

**ROCK CREEK LANDFILL**  
**CALAVERAS COUNTY**  
**TIER 2 TESTING SUMMARY REPORT**

Prepared for  
Calaveras County  
February 1999

Prepared by  
EMCON/OWT  
1433 North Market Boulevard  
Sacramento, California 95834-1943

Project 16040-500.000

## CONTENTS

---

<b>1 INTRODUCTION</b>	<b>1-1</b>
<b>2 FIELD PROCEDURES</b>	<b>2-1</b>
2.1 Field Results	2-2
<b>3 LABORATORY RESULTS</b>	<b>3-1</b>
<b>ATTACHMENT 1 SAMPLE LOCATION PLOT</b>	
<b>ATTACHMENT 2 FIELD DATA</b>	
<b>ATTACHMENT 3 LABORATORY RESULTS AND INFORMATION</b>	
<b>ATTACHMENT 4 CORRECTION CALCULATION FOR LFG SAMPLE</b>	

## 1 INTRODUCTION

---

On January 11, 1999, EMCON/OWT conducted a Tier 2 test at the Rock Creek Landfill on behalf of Calaveras County. This Tier 2 Testing Summary Report has been prepared for submittal to the County to provide an estimated site specific NMOC concentration as hexane ( $C_{\text{NMOC}}$ ) in accordance with 40 cfr 60.743 (a)(3) Tier 2. The County will then use the site specific NMOC concentration, instead of the EPA's default value, to calculate the mass NMOC emission rate. Included in this report is a description of the field procedures used to collect the LFG sample for laboratory analysis, a review of the field results, the laboratory results, the completed Tier 2 NMOC correction, and a summary of the test results.

## 2 FIELD PROCEDURES

---

The Tier 2 test procedure described below is consistent with the requirements and methods outlined in Environmental Protection Agency (EPA) Method 25C for collecting LFG samples for Tier 2 analysis. In addition, EPA Method 3C is used to determine the nitrogen concentration of the samples. In accordance with 40 CFR §60.754 (a)(3), two landfill gas (LFG) samples are collected for every hectare of landfill (to a maximum of 50 samples) that has retained waste for at least two years. Because approximately 4 hectares of the Rock Creek Landfill has had refuse in place for more than two years, a total of 8 samples was required. The sample locations were determined using information provided by the County. Samples were collected at the site as follows:

1. A hydraulic drive sampling unit (Hydropunch<sup>®</sup>) was used to push a sampling probe into the ground to depths of approximately 10 to 15 feet.
2. The sampling train was purged at a rate of 500 ml/min or less for a total of 2 sample volumes (~3 Liters) purged.
3. The LFG present in the probe-hole was analyzed in the field using a Landtec GEM-500<sup>®</sup> portable LFG monitoring unit. Oxygen, carbon dioxide, methane, and nitrogen concentrations were recorded.
4. Upon verification that LFG was present in the probe-hole, a Summa<sup>®</sup> passivated canister was used to collect a 1-liter sample at a rate of 500 ml/min. or less. Four 1.5-liter samples were collected per canister at a total of 8 different locations as shown on Figure 1 - Sample Location Plot.
5. A total of 2 canisters were sent to Performance Analytical Inc. Laboratory. for laboratory analysis.

The location of each sample and the field data recorded during the collection of samples is presented in Attachment 1 - Sample Locations Plot and Attachment 2-Field Data.

## 2.1 Field Results

The sample volumes from the eight probes were nearly equivalent, based on review of the vacuum changes recorded during the sampling. Approximately 1.2 liter was sampled from each probe. Thus, the measured NMOC concentrations represent nearly equally weighted samples from all eight areas of the landfill.

The sampling flow rates at all eight probes complied with the method 25C requirement of 500 ml/min. or less. The flow rates ranged from approximately 148 to 300 ml/min, based on the recorded sampling times and vacuum changes.

The concentration of nitrogen as measured by gas analysis with a portable infrared absorbance detector and balance gas calculations at all of the sample locations was below the maximum 20 percent by volume allowable. The infrared gas analyzer appeared to be calibrated appropriately for the span reading in atmospheric air. No data was provide to confirm calibration on the landfill gas.

Note that ambient and sample probe temperatures were not measured during sampling, nor was the local barometric pressure. Reasonable assumptions for these values were made by EMCON, in order to complete the dilution corrections.

### 3 LABORATORY RESULTS

---

The certified analytical results are presented in Attachment-3 - Laboratory Results. Performance Analytical Inc. used the equations in Section 6 of Method 25C to normalize for sampling and dilution gas pressures of the canister in the lab. EMCON/OWT used the equations in Section 6 of Method 25C to correct for dilution of the samples by water vapor and nitrogen. These calculations are presented in Attachment-4. The laboratory results were expressed as total NMOC by volume as methane. To convert to total NMOC by volume as hexane, EMCON divided the results by six.

Assuming equal weighting of gas samples from all eight probes, the arithmetic mean of the NMOC concentrations in the two composite canisters would be the Cnmoc for the Landfill. The Cnmoc value to be used in the Tier 2 equation is therefore 479 ppm as hexane.

**Table 1**  
**Summary of Data**

Canister ID Number	Composite Sample Numbers	Weighting Factor	NMOC as Carbon ppmv	NMOC as Hexane ppmv
S1	RC1, RC2, RC3, RC4	4/8	3141	524
S2	RC5, RC6, RC7, RC8	4/8	2605	434
Weighted Average				479

**ATTACHMENT 1**  
**SAMPLE LOCATION PLOT**



**ATTACHMENT 2**

**FIELD DATA**

**Rock Creek Sanitary Landfill  
TIER 2 NMOC FIELD DATA  
Sample Rate and Pressure Checks**

Purge Time Start	Purge Time End	Purge Time	Fill Time Start	Fill Time End	Fill Time Elaps.	Fill Time minutes	Initial Vacuum (mm Hg)	Final Vacuum (mm Hg)	Diff. Vacuum (mm Hg)	Diff. Volume (liter)	Flow Rate (ml./min)
9:43	9:55	0:12	9:56	10:04	0:08	8	19.7	15.8	-3.9	1.19	148
10:16	10:32	0:16	10:33	10:37	0:04	4	15.6	11.7	-3.9	1.19	297
10:50	11:02	0:12	11:03	11:08	0:05	5	11.5	7.7	-3.8	1.16	231
11:17	11:29	0:12	11:30	11:35	0:05	5	7.4	3.5	-3.9	1.19	238
11:46	11:58	0:12	11:59	12:05	0:06	6	19.5	15.7	-3.8	1.17	195
12:14	12:26	0:12	12:27	12:32	0:05	5	15.1	11.2	-3.9	1.20	240
12:36	12:48	0:12	12:49	12:54	0:05	5	10.5	6.7	-3.8	1.17	234
12:58	13:10	0:12	13:11	13:15	0:04	4	6	2.1	-3.9	1.2	300



**ATTACHMENT 3**  
**LABORATORY RESULTS AND INFORMATION**



## Performance Analytical Inc.

Air Quality Laboratory  
A Division of Columbia Analytical Services, Inc.  
An Employee Owned Company.

### LABORATORY REPORT

Client:	ORGANIC WASTE TECHNOLOGIES, INC.	Date of Report:	02/18/99
Address:	1433 N. Market Blvd. Sacramento, CA 95834	Date Received:	01/15/99
Contact:	Mr. Steve Giacomini	PAI Project No:	P9900085
		Purchase Order:	Verbal

Client Project ID: Calaveras County #10640.500.000

---

Two (2) Stainless Steel Summa Canisters labeled: "S1" and "S2"

---

The samples were received at the laboratory under chain of custody on January 15, 1999. The samples were received intact. The dates of analysis are indicated on the attached data sheets.

#### Total Gaseous Non-Methane Organics Analysis

The samples were analyzed in triplicate for total gaseous non-Methane organics according to EPA Method 25C. The analyses were performed by gas chromatography using flame ionization detection/total combustion analysis.

#### Nitrogen Analysis

The samples were analyzed in duplicate for Nitrogen according to EPA Method 3C. The analyses were performed by gas chromatography using thermal conductivity detection.

The results of analyses are given on the attached data summary sheets.

---

Data Release Authorization:

Wade Henton  
Analytical Chemist

Reviewed and Approved:

Michael Tuday  
Laboratory Director



**Performance Analytical Inc.**

Air Quality Laboratory  
A Division of Columbia Analytical Services, Inc.  
An Employee Owned Company

**RESULTS OF TOTAL GASEOUS NON-METHANE ORGANICS (TGNMO) ANALYSIS**

PAGE 1 OF 1

**Client: Organic Waste Technologies, Inc.**

**Client Project ID: Calaveras County #10640.500.000**

**PAI Project ID: P9900085**

Test Code: EPA Method 25C  
Instrument ID: HP5890A/FID/TCA  
Analyst: Ku-Jih Chen/Wade Henton  
Matrix: Summa Canister(s)

Date Sampled: 1/11/99  
Date Received: 1/15/99  
Date Analyzed: 1/27/99  
Volume(s) Analyzed: 0.50 ml  
0.053 ml

Client Sample ID	PAI Sample ID	D.F.	Total Gaseous Non-Methane Organics as Methane Concentration in ppm, v/v	
			Result	Reporting Limit
S1	P9900085-001	2.21	2,800	19
S2	P9900085-002	2.46	2,500	19
N/A (1/27/99)	Method Blank	1.00	ND	1.0

TR = Detected Below Indicated Reporting Limit  
ND = Not Detected

Verified by: RG

Date: 2/1/99



**Performance Analytical Inc.**

Air Quality Laboratory  
A Division of Columbia Analytical Services, Inc.  
An Employee Owned Company

**RESULTS OF NITROGEN ANALYSIS**

PAGE 1 OF 1

**Client: Organic Waste Technologies, Inc.**

**Client Project ID: Calaveras County #10640.500.000**

**PAI Project ID: P9900085**

Test Code: EPA Method 3C  
Instrument ID: HP 5890A/TCD #1  
Analyst: Ku-Jih Chen/Wade Henton  
Matrix: Summa Canister(s)

Date Sampled: 1/11/99  
Date Received: 1/15/99  
Date Analyzed: 1/26/99  
Volume(s) Analyzed: 0.10 ml

Client Sample ID	PAI Sample ID	D.F.	Nitrogen (%, v/v)	
			Result	Reporting Limit
S1	P9900085-001	2.21	9.45	0.200
S2	P9900085-002	2.46	2.62	0.200
N/A (1/26/99)	Method Blank	1.00	ND	0.100

TR = Detected Below Indicated Reporting Limit

ND = Not Detected

Verified by: RG

Date: 2/1/99



**Performance Analytical Inc.**  
 Air Quality Laboratory  
 A Division of Columbia Analytical Services, Inc.  
 An Employee Owned Company

2665 Park Center Drive, Suite D  
 Simi Valley, California 93065  
 Phone (805) 526-7161  
 Fax (805) 526-7270

**Chain of Custody Record  
 Analytical Services Request**

Client / Address <b>OWT 1433 N. MARKET Blvd SACRAMENTO CA 95834</b>		Phone <b>916 928 3320</b>		Fax <b>916 928 3341</b>		ANALYSES		PAI Project No. <b>P9900085</b>			
Client Project Name / Location <b>Colusa County / ROCK CREEK</b>		Client Project No. <b>10640-500-000</b>		P. O. No.							
Contact <b>Steve Giacomini</b>		Sampler (Signature)									
Client Sample ID	Date Collected	Time Collected	Lab Sample No.	Type of Sample	Container ID (Serial#)	Regulator ID (Serial#)	EPA Method 25C	EPA Method 25C	Expected Turnaround Time	Remarks	
<b>S1</b>	<b>1-11-99</b>	<b>1135</b>	<b>-001</b>		<b>00419</b>		<b>X</b>	<b>X</b>	<b>STANDARD</b>		
<b>S2</b>	<b>1-11-99</b>	<b>1315</b>	<b>-002</b>		<b>00420</b>		<b>X</b>	<b>X</b>	<b>φ</b>		
<del>_____</del>											
Relinquished by : (Signature) <i>[Signature]</i>		Time		Received by : (Signature) <b>SFF</b>		Date		Date		Time	
Relinquished by : (Signature) <b>SFF</b>		Time		Received by : (Signature) <i>[Signature]</i>		Date		Date		Time	
Relinquished by : (Signature)		Time		Received by : (Signature)		Date		Date		Time	

**ATTACHMENT 4**  
**CORRECTION CALCULATION**  
**FOR LFG SAMPLE**

**Rock Creek Sanitary Landfill  
TIER 2 NMOC CORRECTION  
(from Part 60, Appendix A, Method 25C:  
Determination of Nonmethane Organic Compounds in MSW Landfill Gases)**

Sample I.D. #	T <sub>t</sub> (deg. C)	P <sub>b</sub> (mm Hg)	P <sub>w</sub> (mm Hg)	B <sub>w</sub> (% H <sub>2</sub> O)	C <sub>N<sub>2</sub></sub> (%N <sub>2</sub> )	C <sub>im</sub> (ppm NMOC as CH <sub>4</sub> )	C <sub>t</sub> (ppm NMOC as CH <sub>4</sub> )	C <sub>i</sub> (ppm NMOC as C <sub>6</sub> H <sub>14</sub> )
S1	10.0	746	10.5	1.41%	9.45%	2800	3141	524
S2	10.0	746	10.5	1.41%	2.62%	2500	2605	434

- T<sub>t</sub> = sample tank temperature during sampling (assumed).
- P<sub>b</sub> = barometric pressure (assumed based on site elevation of 500 feet mean sea level).
- P<sub>w</sub> = water vapor pressure from table 25C-1.
- B<sub>w</sub> = water correction from table 25C-1.
- C<sub>N<sub>2</sub></sub> = nitrogen concentration measured using USEPA Method 3C.
- C<sub>im</sub> = measured NMOC volume concentration, as carbon.
- C<sub>i</sub> = normalized NMOC volume concentration, as carbon or hexane.