

Verification Report for the Seneca Meadows Landfill Expansion Project Waterloo, New York

Reporting Period: January 1 to June 30, 2012

American Carbon Registry

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1. Introduction

This report is provided to Seneca Meadows, Inc. (SMI) as a deliverable of the American Carbon Registry (ACR) project verification process. This report covers the verification of the Seneca Meadows Landfill Expansion Project (the Project) for the period from January 1 to June 30, 2012. First Environment, Inc. (First Environment) conducted the verification from November to December 2012.

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 Boundaries	Seneca Meadows Landfill Waterloo, New York, USA
Greenhouse Gases Verified	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e) resulting from methane destruction; Project emissions of CO ₂ , CH ₄ , N ₂ O from purchased electricity and fossil fuel combustion
Reporting Period	January 1 to June 30, 2012
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	<ul style="list-style-type: none">• ACR Standard, Version 2.0, February 2010• EPA Climate Leaders Greenhouse Gas Inventory Protocol Offset Methodology for Landfill Methane Collection and Combustion, Version 1.3, August 2008• GHG Project Plan, Dated March 2011
Verification Process	<ul style="list-style-type: none">• ACR Verification Guideline for GHG Projects, Version 1.1, June 2012• ISO 14064-3: 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 SMI contact;
- development of the verification plan and sampling plan;
- review and evaluation of GHG information systems and data;
- follow-up interaction with SMI 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. A project-specific conflict of interest form was also filed with ACR during the first verification for the Project.

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 – Mary Pat Campbell, Ellen Reid, Ross MacWhinney
Internal Reviewer – James Wintergreen

5.3 Audit Kick-off

The verification audit was initiated with a kick-off meeting on November 12, 2012 with the primary SMI contacts. 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. SMI was afforded the opportunity to comment on the key elements of the plan for verification. Based on items discussed and agreed upon with SMI, 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 and established project deliverables. A separate data-sampling plan was designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

5.5 Site Visit

First Environment performed a site visit on June 5, 2012 as part of the previous verification. The site visit included review of site operations, data collection processes, and information management systems, as well as interviews with key project personnel. SMI confirmed that no significant operational changes or monitoring reconfigurations had occurred since the site visit; therefore, a repeat site visit for this verification period was deemed unnecessary.

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 clarification during the verification process. SMI provided sufficient responses to all clarification requests. These requests and SMI's responses are described in detail in Section 7 of the report.

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 SMI, along with a verification statement. Both the report and statement are submitted to ACR as part of the verification reporting process.

6. Project Conformance with Verification Criteria

6.1 Project Description

The Seneca Meadows landfill is owned and operated by Seneca Meadows, Inc. and is located in Waterloo, New York. The Project consists of the installation of a gas collection and control system at the landfill. The Project collects landfill gas (LFG) generated from solid waste and combusts it in engines to produce electricity or in auxiliary flares.

Although the landfill is subject to NSPS regulations regarding LFG emissions, gas collection and destruction is not mandated in expansion cells of the landfill for the first five years from the initial placement of waste in the cell or after two years from the time the cell reaches final grade,

whichever is sooner. The Project can only create emission reductions in these cells in the years before they become subject to NSPS requirements.

The baseline scenario is defined as the unmitigated release of LFG from the landfill to the atmosphere, less methane that is oxidized by soil bacteria. Combustion of LFG controlled by the Project destroys the methane in the LFG, resulting in a reduction in CO₂-e emissions.

The GHG Project Plan provides additional details about the Project.

6.2 Eligibility

The Project meets the eligibility requirements set forth in the ACR Standard and Climate Leaders Protocol. Project boundaries are consistent with those identified in the GHG Project Plan and were reconfirmed during the previous verification site visit performed in June 2012.

The Project is located within the United States and has a start date after January 1, 2000. The Project occurs in several phases as the landfill is expanded into new cells; therefore, each cell has its own start date and crediting period. The crediting period for each expansion begins on the date of the first placement of waste in the cell.

The current reporting period only includes gas collected from the Southeast Bumpout (SBO) cell of the landfill; the Project has not expanded beyond this cell to date. Waste was first placed in the SBO on December 17, 2008; therefore, this serves as the start date for the crediting period for this cell. The start date for this cell was confirmed in correspondence with the New York State Department of Environmental Conservation. Additionally, the GHG Project Plan includes discounting of any gas collected from ineligible cells of the landfill within the radius of influence of wells in the SBO; the methodology and calculations for this adjustment to gas flow totals are described in Section 6.5 and 6.6 below.

The GHG Project Plan describes the process that SMI will employ to identify and address negative community or environmental impacts. No negative impacts were recorded during the current reporting period.

The Project does not participate in any other GHG emission trading or compliance programme and has not previously been rejected by another GHG programme.

6.3 Offset Title

SMI owns and operates the landfill, the gas collection system, and the two enclosed flares. Because SMI owns the emission source controlled by the Project, they are appropriately identified as the entity holding offset title. Additionally, Innovative Energy Systems, the operator of the LFG-to-energy plant that destroys LFG generated by the landfill, provided correspondence waiving any right to claim credit for GHG emission reductions from the Project. Therefore, First Environment concluded that SMI holds title to emission reduction credits associated with the Project.

6.4 Additionality

The Project satisfies the requirements for the demonstration of additionality specified by the ACR Standard by passing an approved performance standard and a regulatory additionality test.

The Project consists of the voluntary expansion of a landfill gas collection and combustion system that collects LFG and destroys it in engines to produce electricity or in enclosed flares and therefore exceeds the performance standard defined by the Climate Leaders Protocol.

Because the Project occurs at expansion cells at an NSPS site, gas collected is not subject to control requirements until five years from the first placement of waste in an expansion cell or two years after it reaches final grade. As described above, since gas collected during this reporting period only came from the SBO and the first waste was placed in this cell in 2008, LFG collected and combusted during the current reporting period is considered additional because it is not yet required under NSPS regulations until 2013.

No state or local laws mandate the collection and destruction of landfill gas prior to the timelines established by federal NSPS regulations.

6.5 Project Monitoring and Management System

The project was implemented in conformity with the GHG Project Plan. Significant aspects of the project's monitoring plan are discussed below.

Total LFG destroyed by the project is measured continuously using a Magnetrol Thematel Model TA2 mass flow meter. The site owns two meters and operates one with the other meter rotated in as needed due to ongoing meter maintenance or every two years for calibration. Flow meter S/N 10829-01-002 corrects ambient flow conditions to a standard temperature and pressure of 60°F and one atmosphere, while flow meter S/N 10829-01-001 corrects to 70°F and one atmosphere. Flow data is recorded electronically through a SCADA system and downloaded by SMI personnel.

Table 1 below shows the dates during the reporting period that each meter was installed during the reporting period.

Table 1: Flow Meter Dates of Service

Dates of Service	Flow Meter S/N	Reason for Removal
January 1, 2012 – April 27, 2012 10:59AM	10829-01-001	Routine replacement
April 27, 2012 11:00AM – June 30, 2012 ¹	10829-01-002	N/A – in use through end of reporting period

¹ Flow meter 10829-01-002 was originally installed on April 23, 2012 at 11:00AM. However, upon installation and startup, the meter displayed erroneous readings. SMI removed the meter at 11:35AM and sent it to the manufacturer for calibration. Following successful calibration, meter 10829-01-002 was then re-installed on April 27, 2012 and used from 11:00AM through the end of the verification period. No emission reduction credit is claimed on April 23 during the period when meter 10829-01-002 was in use.

A semi-annual inspection of meter No. 10829-01-001 was performed on March 1, 2012 in accordance with the GHG Project Plan. Meter No. 10829-01-002 was also inspected on August 12, 2011 when it was reinstalled.

The GHG Project Plan specifies a calibration interval of every two years for the Magnetrol flow meter. Meter No. 10829-01-002 was factory calibrated on April 26, 2012. Because Meter No. 10829-01-001 was last factory calibrated in November 2010, no factory calibration was required for this instrument during the current verification period.

Methane concentration in LFG is measured using one of three Elkins Envision handheld instruments owned by SMI. Measurements are taken each business day of operation and logged in the monitoring instrument. Data is later downloaded from field PCs into electronic spreadsheets. The Elkins Envision handheld instruments are calibrated in the field using a reference gas of known concentration prior to each use and internal calibrations are performed according to manufacturer's recommendations

The GHG Project Plan specifies a calibration interval of one year for the Envision instrument. Two of the three Envision analyzers used by SMI were calibrated on July 21, 2011. The third Envision analyzer was calibrated on July 18, 2011. Therefore, none of these three instruments were due for calibration during the reporting period.

Because combustion devices destroy gas from both eligible and ineligible cells of the landfill, gas flow and methane measurements must be taken prior to any co-mingling of these gas streams. By reviewing engineering diagrams for the collection system and receiving confirmation from SMI at the kickoff meeting that the monitoring configuration did not change since the last site visit conducted in June 2012, First Environment confirmed that the flow meter and point of measurement are both located along the header pipe for the SBO prior to tie-in to larger headers that carry gas from other sections of the landfill.

The potential also exists for the collection wells closest to this boundary of the SBO to influence and collect gas from adjacent, ineligible cells of the landfill. Temperature, pressure, and vacuum readings are taken at each of the horizontal and vertical collectors for the SBO primarily using one of the Elkins Envision instruments or the GEM-2000 gas analyzer as a backup. These readings are used to calculate the monthly radius of influence (in feet) using Darcy's Law as presented in the GHG Project Plan. First Environment reviewed SMI's calculations to determine the effective radius of influence of perimeter wells, and performed recalculations of radii of influence for each affected well and concluded that appropriate deductions are made in emission reduction calculations.

Both gas flow and methane concentration measurements are taken on a wet basis. Because the points of measurement on the header pipe completely isolate gas flow and methane data from the SBO, no additional measurements or adjustments are necessary to capture eligible project data.

Activity data for purchased electricity and fossil fuel consumption are monitored according to the GHG Project Plan. Monthly quantities of purchased electricity for project equipment are obtained from meter reads by project personnel. Fuel consumption during project construction and propane consumed for flare assistance is logged on field forms.

The monitoring approach described in the GHG Project Plan and implemented on site meets the requirements of the Climate Leaders Protocol and the ACR Standard.

6.6 Emissions Reduction Calculation Assessment

As part of the emissions reduction calculation assessment, the Project's assumptions and calculations were reviewed.

Emission reduction calculations were reviewed to ensure accuracy in the formulas used and the raw data used as inputs. Formulae were tested to ensure they were consistent with the calculation methodology described in the Climate Leaders Protocol and GHG Project Plan. A 10 percent methane soil oxidation factor was applied in emission reduction calculations in accordance with the Climate Leaders Protocol. A destruction efficiency of 98.34 percent is assigned to all combustion devices within the project boundary. This value is consistent with the GHG Project Plan. Because this value is lower than the 99 percent destruction efficiency specified by the Climate Leaders Protocol, it is conservative to apply it to all combustion devices.

The amount of methane destroyed was calculated from metered data for landfill gas collected. Totalized flow was calculated from data obtained in one minute intervals from the SCADA system. Flow data are aggregated into weekly totals. The fraction of methane in landfill gas during a given interval was determined by averaging all measurements taken in a given week.

The gas collection from the SBO may capture small amounts of ineligible gas from adjacent cells that are subject to NSPS regulations. Therefore, the radius of influence calculation described in the GHG Project Plan is required for the current reporting period. A radius of influence was calculated for each of the vertical and horizontal collector wells along with a percentage for each collection point influencing the adjacent ineligible cells. This percentage represents the amount of ineligible gas potentially collected, and the corresponding discount is then applied to monthly volume of methane destroyed.

The total volume of methane destroyed by the Project is computed using Equation A from the Climate Leaders Protocol. No independent correction of the pressure and temperature of LFG flow totals is required for dates when flow meter No. 10829-01-002 was used because the flow meter corrects to standard conditions of 60°F and one atmosphere, which is consistent with the assumptions of the Climate Leaders Protocol. Meter No. 10829-01-001 corrects flow measurements from ambient conditions to standard conditions of 70°F and one atmosphere. In the emissions reduction calculations, SMI correctly performed the calculations as required by Climate Leaders Equation A to correct flow data recorded by meter No. 10829-01-001 to a standard temperature of 60°F and pressure of one atmosphere.

Data substitutions were performed for gas flow and methane concentration data in several instances during the reporting period. All substitutions were performed in accordance with the procedure specified in the GHG Project Plan. The Project also achieved the minimum data recording thresholds during the reporting period described in the GHG Project Plan as eligibility conditions for performing data substitution.

Project emissions were subtracted from total volume of methane destroyed and quantified using Equation B from the Climate Leaders Protocol. Project emissions were calculated by

multiplying activity data by an appropriate emission factor. Project emissions sources consisted of purchased electricity to power project equipment, propane used to start flares, and mobile combustion of gasoline and diesel from project-related construction activities.

There are no leakage emissions associated with the Project; therefore, these are assigned a value of zero in Equation C from the Climate Leaders Protocol.

Total emission reductions were computed using Equation D from the Climate Leaders Protocol. All emission sources within the project boundaries are properly accounted for in calculations.

Copies of the raw data used in the calculations, including flow data and methane content data, were compared with the data used in the final calculations and tested for transcription or mathematical errors. First Environment performed recalculations of emission reductions for the entire reporting period to assess whether they were free of material misstatement. First Environment found the emission reduction calculations to be free of material misstatement.

7. Audit Results

SMI provided good documentation for its emissions estimates as well as its procedures surrounding the data collection process. To complete the verification process, First Environment issued requests for additional clarification. Through communications with the Audit Team, SMI was able to resolve all clarification requests made by First Environment during the verification process.

The following tables summarize the clarifications requested, as well as SMI's responses:

ID	Clarification Request	Summary of Participant Response	Verification Conclusion
1	During the kickoff meeting, it was discussed that gas collection in the Stage 3 Area/Western Expansion began in May 2012. Please confirm whether monitored data for the current reporting period includes gas collection from the new expansion area of the landfill or only the existing Stage 1/2 Area (SBO).	SMI confirmed that metered data in the current reporting period only includes gas collected from the Stage 1/2 Area (Southeast Bumpout) cell.	Response is acceptable.

Two opportunities for improvement (OFI) were also identified during the audit process. The following table summarizes the OFIs raised:

ID	OFI	Verification Conclusion
1	The last documented calibration event for flow meter S/N 10829-01-002 occurred on 1/12/2010. The meter exceeded the 24 month calibration interval identified in the GHG Project Plan when it was placed into service on April 23, 2012. SMI should ensure that all flow meters are calibrated at least every 24 months per the GHG Project Plan.	Because no emission reduction credit is claimed on April 23, 2012 when meter S/N 10829-01-002 was in use, there is no impact on reported emission reductions in the current reporting period. SMI should be aware that late calibrations of instruments may affect the eligibility of emission reductions claimed in future reporting periods.
2	Flow meter accuracies reported during Pitot tube field checks are not calculated consistently. The reference point used in the denominator of the accuracy calculation fluctuates between the Pitot tube result and the observed flow reading on the meter resulting in incorrect calculations of meter accuracy in some instances.	First Environment will review calculations performed in future reporting periods to verify correct calculation of accuracy calculations.

Verified results show 250,324 metric tonnes of CO₂e from Vintage 2012 from the reporting period from January 1 to June 30, 2012 eligible for registration with the American Carbon Registry.

8. Verification Conclusion

First Environment was retained to provide verification services for the Project's GHG emission reductions assertion based on the following fundamentals:

- *Level of assurance:* Reasonable assurance.
- *Objectives of verification:* To assure project conformance with the verification criteria and ACR requirements.
- *Verification criteria:* American Carbon Registry Standard, Version 2.0, February 2010; Climate Leaders Greenhouse Gas Inventory Protocol Offset Project Methodology for Project Type: Landfill Methane Collection and Combustion, Version 1.3, August 2008; approved GHG Project Plan.
- *Definition of materiality:* Misstatements of greater than five percent of the GHG reduction assertion and qualitative non-conformities with verification criteria are considered material.
- *Scope, including:*
 - *Boundaries of the assertion:* Seneca Meadows landfill operations;
 - *The physical infrastructure, facilities, and activities within the assertion:* LFG collection and destruction operations;
 - *GHG sources, sinks, and reservoirs included within the assertion:* CH₄ emissions from anaerobic decomposition of waste; CO₂, CH₄, and N₂O emissions from combustion of fossil fuels; and CO₂, CH₄, and N₂O emissions from purchased electricity; and
 - *The time period for the assertion:* January 1, 2012 to June 30, 2012.

Based on the assessments performed and the historical evidence collected, First Environment concludes that the Project GHG emissions reductions, due to the capture and combustion of methane gas for the period January 1 to June 30, 2012, can be considered with a reasonable level of assurance:

- consistent with the GHG Project Plan and identified verification criteria,
- without material discrepancy, and
- meeting the minimum level of accuracy of at least 95 percent.

Verified results show:

Reporting Period: January 1 through June 30, 2012	Total
Baseline Emissions (m.t.CO ₂ e)	251,386
Project Emissions (m.t.CO ₂ e)	1,062
Emissions Reductions (m.t.CO ₂ e)*	250,324

*as measured and calculated in accordance with the Project Methodology

9. Lead Verifier Signature



Michael M. Carim
Senior Associate

10. Independent Internal Reviewer Signature



James Wintergreen
Senior Associate