



July 12, 2011

Ms. Elizabeth S. Werner
Hydrogeologist
NCDENR DWM Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: **Landfill Gas Well Installation/Abandonment Report
With Revised Landfill Gas Monitoring Plan
Chatham County Closed MSW Landfill
Pittsboro, North Carolina**

Dear Ms. Werner:

Richardson, Smith, Gardner, and Associates Inc. (RSG) is submitting this letter on behalf of Chatham County to document modifications to the landfill gas monitoring network at the closed Chatham County Landfill conducted on May 16, 2011.

Due to elevated concentrations of landfill gas detected in the previously installed landfill gas monitoring network, RSG submitted a request on April 21, 2011 to perform the following:

1. Abandon five (5) of landfill gas monitoring wells MP-9, MP-13, MP-14, MP-16 and MP-17 due to their close proximity to the waste unit.
2. Installation of two (2) permanent LFG monitoring wells, MP-18 and MP-19.
3. Revision of the Chatham County LFG monitoring plan to include the new wells in the monitoring network and remove reference to the abandoned wells.

This request was approved on April 25, 2011. The well locations are shown on the attached **Figure 1**.

On May 16, 2011, wells MP-9 (16'), MP-13 (21'), MP-14 (21'), MP-16 (21') and MP-17 (31') were abandoned in accordance with 15A NCAC 2C.0113 for permanent abandonment of monitoring wells by Vince Federle, a licensed driller (#3552) with Geologic Exploration, Inc., under the supervision of RSG personnel. For this abandonment, grout was injected via tremie-pipe to fill the well from bottom to top. These wells did not have concrete pads or steel casings present at the time of abandonment. The PVC stick-ups were cut flush with the ground surface. The well abandonment records are included in **Attachment 1**.

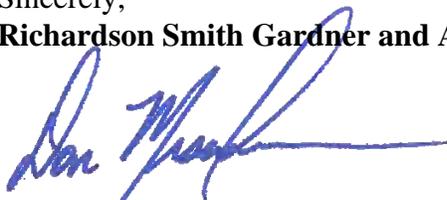
A track-mounted Geoprobe drill rig was used to install wells MP-18 and MP-19. In both instances, hollow stem augers were advanced to the approximate depth of groundwater for the probe installation.

Each well consists of a 2-inch diameter PVC screened interval and solid riser pipe with appropriate sand pack and bentonite plug in the annular space. Each well was completed with a well cap suitable for landfill gas monitoring and outer protective steel casing. The landfill gas well installations are summarized in **Table 1**, while the boring logs and well completion records for the wells are included in **Attachment 1**.

The LFG Monitoring Plan has been revised to include these latest well installations and is included as **Attachment 2** for review. This plan is written in accordance with NCDENR's Landfill Gas Monitoring Guidance Document (2010).

If you have any questions, or require additional information, please contact us at your earliest convenience at 919-828-0577 or by e-mail (address below).

Sincerely,
Richardson Smith Gardner and Associates, Inc.



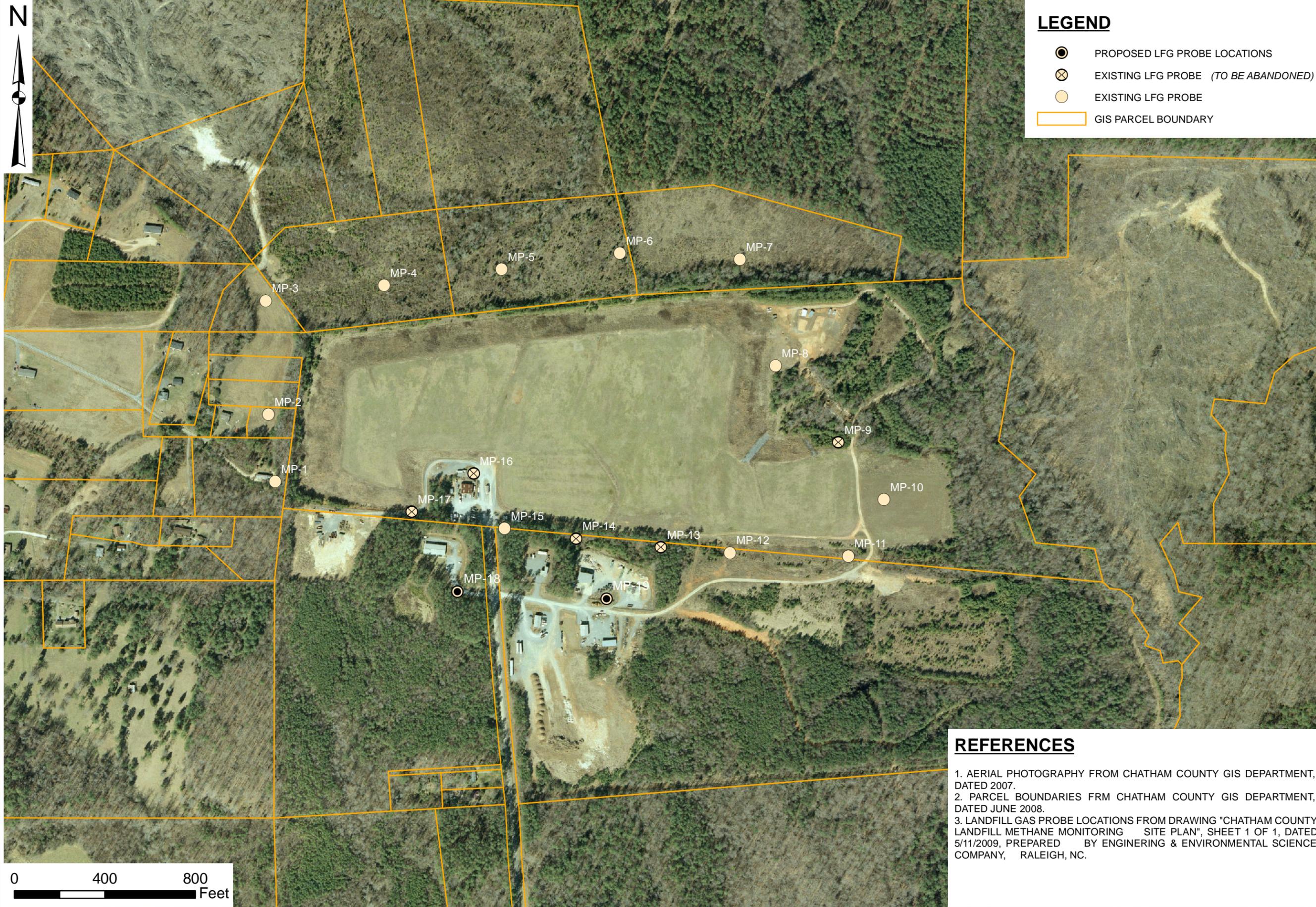
Don Misenheimer
Project Scientist
don@rsgengineers.com ext. 224



Joan A. Smyth, P.G.
Senior Hydrogeologist
joan@rsgengineers.com ext. 221

Attachments
CC: Dan LaMontagne – Chatham County
File

Figures



LEGEND

- PROPOSED LFG PROBE LOCATIONS
- ⊗ EXISTING LFG PROBE (TO BE ABANDONED)
- EXISTING LFG PROBE
- ▭ GIS PARCEL BOUNDARY



REFERENCES

1. AERIAL PHOTOGRAPHY FROM CHATHAM COUNTY GIS DEPARTMENT, DATED 2007.
2. PARCEL BOUNDARIES FRM CHATHAM COUNTY GIS DEPARTMENT, DATED JUNE 2008.
3. LANDFILL GAS PROBE LOCATIONS FROM DRAWING "CHATHAM COUNTY LANDFILL METHANE MONITORING SITE PLAN", SHEET 1 OF 1, DATED 5/11/2009, PREPARED BY ENGINEERING & ENVIRONMENTAL SCIENCE COMPANY, RALEIGH, NC.



FIGURE NO.

1

SCALE:

AS SHOWN

CHECKED BY:

J.A.S.

DRAWN BY:

C.T.J.

PROJECT NO.

CHATHAM 11-1

FILE NAME

CHATHAM-B0025

DATE:

MAR. 2011

TITLE:
LFG MONITORING PROPOSED NETWORK
CLOSED CHATHAM COUNTY
MSW LANDFILL
PITTSBORO, NORTH CAROLINA

Tables



By: DMM
 Date: 6/1/2011
 Ckd By: JAS

TABLE 1
Landfill Gas Monitoring Well Construction
Chatham County Closed MSW Landfill
Pittsboro, North Carolina

MONITORING POINT	BORING DEPTH (ft bg)	DEPTH INTERVAL (ft bg)			
		SCREEN (ft)		BENTONITE PLUG (ft bg)	GROUTED INTERVAL(ft bg)
		INTERVAL	LENGTH		
MP-18	25.0	5' - 25'	20	3' - 4'	0' - 3'
MP-19	20.0	5' - 20'	15	3' - 4'	0' - 3'

Notes: All wells are 2-inch diameter wells.

Attachment 1



NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
 Well Contractor (Individual) Name
GEOLOGIC EXPLORATION, INC
 Well Contractor Company Name
176 COMMERCE BLVD
 Street Address
STATESVILLE NC 28625
 City or Town State Zip Code
 (704) 872-7686
 Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A
 OTHER ASSOCIATED PERMIT#(if applicable) _____
 SITE WELL ID #(if applicable) MP-18

3. WELL USE (Check One Box) Monitoring Municipal/Public
 Industrial/Commercial Agricultural Recovery Injection
 Irrigation Other (list use) _____
 DATE DRILLED 05/16/11

4. WELL LOCATION:

720 COUNTY LANDFILL ROAD 27312
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
 CITY: PITTSBORO COUNTY CHATHAM
 TOPOGRAPHIC / LAND SETTING: (check appropriate box)
 Slope Valley Flat Ridge Other _____
 LATITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 LONGITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 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)

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

CHATHAM COUNTY LANDFILL N/A
 Facility Name Facility ID# (if applicable)
720 COUNTY LANDFILL ROAD
 Street Address
PITTSBORO NC 27312
 City or Town State Zip Code
CHATHAM CO SOLID WASTE MGT
 Contact Name
720 COUNTY LANDFILL ROAD
 Mailing Address
PITTSBORO NC 27312
 City or Town State Zip Code

() _____
 Area code Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 25.0 FEET
 b. DOES WELL REPLACE EXISTING WELL? YES NO
 c. WATER LEVEL Below Top of Casing: DRY FT.
 (Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2.5 FT. Above Land Surface*
 *Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

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

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

g. WATER ZONES (depth):
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____

7. CASING: Depth Diameter Thickness/ Weight Material
 Top 0.0 Bottom 5.0 Ft. 2 INCH SCH 40 PVC
 Top _____ Bottom _____ Ft. _____ _____ _____
 Top _____ Bottom _____ Ft. _____ _____ _____

8. GROUT: Depth Material Method
 Top 0.0 Bottom 3.0 Ft. PORTLAND BENTONITE SLURRY
 Top _____ Bottom _____ Ft. _____ _____
 Top _____ Bottom _____ Ft. _____ _____

9. SCREEN: Depth Diameter Slot Size Material
 Top 5.0 Bottom 25.0 Ft. 2.0 in. .010 in. PVC
 Top _____ Bottom _____ Ft. _____ in. _____ in. _____
 Top _____ Bottom _____ Ft. _____ in. _____ in. _____

10. SAND/GRAVEL PACK: Depth Size Material
 Top 4.0 Bottom 25.0 Ft. 20-40 FINE SILICA SAND
 Top _____ Bottom _____ Ft. _____ _____
 Top _____ Bottom _____ Ft. _____ _____

11. DRILLING LOG
 Top Bottom Formation Description
0.0 / 1.0 TOPSOIL
1.0 / 25.0 TAN SANDY CLAYEY SILT
 _____ / _____ _____
 _____ / _____ _____
 _____ / _____ _____
 _____ / _____ _____
 _____ / _____ _____
 _____ / _____ _____
 _____ / _____ _____

12. REMARKS:
BENTONITE SEAL FROM 3.0 TO 4.0 FEET

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.
Vincent R. Federle 05/24/11
 SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE
VINCE FEDERLE
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL

site

County landfill Rd.

HWY 104



NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
 Well Contractor (Individual) Name
GEOLOGIC EXPLORATION, INC
 Well Contractor Company Name
176 COMMERCE BLVD
 Street Address
STATESVILLE NC 28625
 City or Town State Zip Code
 (704) 872-7686
 Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A
 OTHER ASSOCIATED PERMIT#(if applicable) _____
 SITE WELL ID #(if applicable) MP-19

3. WELL USE (Check One Box) Monitoring Municipal/Public
 Industrial/Commercial Agricultural Recovery Injection
 Irrigation Other (list use) _____
 DATE DRILLED 05/16/11

4. WELL LOCATION:

720 COUNTY LANDFILL ROAD 27312
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
 CITY: PITTSBORO COUNTY CHATHAM
 TOPOGRAPHIC / LAND SETTING: (check appropriate box)
 Slope Valley Flat Ridge Other _____
 LATITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 LONGITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 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)

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

CHATHAM COUNTY LANDFILL N/A
 Facility Name Facility ID# (if applicable)
720 COUNTY LANDFILL ROAD
 Street Address
PITTSBORO NC 27312
 City or Town State Zip Code
CHATHAM CO SOLID WASTE MGT
 Contact Name
720 COUNTY LANDFILL ROAD
 Mailing Address
PITTSBORO NC 27312
 City or Town State Zip Code

() _____
 Area code Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 20.0 FEET
 b. DOES WELL REPLACE EXISTING WELL? YES NO
 c. WATER LEVEL Below Top of Casing: DRY FT.
 (Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2.5 FT. Above Land Surface*
 *Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

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

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

g. WATER ZONES (depth):
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____

7. CASING:	Depth	Diameter	Thickness/Weight	Material
Top	<u>0.0</u>	Bottom <u>5.0</u>	Ft. <u>2 INCH</u>	<u>SCH 40 PVC</u>
Top	_____	Bottom _____	Ft. _____	_____
Top	_____	Bottom _____	Ft. _____	_____

8. GROUT:	Depth	Material	Method
Top	<u>0.0</u>	Bottom <u>3.0</u>	Ft. <u>PORTLAND BENTONITE</u> <u>SLURRY</u>
Top	_____	Bottom _____	Ft. _____
Top	_____	Bottom _____	Ft. _____

9. SCREEN:	Depth	Diameter	Slot Size	Material
Top	<u>5.0</u>	Bottom <u>20.0</u>	Ft. <u>2.0 in.</u>	<u>.010 in. PVC</u>
Top	_____	Bottom _____	Ft. _____	_____
Top	_____	Bottom _____	Ft. _____	_____

10. SAND/GRAVEL PACK:	Depth	Size	Material
Top	<u>4.0</u>	Bottom <u>20.0</u>	Ft. <u>20-40</u> <u>FINE SILICA SAND</u>
Top	_____	Bottom _____	Ft. _____
Top	_____	Bottom _____	Ft. _____

11. DRILLING LOG	Top	Bottom	Formation Description
	<u>0.0</u>	<u>1.0</u>	<u>TOPSOIL</u>
	<u>1.0</u>	<u>20.0</u>	<u>ORANGE CLAYEY SILT</u>
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

12. REMARKS:
BENTONITE SEAL FROM 3.0 TO 4.0 FEET

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.

Vincent R. Federle

SIGNATURE OF CERTIFIED WELL CONTRACTOR 05/24/11
 DATE

VINCE FEDERLE
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL

site

County Landfill Rd

Hwy 64

10/10/10



WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.
Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625
City or Town State Zip Code

(704) - 872-7686
Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) MP-9

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): Monitoring Residential

Municipal/Public Industrial/Commercial Agricultural

Recovery Injection Irrigation

Other (list use) _____

3. WELL LOCATION:

COUNTY CHATHAM QUADRANGLE NAME _____

NEAREST TOWN: PITTSBORO

720 COUNTY LANDFILL ROAD 27312
(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other _____

(Check appropriate setting)

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.)

4a. FACILITY- The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY CHATHAM COUNTY LANDFILL

STREET ADDRESS 720 COUNTY LANDFILL ROAD

PITTSBORO NC 27312
City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME CHATHAM CO SOLID WASTE MGT

STREET ADDRESS 720 COUNTY LANDFILL ROAD PITTSBORO, NC 27312

5. WELL DETAILS:

a. Total Depth: 16.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING:

a. Casing Depth (if known): N/A ft. _____ in.

b. Casing Removed: N/A ft. _____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Cement ____ lb.

Water ____ gal.

Sand Cement

Cement ____ lb.

Water ____ gal.

Bentonite

Bentonite _____ lb.

Type: Slurry Pellets

Water _____ gal.

Other

Type material PORTLAND BENTONITE SLURRY

Amount 2.75 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 5/16/11

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

Vincent R. Federle

05/24/11

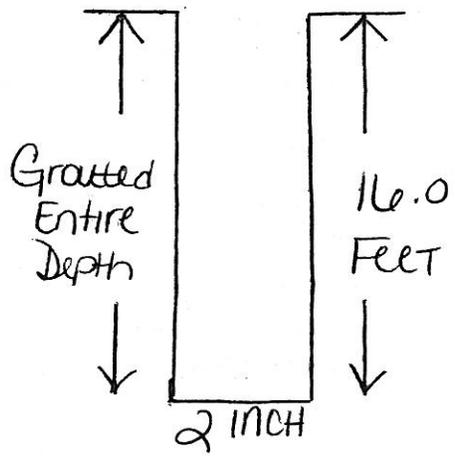
SIGNATURE OF CERTIFIED WELL CONTRACTOR

DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

VINCE FEDERLE

PRINTED NAME OF PERSON ABANDONING THE WELL



Grouted & sealed



WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE

Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.

Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625

City or Town State Zip Code

(704) - 872-7686

Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) MP-13

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): Monitoring Residential

Municipal/Public Industrial/Commercial Agricultural

Recovery Injection Irrigation

Other (list use) _____

3. WELL LOCATION:

COUNTY CHATHAM QUADRANGLE NAME _____

NEAREST TOWN: PITTSBORO

720 COUNTY LANDFILL ROAD 27312

(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other _____

(Check appropriate setting)

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.)

4a. FACILITY- The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY CHATHAM COUNTY LANDFILL

STREET ADDRESS 720 COUNTY LANDFILL ROAD

PITTSBORO NC 27312

City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME CHATHAM CO SOLID WASTE MGT

STREET ADDRESS 720 COUNTY LANDFILL ROAD PITTSBORO, NC 27312

5. WELL DETAILS:

a. Total Depth: 21.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING:

a. Casing Depth (if known): N/A ft. _____ in.

b. Casing Removed: N/A ft. _____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Cement -- _____ lb.
Water -- _____ gal.

Sand Cement

Cement -- _____ lb.
Water -- _____ gal.

Bentonite

Bentonite _____ lb.
Type: Slurry Pellets
Water _____ gal.

Other

Type material PORTLAND BENTONITE SLURRY

Amount 3.5 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 5/16/11

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

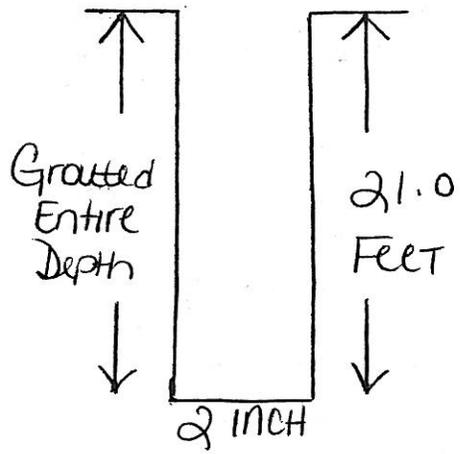
Vincent R. Federle
SIGNATURE OF CERTIFIED WELL CONTRACTOR

05/24/11
DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

VINCE FEDERLE

PRINTED NAME OF PERSON ABANDONING THE WELL



Sketch of channel



WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
Well Contractor (Individual) Name

Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.
Well Contractor Company Name

Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625
City or Town State Zip Code

City or Town State Zip Code

(704) - 872-7686
Area code - Phone number

Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) MP-14

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): Monitoring Residential

Municipal/Public Industrial/Commercial Agricultural

Recovery Injection Irrigation

Other (list use) _____

3. WELL LOCATION:

COUNTY CHATHAM QUADRANGLE NAME _____

NEAREST TOWN: PITTSBORO

720 COUNTY LANDFILL ROAD 27312
(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other _____

(Check appropriate setting)

LATITUDE _____

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

LONGITUDE _____

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.)

4a. FACILITY - The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY CHATHAM COUNTY LANDFILL

STREET ADDRESS 720 COUNTY LANDFILL ROAD

PITTSBORO NC 27312
City or Town State Zip Code

City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME CHATHAM CO SOLID WASTE MGT

STREET ADDRESS 720 COUNTY LANDFILL ROAD PITTSBORO, NC 27312

5. WELL DETAILS:

a. Total Depth: 21.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING: Length Diameter

a. Casing Depth (if known): N/A ft. _____ in.

b. Casing Removed: N/A ft. _____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Sand Cement

Cement _____ lb.

Cement _____ lb.

Water _____ gal.

Water _____ gal.

Bentonite

Bentonite _____ lb.

Type: Slurry Pellets

Water _____ gal.

Other

Type material PORTLAND BENTONITE SLURRY

Amount 3.5 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 5/16/11

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

Vincent R. Federle

05/24/11

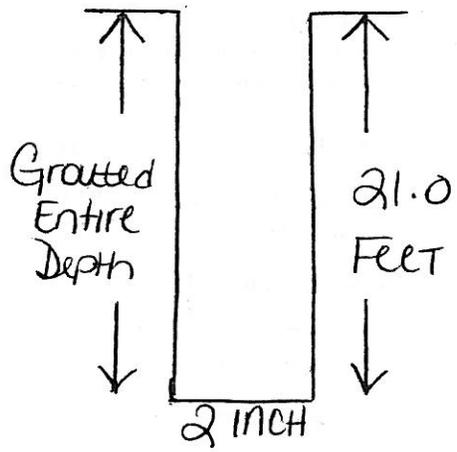
SIGNATURE OF CERTIFIED WELL CONTRACTOR

DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

VINCE FEDERLE

PRINTED NAME OF PERSON ABANDONING THE WELL





WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.
Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625
City or Town State Zip Code

(704) - 872-7686
Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) MP-16

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): Monitoring Residential
 Municipal/Public Industrial/Commercial Agricultural
 Recovery Injection Irrigation
 Other (list use) _____

3. WELL LOCATION:

COUNTY CHATHAM QUADRANGLE NAME _____

NEAREST TOWN: PITTSBORO

720 COUNTY LANDFILL ROAD 27312
(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other _____
(Check appropriate setting)

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.)

4a. FACILITY- The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY CHATHAM COUNTY LANDFILL

STREET ADDRESS 720 COUNTY LANDFILL ROAD

PITTSBORO NC 27312
City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME CHATHAM CO SOLID WASTE MGT

STREET ADDRESS 720 COUNTY LANDFILL ROAD PITTSBORO, NC 27312

5. WELL DETAILS:

a. Total Depth: 21.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.
Measuring point is _____ ft. above land surface.

6. CASING:

a. Casing Depth (if known): N/A ft. _____ in.

b. Casing Removed: N/A ft. _____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement **Sand Cement**
Cement -- _____ lb. Cement -- _____ lb.
Water -- _____ gal. Water -- _____ gal.

Bentonite
Bentonite _____ lb.
Type: Slurry Pellets
Water _____ gal.

Other
Type material PORTLAND BENTONITE SLURRY
Amount 3.5 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 5/16/11

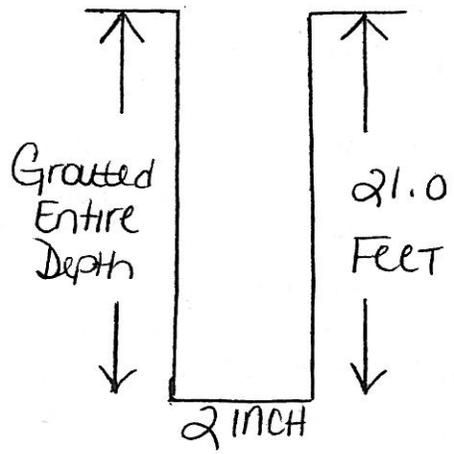
I DO HEREBY CERTIFY THAT THIS WELL WAS ABANDONED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Vincent R. Federle

SIGNATURE OF CERTIFIED WELL CONTRACTOR 05/24/11
DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

VINCE FEDERLE
PRINTED NAME OF PERSON ABANDONING THE WELL





WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE

Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.

Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625

City or Town State Zip Code

(704) - 872-7686

Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) MP-17

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): Monitoring Residential

Municipal/Public Industrial/Commercial Agricultural

Recovery Injection Irrigation

Other (list use) _____

3. WELL LOCATION:

COUNTY CHATHAM QUADRANGLE NAME _____

NEAREST TOWN: PITTSBORO

720 COUNTY LANDFILL ROAD 27312

(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

Slope Valley Flat Ridge Other _____

(Check appropriate setting)

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.)

4a. FACILITY- The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY CHATHAM COUNTY LANDFILL

STREET ADDRESS 720 COUNTY LANDFILL ROAD

PITTSBORO NC 27312

City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME CHATHAM CO SOLID WASTE MGT

STREET ADDRESS 720 COUNTY LANDFILL ROAD PITTSBORO, NC 27312

5. WELL DETAILS:

a. Total Depth: 31.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING:

Length Diameter

a. Casing Depth (if known): N/A ft. _____ in.

b. Casing Removed: N/A ft. _____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Sand Cement

Cement -- _____ lb.

Cement -- _____ lb.

Water -- _____ gal.

Water -- _____ gal.

Bentonite

Bentonite _____ lb.

Type: Slurry Pellets

Water _____ gal.

Other

Type material PORTLAND BENTONITE SLURRY

Amount 5.0 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 5/16/11

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

Vincent R. Federle

05/24/11

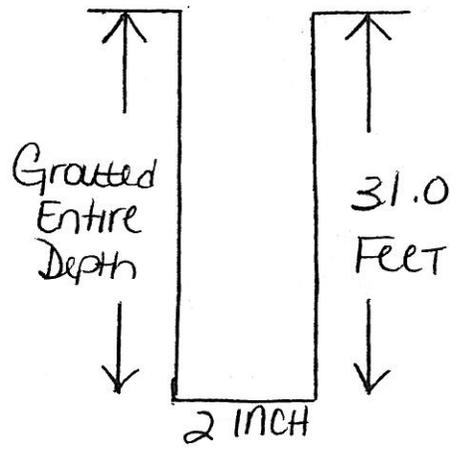
SIGNATURE OF CERTIFIED WELL CONTRACTOR

DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE (The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

VINCE FEDERLE

PRINTED NAME OF PERSON ABANDONING THE WELL



Attachment 2

LANDFILL GAS MONITORING PLAN

**Chatham County Closed MSW Landfill
Pittsboro, North Carolina
NC Solid Waste Permit No. 19-01**

Prepared for:

**Chatham County
Pittsboro, North Carolina**

Prepared by:



14 N. BOYLAN AVENUE
RALEIGH, NORTH CAROLINA 27603
NC LICENSE NO. C-0828 (ENGINEERING)

June 2011



PRINTED ON 100% RECYCLED PAPER

LANDFILL GAS MONITORING PLAN

Chatham County Closed MSW Landfill Ingalls, North Carolina NC Solid Waste Permit No. 19-01

Prepared for:

Chatham County
Pittsboro, North Carolina

RSG Project No. **Chatham 11-2**

The landfill gas monitoring plan for this facility has been prepared by a qualified geologist or engineer who is licensed to practice in the State of North Carolina. The plan has been prepared based on first-hand knowledge of site conditions and familiarity with North Carolina solid waste rules and industry standard protocol. This certification is made in accordance with North Carolina Solid Waste Regulations, indicating this Landfill Gas Monitoring Plan should provide early detection of a landfill gas release into the soils surrounding the landfill, so as to be protective of public health and the environment. No other warranties, expressed or implied, are made.



Joan A. Smyth, P.G.
Senior Hydrogeologist



June 2011



14 N. BOYLAN AVENUE
RALEIGH, NORTH CAROLINA 27603
NC LICENSE NO. C-0828 (ENGINEERING)



PRINTED ON 100% RECYCLED PAPER

**CHATHAM COUNTY LANDFILL
NC SOLID WASTE PERMIT NO. 19-01**

**LANDFILL GAS MONITORING PLAN
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FIGURES

 Figure 1 Site Plan

APPENDICES

 Appendix A Letter of Closure
 Appendix B Boring Logs
 Appendix C Landfill Gas Reporting Forms

CHATHAM COUNTY LANDFILL
NC SOLID WASTE PERMIT NO. 19-01

LANDFILL GAS MONITORING PLAN

1.0 INTRODUCTION

1.1 Project Description

This Landfill Gas Monitoring Plan (Plan) has been prepared by Richardson Smith Gardner & Associates, Inc. (RSG) to present a comprehensive landfill gas (LFG) monitoring program at the closed Chatham County MSW Landfill (NC Solid Waste Permit 19-01). The site is located at 720 County Landfill Road in Pittsboro, North Carolina . The proposed plan presents the rationale for the monitoring program as well as necessary actions required by the Owner to protect and safeguard the area surrounding the landfill and to satisfy North Carolina Solid Waste Management Rules [13B.0503(2)(a)] for monitoring and controlling LFG.

At a minimum, these regulations require owners of landfills to ensure that the facility does not exceed:

- *25% of the lower explosive limit (LEL) or 1.25% CH₄ by volume in structures; and*
- *100% of the LEL or 5% CH₄ by volume at the facility property boundary.*

The Engineer has utilized the best available site data, practices, experience, and judgment to develop this plan. However, the program may require modifications and maintenance over time to accommodate changing landfill conditions, changing receptors in areas adjacent and around the landfill, or other conditions that cannot be fully anticipated. Maintenance suggestions are also included in this plan to assist in the identification of secondary conditions that may require updates to this Plan.

Uncontrolled migration of LFG can result in loss of property, loss of life, injury, vegetative damage and intolerable odors. The monitoring of landfills includes exposure to explosive gases. All operational and/or monitoring staff should be specifically trained in the management and response for situations such as fire or explosion, confined space, drilling, and overhead hazards, and possess and awareness of changing conditions around these sites.

1.2 Contact Information

In case of emergencies, or if questions arise during the implementation of this program, please contact the following:

1.2.1 Owner

Chatham County

Waste Management and Recycling

720 County Landfill Road

Pittsboro, NC 27312

Phone: (919) 542-5516

Mr. Dan LaMontagne, P.E., Director

Cell: (919) 548-9043

email: dan.lamontagne@chathamnc.org

1.2.2 Engineer

Richardson Smith Gardner & Associates, Inc.

14 N. Boylan Avenue

Raleigh, North Carolina 27603

Phone: (919) 828-0577

Ms. Joan A. Smyth, P.G., Senior Hydrogeologist

email: joan@rsgengineers.com

1.2.3 Solid Waste Regulatory Agency

North Carolina Department of Environment and Natural Resources

Division of Waste Management:

Raleigh Central Office (RCO)

401 Oberlin Road, Suite 150

Raleigh, North Carolina 27605

Phone: (919) 508-8400

Ms. Elizabeth S. Werner, Hydrogeologist

email: elizabeth.werner@ncdenr.gov

1.3 Existing Site Conditions

The Chatham County Municipal Solid Waste (MSW) Landfill is a closed landfill located approximately 0.75 miles North of the intersection of Highway 64 and County Landfill Road as shown in **Figure 1**. The facility operated from about 1973. until the time of its closure on

October 8th 1993. The original landfill property is approximately 79.65 acres with additional County properties located around it as shown in **Figure 1**.

1.3.1 Topography

The landfill site lies to the north of Hwy 64 between Pittsboro and Siler City. Existing ground surface elevations vary from approximately El. 440 (feet) at the eastern end to approximately El. 530 at the top of the closed MSW landfill. Currently, much of the surrounding area is undeveloped and wooded.

1.3.2 Adjacent Areas

The landfill site is bordered to the east by Harland's Creek and undeveloped property, to the north by undeveloped property, to the south by property owned by Chatham County and developed only with infrastructure for the landfill and Animal Shelter. The landfill is bounded to the west by private (manufactured) homes on large lots.

1.3.3 Site Soils Information

The native soil types at, and around the landfill are classified as the Georgeville-Davidson type soils. In general the soils detected during well installation consisted of silts and clays.

1.4 Regulatory Status

As previously mentioned, the Chatham County Landfill operated between 1973 and was closed in 1993. A copy of the letter of closure is included in **Appendix A**. This site is regulated under the 15A NCAC 13B.0500 (et. seq.) rules.

2.0 MONITORING PROGRAM

2.1 Perimeter Monitoring Network

2.1.1 Introduction

The monitoring network for the closed Chatham County landfill includes 14 installed LFG monitoring wells (MP-1 through MP-8, MP-10 through MP-12, MP-18 and MP-19) shown on **Figure 1**. The perimeter LFG monitoring system is designed with wells located to intercept potential migrating LFG.

2.1.2 Well Placement

The monitoring well locations have been evaluated based on the surrounding area conditions, soil types, location of waste on property, and nearby bodies of water. As described above:

- There are residences on properties located west of the site;
- The Chatham County Landfill property includes structures to the south of the landfill; and
- Shallow groundwater in the vicinity of Harland's Creek (a perennial stream) to the east will prevent the migration of LFG in this area.

2.1.3 *Monitoring Well Construction*

The LFG monitoring wells were installed using a Geoprobe™ rig and were constructed of two-inch diameter, manufactured PVC well screens with 10-slot per inch intake spacings. Wells were completed with two (2) to fifteen (15) feet of solid PVC riser pipe. A sand filter pack was placed around each screened interval, to a height of up to two (2) feet above the screen, and a hydrated bentonite plug of two (2) feet in thickness was placed above the sand pack to seal each well. A “female” Colder® type quick-connect (or equivalent) fitting was installed on the PVC portion of the well or in the cap as a monitoring port. Boring logs and well completion records are included in **Appendix B** of this plan.

2.2 **Monitoring and Reporting**

Monitoring and reporting of LFG gas concentrations shall be performed in accordance with guidance by the Division of Waste Management document “Landfill Gas Monitoring Guidance” and as outlined below.

2.2.1 *Frequency*

LFG monitoring will be completed on a quarterly basis. Monthly or more frequent monitoring may be necessary if concentrations are at the regulatory levels or demonstrate a pattern which indicate they may be approaching this limit.

2.2.2 *Personnel*

LFG monitoring will be performed by trained personnel knowledgeable of the LFG hazard and the use of explosive gas meters.

2.2.3 *Equipment*

The County currently retains an engineering firm to provide LFG monitoring at the site on the quarterly basis. For all monitoring events an appropriate LFG meter (such as a LandTec GEM 2000 or equivalent) that collects all the data required on the attached NCDENR monitoring form (**Appendix C**) shall be used for monitoring purposes.

All monitoring equipment should be regularly calibrated in accordance with manufacturers specifications and operated only as instructed.

2.2.4 *Procedures*

Each monitoring event should begin by calibrating the gas meter with a known calibration standard in accordance with manufacturer's recommendations and operated only as instructed.

Procedures for the LFG monitoring wells should include the following:

- Check calibration date on the meter;
 - Perform "bump test" against known gas concentration;
 - Connect tubing to sample port on the monitoring well without removing the cap;
 - Record data on the monitoring log form provided in **Appendix C**; and
 - If less than 50% LEL, move to next LFG monitoring well.
- * If explosive gas concentrations **equal to or greater than 50%** of the LEL in any of the LFG monitoring wells, personnel should implement Precautionary Action Plan located in **Section 2.2.5**.
- * IF EXPLOSIVE GAS CONCENTRATIONS EQUAL TO OR GREATER THAN 100% OF THE LEL IN ANY OF THE LFG MONITORING Wells, THE FOLLOWING ACTIONS SHALL BE TAKEN BY PERSONNEL:**
- (1) **Immediately** contact the Solid Waste Director.
 - (2) Recalibrate monitoring equipment and confirm results.
 - (3) If concentrations still exceed 100% LEL, Avery County and the Engineer will implement the Compliance Action Plan located in **Section 3.2**.

2.2.5 *Precautionary Action Plan*

If explosive gas concentrations are **equal to or greater than 50%** of the LEL in any of the LFG monitoring wells, personnel should perform the following additional steps:

- Monitor gas pressure in each well head (in inches of water) using magnehelic gauge or other appropriate metering device;
- Monitor initial gas concentration through sampling port;
- Open well cap and allow to stabilize for at least three (3) minutes;
- Monitor gas concentration inside well just below the top of casing; and
- Evaluate surrounding areas for potential receptors to or signs of LFG migration. LFG can stress vegetation, can kill trees and grass by root asphyxiation. Note any areas of stressed/dead vegetation on the monitoring form.

Monitoring should be completed in this manner for all wells with concentrations equal to or greater than 50% LEL during all monitoring events. This information should be recorded, kept in the operating record and reported to the Solid Waste Director and to the Engineer for further evaluation.

2.2.6 *Record Keeping*

All readings will be documented on the LFG monitoring log form provided in **Appendix C**. The completed forms will be reviewed and initialed by the County Solid Waste Director following each monitoring event and placed in the landfill operating records. The monitoring logs will remain on file with other landfill records in the landfill office at the 720 County Landfill Road. These readings should be available for review by NCDENR personnel upon request.

If readings above 100% LEL are measured, a copy of the LFG monitoring form and an Environmental Data Reporting Form also provided in **Appendix C** shall be submitted to NCDENR. A copy shall be kept in the landfill operating records.

2.3 Maintenance

In addition to the monitoring program, periodic maintenance and site observations shall be conducted to the program components as follows (at a minimum):

- Factory calibration of the gas meter;
- Maintaining access to monitoring wells and gas wells;
- Observing landfill cover conditions, potential erosion areas, landfill seeps, odors, etc.;
- Monitoring well maintenance such accessibility, operational locks, etc.

Any deficiencies shall be noted on the monitoring forms and reported to the Solid Waste Director for repair or replacement as necessary.

3.0 CONTINGENCY PLAN

3.1 Introduction

In the event explosive gas concentrations exceed safe levels (>100% LEL), a contingency plan is recommended and warranted. The contingency plan includes the specific step by step actions that should be implemented to protect human health and the environment.

3.2 Compliance Action Plan

If explosive gas concentrations **equal to or greater than 100%** of the LEL in any of the LFG monitoring wells, the following actions shall be taken by personnel:

3.2.1 Immediate Action Plan

The Solid Waste Director shall take immediate action to ensure the protection of human health and safety as follows:

- (1) Determine potential receptors surrounding the area of the site where the exceedance occurred;

- (2) If warranted by the degree of intensity of the LFG concentration, check the LFG concentrations in structures of receptors surrounding the site;
- (3) If further warranted by the degree of intensity (>25% LEL) of the LFG concentration in structures, evacuate the area;
- (4) If the degree of intensity in structures is >25% LEL, contact the County Fire Marshall;
- (5) Notify verbally the County Manager and NCDENR;
- (6) Investigate and identify the source(s) and conduit(s) for LFG migration that have caused the excessive readings (i.e. the path that the LFG is taking to the monitoring location);
- (7) Identify the extent of the LFG problem through additional wells or bar hole punch sampling methodology; and
- (8) As appropriate, begin to take corrective action to control the LFG levels in building(s) surrounding the landfill site.

3.2.2 *Reporting and Documentation*

Following the **Immediate Action Plan**, the County must take the following actions within seven (7) days:

- (1) Place documentation of the **Immediate Action Plan** in the operating records of the landfill; and,
- (2) Provide documentation of the **Immediate Action Plan** and a description of the steps taken to protect human health in writing to the NCDENR.

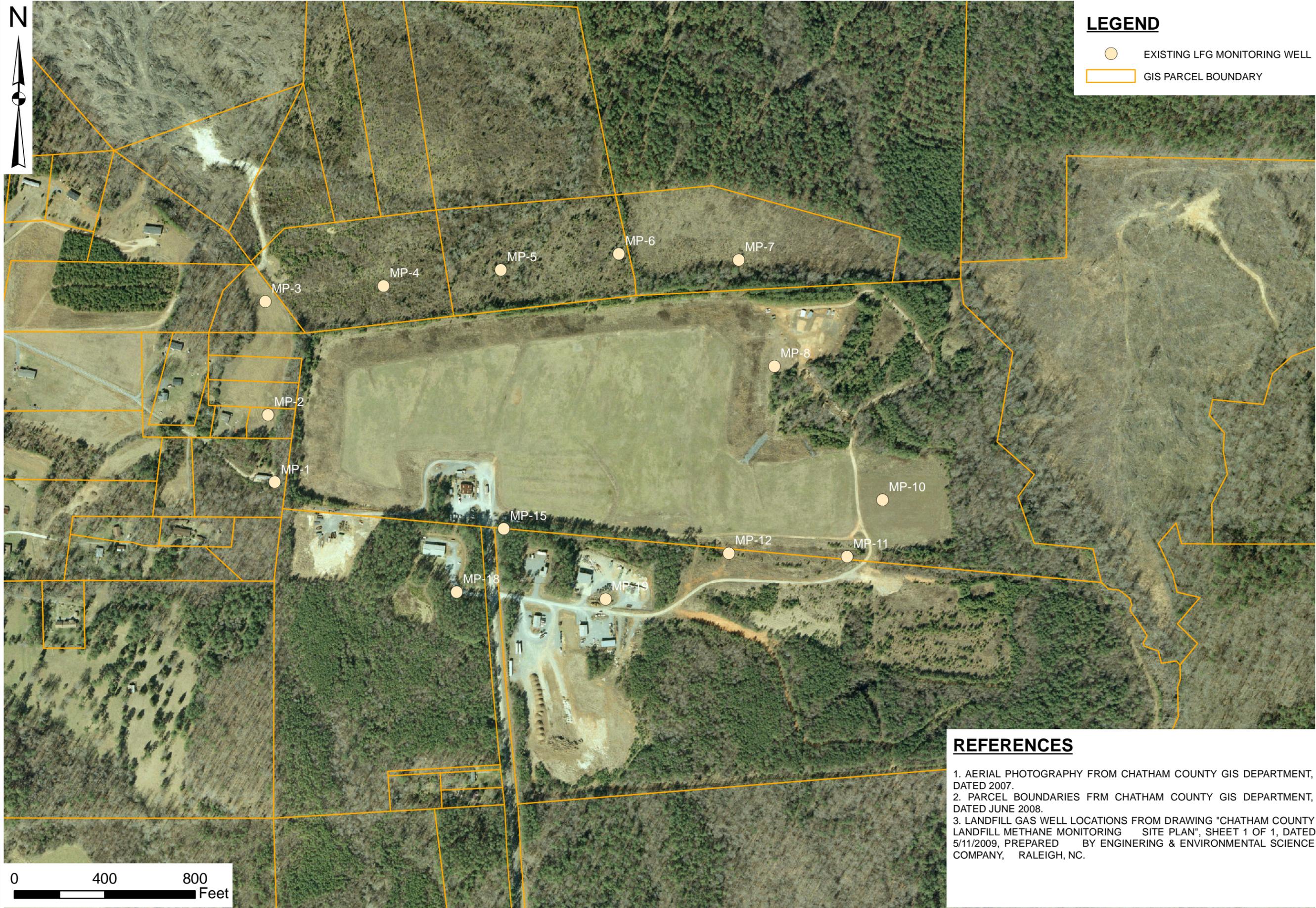
It is also suggested that at this time, a plan be developed which:

- Describes the nature and extent of the problem; and
- Proposes future actions to access/remediate the problem.

3.2.3 *Remediation Plan*

In the event the prolonged explosive gas concentrations exist and as identified during the **Immediate Action Plan**, the County shall prepare and implement a Remediation Plan to mitigate the migration of landfill gas off property. Extensions may be granted by the Division of Waste Management upon written request and depending on severity of the situation.

FIGURES



LEGEND

- EXISTING LFG MONITORING WELL
- GIS PARCEL BOUNDARY

REFERENCES

1. AERIAL PHOTOGRAPHY FROM CHATHAM COUNTY GIS DEPARTMENT, DATED 2007.
2. PARCEL BOUNDARIES FRM CHATHAM COUNTY GIS DEPARTMENT, DATED JUNE 2008.
3. LANDFILL GAS WELL LOCATIONS FROM DRAWING "CHATHAM COUNTY LANDFILL METHANE MONITORING SITE PLAN", SHEET 1 OF 1, DATED 5/11/2009, PREPARED BY ENGINEERING & ENVIRONMENTAL SCIENCE COMPANY, RALEIGH, NC.



FIGURE NO.	1
SCALE:	AS SHOWN
CHECKED BY:	J.A.S.
DRAWN BY:	C.T.J.
PROJECT NO.	CHATHAM 11-1
FILE NAME	CHATHAM-B0027
DATE:	MAR. 2011

TITLE:
LFG MONITORING WELL NETWORK
CLOSED CHATHAM COUNTY
MSW LANDFILL
PITTSBORO, NORTH CAROLINA

APPENDIX A
LETTER OF CLOSURE

COUNTY OF CHATHAM

PUBLIC WORKS DEPARTMENT

- Buildings and Grounds
- Recycling
- Utilities
- Solid Waste



POST OFFICE BOX 87
PITTSBORO, N. C. 27312

ORGANIZED 1770

707 SQUARE MILES

MARK P. ASHNESS
PUBLIC WORKS DIRECTOR

PHONE: 919-542-8254

October 8, 1993

Mr. Jim Coffey
Division of Solid Waste Management
N. C. Department of Environment, Health, & Natural Resources
P.O. Box 27687
Raleigh, NC 27611

RE: Landfill Closure, Permit #19-01
Chatham County Sanitary Landfill

Dear Mr. Coffey:

This letter serves as notification that the existing Chatham County Sanitary Landfill has been closed effective October 8, 1993. All sanitary waste, construction, and demolition material has been redirected to the recently permitted transfer station in Siler City (#19-03T). With regard to the recently closed landfill, the County has completed initial borings to determine the current depth of cover material. I anticipate final closure plans to be submitted to your office by October 29, 1993.

The County has recently purchased sixty (60) acres adjacent to the existing landfill. This site will be developed as a land clearing and inert debris facility. In addition, scrap tires, appliances, yard waste, and waste oil will also be processed at this location. The attached map notes the general location of this property for your reference. While the plans for the future land clearing/inert debris facility and recycling processing facility are prepared, the County requests that the following operations be maintained within the current landfill property:

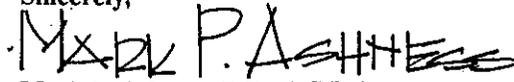
1. Scrap tires
2. Appliances
3. Yard waste & LCID
4. Waste Oil
5. Recyclables Processing

The existing location of these operational areas are also noted on the attached map for your reference. Continuing these operations within the existing landfill boundaries over the next six month period will not interfere with any of the closure and post closure requirements.

**Mr. Jim Coffey, Division of Solid Waste Management
Landfill Closure, Permit #19-01
Chatham County Sanitary Landfill**

Further details with regard to development of the LCID facility and continued interim operation of existing activities at the current landfill will be specified in the final closure plan. If you should have any further questions regarding the enclosed information, please feel free to contact this office at your convenience.

Sincerely,



**Mark P. Ashness, P.E., A.S.L.A.
Public Works Director**

MPA:srm

Attachments

**cc: Ben Shivar, County Manager
Matt Young, Recycling Coordinator**



APPENDIX B
BORING LOGS

CLIENT: Chatham County BORING NO.: MP-1 DATE: 5-20-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSF	WELL DIAGRAM
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____								TOC EL. 511.04'
	Topsoil	0.5							GS 508.03'
	Red Silty Clay (CL), Moist		1						
	Reddish Brown Clayey SILT (ML), Moist	4.0	2						
10			3						
			4						
20	Brown Silty CLAY (CL), Moist	20.0							
			5						
	Light Brown Clayey SILT (ML) Damp to Moist	24.0							
	(Partially Weathered Mudstone)		6						
30	Auger Refusal at 29.5ft	29.5							

Well Legend

-  Bentonite
-  Cement Grout
-  Sand
-  2" Diameter No. 10 Screen, Schedule 40 PVC
-  2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

 NOTED ON RODS dry FT.  AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT.  AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT.  AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-2 DATE: 5-20-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER PSF	WELL DIAGRAM	
				BLOWS/6 in.	RECOVERY %				TOC EL. 506.31'	GS 508.03'
	SURFACE ELEVATION: _____									
	Topsoil	0.5								
	Red Silty CLAY (CL), Damp		1							
	Moist and Dark Red After 7ft		2							
10			3							
			4							
20			5							
	Reddish Brown after 23ft									
	Light Gray Fine Sandy SILT (ML), Damp	28.0	6							
30	Boring terminated at 30.0ft	30.0								

Well Legend

-  -Bentonite
-  -Cement Grout
-  -Sand
-  -2" Diameter No. 10 Screen, Schedule 40 PVC
-  -2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

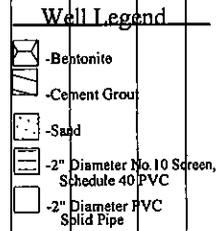
GROUND WATER

*ORGANIC VAPOR METER, PARTS PER MILLION
 **STANDARD PENETRATION TEST

 NOTED ON RODS dry FT.  AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT.  AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT.  AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-3 DATE: 6-10-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSF	WELL DIAGRAM	
				BLOWS/6 in.	RECOVERY %				TOC EL. 496.54'	GS 503.40'
	SURFACE ELEVATION: _____ Topsoil	0.5								
	Red Silty Clay (CL), Very Moist Moist after 2ft		1							
10	Brown Clayey SILT (ML), Damp to Moist	7.0	2							
	Light Gray Fine Sandy SILT (ML), Damp (Partially Weathered Sandstone)	13.5	3							
20	Auger Refusal at 23.0ft	23.0								
30										



BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER, PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

▼ NOTED ON RODS dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AT COMPLETION dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AFTER 168 HRS. 19 FT. ▼ AFTER _____ HRS. _____ FT.

E2S

CLIENT: Chatham County BORING NO.: MP-4 DATE: 6-10-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSF	WELL DIAGRAM TOC EL. 507.15'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____ Topsoil	0.5							GS 503.71'
	Brown Silty CLAY (CL), Moist	4.0	1						
	Brown Clayey SILT (ML), Damp to Moist	9.0	2						
10	Brown Clayey SILT (ML), Damp (Partially Weathered Conlomerate)	15.0	3						
	Boring Terminated At 15.0 ft								
20									
30									

- Well Legend**
-  -Bentonite
 -  -Cement Grout
 -  -Sand
 -  -2" Diameter No. 10 Screen, Schedule 40 PVC
 -  -2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

 NOTED ON RODS dry FT.  AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT.  AFTER _____ HRS. _____ FT.
 AFTER 168 HRS. dry FT.  AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-5 DATE: 5-19-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSP	WELL DIAGRAM TOC EL. 503.64'
				BLOWS/6 in.	RECOVERY %				
SURFACE ELEVATION: _____									
	Topsoil	0.5							
	Reddish-Brown Silty CLAY (CL), Moist		1						
	Light Brown Clayey SILT (ML), Moist	3.5							
	Boring Terminated At 5.0ft	5.0							
10									
20									
30									

- Well Legend
- Bentonite
 - Cement Grout
 - Sand
 -
 -

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

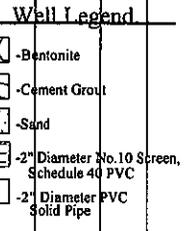
*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

NOTED ON RODS dry FT. AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT. AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT. AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-6 DATE: 5-19-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSP	WELL DIAGRAM TOC EL. 502.11'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____ Topsail	0.5							
	Reddish-Brown Silty CLAY (CL), Moist		1						GS 500.27'
	Boring Terminated At 5.0ft	5.0							
10									
20									
30									



BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

NOTED ON RODS dry FT. AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT. AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT. AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-7 DATE: 5-19-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSF	WELL DIAGRAM
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____								TOC EL. 482.39'
	Topsoil	0.5							GS 480.55'
	Brown Clayey SILT (ML), Damp to Moist	2.0	1						
	Brown Silty CLAY (CL), Moist	5.0							
	Boring Terminated At 5.0ft								
10									
20									
30									

- Well Legend**
- Bentonite
 - Cement Grout
 - Sand
 - 2" Diameter No. 10 Screen, Schedule 40 PVC
 - 2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

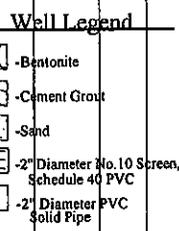
*ORGANIC VAPOR METER, PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

NOTED ON RODS dry FT. AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT. AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT. AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-8 DATE: 5-19-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSP	WELL DIAGRAM TOC EL. 484.89'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____ Topsoil	0.5							GS 482.00'
	Light Brown Fine Sandy SILT (ML), Damp	3.0	1						
	Light Gray SILT (ML), Damp		2						
10	Boring Terminated At 10.0 ft	10.0							



BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

NOTED ON RODS dry FT. AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT. AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT. AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-10 DATE: 5-18-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVUM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TEST	WELL DIAGRAM TOC EL. 492.63'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____ Topsoil	0.5							GS 489.58'
	Dark Brown Clayey SILT (ML), Damp to Moist Greenish-brown after 2.5ft		1						
			2						
10	Brown after 10ft		3						
	Boring Terminated At 15.0 ft	15.0							
20									
30									

- Well Legend**
- Bentonite
 - Cement Grout
 - Sand
 - 2" Diameter No.10 Screen, Schedule 40 PVC
 - 2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

▽ NOTED ON RODS dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AT COMPLETION dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AFTER 144 HRS. dry FT. ▼ AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-11 DATE: 5-18-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSP	WELL DIAGRAM TOC EL. 498.25'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____								GS 489.58'
	Topsoil	0.5							
	Maroon Silty CLAY (CL), Moist		1						
	Reddish Brown after 6ft		2						
10	Grayish-Green Clayey SILT (ML) Damp to Moist, Thin Carbon Seams Present		3						
			4						
20	Boring Terminated At 20.0 ft	20.0							

- Well Legend**
-  -Bentonite
 -  -Cement Grout
 -  -Sand
 -  -2" Diameter No. 10 Screen, Schedule 40 PVC
 -  -2" Diameter PVC Solid Pipe

BORING METHOD

HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

▼ NOTED ON RODS dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AT COMPLETION dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AFTER 144 HRS. dry FT. ▼ AFTER _____ HRS. _____ FT.

CLIENT: Chatham County BORING NO.: MP-12 DATE: 5-18-10
 PROJECT NAME: Methane Monitoring JOB NO.: _____
 PROJECT LOCATION: Chatham County Landfill (19-01) STATION: _____
 BORING METHOD: 4" CFA with 2" Push Tube FOREMAN: Mathew Henderson
 ROCK CORE DIA.: _____ INSPECTOR: Logan Shillington
 SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSF	WELL DIAGRAM TOC EL. 508.71'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____ Topsoil	0.5							GS 505.93'
	Reddish Brown Silty CLAY(CL), Moist		1						
			2						
10	Brown after 12ft and Moist to Very Moist		3						
			4						
20	Boring Terminated At 20.0 ft	20.0							
30									

Well Legend

-  -Bentonite
-  -Cement Grout
-  -Sand
-  -2" Diameter No. 10 Screen, Schedule 40 PVC
-  -2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER,
 PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

▽ NOTED ON RODS dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AT COMPLETION dry FT. ▼ AFTER _____ HRS. _____ FT.
 ▼ AFTER 144 HRS. dry FT. ▼ AFTER _____ HRS. _____ FT.

CLIENT: Chatham County

BORING NO.: MP-15 DATE: 5-18-10

PROJECT NAME: Methane Monitoring

JOB NO.: _____

PROJECT LOCATION: Chatham County Landfill (19-01)

STATION: _____

BORING METHOD: 4" CFA with 2" Push Tube

FOREMAN: Mathew Henderson

ROCK CORE DIA.: _____

INSPECTOR: Logan Shillington

SHELBY TUBE O.D.: _____

DEPTH (ft)	DESCRIPTION & REMARKS	STRATUM DEPTH, ft.	SAMPLE NUMBER	**SPT		*OVM, PPM	MOISTURE CONTENT, %	CALIBRATED PENETROMETER TSP	WELL DIAGRAM TOC EL. 517.42'
				BLOWS/6 in.	RECOVERY %				
	SURFACE ELEVATION: _____								
	Topsoil	0.5							GS 513.28'
	Red Silty CLAY (CL), Moist to Very Moist		1						
	Reddish Brown Clayey SILT (ML), Moist	4.0	2						
10	Red, Minor Maroon Muttng, Clayey SILT, Moist	11.0	3						
			4						
20	Boring Terminated At 20.0 ft	20.0							

Well Legend

-  -Bentonite
-  -Cement Grout
-  -Sand
-  -2" Diameter No.10 Screen, Schedule 40 PVC
-  -2" Diameter PVC Solid Pipe

BORING METHOD
 HSA - HOLLOW STEM AUGER
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVEN CASING
 MD - MUD DRILLING
 RC - ROCK CORING

*ORGANIC VAPOR METER, PARTS PER MILLION
 **STANDARD PENETRATION TEST

GROUND WATER

 NOTED ON RODS dry FT.  AFTER _____ HRS. _____ FT.
 AT COMPLETION dry FT.  AFTER _____ HRS. _____ FT.
 AFTER 144 HRS. dry FT.  AFTER _____ HRS. _____ FT.



NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
 Well Contractor (Individual) Name
GEOLOGIC EXPLORATION, INC
 Well Contractor Company Name
176 COMMERCE BLVD
 Street Address
STATESVILLE NC 28625
 City or Town State Zip Code
 (704) 872-7686
 Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A
 OTHER ASSOCIATED PERMIT#(if applicable) _____
 SITE WELL ID #(if applicable) MP-18

3. WELL USE (Check One Box) Monitoring Municipal/Public

Industrial/Commercial Agricultural Recovery Injection
 Irrigation Other (list use) _____
 DATE DRILLED 05/16/11

4. WELL LOCATION:

720 COUNTY LANDFILL ROAD 27312
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
 CITY: PITTSBORO COUNTY CHATHAM
 TOPOGRAPHIC / LAND SETTING: (check appropriate box)
 Slope Valley Flat Ridge Other _____
 LATITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 LONGITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 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)

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

CHATHAM COUNTY LANDFILL N/A
 Facility Name Facility ID# (if applicable)
720 COUNTY LANDFILL ROAD
 Street Address
PITTSBORO NC 27312
 City or Town State Zip Code
CHATHAM CO SOLID WASTE MGT
 Contact Name
720 COUNTY LANDFILL ROAD
 Mailing Address
PITTSBORO NC 27312
 City or Town State Zip Code

() _____
 Area code Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 25.0 FEET
 b. DOES WELL REPLACE EXISTING WELL? YES NO
 c. WATER LEVEL Below Top of Casing: DRY FT.
 (Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2.5 FT. Above Land Surface*
 *Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

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

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

g. WATER ZONES (depth):
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____

7. CASING: Depth	Diameter	Thickness/Weight	Material
Top <u>0.0</u> Bottom <u>5.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
Top _____ Bottom _____ Ft.	_____	_____	_____
Top _____ Bottom _____ Ft.	_____	_____	_____

8. GROUT: Depth	Material	Method
Top <u>0.0</u> Bottom <u>3.0</u> Ft.	<u>PORTLAND BENTONITE</u>	<u>SLURRY</u>
Top _____ Bottom _____ Ft.	_____	_____
Top _____ Bottom _____ Ft.	_____	_____

9. SCREEN: Depth	Diameter	Slot Size	Material
Top <u>5.0</u> Bottom <u>25.0</u> Ft.	<u>2.0 in.</u>	<u>.010 in.</u>	<u>PVC</u>
Top _____ Bottom _____ Ft.	_____ in.	_____ in.	_____
Top _____ Bottom _____ Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK: Depth	Size	Material
Top <u>4.0</u> Bottom <u>25.0</u> Ft.	<u>20-40</u>	<u>FINE SILICA SAND</u>
Top _____ Bottom _____ Ft.	_____	_____
Top _____ Bottom _____ Ft.	_____	_____

11. DRILLING LOG	Formation Description
Top _____ Bottom _____	_____
<u>0.0 / 1.0</u>	<u>TOPSOIL</u>
<u>1.0 / 25.0</u>	<u>TAN SANDY CLAYEY SILT</u>
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____

12. REMARKS:
BENTONITE SEAL FROM 3.0 TO 4.0 FEET

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.
Vincent R. Federle 05/24/11
 SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE
VINCE FEDERLE
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL

site

County landfill Rd.

HWY 104



NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION # 3552

1. WELL CONTRACTOR:

VINCE FEDERLE
 Well Contractor (Individual) Name
GEOLOGIC EXPLORATION, INC
 Well Contractor Company Name
176 COMMERCE BLVD
 Street Address
STATESVILLE NC 28625
 City or Town State Zip Code
 (704) 872-7686
 Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A
 OTHER ASSOCIATED PERMIT#(if applicable) _____
 SITE WELL ID #(if applicable) MP-19

3. WELL USE (Check One Box) Monitoring Municipal/Public
 Industrial/Commercial Agricultural Recovery Injection
 Irrigation Other (list use) _____
 DATE DRILLED 05/16/11

4. WELL LOCATION:

720 COUNTY LANDFILL ROAD 27312
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
 CITY: PITTSBORO COUNTY CHATHAM
 TOPOGRAPHIC / LAND SETTING: (check appropriate box)
 Slope Valley Flat Ridge Other _____
 LATITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 LONGITUDE _____ ° _____ ' _____ " DMS OR _____ DD
 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)

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

CHATHAM COUNTY LANDFILL N/A
 Facility Name Facility ID# (if applicable)
720 COUNTY LANDFILL ROAD
 Street Address
PITTSBORO NC 27312
 City or Town State Zip Code
CHATHAM CO SOLID WASTE MGT
 Contact Name
720 COUNTY LANDFILL ROAD
 Mailing Address
PITTSBORO NC 27312
 City or Town State Zip Code

() _____
 Area code Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 20.0 FEET
 b. DOES WELL REPLACE EXISTING WELL? YES NO
 c. WATER LEVEL Below Top of Casing: DRY FT.
 (Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2.5 FT. Above Land Surface*
 *Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

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

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

g. WATER ZONES (depth):
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____
 Top _____ Bottom _____ Top _____ Bottom _____

7. CASING: Depth	Diameter	Thickness/Weight	Material
Top <u>0.0</u> Bottom <u>5.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
Top _____ Bottom _____ Ft.	_____	_____	_____
Top _____ Bottom _____ Ft.	_____	_____	_____

8. GROUT: Depth	Material	Method
Top <u>0.0</u> Bottom <u>3.0</u> Ft.	<u>PORTLAND BENTONITE</u>	<u>SLURRY</u>
Top _____ Bottom _____ Ft.	_____	_____
Top _____ Bottom _____ Ft.	_____	_____

9. SCREEN: Depth	Diameter	Slot Size	Material
Top <u>5.0</u> Bottom <u>20.0</u> Ft.	<u>2.0 in.</u>	<u>.010 in.</u>	<u>PVC</u>
Top _____ Bottom _____ Ft.	_____ in.	_____ in.	_____
Top _____ Bottom _____ Ft.	_____ in.	_____ in.	_____

10. SAND/GRAVEL PACK: Depth	Size	Material
Top <u>4.0</u> Bottom <u>20.0</u> Ft.	<u>20-40</u>	<u>FINE SILICA SAND</u>
Top _____ Bottom _____ Ft.	_____	_____
Top _____ Bottom _____ Ft.	_____	_____

11. DRILLING LOG	Formation Description
Top _____ Bottom _____	_____
<u>0.0 / 1.0</u>	<u>TOPSOIL</u>
<u>1.0 / 20.0</u>	<u>ORANGE CLAYEY SILT</u>
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____
_____ / _____	_____

12. REMARKS:
BENTONITE SEAL FROM 3.0 TO 4.0 FEET

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.

Vincent R. Federle

SIGNATURE OF CERTIFIED WELL CONTRACTOR 05/24/11
 DATE

VINCE FEDERLE
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL

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

site

County Landfill Rd

Hwy 64

10/10/10

APPENDIX C

LANDFILL GAS MONITORING AND REPORTING FORMS