

NC DENR **Environmental Monitoring Reporting Form**
 Division of Waste Management - Solid Waste

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- Prepare one form for each individually monitored unit.
- Please type or print legibly.
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i)).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Golder Associates NC, Inc. on behalf of Henderson County

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: David Y. Reedy II Phone: 336-852-4903
 E-mail: dreedy@golder.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Henderson County Closed Landfill	191 Transfer Station Drive Hendersonville, NC 28791	45-01	.1600/.0500	September 23, 2015

Environmental Status: (Check all that apply)

- Initial/Background Monitoring Detection Monitoring Assessment Monitoring Corrective Action

Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells Methane gas monitoring data
 Groundwater monitoring data from private water supply wells Corrective action data (specify) _____
 Leachate monitoring data Other(specify) _____
 Surface water monitoring data

Notification attached?

- No. No groundwater or surface water standards were exceeded.
 Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
 Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

David Y. Reedy II, P.G. Senior Hydrogeologist 336-852-4903
 Facility Representative Name (Print) Title (Area Code) Telephone Number
 Signature *David Y. Reedy II* Date 9-30-15 Affix NC Licensed/ Professional Geologist Seal

Golder Associates NC, Inc., 5B Oak Branch Drive, Greensboro, NC 27407

Facility Representative Address

C-2862

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009





September 30, 2015

083-9650615.201

Ms. Jaclynne Drummond
Compliance Hydrogeologist
North Carolina Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
2090 US Highway 70
Swannanoa, NC 28778
828-296-4706

**RE: METHANE MONITORING RESULTS – THIRD QUARTERLY EVENT OF 2015
CLOSED HENDERSON COUNTY LANDFILL, PERMIT NO. 45-01
HENDERSON COUNTY, NORTH CAROLINA**

Dear Jackie:

Attached are the results from the September 23, 2015, third quarterly methane monitoring event conducted at the above-referenced facility. As shown on the attached Boundary Gas Probe Monitoring Log, methane was detected above the lower explosive limit (LEL) during this event at compliance monitoring point MP-4. This was the second consecutive event with methane above the LEL in MP-4. Methane was detected below the LEL in assessment monitoring point MP-6 during the event. No methane was detected in the facility structures during this compliance monitoring event.

Methane concentrations were measured in landfill gas vents EW-4, EW-5, and EW-17, which are located in closed proximity to MP-4, in order to assess the source of the methane impacting MP-4. Methane was not detected in EW-5 and EW-17, but was detected in EW-4 at 58.6%. Vent EW-4 is currently constructed with a "candy cane" passive vent pipe. The County will replace this with a turbine vent in order to increase extraction of methane from the vent in order to prevent migration towards MP-4.

The closest structure to MP-4 is an unoccupied 3-sided salt storage shed on the adjacent North Carolina Department of Transportation (NC DOT) facility. The salt storage shed is located approximately 115 feet from MP-4 and is constructed with a paved floor. The open construction of the structure would not allow for the potential accumulation of methane.

A *Landfill Gas Remediation Plan – Phase 2* was submitted to the North Carolina Department of Environment and Natural Resources (NC DENR) on January 6, 2015, to address the LEL exceedances and was subsequently approved on January 21, 2015. As specified in the Plan, the landfill gas extraction wells have been converted to allow for passive venting and a turbine vent has been attached to methane monitoring well MP-5. The County installed methane monitoring wells MP-7, MP-8, and MP-9 and decommissioned TR-1 on May 7 and 8, 2015.

Please allow this letter report to act as the 7-day notification of methane exceedances as required by the North Carolina Solid Waste Management Regulations. The corrective actions instituted as part of the *Landfill Gas Remediation Plan – Phase 2* along with those stated above should allow landfill gas in the waste unit to passively vent and reduce the migration potential toward MP-4. If you have any questions or concerns, please contact us at 336-852-4903.

Golder Associates NC, Inc.
5B Oak Branch Drive
Greensboro, NC. 27407 USA

Tel: (336) 852-4903 Fax: (336) 852-4904 www.golder.com
Engineering Lic. No. C-2862/Geology Lic. No. C-399

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation

Sincerely,
GOLDER ASSOCIATES NC, INC.



David "Dusty" Y. Reedy II, PG
Senior Hydrogeologist



Rachel P. Kirkman, PG
Associate and Senior Consultant

Attachment: Boundary Gas Probe Monitoring Log – September 29, 2015
Methane Monitoring Location Map
Calibration Record

Cc: Marcus Jones, PE, Director of Engineering, Henderson County, 1 Historic Courthouse Square, Suite 6, Hendersonville, NC 28792. 828-694-6560. majones@hendersoncountync.org
(electronic copy)

Natalie Berry, PE, Assistant County Engineer, Henderson County, 100 North King Street, Hendersonville, North Carolina 28792. 828-694-6521. nberry@hendersoncountync.org

Greg Wiggins, Operations Manager, Henderson County, 191 Transfer Station Drive, Hendersonville, North Carolina 28791. 828-694-7982. gwiggins@hendersoncountync.org

g:\projects\henderson county\lfg\methane monitoring events\2015 september\45-01 henderson methane report sep 2015.docx

BOUNDARY PROBE MONITORING LOG

Date: 09/23/15

Project Name: Henderson County Landfill

Project Number: 0839650615

Site Contact: Greg Wiggins

Technician(s): Lucas Hamelman

Starting Temperature: 72.0° F

End Temperature: 73.9° F

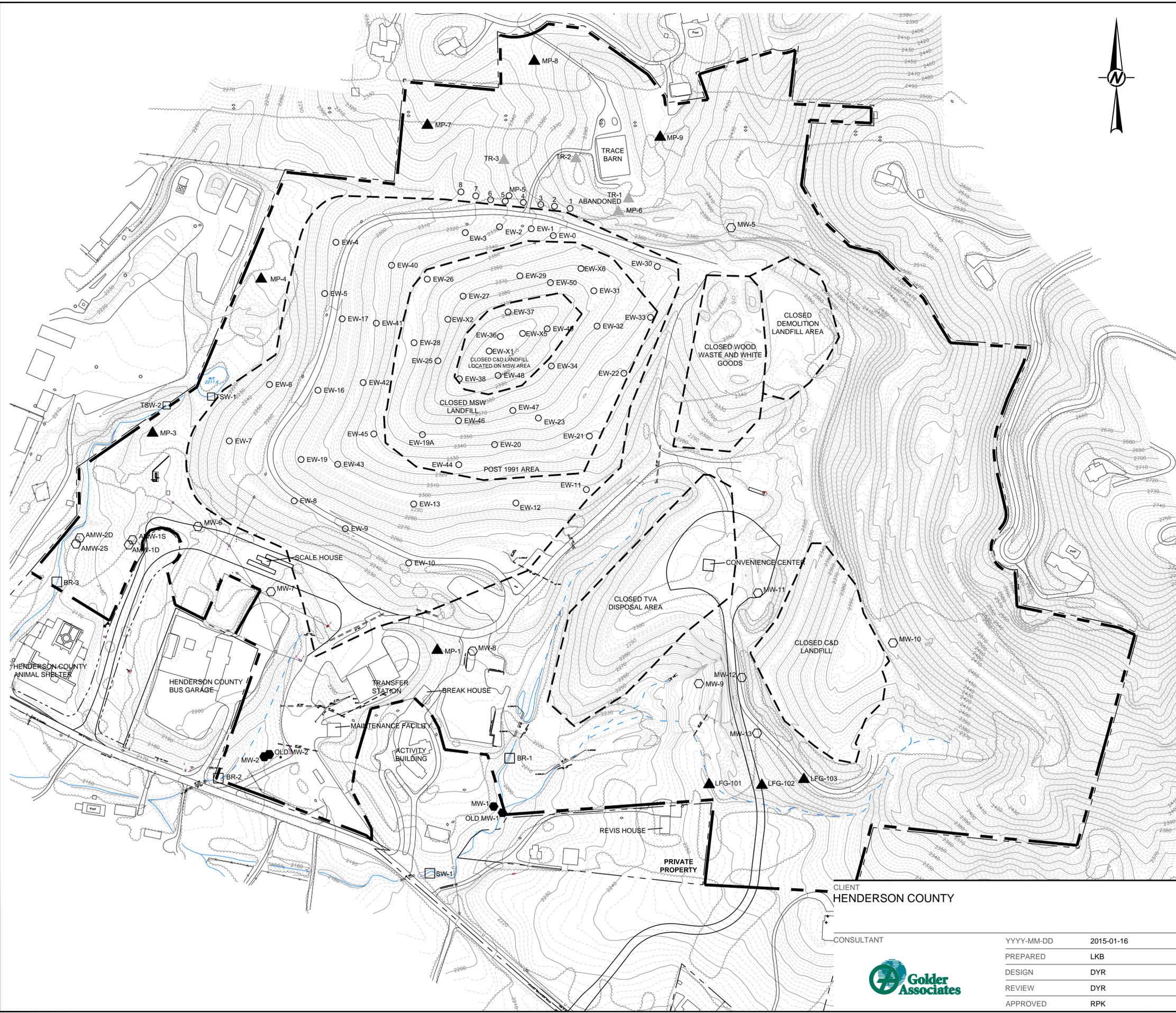
Starting Barometric Pressure: 30.18 in Hg

End Barometric Pressure: 30.11 in Hg

Monitoring Equipment: GEM 2000 plus

Monitoring Location	Time	Time Pumped (sec)	% Methane (CH ₄)	% Carbon Dioxide (CO ₂)	% Oxygen (O ₂)	% Balance Gas	Initial % LEL	Stabalized % LEL	Hydrogen Sulfide (H ₂ S, ppm)	Monitoring Point Status
MP-1	16:12	60	0.0	3.6	16.3	80.1	0	0	0.0	MSW Compliance Well
MP-3	16:01	60	0.0	1.3	18.3	80.4	0	0	0.0	MSW Compliance Well
MP-4	13:51	60	8.7	23.2	0.3	67.8	174	174	0.0	MSW Compliance Well
MP-7	14:43	60	0.0	3.8	16.3	79.9	0	0	0.0	MSW Compliance Well
MP-8	14:36	60	0.0	0.6	19.2	80.2	0	0	0.0	MSW Compliance Well
MP-9	14:21	60	0.0	2.5	17.3	80.2	0	0	0.0	MSW Compliance Well
Activity Building	16:17	200	0.0	0.0	19.6	80.4	0	0	0.0	Structure
Animal Shelter	16:35	200	0.0	0.0	19.7	80.3	0	0	0.0	Structure
Break House	13:18	200	0.0	0.1	20.5	79.4	0	0	0.0	Structure
Bus Garage	16:30	200	0.0	0.0	19.7	80.3	0	0	0.0	Structure
Convenience Center	13:58	200	0.0	0.0	20.0	80.0	0	0	0.0	Structure
Maintenance Shop	13:14	200	0.0	0.0	20.6	79.4	0	0	0.0	Structure
Scalehouse	16:07	200	0.0	0.0	19.3	80.7	0	0	0.0	Structure
Trace Barn	12:15	14:08	0.0	0.0	20.0	80.0	0	0	0.0	Structure
MP-6	15:45	60	0.8	2.0	17.5	79.7	16	16	0.0	MSW Assessment Well
TR-2	14:04	60	0.0	13.5	8.9	77.6	0	0	0.0	MSW Assessment Well
TR-3	14:55	60	0.0	25.7	4.7	69.6	0	0	0.0	MSW Assessment Well
LFG-101	13:30	60	0.0	4.4	17.0	78.6	0	0	0.0	C&D Compliance Well
LFG-102	13:36	60	0.0	0.8	19.4	79.8	0	0	0.0	C&D Compliance Well
LFG-103	13:41	60	0.0	3.4	16.7	79.9	0	0	0.0	C&D Compliance Well

Completed by: *Paul R. Reed*

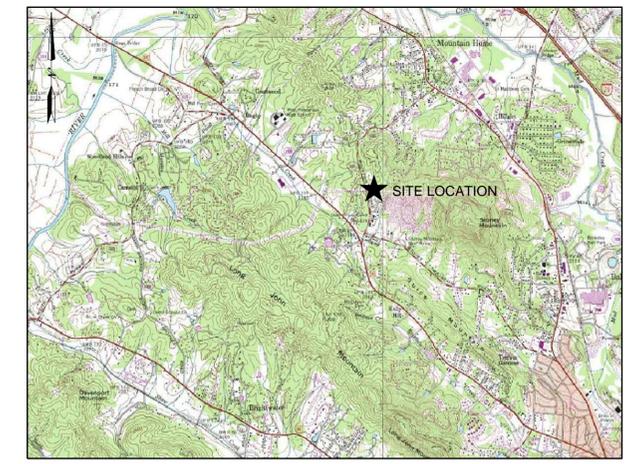


LEGEND

	EXISTING 10 FT. CONTOUR
	EXISTING 2 FT. CONTOUR
	PROPERTY LINE
	LIMITS OF WASTE
	STREAM
	BUFFER
	TREELINE
	EXISTING ROAD
	FENCE
	LFG COLLECTION PIPING
	MW-8 COMPLIANCE MONITORING WELL
	MW-1 NON COMPLIANCE MONITORING WELLS
	MP-6 COMPLIANCE METHANE MONITORING WELLS
	MP-6 ASSESSMENT METHANE MONITORING WELLS
	BR-1 SURFACE WATER MONITORING POINT
	EW-29 LFG EXTRACTION WELL CONVERTED TO PASSIVE VENTING

- NOTES**
1. TOPOGRAPHIC CONTOUR INTERVAL = 2 FEET
 2. COORDINATE SYSTEM IS N.C. STATE PLANE GRID.
 3. TOPOGRAPHIC DIVIDING LINE DIVIDES THE BASE MAP TOPOGRAPHIC CONTOURS FROM LANDSAT TOPOGRAPHIC CONTOURS. LANDSAT TOPOGRAPHIC CONTOURS HAVE A 5-CONTOUR INTERVAL.
 4. RECORDS WERE UNABLE TO BE LOCATED FOR LFG EXTRACTION WELLS EW-X1 THROUGH EW-X7 AND WERE GIVEN IDENTIFICATION NAMES UNTIL SUCH TIME THAT RECORDS ARE FOUND.

- REFERENCE**
1. BASE MAP PROVIDED BY CAMP DRESSER & McKEE FROM PREVIOUS WATER QUALITY MONITORING REPORTS.



SITE LOCATION MAP
NOT TO SCALE

PROJECT			
HENDERSON COUNTY CLOSED MSW AND C&D LANDFILL			
PERMIT # 45-01			
TITLE			
METHANE MONITORING LOCATION MAP			
PROJECT No.	PHASE	Rev.	DRAWING
0839650614		1	1

CLIENT	HENDERSON COUNTY
CONSULTANT	
DATE	2015-01-16
PREPARED BY	LKB
DESIGNED BY	DYR
REVIEWED BY	DYR
APPROVED BY	RPK



Path: \\gmsrcb\cadd\Projects\08396506 - Henderson\PRODUCTION - E - Methane Monitoring | File Name: 08396506_1E01.dwg

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 13832
Description GEM 2000 +
Calibrated 9/22/2015 11:06:13AM

Manufacturer CES Landtec	State Certified
Model Number GEM2000+	Status Pass
Serial Number/ Lot Number GM11198	Temp °C 22
Location North Carolina	Humidity % 59
Department	

Calibration Specifications

<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
Group # 1 Group Name Methane Stated Accy Pct of Reading				Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.00			
50.00 / 50.00	%Volume	50.00	%Volume	50.00	50.00	0.00%	Pass
Group # 2 Group Name Carbon Dioxide Stated Accy Pct of Reading				Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.00			
35.00 / 35.00	%Volume	35.00	%Volume	35.00	35.00	0.00%	Pass
Group # 3 Group Name Oxygen Stated Accy Pct of Reading				Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.00			
20.90 / 20.90	%Volume	20.90	%Volume	20.90	20.90	0.00%	Pass
Group # 4 Group Name Carbon Monoxide Stated Accy Pct of Reading				Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.00			
50.00 / 50.00	PPM	50.00	PPM	50.00	50.00	0.00%	Pass
Group # 5 Group Name Hydrogen Sulfide Stated Accy Pct of Reading				Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.00			
25.00 / 25.00	PPM	25.00	PPM	25.00	25.00	0.00%	Pass

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 13832
Description GEM 2000 +
Calibrated 9/22/2015 11:06:13AM

<u>Test Instruments Used During the Calibration</u>					<u>(As Of Cal Entry Date)</u>	
<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Last Cal Date/ Opened Date</u>	<u>Next Cal Date / Expiration Date</u>
NC 4 GAS MAO-412-3 EXP 5/16	NC 4 GAS MIX LOT CAO-412.4	Calgaz	GP 12089	MAO-412-3		5/18/2016
NC 50/35 CO2 LOT 1027FB12 11/16	NC 50 CH4/35 CO2	American Gas Group	GP 12126			11/30/2016

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Duke

All instruments are calibrated by Pine Environmental Services, LLC. according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services, LLC. of any defect within 24 hours of receipt of equipment
Please call 866-960-7463 for Technical Assistance