



Verification Report

CAR674 Oneida Herkimer Landfill Ava, NY

Reporting Period: July 15, 2022 – July 14, 2023

Prepared for:

Oneida Herkimer Solid Waste Authority

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Ruby Canyon Environmental, Inc.

743 Horizon Court, Suite 385

Grand Junction, Colorado 81506

www.rubycanyonenv.com

(970) 241-9298

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1.0 Introduction

Ruby Canyon Environmental, Inc. (RCE), a subsidiary of TÜV SÜD America, was contracted by Oneida Herkimer Solid Waste Authority (OHSWA) to perform the verification of the Oneida Herkimer Landfill Ava, NY (Project) for the reporting period July 15, 2022 – July 14, 2023 to the Climate Action Reserve (Reserve) Landfill Project Protocol 5.0 (Protocol). The Project is located in Ava, NY at the Oneida Herkimer Regional Landfill (Landfill).

1.1 Project Background & Site Description

The Landfill was opened in 2006 and currently consists of six constructed cells. The waste stream consists primarily of mixed municipal solid waste, as well as construction and demolition debris, asbestos waste, industrial waste, sewage treatment plant sludge, and petroleum contaminated soil. The Project consists of the collection of landfill gas (LFG) and its subsequent destruction by combustion in two electric generators and three open flares. OHSWA owns and operates the Landfill, gas collection system, and flares, while Waste Management Renewable Energy (WMRE) owns the electricity generation facility.

1.2 Responsible Parties

Project Developer and Landfill owner: Oneida Herkimer Solid Waste Authority (OHSWA)

Owner of flares: Oneida Herkimer Solid Waste Authority

Landfill gas-to-energy owner: Waste Management Renewable Energy

Consultant: Barton & Loguidice (B&L)

OHSWA is responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria listed below in Table 1.

1.3 Verification Team

RCE is responsible for expressing an opinion on the GHG statement based on the verification. The RCE verification team consisted of the following individuals who were selected based upon verification experience and knowledge of reporting GHG emissions sources.

Lead Verifier: Masury Lynch

Senior Internal Reviewer: Garrett Heidrick

1.4 Objectives

The goal of the verification activities was to ensure that the claimed GHG emission reductions were complete, consistent, accurate, transparent, and permanent and that the Project was in compliance with the Reserve's Project additionality, monitoring, and reporting requirements. Furthermore, the verification activities ensure that the data provided to RCE is well documented and free of any material errors or omissions.

1.5 Scope

The scope of the verification consisted of the following independent and objective activities:

- Review the reporting period's Project Monitoring Plan;
- Review the Project data acquisition and quality control procedures;
- Review the Project's baseline emissions and confirm the baseline and Project boundaries;
- Review the Project's evidence of environmental and regulatory requirements to ensure that the Project is additional;
- Review the Project's emission reduction calculations;

- Review the Project documents and data against the criteria listed in Table 1;
- Issue requests for additional documentation, clarifications, and corrective actions as necessary; and
- Issue a verification report, verification statement, and list of findings to OHSWA and the Reserve.

1.6 Verification Criteria

Table 1 – Summary of Verification Criteria

Criteria	Details
Standard of Verification	• CAR Landfill Project Protocol, Version 5.0 (April 24, 2019) • Reserve Offset Program Manual (March 12, 2021) • The Reserve Verification Program Manual (February 3, 2021) • Policy Memo: Use of Global Warming Potential Values for All Offset Protocols (July 13, 2022)
Verification Process	• ISO 14064-3:2019 “Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas statements”
Level of Assurance	Reasonable assurance
Materiality	99% accuracy level (less than 1% error) because total annual emission reductions are greater than 100,000 tCO ₂ e.

2.0 Verification Activities Summary

The Verification process consisted of the following activities as outlined in the verification plan:

- RCE completed a NOVA/COI form to identify any potential conflict of interest with the Project, OHSWA, WMRE, or B&L. The NOVA/COI form was submitted to the Reserve and the COI assessment revealed no conflicts of interest and was approved by the Reserve on August 8, 2023.
- RCE held a verification kick-off meeting with OHSWA on August 15, 2023. During the kick-off meeting RCE reviewed the verification objectives and process, reviewed the verification schedule, and requested the verification background documents.
- RCE performed a strategic review and risk assessment of the received data and support documents in order to understand the scope and areas of potential risk in the GHG emissions reductions.
- RCE developed a risk-based sampling plan based upon the strategic review and risk assessment. The verification plan and sampling plan were used throughout the verification and were revised as needed based upon additional risk assessments.
- No site visit was completed because RCE conducted a site visit to the Landfill for the verification of the previous reporting period on December 6, 2022. RCE reviewed the Project site, data management and monitoring systems, and interviewed key personnel, including Emily Albright (OHSWA), Joshua Olbrys (OHSWA), Kyle Williams (B&L), Brianna Harte (B&L), Denise Farrell (Environmental Attribute Advisors), and Bryan (WMRE).
- RCE performed a risk-based desktop review of the submitted verification documents. The desktop review included an assessment of the GHG calculation methods and inputs, source data completeness, GHG management and monitoring systems, evidence of regulatory compliance, and record retention practices.
- RCE submitted requests for additional documentation, clarifications, non-material findings, and material corrective actions, as applicable, to OHSWA throughout the verification.
- RCE’s senior internal reviewer conducted a review of the verification sampling, report, and statement.
- RCE issued a Final verification report, verification statement, and list of findings.

- RCE held an exit meeting with OHSWA.

3.0 Verification Findings

3.1 Assessment of the GHG Emission Reductions Project Operations

The Project currently collects LFG from the Landfill and destroys it via two engines and three open flares. The LFG is pulled from 178 vertical wells. RCE confirmed that the open flares can combust all LFG produced and the Landfill is not a bioreactor.

3.2 GHG Project Boundary (sources, sinks and/or reservoirs)

According to the Protocol, carbon dioxide and methane are the only GHGs included in the Project boundary from both the baseline and Project activities. Baseline emissions are the total methane vented to the atmosphere less the oxidation of methane by soil bacteria. The emissions resulting from the Project activity must be deducted from the Project baseline emissions in order to calculate total emission reductions. These Project emissions include carbon dioxide resulting from the consumption of electricity from the grid and propane used to ignite the flares. Table 2 lists the sources of GHG emissions reviewed during the verification of the Project.

Table 2 – Summary of the Project GHG Sources, Sinks and Reservoirs

Activity	GHG Sources, Sinks & Reservoirs
Baseline	• SSR 4 – CH₄ emissions from waste breakdown in Landfill.
Project	• SSR 5 – CO₂ emissions from the gas collection system (resulting from the consumption of purchased electricity). • SSR 6 – CO₂ emissions from the combustion of supplemental fossil fuels (propane) used during operation and maintenance of the Project activity. • SSR 8 – CH₄ Emissions from Project LFG electricity generation • SSR 9 – CH₄ emissions from Project LFG flare destruction.

3.3 Project Eligibility Criteria

The Protocol specifies five eligibility rules that a Project must meet in order to register emission reductions with the Reserve: Location, Project Start Date, Project Crediting Period, Additionality, and Regulatory Compliance. Below is a summary of the Reserve eligibility requirements and the Project's compliance to each requirement.

Eligibility Rule 1: Location

The Project is a US-based landfill located in the town of Ava, NY. The Project therefore meets this eligibility requirement. RCE confirmed this information with a site visit.

Eligibility Rule 2: Project Start Date

The Landfill Project Protocol states a Project start date is the date when methane was first continuously destroyed in a qualifying destruction device at the site. RCE reviewed a letter from OHSWA to B&L confirming that the Project first began continuous methane destruction on July 15, 2010. The Project submittal form was submitted to the Reserve on May 14, 2010.

Eligibility Rule 3: Project Crediting Period

The Project's first crediting period started on July 15, 2010 and ended on July 14, 2020. The Project applied for a second crediting period for July 15, 2020 to July 14, 2030, which was approved by the Reserve.

Eligibility Rule 4: Additionality

Performance Standard Test

Prior to the Project activity, the Landfill was collecting and destroying LFG in passive flares located at leachate cleanouts and horizontal collector locations. RCE confirmed this with Landfill staff during the site visit.

Thus, the Project passes the Performance Standard Test number 3a since it involves:

“Installation of a new qualifying destruction device at an eligible landfill where landfill gas was collected and destroyed at any time prior to the project start date using a non-qualifying destruction device.”

Limits on Credit Stacking

There is no evidence of crediting stacking at the Project area: that the Landfill is receiving any type of mitigation credit other than offsets.

Legal Requirement Test

RCE confirmed that there are currently no laws or ordinances requiring the Landfill to collect and destroy LFG. The Landfill is a municipal solid waste (MSW) Landfill that exceeds the design capacity of 2.5 million megagrams (Mg) or 2.5 million cubic meters as specified in the New Source Performance Standards (NSPS) codified in Title 40 of the Code of Federal Regulations (CFR) Part 60, Subpart WWW. The Landfill is therefore subject to the requirements of the NSPS for MSW Landfills.

RCE examined the NMOC modeling results for the Landfill. The estimated NMOC emission rates for 2021 and 2022 of 14.88 Mg/year and 15.83 Mg/year, respectively, are below the 34 Mg/year threshold for a required gas collection and combustion system.

RCE also reviewed the Project’s Monitoring Plan which defines how the Project continues to exceed the Legal Requirement Test. Landfill personnel and their consultant, B&L, review local, state, and federal regulations prior to each verification period in order to confirm that there are no new requirements or laws that mandate the GCCS be in place. The Attestation of Voluntary Implementation form was also signed after the end of the reporting period and uploaded to the Reserve registry which states that the Project was implemented and established voluntarily.

During the review of the supporting evidence, RCE did not observe any indication that the Landfill was mandated to destroy LFG. Additionally, there are no local, state, or federal requirements for the installation of a GCCS at the Landfill. Therefore, the results of the review indicated that OHSWA is following its Monitoring Plan procedures to assure that it passes the Legal Requirement Test.

Eligibility Rule 4: Regulatory Compliance

RCE reviewed the procedures described in OHSWA’s Monitoring Plan to ensure that the Project remains in compliance with all applicable local, state, and federal requirements. RCE searched the Environmental Protection Agency’s Enforcement & Compliance History Online (ECHO) database and found no instances of violations or noncompliance. RCE also contacted the New York State Department of Environmental Conservation to inquire about instances of violations or noncompliance but never received a response. RCE also reviewed environmental and operating permits including the Landfill’s Title V Permit, Solid Waste Permit, and SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity Permit.

During RCE’s review there was no evidence of noncompliance found, and the procedures for ensuring regulatory compliance in the Monitoring Plan were being properly followed. Finally, RCE confirmed signature of the Attestation of Regulatory Compliance, after the end of the reporting period, which was uploaded to the Reserve.

3.4 Ownership of Generated Emission Reductions

RCE reviewed the completed Attestation of Title which states that OHSWA owns the emission reduction credits generated by the Project. RCE also reviewed the contract between OHSWA and WMRE, which states that although WMRE owns the electricity generation facility, OHSWA retains the environmental attributes of the LFG.

3.5 Site Visit

No site visit was conducted for the current reporting period. However, a site visit was conducted by RCE for the preceding reporting period. The site visit was conducted at the landfill in Ava, NY on December 6, 2022 by Masury Lynch. She interviewed Landfill staff, WMRE staff, and B&L consultants about the data systems in place, monitoring equipment, regulatory compliance, and QA/QC processes. During the site visit, Masury toured the Project site and viewed the flares, electricity generation facility, propane tanks, flow meters, and gas analyzers. Masury confirmed that the equipment was functioning and in good condition.

3.6 GHG Monitoring and Management Systems

RCE reviewed the data management systems during both desktop review and during the site visit for the previous reporting period. RCE completed the majority of the GHG management systems review during the site visit by observing the onsite procedures and interviewing the personnel responsible for the Project. The onsite review included an assessment of the Project data collection, processing and handling procedures, recordkeeping and data storage, quality control and assurance procedures, record retention systems, and a field tour of the Project equipment. The desktop review included a detailed review of the Project Monitoring Plan and its conformance to Protocol requirements. RCE also confirmed that the Project was implemented according to the Monitoring Plan.

The primary Project data include the LFG flow to the engines and flares, methane content of the LFG, engine operation, and flare operation. During the reporting period, the LFG flow was continuously measured by several different flow meters, including five Thermal Instrument Company (TIC) flow meters and one ABB flow meter. RCE confirmed when each meter was used for each destruction device. The flow meters all internally correct for temperature and pressure at 60°F and 1 atm. Table 3, below, summarizes the flow meters used during the reporting period.

Table 4 – Summary of Flow Meters

Manufacturer	Serial Number	Dates in Service
Thermal Instrument Company	2010175	7/15/2022 - 8/4/2022 (flare 25) 10/26/2022 - 7/14/2023 (flare 26)
Thermal Instrument Company	2011156	7/15/2022 - 10/26/2022 (flare 26) 5/23/2023 - 7/14/2023 (flare 25)
Thermal Instrument Company	2014201	8/4/2022 - 5/23/2023 (flare 25)
Thermal Instrument Company	2020374	7/15/2022 - 12/28/2022 (flare 27) 1/31/2023 - 7/14/2023 (flare 27)
Thermal Instrument Company	2022019	12/28/2022 - 1/31/2023 (flare 27)
ABB Totalflow	267CS6502016255	7/15/2022 – 7/14/2023 (engine flow)

All monitored data is recorded continuously by a Yokogawa data recorder. The methane content of LFG sent to the flares was measured continuously by a Landtec Biogas 3000 gas analyzer (SN G300695), which was used to measure methane content of LFG sent to the flares. The methane content of LFG sent to the engines was measured continuously by an ABB Model NGC8203 gas analyzer (SN T112455143). Methane concentration data was occasionally collected at the flare skid using two handheld Elkins Earthworks gas analyzers (SN 1901203B and SN 1503201). However, no handheld measurements from either Elkins analyzers were used in the calculations for this reporting period.

During the desktop review, RCE reviewed the data storage and retention policies of OHSWA and verified they were in conformance with the Protocol requirements and documented in the Monitoring Plan. All data is kept for a period of ten years after the information is generated or seven years after the last verification.

3.7 Instrument QA/QC

RCE reviewed evidence that the flow meters and methane analyzers met instrument QA/QC requirements as outlined in the Protocol for cleaning, inspection, and calibration. The Project Monitoring Plan describes the procedures for instrument field checks and calibrations. These procedures in the Monitoring Plan are in compliance with the Protocol requirements. Landfill staff performed quarterly documented checks on the entire gas collection system, which includes the flow meters and gas analyzers. These quarterly checks ensure that all pieces of equipment are functioning properly, and equipment is fixed or calibrated in a timely manner, if necessary. The TIC flow meters for the flares were inspected on 7/27/2022, 10/27/2022, 1/27/2023, and 4/21/2023. The Landtec analyzer for the flares was inspected on 7/29/2022, 10/12/2022, 1/16/2023, and 4/21/2023. As shown below in Table 4, the ABB flow meter and analyzer for the engines were inspected and calibrated on 7/28/2022, 11/15/2022, 2/10/2023, and 6/27/2023.

RCE reviewed calibration and accuracy check documentation for the flow meters and methane analyzers. Table 5 summarizes how each meter satisfied the Protocol's calibration and accuracy check requirements.

Table 4 – Summary of Flow Meters

Meter Type	Serial Number	Accuracy Check	Within +/-5% Accuracy?	Calibration Frequency	Calibration Date(s)
TIC flow meter	2010175	7/13/2023	Yes	18 months	8/12/21, 8/10/22
TIC flow meter	2011156	7/13/2023	Yes	18 months	10/23/20, 11/3/21, 11/8/22
TIC flow meter	2014201	6/5/2023	Yes	18 months	5/20/21, 5/26/22, 6/5/23
TIC flow meter	2020374	7/13/2023	Yes	18 months	12/16/20, 1/11/22, 1/5/23
TIC flow meter	2022019	2/7/2023	Yes	18 months	2/7/22, 2/7/23
Landtec analyzer	G300695	7/24/2023	Yes	12 months	3/30/22, 7/14/22, 11/16/22, 7/24/23
ABB flow meter	267CS6502016255	6/27/2023	Yes	Not specified	7/28/2022, 11/15/22,

					2/10/23, 6/27/23
ABB analyzer	T112455143	6/27/2023	Yes	Not specified	7/28/2022, 11/15/22, 2/10/23, 6/27/23

All accuracy checks were found to be within the Protocol required +/-5% accuracy threshold. As shown in Table 4, all devices were compliant with Protocol requirements regarding accuracy checks and calibrations.

3.8 Assessment of GHG Emission Reductions Calculations

The emission reduction calculation assessment included a review of Project assumptions, raw data inputs, and accuracy of calculations. RCE assessed the completeness of the raw data and how the data are transferred to the calculation spreadsheet. RCE reviewed the formulas and raw data inputs for accuracy and compliance with Protocol requirements.

The Project data consisted of raw data in the form of spreadsheets of engine and flare flow, methane content (both continuous and non-continuous), and operational activity of the destruction devices. RCE compared raw data in the spreadsheets to the respective daily sums, then compared those data and the methane readings to the calculation workbooks. RCE confirmed operational activity of the engines by checking that the kwh and/or MMBtu output was positive and operational activity of the flare using thermocouple readings above 500°F supplied in the raw data. RCE confirmed that a 93.6% destruction efficiency was assigned to the Project's engines and a 96% destruction efficiency was assigned to the Project's open flares. As the Landfill is not covered with a synthetic liner, RCE verified that a 10% oxidation factor was applied in the calculation of baseline emissions to account for oxidation of methane by soil bacteria.

RCE reviewed OHSWA's pre-project destruction calculations for the passive flares and ensured that they followed all Protocol requirements.

RCE reviewed source documentation for Project emissions from purchased electricity and propane consumption. OHSWA provided a log documenting the date of propane refills and the quantity. RCE also reviewed electricity invoices for both the flaring facility and electricity generation facility. The electricity consumption quantity used in the calculations was incorrect but resulted in a non-material error. This was documented in the list of findings. RCE confirmed that appropriate emission and conversion factors were used and reviewed the use of Protocol equations for Project emissions in OHSWA's calculation workbook.

Two large data gaps occurred during the reporting period, the first occurring from 1/1/2023 to 1/12/2023 (11.6 days) and the next from 5/31/2023 to 6/1/2023 (24 hours). Both instances occurred due to issues with the data recorder, and no data was recorded during these gaps. The first gap was ineligible for data substitution because it occurred for more than one week and no thermocouple data was available, and the second gap was ineligible for data substitution because no thermocouple data was available during the period of missing data. Missing data substitution was not utilized at any point during the reporting period.

Emission reductions decreased by approximately 1.4% from the previous reporting period primarily due to the aforementioned issue with the data recorder and the resulting missing data in January and May 2023.

RCE independently recalculated the GHG emission reductions using raw flow and methane data provided by OHSWA. RCE compared their results to OHSWA's results to determine if the GHG emission reductions were materially correct. RCE's recalculations involved calculation of the daily eligible total of LFG flow to the flares and engines, calculation of methane destroyed, calculation of baseline emissions, calculation of project emissions, and calculation of emission reductions. RCE found no material misstatements in the final Project

GHG emission reductions calculations. Materiality was calculated according to the equation for calculating percent error in the Reserve's Verification Program Manual: $\text{abs}((\text{stated reductions} - \text{verified reductions})/\text{verified reductions}) * 100$. RCE determined that the Project's percent error for GHG emission reductions was 0.09%, calculated as follows: $((244,898 - 244,687)/244,687) * 100$. Therefore, percent error was below the materiality threshold of 1% for the Project.

4.0 Verification Results

OHSWA provided sufficient evidence and documentation of its emission reductions, data collection procedures, and monitoring and quality control procedures. The verification process focused on verifying the emission reduction calculations and the source data used to quantify the emission reductions in accordance with the Reserve Landfill Project Protocol 5.0. The following is a summary of the verification results.

The Project reported emission reductions of 244,898 metric tons of CO₂e from July 15, 2022 to July 14, 2023. During Final review, RCE identified no material misstatements in the data or emission reductions calculations. Table 6 defines the emission reductions verified for the reporting period. During the verification process, RCE made requests for Material Findings, Non-Material Findings, Additional Documentation, and Clarifications to complete the verification. OHSWA sufficiently addressed all requests. The details of these requests are documented in RCE's List of Findings provided to the Reserve and OHSWA.

5.0 Verification Opinion

Ruby Canyon Environmental, Inc. (RCE) conducted the verification of the CAR674 Oneida Herkimer Landfill Ava, NY (Project) according to the requirements found in ISO 14064-3:2019. The objective of this verification was to ensure that the GHG statement is materially correct and conforms to all relevant criteria. The GHG statement is the responsibility of OHSWA. A summary of the GHG statement is as follows:

- GHG-related activity: Methane destruction at the Oneida Herkimer Landfill
- GHG statement: 7/15/2022 – 7/14/2023
- Criteria:
 - Reserve Offset Program Manual, March 12, 2021
 - Reserve Verification Program Manual, February 3, 2021
 - Reserve U.S. Landfill Project Protocol, V5.0, April 24, 2019
 - Policy Memo: Use of Global Warming Potential Values for All Offset Protocols, July 13, 2022

The data and information supporting the GHG statement were historical in nature.

RCE has ensured OHSWA's effective use of controls related to the GHG statement. RCE concludes that there is sufficient and appropriate evidence to support OHSWA's GHG statement and is issuing an Unmodified Opinion.

RCE confirms that the GHG statement has been prepared:

- Without material discrepancy,
- In accordance with all applicable criteria, and
- Verified to a reasonable level of assurance.

Table 6 - Emission Reductions Verified for July 15, 2022 – July 14, 2023

Year	Baseline Emissions CO₂e (tonnes)	Project Emissions and Pre-Project Deductions CO₂e (tonnes)	Emission Reductions CO₂e (tonnes)
2022	122,710	3,356	119,353
2023	129,395	3,850	125,545
Total	252,104	7,206	244,898

Note: Due to rounding, individual values might not equal totals and values are not representative of raw data used in the emission reductions calculation.

Lead Verifier Signature



Masury Lynch

Senior Internal Reviewer Signature



Garrett Heidrick