



Verification Report

CAR560 New River Landfill Gas Methane Destruction Project

Reporting Period: January 1, 2021 – December 31, 2021

Prepared for:

New River Resource Authority

December 14, 2022

Ruby Canyon Environmental, Inc.

743 Horizon Court, Suite 385

Grand Junction, Colorado 81506

www.rubycanyonenv.com

(970) 241-9298

Table of Contents

1.0	Introduction	1
1.1	Project Background & Site Description	1
1.2	Responsible Parties	1
1.3	Verification Team	1
1.4	Objectives	1
1.5	Scope	1
1.6	Verification Criteria	2
2.0	Verification Activities Summary	2
3.0	Verification Findings	3
3.1	Assessment of the GHG Emission Reductions Project Operations	3
3.2	GHG Project Boundary (sources, sinks and/or reservoirs)	3
3.3	Project Eligibility Criteria	3
3.4	Ownership of Generated Emission Reductions	5
3.5	Site Visit	5
3.5	GHG Monitoring and Management Systems	5
3.6	Instrument QA/QC	5
3.7	Assessment of GHG Emission Reductions Calculations	6
4.0	Verification Results	7
5.0	Conclusion	7

1.0 Introduction

Ruby Canyon Environmental, Inc. (RCE) was contracted by New River Resource Authority to perform the verification of the New River Landfill Gas Methane Destruction Project (Project) for the reporting period January 1, 2021 – December 31, 2021 to the Climate Action Reserve (Reserve) Landfill Project Protocol 5.0 (Protocol). The Project is located in Pulaski County, Virginia at the New River Resource Landfill (Landfill).

1.1 Project Background & Site Description

The Landfill commenced operations in 1997 and includes 350 acres designated for landfilling purposes. The Landfill is permitted to receive municipal solid waste, construction and demolition debris, and other non-hazardous wastes. The Project consists of the collection of landfill gas (LFG) and its subsequent destruction by combustion in twelve electric generators and one open flare. The landfill owns the gas collection system and flare, while Ingenco owns the electricity generation facility.

1.2 Responsible Parties

Project Developer and Landfill Owner: New River Resource Authority (NRRRA)

Consultant: SCS Engineers

Landfill gas-to-energy (LFGE) owner: Ingenco

1.3 Verification Team

The RCE verification team consisted of the following individuals who were selected based upon verification experience and knowledge of the landfill methane sector.

Lead Verifier: Garrett Heidrick

Team Member: Masury Lynch

Senior Internal Reviewer: Phillip Cunningham

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;
- Conduct a site visit at the landfill;
- 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 NRRRA 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	• The Reserve Verification Program Manual and ISO 14064-3:2006 Specification with guidance for the validation and verification of greenhouse gas assertions • 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	97% accuracy level (less than 3% error) because total annual emission reductions are between 25,000 tCO ₂ e and 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, NRRA, or technical consultants. 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 19, 2022.
- RCE held a verification kick-off meeting with NRRA and SCS Engineers on August 22, 2022. 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.
- RCE conducted a site visit to the landfill on October 13, 2022. RCE reviewed the Project site, data management and monitoring systems, and interviewed key personnel, including Ryan Duckett, Alex Hajek, Isaac Slade Wall, Brandon Atkins, Dave Rupe, and Thad Ball.
- 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 NRRA 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 NRRA.

3.0 Verification Findings

3.1 Assessment of the GHG Emission Reductions Project Operations

The Project currently collects landfill gas from the Landfill and destroys it via combustion in 12 electricity generating engines and an open flare. The LFG collection system consists of 31 vertical wells, 7 horizontal collectors, and 7 leachate cleanout collections.

RCE confirmed that the landfill is not a bioreactor and does not re-circulate leachate nor add any liquid other than leachate in a controlled fashion to accelerate or enhance the anaerobic biodegradation of the waste.

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 the carbon dioxide resulting from the consumption of electricity from the grid and consumption of propane related to Project activities. 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 and diesel) 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 Pulaski County, Virginia. The Project therefore meets this eligibility requirement. RCE confirmed this during the 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 the SCS Engineers Construction Quality Assurance Certificate Report to confirm that the Project first began continuous methane destruction on January 14, 2008. The Project submittal form was completed on November 12, 2009 and submitted to the Reserve on November 17, 2009.

Eligibility Rule 3: Project Crediting Period

The Project's first crediting period started on January 14, 2008 and ended on January 13, 2018. The project applied for a second crediting period for January 14, 2018 to January 13, 2028, which was approved by the Reserve. This is the Project's third reporting period in its second crediting period.

Eligibility Rule 4: Additionality

Performance Standard Test

Prior to the Project activity, the Landfill was collecting and destroying gas via two passive flares, which were installed for odor control. RCE confirmed this with landfill staff during the site visit.

Thus, the Project passes the Performance Standard Test number 3 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. A non-qualifying destruction device (e.g., passive flares)."

Limits on Credit Stacking

There is no evidence of crediting stacking at the project area: that the landfill is not 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 rate for 2021 of 19.9 Mg/year is 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 SCS Engineers 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 to 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 NRRRA is following its Monitoring Plan procedures to assure that it passes the Legal Requirement Test.

Eligibility Rule 5: Regulatory Compliance

RCE reviewed the procedures described in NRRRA's monitoring plan to ensure that the Project remains in compliance with all applicable local, state, and federal requirements. RCE searched the U.S. Environmental Protection Agency's Enforcement & Compliance History Online (ECHO) database to confirm that there were no notices of violation or unresolved compliance issues. RCE found one violation related to the Clean Water Act which is not related to the Project activity. RCE received written confirmation from Virginia DAQ on October 27, 2022 that the landfill had no instances of non-compliance or violations during the reporting period. RCE reviewed environmental and operating permits including Title V permits for both the flare and LFGE facilities, Landfill's Solid Waste Management Permit, and Landfill's Virginia Pollutant Discharge Elimination System General Stormwater Industrial Discharge Permit. During RCE's review there was no evidence of noncompliance found relating to the Project, 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 Landfill Gas Purchase Agreement contract between NRRRA and Ingenco, which states that Ingenco owns the LFGE facility but NRRRA retains the rights to greenhouse gas credits. RCE also reviewed the completed Attestation of Title which states that NRRRA owns the emission reduction credits generated by the Project.

3.5 Site Visit

The site visit was conducted at the landfill in Virginia on October 13, 2022 by Masury Lynch. She interviewed Landfill staff, Ingenco staff, and SCS Engineer 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 flare, LFGE facility, propane tanks, diesel storage, electricity meters, flow meters, and portable gas analyzers. Masury confirmed that the equipment was functioning and in good condition.

3.5 GHG Monitoring and Management Systems

RCE reviewed the data management systems during the desktop review. 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 assessment of the Project monitoring plan and its conformance to Protocol requirements. RCE confirmed that the Project was implemented according to the Monitoring Plan.

The primary project data include the LFG flow to the engines and one flare, methane content of the LFG, engine operation, and flare operation. The LFG flow is continuously measured by two flow meters: one Veris Verabar (SN V13064-01.1) flow meter for flow to the flare and one Rosemount flow meter (SN 0462213) for the flow to the engines. The Veris Verabar is paired with Rosemount differential pressure transmitters, which send the data to the PLC. The Veris Verabar flow meter records data at 59°F and 1 atm and the flow is corrected to standard temperature and pressure in the emission reductions calculations for the flare. The Rosemount records data at 60°F and 1 atm. All monitored data is recorded continuously by a Yokogawa FX106 data logger.

The methane content of the LFG was measured weekly with one of two Elkins Earthworks gas analyzers (SN 1510206 and SN 1905204B). Each gas analyzer was field calibrated before each use. RCE confirmed that a 10% discount factor was applied to all readings using the gas analyzers since measurements were taken at a frequency that is less than continuous.

During the desktop review, RCE reviewed the data storage and retention policies of NRRRA 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.

3.6 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. The procedures in the Monitoring Plan are in compliance with the Protocol requirements. Landfill staff performed quarterly inspections of the flow meters.

Landfill and Ingenco staff are on-site at the flare skid and LFGE facility on a weekly basis for maintenance and to ensure that the equipment is operating properly.

RCE reviewed calibration documentation for the flow meters and methane analyzers. Flow meters were field checked for calibration accuracy by a third-party technician at the end of but not greater than 2 months prior to or after – the end date of the reporting period. This requirement does not apply to the gas analyzers because they are portable units and are field calibrated before each use. The Veris Verabar and Rosemount differential pressure transmitter (flow to the flare) were checked on 11/3/2021 and found to be within the Protocol required +/-5% accuracy threshold. The Rosemount 3051S (flow to the engines) was checked on 1/11/2022 and found to be within the Protocol required +/-5% accuracy threshold.

The Veris Verabar flow meters are not required to be calibrated per manufacturer's guidance and cannot be calibrated due to the nature of the equipment. The Rosemount differential pressure transmitters are the instruments requiring calibration and must be calibrated every 5 years. The Rosemount transmitters were last calibrated by the manufacturer on 11/3/2021. The Rosemount 3051S must be calibrated every 5 years and was last calibrated on 1/11/2022. All calibration results were found to be within 5% accuracy.

The Protocol requires that all portable gas analyzers are calibrated annually. The primary Elkins gas analyzer (SN 1510206) was calibrated on 11/17/2021 by Elkins. The secondary Elkins gas analyzer (SN 1905204B) was calibrated on 5/28/2021 by Elkins. All calibration results were found to be within 5% accuracy.

3.7 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, and operational activity of the destruction devices. RCE compared raw data in the spreadsheets to the respective daily sums, and then compared those data and the methane readings to the calculation workbooks. RCE confirmed operational activity of the engines by checking the flow rate (greater than 50 SCFM) and operational activity of the flare using thermocouple readings above 500°F supplied in the raw data. RCE confirmed that a 10% discount was applied due to non-continuous methane readings. 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 flare. 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 NRRRA'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. Propane consumption was estimated based on two 15-pound propane cylinders used on-site, which consume approximately 1 lb/month. For diesel consumption, RCE reviewed monthly diesel consumption records provided by Ingenco. RCE confirmed that appropriate emission and conversion factors were used, and reviewed the use of Protocol equations for Project emissions in NRRRA's calculation workbook.

RCE verified there was no use of missing data substitution during this reporting period.

RCE recalculated the GHG emission reductions and compared the results to NRRRA's calculations to determine if the GHG emission reductions were materially correct. RCE's calculations involved recalculation of the daily total of LFG flow to the engine, calculation of monthly methane destroyed, and recalculation of the project

and baseline emissions. RCE found no material misstatements in the final Project GHG reductions calculations.

Emissions reductions increased approximately 19% from the previous reporting period, 2020, due to increased landfill gas collection and the increase in GWP from 25 to 28.

4.0 Verification Results

NRRA 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 81,150 metric tons of CO₂e from January 1, 2021 to December 31, 2021. During final review, RCE identified no material misstatements in the data or emission reductions calculations. Table 3 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. NRRA sufficiently addressed all requests. The details of these requests are documented in RCE's List of Findings provided to the Reserve and NRRA.

5.0 Conclusion

RCE conducted a risk-based analysis of the Project's GHG emission reductions including a strategic review of the Project data and evidence. Based upon the processes and procedures and the evidence collected, RCE concludes that the Project emission reductions resulting from the capture and destruction of LFG during the reporting period January 1, 2021 – December 31, 2021 can be considered:

- In conformance with the Reserve Landfill Project Protocol 5.0,
- Without material discrepancy, and
- Verified to a reasonable level of assurance

Table 3 - Emission Reductions Verified for January 1, 2021 – December 31, 2021

Year	Baseline Emissions CO ₂ e (tonnes)	Project Emissions CO ₂ e (tonnes)	Pre-Project Destruction CO ₂ e (tonnes)	Emission Reductions CO ₂ e (tonnes)
2021	93,465	498	11,816	81,150

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

Garrett Heidrick

Senior Internal Reviewer Signature

Phillip Cunningham