

RECEIVED

JUN 16 2010

CEC

Fac/Perm/Co ID #	Date	Doc ID#
95-02	6/21/10	10903

SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CERTIFICATION REPORT
LANDFILL GAS COLLECTION AND CONTROL
SYSTEM MODIFICATIONS

WATAUGA COUNTY LANDFILL
BOONE, NORTH CAROLINA



Prepared for:

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

2090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

On behalf of:

WATAUGA COUNTY SOLID WASTE DEPARTMENT

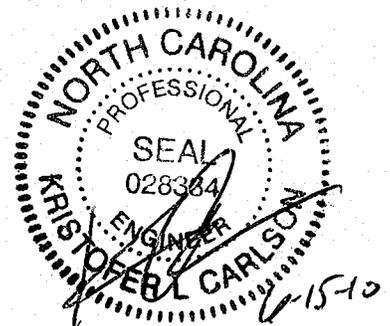
336 Landfill Road
Boone, NC 28607
(828) 264-5305

Prepared by:

CARLSON ENVIRONMENTAL CONSULTANTS, PC

305 S. Main Street
Monroe, NC 28112
(704) 283-9765

June 2010





Fac/Perm/Co ID #	Date	Doc ID#
95-02	6/21/10	10903

CARLSON ENVIRONMENTAL CONSULTANTS, PC

LANDFILL GAS, AIR PERMITTING, AND REGULATORY COMPLIANCE SERVICES

June 15, 2010

Mr. Allen Gaither
Environmental Engineer
NCDENR
Division of Waste Management
2090 US Highway 70
Swannanoa, NC 28778

VIA FEDERAL EXPRESS

RECEIVED

Subject: Construction Certification Report
LFG System Modifications
Watauga County Landfill – Boone, NC

JUN 16 2010

SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

Dear Mr. Gaither,

Per your letter request dated May 18, 2010, and on behalf of Watauga County, North Carolina, Carlson Environmental Consultants, PC (CEC) is submitting two (2) copies of this Construction Certification Report (Report) for the construction of the landfill gas (LFG) pipeline and replacement of three (3) gas extraction wells at the Watauga County Landfill (Landfill) located in Boone, North Carolina. This report documents the construction activities from the beginning of construction on May 10, 2010 through May 27, 2010.

PROJECT SUMMARY

Carlson Environmental Consultants, PC was retained by the Watauga County Landfill to install a 6" HDPE gas transmission line from the existing LFG blower/flare station to the future location of the Landfill Gas-to-Energy (LFGTE) engines, as well as drill three (3) replacement extraction wells for existing wells EW-13, EW-14 and EW-15. The pipeline project began on May 10th and was finished on May 24th and the well drilling began on May 25th and was finished on May 26th.

305 SOUTH MAIN STREET
MONROE, NC 28112
704-283-9765
704-283-9755 FAX

12715 KEY LIME BLVD
WEST PALM BEACH, FL 33412
863.634.7185
704-283-9755 FAX

PARTIES INVOLVED

The following parties were involved in this Project and their respective roles are detailed below:

Watauga County, North Carolina

Watauga County, North Carolina (County) is the owner and operator of the Watauga County Landfill and the owner and operator of the landfill gas collection system. The County provided waste disposal for the excavated waste materials from the replacement wells. The waste was placed in roll-off containers and delivered by the County to the on-site transfer station. The County also provided backfill soil and excavation equipment.

Kellets Well Boring, Inc.

Kellets Well Boring, Inc. of Simpsonville, South Carolina provided the LFG extraction well drilling services for EW-13R, EW-14R and EW-15R.

Carlson Environmental Consultants, PC

Carlson Environmental Consultants, PC (CEC) of Monroe, North Carolina was the engineer of record for the project and provided construction services and full-time construction quality oversight throughout. CEC representatives were present during construction on a full-time basis to inspect construction activities in accordance with the Project Plans and Specifications. The field work was performed by Mr. Craig Evans, Mr. Ken Wiggins and Mr. Jamie Miller of CEC and Mr. Kristofer L. Carlson, P.E. of CEC was the certifying engineer.

LANDFILL BACKGROUND

The Watauga County Landfill is a closed municipal solid waste (MSW) landfill located off Highway 421 approximately one mile east of the Town of Boone. The facility is owned and operated by Watauga County, North Carolina. The Landfill was operated as a sanitary landfill under Solid Waste Permit No. 95-01 from 1972 to 1984 and under Permit No. 95-02 from 1984 to 1994. In addition to MSW, the facility also accepted yard waste and construction and demolition (C&D) material.

The MSW landfill was closed in 1994 and the County began operation of an onsite transfer station. The Landfill does not have a Subtitle D liner system or a leachate collection system. In 1996, a final cover system was installed over the MSW portions of the Landfill that consisted of a 40-mil LLDPE synthetic cap overlain with 24-inches of soil cover. Included with the final cover was the installation of twenty-two (22) passive gas vents.

In 2005 and 2006, an active landfill gas collection and control system was installed at the Landfill. This system was designed and permitted by CEC and installed by McGee Environmental, Inc. The collection system utilized the 22 existing gas vents and installed 4-inch, 6-inch, and 8-inch SDR 17 HDPE piping from each gas well to a new blower/flare station. The blower/flare is a Perennial Energy, Inc. unit that is capable of combusting up to 300 scfm of LFG.

The Landfill is not subject to the New Source Performance Standards (NSPS) as listed in 40 CFR Part 60 – Subpart WWW or the National Emission Standards for Hazardous Air Pollutants (NESHAP) as listed in 40 CFR Part 61.

CONSTRUCTION SCOPE

LFG Pipeline Installation

A 6-inch SDR 17 HDPE pipeline was constructed between the existing LFG open flare system and a future landfill gas-to-energy (LFGTE) plant located near the Watauga County Landfill's new maintenance shop. The length of this pipeline was approximately 1,200 linear feet and the alignment was off the waste footprint. The pipeline was designed and constructed by CEC.

The pipeline trench was approximately 24 to 30 inches deep with the final depth of the 6-inch gas line being approximately 18 inches below grade (top of pipe). The pipeline was encased in a 12 inch corrugated metal pipe at all road and ditch crossings. A 12 inch SDR 17 HDPE condensate sump was installed at the low point between the blower/flare station and the inlet to the LFGTE building. The condensate sump was installed at a location approved by Watauga County personnel. The sump was designed to be manually pumped via a suction truck.

A 3-inch stainless steel ball valve was installed at the inlet to the pipeline at the blower/flare station to allow the pipeline to be closed-off during operation of the flare stack. A 6-inch butterfly valve was installed at the end riser near the LFGTE building to allow the County to shut-off the LFG supply from the pipeline.

No deviations to the plans and information provided to the NCDENR were made.

LFG Well Installation

Per the NCDENR approved plans, three (3) replacement gas extraction wells were drilled for EW-13, EW-14, and EW-15. The new wells were labeled EW-13R, EW-14R, and EW-15R (see the attached site plan drawing in Attachment D). Kellets Well Drilling provided the well drilling equipment and an operator and CEC provided the installation materials and labor to complete each well. The County provided all waste disposal and

all waste removed from each well was moved to the County's on-site waste transfer station.

Each well was staked and an approximate 48" x 48" square of the Landfill's final synthetic cap was removed. The replacement wells were drilled to a depth of approximately 25 feet (based on observation of waste removed from each well). A bentonite plug was installed at the base of each well and the wells were constructed using 6-inch SCH80 PVC pipe, 1" to 3" stone, two additional bentonite seals, and soil backfill (see the attached well logs in Attachments B and C). Once backfilled, a replacement section of 60-mil geosynthetic liner material was HDPE welded to the existing liner and booted and banded around each well. CEC performed the HDPE extrusion welding and provided the CQA observation.

Wellheads were installed on each new well and a 4-inch SDR 17 HDPE gas lateral was installed above the final cap to the new wells to provide vacuum. The vegetative cover was restored to pre-construction conditions and all disturbed areas were seeded, mulched, and stabilized with tacking material.

No deviations to the plans and information provided to NCDENR were made.

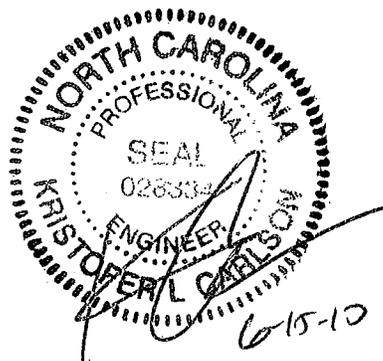
ATTACHMENTS

Per your letter to Mr. J.V. Potter (Landfill), dated May 18, 2010, CEC has included the following documents:

- Attachment A - CEC's Field Report Forms
- Attachment B - CEC's Drill Logs
- Attachment C - Kellett's Drill Logs
- Attachment D - As-built Drawings
- Attachment E - Construction Photographs

CERTIFICATION

Based on the information provided to me by CEC personnel, Kelletts Well Boring, Inc., and Watauga County personnel and my on-site inspections, it is my professional opinion that the landfill gas pipeline installation and the installation of replacement gas wells EW-13R, EW-14R and EW-15R were constructed in accordance with the Project Plans and Specifications.



Mr. Allen Gaither
June 15, 2010
Page 5 of 5

CLOSING

Please feel free to call me at (704) 283-9765 if you have any questions or require additional information.

Sincerely,



Kristofer L. Carlson, P.E.
Principal
Carlson Environmental Consultants, PC

cc: JV Potter, Watauga County
Lisa Doty, Watauga County
Stevia Morton, CEC

APPENDIX A

CEC DAILY FIELD REPORTS

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-10-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig, Ken

Project Day No.: 1

Time In: 6:50 am

Time Out: 7:30 pm

Total Hours: 12.40

Miles Driven: 15

Temperature: low 33
high 59

Weather: Partly Cloudy

Pressure: 30.31

Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Mobilization to Landfill site. Met with JV Potter of Watauga County. Dug ditch around electric line and sewer and water lines. Fused up 6" pipe for LFG transmission pipeline.

CEC Notes: Ken Wiggins onsite CQA

Record Prepared By: Craig Evans

Date: 5-10-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill
Date: 5-11-10
Project: LFG System Modification
Site: Watauga County Landfill
Location: Boone, NC
CEC Personnel: Craig, Ken, Jamie

Project Day No.: 2
Time In: 7:00 am
Time Out: 8:30 pm
Total Hours: 12.5
Miles Driven: 15
Temperature: low 46
high 53

Weather: Partly Cloudy
Pressure: 30.30
Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Continued excavation and installation of 6" LFG transmission pipeline. Approximately 500 linear feet of pipeline installed.

CEC Notes: Ken Wiggins onsite CQA

Record Prepared By: Craig Evans

Date: 5-11-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-12-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig, Jamie, Ken

Project Day No.: 3

Time In: 7:00 am

Time Out: 8:00 pm

Total Hours: 13

Miles Driven: 15

Temperature: low 53
high 73

Weather: Partly Cloudy

Pressure: 30.25

Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Installed LFG pipeline behind cement wall. Cleaned up 500' of ditch. Dug out 250' of ditch. Fused up 6" SDR 17 HDPE pipe.

CEC Notes: Ken Wiggins onsite CQA

Record Prepared By: Craig Evans

Date: 5-12-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-13-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig, Ken, Jamie

Project Day No.: 4

Time In: 7:00 am

Time Out: 8:45 pm

Total Hours: 12.75

Miles Driven: 15

Temperature: low 57
high 78

Weather: Partly Cloudy

Pressure: 30.30

Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Completed installation of the 6" LFG transmission line. Cleaned up pipeline areas. Installed condensate sump per County approved location. Approximately 600 linear feet of 6" pipeline installed.

CEC Notes: Ken Wiggins onsite CQA

Record Prepared By: Craig Evans

Date: 5-13-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-17-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig

Project Day No.: 5

Time In: 9:00 am

Time Out: 7:00 pm

Total Hours: 10

Miles Driven: 135

Temperature: low 55
high 69

Weather: Partly Cloudy

Pressure: 30.04

Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Installed V-cut ball valve and new SS spool for blower/flare diversion line.

CEC Notes:

Record Prepared By: Craig Evans

Date: 5-17-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-24-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig & Jamie

Project Day No.: 6

Time In: 9:00 am

Time Out: 3:00 pm

Total Hours: 6

Miles Driven: 170

Temperature: low 53
high 69

Weather: Partly Cloudy

Pressure: 30.21

Equipment: N/A

Contractor Activities: Mobilization to site. Installed valves and flanges at blower/flare station. Well locations stalked and liner material removed (48" x 48" section) at each well.

CEC Notes: Kelletts mobilized drill rig to site. County personnel prepared roll-off containers to receive waste materials. Craig Evans provided CQA on liner work.

Record Prepared By: Craig Evans

Date: 5-24-10

Page 1 of 1

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-25-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig & Jamie

Project Day No.: 7

Time In: 7:15am

Time Out: 8:45pm

Total Hours: 12.5

Miles Driven: 15

Temperature: low 57
high 73

Weather: Partly Cloudy

Pressure: 30.23

Equipment: Generator, Chevy Truck and tools, 4" pitbull

Contractor Activities: Kelletts drilled replacement wells EW-13R, EW-14R and EW-15R.
Backfilled and completed wells.

CEC Notes: Craig Evans provided onsite CQA on well drilling.

Record Prepared By: Craig Evans

Date: 5-25-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-26-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig & Jamie

Project Day No.: 8

Time In: 7:00am

Time Out: 9:30pm

Total Hours: 14.5

Miles Driven: 15

Temperature: low 55
high 78

Weather: Partly Cloudy

Pressure: 30.09

Equipment: Chevy Truck and tools, Generator and Excursion equipment

Contractor Activities: Installed 4" SDR 17 HDPE gas laterals to EW-13R, EW-14R and EW-15R.

CEC Notes: Prep for HDPE liner boot installations at EW-13R, EW-14R and EW-15R. Craig Evans provided CQA services.

Record Prepared By: Craig Evans

Date: 5-26-10

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

Landfill Gas, Air Permitting, and Regulatory Compliance Services

CQA DAILY FIELD REPORT

Client: Watauga County Landfill

Date: 5-27-10

Project: LFG System Modification

Site: Watauga County Landfill

Location: Boone, NC

CEC Personnel: Craig, Ken

Project Day No.: 9

Time In: 6:30am

Time Out: 8:00pm

Total Hours: 13.5

Miles Driven: 15

Temperature: low 55
high 80

Weather: Partly Cloudy

Pressure: N/A

Equipment: Chevy Truck, Generator, Excursion Equipment

Contractor Activities: Welded new liner boots at EW-13R, EW-14R and EW-15R. Completed seed, mulch and tack on all disturbed areas.

CEC Notes: Kris Carlson provided CQA on liner repairs.

Purchased: 10 loads of dirt, seed and straw, 6" Bolt Kit, 1" Valve kit

Record Prepared By: Craig Evans

Date: 5-27-10

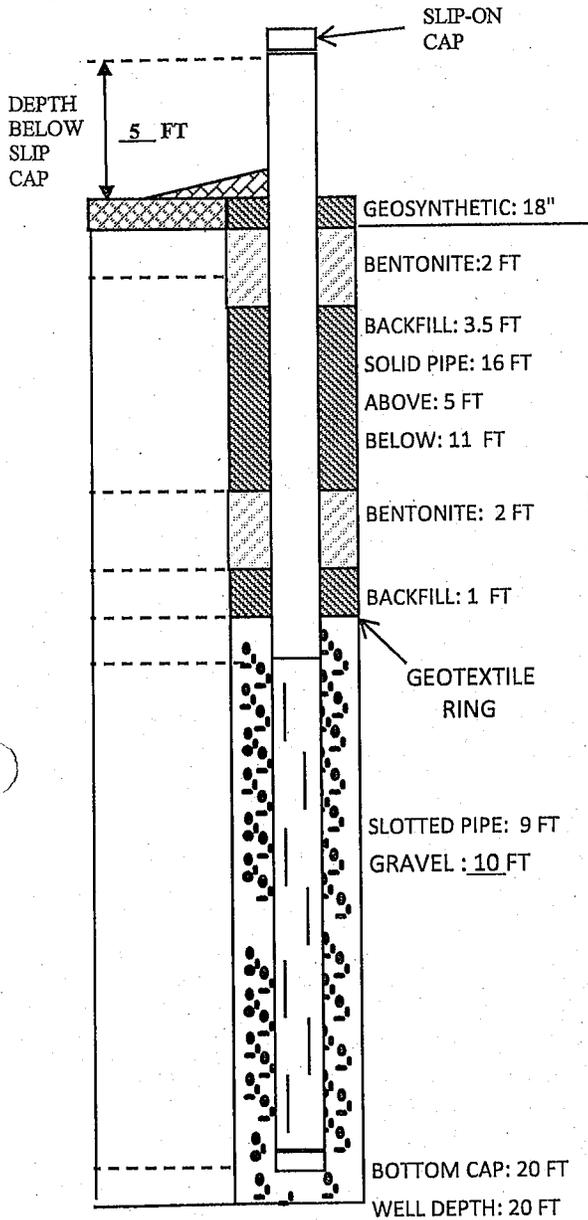
APPENDIX B

CEC'S DRILL LOGS



DRILLING AND COMPLETION LOG

PROJECT NAME: WATAUGA COUNTY
 PROJECT NO.: LFG SYSTEM MODIFICATION
 DATE: 5.25.10
 WELL NO.: 13 R



DRILL	36"	WEATHER	74 °F
COMP	TRANSIT	START DRILLING	3:10 PM
ABAN.	N/A	FINISH DRILLING	5:00 PM
SOLID	16'	GRAVEL	10'
PERF.	9'		

DEPTH	COMPOSITION	TEMP (F)	DEGREE OF DECOMP	AMT OF MOISTURE
0-2	DIRT	68	NONE	NONE
2-20	DIRT/MSW	68	LOW	LOW
20-30				
30-40				
40-50				
50-60				
60-70				
70-80				
80-90				
90-100				
100-110				
110-120				
120-130				
130-140				

BORING DIA: 36 INCHES

TD: 20' FT

NOTES:

DRILL 36' HOLE 20' DEEP. TRASH WAS LIGHTLY DAMP WITH LITTLE GAS

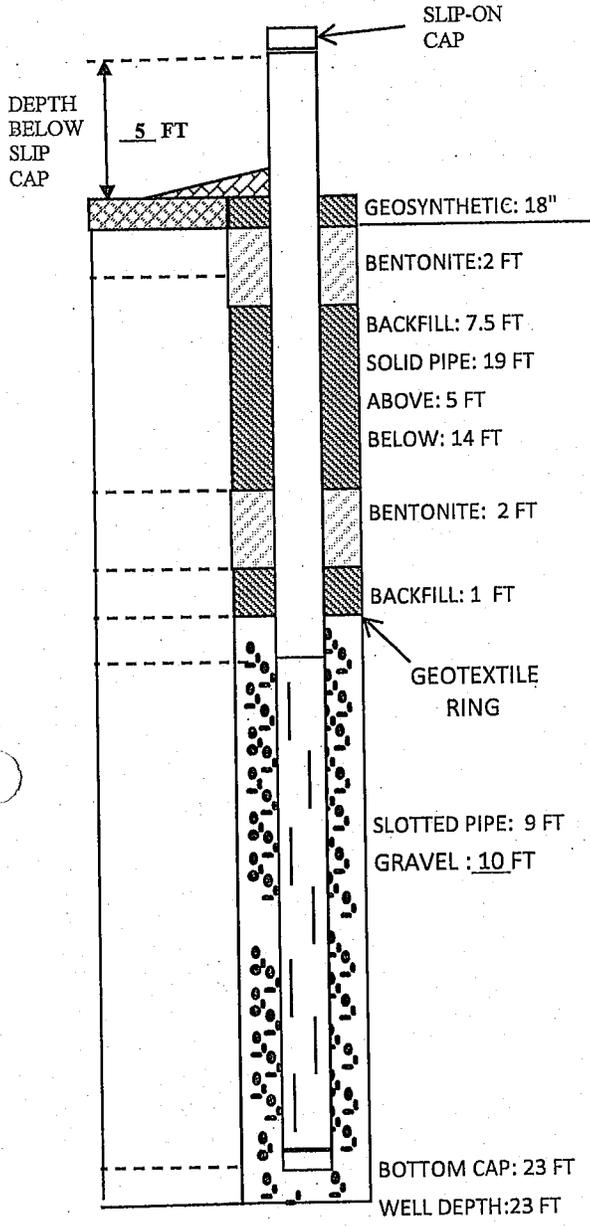
CRAIG EVANS
 CEC PERSONNEL

5.25.10
 DATE



DRILLING AND COMPLETION LOG

PROJECT NAME: WATAUGA COUNTY
 PROJECT NO.: LFG SYSTEM MODIFICATION
 DATE: 5.25.10
 WELL NO.: 14 R



DRILL	36"	WEATHER	74 °F
COMP.	TRANSIT	START DRILLING	12:25 PM
ABAN.	N/A	FINISH DRILLING	2:40 PM
SOLID	19'	GRAVEL	10'
PERF.	9'		

DEPTH	COMPOSITION	TEMP (F)	DEGREE OF DECOMP	AMT OF MOISTURE
0-2	DIRT	69	NONE	NONE
2-20	DIRT/MSW	69	LOW	LOW
20-30	MSW	69	LOW	LOW
30-40				
40-50				
50-60				
60-70				
70-80				
80-90				
90-100				
100-110				
110-120				
120-130				
130-140				

BORING DIA: 36 INCHES

TD: 23' FT

NOTES:

WELL WAS DUG TO 23' TRASH WAS DRY, LIGHTLY MOIST

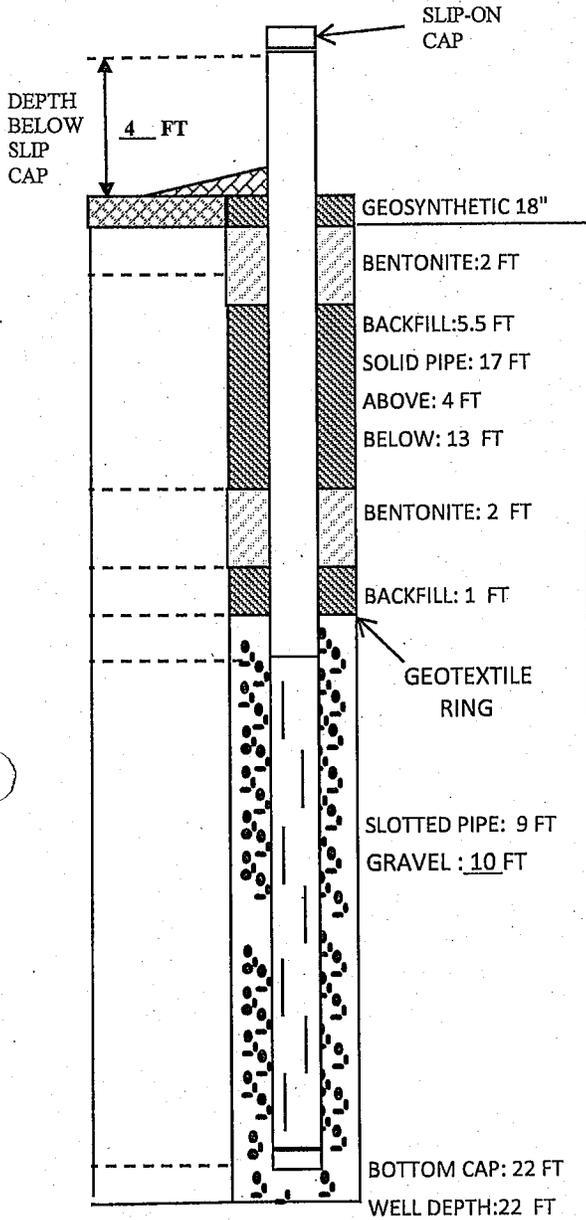
CRAIG EVANS
 CEC PERSONNEL

5.25.10
 DATE



DRILLING AND COMPLETION LOG

PROJECT NAME: WATAUGA COUNTY
 PROJECT NO.: LFG SYSTEM MODIFICATION
 DATE: 5.25.10
 WELL NO.: 15 R



DRILL	36"	WEATHER	74 °F
COMP	TRANSIT	START DRILLING	10:00 PM
ABAN	N/A	FINISH DRILLING	12:00 PM
SOLID	17'	GRAVEL	10'
PERF.	9'		

DEPTH	COMPOSITION	TEMP (F)	DEGREE OF DECOMP	AMT OF MOISTURE
0-2	DIRT	68	NONE	NONE
2-20	MSW	68	LOW	LOW
20-30	MSW	68	LOW	LOW
30-40				
40-50				
50-60				
60-70				
70-80				
80-90				
90-100				
100-110				
110-120				
120-130				
130-140				

BORING DIA: 36 INCHES

TD: 22' FT

NOTES:

DRILL TO 22', TRASH WAS LIGHTLY MOIST, NO GAS

CRAIG EVANS
 CEC PERSONNEL

5.25.10
 DATE

APPENDIX C

KELLETT'S DRILL LOGS

APPENDIX D

AS BUILT DRAWINGS

