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DIN 14556

Catawba Co Landfill (Newton)
1801-MSWLF-1973

July 21, 2011

Mr. Ervin Lane
Compliance Hydrogeologist
Division of Waste Management
Solid Waste Section
401 Oberlin Road
Suite 150
Raleigh, North Carolina 27605-1350

Subject: Catawba County, North Carolina
Newton Sanitary Landfill
Methane Migration Remediation Completion Report

Dear Mr. Lane:

Camp Dresser and McKee (CDM), on behalf of Catawba County (County), is submitting this Methane Migration Remediation Completion Report for the Newton Sanitary Landfill (Landfill) located on Bethany Church Road approximately 3 miles east of Newton, North Carolina. This completion report presents the results of the remediation activities discussed in the approved Methane Migration Remediation Plan dated March 18, 2011. Remediation activities completed as part of the Remediation Plan include: Immediate remediation actions, offsite migration assessment, offsite structure monitoring, and landfill gas (LFG) collection system improvements. The results of each activity are discussed below.

Background

The Landfill ceased waste disposal operations in 1990 and was capped with a silty clay soil material cover at an average depth of 4 feet. The County currently operates a convenience center site in the southwest corner of the landfill property. Public access to the landfill disposal area is prevented by perimeter fencing and a locked gate. The County operates an active LFG collection system which consists of 84 extraction wells, a blower, and a flare for the collection and destruction of LFG. During routine system monitoring on January 28, 2011, methane concentrations exceeding 100% of the Lower Explosive Limit (5% methane by volume) were detected in nine LFG monitoring wells along the west and northwest property boundaries as shown in **Figure 1**.

NCDENR Division of Waste Management (DWM) was notified on January 31, 2011 of the exceedences. On February 8, 2011, DWM staff and County personnel conducted a site inspection. During the inspection, it was agreed that a remediation plan would be submitted within 60 days of the initial



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reporting on January 31, 2011. The remediation plan was submitted to the DWM on March 18, 2011, and was approved on March 25, 2011.

Immediate Remediation Activities

Immediately following discovery and reporting of the exceedence, the County performed the following remedial actions:

- inspected the LFG collection system and determined that vacuum was low at a number of extraction wells and at the blower,
- blower vacuum was increased without a corresponding increase at the extraction wells. County staff concluded that the header pipe and/or extraction wells were flooded,
- condensate sumps were pumped out,
- vacuum increased at some wells but remained low at several of the wells. Further investigation revealed that water was present in the wells exhibiting low vacuum levels,
- activated the extraction wells directly adjacent to the monitoring wells with exceedences,
- installed a new blower on March 8, 2011 to improve reliability and efficiency of the collection system and,
- collected methane readings since the initial exceedence was discovered. A summary of weekly readings through June 30, 2011 is provided in **Table 1**. A graphical representation of the weekly readings is provided on **Figure 2**.

Offsite Migration Assessment

To assess offsite migration, the County installed 17 temporary borings on the west side of Bethany Church Road in the NCDOT right-of-way and four temporary borings on the property adjacent to the northwest corner of the landfill property as shown in **Figure 3**. Boreholes were installed with a GeoProbe® under supervision of a CDM geologist on April 13, 2011. The borings were spaced approximately 100 feet apart and drilled 20 feet below ground surface.

Soil samples were collected to determine if preferential flow paths such as weathered intrusions or sand/gravel lenses were present. The lithology was as expected for that region: A thin layer of topsoil and residuum underlain by a thick (typically greater than 20 ft) layer of reddish brown to tan saprolite, consisting of silty sand. None of the temporary borings extended into the coarser partially weathered rock unit. No sand/gravel lenses were encountered however, numerous weathered quartz veins,



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ranging from 1 to 6 inches thick, were encountered which could potentially act as preferential flow paths for landfill gas. Groundwater was not encountered in any of the borings.

Initial readings were collected at each boring for CH₄, CO₂, and O₂ using a GEM 2000. The GEM was calibrated each day prior to use. A second round of readings was collected prior to leaving the site on April 13, 2011 and final readings were collected on the afternoon of April 14, 2011. A summary of the readings are provided in **Table 2**. Following collection of the final readings, the boreholes were abandoned by backfilling with bentonite pellets.

Elevated methane concentrations were detected along Bethany Church Road and on the property north of the landfill. Initial readings in the morning from the bore holes installed on the property to the north had 0% methane. However, the afternoon readings had detections ranging from 21 to 50%. The readings collected at the end of the day on April 13, 2011 indicate that methane has migrated past the landfill property boundary at concentrations above the 5% lower explosive limit to the west and north of the landfill. These readings were confirmed on April 14, 2011.

Offsite Structures Monitoring

The structures on the adjacent property parcels shown in **Figure 3** were monitored for the presence of LFG by probing around the perimeter and in the basements or crawl spaces for CH₄, CO₂, and O₂ with a GEM 2000 and total organics with a hand held flame ionizing detector (FID). Prior to monitoring the offsite structures, the County contacted the property owners and was granted permission to enter the properties and perform the monitoring. No CH₄ or CO₂ readings were detected with the GEM 2000 and no FID readings above 0 parts per million total organics were detected in or around any offsite structures. The structures monitored included the basement at the occupied McGee house, a detached garage and a barn on the McGee property, and in the crawlspace of the abandoned structure on the parcel adjacent to the McGee property. The property owners were notified of the monitoring results upon conclusion of the monitoring activity. A summary of the offsite structure monitoring results is provided on **Table 3**.

LFG Collection System Improvements

The County made the following improvements to the existing LFG collection system to provide better control of LFG:

- along the western boundary of the site the County installed replacement wells close to existing extraction wells that were not performing well (the existing extraction wells were left in service),



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- installed additional extraction wells along the west side of the landfill to provide closer spacing between wells (approximately 130-ft apart),
- installed new header pipe and condensate sump to provide maximum vacuum to the wells, and,

Ten new vertical extraction wells (100, 101, 102, 103, 104, 105, 106, 107, 108, and 109) and 4 replacement wells (11R, 12R, 13R, and 14R) were installed April 6-7, 2011 at the locations shown in **Figure 4**. The boreholes were drilled by Kellet's Well Boring, Inc. utilizing a 36-inch diameter bucket auger. Drill cuttings were placed in a roll-off container and transported to the Blackburn Subtitle D Landfill. Following completion of the boreholes, County staff installed the new extraction wells. All wells were constructed with 6-inch diameter Schedule 80 PVC pipe. Screen intervals were hand-slotted in the field. The borehole annulus was backfilled with NCDOT #78 stone for the length of the screen interval and completed to grade with a bentonite plug and soil backfill. Total depths and screen intervals for the newly installed wells are provided on **Table 4**. All wells were allowed to vent following construction until they could be connected to the permanent vacuum system. Boring logs are provided in Appendix 1.

In addition to the new extraction wells, new header piping and condensate sumps were installed to provide vacuum to the new wells. The installation of header pipe, condensate sumps, and well heads were completed on May 25, 2011. An as-built drawing of the new wells and associated piping is provided on **Figure 4**.

The newly installed extraction wells were activated on May 26, 2011. County personnel make adjustments to the applied vacuum at each well as necessary to maximize LFG collection. Readings from the LFG monitoring wells at the property boundary continue to be recorded and results are kept on file at the Blackburn Landfill.

Conclusions

The County has implemented the Remediation Plan and continues to monitor the LFG monitoring wells at the property boundary. LFG monitoring wells P-4, P-8, P-9, P-10, and P-11 have generally shown positive response to the newly installed extraction wells; however several monitoring wells (P-5, P-6, and P-7) have shown no response so far. The County will continue to monitor the LFG monitoring wells, while making adjustments to the expanded well field on a weekly basis, until detected levels of methane are below 5% CH₄, after which time, the County will return to regulatory required quarterly monitoring. The County will consider installation of additional wells in the area of P-5, 6, and 7 if conditions in these probes do not improve.

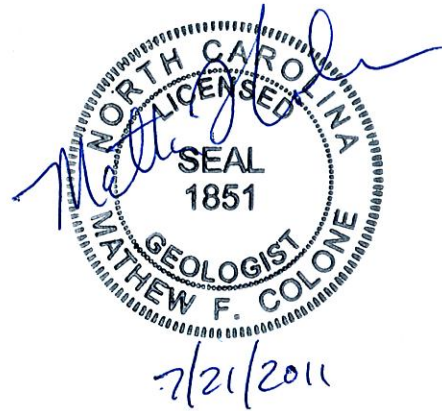


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Catawba County and CDM are committed to working with the DWM in resolving the gas migration issue at the Newton Sanitary Landfill. If you have any questions or comments, please do not hesitate to contact me at (919) 787-5620 or at colonemf@cdm.com.

Very truly yours,

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



cc: Rodney Hamby, Catawba County
Barry Edwards, Catawba County
Chris Gabel, CDM
Martin Sanford, CDM
Kenton Yang, CDM

Attachments: Table 1 – Summary of LFG Monitoring Well Methane Readings
Table 2 – Offsite Temporary Probe Monitoring Results
Table 3 – Offsite Structure Monitoring Results
Table 4 – Extraction Well Installation Construction Summary
Figure 1 – Methane Exceedence Locations
Figure 2 – Detected Methane Concentration in Select Probes Vs. Time
Figure 3 – Offsite Monitoring Locations
Figure 4 – LFG System Improvements
Appendix 1 - Extraction Well Bore Logs

Table 1
Landfill Gas Probe Monitoring Summary
Newton Sanitary Landfill

Probe ID	Percent Methane by Volume												
	1/28/2011	1/31/2011	2/8/2011	2/14/2011	2/21/2011	2/23/2011	4/13/2011	5/4/2011	6/1/2011	6/8/2011	6/13/2011	6/20/2011	6/30/2011
P-1	0	0	0	0	0	0	NM	0	0	0	0	0	0
P-2	0	0	0	0	0	0	NM	0	0	0	0	0	0
P-3	1	0	0	8	0	0	NM	0	2	2	2	4.5	2.5
P-4	51	59	65	67	64	63	64	57	39	10	32	20	7.9
P-5	51	55	56	56	55	56	55	56	51	49	54	52.6	47.4
P-6	57	57	57	57	54	56	56	55	55	52	56	53.3	31.6
P-7	57	57	57	57	57	57	56	57	57	56	55	55.0	42.3
P-8	57	59	58	57	57	57	56	50	1	4	49	52.4	46.7
P-9	46	52	64	63	59	60	58	49	7	5	26	24.8	21.6
P-10	17	18	23	23	25	25	43	37	21	12	31	28.8	26.7
P-11	20	0	60	61	61	59	57	56	55	28	34	41.8	44.6
P-12	0	0	0	0	0	0	NM	0	0	0	0	0	0

Notes:

NM - Not Measured

New blower installed March 8, 2011.

New extraction wells brought on-line May 26, 2011.

Table 2
Offsite Temporary Probe Monitoring Results
Newton Sanitary Landfill

Location	Date	Time	%CH ₄	%CO ₂	%O ₂
B-1	4/13/2011	1035-1045	0	0.1	21
	4/13/2011	1505-1600	50.2	31	3.9
	4/14/2011	1300-1425	42.9	25.5	6.2
B-2	4/13/2011	1035-1045	0	0.1	20.9
	4/13/2011	1505-1600	33.3	21.2	9.1
	4/14/2011	1300-1425	31.7	18	9.8
B-3	4/13/2011	1035-1045	0	0.1	20.9
	4/13/2011	1505-1600	20.1	8.9	13.7
	4/14/2011	1300-1425	18.2	6	15.2
B-4	4/13/2011	1035-1045	0	0.1	20.9
	4/13/2011	1505-1600	20.9	15.6	3.2
	4/14/2011	1300-1425	14.2	8.6	9.3
B-5	4/13/2011	1505-1600	26.5	17.1	8.1
	4/14/2011	1300-1425	27.2	16	7.8
B-6	4/13/2011	1505-1600	34.1	20.3	8.8
	4/14/2011	1300-1425	29.9	15.1	10.7
B-7	4/13/2011	1505-1600	35.2	21.7	9.8
	4/14/2011	1300-1425	25.3	15.9	11.4
B-8	4/13/2011	1505-1600	56.8	43.1	0
	4/14/2011	1300-1425	57.7	41.6	0.5
B-9	4/13/2011	1505-1600	53.7	39.8	2.1
	4/14/2011	1300-1425	44.6	31.1	5.7
B-10	4/13/2011	1505-1600	56.7	42.5	0.6
	4/14/2011	1300-1425	45.6	31.8	5.1
B-11	4/13/2011	1505-1600	49.4	34.5	4
	4/14/2011	1300-1425	33.2	21.6	8.9
B-12	4/13/2011	1505-1600	49.7	34.7	3.5
	4/14/2011	1300-1425	30.5	19.5	8.9
B-13	4/13/2011	1505-1600	31.3	22	9.7
	4/14/2011	1300-1425	26.1	14.2	12
B-14	4/13/2011	1505-1600	12.7	7.1	14.9
	4/14/2011	1300-1425	8.3	3.1	17.2
B-15	4/13/2011	1505-1600	19.6	14.4	12.6
	4/14/2011	1300-1425	0.7	1.3	20.1
B-16	4/13/2011	1505-1600	10.2	7.4	14.9
	4/14/2011	1300-1425	0.5	0.7	20.3
B-17	4/13/2011	1505-1600	0	2.8	18
	4/14/2011	1300-1425	0	0.9	20

Table 2
Offsite Temporary Probe Monitoring Results
Newton Sanitary Landfill

Location	Date	Time	%CH ₄	%CO ₂	%O ₂
B-18	4/13/2011	1505-1600	16	10.2	13.8
	4/14/2011	1300-1425	14.3	16	7.2
B-19	4/13/2011	1505-1600	3.8	2.9	18.3
	4/14/2011	1300-1425	6	2.7	17.7
B-20	4/13/2011	1505-1600	0	0.3	20.6
	4/14/2011	1300-1425	0.6	1.3	19.7
B-21	4/13/2011	1505-1600	0	0.1	20.9
	4/14/2011	1300-1425	2.4	2.1	18.7

Notes:

1. CH₄ - Methane
2. CO₂ - Carbon Dioxide
3. O₂ - Oxygen
4. All readings are from a GEM 2000 landfill gas meter calibrated on 4/12 and 4/14/11.
5. Bore holes B-1 to B-4 were installed on the McGee property and B-5 to B-17 along the west side of Bethany Church Road.

**Table 3
Offsite Structure Monitoring Results
Newton Sanitary Landfill**

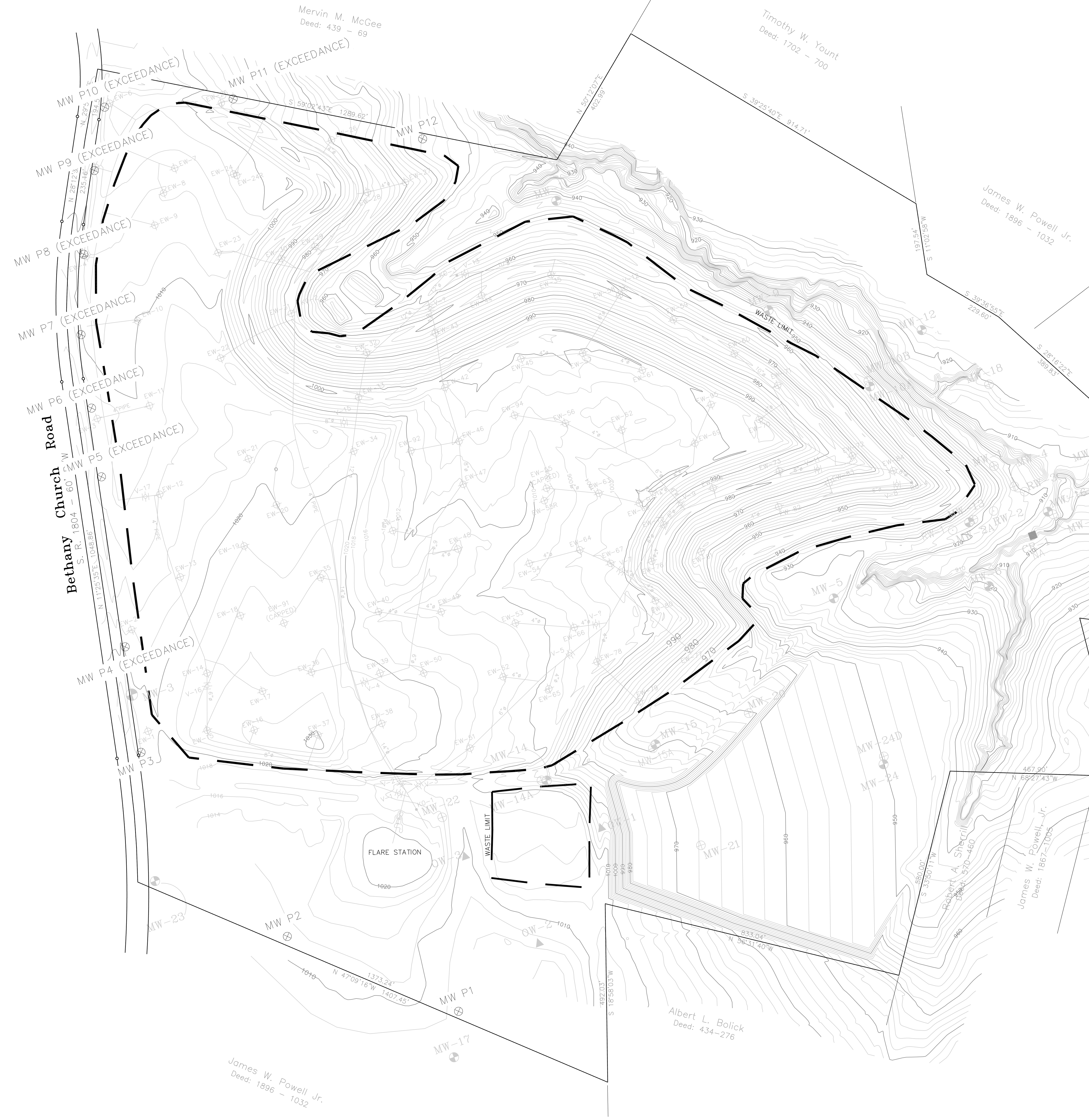
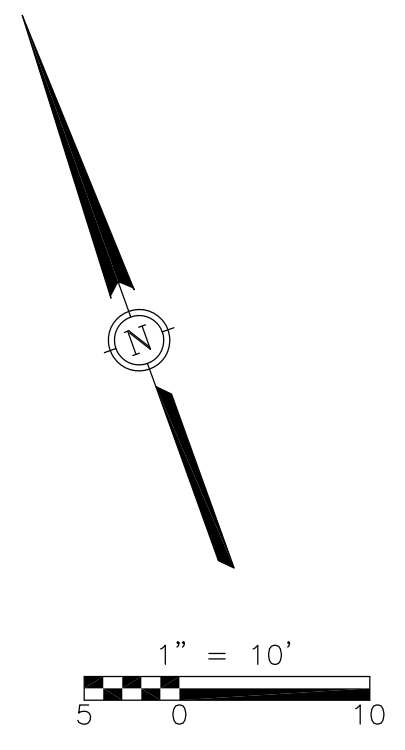
McGee Property	Date	Time	%CH₄	%CO₂	%O₂	Volatile Organics (ppm)
Basement	4/13/2011	1450-1525	0	0	21	0
Detached Garage	4/13/2011	1450-1525	0	0	21	0
Barn	4/13/2011	1450-1525	0	0	21	0
Vacant Structure						
Crawl Space	4/13/2011	1535-1550	0	0	21	0

Notes:

1. CH₄ - Methane
2. CO₂ - Carbon Dioxide
3. O₂ - Oxygen
4. ppm - parts per million
5. All readings are from a GEM 2000 landfill gas meter calibrated on 4/12/11, with the exception of volatile organics.
Volatile organics were measured using a flame-ionization detector calibrated on 4/12/11.

Table 4
Extraction Well Installation Construction Summary
Newton Sanitary Landfill

Well	Completion Date	Depth (feet)	Top of Casing (ft MSL)	Screen Interval (feet bls)	Well Diameter (inches)	Borehole Diameter (inches)
11R	4/6/2011	28	1012.57	8 - 28	6	36
12R	4/6/2011	19	1015.35	2 - 19	6	36
13R	4/6/2011	26	1017.35	4 - 26	6	36
14R	4/6/2011	19.5	1019.66	4.5 - 19.5	6	36
100	4/6/2011	22	1023.47	4 - 18	6	36
101	4/6/2011	18.5	1016.05	4.5 - 18.5	6	36
102	4/6/2011	22	1013.29	5 - 22	6	36
103	4/6/2011	20	1011.24	2 - 20	6	36
104	4/7/2011	24	1008.78	5 - 24	6	36
105	4/7/2011	22.5	1004.55	3.5 - 22.5	6	36
106	4/7/2011	25.5	1002.32	4.5 - 25.5	6	36
107	4/7/2011	33.5	998.07	6 - 33.5	6	36
108	4/7/2011	19	1007.33	4 - 19	6	36
109	4/7/2011	18	1014.02	8 - 18	6	36



LEGEND

- PROPERTY LINE
- SANITARY LANDFILL LIMITS
- EXISTING INTERMEDIATE CONTOUR
- 90 — EXISTING INDEX CONTOUR
- EW-37 — EXISTING EXTRACTION WELL
- EXISTING KNOCKOUT SUMPS
- ⊕ EXISTING VALVE
- EXISTING GAS PIPE
- ABANDON EXISTING GAS PIPE
- ⊕ MW P3 — EXISTING LFG MONITORING WELL

METHANE MONITORING WELLS

ID	EXCEEDANCE
MW P1	NO
MW P2	NO
MW P3	NO
MW P4	YES
MW P5	YES
MW P6	YES
MW P7	YES
MW P8	YES
MW P9	YES
MW P10	YES
MW P11	YES
MW P12	NO

03/15/11 12:11:52 PM G:\CATAWBA\NEWTON METHANE REMEDIATION\REMEDATION PLAN\FINAL\FIGURE.DWG

DESIGNED BY:	MC/KJY
DRAWN BY:	KJY
SHEET CHK'D BY:	MDS
CROSS CHK'D BY:	CJC
APPROVED BY:	
DATE:	MARCH 2011

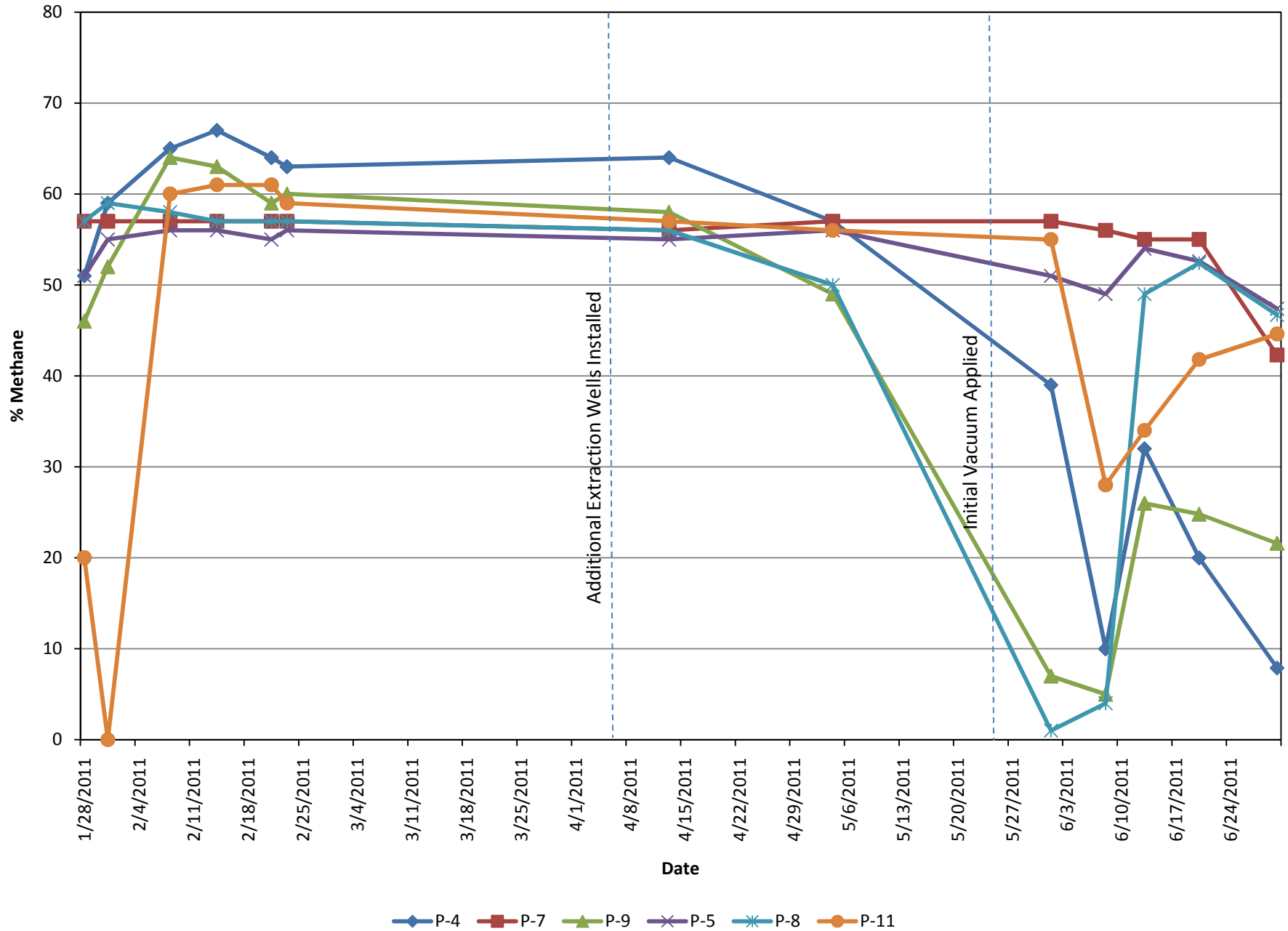
CDM
 Camp Dresser & McKee
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**CATAWBA COUNTY
 NORTH CAROLINA
 METHANE MIGRATION REMEDIATION PLAN
 NEWTON SANITARY LANDFILL**

METHANE EXCEEDANCE LOCATIONS

PROJECT NO.	6717-81467
FILE NAME:	FIGURE
	1

Figure 2
Detected Methane Concentration in Select Probes Vs. Time
Newton Sanitary Landfill





CATAWBA COUNTY

Newton Sanitary Landfill



Unoccupied Structure

McGee House

McGee Detached Garage

McGee Barn

B-4

B-3

B-2

B-1

B-5

B-6

B-7

B-8

B-9

B-10

B-11

B-12

B-13

B-14

B-15

B-16

B-17

B-18

B-19

B-20

B-21

Convenience Center

Bethany Church Road

LEGEND

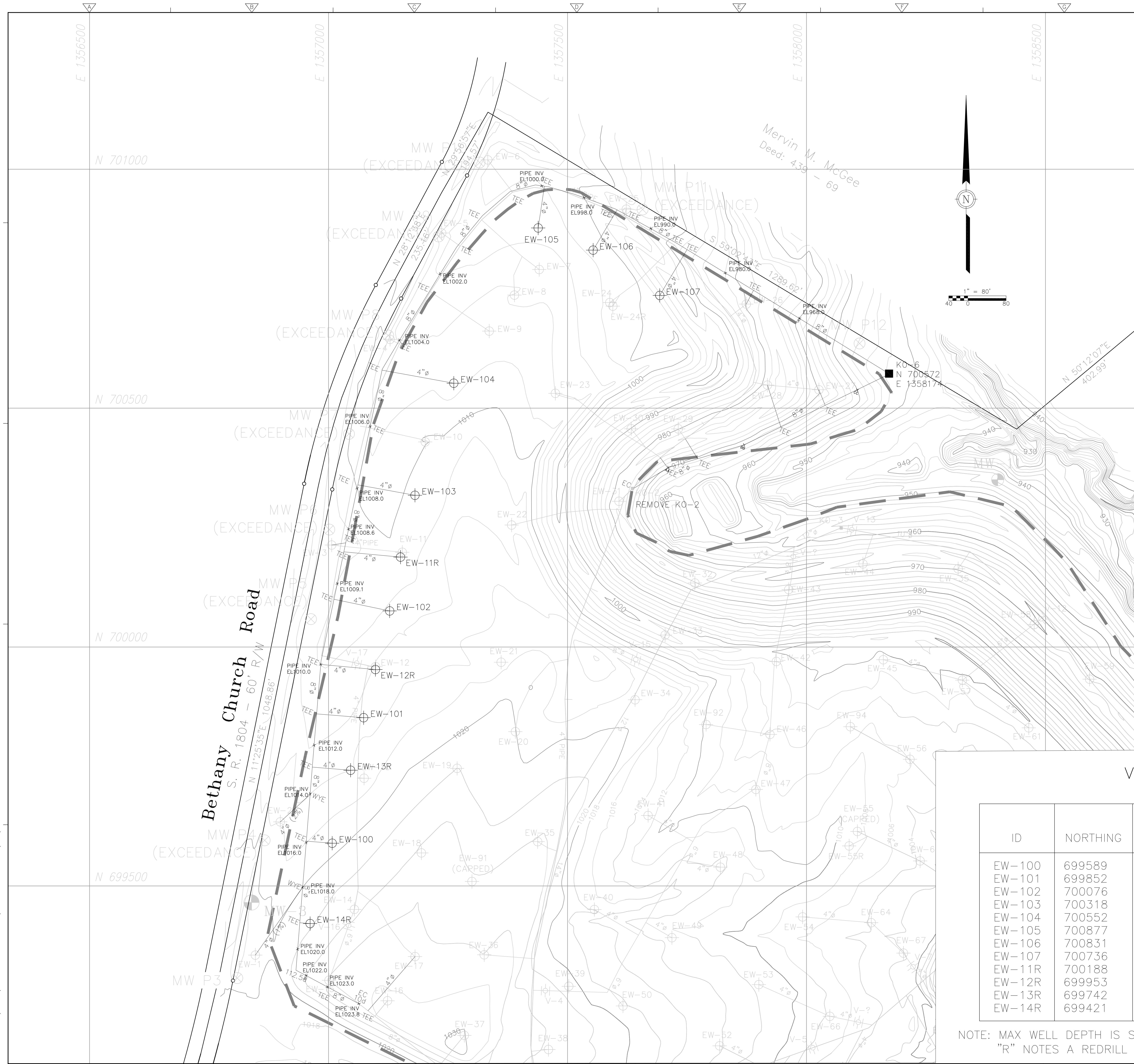
● Temporary Boring Location
B-2

□ Parcel

□ Landfill Parcel

Note: Occupied and unoccupied structures within the highlighted parcels monitored for total organics, including methane.

1 inch = Approximately 600 feet



LEGEND

- — — — — PROPERTY LINE
- - - - - SANITARY LANDFILL LIMITS
- — — — — EXISTING INTERMEDIATE CONTOUR
- — — — — 90 — — — — EXISTING INDEX CONTOUR
- ⊗ EW-37 EXISTING EXTRACTION WELL
- EXISTING KNOCKOUT SUMPS
- ⊕ EXISTING VALVE
- — — — — EXISTING GAS PIPE
- — — — — GAS PIPE
- ⊗ EW-101 EXTRACTION WELL
- KNOCKOUT SUMPS
- ⊗ MW P3 EXISTING LFG MONITORING WELL

NOTES:

1. MIN SLOPE FOR GAS PIPE IS 0.5%.

VERTICAL WELL SCHEDULE
(ELEVATIONS ARE APPROXIMATE)

ID	NORTHING	EASTING	SURFACE ELEVATION	SEASONAL HIGH GROUNDWATER ELEVATION	MAX WELL DEPTH	MAX WELL DEPTH ELEVATION
EW-100	699589	1357008	1019	985	24	995
EW-101	699852	1357073	1014	980	24	990
EW-102	700076	1357128	1012	975	27	985
EW-103	700318	1357181	1010	970	30	980
EW-104	700552	1357262	1007	965	32	975
EW-105	700877	1357439	1001	965	26	975
EW-106	700831	1357554	1001	960	31	970
EW-107	700736	1357693	996	955	31	965
EW-11R	700188	1357151	1011	975	26	985
EW-12R	699953	1357098	1014	975	29	985
EW-13R	699742	1357046	1016	980	26	990
EW-14R	699421	1356962	1022	995	17	1005

NOTE: MAX WELL DEPTH IS SURFACE EL MINUS GROUNDWATER EL MINUS 10-FT.
"R" NOTES A REDRILL OF AN EXISTING WELL

04/12/11 4:46:01 PM C:\CATAWBA\NEWTON METHANE REMEDIATION\CONSTRUCTION DOCUMENTS\VIEW\FIGURES\REV1.DWG

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KJY
 DRAWN BY: KJY
 SHEET CHK'D BY: MDS
 CROSS CHK'D BY: CJC
 APPROVED BY: [Signature]
 DATE: APRIL 2011

CDM
 Camp Dresser & McKee
 5400 Glenwood Avenue, Suite 300
 Raleigh, NC 27612
 Tel: (919) 797-6600
 North Carolina Firm License: F-0412
 consulting • engineering • construction • operations

**CATAWBA COUNTY
 NORTH CAROLINA
 METHANE MIGRATION REMEDIATION PLAN
 NEWTON SANITARY LANDFILL**

LFG SYSTEM IMPROVEMENTS

PROJECT NO. 6717-81467
 FILE NAME:
 FIGURE
4

Appendix 1
Extraction Well Bore Logs

LOG OF BORING

BORING #: **EW-11R**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 28' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
3	Red silty clay material (final cover) Some soil cover mixed with a little trash		2:34 p.m. offset from stake to be inline with EW-102
6	Hit waste about 5' down	N	
9	Waste C&D material, industrial, residential, insulatio	N	
12	Waste	N	
15	Waste	N	
18	Waste	N	
21	Waste	N	
24	Waste	N	
27	Waste	Y	
30	Bottom of boring @ 28' - last 1 foot of material was soil low water level in this borehole		
33			
36			
39			

LOG OF BORING

BORING #: **EW-12R**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 19' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
	Red silty clay material (final cover)		12:47 p.m.
3	Some soil cover mixed with a little trash		
	Hit waste about 5' down		
6		Y	water coming in
	Waste C&D material, industrial, residential wet @ 8' deep	Y	
9			
	Waste	N	
12			
	Waste	N	
15			
	Soil	Y	end of waste waste about 13' deep
18			
	Soil @ 19' - asumed to be in an separation/operation berm - stopped drilling Bottom of boring @ 19' perched water continuing to enter borehole		1:15 PM
21			
24			
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-13R**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 26' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
	Red silty clay material (final cover)		
3	Some soil cover mixed with a little trash		
	Hit waste about 4' down		
6			
	Waste C&D material, industrial, residential		
9			
12	Waste	N	
15	Waste	N	
18	Waste	N	
21	Waste	N	
24	Waste		end of waste waste about 21' deep
	bucket bringing up dirt @ 25' Bottom of boring @ 26'		
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-14R**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 19.5' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
	Red silty clay material (final cover)		8:54 a.m
3	Some soil cover mixed with a little trash		
	Hit waste about 4' down		
6			
	Waste C&D material, residential, sliced tires		
9			
	Waste becoming damp/wet about 10 feet	Y	
12		Y	
	Waste	Y	
15		Y	
18	End of waste at @ 18.5' - bottom of auger plug was dirt		waste about 14.5' deep
	Advanced 1 more foot to 19.5' to verify end of waste water coming in the borehole	Y	9:15 a.m.
21			
24			
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-100**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 22' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
	Red silty clay material (final cover)		9:30 a.m.
3	Some soil cover mixed with a little trash		
	Hit waste about 4' down		
6			
	Waste C&D material, residential, sliced tires, wires, hose		
9			
	Waste becoming damp @ 12'	Y	
12			
	Waste	Y	
15			
	Waste	Y	waste about 14.5' deep
18			
	Waste	Y	water coming in the hole
21			
	Bottom of boring @ 22'		end of waste
24			9:50 a.m.
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-101**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 18.5 Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
	Red silty clay material (final cover)		10:54 am
3	Some soil cover mixed with a little trash		
	Hit waste about 4' down		
6			
	Waste insulation, C&D material, residential		
9			
12	Waste	N	
15	Waste	N	
18	Waste - wet at 18' - water pouring in the borehole and filled to about 7' deep from bottom	Y	
	Bottom of boring @ 18.5'		end of waste waste about 14.5' deep
21			11:07 am
24			
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-102**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 22' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
3	Red silty clay material (final cover) Some soil cover mixed with a little trash		1:27 p.m. 12' offset from stake to avoid berm
6	Hit waste about 4.5' down	N	
9	Waste C&D material, industrial, residential, insulatio wet @ 7' deep	Y	water coming in
12	Waste	Y	
15	Waste	Y	
18	Waste	Y	
21	Soil @19' - asumed to be in a operational berm - stopped drilling		
24	Bottom of boring @ 22' - last 1 foot of material was soil Borehole filling in with perched water		end of waste @21' waste about 17' deep 1:58 p.m.
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: **EW-103**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 6-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 20' Method Used: Bucket Auger 36-inches
 Inspector sanford

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
3	Red silty clay material (final cover) Some soil cover mixed with a little trash		3:30 p.m. offset from stake to be inline with EW-102 water pouring in
6	Hit waste about 5' down	N	
9	Waste C&D material, industrial, residential, insulatio Wet @ 7' deep	N	
12	Waste	Y	
15	Waste	Y	
18	Waste slow drilling due to perched water	Y	
21	Bottom of boring @ 20' - stopped drilling due to perched water - still in waste material about 6-7 ft. of water in the borehole		
24			
27			
30			
33			
36			
39			

LOG OF BORING

BORING # EW-104

Project Catawba County LFG Well Inst Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 24' Method Used: Bucket Auger 36-inches
 Inspector Hamby

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
3	Red silty clay material (final cover) Some soil cover mixed with a little trash	N	7:30 AM Drilled 5' and hit water abandoned well and moved SW about 50'
6	Soil cover	N	
9	Hit waste about 7' down Waste wood, shingles, plastic	N	
12	Waste furniture wood, paper	N	
15	Waste fabric rolls, plastic	N	
18	Waste wood. Paper, fabric	N	
21	Waste wire, plastic	N	
24	Waste mixed with dirt Bottom of boring @ 24' - last foot was soil	N	
27			
30			
33			Completion 8:10 am
36			
39			

LOG OF BORING

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 22.5' Method Used: Bucket Auger 36-inches
 Inspector Hamby

BORING #: EW-105
 Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)	
			8:30 AM	
3	Red silty clay material (final cover)	N	No signs of water waste was dry all the way to bottom.	
4	Soil cover Hit waste about 5' down			
6	Waste plasitic, cloth rolls	N		
9	Waste wood, shingles, plastic	N		
12	Waste foam material, paper, plastic	N		
15	Waste residential, cloth	N		
18	Waste cloth, wire	N		
21	Waste plastic, paper	N		
22.5	Bottom of boring @ 22.5' - last foot was soil	N		Completion 9:10 am
24				
27				
30				
33				
36				
39				

LOG OF BORING

BORING #: **EW-106**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 25.5' Method Used: Bucket Auger 36-inches
 Inspector Hamby

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
			9:30 AM
3	Red silty clay material (final cover)	N	
6	Hit waste about 6' down cloth, plastic	N	
9	Waste fabric reels, wire, plastic	Y	hit a pocket of water
12	Waste wire, cloth, paper	Y	
15	Waste furniture wood, plastic	DAMP	waste is dryer
18	Waste cloth rolls, plastic	DAMP	
21	Waste cloth, plastic, wood	DAMP	Not a lot of water running into well.
24	Waste plastic, paper		Completion 10:00 am
25.5	Bottom of boring @ 25.5' - last foot was soil		
27			
30			
33			
36			
39			

LOG OF BORING

BORING #: EW-107

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 33.5 Method Used: Bucket Auger 36-inches
 Inspector Hamby

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)	
3	Red silty clay material (final cover)	N	10:30 AM Drilled 6' and hit water moved bore east 50'	
6	soil cover	N		
	Hit waste fabric, plastic, paper			
9	Waste fabric reels, wire, plastic	N		
12	Waste upholstery fabric, plastic, dirt	N		
15	Waste yarn rolls, wire, cushion material	DAMP		
18	Waste wood, plastic, paper	DAMP		
21	Waste wood, cloth, wire	DAMP		
24	Waste yarn, paper, plastic	DAMP		
27	Waste residential	DAMP		
30	Waste wood, paper, cloth	Y		
33	Waste paper, plastic mixed with dirt	Y		
	Bottom of boring @ 33.5' - last foot was soil			Completion 11:30 am
36				
39				

LOG OF BORING

BORING #: **EW-108**

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 19' Method Used: Bucket Auger 36-inches
 Inspector Hamby

Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
3	Red silty clay material (final cover)	N	12:45 PM WELL IS DRY No water running in. waste is still readable
6	soil cover Hit waste fabric, plastic, paper	N	
9	Waste fabric reels, wire, plastic	N	
12	Waste paper, plastic, carpet	N	
15	Waste paper rolls, fabric, wood	N	
18	Waste yarn, cloth strips, plastic	N	
19	Bottom of boring @ 19' - last foot was soil		
21			
24			
27			
30			
33			
36			
39			

LOG OF BORING

Project Catawba County LFG Well Install Location Newton Landfill
 Date Drilled 7-Apr-11 Drilling Co.: Kellett's Well Boring
 Total Depth 18' Method Used: Bucket Auger 36-inches
 Inspector Hamby

BORING # EW-109
 Page 1 of 1
 Water elev: _____

Depth (feet)	Sample Description	Wet (Y/N)	Remarks (time)
			1:45 PM
3	Red silty clay material (final cover)	N	
4	soil cover		
6	Hit waste between 5' and 6' fabric, plastic, paper	N	
9	Waste fabric reels, plastic	Y	
12	Waste wood, shingles, paper	Y	
15	Waste cloth, paper	Y	
18	Waste yarn, cloth strips, plastic	Y	
20	Bottom of boring @ 18' had to stop boring, material to wet to pull out of bore.		Completion 2:15 pm
21			water level not rising in well,
24			
27			
30			
33			
36			
39			