

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

American Carbon Registry

November 2016

Prepared by: First Environment, Inc.
770 L Street, Suite 950
Sacramento, California 95814



TABLE OF CONTENTS

1. Introduction	1
2. Objectives	1
3. Verification Scope	1
4. Standards Used to Verify Emissions (Criteria)	1
5. Overview of the Verification Process	2
5.1 Conflict of Interest Review	2
5.2 Audit Team	2
5.3 Audit Kick-off.....	2
5.4 Development of the Verification Plan	3
5.5 Site Visit.....	3
5.6 Emissions Reduction Data and Calculation Assessment	3
5.7 Corrective Actions and Supplemental Information.....	3
5.8 Verification Reporting.....	3
6. Project Conformance with Verification Criteria	3
6.1 Project Description.....	3
6.2 Eligibility.....	4
6.3 Offset Title	4
6.4 Additionality	4
6.5 Project Monitoring and Management System.....	5
6.6 Emissions Reduction Calculation Assessment.....	6
7. Audit Results.....	7
8. Verification Conclusion.....	8
9. Lead Verifier Signature	9
10. Independent Internal Reviewer Signature.....	9

TABLE

TABLE 1: Flow Meter Dates of Service	5
--	---

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 July 1 to December 31, 2014. First Environment, Inc. (First Environment) conducted the verification from the date of the kickoff meeting through November 9, 2016.

This report describes the verification of greenhouse gas (GHG) emission reductions from the Western Expansion (WEX) cell of the landfill.

2. Objectives

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

- the objectives of the ACR Validation and Verification Guideline Chapter 8.B are met;
- 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 – Western Expansion Area 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	July 1 to December 31, 2014
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 Validation and Verification Guideline, 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 were considered material. Qualitative non-conformities with the verification criteria were 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 for this crediting period was filed with ACR on December 16, 2015.

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 – Luca Nencetti, Jeff Daley
Internal Reviewer – James Wintergreen

5.3 Audit Kick-off

The verification audit was initiated with a kick-off meeting on January 5, 2016 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

Mr. Jeff Daley conducted a site visit on April 20, 2016 to assess GHG project boundaries, site operations, data collection processes, and information management systems, as well as conduct interviews with key project personnel.

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 action during the verification process. SMI provided sufficient responses to all 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 of net 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 confirmed during the site visit performed during the verification.

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 scope of verification covered by this report includes only gas collected from the Western Expansion (Stage 3/4) cell of the landfill.

Waste was first placed in the WEX on May 24, 2011; therefore, this serves as the start date for the crediting period for this cell. The start date for this cell was confirmed in an inspection report from the New York State Department of Environmental Conservation (NYS DEC). Emission reductions from the destruction of landfill gas generated by the cell are eligible for crediting during the entire reporting period since the cell did not reach final grade prior to May 2014.

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. This was confirmed by documentation from the NYS DEC. 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, project gas collected during this reporting period originated from the WEX area and the first waste was placed in this cell in 2011. LFG collected and combusted from the WEX is considered additional throughout the reporting period because destruction of LFG generated by this cell of the landfill is not required under NSPS regulations until May 2016.

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.

LFG generated by the WEX is collected and routed through two separate header pipes on opposite sides of the cell's perimeter. LFG flow rates and methane concentration are measured at monitoring stations on each header pipe prior to the gas being co-mingled with LFG collected from other areas of the landfill. Collection of project data from the monitoring station installed on the second header pipe (WEX-CC-0002) began during the current reporting period on September 4, 2014.

LFG flow in each header pipe is measured continuously using two Magnetrol Thermo Model TA2 mass flow meters. Table 1 identifies the project flow meters and the standard temperature and pressure to which each meter corrected data recorded at ambient conditions.

TABLE 1: Project Flow Meters

Monitoring Location	Flow Meter S/N	Reference Conditions
WEX-CC-0001	010829-01-001	70°F and 1 atm
WEX-CC-0002	690673-01-001	60°F and 1 atm

Flow data is recorded electronically through a SCADA system and downloaded by SMI personnel.

The GHG Project Plan specifies a calibration interval of every two years for the Magnetrol flow meter. Instrument S/N 690673-01-001 was previously calibrated by the manufacturer on June 20, 2014; therefore, subsequent calibration was not due during the reporting period. Instrument S/N 010829-01-001 was previously calibrated by the manufacturer on November 18, 2013; therefore, subsequent calibration was not due during the reporting period.

The GHG Project Plan requires a semi-annual (twice yearly) inspection of the flow meter as well as an instrument accuracy check using a Pitot tube on a quarterly basis. An inspection of both meters was carried out on August 27, 2014. Instrument S/N 690673-01-001 was checked for calibration accuracy with a Pitot tube on September 3, 2014 and was found to be operating accurately. A calibration accuracy check was not performed for instrument 010829-01-001 during the current reporting period. SMI obtained an approved deviation from ACR relative to the accuracy check requirement in order to address the issue.

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 factory calibrations are performed according to manufacturer's recommendations.

The GHG Project Plan specifies a calibration interval of one year for the Envion instrument. Evidence was reviewed showing that two of the Envion analyzers, S/N 1007001 and S/N 1007009, were factory calibrated during the first half of 2014 so no subsequent calibration is due for these instruments during the current reporting period. Envion analyzer S/N 1011016 was not used for emission reduction reporting purposes during this reporting period.

First Environment confirmed during the site visit that gas flow and methane concentration for the WEX area is monitored separately from existing gas collection at the landfill. First Environment also confirmed during the site visit that the Stage 3/4 area is sufficiently isolated from other cells of the landfill so that no adjustment in gas flow calculations is required to account for inadvertent measurement of LFG infiltrating it from NSPS-regulated cells.

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 total volume of methane destroyed by the Project is computed using Equation A from the Climate Leaders Protocol. Data collected from flow meter S/N 010829-01-001 was corrected from reference conditions of 70°F and one atmosphere to a standard temperature and pressure of 60°F and one atmosphere. No adjustment was required for gas flow data recorded by meter S/N 690673-01-001.

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 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 assist 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 boundary 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. A risk-based sample of 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. 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 corrective action and clarification requests. Through communications with the Audit Team, SMI was able to resolve all requests made by First Environment during the verification process.

The following tables summarize the findings issued, as well as SMI's responses:

ID	Corrective Action Request	Summary of Participant Response	Verification Conclusion
1	<p>The Monitoring Report was not prepared in accordance with the requirements in the ACR template in the following sections:</p> <ul style="list-style-type: none"> • Section II.6 (Current project crediting period) • Section III.2 (Program of Activities Project Implementation) • Section III.3 (Project Deviations) • Section III.4 (Regulatory Compliance) 	<p>The Monitoring Report was revised to address all requirements of the ACR template.</p>	<p>Response is acceptable.</p>

ID	Corrective Action Request	Summary of Participant Response	Verification Conclusion
	<ul style="list-style-type: none"> Section V.2 (Monitoring Plan) <ul style="list-style-type: none"> Location and recordkeeping/retention requirement for all stored data Description of the internal audit and other QA/QC procedures Sampling methods utilized and performed during the reporting period 		

ID	Clarification Request	Summary of Participant Response	Verification Conclusion
1	Please confirm whether any negative community or environmental impacts caused by the project were identified for the current reporting period.	The Monitoring Report was revised to confirm that the project caused no negative community or environmental impacts during the reporting period.	Response is acceptable.

Verified results show 189,668 metric tonnes of CO₂e for the reporting period from July 1 to December 31, 2014 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 that the requirements of the ACR Validation and Verification Guideline, Chapter 8.B are met.
- 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, Western Expansion cell;
 - 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:* July 1 to December 31, 2014.

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 from July 1 to December 31, 2014, 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: July 1 to December 31, 2014	Total
Baseline Emissions (m.t.CO ₂ e)	190,647
Project Emissions (m.t.CO ₂ e)	979
Emissions Reductions (m.t.CO ₂ e)*	189,668

*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