

Verification Report for Black Warrior Solid Waste Disposal Authority Coker, Alabama

Climate Action Reserve

June 2009

**Prepared by: First Environment, Inc.
91 Fulton Street
Boonton, New Jersey 07005**



1. Introduction

This report is provided to Black Warrior Solid Waste Disposal Authority (BWSWA) as a deliverable of the Climate Action Reserve's (CAR) project verification process. This report covers the verification of emission reductions from the capture and destruction of landfill gas (LFG) for the period of January 16, 2009 through February 28, 2009 at the Black Warrior Solid Waste Disposal Authority Landfill (the Project) in Coker, Alabama. First Environment, Inc. (First Environment) conducted the verification from March through June 2009.

2. Objectives

The purpose of this verification was, through review of appropriate evidence, to establish that:

- the Project conforms to the requirements of the verification criteria discussed in Section 4 of this report; and
- the data reported are accurate, complete, consistent, transparent, and free of material error or omission.

3. Verification Scope

Specific scope metrics for the verification are outlined in the table below:

Geographic Boundary	Black Warrior Solid Waste Disposal Authority Landfill, Coker, Alabama
Greenhouse Gases Verified	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e) resulting from methane destruction
Reporting Period	January 16, 2009 through February 28, 2009
Data Sources	Metered Data and Emissions reduction calculations

4. Standards Used to Verify Emissions (Criteria)

The following table outlines the guidance and protocols used to conduct this verification:

Standard of Verification	Climate Action Reserve Landfill Project Reporting Protocol, Version 2.0, November 2008 (CAR Protocol)
Verification Process	California Climate Action Registry Landfill Verification Protocol, Version 2.0, November 2008
Level of Assurance	Reasonable assurance
Materiality	Misstatements greater than five percent of the emissions reductions assertion are considered material

5. Overview of the Verification Process

To review the Project's GHG information, the following verification process was used:

- conflict of interest review;
- selection of Audit Team;
- initial interaction with BWSWA's contact;
- development of the verification and sampling plan;
- review and evaluation of raw data and calculations for period under review;
- site audit;
- follow-up interaction with BWSWA's contact for corrective action or supplemental data as needed; and
- final statement and report development.

The verification process was utilized to gain an understanding of the Project's emission sources and reductions (including the risk for leakage), to evaluate and verify the collection and handling of data, the calculations that lead to the results, and the means for reporting the associated data and results.

Conflict of Interest Review

Prior to beginning any verification project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the Project. No potential conflicts were found for this Project. First Environment also received a determination of a low potential for conflict of interest from CAR prior to initiating verification activities.

Audit Team

First Environment's Audit Team consisted of the following individuals who were selected based on their verification experience, as well as familiarity with landfill operations.

Lead Verifier: Michael Carim
Verifiers: Alicia Chin, Ellen Reid, John Miksa
Internal Reviewer: Jay Wintergreen

Audit Kick-off

The verification audit was initiated with an exchange of e-mails between First Environment and the primary BWSWA contact, Ken Thrasher. The communication focused on confirming the scope and schedule, and identifying the data required for the verification. A kickoff meeting was held on March 26, 2009.

Development of the Verification Plan

The team formally documented its verification plan as well as determined the data-sampling plan.

Site Visit

Michael Carim, Ellen Reid, and John Miksa conducted a site visit on May 6, 2009 to assess the project's data management systems and interview personnel relevant to the project.

Emissions Reduction Data and Calculation Assessment

This assessment used information and insights gained during the previous steps to evaluate the collected data and the reported emissions reduction quantities, and identify if either contained material or immaterial misstatements.

Corrective Actions and Supplemental Information

The team made supplemental information and clarification requests, as well as seven corrective action requests, during the verification process. The corrective actions requested and the responses provided are summarized in Section 7.

Verification Reporting

Verification reporting, represented by this report, documents the verification process and identifies its findings and results. Verification reporting consists of this report for BWSWA and a verification statement and attestation to be submitted to the Climate Action Reserve.

6. Site's Conformance with Verification Criteria

Site Overview

The landfill, located at 3301 Landfill Drive in Corker, Alabama, is owned and operated by BWSWA. The site originally opened in 1978 and was operated by a solid waste authority chartered by the City of Tuscaloosa. This entity was dissolved in 1994 and BWSWA was established to upgrade environmental controls and operate the landfill. The site began accepting waste as a Subtitle D landfill in January 1994. The construction of lined cells began in 1996 and the first municipal solid waste went into the lined cells on January 26, 1997. The facility consists of 226 permitted acres and intends to place waste in 127.5 acres, with the balance used for site infrastructure. At present, the site accepts primarily municipal solid waste with smaller amounts of industrial and construction and demolition waste also deposited over approximately 60 acres of constructed landfill (seven cells).

BWSWA began the installation of an active gas collection and combustion system in July 2008. First Environment reviewed design plans for the system dated 2008 to confirm that the project meets the CAR Protocol's criteria for start date after January 1, 2001. The system, consisting of 43 vertical wells and one horizontal well, along with eight tie-ins to leachate cleanouts, came online on January 14, 2009. Evidence of initial combustion of gas on this date was reviewed

during the site visit, establishing January 14, 2009 as the project state date. The collection system routes gas to a 16-inch header pipe at the southern end of the site. Gas passes through a knock out tank that removes condensates and moisture and then through two blowers and finally to an open flare where it is combusted.

The landfill's design capacity is larger than 2.5 million megagrams and is therefore subject to NSPS regulations. Tier II testing in May 2006 showed the non-methane organic compounds (NMOC) emission rate to be 13.06 megagrams per year, well below the 50 megagrams threshold that would mandate gas collection and control at the landfill. The summary from the Tier II test report, along with BWSWA's attestation of regulatory compliance, are provided in Attachments A and B.

BWSWA owns all environmental attributes associated with landfill gas destruction. An attestation of title is provided in Attachment C.

Data Collection and Monitoring Processes

The Audit Team discussed the following topics with site staff during the site visit in May 2009 and confirmed the information during this verification process:

- the data collection process; and
- internal documents and protocols that set guidelines for the data collection process.

Information gathered during these discussions was used to assess the Project's GHG information system and its controls for sources of potential errors and omissions.

Total landfill gas flow was monitored continuously by a Thermal Instruments ST-95 mass flow meter during the verification period. The meter standardizes flow readings to a pressure of one atmosphere and a temperature of 70°F. The flow meter is located downstream of the blowers and upstream of the flare, sufficiently placed to ensure laminar flow at the point of measurement. Proof of factory calibration of the meter prior to installation at the site is provided in Attachment D. Because this verification covers the project's initial reporting period after startup, which is only six weeks in duration, this calibration event is sufficient to meet CAR Protocol requirements for instrument calibration for the entire length of the reporting period.

A Yokagowa data logger records gas flow rates continuously.¹ For each interval, a minimum and maximum flow rate is recorded; the two values are averaged to determine the flow rate during a given interval. The landfill manager, along with TTL, Inc. (TTL), a BWSWA contractor, is responsible for obtaining gas flow data from the Yokagowa instrument. They swap an external flash card from the data recorder with a blank one and download the previous week's gas flow data to spreadsheets. Flow data is archived electronically at the site and by TTL and CDG Engineers (CDG), another contractor responsible for maintenance and other aspects of the project.

¹ During the period from January 16th to February 10th, gas flow was recorded in one minute intervals; on February 10th and 11th, flow was recorded in eight minute intervals; from approximately mid-morning on February 11th to the end of the reporting period, flow was recorded in four minute intervals.

The site has a CAI continuous gas analyzer to monitor methane concentration of the landfill gas. However, the site determined the instrument to be unreliable during this reporting period based on review of data recorded and calibration results. Although data logged by the CAI device is recorded and displayed in spreadsheets with gas flow data from the Yokagowa data logger, it is excluded from the scope of the verification.

For the purposes of emission reduction reporting, BWSWA has elected to use weekly measurements taken by SCS Engineers (SCS) in its calculations as both these and gas flow are measured on a dry basis. SCS uses a GEM-2000 hand held gas analyzer to take at least weekly measurements of the methane content through a sampling port just downstream of the blowers where gas is pushed past the flow meter and into the flare. SCS's procedure includes calibration of the device against a reference gas of known concentration prior to each use. Devices are also sent to the manufacturer for calibration.

Two thermocouples are used to monitor the temperature within the flare shroud in order to detect flame presence and determine operating hours of the flare. The project's operating system has several alarms and an auto-dialer that alerts field personnel if an alarm is triggered. Alarms trigger if the flame temperature falls below 800°F or if the flame is extinguished and fails to relight after three attempts. The system automatically shuts down and gas is prevented from flowing to the flare if the flame remains extinguished.

There are two sources of project emissions identified within the project boundaries. Indirect emissions of CO₂ occur from purchased electricity used to power project equipment. Activity data is obtained from monthly utility invoices. Additionally, the site uses a propane tank to assist in igniting the flare should it become extinguished. The site archives propane purchase records in order to estimate project emissions from this source.

BWSWA also developed and implemented a project monitoring plan to track relevant project parameters and data sources. The final monitoring plan submitted during the verification process was found to fully comply with the requirements of the CAR Protocol.

Emissions Reduction Calculation Assessment

As part of the emissions reduction calculation assessment, the Project's assumptions and calculations were reviewed. Because no pre-existing combustion devices existed at the site, per the CAR Protocol, the baseline scenario is defined as the total release of LFG to the atmosphere.

Emission reduction calculations, provided in Attachment E, were reviewed to ensure accuracy in the formulas used and the raw data used as inputs. The formulas were tested to ensure they were consistent with the calculation methodology described in the CAR Protocol. In accordance with the Protocol, a 10 percent discount is applied to the total quantity of methane destroyed because the site employs weekly methane measurements in its calculations. A 96 percent destruction efficiency is assigned to the project's combustion device and applied accordingly in emission reduction calculations. Because the landfill does not have a synthetic liner, a 10 percent discount is applied to the baseline scenario for bacterial oxidation of methane under the cap.

The amount of methane destroyed was calculated from metered data for landfill gas collected. As described in the previous section, continuously monitored gas flow data is downloaded from the Yokagawa data logger. Since the volume of gas flow metered by the Thermal Instruments flow meter is recorded at a temperature of 70°F and one atmosphere, the flow readings were adjusted to a standard temperature and pressure of 60°F and one atmosphere per the Protocol's requirement. The average flow rates for each interval are multiplied for the length of the interval, then summed to determine total volumetric gas flow on a daily basis. This volume is converted to a mass flow using the density of methane at 60°F and one atmosphere of pressure.

The fraction of methane in landfill gas during a given week was determined by averaging measurements taken during the corresponding week. The total amount of methane destroyed by the Project is tabulated in monthly intervals. Project emissions were subtracted from total volume of methane destroyed. Project emissions for BWSWA consisted of indirect emissions of CO₂ from electricity consumption and direct emissions of CO₂ from the combustion of propane to assist the flare. Project emissions were calculated from the product of activity data by an appropriate emission factor.

Copies of the raw data used in the calculations, including flow data, methane content data, and utility and other fossil fuel invoices, were compared with the data used in the final calculations and tested for transcription or mathematical errors. The short timeframe being verified allowed for inclusion of all raw data sources over the entire verification period. Calculations for the entire period were reviewed as well.

7. Audit Results

BWSWA provided good documentation for their emissions estimates as well as its procedures surrounding the data collection process. The verification process focused on verifying the data and quantification methodology that was used by BWSWA to calculate the emissions reductions, as shown on the spreadsheets in Attachment E.

To complete the verification process, First Environment requested several clarification and supplemental document requests, as well as seven corrective action requests. The corrective action requests and BWSWA responses are detailed below:

Corrective Action Request	Response
The Monitoring Plan does not address how the project will monitor annual compliance with the Protocol's regulatory test. Please submit a revised Monitoring Plan.	Monitoring plan was revised to include a mechanism by which to annually evaluate and attest to the status of the regulatory test.
The Monitoring Plan does not address how the project will monitor project emissions from purchased electricity or fossil fuel combustion within the project boundary. Please submit a revised Monitoring Plan.	Monitoring plan was revised to include monitoring of purchased electricity and fossil fuel combustion within the project boundary.
The Monitoring Plan does not identify roles and responsibilities for site personnel in the data collection processes. Please submit a revised Monitoring Plan.	Monitoring plan was revised to include roles and responsibilities for site personnel in the data collection processes.

Section 1.B of the Monitoring Plan ("Secondary Monitoring Plan") does not describe a QA/QC procedure for gas flow data. Please submit a revised Monitoring Plan.	Monitoring plan was revised to include a QA/QC procedure for gas flow data.
Section 2 of the Monitoring Plan ("Equipment Calibration") does not describe a procedure for calibrating the handheld gas analyzer. Please submit a revised Monitoring Plan.	Monitoring plan was revised to include a calibration procedure for the handheld gas analyzer.
Total gas flow and methane concentration values used in emission reduction calculations are not measured on the same basis relative to moisture content.	BWSWA corrected its emission reduction calculations to use methane measurements taken at the flare inlet (dry basis) in lieu of those taken at the blower inlet (wet basis).
The period from February 15 to February 21 is ineligible for data substitution with regard to methane concentration values.	BWSWA revised its emission reduction calculations to exclude the period from February 15 to February 21.

During the verification process, minor transcription errors were also identified, however, these errors did not have a material impact on the project's emission reduction assertion and therefore did not require corrective action.

Verified results show 3917.47 metric tonnes of CO₂e eligible for registration with CAR.

8. Verification Conclusion

Based on the assessments performed and the evidence collected, First Environment concludes that the Project GHG emissions reductions, due to the capture and combustion of methane gas for the period of January 16, 2009 through February 28, 2009, can be considered to a reasonable level of assurance:

- consistent with the Project Methodology,
- without material discrepancy, and
- meeting the minimum level of accuracy of at least 95 percent.

Verified results show:

	Total
Baseline Emissions (tCO₂-e)	3925.6
Project Emissions (tCO₂-e)	8.13
Emissions Reductions* (tCO₂-e)	3917.47

*as measured and calculated in accordance with the Project Methodology

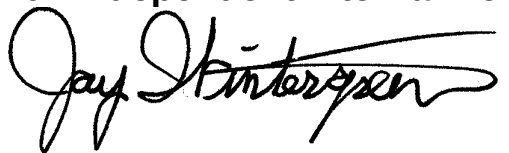
As per CAR requirements, only a CAR-approved verifier can provide an independent assessment of projects applying for approval under the CAR Landfill Project Reporting Protocol. First Environment currently has accreditation from CAR.

9. Lead Verifier Signature



Michael C. Carim

10. Independent Internal Review Signature



James T. Winger

ATTACHMENT A

TIER 2 TESTING REPORT

Black Warrior Solid Waste Facility

Facility No. 413-0084

prepared by:

TTL, Inc.

TTL Project No. 0601-009

May 31, 2006

The logo for TTL, Inc. consists of the letters "TTL" in a bold, italicized, sans-serif font. The letters are slanted to the right, giving it a dynamic appearance.

geotechnical • analytical • materials • environmental



geotechnical . analytical . materials . environmental

3516 Greensboro Avenue (35401)

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Facsimile 205.345.0992

www.TTLINC.com

Decatur . Florence . Montgomery . Tuscaloosa . ALABAMA

Albany . Valdosta . GEORGIA

May 31, 2006

Mr. Aaron Schilke
Air Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110

Re: Black Warrior Solid Waste Disposal Authority
Facility No. 413-0084
Tier 2 Testing Results

Dear Mr. Schilke:

Transmitted herewith are two copies of the Tier 2 testing results for the above referenced site. Table 1 is included following this cover letter and summarizes the Method 25-C testing results and calculates the average NMOC concentration in the new section and the old section of the landfill. Please note that the results of samples NS-11, NS-28, and OS-5 were not included in the average NMOC concentrations because the N_2 and O_2 concentrations as measured by Method 3-C exceeded the Method 25-C criteria of 20% for N_2 and 5% for O_2 .

With the results of the Tier 2 testing, the site's NMOC emissions rate was recalculated using the EPA Landfill Gas Emissions Model (LandGEM) version 3.02. Default values of 0.05 l/yr for k and 170.00 m^3/Mg for L_0 were used in the calculation. The default NMOC concentration of 4000 ppmv was replaced with the site specific test value of 206.76 (average NMOC ppm as Hexane for the new section) and 168.07 (average NMOC ppm as hexane for the old section). As shown by the LandGEM results that follow, the site is well below the 50 Mg/yr NMOC threshold rate and is expected to remain below the threshold throughout the next 5 years. The current (2005) NMOC emission rates for the old and new sections are 2.59 Mg/yr and 10.46 Mg/yr, respectively. Therefore, the total NMOC emissions from the landfill are 13.05 Mg/yr.

The landfill gas samples were collected by **TTL, Inc.**, on April 25, 26, and 27, 2006. Laboratory analyses were performed for **TTL** by Triangle Environmental Services, Inc. Sample collection and analyses were performed in accordance with the Tier 2 Testing Protocol prepared by **TTL** and submitted to the Air Division of ADEM on April 6, 2006.

The overall area that was tested was separated into two areas designated "old section", with sample numbers preceded by "OS", and "new section", with sample numbers preceded by "NS". The area of the old section at the time of testing was approximately 19 acres, or 7.7 hectares; while the area of the new section at the time of the testing was approximately 54.1 acres, or 21.9

hectares. Since the overall area of the landfill with waste that has been in place for greater than 2 years is greater than 25 hectares, a total of 50 samples were collected from the landfill. 37 samples were collected from the new section while 13 samples were collected from the old section.

Documentation for sample collection is in Attachments A through D. Attachment A is a site map that shows the general locations where samples were collected. Attachment B contains the field data sheets. Attachment C contains the chain-of-custody form and sample-data sheets that identify each tank and the sample collected in it. Attachment D contains calibration data for the field analyzer.

Analytical results are in Attachment E, which is divided into tabbed sections for the two types of analysis performed: Method 25-C and Method 3-C. Results are compiled in two tables, one for each type of analysis, located in the first few pages of Attachment E, prior to the first tabbed section.

If you have questions or need additional information, please call me at 205-345-0816 or contact me by email at smcmillan@ttlinc.com.

Sincerely,

TTL, Inc.



Scott A. McMillan, P.E.
AL License No. 25425

Enclosures

cc: Ken Thrasher - Black Warrior Solid Waste Landfill
Mark Pugh - CDG Engineers

ATTACHMENT B

Project Developer's Attestation of Regulatory Compliance

Reference is made to the Terms of Use (the "Terms of Use") by and between [Black Warrior Solid Waste Disposal Authority], a [Alabama nonprofit public corporation] (the "Project Developer"), and the California Climate Action Registry, a California nonprofit public benefit corporation (the "Registry"), with respect to [Black Warrior Solid Waste Disposal Authority Project] (the "Project") located at [3301 Landfill Dr, Coker, AL] (the "Property"). The undersigned, [Ken Thrasher], in [his/her] capacity as an officer of the Project Developer, in the name and on behalf of the Project Developer, hereby attests, certifies, represents and warrants to the Registry, as of the date set forth below, as follows:

1. The Project was implemented and established voluntarily and, at all times thereafter, has been operated and conducted voluntarily. None of such implementation, establishment, operation or conduct of the Project are or at any time have been required by any law, statute, rule, regulation, ordinance, court order, governmental agency action, enforcement action, or other legally binding mandate, including without limitation any of the foregoing issued, enacted or otherwise rendered effective by any federal, state, local or foreign governmental or regulatory agency, commission, department, board, court or other authority having jurisdiction over the Project ("Law").
2. Except as otherwise expressly permitted under the protocol developed by the Registry that applies to the Project, the Project was not established or implemented and has not at any time been operated or conducted in anticipation of, or to avoid or satisfy the anticipated requirements of, any Law that would require or would have required the Project Developer to use the Property in the manner contemplated by the Project.
3. The Project is in material compliance with all Laws.
4. The Project Developer has disclosed to the Project Verifiers in writing any and all instances of non-compliance of the Project with any Law. For purposes hereof, "Project Verifiers" shall mean any and all third party verifiers approved by the Registry and assigned to the Project.
5. The undersigned is the duly elected, qualified and acting [Executive Director] of the Project Developer and is authorized to execute and deliver this Attestation in the name and on behalf of the Project Developer, thereby rendering this Attestation binding on the Project Developer.

The Project Developer recognizes, acknowledges and agrees that (i) this Attestation may be relied upon by the Registry and/or any user of the Climate Action Reserve program of the Registry (the "Reserve"), and each of their successors and assigns (including, without limitation, reliance in connection with the issuance and transfer of CRTs (as defined in the Terms of Use) in respect of the Project); (ii) the statements set forth in paragraphs 1 through 5 hereof shall, for all purposes of the Terms of Use, be deemed to be additional representations and warranties made thereunder by the Project Developer to the Registry; (iii) in the event of any breach of any of any paragraphs 1 through 5 hereof, the Registry shall be entitled to pursue any rights and remedies available at law or in equity (including, without limitation, rights to indemnification pursuant to the Terms of Use) in any court of competent jurisdiction; and (iv) if at any time the Registry determines, in its sole discretion, that any such breach has occurred, the Registry shall have the right to immediately close the Project Developer's account on the Reserve.

[Signatures on Next Page]

IN WITNESS WHEREOF, the undersigned, in the name and on behalf of the Project Developer, has executed this Attestation this 16th day of April, 2009.

PROJECT DEVELOPER¹

Black Warrior Solid Waste Disposal Authority

By: Ken Thrasher

Name: Ken Thrasher

Title: Executive Director

Address: 3301 Landfill Drive, Coker, AL 35452

Accepted and agreed:

CALIFORNIA CLIMATE ACTION REGISTRY

By: _____

Name: _____

Title: _____

Address: 523 W. Sixth Street, Suite 428
Los Angeles, CA 90014

¹ If the Project Developer is a corporation, partnership or other legal entity, this Attestation must be executed by an officer of the Project Developer. If the Project Developer is an individual, this Attestation must be executed by the individual and revised accordingly.

ATTACHMENT C

Project Developer's Attestation of Title

The undersigned, on behalf of Black Warrior Solid Waste Disposal Authority, (the "Project Developer"), represents and warrants to the California Climate Action Registry ("California Registry"), as of the date set forth below, and throughout the period during which the Carbon Reduction Tons ("CRTs") related to Black Warrior Solid Waste Facility (the "Project") are posted on the California Registry's Climate Action Reserve ("Reserve"), that:

1. it is the owner of full, unencumbered legal and beneficial title to CRTs registered in its name;
2. it has the right to sell and shall convey good title to the CRTs and will transfer the CRTs to a buyer via the Reserve only;
3. it agrees that all emission reductions related to the Project that are submitted for registration on the Reserve will be independently verified by a California Registry accredited third party verifier ("Verifier"), and will meet all the California Registry's requirements and protocols;
4. it has not made or provided knowingly false, fraudulent or misleading statements or information to the Verifier or the California Registry;
5. the Project has not been required to be implemented and maintained by any law, statute, regulation, court order, or other preexisting legally binding mandate;
6. for all vintage years that the Project is registered with the Reserve by the Project Developer, any CRTs issued by the California Registry for the Project, or the greenhouse gas emission reductions or removals associated with the CRTs issued for the Project, have not been, nor will be, registered with or claimed by other registries or under a different project title or location or previously sold to any third party prior to registration with the Reserve; and
7. for all vintage years that the Project is registered with the Reserve by the Project Developer, it has not, and will not in the future, retire, sell, claim, represent elsewhere, or use to satisfy obligations outside of the Reserve any of the CRTs issued by the California Registry for the Project or the greenhouse gas emission reductions or removals associated with the CRTs issued for the Project that would create the relevant CRTs unless retired through the Reserve for that purpose.

The following attestations apply to projects that: (a) have previously been registered with other registries, registry entities or similar systems; or (b) have generated emission reductions that were previously sold to a third party:

8. it will complete and sign the Project Transfer Form.
9. it agrees that the Project and all emission reductions must be verified by a Verifier per the relevant California Registry project protocol in order to be registered on the Reserve.

I declare that all statements contained herein are true and correct, to the best of my knowledge, and are made with full knowledge that the California Registry and all users of the Reserve rely upon the truth of the statements contained in this attestation. I am authorized to make this declaration on behalf of Project Developer. I understand and acknowledge that if any of the above representations made by or on behalf of the Project Developer in or pursuant to this Attestation of Title is false in any material respect when made or deemed repeated upon the making of each request for the CRTs to be issued for the Project or posted on the Reserve, Project Developer may be subject to penalties and potential indemnification damages under the Terms of Use, and that the California Registry would have the right to close Project Developer's account on the Reserve.

PROJECT DEVELOPER¹

Black Warrior Solid Waste Disposal Authority

Signature: Ken Thrasher

By: Ken Thrasher

Name: _____

Executive Director

Title: _____

Address: 3301 Landfill Drive, Coker, Alabama 35452

Date: 9/30/2008

¹ If Project Developer is a corporation, partnership or other legal entity, this Consent must be executed by a company officer of the Project Developer. If Project Developer is an individual, this Consent must be executed by the individual.

ATTACHMENT D

CALIBRATION CERTIFICATION

We certify that the calibration accuracies listed below are obtained on equipment, and with methods, that can be traced directly to the US National Institute of Standards and Technology.

FLOWRATE READOUT ACCURACY: $\pm 1\%$ Full Scale

PRESSURE TESTED AT: 150 psig

METER SERIAL NUMBER: 2008455

MODEL NUMBER: 62-9/9500

The calibration listed above was performed under the following conditions:

0 to 1500 SCFM WASTE GAS

40 to 200°F

0 to 15 PSIG

LINE SIZE: 6" SCH 10

Signature Joseph L. Luman Date Nov 19, 2008

THERMAL INSTRUMENT COMPANY, INC.

217 Sterner Mill Road, Trevoise, PA 19053

Phone: 215-355-8400 Fax: 215-355-1789

Web: www.thermalinstrument.com

ATTACHMENT E

Table A.1
Emissions Reduction Summary
Rev: 6-2-09

Indirect Emissions from use of Electricity		
1	EL=	15,581.00 kWh
2	Reporting Period Days=	44.00 days
3	Total Days for Elec. Invoices=	57.00 days
4	Difference=	13.00 days
5	kWh/Billing Days=	273.35 kWh/day
6	Reporting Period Reduction=	3,553.56 kWh
7	Reduced EL for Reporting Period=	12,027.44 kWh
8	EF _{EL} =	1,490.37 lb/MWh per Figure III.6.1 and Table C.2
9	ELCO ₂ =	8.13

Indirect Emissions from Fossil Fuel Usage		
10	Number of 20 bl. Bottles of Propane=	2.00
11	Volume per bottle=	4.50 gal
12	Total volume of propane=	9.00 gal
13	EF _{FF} =	9.10E-05 kg CH ₄ /gallon
14	FFCO ₂ =	8.19E-07

Period Emissions Reduction Summary		
	ER _{Jan} =	1,974.60
	ER _{Feb} =	1,951.00
	Total for Period	3,925.60

Net Emission Reductions=				
	3,925.60	-	8.13	=
				3,917.47

Table A.2
GHG Emissions Reduction Calculations
January-09
Rev: 5-11-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_i) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 \cdot 0.000454)$$

OX= 0.10
FFCO2= 0.00
DE= 0.96
FFCH4= 0.00
PREdiscount= 0.00

Date	Total Flow SCF/Day	GEM (% CH ₄)		Methane (Q)		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
				SCF/Day									tCO ₂ /day
1/16/2009	495,798.55	37.65		186,668.16		179,201.43		3.44		0.1	0		58.54
1/17/2009	1,020,717.58			384,300.17		368,928.16		7.08		0.1	0		120.52
1/18/2009	825,218.61	50.45		416,322.79		399,669.88		7.68		0.1	0		130.56
1/19/2009	779,915.57			393,467.41		377,728.71		7.25		0.1	0		123.39
1/20/2009	1,172,505.41			591,528.98		567,867.82		10.91		0.1	0		185.50
1/21/2009	1,009,267.51			509,175.46		488,808.44		9.39		0.1	0		159.68
1/22/2009	460,368.42			232,255.87		222,965.63		4.28		0.1	0		72.83
1/23/2009	1,071,592.50			540,618.42		518,993.68		9.97		0.1	0		169.54
1/24/2009	855,476.92			431,588.11		414,324.58		7.96		0.1	0		135.34
1/25/2009	432,098.63	42.27		182,648.09		175,342.17		3.37		0.1	0		57.28
1/26/2009	1,187,323.84			501,881.79		481,806.52		9.25		0.1	0		157.39
1/27/2009	884,225.31			373,762.04		358,811.56		6.89		0.1	0		117.21
1/28/2009	1,019,131.08			430,786.71		413,555.24		7.94		0.1	0		135.09
1/29/2009	960,723.24			406,097.71		389,853.81		7.49		0.1	0		127.35
1/30/2009	888,811.03			375,700.42		360,672.41		6.93		0.1	0		117.82
1/31/2009	803,880.42			339,800.25		326,208.24		6.26		0.1	0		106.56
TOTALS	13,867,054.62			6,296,602.36						ER _{Jan} =			1,974.60

Revisions:

1. Landfill gas flows now account for modifications to scf at 60°F.
2. In order to ensure both the flow measurement and the methane content measurement are on a dry basis the values of the GEM column have been modified to only reflect those measurements taken at the flame arrestor (Flareport) as per the SCS data.

Table A.2
GHG Emissions Reduction Calculations
Feb-09
Rev: 6-2-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_i) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 - 0.000454)$$

$$\begin{aligned} OX &= 0.10 \\ FFCO_2 &= 0.00 \\ DE &= 0.96 \\ FFCH_4 &= 0.00 \\ PRE_{discount} &= 0.00 \end{aligned}$$

Date	Total Flow	GEM (% CH ₄)	Methane (Q)	CH4Dest _{flare}	CH4Dest _{pr}	DF1	DF2	ER
	SCF/Day		SCF/Day					
2/1/2009	715,163.71	46.07	329,475.92	316,296.88	6.07	0.1	0	103.32
2/2/2009	1,103,950.76		508,590.12	488,246.51	9.38	0.1	0	159.49
2/3/2009	1,113,205.17		512,853.62	492,339.47	9.45	0.1	0	160.83
2/4/2009	812,660.15		374,392.53	359,416.83	6.90	0.1	0	117.41
2/5/2009	1,037,857.84		478,141.11	459,015.46	8.82	0.1	0	149.94
2/6/2009	1,002,914.64		462,042.78	443,561.07	8.52	0.1	0	144.90
2/7/2009	764,644.55		352,271.75	338,180.88	6.49	0.1	0	110.47
2/8/2009	529,907.26	44.1	233,689.10	224,341.54	4.31	0.1	0	73.28
2/9/2009	371,265.88		163,728.25	157,179.12	3.02	0.1	0	51.34
2/10/2009*	821,614.63		362,332.05	347,838.77	6.68	0.1	0	113.63
2/11/2009	1,045,213.06		460,938.96	442,501.40	8.50	0.1	0	144.55
2/12/2009	1,002,774.26		442,223.45	424,534.51	8.15	0.1	0	138.68
2/13/2009	1,079,521.06		476,068.79	457,026.04	8.78	0.1	0	149.29
2/14/2009	1,031,716.05		454,986.78	436,787.31	8.39	0.1	0	142.68
2/15/2009	767,576.04	0.00	0.00	0.00	0.00	0	0	0.00
2/16/2009	1,008,215.08		0.00	0.00	0.00	0	0	0.00
2/17/2009	966,972.04		0.00	0.00	0.00	0	0	0.00
2/18/2009	933,280.57		0.00	0.00	0.00	0	0	0.00
2/19/2009	897,446.94		0.00	0.00	0.00	0	0	0.00
2/20/2009	913,225.52		0.00	0.00	0.00	0	0	0.00
2/21/2009	417,810.33		0.00	0.00	0.00	0	0	0.00
2/22/2009	97,762.00	29.3	28,644.27	27,498.50	0.53	0.1	0	8.98
2/23/2009	963,689.09		282,360.90	271,066.47	5.21	0.1	0	88.55
2/24/2009	624,492.84		182,976.40	175,657.34	3.37	0.1	0	57.38
2/25/2009	93,829.14		27,491.94	26,392.26	0.51	0.1	0	8.62
2/26/2009	175,433.61		51,402.05	49,345.97	0.95	0.1	0	16.12
2/27/2009	125,402.01		36,742.79	35,273.08	0.68	0.1	0	11.52
2/28/2009	0.00		0.00	0.00	0.00	0.1	0	0.00
Totals	20,417,544.21		6,221,353.53			ER _{Feb} =		1,951.00

Revisions:

1. Landfill gas flow has been normalized from the flow meter's scf (70°F) to the protocol scf (60°F) using Equation 5.4.
2. The GEM column readings have been changed to weekly averages for those readings at the "Flare" port at the flame arrestor to ensure the readings are on a dry basis.
3. Additional GEM data was found for the week of 2-8-09 and this data is now used.
4. No destruction credits are accounted for in the week of 2-15-09.