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11-07	11/18/09	8928

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SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

November 17, 2009

Mr. Allen Gaither
North Carolina Department of Environmental and Natural Resources
Division of Waste Management
Solid Waste Section
2090 US Highway 70
Swannanoa, North Carolina 28778

Subject: Methane Monitoring Well Installation
Buncombe County Landfill Facility
Alexander, North Carolina
Permit # 11-07

Dear Mr. Gaither:

The purpose of this letter is to notify the Solid Waste Section that methane monitoring wells M-3 and M-4 have been installed downgradient of the existing Buncombe County Subtitle D Landfill. Methane monitoring wells M-3 and M-4 were installed as discussed in the May 2009 Letter of Notice. In addition, methane monitoring wells M-10 and M-11 were installed downgradient of the existing and future C&D facility. Approximate well locations are provided on **Figure 1**.

Well Installation

SAEDACCO, Inc., installed the wells on October 27 and 28, 2009 under supervision of a CDM geologist. The wells were drilled with Diedrich D-50 track-mounted ATV rig utilizing hollow-stem auger drilling methods. At the Subtitle D facility, M-3 was advanced to 35 feet below land surface (bls) and M-4 was advanced to auger refusal at 9 feet bls. At the C&D area, M-10 was advanced to auger refusal at 15 feet bls and M-11 was advanced to auger refusal at 10 feet bls.

All wells were constructed of 2-inch schedule 40 PVC and 0.010-inch slotted screen. Well screen length varied from 5 feet in wells M-4 and M-11 to 30 feet in M-3. Boring logs with well construction diagrams and the driller's well construction records (Form GW-1b) are attached. A summary of the well completion data for the newly installed methane wells is provided in **Table 1**.

Each well was completed with an above grade steel protective riser and a 2-feet by 2-feet by 6-inch concrete pad. The wells will be surveyed to State Plane Coordinates by a North Carolina





Mr. Allan Gaither
November 17, 2009
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registered surveyor. Following installation, each well was screened for percent methane, percent carbon dioxide, and percent oxygen with a GEM-2000 landfill gas monitor. **Table 2** provides a summary of monitoring data for each of the newly installed wells.

If you have any questions or need additional information, please feel free to contact me at (919) 325-3569 or by email to colonemf@cdm.com.

Very truly yours,

Mathew F. Colone, P.G.
Camp Dresser & McKee

xc: A. Keller, NCDENR DWM
J. Mears, BCSWMF
K. Smith, BCSWMF
K. Yang, CDM
C. Gabel, CDM



11/17/2009

Table 1
Summary of Methane Well Completion Data
Buncombe County Solid Waste Management Facility

Piezometer Designation	**TOC Elevation (MSL)	**Ground Elevation (MSL)	Date of Construction	Drilling Method	Screened Interval Lithology	*Depths (feet below ground surface)				Borehole Diameter (inches)
						Total Borehole Depth	Screen Interval	Sand Filter Interval	Bentonite Seal Interval	
M-3	--	--	10/28/2009	HSA	Saprolite	35	5.0-35.0	3.0-35.0	1.0-3.0	8.0
M-4	--	--	10/28/2009	HSA	Saprolite/PWR	9	4.0-9.0	2.0-9.0	0.5-2.0	8.0
M-10	--	--	10/27/2009	HSA	Saprolite/PWR	15	5.0-15.0	3.0-15.0	1.0-3.0	8.0
M-11	--	--	10/27/2009	HSA	Saprolite/PWR	10	5.0-10.0	3.0-10.0	1.0-3.0	8.0

NOTES:

MSL - Mean Sea Level

HSA - Hollow-Stem Auger

PWR - Partially Weathered Rock

*Depths below ground surface are estimated

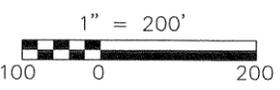
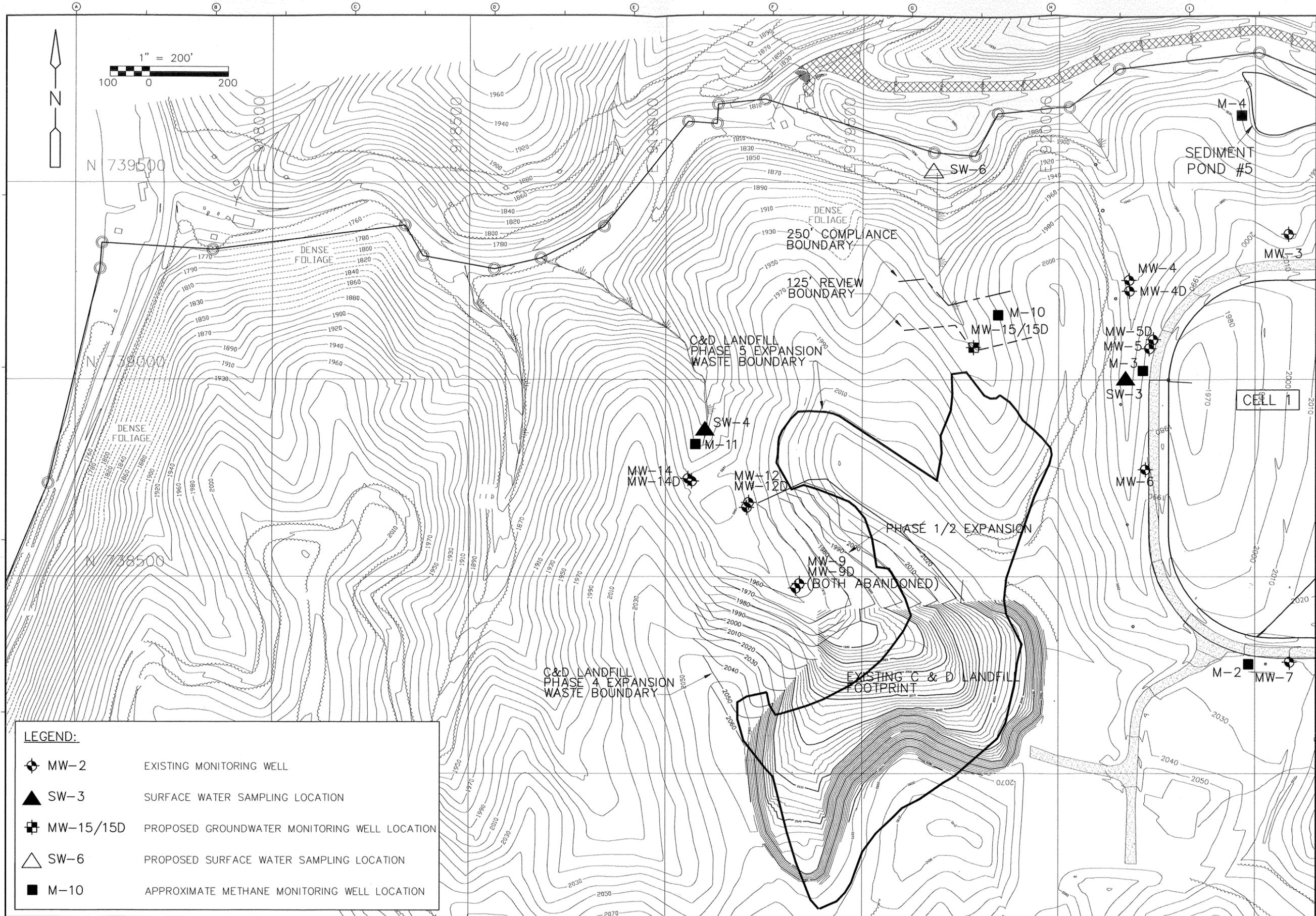
** Survey data pending

Table 2
Methane Monitoring Well Installation - Subtitle D and C&D Landfills
Buncombe County Solid Waste Management Facility

Methane Well I.D.	Landfill Monitored	Date	% CH ₄	% CO ₂	% O ₂	% LEL
M-3	Subtitle D	10/28/2009	0	0.2	20.2	0
M-4	Subtitle D	10/28/2009	0	0.3	20.1	0
M-10	C&D	10/28/2009	0	0.1	20.4	0
M-11	C&D	10/28/2009	0	0.2	20.3	0

Notes:

1. LEL - Lower Explosive Limit
2. CH₄ - Methane, CO₂ - Carbon Dioxide, O₂ - Oxygen
3. Barometric pressure at time of readings = 29.63 inches of mercury (1,003 millibars)



LEGEND:

	MW-2	EXISTING MONITORING WELL
	SW-3	SURFACE WATER SAMPLING LOCATION
	MW-15/15D	PROPOSED GROUNDWATER MONITORING WELL LOCATION
	SW-6	PROPOSED SURFACE WATER SAMPLING LOCATION
	M-10	APPROXIMATE METHANE MONITORING WELL LOCATION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. COLONE
 DRAWN BY: J. KILLINGSWORTH
 SHEET CHK'D BY: _____
 CROSS CHK'D BY: _____
 APPROVED BY: _____
 DATE: NOVEMBER 2009

CDM Camp Dresser & McKee
 3450 Emerald Avenue, Suite 300
 Raleigh, North Carolina 27612
 Tel: (919) 787-5620 Fax: (919) 787-5730

BUNCOMBE COUNTY
 NORTH CAROLINA
METHANE MONITORING

METHANE MONITORING WELL LOCATIONS

PROJECT NO. 6447-65973
 FILE NAME: METHANE FIG 1.dwg
 SHEET NO. 1



FIELD BOREHOLE LOG

BOREHOLE NO.: M-3

TOTAL DEPTH: 35'

PROJECT INFORMATION

DRILLING INFORMATION

PROJECT: **Buncombe County Methane Well Installation**
 SITE LOCATION: **85 Panther Branch Road, Alexander, NC**
 JOB NO: **6447-73768**
 GEOLOGIST: **Dan Forbes**
 DATE DRILLED: **10/28/09**

DRILLING CO: **SAEDACCO**
 DRILLER: **Stefan Smith**
 RIG TYPE: **Diedrich D-50**
 METHOD OF DRILLING: **8.25" Hollow-Stem Auger**
 SAMPLING METHODS: **Split-Spoon**
 HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
0						Locking, Above Grade Protective Cover
						Cement Grout
						Bentonite
						2-inch Schedule 40 PVC Riser
-5		SILTY SAND: SAPROLITE, granular weathered rock from 4.5-5, 9.25-9.75, and 12-17 feet, brown with a little orangish brown, fine-grained, micaceous, loose to dense, moist	S1 (3-5)	2-2-4-7 (24")		#2 Silica Sand Filter Pack
-10			S2 (8-10)	21-19-17-13 (20")		
-15			S3 (13-15)	2-4-5-5 (24")		Schedule 40 PVC Screen, 0.010" Slot, from 5' to 35' bls
		SILT: some fine-grained SAND, trace weathered rock, brown with a little orangish brown, micaceous, loose to medium dense, moist	S4 (18-20)	1-3-4-5 (24")		

Notes:



FIELD BOREHOLE LOG

BOREHOLE NO.: M-3

TOTAL DEPTH: 35'

PROJECT INFORMATION

PROJECT: **Buncombe County Methane Well Installation**
 SITE LOCATION: **85 Panther Branch Road, Alexander, NC**
 JOB NO: **6447-73768**
 GEOLOGIST: **Dan Forbes**
 DATE DRILLED: **10/28/09**

DRILLING INFORMATION

DRILLING CO: **SAEDACCO**
 DRILLER: **Stefan Smith**
 RIG TYPE: **Diedrich D-50**
 METHOD OF DRILLING: **8.25" Hollow-Stem Auger**
 SAMPLING METHODS: **Split-Spoon**
 HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
-20						
-25			S5 (23-25)	1-3-5-9 (24")		#2 Silica Sand Filter Pack
-30			S6 (28-30)	2-4-6-8 (22")		
-35		SILTY SAND: trace weathered rock, brown with a little orangish brown, fine-grained, micaceous, medium dense, moist	S7 (33-35)	5-7-6-13 (20")		Schedule 40 PVC Screen, 0.010" Slot, from 5' to 35' bls

Notes:



FIELD BOREHOLE LOG

BOREHOLE NO.: M-4

TOTAL DEPTH: 9'

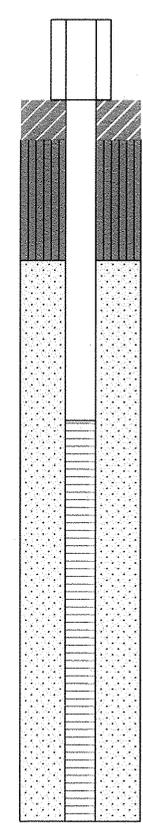
PROJECT INFORMATION

PROJECT: Buncombe County Methane Well Installation
 SITE LOCATION: 85 Panther Branch Road, Alexander, NC
 JOB NO: 6447-73768
 GEOLOGIST: Dan Forbes
 DATE DRILLED: 10/28/09

DRILLING INFORMATION

DRILLING CO: SAEDACCO
 DRILLER: Stefan Smith
 RIG TYPE: Diedrich D-50
 METHOD OF DRILLING: 8.25" Hollow-Stem Auger
 SAMPLING METHODS: Split-Spoon
 HAMMER WT./DROP: 140 lb., 30 in.

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
0						Locking, Above Grade Protective Cover
		SILT: some fine-grained SAND, SAPROLITE transitioning to PARTIALLY WEATHERED ROCK at 7 feet, very light brown to brown, micaceous, medium dense to dense, dry to moist				Cement Grout
						Bentonite
						2-inch Schedule 40 PVC Riser
-5		(Assumed lithology from 7 to 9 feet due to poor recovery)	S1 (4-6)	8-10-18-25 (24")		#2 Silica Sand Filter Pack
-10			S2 (9-11)	50/2 (2")		Schedule 40 PVC Screen, 0.010" Slot, from 4' to 9' bls



Notes:



FIELD BOREHOLE LOG

BOREHOLE NO.: M-10

TOTAL DEPTH: 15'

PROJECT INFORMATION

PROJECT: **Buncombe County Methane Well Installation**
 SITE LOCATION: **85 Panther Branch Road, Alexander, NC**
 JOB NO: **6447-73768**
 GEOLOGIST: **Dan Forbes**
 DATE DRILLED: **10/27/09**

DRILLING INFORMATION

DRILLING CO: **SAEDACCO**
 DRILLER: **Stefan Smith**
 RIG TYPE: **Diedrich D-50**
 METHOD OF DRILLING: **8.25" Hollow-Stem Auger**
 SAMPLING METHODS: **Split-Spoon**
 HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
0						Locking, Above Grade Protective Cover
		SAND: some SILT, SAPROLITE transitioning to PARTIALLY WEATHERED ROCK at 5.5 feet, brown with some orangish brown, fine-grained, trace of weathered rock, dense, moist to wet				Cement Grout
		(Assumed lithology from 7 to 15 feet due to poor recovery)				Bentonite
-5			S1 (4-6)	4-18-25-50/5 (20")		2-inch Schedule 40 PVC Riser
-10			S2 (9-11)	50/5 (2")		#2 Silica Sand Filter Pack
-15			S3 (14-16)	50/5 (2")		Schedule 40 PVC Screen, 0.010" Slot, from 5' to 15' bls

Notes: Light to Heavy Rain during Installation



FIELD BOREHOLE LOG

BOREHOLE NO.: M-11

TOTAL DEPTH: 10'

PROJECT INFORMATION

DRILLING INFORMATION

PROJECT: Buncombe County Methane Well Installation
 SITE LOCATION: 85 Panther Branch Road, Alexander, NC
 JOB NO: 6447-73768
 GEOLOGIST: Dan Forbes
 DATE DRILLED: 10/27/09

DRILLING CO: SAEDACCO
 DRILLER: Stefan Smith
 RIG TYPE: Diedrich D-50
 METHOD OF DRILLING: 8.25" Hollow-Stem Auger
 SAMPLING METHODS: Split-Spoon
 HAMMER WT./DROP: 140 lb., 30 in.

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
0		SILT: some fine-grained SAND, SAPROLITE transitioning to PARTIALLY WEATHERED ROCK at 5.5 feet, brown, dense, moist to wet				Locking, Above Grade Protective Cover
						Cement Grout
						Bentonite
						2-inch Schedule 40 PVC Riser
-5		(Assumed lithology from 7 to 10 feet due to poor recovery)	S1 (4-6)	11-17-27-50/5 (17")		#2 Silica Sand Filter Pack
-10			S2 (9-11)	50/3 (2")		Schedule 40 PVC Screen, 0.010" Slot, from 5' to 10' bls

Notes: Light to Heavy Rain during Installation



NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION # 3576

#7764

1. WELL CONTRACTOR:

Stefan Smith

Well Contractor (Individual) Name

SAEDACCO Inc

Well Contractor Company Name

STREET ADDRESS: 9088 Northfield Drive

Fort Mill SC 29707
City or Town State Zip Code

(704) 622-6920
Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) M11

STATE WELL PERMIT # (if applicable)

DWQ or OTHER PERMIT # (if applicable)

WELL USE (Check Applicable Box) Monitoring Municipal/Public

Industrial/Commercial Agricultural Recovery Injection

Irrigation Other (list use)

DATE DRILLED 10-27-09

TIME COMPLETED 1:00 AM PM

3. WELL LOCATION:

CITY: Alexander COUNTY: Buncombe

85 Panther Branch Road, Alexander, NC 28701

(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other
(check appropriate box)

LATITUDE

LONGITUDE

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: GPS Topographic map

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

4. FACILITY: Is the name of the business where the well is located.

FACILITY ID # (if applicable)

NAME OF FACILITY: Buncombe County Landfill

STREET ADDRESS: 85 Panther Branch Road

Alexander NC 28701
City or Town State Zip Code

CONTACT PERSON: Dan Forbes

MAILING ADDRESS

Raleigh NC
City or Town State Zip Code

(919) 943-2346
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 10

b. DOES WELL REPLACE EXISTING WELL? YES NO

c. WATER LEVEL Below Top of Casing: 0 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3 FT. Above Land Surface

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

e. YIELD (gpm): METHOD OF TEST

f. DISINFECTION: Type Amount

g. WATER ZONES (depth):

From To From To

From To From To

From To From To

6. CASING:

Depth Diameter Thickness/Weight Material
From 0 To 5 Ft. 2 40 PVC

From To Ft.

From To 0 Ft.

7. GROUT:

Depth Material Method

From 0 To 3 Ft. Bentonite Pour

From To Ft.

From To Ft.

8. SCREEN:

Depth Diameter Slot Size Material

From 5 To 10 Ft. 2 in. 010 in. PVC

From To Ft. in. in.

From To Ft. in. in.

9. SAND/GRAVEL PACK:

Depth Size Material

From 3 To 10 Ft. Pour Sand

From To Ft.

From To Ft.

10. DRILLING LOG

From To Formation Description

0 10 Silt/PWR

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.

Stefan Smith 11-2-09
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Stefan Smith
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt. 1817 Mail Service Center - Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b Rev. 7/06