



Verification Report for

Anson County Landfill CAR517

Reporting Period:

January 1, 2019 to December 31, 2019

Climate Action Reserve Landfill Project Protocol, Version 5.0

November 3, 2020

Report Prepared for

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Project Verification Report

Summary

Element Markets Emissions, LLC (Element Markets) engaged NSF Certification, LLC (NSF) to verify the destruction of landfill gas (LFG) from the Anson County Landfill (herein referred to as the “Project”) defined in accordance with the requirements of the Climate Action Reserve Landfill Project Protocol, Version 5.0 (April 24, 2019). The project is comprised of a landfill gas conveyance and collection system and one flare at the Anson County Landfill in Polkton, NC (ACL).

This verification report submitted to the Reserve for the Project report period of January 1, 2019 to December 31, 2019 with reduced emissions into the atmosphere by 34,980 metric tons CO₂-e.

1. Introduction

1.1 Objective

The objective of this verification audit was to determine, with reasonable assurance, that Anson County had quantified, monitored, and fairly reported to the Climate Action Reserve its emission reductions from the destruction of landfill gas and to determine that the Project conformed to the requirements of the verification criteria set in Section 1.3 of this report, including its continuing eligibility. This project is listed as CAR517 with the Climate Action Reserve.

1.2 Scope

The scope of the engagement included verification of the quantification, monitoring and reporting of greenhouse gas emission reductions from the Project for the period January 1, 2019 to December 31, 2019. It also included verification of the calculated project emissions associated with combustion of fossil fuel in a single flare, vehicle fuel use and indirect emissions attributed to electricity consumption from project-related activities.

1.3 Criteria

NSF verified reported project emission reductions against the following criteria:

- Reserve Offset Program Manual (October 23, 2020),
- Landfill Project Protocol, Version 5.0 (April 24, 2019) (the Landfill Project Protocol),
- Climate Action Reserve Verification Program Manual (February 8, 2017) and
- ISO 14064:2006 Part 3, *Greenhouse gases – Specification with guidance for the validation and verification of greenhouse gas assertions*.

1.4 Materiality

In accordance with the Verification Program Manual, NSF applied a materiality threshold of 3% because total annual emission reductions are greater than 25,000 tCO₂e but less than 100,000 tCO₂e.

1.5 Level of Assurance

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This verification engagement was performed at the reasonable level of assurance.

2. Verification Approach

2.1 Team Appointment and COI Review

This verification was performed by Tina Sentner, NSF Lead Verifier, and reviewed by Mike DeBusschere, NSF Internal Reviewer. Conflict of Interest inquiries were completed for NSF and for the verification team and a finding of low COI risk was confirmed by the Climate Action Reserve.

2.2 Document Review

The verification team conducted a document review to inform the planning process in advance of performing on-site verification activities. Documents reviewed included Element Markets' project documentation submitted to the Climate Action Reserve, the basis for emission reduction calculations, project design documentation, procedures, regulatory information, and project reporting period raw data provided by Element Markets.

2.3 Planning

NSF's verification approach is risk-based. It draws upon our understanding of risks to fair statement of reported emissions and the operation of controls to reduce such risks. As a result of the document review and preliminary conversations with project management personnel, a verification plan and a sampling plan were developed for this engagement. NSF retains all verification documentation for a minimum of 10 years.

2.4 Site Visit

Per Landfill Protocol 5.0, a site visit was required for this report period. The project submitted and was granted an Extenuating Circumstances Determination by the Climate Action Reserve allowing for a remote site visit due to the Covid-19 pandemic. NSF conducted the remote site visit on August 20, 2020 using information and communications technology (ICT).

- NSF included in our risk assessment the risks/potential limitations of using information and communications technology (ICT) to conduct a virtual site visit and determined reasonable assurance could be attained with a virtual site visit.
- NSF was able to conduct a full assessment of the implementation and operation of the project activity through the virtual site visit.
- NSF was able to request a full walk through of the facility and was able to verify all Landfill Verification items as they are presented in Section 8.5 of the Protocol.

3. Verification Findings

3.1 Project Description

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The Anson County Landfill (ACL) is a municipal solid waste landfill located in Polkton, NC. The property consists of approximately 134 acres and the design capacity of the landfill is 5.9 million Mg. Final closure of the landfill is estimated to take place in 2050.

ACL collects landfill gas (LFG) from an active landfill gas collection and control system (GCCS) that began operation in 2008. The Project utilizes a network of LFG extraction wells, associated piping and other components to route landfill gas to an open utility flare, where it is destroyed.

NSF confirmed the landfill is not considered a Bioreactor as defined by U.S. EPA. During the verification, it was noted a Zero Credit Reporting Period from December 5, 2011 to December 31, 2018 was granted by the Reserve.

The account holder and project developer is Element Markets Emissions, LLC

3.2 Eligibility and Title

Project Location. The landfill is located in Polkton, NC within the United States. NSF confirmed the location through the remote site visit on August 20, 2020.

Project Start Date: The Project start date was listed as February 7, 2008 on the listing document on the Climate Action Reserve website, when the flare began combusting landfill gas. Anson County provided various documents to support the evidence of construction of the landfill gas project such as the permit to construct the GCCS with flare dated Sept. 19, 2007, the LFG Master plan design by SCS Engineers for Anson County Landfill dated Nov. 7, 2007, and lastly the SCS Engineers field notes for startup of the flare dated February 7, 2008. NSF concluded that the project remains eligible.

Crediting Period. The crediting period for landfill projects is 10 years from the project start date. The first crediting period ended on February 6, 2018. The second crediting period started on February 7, 2018 and extends to February 6, 2028.

Zero Credit Reporting Periods. The project reported a zero credit reporting period from 12/5/2011 to 12/31/2018. The Project provided a Zero Credit Reporting Acknowledgement and Election form dated 06/08/2020. The project received a Zero Credit Reporting Period confirmation from CAR on 6/16/2020. NSF also confirmed the project provided evidence to support that project emissions were less than baseline emissions during the zero credit reporting period.

3.3 Additionality

Project Proponents must indicate that reductions are above and beyond business as usual. In order to do so, the Project must pass a Performance Standard test and the Legal Requirement test.

Performance Standard Test

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For the Performance Standard test, a project developer may meet eligibility under three possible performance threshold scenarios. The following scenario applied to the Anson County Landfill:

The landfill was not previously collecting and destroying any landfill gas in a qualifying destruction device prior to the project start date.

Through observation during the remote site visit and interviews with the landfill site manager, there was no evidence of a solar flare or pre-existing destruction devices, nor were pre-existing destruction devices identified on historical project drawings or landfill maps. In addition, NSF reviewed the MSW Permit and subsequent modifications for the landfill gas conveyance and collection systems along with the Title V Permit application for Anson County Landfill and found no evidence of a pre-existing destruction device. Therefore, NSF concluded the project proponent meets the performance standard threshold under option 1.

Limits on Credit Stacking

Credit stacking is defined as receiving both offset credits and other types of mitigation credits for the same activity on spatially overlapping areas (i.e., in the same landfill). Per interviews with the landfill regulatory compliance personnel and Element Markets, the Project has not received offset credits and other types of mitigation credits for the same activity.

Legal Requirement Test

A regulatory review of the Project and the landfill were conducted by the verification team. The results of the regulatory review indicated the landfill is in compliance with Federal, State, and Local regulations. There are no laws, statutes, regulations, court orders, environmental mitigation agreements, permitting conditions, or other legally binding mandates requiring the destruction of landfill gas. The project has also developed a procedure in the monitoring plan to ascertain and demonstrate that the project at all times passes the legal requirement test. The verification team reviewed the Monitoring Plan, the Title V Air Permit, The NCDEQ Air permit, and the Municipal Solid Waste Permit and found no requirements to install a gas collection system.

In addition, Anson County has conducted a non-methane organic compound (NMOC) Threshold review. The Anson County Landfill is subject to NSPS regulation because the waste design capacity of the landfill is greater than 2.5 million Mg, requiring the facility to conduct Non-Methane Organic Compound (NMOC) emission rate testing. Anson County Landfill is also subject to the lower threshold of 34 Mg/year as the landfill has been modified, constructed or reconstructed after July 17, 2014. The most recent Tier 2 NMOC Emission Rate Report for Anson County Landfill was conducted on January 31, 2019. The annual NMOC was updated to reflect annual emissions which produced an estimate of 26.26 Mg/yr NMOC for 2019. This is below the 34 Mg/yr NMOC threshold and therefore the landfill is not required to install a gas collection and conveyance system to meet the emission control

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requirements of the NSPS (new landfills) or the Emission Guidelines (existing landfills) during the reporting period.

Lastly, NSF reviewed the Attestation of Voluntary Implementation, signed on October 6, 2020 by an eligible signatory to attest for the Project. Anson county has affirmed that the Project was established and implemented voluntarily and continues to operate as such. Based on this evidence, NSF concludes the Project passes the legal requirements test.

3.4 Regulatory Compliance.

NSF reviewed the Attestation of Regulatory Compliance completed by Anson County. In addition, NSF conducted a review of the regulatory compliance of the landfill facility operated by the Project. NSF also reviewed the EPA Enforcement & Compliance History Online database (ECHO), the Title V Semi-annual Compliance Certifications along with various other environmental reports. There were no material compliance issues noted. NSF reviewed the annual inspection report from the North Carolina Department of Environmental Quality Air Division conducted on 10/28/2019 and 06/05/2020 with no violations noted during the reporting period. Additional information on the regulatory compliance review is noted in the list of findings. Lastly, NSF noted the Project's monitoring plan contained procedures for maintaining and monitoring regulatory compliance and that the procedures are being properly followed. Through its review, NSF confirmed that the Project was in material compliance with all applicable laws during the reporting period.

3.5 Ownership

Waste Connections of North Carolina, Inc. (WCN), is the owner and operator of the Anson County Landfill. Ownership was confirmed through a review of various regulatory permits issued from NCDCEQ as well as review of the agreement between the Landfill and Element Markets. Element Markets is the Project Developer and retains full, legal, and beneficial title to the carbon offset credits being issued as a result of the collection and combustion of methane at the landfill facility. Element Markets manages the annual verification and provides support regarding project management and calculating emission reductions. Lastly, NSF reviewed the Attestation of Title signed by Element Markets dated October 6, 2020 concerning ownership of landfill gas emission reduction credits for the reporting period. This document asserts that the project applicant has legal rights to any emission reduction credits to be issued by the Climate Action Reserve. From this evidence, NSF has concluded that the project developer, Element Markets, is entitled to receive the emission reduction credits that may be issued by the Climate Action Reserve for methane destroyed during this project period.

3.6 Project Boundaries and Emission Sources

The Project included all emission sources from the operation of the landfill gas collection system to the ultimate destruction of the landfill gas. The sources of GHG emissions reviewed in the Project were as follows.

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

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- CH₄ vented to the atmosphere,
- CO₂ from the oxidation of CH₄ by soil bacteria. As the landfill was partially covered with a synthetic liner, the Climate Action Reserve Landfill Project Protocol Version 5.0 assumption that 10% of the methane produced would be naturally oxidized by soil bacteria has been applied.

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

- CH₄ from the incomplete combustion of CH₄ in an open 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.

The gases reviewed include CO₂ and CH₄. All gases have been converted to CO₂-equivalents.

3.7 Performance Against Project Protocol/Methodology

The Project was implemented in conformity with the Climate Action Reserve Landfill Project Protocol Version 5.0.

Monitoring and Operations Plan

In accordance with the Landfill Project Protocol requirements, a monitoring and operations plan was provided for the Project. This document addressed frequency of data acquisition, flow and methane concentration monitoring, facility and data management systems, QA/QC provisions of monitoring instrumentation, roles of individuals responsible for monitoring activities, a project diagram, a record keeping plan and describes how relevant parameters required by the Landfill Project Protocol Table 6.1 are to be collected and reported.

Monitoring Equipment

The primary data gathered for the Project is landfill gas flow, pressure, temperature, and methane content of the landfill gas. A TIC Model 62-9/9500 Thermal Mass Flow Meter continuously monitors flow after the blower and a knockout prior to combustion in the open flare. The position of the flow meter was adequate to ensure laminar flow. The meter automatically corrects LFG flow readings to 60 °F and 1 atmosphere as required by the Protocol.

This meter was previously calibrated on May 22, 2018 and again on July 30, 2019. The Manufacturer's specifications indicate the meter should be calibrated on an 18 month interval, otherwise there are no factory cleaning and inspection requirements. The flow meter was inspected and cleaned on a periodic basis with the as found/as left conditions of the flow meter documented. The July 30, 2019 calibration showed that the flow meter read outside the +/- 5% margin of error during the reporting period. The project adjusted the data back to the beginning of the reporting period as required by section 6.2 of the protocol. The last calibration check was not conducted within 2 months of the end of the reporting period by a certified third party. A project variance was requested and granted for this nonconformance of the Protocol (see section

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3.12 below for further discussion of the variance). NSF confirmed the flow meter “as left” condition was calibrated to a range of flow rates corresponding to the flow rates expected at the landfill and within Protocol tolerances.

The QA/QC results for the flow meter were as follows.

Table 1. Flow Meter Field Calibration Check Results

Cleaning& Inspection	Service Provider
5/6/19, 6/25/19, 9/9/19 and 12/4/19	SCS Engineers

The Landfill also employed two GEM 2000 handheld gas analyzers to record methane concentration on a weekly basis. The manufacturer recommends that the analyzers be calibrated on a semi-annual basis. The calibration dates are greater than six months however one GEM analyzer is used for 6 months and then replaced with the spare analyzer and calibrated. There is no cleaning and inspection recommendation, however records note the landfill calibrated the handheld meters with a known sample gas prior to every use. NSF confirmed the methane analyzer meter was calibrated to a range of conditions corresponding to the methane rates expected at the landfill. The calibration results for the methane analyzer meter were as follows.

Table 2. Gas Analyzer Field Calibration Check Results

GEM Serial #	Calibration Date	Service Provider
GM12448	1/2/2019 and 11/25/2019	Landgem
GM11804	6/10/2019 and 4/29/2020	Landgem

Temperature and hours of operation were continuously monitored via a thermocouple positioned within flare. For flares, operation is typically defined as thermocouple readings above 500° F however the data from the thermocouple was not set to record flare temperature correctly. It was observed that an orifice plate installed before the flare to propel gas flow. The orifice plate caused the thermocouple probe to read a lower temperature because it was not positioned at the flare, and the safety shut off valve was suspending gas flow when the flare was fully operational. For this reason, the ACL operator manually programed the safety shut off valve to trip at 150 degrees Fahrenheit instead of 500 degrees to continue operations.

To prove operationality of the flare, the thermocouple temperature was compared to the max ambient temperature for the given month, and the if the differential was greater than 200 degrees Fahrenheit, the flare was considered operational (See 6.2 of protocol).

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The continuous flow meter and methane analyzer readings are measured on the same wet basis. Flow and temperature was recorded by a Yokogawa digital data recorder every 8 minutes. Data is acquired remotely from the site and compiled daily. The Project monitors for accuracy, completion and periods of unusual temperature and/or flow. WCN visually inspects the data recorder unit to ensure that the data recorder is communicating correctly with the monitoring equipment.

NSF confirmed the project records are kept for a minimum of ten years when the information is first generated or seven years after the last verification as stated in the current version of the project's monitoring plan. Lastly, NSF confirmed the Project was in conformance with the monitoring plan and the Landfill Protocol version 5.0.

3.8 Project Management System

NSF verified the Project's management system during document review and the remote site visit. NSF interviewed executive management in addition to the personnel with specific responsibility for implementing the emission reduction project during this reporting period. NSF found a sufficient control environment for the project, including information management, authorizations for key activities, management reviews, and recordkeeping. In particular, NSF reviewed for adequacy the following elements:

- Definition and maintenance of an appropriate control environment by landfill management and personnel;
- Training and competence of landfill project managers and operating personnel, including contractors;
- Identification and management of legal requirements related to landfill operations;
- Identification and maintenance of records required by the landfill project;
- Landfill site and gas collection and combustion equipment specifications;
- Quantification methods and calculations of project emissions;
- Checking and corrective action mechanisms.

3.9 Calculation of GHG Emission Reductions

The Anson County Landfill emission reductions were calculated per the formula defined in the Climate Action Reserve Landfill Gas Protocol Version 5.0. The basic formula was:

Landfill gas destroyed

- the portion of methane oxidized by soil bacteria (as the landfill is not covered with a synthetic liner, the Landfill Project Protocol assumption that 10% of the methane produced would be naturally oxidized by soil bacteria has been applied)
 - carbon dioxide emissions from fossil fuel consumption
 - indirect carbon dioxide emissions from the use of electricity from the grid
 - discount factor to account for uncertainties associated with the project monitoring equipment. (a 10% monitoring discount factor was applied)
- = Project Emission Reductions.

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NSF verified the calculated project emission reductions on a sampling basis from information in the Project spreadsheets by checking the Excel spreadsheet formulas and retracing spreadsheet inputs back to the raw data flow. Similarly, NSF checked the total claimed flow for each aggregated daily summary to verify the correct totals for each day were used in the project spreadsheet equations. NSF also checked the methane concentration equations in the project's spreadsheets for accuracy.

NSF verified gas flow was recorded at 60 deg and 1 ATM as required by the Landfill Project Protocol. For data control and quality purposes, any measurements when the flare skid system would trigger either manual or automatic restarts or shutdowns, NSF confirmed that all data points were deleted. In addition, the project opted to utilize the difference between ambient temperature readings and thermocouple readings with a minimum differential of at least 200 degree F. NSF confirmed the Emission reductions were deleted when readings were less than the 200 degree F differential. NSF also confirmed the project applied a 0.96 destruction efficiency for the flare.

There were no pre-project destruction devices prior to the Project.

NSF verified the correct calculation of project emissions based upon evidence of fossil fuel consumption, and indirect CO₂ emissions from the use of electricity from the grid.

As a result of NSF's verification process, we conclude emission reductions are fairly quantified and without material error.

3.10 Corrective Action Requests/Recommendations

All requests for corrective action raised by NSF during this reporting period were addressed to NSF's satisfaction and closed. These findings are detailed in our List of Findings, a private document.

3.11 Missing data

There were four discreet instances of missing weekly methane readings that were substituted during the reporting period. NSF confirmed the substituted data was implemented in line with the Protocol requirements of using the lower of the measurement before and the measurement after the missing weekly data and only one consecutive missing weekly measurement was substituted. In addition, flow rates and thermocouple readings were consistent with normal operation during these events.

3.12 Approved Variances or Deviations

In addition to an Extenuating Circumstances Variance allowing a remote site visit, another variance was requested and granted during the report period. The protocol requires that all gas flow meters and continuous methane analyzers must be field checked for calibration accuracy by a third-party technician with the percent drift documented, using either a portable instrument (such as a pitot tube) or manufacturer-specified guidance, at the end of – but no more than two

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months prior to or after – the end date of the reporting period. Element Markets requested a variance for Anson County Landfill to allow for a manufacturer calibration of the flow meter conducted 5 months prior to the end of the reporting period, as well as periodic cleanings and inspections, in place of the field check for calibration accuracy within two months of the end of the reporting period. As Part of the variance requirement, NSF confirmed the following variance conditions were met:

- The calibration conducted on July 31, 2019 shows that the “As Left” indication of the flow meter was within the +/- 5% accuracy threshold.
- The periodic cleaning and inspections of the flow meter were conducted as noted and show that the meter was operating as expected with no apparent issues.
- The project monitoring plan includes regular QA/QC for the flow meter along with the requirement for a field check for calibration accuracy within two months of the end of the reporting period.

4. Verification Results

4.1 Verification Team Recommendation

Based on the verification activities described above, the verification team has concluded that the Anson County Landfill project had quantified, monitored, and accurately reported to the Climate Action Reserve its emission reductions from the destruction of landfill gas and the Project conformed to the requirements of the verification criteria set in Section 1.3 of this report. NSF verified the Project has achieved the following emission reductions:

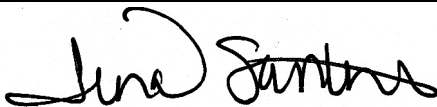
Emissions Verified	January 1, 2019 to December 31, 2019
Baseline Emissions	35,004
Project Emissions	24
Pre-Discount	0
Total Emissions Reductions	34,980

Final values Rounded for simplicity

4.2 Verification Audit Summary

Project Developer	Element Markets Emissions, LLC 3555 Timmons Lane, Houston, TX 77027 USA
Project Location	Anson County Landfill Polkton, NC, USA
Project Type	Destruction of Landfill gas
Project Period	January 1, 2019 –December 31, 2019

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Protocol/Methodology	Climate Action Reserve, U.S. Landfill Project Protocol, v. 5.0
Emissions/Removals Verified	Total: 34,980 metric tons CO ₂ -e
Verification Conclusion	Based upon the verification activities described above, NSF has concluded with reasonable assurance that the Anson County Landfill emission reductions of 34,980 metric tons CO ₂ -e reported to the Climate Action Reserve for the period January 1, 2019 to December 31, 2019, are, in all material respects, fairly stated.
Lead Verifier	 Tina Sentner, November 3, 2020
Internal Reviewer	 Michael DeBusschere, November 03 , 2020
<i>This verification statement is valid when signed and dated by an NSF internal reviewer.</i>	