



Verification Report for

Rio Grande Valley Landfill
Donna, Texas, USA
USA

Climate Action Reserve
Project ID CAR 512

Landfill Project Protocol, Version 2.1

1 April 2015

Report Prepared for:

BFI Waste Systems of North America, LLC
18500 North Allied Way
Phoenix, Arizona 85054

Report Prepared by:

NSF International
789 Dixboro Road
Ann Arbor, Michigan 48105

Summary

BFI Waste Systems of North America, LLC engaged NSF International (NSF) to verify its methane emission reductions from the Rio Grande Valley Landfill to the Climate Action Reserve for the reporting period of 12 December 2013 to 11 December 2014.

BFI Waste Systems of North America, LLC, the project developer, is the developer for Rio Grande Valley Landfill, a closed municipal solid waste (MSW) facility owned and operated BFI Waste Systems of North America, LLC as described by NAICS code 562212. The Rio Grande Valley Landfill project (the “Project”) is listed in the Reserve’s database with the identification number CAR 512.

Rio Grande Valley Landfill’s methane emission reductions during the cited project reporting period resulted from the collection and destruction of landfill gas in a single flare at the landfill located at Farm to Market 493 and Mile 12 Road, Donna, Texas 78753, Hidalgo County, USA.

The Project reduced emissions into the atmosphere 102,856 metric tons CO₂-e for the reporting period of 12 December 2013 to 11 December 2014.

1. Introduction

1.1 Objective

The objective of this verification audit was to determine, with reasonable assurance, that BFI Waste Systems of North America, LLC had met eligibility requirements and had quantified, monitored and fairly reported to the Climate Action Reserve its landfill gas emission reductions at the Rio Grande Valley Landfill in accordance with all applicable requirements of the Climate Action Reserve’s Landfill Project Protocol version 2.1.

1.2 Scope

The scope of the engagement included verification of the quantification, monitoring and reporting of greenhouse gas emission reductions from the project at the Rio Grande Valley Landfill for the reporting period of 12 December 2013 to 11 December 2014.

The scope included verification of the calculated project emissions associated with combustion of fossil fuel in a single flare and indirect emissions attributed to electricity and flare start-up propane consumption from project-related activities. And finally, the scope of this verification covered a review of all eligibility rules for this project per the requirements in the Landfill Project Protocol.

1.3 Criteria

BFI Waste Systems of North America, LLC implemented its methane reduction in accordance with the requirements of the Climate Action Reserve’s Landfill Project Protocol, Version 2.1 (October 14, 2009), Errata and Clarifications, Version 2.1, January 21, 2014 and the Climate Action Reserve Program Manual, October 26, 2011.

NSF conducted its verification of the reported emission reductions in accordance with the requirements of the Climate Action Reserve's Verification Program Manual, December 20, 2010, the Landfill Project Verification Protocol, v2.0 and to 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, emission reduction reports are considered fairly stated if Projects registering greater than 100,000 CRTs (expressed in terms of CO₂e) annually achieve greater than a +99% accuracy level (less than 1% error) relative to the verification body's calculated emission reductions. The verification body applied this quantitative threshold of materiality the whole reporting period.

1.5 Level of Assurance

This engagement was performed at the reasonable level of assurance.

2. Verification Approach

2.1 Team appointment and COI Review

This verification was performed by Mark Lutz, NSF Lead Verifier and reviewed by Michael DeBusschere, NSF Senior Internal Reviewer. Conflict of Interest inquiries were completed for NSF, the Lead Verifier and the Senior Internal Reviewer. A finding of low COI risk was confirmed by the Climate Action Reserve on January 27,, 2015.

2.2 Document Review

The Lead Verifier conducted a document review to inform the planning process in advance of performing on-site verification activities. Documents reviewed included Rio Grande Valley Landfill's project documentation submitted to the Climate Action Reserve; documentation prepared for the project by Element Markets (contracted by BFI Waste Systems of North America, LLC to assist them in this project), including a project monitoring plan entitled "RGLF Project Design Document v2 2-17-14", gas flow meter and methane analyzer data; aggregated and calculated data on Excel spreadsheets; calibration documentation; regulatory compliance attestations and supporting documents and equipment information related to flare operations and monitoring equipment.

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 Element Markets personnel, a verification plan and a sampling plan were developed for this reporting period.

2.4 Verification Activities

NSF conducted a site visit at Rio Grande Valley Landfill in Donna, Texas. The site visit was conducted February 13, 2015.

Project Verification Report

Verification activities included:

- Confirmation of continuing eligibility, ownership of the project, and quantification of project emission reductions in accordance with the Climate Action Reserve Landfill Project Protocol Version 2.1;
- Verification of evidence presented by BFI Waste Systems of North America, LLC and by Rio Grande Valley Landfill's personnel to demonstrate their knowledge of and assertion of compliance with applicable air, waste and water regulations;
- Verification of applicable methane and carbon dioxide emission sources within the project boundary and their quantification as defined by the Climate Action Reserve Landfill Project Protocol Version 2.1;
- Verification of Rio Grande Valley Landfill's monitoring of key operational parameters of its landfill gas collection and destruction project;
- Determination of Rio Grande Valley Landfill's conformity in all material respects with the requirements of the Climate Action Reserve Landfill Project Protocol Version 2.1;
- Selecting locations and processes within the scope of BFI Waste Systems of North America, LLC's landfill gas project to visit based upon an assessment of risks to fair reporting; and
- Reviewing the basis for and results achieved from the calculated methane emission reductions from its landfill gas collection and destruction project.

3. Verification Findings

3.1 Project Description

The project consisted of methane collected from a landfill that included 88 LFG vertical extraction wells, associated piping and a blower/flare skid. The LFG was combusted in one open flare. The landfill consists of 134.5 acres with a total permitted footprint of 92.1 acres. There were eight cells on this landfill, all of which are constructed. This landfill stopped accepting waste on 9/21/2013 and is considered as a closed landfill.

Rio Grande Valley Landfill controls leachate by a collection system that uses collection piping to drain all leachate into sumps located within the waste mass. From there, the leachate is collected and stored in a 150,000 gallon storage tank and is re-circulated under Rio Grande Valley Landfill's municipal waste permit. The landfill is not considered a bioreactor per the EPA guidelines, because no additional liquids are added to the waste mass.

3.2 Eligibility

NSF considered evidence to establish the eligibility of the Rio Grande Valley Landfill Project under the Landfill Gas Protocol Version 2.1.

Project Location: The project is located near Donna, Texas – located entirely within the U.S. and continues to be eligible as a landfill project under the Climate Action Reserve Protocol.

Project Start Date: The project start date of 21 February 2005 was confirmed by the original verification of this landfill. NSF had confirmed the start date of the Project by a review documents that supported the evidence of the construction of the landfill project including documentation of flow meter readings and temperature data at the flare skid before and after the project began; a construction report by Weaver Boos Consultants-Southwest (an outside contractor) to BFI Waste Systems of North America, LLC (August, 2005) and an e-mail from Practical Controls (a third-party engineering firm contracted by BFI Waste Systems of North America, LLC) who witnessed the start-up.

Crediting Period: The crediting period established is from 21 February 2005 (the project start date) to 20 February 2015. NSF has concluded that this reporting period, 12 December 2013 to 11 December 2014, is within this first crediting period of the project.

3.3 Additionality

Legal Requirement Test: NSF reviewed an Attestation of Voluntary Implementation signed by the Area President of BFI Waste Systems of North America Waste Systems, LLC on 23 January, 2015 for the project reporting period from 12 December 2013 to 11 December 2014. The New Source Performance Standard (NSPS) for MSW landfills requires that landfills that began receiving waste after May 30, 1991, with a design capacity greater than 2.5 Mg to control emissions of non-methane organic compounds (“NMOC”) when the estimated NMOC emissions exceed 50 Mg per year. Based upon the results of the Tier II Report conducted by Weaver Boos Consultants, LLC (done in December, 2014 and reported in January, 2015), Rio Grand Valley’s NMOC emissions were less than 50 Mg/year (30.61 Mg in 2013 and 31.45 Mg in 2014.)

NSF had previously examined a “Tier I Operating Air Permit Application for LFG Utility” report prepared by Weaver Boos Consultants, LLC; dated June, 2005. It stated that the facility is a Type 1 MSW landfill and was not subject to 40 CFR Part 70 requirements, but required that a permit was needed for the operation of the flare. NSF re-confirmed during this site visit that this permit is still current and continues to conclude that Rio Grande Valley Landfill is not required to capture and destroy landfill gas under federal (NSPS, EG or NESHAP) regulations.

During the site visit for this reporting period, NSF also reconfirmed that Rio Grande Valley Landfill continues to not be required to manage its landfill gas under either the Texas Commission of Environmental Quality (TCEQ) or local regulations.

NSF also verified the implementation of the project developer’s monitoring plan with respect to changes in regulations that could affect the continued eligibility of the landfill gas destruction project. NSF reviewed evidence obtained from BFI Waste Systems of North America, LLC concerning knowledge of any changes to regulations that would affect the voluntary nature of the project’s implementation. From this review, NSF has concluded that the project implementation continued to be voluntary.

Performance Standard Test: NSF had previously determined during the initial site visit, January 6 and 7, 2011, that the Rio Grande Valley Landfill had installed a gas collection system and a new qualifying destruction device at an eligible landfill where landfill gas had never been collected and destroyed prior to the project start date. A collection system and flare were installed and became active as of 21 February

2005, the start date confirmed by construction reports, e-mails prepared by third parties and other data. NSF verified during the first on-site visit that there was no previous gas collection system or flare(s) by an examination of landfill drawings, an interview with the Landfill Operations Manager and a tour of the landfill. The project therefore has met the performance standard test (section 3.4.1, 1) described in the Landfill Project Protocol Version 2.1.

During the most recent site visit February 13, 2015, NSF re-confirmed that there have been no substantive changes to the flare and gas collection for the reporting period during an inspection of the landfill, landfill gas collection system and of the flare skid. According to the Protocol, the project developer who has once passed the performance standard test is eligible to register reductions for the lifetime of the project crediting period, as long as a project is not otherwise determined ineligible due to the regulatory changes that impacted project's voluntary implementation. NSF has concluded from these facts the project has met the performance standard test.

3.4 Regulatory Compliance:

NSF reviewed an Attestation of Regulatory Compliance signed by the Area President of BFI Waste Systems of North America Waste Systems, LLC on 23 January, 2015 for the project reporting period from 12 December 2013 to 11 December 2014. NSF examined regulatory compliance by an interview with Rio Grande Valley's Operations Supervisor and by a review of Rio Grande Valley Landfill's primary regulatory documents.

NSF reviewed regulatory compliance documents for the Rio Grande Valley Landfill site from the Texas Commission on Environmental Quality ("TCEQ"), including a Municipal Solid Waste Landfill Permit (MSW-1984a issued January 10, 2002); an Air Permit (#\$73250 issued October 1, 2004) ; a Municipal Solid Waste General Operating Permit (#4948a); Texas Water Act General Permit (TXR050000); and a General Operating Permit (#0-2526). These permits included, as applicable, inspection frequencies, sampling frequencies and reporting requirements. NSF verified that these permits continued to be current and that there is an on-going system (see next paragraph) to monitor on-going compliance to permit requirements.

NSF reviewed the processes in place at Rio Grande Valley Landfill for on-going monitoring of regulatory compliance to Federal, State and local regulations and related permit requirements. This was done through a review of the regulatory monitoring plan described in Rio Grande Valley Landfill's "RGLF PDD 12.12.113 - 12.11.14 verification_v2.3"; interviews with Rio Grande Valley Landfill's Operations Supervisor and Element Market's Project Manager; and finally a review of a sample of checklists connected with compliance to the above permits for this landfill.

As a cross-check, on March 2, 2015, NSF reviewed the EPA's publicly available Office of Enforcement and Compliance History database, and found records of state inspection for compliance with the Clean Air Act (CAA). No Notices of Violation had been recorded in the database in this reporting period under the CAA, National Pollution Discharge Elimination System, or Resources Recovery and Reclamation Act.

From this evidence, NSF has concluded that the project and the Rio Grande Valley Landfill remains in material compliance with applicable laws and regulations during the reporting period 12 December, 2013 to 11 December, 2014.

3.5 Ownership

NSF reviewed an Attestation of Title signed by the Area President of BFI Waste Systems of North America, LLC on 23 January 2015 for the project reporting period from 12 December 2013 to 11 December 2014. This document asserts that the project applicant had legal rights to any emission reduction credits to be issued by the Climate Action Reserve.

NSF confirmed the information in the Attestation of Title documents by reviewing contract documents, including the contractual scope of work statement that BFI Waste Systems of North America, LLC executed with Element Markets. This agreement was executed on 3 September 2009 between Element Markets and BFI Waste Systems of North America, LLC (as full owner of the Rio Grande Valley Landfill) to develop a gas destruction project at the Rio Grande Valley Landfill and for BFI Waste Systems of North America to be the legal owner of the gas reduction carbon credits. The Rio Grande Valley Operations Manager and the Project Manager for Element Markets both re-confirmed that this agreement is still in effect and that no modifications or amendments to that agreement had been made since this date of execution.

From this evidence, NSF has concluded that the project developer, BFI Waste Systems of North America, LLC, 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 in an open flare.

GHG Sources, Sinks and Reservoirs associated with the baseline scenario:

- CO₂ from the oxidation of CH₄ by soil bacteria. As the landfill is not covered by a synthetic liner, the Landfill Project v 2.1 Reporting Protocol assumption that 10 percent of the methane produced would be naturally oxidized by soil bacteria has been applied.
- CH₄ vented to the atmosphere.

GHG sources, sinks and reservoirs associated with the project:

- CH₄ from the incomplete combustion of CH₄ in the flare.
- CO₂ from the combustion of fossil fuels (propane) 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 Landfill Project Protocol version 2.1

Conditions Affecting Landfill Gas Collection. There were no destruction device issues for the reporting period other than 1) Problems with the air compressor during a short time in 2014 and 2) Issues with the methane analyzer in December, 2013. Both issues were resolved. Also, because this is a closed landfill, there has been work on installing the final cap which was reported to be 99% complete at the time of the site visit. In addition, this last reporting period saw a large increase in methane collected and destroyed: Twenty-four additional vertical extraction wells were installed in this landfill in 2013, but many of them did not become fully operational until 2014. A review of the raw data and a tour of the landfill and flare skid showed that the landfill continues to operate without major problems and that the collection system and flare were operating smoothly. This continues to be a closed landfill. There has been no new waste collected on this landfill since its closure in 2012. This is the fifth reporting period for this project.

Monitoring and Measurement Equipment. The project required the development and implementation of project monitoring and quarterly inspections, cleaning and calibration of landfill gas flow metering devices.

NSF reviewed flow meter calibration and maintenance records that indicated that the flow measurement equipment was cleaned and inspected on a quarterly basis (1/29/2014, 6/6/2014, 9/29/2014 and 12/10/2014) with documented findings. NSF verified that quarterly inspections, cleanings and calibration checks were performed for the flow meter installed at the open flare. In each instance, the as- found condition was within acceptable calibration tolerances.

NSF also confirmed that the gas flow meter was field checked for calibration accuracy within two months of the end of the reporting period (December 10, 2014), by a certified third party, per protocol requirements and that factory calibration schedules adhere to the manufacturer's guidance (12 to 18 months.) The flow meter (SN 2007341) was last calibrated 6/28/2013 and previously calibrated 1/04/2012 - both by a certified calibration service. This meets the 12 to 18 month manufacturer-recommended time frame for this reporting period. All calibration and calibration check records indicated that accuracy on these checks were well within the protocol guidelines of $\pm 5\%$.

The protocol requires that methane is measured continuously, recorded every 15 minutes and averaged at least daily. With data information seen on the monitoring equipment during our site survey and with the inspection of samples of the raw data and spreadsheet calculations, NSF concluded that methane was measured continuously and recorded and averaged per protocol requirements. A continuous gas analyzer connected to a digital data recorder was the system used throughout the reporting period to monitor methane.

NSF verified by records that the continuous gas analyzer was inspected, cleaned as needed and field checked for calibration accuracy on a quarterly basis - 1/29/2014, 6/6/2014, 9/29/2014 and 12/10/2014. NSF also confirmed that the continuous methane analyzer was field checked for calibration accuracy within two months of the end of the reporting period (December 10, 2014), by a certified third party, per protocol requirements. Element Markets supplied the manual for information related to the recommended factory calibration. The manual makes no statement for manufacturer's recommended calibration interval, nor was there anything found on the manufacturer's website. Therefore, the Reserve's guidance of every five years is the default. Because this unit has been in place for less than 5 years (installed April 2, 2010), the most recent calibration is within the calibration interval.

Between 12/30/2013 and 1/29/2014, the analyzer on occasion had operational issues. The O₂ sensor needed replacement and the analyzer discharge piping needed adjustment to facilitate discharge by the

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analyzer's pump. The certification calibration service consulted with the manufacturer to correct and the analyzer was put back into operation. In this time period, the discrete data gaps (represented by a reduced methane reading), but both the thermocouple and flow meter data showing normal and continued operation. Each data gap or anomaly was limited to 12 hours or less. NSF verified that sufficient data was available to substitute data during those periods, per the guidance in the protocol.

Flow rate, flare temperature and methane concentration were monitored remotely using a telemetry system that includes a Yokogawa digital recorder, cellular modem and the internet. This telemetry system gives all relevant parties' access to view the operation of the flare skid in real-time. Data is collected every four minutes.

NSF reviewed the Monitoring Plan and calculation procedures to the Landfill Project Protocol requirements and the application of the most current Errata and Clarifications document. NSF found that the current Monitoring Plan is consistent with Protocol requirements.

For this reporting period, NSF examined data sets, in a raw data Excel file and a number of aggregated Excel data files to verify that spreadsheet formulas were consistent with the Landfill Gas Project Protocol and that operating parameters (flare temperatures and flow, in particular) have been met. In addition, NSF verified that all data points were deleted in the Excel files where LFG flow is recorded at less than 500 deg. F. NSF also confirmed through inspection of calibration documents that the flow meter continues to automatically adjust to 60 deg F and 14.7 psia per protocol requirements.

The Project maintains a separate, metered electrical service powering the blower/flare skid. Monthly records of electrical consumption attributed to the Project's operations were reported in kilowatt hours on billing statements provided by the local power company. Propane delivery records were used to calculate the amount of propane use to fuel the flare pilot ignition system. NSF found that the calculations of the CO₂ emissions from this usage of both electricity and propane were found to be correctly applied in the Project emissions.

3.8 Project Management System

NSF verified the project's management system in the site visit conducted on February 13, 2015. In particular, verification looked to confirm continued adequacy of the following elements:

- Definition and maintenance of an appropriate control environment by BFI Waste Systems of North America, LLC and Rio Grande Valley Landfill management and personnel;
- Training and competence of landfill project managers and operating/data management personnel;
- Identification and management of legal requirements related to the 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 a project emissions; and
- Checking and corrective action mechanisms.

Based on this review, NSF found the continued adequate control environment existed for the project.

3.9 Calculation of GHG Emission Reductions

Rio Grande Valley Landfill's emission reductions were calculated per the formula defined in the Climate Action Reserve Landfill Gas Protocol, Version 2.1. The basic formula was: Landfill gas destroyed,

- the portion of methane oxidized in the baseline scenario,
 - carbon dioxide emissions from fossil fuel consumption (propane),
 - indirect carbon dioxide emissions resulting from the use of electricity from the grid,
- = Project Emission Reductions

In addition, there was no liner for the landfill during the reporting period. As a result, the project reduced its quantified methane destroyed by the 10% methane soil oxidation factor per protocol requirements.

For this project, there was no supplemental natural gas utilized, apart from propane used for flare start-ups, nor were there any pre-project destruction devices, so there was no need to calculate these reductions. NSF further verified the data for accuracy, based on its sampling plan, the trail of data beginning from the raw data outputs to the spreadsheets capturing this data to the final calculations. NSF independently calculated the destruction amounts based on the calculations in the Protocol and found Rio Grande Valley Landfill's claimed emission reductions were fairly stated.

As mention earlier there were several (seven) instances of missing data observed during the reporting period, six connected with problems related to the methane analyzer (discussed above) related to problems at the beginning of the reporting period. All of the methane data substitutions were, in turn, were directly or indirectly related to a 5 AM daily "AutoCal" event failure of the analyzer. NSF confirmed that sufficient data was available to substitute the missing data in accordance with the protocol.

Substitution #7 was applied to a discrete gap in flow readings. NSF verified that both thermocouple and methane analyzer readings in the 36 hour missing data period show that the flare was operational and combusting gas, and that the protocol's guidelines for data substitution were followed per protocol requirements.

In the case of the Rio Grande Valley Landfill Project, the verification team reviewed data downloaded from the data logger and compared a sample to the emission reduction calculations, verified data completeness for the reporting period, scanned data for data gaps and for out-of-range values, reviewed spreadsheet formulas for consistency with Protocol equations, and recalculated emission reductions.

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 Approved Variances or Deviations

There were no requested variances or approved deviations for this project.

4. Verification Results

4.1 Verification Team Recommendation:

Based on the verification activities described above, the verification team has concluded that the Rio Grande Valley Landfill project has achieved the following emission reductions:

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Vintage Year :	Baseline Emissions	- Project Emissions	- Adjustments	= Metric tons CO ₂ -e Removals (net)*
2013	7,113	5	0	7,108
2014	95,841	93	0	95,748
Totals				102,856

* Rounded

4.2 Verification Audit Summary:

Project Developer	BFI Waste Systems of North America, LLC 18500 North Allied Way Phoenix, Arizona 85054
Project Location	Rio Grande Valley Landfill Farm to Market 493 and Mile 12 Road Donna, Texas 78753 Lat: 26° 13' 31.58" N/ Long: 98° 01' 54.93" W
Project Type	Collecting and Destroying Methane from Landfills
Project Period	12 December 2013 through 11 December 2014
Protocol Methodology	Climate Action Reserve, Landfill Project Protocol, Version 2.1
Emission Removals Verified	Vintage 2013: 7,108 metric tons of CO ₂ -e Vintage 2014: 95,748 metric tons of CO ₂ -e
Verification Conclusion	Based upon the above, NSF has concluded that Rio Grande Valley Landfill's 2013 vintage methane emission reductions of 7,108 metric tons (CO ₂ -e) and 2014 vintage methane reductions of 95,748 metric tons (CO ₂ -e) reported to the Climate Action Reserve are, in all material respects, fairly stated.
Lead Verifier	 Mark Lutz, 04-01-2015
Internal Reviewer	 Michael DeBusschere, 04-04-2015
<i>This verification statement is valid when signed and dated by an NSF internal reviewer.</i>	