



**Verification Report
For
The McKinney Landfill Gas Destruction
and Utilization Project
as prepared for:
Montauk Energy Capital LLC**

May 13th, 2009



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Introduction

SGS North America Inc. was commissioned by Montauk Energy Capital LLC to undertake the project verification of the McKinney Landfill Gas Destruction and Utilization Project. The project consists of the collection of landfill gas (LFG) from the McKinney Landfill, located in the town of McKinney in Collins County, Texas, and subsequent destruction through combustion in a permanent open flare with the option to use the gas for generation of electricity in the future. This report covers the verification period of September 1, 2008 to December 31, 2008 as a project deliverable into the Climate Action Reserve.

Objectives and Criteria

The purposes of this verification exercise are, by review of objective evidence, to establish that the project meets the following:

Criteria:

The GHG emission data conform to the requirements of the Climate Action Reserve Landfill Reporting Protocol V.2., the Landfill Verification Protocol V.2 and CCAR General Reporting and Verification Protocols V. 3.0 respectively.

Materiality:

The data reviewed meets the principles of accuracy, completeness, transparency and is free of material error or omission. For this assessment, a materiality threshold of plus or minus 5% has been defined. Misstatements greater than 5 percent will be considered material.

Level of Assurance:

Reasonable Assurance.

Scope

The verification scope of work is described as follows:

Period Covered: September 1, 2008 to December 31, 2008. This is the first verification of emission reductions for the McKinney Landfill Gas Destruction and Utilization Project.

Geographical boundaries: McKinney Landfill in McKinney, Texas, USA.

Greenhouse gases included in inventory: Emission Reductions resulting from the capture and destruction of landfill gas methane. Gases reviewed include [CO₂, CH₄]. All gases converted to CO₂ equivalents.

Organizational boundaries: The project includes all emission sources from the operation of the landfill gas collection system to the ultimate destruction of the landfill gas

Sources of GHG emissions reviewed:

The GHG sources, sinks, and reservoirs associated with the baseline scenario are:

- CH₄ vented to the atmosphere.
- CO₂ from the oxidation of CH₄ by soil bacteria. As the landfill is not covered with a synthetic liner, the CCAR Landfill Project v.2 Reporting Protocol assumption that 10 percent of the methane produced would be naturally oxidized by soil bacteria has been applied.

The GHG sources, sinks, and reservoirs associated with the project are:

- CO₂ from the combustion of CH₄ in electrical generation and the flare.
- CO₂ from the combustion of fossil fuels used during operation and maintenance activities for the project activity.
- CO₂ resulting from the consumption of imported electricity

Verification Process

Summary

The verification process consisted of the following:

- Project listed and SGS North America Inc. selected as project verifier: The McKinney Landfill Gas Destruction and Utilization Project was listed on the California Climate Action Reserve (CAR) website. Montauk Energy Capital selected SGS North America Inc. as their verification body.
- A Conflict of interest review and notification of verification activities was submitted to CAR. The COI assessment was conducted to identify any potential conflicts interests with the verification/project. No conflicts were identified and a determination of low potential for conflict of interest was received from the Climate Action Reserve prior to the commencement of verification activities (ref 1- COI Determination).
- A kick off meeting was held with the client to review verification activities and initiate emission data transmission.
- A full Strategic Review and Risk Assessment (SR&RA) exercise was completed in order that the verification team could understand the scope and risks associated with the emissions reductions reported by the project. A verification plan was developed as part of the SR&RA process (Ref. 8- GP5611 Worksheet).
- A Site visit was conducted at the McKinney Landfill in McKinney Texas. See itinerary for details.
- A Review and evaluation of GHG management systems, data collection and handling, and emission reduction calculations and procedures was conducted during the site visit and part of the desk review.
- Issuance and Resolution of Corrective Action and New Information requests were conducted throughout the verification.
- An assessment of emission reduction calculation inputs and procedures.
- Development of final verification report and opinion statement
- Exit meeting with client

Verification Team

The verification was undertaken by Edgar Salinas; Lead Assessor, and Tina Sentner, assessor, both of SGS NA. The Technical Review was performed by Irma Lubrecht of SGS UK.



Itinerary

A kick off meeting was conducted between the verification team and Sharon Frank of Montauk Energy Capital on January 14, 2009. The purpose of the kick off meeting was to discuss timeline of audit; confirm verification criteria; schedule the site visit and to begin gathering information.

A site visit was conducted by the audit team on February 17-18th at the McKinney Landfill in McKinney Texas. Sharon Frank and Rob Iverson (from Montauk Energy); Edgar Salinas and Tina Sentner (from SGS) and Tim Kidman (from the Climate Action Reserve) were in attendance. The purpose of the site visit was to observe operation of monitoring equipment onsite, interview key personnel, and to review the project data management systems implemented for the project.

The activity schedule and audit plan are included as Reference 02.

Review of Project Description and Eligibility

The McKinney Landfill Gas Destruction and Utilization Project ("The Project") collects landfill gas (LFG) from the McKinney Landfill and destroys it via combustion through an open candlestick flare or in two Caterpillar 3520 lean burn internal combustion engines (to produce electricity) each with a rated capacity of 1.6 MW. At the time of this assessment, the internal combustion engines were not yet operational at the site. The project is located at the McKinney Landfill in the town of McKinney in Collins County, Texas, 30 miles north of Dallas, Texas. The landfill is an inactive solid waste sanitary landfill and covers approximately 65 acres. The landfill began accepting wastes in 1968. In 2004, the landfill ceased accepting municipal wastes and began accepting only Construction and Demolition type debris until its closure on December 31, 2008.

McKinney began installation of the landfill gas collection and conveyance system (GCCS) in the spring 2008 and began flaring gas on August 1, 2008. The permit application for the installation of the flare was reviewed and the project equipment delivery receipt provided evidence of the project start date (Ref.03 - McKinney PDD v.4_090417.doc). The GCCS consists of a series wellheads that pull gas from vertical and horizontal extraction points. The gas is then routed via a main header line into the flare skid. The landfill gas is pulled by a blower and passes through various knockout vessels to remove moisture prior to passing through the flow meter in route to the candlestick flare. A Passive Solar Flare, connected to the landfill leachate riser system, was installed at the site voluntarily prior to the installation of the project gas collection and conveyance system. The Solar flare is operated only when sufficient gas is collected from the leachate lines. The Passive solar flare permit application and acknowledgement from Texas Commission on Environmental Quality was reviewed (Ref.06 - Solar Flare Air Permit.pdf). The McKinney Landfill project will consider only landfill gas destroyed beyond that resulting from the pre-project passive collection and destruction system as additional.

The McKinney Landfill is subject to NSPS regulation requiring the facility to conduct Non-Methane Organic Compound (NMOC) emission rate testing. The most recent Tier 2 NMOC Emission Rate Report for McKinney Landfill was 41.5 Mg/year (Ref.03 - McKinney PDD v.4_090417.doc). The NMOC emission rate is expected to continue to decline each year since the landfill has only accepted C&D wastes since 2004 and is currently in closure status. Therefore it is expected that the NMOC rate will remain below the regulatory compliance limit of 50 Mg/yr. In addition, a regulatory review of the project and landfill were conducted and documented for the project. The landfill appears to be in compliance with Federal, State and Local regulations and therefore no mandatory regulatory requirements have been implemented to require the installation of a gas collection and conveyance system. An Attestation of Compliance signed by the Vice President of Montauk was noted on March 23, 2009 and again under the Climate Action Reserve form on April 17th, 2009 (ref 07a).



Montauk Energy Capital LLC and North Texas Municipal Water District have entered into a gas purchase rights agreement on July 10, 2007 regarding the purchase and ownership of Emission Reduction Credits (Ref. 3 Project Design Document v.3 (4-2009)). In addition, further evidence of ownership of emission reduction credits is provided in an Attestation of Title signed on October 20, 2008 by Montauk Energy Capital LLC (Ref.07 - Attestation of Title_081020.pdf).

Review of Project GHG Management Systems

During the site visit, a review of the project greenhouse gas management systems was reviewed with the project proponent. This review included a detailed look at the project data handling and processing procedures, recordkeeping and data storage, and quality control and assurance procedures. The following is the result of this review:

The primary data gathered for the project is landfill gas flow, pressure, temperature and methane content of the landfill gas. A Thermal Instrument 62-9/9500 Flow Meter continuously monitors flow after the blower and a knockout prior to combustion in the candlestick flare. The position of the flow meter is adequate to ensure laminar flow. This meter was factory calibrated prior to installation and is quarterly calibrated in the field using a single point test with Pitot tube and manometer. The calibration results indicate the instruments are reporting accurate data.

Methane content is continuously monitored using the ABB Natural Gas Chromatograph Model # NGC 8200. The Gas analyzer was factory calibrated on May 30, 2008 (Ref. 05 Evidence Binder, Section 6). The instrument performs daily self calibrations against reference gases of known concentrations. The meter was manually placed in calibration to observe the process during the site visit. Calibration gases were verified in the field to be appropriate for the instrument. Data from this device is digitally recorded in the Yokogawa every two seconds and transmitted to the Montauk ftp internet site on an hourly basis. The data is downloaded weekly and the average methane content of the landfill gas for each day is entered into a log.

The operation of the flare is continuously monitored using a thermocouple located within the flare shroud to record the temperature and operating hours of the flare. Temperature readings are transmitted to the Yokogawa recorder and electronically transmitted to the Montauk ftp internet site on an hourly basis. An automatic valve is used to stop flow to the flare if the flame is extinguished. In addition, site personnel observe the flare and notify the field technician in the event the flare is inoperable.

The Yokogawa data logger has a compact flash card with 2GB capacity and can retain approximately two months worth of raw data. In addition, data from the FTP website is downloaded weekly and transferred to Compact Disks for storage (Ref.04 - McKinney Monitoring Plan_090322.doc).

Emission Reduction Calculation Assessment

The emission reduction calculation assessment included the review of project assumptions, raw data inputs and accuracy of calculations. The formulas and raw data inputs used to determine emission reduction calculations as described in the McKinney Project Design Document and the calculation spreadsheets (Ref.10 - McKinney ERs spreadsheet_090417.xls) were first reviewed for compliance with the Landfill Project Reporting Protocol V.2.0. The main parameters of formula 5.1 and 5.2 were verified as follows

Total annual methane emissions destroyed by the project landfill gas collection and destruction system ($CH_4 \text{ Dest}_{PR}$)

The amount of methane destroyed is calculated from the continuously metered landfill gas data (i.e. gas flow and methane concentration as per equation 5.2). For the period of September 1, 2008 to November 12, 2008, project developers contracted with Critical Wireless to provide wireless data acquisition (ref. 09a). Data was electronically transmitted to the Critical Wireless website; aggregated on intervals of 10 minutes each and totalized on a daily basis for the purpose of the calculations of emissions reductions. For this period where the critical wireless system was in use, data was downloaded on a weekly basis into a Microsoft Excel spreadsheet by the field technician, who kept the necessary registries for the calculation of emission reductions. For the period November 12, 2008 to December 31, 2008, project developers shifted to a different system called the Yokogawa, which recorded pulses of information coming from the meters at intervals of two seconds each. The main monitored parameters needed to calculate the amount of methane destroyed are:

$LFG_{i,t}$ = total quantity of landfill gas fed to the destruction device¹; and
 $PR_{CH_4 i,t}$ = the average methane fraction of the landfill gas in time interval t as measured

Due to the large size of raw data set for the period, a sample set of raw data (consisting of methane content, and landfill gas flow) was randomly selected in order to identify material misstatements due to transcription mistakes, mathematical errors or malfunction of instruments. The sample effort is presented in the following table:

Sample date	Values presented in ERs calculation		Raw Data Reviewed by SGS		Comments
	CH4 concentration	Gas flow (scf)	CH4 concentration	Gas flow (scf)	
09/08/2008	57.142	1307000	57.142	1307000	No material error found
09/18/2008	0.000	0	0.000	0	Flare off
09/22/2008	57.115	436000	no entry	434000	The procedure for substitution of data was applied (See Ref.16). Between Sept. 15th and 22nd a 5% discount factor was applied to account for the uncertainty associated with the data substitution methods.
09/28/2008	57.288	1289000	57.288	1289000	No material error found
10/08/2008	57.102	1316000	57.102	1316000	No material error found

¹ Landfill gas flow was corrected from a temperature of 70°F and one atmosphere of pressure to 60°F and one atmosphere of pressure.



10/18/2008	57.163	1245000	no entry	1245000	The procedure for substitution of data was applied (See Ref.16). Between Oct. 18th and 22nd a 5% discount factor was applied to account for the uncertainty associated with the data substitution methods.
10/28/2008	53.980	1500000	53.980	1500000	No material error found
11/08/2008	57.212	1628000	57.212	1628000	No material error found
11/18/2008	57.185	1640000	no entry	1639000	The procedure for substitution of data was applied (See Ref.16). Between Nov. 12th and 21st a 5% discount factor was applied to account for the uncertainty associated with the data substitution methods.
11/28/2008	57.100	1666000	57.090	1667000	No material error found
12/08/2008	57.450	1494000	57.440	1494000	No material error found
12/18/2008	57.640	1572000	57.630	1572000	No material error found
12/28/2008	55.930	1643000	55.920	1642000	No material error found

Project emissions consisting of indirect emissions from electricity and direct emissions from propane use are subtracted from the total amount of methane destroyed. The values presented in the calculations

Default methane destruction efficiency for device (DEi)

The value applied was 0.960 for Open flares, as prescribed by the protocol

Factor for the oxidation of methane by soil bacteria (OX)

The McKinney Landfill project does not incorporate a synthetic liner in its cover system; therefore a 10% methane soil oxidation factor was applied to the baseline scenario.

Discount factor to account for uncertainties associated with the project monitoring equipment (DF)

As per the methodology, DF equals to zero if using continuous methane monitor with no missing data and all calibration tests are within a 5% margin of error. It was indeed verified that measurement readings are continuous and that calibration certificates indicated that instruments were within the thresholds for permissible error (see section above: Review of Project GHG Management Systems).

Adjustment to account for pre-project LFG destruction device (PRE_{discount})

An adjustment to the project baseline was necessary due to the installation of a pre-project destruction device, a Passive Solar Flare connected to the leachate riser system. The discount for the amount of methane destroyed by the pre-project Passive Flare was applied to the baseline scenario.

Total annual indirect carbon dioxide emissions from the consumption of electricity from the grid (EL_{CO2}) and total annual carbon dioxide emissions from the destruction of fossil fuel (FF_{CO2})

CO2 emissions result from consumption of electricity to power project equipment and activity data for this source was tracked by reviewing utility invoices from the power supplier TXU Energy.



Direct CO₂ emissions result from propane used to assist the ignition of the flare. This activity data is taken from purchase invoices and estimates from propane used (Ref. 05 Evidence Binder, Section 9-10).

During this review, inconsistencies in the data and the calculations methodologies that were identified were corrected by the project proponent through the issuance of Corrective Action requests. Details on these issues and how they were closed out are provided separately in the US. GP5613 Findings Overview.

Verification Results

The verification of the McKinney Landfill Gas Destruction and Utilization project focused on the accurate collection of data and quantification of emission reductions as implemented by Montauk Energy Capital LLC in accordance to with the Landfill Project Protocol. The following provides a summary of the verification results:

On February 12, 2009, project proponents reported 30,552 metric tonnes as per the information loaded into the Climate Action Reserve website (Ref. Ref.11 - CAR Project ERs_090212.pdf). This was the initial value upon which the verification began. During the site visit, some corrective action requests were raised (See CAR04) with regard to the way the calculation of emission reductions had been presented and the verification of those calculations was put on hold until a new set of data was provided. As a result of the required amendments, Montauk Energy Capital LLC submitted a new set of calculations that consisted of two files (i.e. Critical wireless and McKinney ERs spreadsheet). These two files reflected a value of 27,952 metric tones of CO₂-e (see Ref.11 - CAR Project ERs_090414.pdf). The excel file containing the data set from Sept. 1st – Nov.12th, 2008 was reviewed (see Ref.09 - Critical Wireless_090416 reviewed by SGS.xls) as well as the file containing the summary of the emissions reductions (see Ref.10 - McKinney ERs spreadsheet_090416 reviewed by SGS.xls). Both files still held inconsistencies that were communicated to the project developers so they could be corrected (See CAR10).

After project proponents corrected the calculations and submitted a new summary of emissions reductions calculations (Ref.10 - Ref.10 - McKinney ERs spreadsheet_090417.xls); the amount of emission reductions verified resulted as follows:

Period September 1, 2008 to December 31, 2008	Verified
Baseline Emissions	30,136.65
Project Emissions	20.25
	0.0048
Pre-Discount	1940.29
Total Emission Reductions	28,176.10

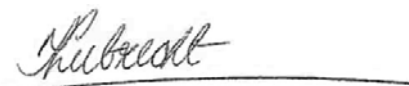
As an integral part of the verification process, SGS made several supplemental documentation requests in the form of Corrective Action and New Information requests. These requests provided clarification regarding the project. In total 6 CARS and 4 NIR were issued throughout the verification. The details and resolution of these requests are documented in the SGS Findings Overview form and attached separately (US.FO McKinney Landfill_090416.doc).

Conclusion on Data Quality and Decision on Materiality

Based on the data collected and reviewed, the McKinney Landfill Destruction and Utilization project is considered to comply with the guidelines of the Climate Action Reserve Landfill Gas Project Reporting and Verification Protocols v2.0. The emission reductions generated from the capture and destruction of landfill gas methane has been compiled in a transparent manner, protocols have been applied consistently; the data were found to be accurate within the uncertainty limits of the measurement equipment and emission reduction calculations were found to include all the required sources. No material errors or omissions have been identified for the period of September 1, 2008 to December 31, 2008. The Emission reduction CRT(s) are considered verified to a reasonable level of assurance.

Recommendation

The Verification Team Lead Verifier recommends that SGS issue a Verification Opinion stating the following:

Name and address	Montauk Energy Capital LLC
Scope of verification	Emission reductions arising from the capture and destruction of Landfill Gas Methane from the McKinney Landfill Gas Destruction and Utilization Project
Total GHG emissions verified	28,176 metric tonnes [CO₂e]
GHG protocol(s) used for Verification	California Climate Action Registry Landfill Project and Verification Protocols v2.0 , California Climate Action Registry General Reporting and Verification Protocols v. 3.0
Verification opinion with regard to data quality and materiality	The data are considered to be complete, transparent and free of material error or omission.
Applicable year	The emissions have been calculated from data collected during the period September 1, 2008 to December 31, 2008 .
Date of verification	The Verification Statement is to be dated when the technical reviewer accepts the recommendation to issue the statement.
Dated and signed on behalf of the verification body by authorized signatory	 Edgar Salinas 05-13-2009
Dated and signed on behalf of the verification body Technical Reviewer	 Irma Lubrecht 05-12-09

Confidentiality Statement

All members of the verification team are bound by the terms of Non-Disclosure included in employment / sub-contractor agreements.

List of References

Reference #	File Name	Document Type
01	2009-COI-Determination-CAR409.pdf	Electronic- pdf
02	US AUD GP5609_CAR Ver 0002_LFG McKinney.p	Electronic-pdf
03	McKinney PDD v.4_090417.doc	Electronic-word
04	McKinney Monitoring Plan_090322.doc	Electronic- pdf
05	Evidence_Binder	Electronic version of hard copy files
06	Solar Flare Air Permit	Electronic-pdf
07	Attestation of Title_081020	Electronic-pdf
08	GP5611-Verification Plan with SR&RA	Electronic- xls. (not included in client submittal)
09	Critical Wireless_090417	Electronic- xls.
09	Critical Wireless_090416 reviewed by SGS	Electronic- xls.
09a	Critical Wireless Quote	Electronic-pdf
10	McKinney ERs spreadsheet_090416 reviewed by SGS	Electronic- xls.
10	McKinney ERs spreadsheet_090417	Electronic- xls.
11	CAR Project ERs_090212	Electronic-pdf
11	CAR Project ERs_090414	Electronic-pdf