

Verification Report for Stones Throw Landfill - CAR 588 Tallassee, Alabama

Climate Action Reserve

March 2011

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



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1. Introduction

This report is provided to Sustainable Energy Solutions, LLC (SES) as a deliverable of the Climate Action Reserve (CAR) project verification process. This report covers the verification of the Stones Throw Landfill – CAR588 (the Project) for the period from May 6 through December 31, 2010. First Environment, Inc. (First Environment) conducted the verification from May 2010 to March 2011.

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, including all eligibility requirements, 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 Boundaries	Stones Throw Landfill operation, Tallassee, Alabama
Greenhouse Gases Verified	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e) resulting from methane destruction; Project emissions of CO ₂ from purchased electricity and fossil fuel combustion
Reporting Period	May 6, 2010 through December 31, 2010
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's Landfill Project Protocol, Version 3.0, December 2009; Climate Action Reserve Landfill 3.0 Errata & Clarifications, January 4, 2011; Climate Action Reserve Program Manual March 2010
Verification Process	Climate Action Reserve's Landfill Project Protocol, Version 3.0, December 2009, Section 8; Climate Action Reserve Verification Program Manual, June 2009; ISO14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006
Level of Assurance	Reasonable assurance
Materiality	Misstatements greater than five percent of the Project's emission reductions assertion are considered material; Qualitative non-conformities with the verification criteria are also 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 and kickoff meeting with primary SES contact;
- development of the verification plan;
- site visit;
- review and evaluation of raw data and calculations for period under review;
- follow-up interaction with SES 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, 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.

5.1 *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 determination of a low risk of conflict of interest from CAR in a notification dated April 26, 2010.

5.2 *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 – Ellen Reid, Jeff Daley, Ross MacWhinney, Mary Pat Campbell

Senior Internal Reviewer – Jay Wintergreen

5.3 *Audit Kick-off*

The verification audit was initiated with a kick-off meeting on May 13, 2010 with the primary SES contact, Bill Gibbes. The meeting focused on confirming the scope, schedule, and data required for verification.

5.4 *Development of the Verification Plan*

The team formally documented its verification plan as well as determined the data-sampling plan. The verification plan was developed based on the discussion of key elements of the verification process during the kick-off meeting. SES was afforded the opportunity to comment on the key elements of the plan for verification. Based on items discussed and agreed upon with SES, the plan identified the First Environment project team members, project level of

assurance, materiality threshold, and standards of evaluation and reporting for the verification. It also provided an outline of the verification process, established project deliverables, and presented a data-sampling plan designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

5.5 Site Visit

Ellen Reid conducted a site visit on January 19, 2011 to assess the Project's data management systems and interview personnel relevant to the project.

5.6 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.

5.7 Corrective Actions and Supplemental Information

The team made requests for corrective action and clarification during the verification process. SES provided sufficient responses to all corrective action and clarification requests.

5.8 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 SES, a verification opinion, and a list of findings to be submitted to the Climate Action Reserve.

6. Project Conformance with Verification Criteria

6.1 Project Description

The Stone's Throw Landfill, located in Tallassee, Alabama, is owned and operated by Tallassee Waste Disposal Center, Inc. A landfill gas collection and combustion agreement was obtained by SES in September 2009. The landfill opened in 1982 and currently receives municipal solid waste.

SES began installing a landfill gas (LFG) well field and active gas collection and control system in 2009. Prior to this system, LFG was not collected at the landfill. The Project consists of the voluntary collection and destruction of landfill gas in the open flare. The Project destroys landfill gas that otherwise would be vented to the atmosphere, resulting in a net reduction of CO₂-equivalents. The baseline scenario, defined as the total release of landfill gas to the atmosphere, was confirmed through review of start date documentation and interviews with project personnel during the site visit.

6.2 Eligibility

The Stones Throw Landfill meets the eligibility requirements set forth in the Landfill Project Reporting Protocol, Version 3.0. The project is located within the United States and has a project date after January 1, 2001. The project start date of the project was May 6, 2010. First Environment confirmed the start date through a review of documentation from the vendor that installed the flare and flare skid that indicated flare startup.

The Landfill is owned and operated by Tallassee Waste Disposal Center, Inc., a wholly owned subsidiary of Stone's Throw Landfill, LLC. An agreement between Stones Throw Landfill, LLC and SES was executed in September 2009 granting SES rights to install and operate a LFG collection and combustion system, and granted SES rights to all environmental attributes generated by the project. Additionally, the CAR Attestation of Title has been completed by SES for the reporting period and is on file with CAR. First Environment reviewed the Attestation of Title during the verification process and confirmed that it was completed correctly.

First Environment reviewed the applicable solid waste and construction permits as well as the Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database for the Stones Throw Landfill to inform the assessment of regulatory compliance. This cursory review and interviews conducted during the site visit indicated that the Project was in compliance and no violations occurred during the reporting period.

First Environment also relied in part on the Attestation of Regulatory Compliance completed by SES, and on file with CAR, for the current reporting period in order to confirm the project's regulatory status. First Environment reviewed the Attestation of Regulatory Compliance during the verification process and confirmed that it was completed correctly; the Attestation indicates no dates of material non-compliance during the reporting period.

6.3 *Additionality*

The Project consists of the installed LFG collection and combustion system and therefore exceeds the performance standard defined by the CAR protocol, specifically Scenario 1 from the list provided in Section 3.4.1 of the CAR Protocol, because LFG was not collected or destroyed in the baseline scenario. Therefore, the project gas collection system and combustion system passes the CAR Protocol's Performance Standard.

The landfill is subject to NSPS requirements that require a Tier II test for NMOC emissions. First Environment reviewed the landfill's most recent Tier II NSPS testing, which showed an NMOC emissions rate of 7.25 Mg/yr in 2010; well below the 50 Mg/yr threshold that would require installation of a gas collection and combustion system.

First Environment also reviewed the landfill's air permit, solid waste permit, and Authority to Construct permit to inform the assessment of regulatory additionality. This cursory review of laws and regulations indicated that the project is not required by regulation; therefore the Project passes the CAR Protocol's Legal Requirements Test.

Additionally, First Environment relied in part on the Attestation of Voluntary Implementation completed by SES for the current reporting period. The Attestation is on file with CAR and was reviewed to confirm that it was completed correctly.

6.4 *Project Performance Against Protocol/Methodology and Project Management System*

The project was implemented in conformity with the CAR Protocol, and the project specific monitoring plan.

LFG collected by the active gas collection and control system is destroyed by the landfill's open flare. LFG flow is continuously monitored using a Rosemount Mass ProBar flow meter and the

flow rate is recorded on a Yokogawa digital chart recorder. The instrument corrects flow rates from ambient conditions to a standard temperature and pressure of 60°F and one atmosphere of pressure. The concentration of methane in the LFG is monitored continuously using a Siemens Ultramat 23 Continuous Gas Analyzer and also logged along with flare temperature on the Yokogawa recorder. The data are exported to Microsoft Excel for review and quantification.

The flow meter is cleaned and inspected on a monthly basis by site personnel, as documented on the Monthly Checklist. The Monitoring Plan indicates that the flow meter consists of a multivariable transmitter that was factory calibrated on December 29, 2009. The manufacturer does not recommend a regular calibration schedule for the multivariable transmitter since multivariable transmitters retain their accuracy for several years. During the reporting period, a field calibration was performed by SCS Engineers on November 18, 2010, which is less than two months prior to the end of the reporting period as required by the CAR Protocol. First Environment reviewed evidence of the initial factory calibration, the monthly inspections and cleanings, and the field calibration of the flow meter – all of which indicated that the flow meter was operating accurately, with observed drift within the five percent threshold specified in the CAR Protocol.

The methane concentration of the landfill gas is continuously measured using a Siemens Ultramat 23 gas analyzer. The methane concentration was recorded every 30 seconds by the Yokogawa datalogger for the length of the reporting period. The data are exported to Microsoft Excel for review and quantification.

The gas analyzer is cleaned and inspected on a monthly basis, as documented on the Monthly Checklist. The Monitoring Plan indicates that the gas analyzer is field calibrated annually and factory calibrated every five years. The field calibrations are performed per manufacturer's recommended procedures using a gas of known concentration. During the reporting period, the field calibration occurred on December 15, 2010, which is less than two months prior to the end of the reporting period as required by the CAR Protocol. First Environment reviewed evidence of the monthly inspections and cleanings and the field calibration of the gas analyzer. This review indicated the Siemens Ultramat gas analyzer was operating accurately.

As per the monitoring plan, if the Ultramat 23 gas analyzer was ever not functioning properly, a GEM2000 portable gas analyzer will be used to take manual methane readings during these periods of down time. The Ultramat 23 gas analyzer was found to be functioning properly for the entire length of the verification period and thus this alternate source of methane concentration data was not needed.

Flare temperature is continuously monitored by a thermocouple and recorded by the Yokogawa datalogger. The data are exported to Microsoft Excel for review and quantification. The blower and flare system is designed to shut down when the flare temperature drops below 400°F.

Project emissions consist of indirect emissions of CO₂ from purchased electricity used to power project equipment and direct emissions from the combustion of propane for the flare pilot. Activity data for electricity consumption is obtained from monthly invoices. Activity data for propane consumption is obtained from propane purchase records.

SES and SCS developed and implemented a monitoring plan to track relevant parameters and data sources for the Project. First Environment reviewed the monitoring plan and determined

that it met the requirements of the CAR Protocol and accurately reflected the monitoring practices in place.

6.5 Emissions Reduction Calculation Assessment

Emission reduction calculations 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. Because the landfill is still receiving waste and is not capped, a 10 percent methane soil oxidation factor was applied in emission reduction calculations. A 96 percent destruction efficiency is assigned to the open flare and is applied accordingly in emission reduction calculations.

Landfill gas flow and methane concentration were calculated from data obtained in thirty second intervals. Flow readings with a corresponding flare temperature of less than 500°F are excluded from calculations as a quality control measure. No temperature or pressure correction was required in the emission reduction calculations since the flow meter automatically corrects to one atmosphere of pressure and a temperature of 60°F.

Total flow in a given interval was computed by multiplying the flow rate by the length of the interval. The total volume of methane destroyed by the Project is computed in daily intervals by multiplying flow of methane to the flare by the daily average of methane concentration measurements. The total quantity of methane destroyed is aggregated monthly. Data substitution was applied for erroneous flow data on three consecutive days during the reporting period. Data was unavailable due to a malfunctioning flow sensor. All periods of missing flow data where substitution was applied were less than one week in length. SES correctly applied the data substitution methodology prescribed in Appendix E of the CAR Protocol to determine the flow values for the affected periods.

Project emissions were subtracted from total volume of methane destroyed. Project emissions were calculated by multiplying activity data by an appropriate emission factor. Project emissions sources consisted of purchased electricity to power project equipment and stationary combustion of propane for the flare's pilot light.

Copies of the raw data used in the calculations, including flow data, methane content data, and utility invoices and other fossil fuel purchase records, were compared with the data used in the final calculations and tested for transcription or mathematical errors. All raw data sources and calculations over the entire verification period were reviewed. First Environment performed recalculations of emission reductions for the entire reporting period to assess whether they were free of material misstatement. During this review First Environment found the emission reduction calculations to be free of material misstatement.

6.6 Approved Variance or Deviations

SES did not request any variances from CAR for the current reporting period.

6.7 Changes Due to Errata & Clarification Document

The issuance of the Errata and Clarification to the Landfill Project Protocol, Version 3.0 document on January 4, 2011 resulted in a change to the attestation forms that the project developer submitted to the Reserve. First Environment reviewed the Attestation of Voluntary

Implementation and the Attestation of Regulatory Compliance forms and confirmed that these forms were completed correctly and are on file with the Reserve.

7. Audit Results

SES provided good documentation for its emissions estimates as well as its procedures surrounding the data collection process. To complete the verification process, First Environment requested corrective action and additional clarification for several items. The responses given by SES were sufficient to resolve the issues raised by the Audit Team.

Verified results show 30,548 metric tonnes of CO₂e for Vintage 2010 from the reporting period of May 6 through December 31, 2010 eligible for registration with the Climate Action Reserve.

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 from May 6 through December 31, 2010, can be considered with 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:

Reporting Period: May 6, 2010 – December 31, 2010	Total
Baseline Emissions (tCO ₂ e)	30,579
Project Emissions (tCO ₂ e)	31
Emissions Reductions (tCO ₂ e)	30,548

*as measured and calculated in accordance with the Project Methodology

9. Lead Verifier Signature

Michael M. Carim
Associate

10. Senior Internal Reviewer Signature

James Wintergreen
Senior Associate