.0	%
		Nat. Moist. Content	na	%

Filename: 1264-00-157 (171)



S&ME, Inc. Job Name	Belew's Creek Ash Landfill	Date Performed	5/1/00	
		S&ME Lab No.	172	
S&ME, Inc. Job Number	1264-00-157	LL	32	
		PI	4	
Sample ID	BC-5	% finer #200	58.3	%
		Max. Dry Density	104.0	pcf
Soil Description	Tan coarse to fine sandy SILT (ML)	Opt. Moist. Content	18.5	%
		Nat. Moist. Content	na	%

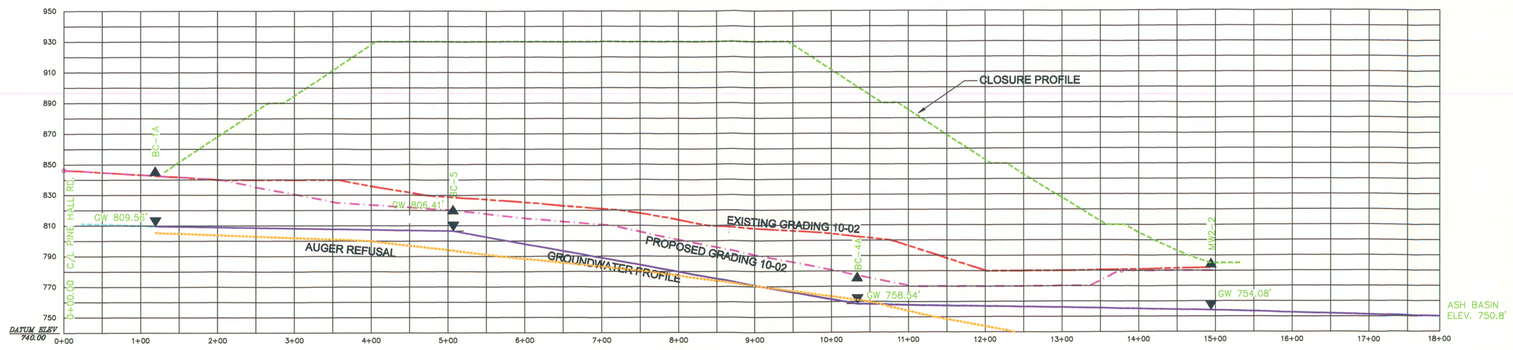
Filename: 1264-00-157 (172)



S&ME, Inc. Job Name	Belew's Creek Ash Landfill	Date Performed	5/1/00	
		S&ME Lab No.	173	
S&ME, Inc. Job Number	1264-00-157	LL	39	
		PI	4	
Sample ID	BC-6	% Finer #200	64.9	%
		Max. Dry Density	98.0	pcf
Soil Description	Orange tan coarse to fine sandy SILT (ML)	Opt. Moist. Content	22.5	%
		Nat. Moist. Content	na	%

Filename: 1264-00-157 (173)

Drawing Under Seperate Cover



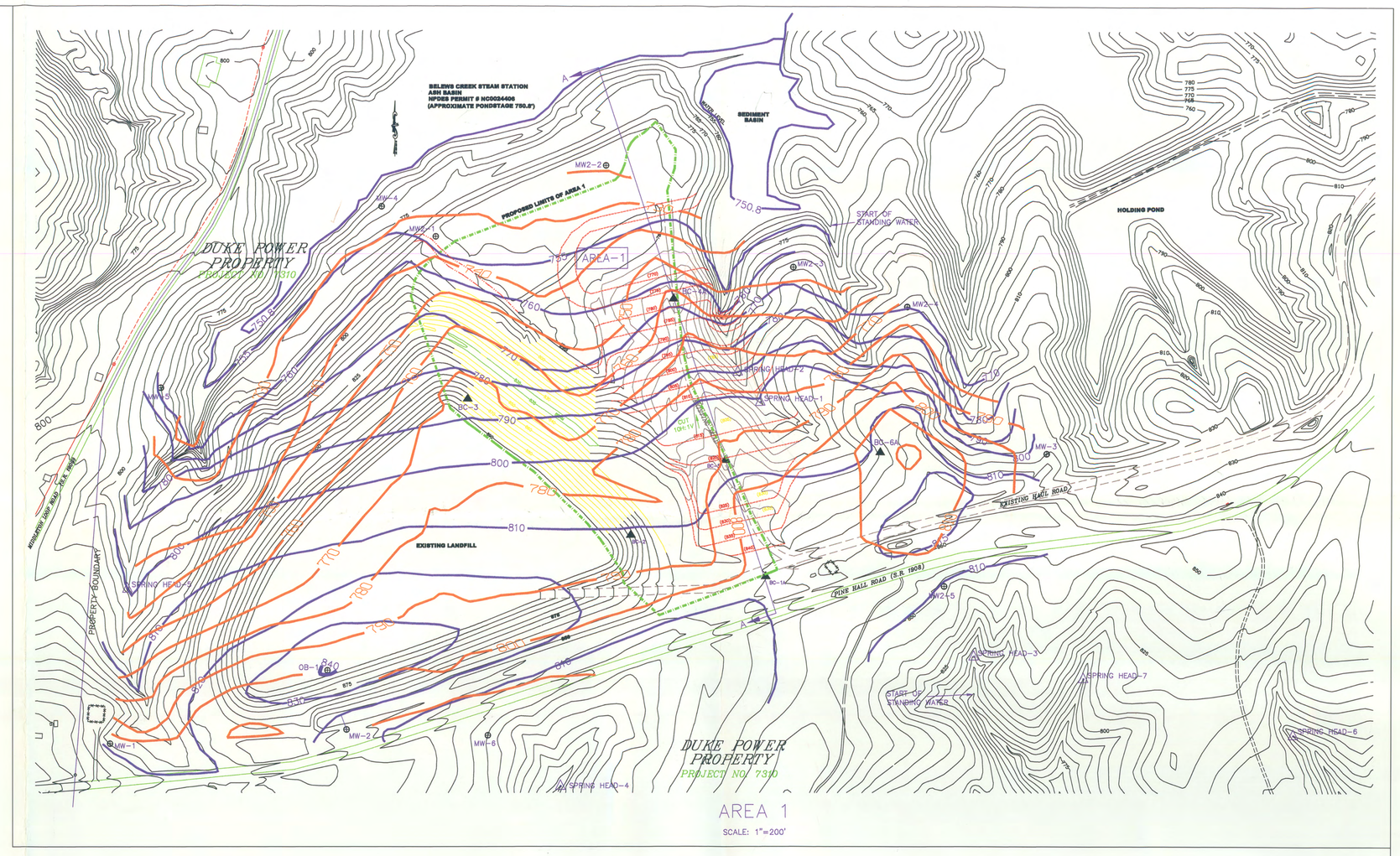
SECTION A–A (AREA 1)

SCALE

VERTICAL – 1" = 50'

HORIZONTAL – 1" = 100'

Groundwater profile based on measurements taken in April, 2001



AREA 1

SCALE: 1"=200'

LEGEND

- FOOTPRINT OF AREA 1
- MONITORING WELL
- SOIL BORING/TEMPORARY WELL
- SPRING HEAD
- (850) GRADED ELEVATION LABEL
- 850 EXISTING ELEVATION LABEL
- PROPOSED EXCAVATION CUT
- 810 GROUNDWATER CONTOUR (APRIL 2001)
- 780 AUGER REFUSAL - TOP OF WEATHERED/FRACTURED ROCK CONTOUR

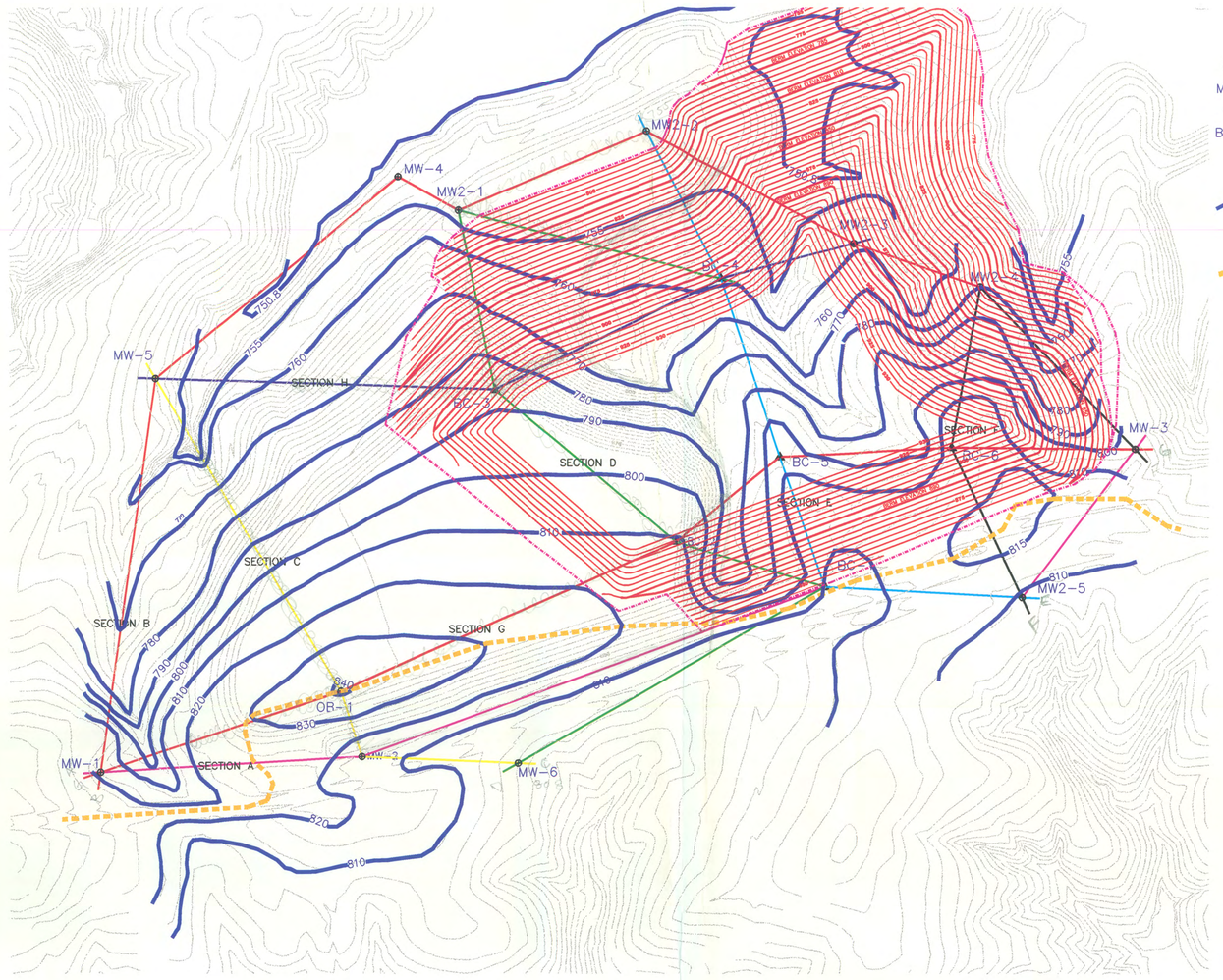
DUKE POWER COMPANY
BELEWS CREEK STEAM STATION

Belews Creek Ash Landfill - Expansion
Groundwater Contours, Top of Weathered/Fractured Rock Contours and Proposed Area 1 Grades

DESIGNER	M.F.Schaeffer	DATE	INSP.	DATE	
DRAWN	W. R. McConnell	DATE	INSP.	DATE	
CHECKED	M.F.Schaeffer	DATE	APPR.	DATE	

Drawing BCK-02 **FRAMATOME ANP DE&S**

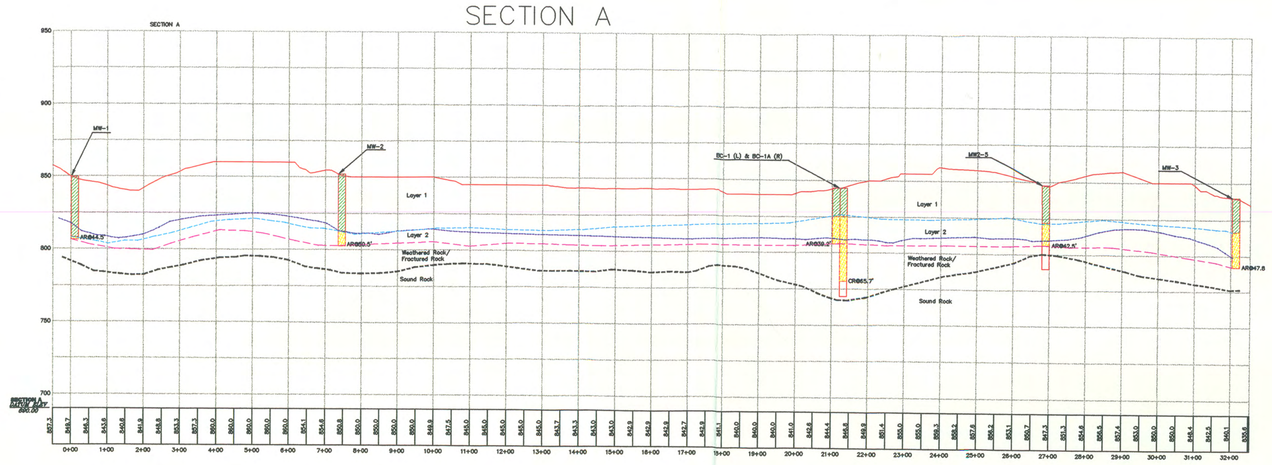
DWG NO. | REV.



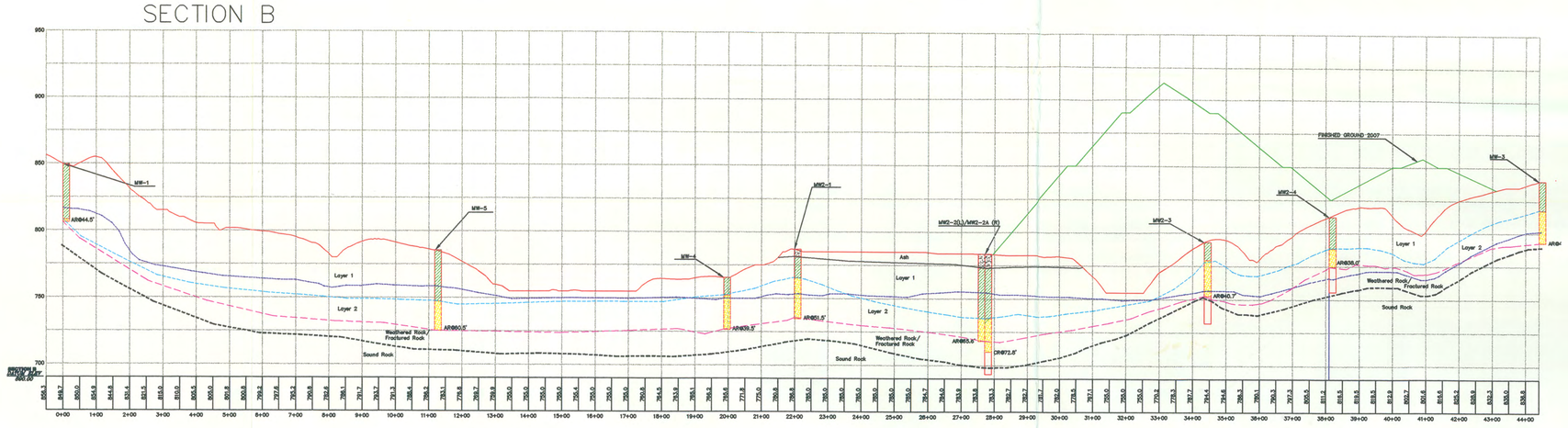
EXPLANATION – Plan

- ⊕ Monitoring Well.
- ⊕ MW-2 / BC-1 Test Boring and Temporary Monitoring Well
- Groundwater Contours.
- Drainage Basin Divide.
- Proposed Landfill Footprint

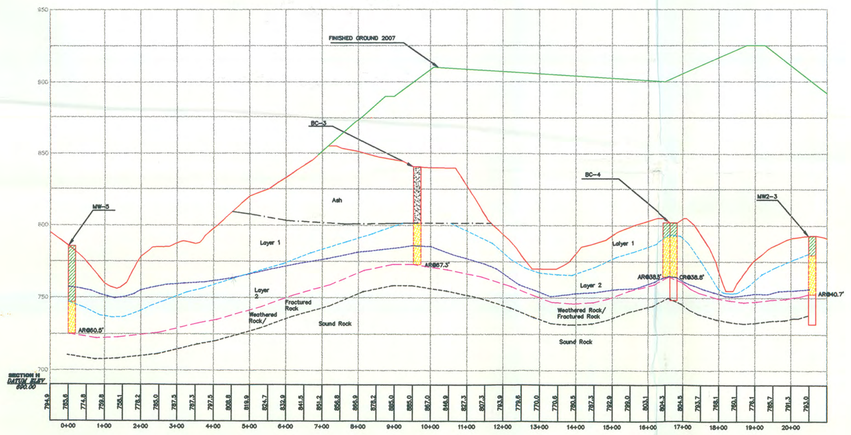
SECTION A



SECTION B



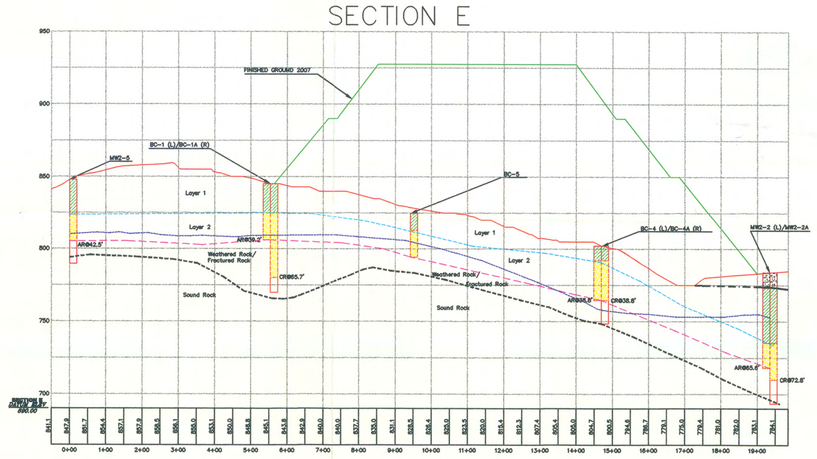
SECTION H



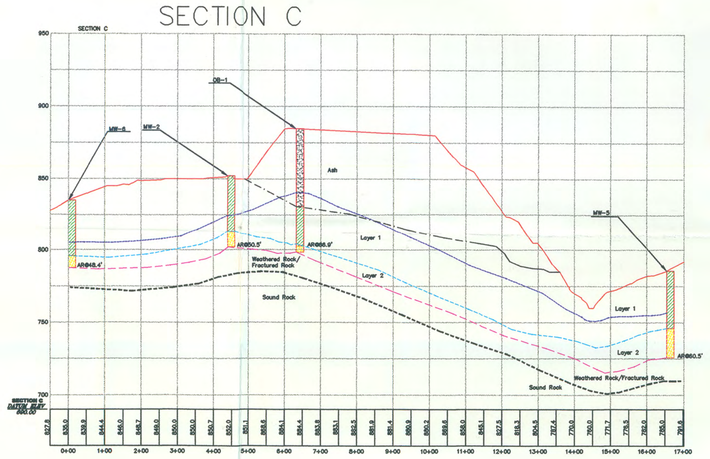
HORIZONTAL SCALE
0 100 200 400 600
SCALE IN FEET

VERTICAL SCALE
0 25 50 100 300
SCALE IN FEET

SECTION E



SECTION C



EXPLANATION – Cross-Sections

- Ash.
- Layer 1 – Residual Soil and Saprolite, primarily sandy silts (ML) to silty sands (SM). Standard Penetration Resistance, N≤30.
- Layer 2 – Saprolite and weathered rock consisting of sandy silts (ML) and silty sands (SM) with layers of moderately to severely weathered rock. Standard Penetration Resistance, N≥30.
- Weathered Rock/Fractured Rock – Severely to slightly weathered rock and fractured rock. Recovery less than 90% and Rock Qualtity Designation (RQD) less than 50%.
- Sound Rock – Rec.>90% and RQD>50%.

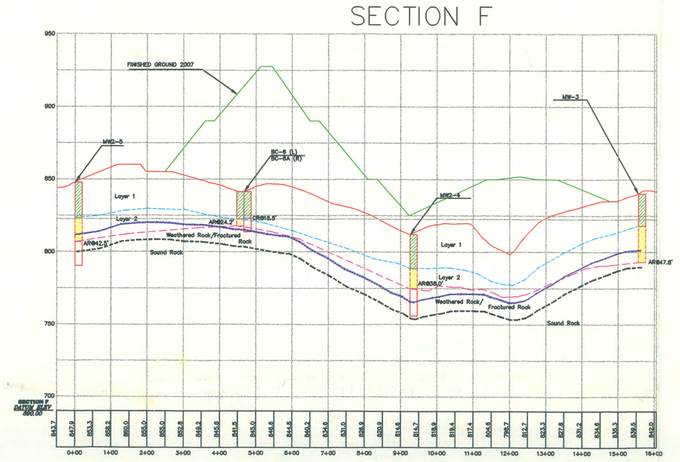
CRB40.6' Carbide Refusal.
ARB40.6' Auger Refusal.

- Groundwater Table/Potentiometric Surface.
- Contact between Ash and Underlying Soil.
- Contact between Layer 1 and Layer 2.
- Contact between Layer 2 and Weathered/Fractured Rock.
- Contact between Weathered/Fractured Rock and Sound Rock.

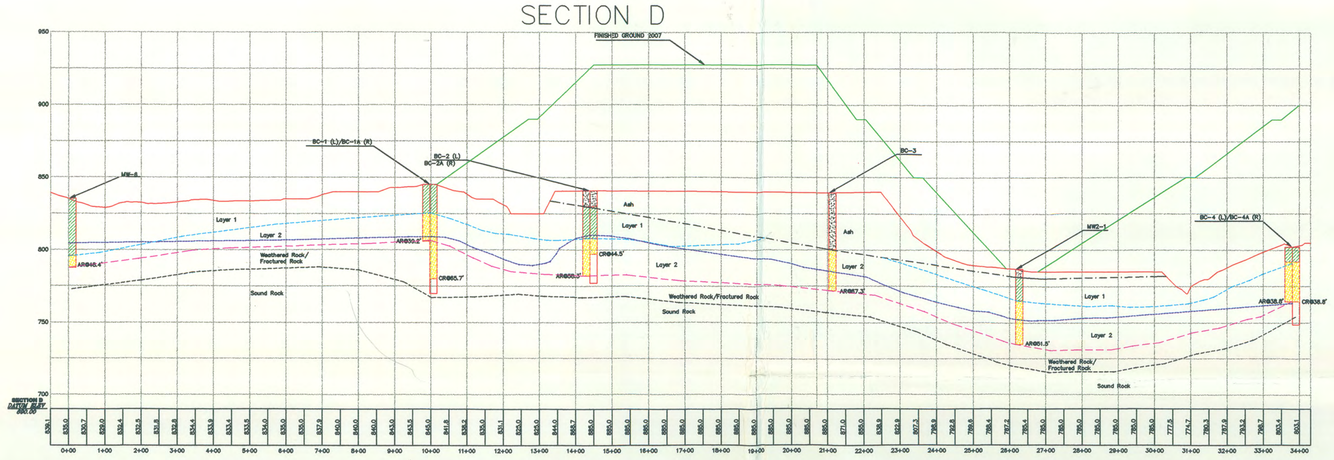
All contacts approximate.

Note: Weathered/Fractured Rock and Sound Rock indicated by same pattern. Separated by approximate contact.

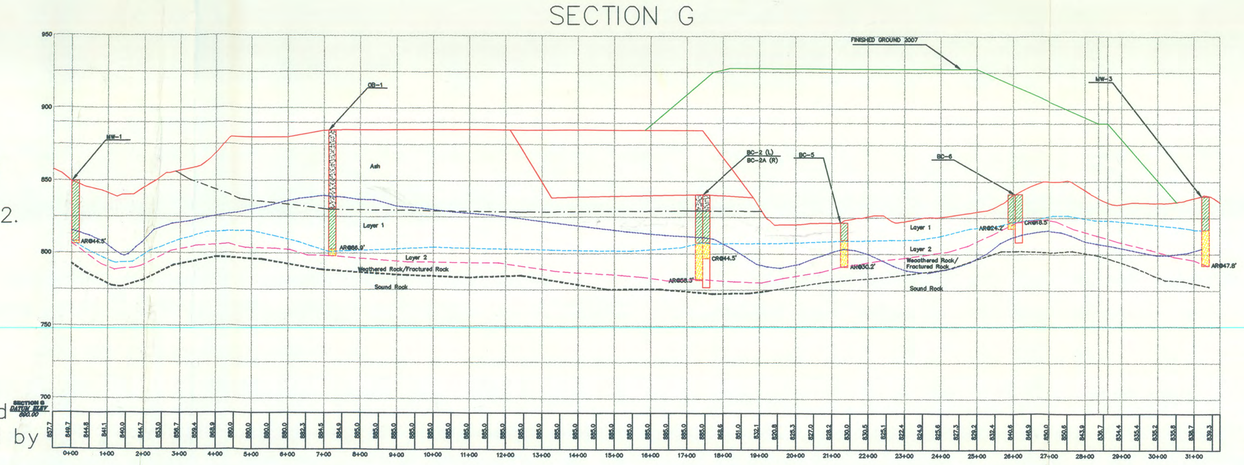
SECTION F



SECTION D



SECTION G



NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE	CIVIL	ELEC.	MECH.
ORIG.								INSPECTED		

DUKE POWER COMPANY
BELEWS CREEK STEAM STATION

Belews Creek Existing Ash Landfill and Proposed Expansion
Plan, Groundwater Contours, and Cross-Sections
A, B, C, D,
E, F, G, AND H

DESIGNER MFSchoeffer DATE 02/09/01 INSP. DATE
DRAWN CAHines/MFSchoeffer DATE 02/09/01 INSP. DATE
CHECKED MFSchoeffer DATE 09/18/01 APPR. DATE
SCALE as noted DWG NO. BCK-01 REV.