

Verification Report for the City of Garland Landfill Carbon Project

Climate Action Reserve—CAR545

June 2020

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TABLE OF CONTENTS

1.	Introduction	1
2.	Objectives	1
3.	Verification Scope	1
4.	Standards Used to Verify Emissions (Criteria).....	1
5.	Overview of the Verification Process	2
5.1	Conflict of Interest Review	2
5.2	Verification Team	2
5.3	Verification Kick-off	2
5.4	Development of the Verification Plan	3
5.5	Site Visit.....	3
5.6	Emissions Reduction Data and Calculation Assessment	3
5.7	Corrective Actions and Supplemental Information.....	3
5.8	Verification Reporting.....	4
6.	Site's Conformance with Verification Criteria	4
6.1	Project Description	4
6.2	Eligibility.....	4
6.2.1	Ownership and Title	4
6.2.2	Project Start Date	4
6.2.3	Additionality	4
6.2.3.1	Performance Standard Test.....	4
6.2.3.2	Legal Requirements Test.....	5
6.2.4	Regulatory Compliance.....	5
6.3	Project Performance Against CAR Protocol and Project Management System	6
6.3.1	Project Monitoring	6
6.3.2	Instrument Quality Assurance/Quality Control.....	6
6.3.3	Project Emissions	8
6.4	Emissions Reduction Calculation Assessment.....	8
6.5	Approved Variance or Deviations.....	9
7.	Verification Conclusion	9
8.	Lead Verifier Signature.....	9
9.	Senior Internal Reviewer Signature	10

TABLES

TABLE 1: Virtual Site Visit Requirements..... 3

TABLE 2: Monitoring Equipment 6

TABLE 3: Instrument QA/QC 7

TABLE 4: Project Emissions 8

TABLE 5: Input Parameters 8

1. Introduction

This report is provided to Garland Power & Light (GPL) as a deliverable of the Climate Action Reserve (CAR) project verification process. This report covers the verification of the City of Garland Landfill Carbon Project – CAR545 (the Project) for the period from June 10, 2018 through June 9, 2019.

2. Objectives

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

- the Project conforms to the requirements of the verification criteria, including all eligibility requirements, discussed in Section 4 of this report; and
- the data reported are accurate, complete, consistent, transparent, and free of material error or omission.

3. Verification Scope

Specific scope metrics for the verification are outlined in the table below:

Geographic Boundaries	C. M. Hinton Jr. Regional Landfill, Rowlett, TX
Emission Reduction Sources, Project Emissions, and Greenhouse Gases	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ e)) resulting from methane destruction; Project emissions of CO ₂ from fossil fuel combustion and purchased electricity.
Reporting Period	June 10, 2018 through June 9, 2019
Data Sources	Metered Data and Emissions Reduction Calculations

4. Standards Used to Verify Emissions (Criteria)

The following table outlines the guidance and protocols used to conduct this verification:

Standard of Verification	• Climate Action Reserve U.S. Landfill Project Protocol, Version 2.1, October 14, 2009 (CAR Protocol) • Climate Action Reserve Landfill Project Protocol Version 2.1 Errata & Clarification, July 21, 2016 (Errata and Clarification) • Reserve Offset Program Manual, November 12, 2019 • Applicable Climate Action Reserve Policy Memos
Verification Process	• Landfill Project Verification Protocol, Version 2.0, November 18, 2008 • Errata and Clarification • Climate Action Reserve Verification Program Manual, February 8, 2017 • ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006

Level of Assurance	• Reasonable assurance
Materiality	• Misstatements greater than one percent of the Project's emission reductions assertion are considered material • Qualitative non-conformities with the CAR Protocol are also considered material

5. Overview of the Verification Process

The verification process was utilized to gain an understanding of the Project's emission sources and reductions and to evaluate and verify the collection and handling of data, the calculations that lead to the results, and the means for reporting the associated data and results.

The following verification process was used:

- conflict of interest review;
- selection of Verification Team;
- initial interaction and kickoff meeting with GPL;
- development of the verification and sampling plan;
- review of management and data collection system;
- site visit;
- assessment of raw data and calculations for the period under review;
- follow-up interaction with GPL for corrective action, clarification, or supplemental data as needed; and
- final statement and report submittal.

5.1 Conflict of Interest Review

Prior to beginning any verification project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the Project. No potential conflicts were found for this Project. First Environment also received authorization to proceed with verification activities for the Project developer from CAR in a notification dated January 27, 2020.

5.2 Verification Team

First Environment's Verification Team consisted of the following individuals who were selected based on their verification experience, as well as familiarity with landfill operations.

Lead Verifier – Jeff Daley
Senior Internal Reviewer – Michael Carim

5.3 Verification Kick-off

The verification was initiated with a kick-off meeting on February 18, 2020 with GPL. The meeting focused on confirming the scope, schedule, and data required for verification.

5.4 Development of the Verification Plan

The Verification Team formally documented its verification plan as well as determined the data-sampling plan. The verification plan was developed based on the discussion of key elements of the project verification process during the kick-off meeting. GPL was afforded the opportunity to comment on the key elements of the plan for verification. Based on items discussed and agreed upon with GPL, the plan identified the First Environment project team members, project level of assurance, materiality threshold, and standards of evaluation and reporting for the verification. It also provided an outline of the verification process and established project deliverables. A separate data-sampling plan was designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

5.5 Site Visit

Due to the COVID-19 Pandemic, GPL requested that a virtual site visit be allowable for the current verification period. GPL's request for a modification due to extraordinary circumstances was approved by the Reserve on May 27, 2020 (2018-6-2019-6-EXT-CIR-DET-CAR545) for the reporting period of June 10, 2018 through June 9, 2019. Mr. Jeff Daley conducted a virtual site visit on June 11, 2020. Table 1 summarizes the specific conditions of the approval.

TABLE 1: Virtual Site Visit Requirements

Extraordinary Circumstances Determination Requirement	Verification Adherence
The verifier is able to conduct a full assessment of the implementation and operation of the project activity through the virtual site visit.	First Environment conducted a full assessment of the implementation and operation of the project activity. Screen sharing conference calling software was utilized to assess the Project's data management systems and interview personnel relevant to the Project for the verification period. Live video conferencing was also utilized as discussed below.
The verifier is able to request a full walk through of the facility and is able to verify all necessary items for Landfill projects, pursuant to the protocol.	Live video conferencing software was utilized to conduct a full walk through and tour the Project activity, which included confirming project monitoring, metering devices, and all necessary verification items pursuant to the Protocol.
The verification body adheres to all the requirements for virtual site visits, as they are described in the email connected to this determination.	First Environment adhered to all requirements contained in the email communication attached to the determination. Including, implementing additional planning and preparation for the virtual site visit, utilizing recommended software, and updating the verification risk assessment relative to risks associated with a virtual site visit.

5.6 Emissions Reduction Data and Calculation Assessment

This assessment used information and insights gained during the previous steps to evaluate the collected data and the reported emissions reduction quantities, and identify if either contained material or immaterial misstatements.

5.7 Corrective Actions and Supplemental Information

The team issued corrective action and clarification requests during the verification process. GPL provided sufficient responses to all of the corrective action and clarification requests.

5.8 Verification Reporting

Verification reporting, represented by this report, documents the verification process and identifies its findings and results. Verification reporting consists of this report for GPL, a verification statement, and a list of findings, all to be submitted to the Climate Action Reserve.

6. Site's Conformance with Verification Criteria

6.1 Project Description

The C. M. Hinton Jr. Regional Landfill is located in Rowlett, Texas and is owned and operated by the City of Garland, Texas. The Project activity is owned and operated by Garland Power & Light, a subsidiary of the City of Garland, Texas. The landfill opened in 2002 and currently receives municipal solid waste.

The Project consists of the voluntary collection and destruction of landfill gas in an open flare. GPL began installing a landfill gas (LFG) well field and active gas collection and control system in 2009. The Project destroys landfill gas that otherwise would be vented to the atmosphere, resulting in a net reduction of CO₂-equivalents. No combustion devices existed on site prior to the implementation of the Project activity. The baseline scenario is defined as the total release of landfill gas to the atmosphere

6.2 Eligibility

The Project meets the eligibility requirements set forth in the CAR Protocol as described below.

6.2.1 Ownership and Title

The City of Garland is the owner of the C. M. Hinton Jr. Regional Landfill, and Garland Power & Light. Garland Power & Light owns the Project equipment and manages the Project activity. First Environment reviewed several permits held by the City of Garland to confirm ownership status of the landfill. Additionally, an ownership representation document from the City Manager was provided which identifies that Garland Power & Light is a division of the City of Garland and, as such, is the owner of the carbon credits. The ownership status was also confirmed at the site visit through interviews conducted with project personnel.

Additionally, First Environment relied on the Attestation of Title completed by GPL for the current reporting period. The Attestation is on file with CAR and was reviewed to confirm that it was completed correctly.

6.2.2 Project Start Date

First Environment confirmed that the Project meets CAR's start date requirements. The Project start date is June 10, 2009, which was confirmed through review of a construction report and flare skid field logbook entries.

6.2.3 Additionality

The Project passes both the Performance Standard Test and the Legal Requirements Test, as described below.

6.2.3.1 Performance Standard Test

The Project consists of the installation of a landfill gas collection and control system and therefore exceeds the performance standard defined by the CAR protocol, specifically Scenario

1 from the list provided in Section 3.4.1 of the CAR Protocol, because no collection or control system existed prior to the Project start date. It was also confirmed at the site visit that the landfill is not a bioreactor.

6.2.3.2 Legal Requirements Test

The landfill has a permitted capacity above the 2.5 million cubic meter threshold of municipal solid waste that triggers New Source Performance Standard (NSPS) requirements. Because the landfill had not been modified or re-constructed since July 17, 2014, the landfill is subject to 40CFR60, Subpart WWW. As such, non-methane organic compounds (NMOC) emissions rate testing is conducted in accordance with Subpart WWW. The most recent Tier II testing event occurred in January 2017, as documented in the most recent NMOC Emissions Rate Report dated March 20, 2017. The results of this test indicated that the NMOC emission rate threshold of 50Mg per year was exceeded in 2017 with an emissions rate of 54.00 Mg. Because the landfill has exceeded the NMOC threshold, per 40CFR 60.752, the landfill is required to operate a gas collection and control system within 30 months of the date of the NMOC emissions rate report. Therefore, the last date this Project will be eligible under the Landfill Protocol is September 20, 2019. Because the Project is still within the 30-month time period, landfill gas collection and destruction is not required by regulation, and the Project is still eligible under the Landfill Protocol for the current reporting period.

Additionally, First Environment relied on the Attestation of Voluntary Implementation completed by GPL for the current reporting period. The Attestation is on file with CAR and was reviewed to confirm that it was completed correctly.

6.2.4 Regulatory Compliance

First Environment reviewed the landfill's General Operating permit, Wastewater permit, generated a compliance report on April 6, 2020 using the Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) database, generated a solid waste compliance report on June 26, 2020 using the Texas Commission on Environmental Quality (TCEQ) website, and interviewed site personnel to determine regulatory compliance. The landfill had previously received a Notice of Enforcement dated December 18, 2017 from the TCEQ for failure to report daily visible emissions observations of the flare. As soon as the facility became aware of the issue, they began conducting daily visible emissions monitoring and have had personnel trained by a third party on visible emissions monitoring methods. On March 1, 2019, the TCEQ filed a Notice of Non-Suit and Withdrawal of the preliminary report and petition; therefore, the issue is considered to be closed. The facility has continued conducting visible emissions monitoring each day that the landfill is open. Additionally, and related to the visible emissions issue from the previous reporting period, the 2018 and 2019 Title V Compliance Certification reports identify deviations related to visible emissions monitoring that did not occur on days the landfill was closed. The TCEQ had previously issued a memorandum that states enforcement action will not be taken for missing flare observations on days the landfill is closed. The landfill is required however to report this as a deviation in the Title V Compliance Certification reporting process, which is why it appears in the ECHO database. First Environment has reviewed all aforementioned documents. Consistent with the Reserve's previous review of this issue and because the issue is administrative in nature, the Project is eligible for CRT crediting. Aside from the issue identified above, there was no evidence of any additional non-compliance issues during the reporting period.

First Environment relied on the Attestation of Regulatory Compliance completed by the GPL for the current reporting period. The Attestation is on file with CAR and was reviewed to confirm that it was completed correctly.

6.3 Project Performance Against CAR Protocol and Project Management System

The Project was implemented in conformity with the CAR Protocol. GPL developed and implemented a Monitoring Plan to track relevant Project parameters and data sources. The Monitoring Plan, including the Project Diagram, was reviewed to determine compliance with the protocol requirements. Based on observations made during the site visit and review of relevant Project documentation, First Environment found the Monitoring Plan and Project Diagram to meet the requirements set forth by the CAR Protocol and the Project to be implemented in accordance with the Monitoring Plan.

6.3.1 Project Monitoring

Landfill gas flow is continuously monitored using a Fluid Components International (FCI) Mass Flow meter and transmitted to a Yokogawa data logger that electronically archives all flow data. Flow data are measured at standard temperature and pressure conditions of 70°F and one atmosphere, respectively. The data are exported to Microsoft Excel for review and quantification. Two FCI mass flow meters are used in rotation by the Project to facilitate quarterly manufacturer calibrations.

Methane concentration of the landfill gas is continuously measured with a Siemens Ultramat 23 continuous gas analyzer. The methane content of the landfill gas is recorded by the Yokogawa data logger, and data are exported to Microsoft Excel for review and quantification.

Both gas flow rates and methane concentration are measured on the same relative moisture basis.

Flare temperature is continuously monitored by thermocouples and recorded by the Yokogawa data logger. The data are also exported to Microsoft Excel for review and quantification.

Table 2 summarizes the Project monitoring system parameters and monitoring equipment employed by the Project.

TABLE 2: Monitoring Equipment

Parameter	Monitoring Equipment	Frequency of Measurement	Frequency of Recording	Recording Device
Landfill gas flow	FCI Flow Meters	Continuous	Every two minutes	Yokogawa digital chart recorder
Methane Concentration	Siemens continuous analyzer	Continuous	Every two minutes	Yokogawa digital chart recorder
Hourly Operation of Destruction Device	Thermocouple	Continuous	Every two minutes	Yokogawa digital chart recorder

6.3.2 Instrument Quality Assurance/Quality Control

GPL's instrument quality assurance/quality control (QA/QC) plan for the Project's monitoring equipment complies with the CAR Protocol's requirements.

The flow meters are cleaned and inspected several times per month with as-found/as-left conditions documented and calibrated quarterly, including at least once within the last two months of the end of the reporting period. First Environment reviewed documentation of all manufacturer calibrations performed during the current reporting period, all of which indicated that the as-found conditions of the flow meters were within the required five percent accuracy threshold, with the exception of the April 29, 2019 check/calibration which identified the meter was over reporting outside the five percent accuracy threshold, and the November 6, 2018 check/calibration which identified the meter was under reporting outside of the five percent accuracy threshold. Since the November 6, 2018 check/calibration identified the meter was under reporting flow, all flow is left “as is” as required per Protocol requirements. As a result of the April 29, 2019 check/calibration, all affected flow was drift adjusted according to the maximum calibration drift identified during manufacturer calibration. The manufacturer recommends calibrations once every 18 months. The Project flow meters are calibrated more frequently than the manufacturer recommendations, and Protocol requirements.

The continuous gas analyzer is cleaned and inspected with as-found/as-left conditions documented, field checked for accuracy, and undergoes an in-situ calibration several times per month, including at least once within the last two months of the end of the reporting period. First Environment reviewed documentation of all field accuracy checks and calibrations performed during the current reporting period, all of which indicated that the analyzer was operating within the required five percent accuracy threshold. The manufacturer does not recommend a specific interval to perform calibrations. Therefore, the analyzer is calibrated at a minimum of once every five years.

First Environment also confirmed that the calibration gases used to perform field checks of the continuous gas analyzer were within their useful life span.

Table 3 shows the dates during the current reporting period when instrument QA/QC was performed.

TABLE 3: Instrument QA/QC

Monitoring Equipment	In Service	Inspected/Cleaned	Accuracy Check	Manufacturer Calibration
FCI Flow Meter (s/n: 437725)	9/14/2018 – 12/28/2018; 4/3/2019 – end of reporting period	Documented at least monthly	7/17/2018; 2/5/2019	7/17/2018; 2/5/2019
FCI Flow Meter (s/n: 432062)	6/10/2018 – 9/14/2018; 12/28/2018 – 4/3/2019	Documented at least monthly	11/6/2018; 4/29/2019	11/6/2018; 4/29/2019
Siemens Ultramat Gas Analyzer (s/n N1-X2-871)	Entire Reporting Period	Documented at least monthly	6/8/2018; 7/6/2018; 7/20/2018; 8/2/2018; 8/17/2018; 8/30/2018; 9/14/2018; 9/28/2018; 10/5/2018; 10/18/2018; 10/31/2018; 11/15/2018; 11/30/2018; 12/14/2018; 12/28/2018; 1/11/2019; 1/25/2019; 2/8/2019; 2/21/2019; 3/7/2019; 4/5/2019; 4/12/2019; 4/19/2019; 5/3/2019; 5/17/2019; 5/24/2019; 6/7/2019	3/22/2019

6.3.3 Project Emissions

Project emissions sources and the associated monitoring methodology are summarized in Table 4.

TABLE 4: Project Emissions

Project Emissions Source	Monitoring
Consumption of Purchased Electricity	Utility Invoices
Propane consumption	Estimated usage based on purchase invoices
Gasoline	Estimated usage based on purchase invoices

6.4 Emissions Reduction Calculation Assessment

The emission reduction calculations were reviewed to ensure accuracy in the formulas applied and the raw data used as inputs. The formulas were tested to ensure consistency with the calculation methodology described in the CAR Protocol.

Total landfill gas flow is computed by multiplying the average landfill gas flow rate in a given interval by the length of the interval. Flow totals are aggregated on a daily basis. Metered gas flow volumes are corrected in the emission reduction calculations from standard conditions at one atmosphere of pressure and a temperature of 70°F, to Protocol standard conditions of one atmosphere of pressure and a temperature of 60°F. The total volume of methane destroyed by the Project was computed in daily intervals by multiplying the daily gas flow to the flare by the daily average of methane concentration measurements and is converted to a mass flow using the density of methane at 60°F and one atmosphere of pressure. The total quantity of methane destroyed by the Project is aggregated monthly and summed over the reporting period to obtain the total baseline emissions. Project emissions were calculated by multiplying activity data by an appropriate emission factor. The total emission reductions were determined by subtracting the project emissions from the baseline emissions. Twenty-two instances of methane concentration data substitution were performed throughout the reporting period for outages lasting less than six hours. Two instances of methane concentration data substitution were performed throughout the reporting period for outages lasting greater than 24 hours, but less than seven days. First Environment confirmed that all data substitution calculations were performed correctly in accordance with Appendix E of the Protocol.

Table 5 summarizes the input parameters used in the emission reduction calculations.

TABLE 5: Input Parameters

Input Parameter	Name	Description/ Value
LFG _{i,t}	Total quantity of landfill gas sent to the flare	Summed daily from metered data, measured at 70°F and one atmosphere of pressure
PR _{CH₄,t}	Methane content	Averaged daily from continuously recorded data
DE _i	Default destruction efficiency	96%
OX	Oxidation Factor	10%
DF	Discount Factor	0%
Flare Temperature Cut-off	Metered data below corresponding temperature cut-off are excluded from calculations.	500°F
EF _{FF}	Propane emission factor	5.74 kg CO ₂ /gallon

Input Parameter	Name	Description/ Value
EF _{FF}	Gasoline emission factor	8.81 kg CO ₂ /gallon
EF _{EL}	Purchased electricity emission factor	931.7 lbs. CO ₂ /MWh
GWP _{CH4}	Global Warming Potential of Methane	25 (IPCC 4 th Assessment Report)

Copies of the raw data used in the calculations, including flow data and methane content data, were compared with the data used in the final calculations and tested for transcription or mathematical errors. A representative sample of raw data sources and calculations over the entire verification period were reviewed. First Environment performed recalculations of emission reductions for the entire reporting period to assess whether they were free of material misstatement. First Environment found the emission reduction calculations to be free of material misstatement.

6.5 *Approved Variance or Deviations*

No variances or deviations were obtained for the Project in this verification period.

7. Verification Conclusion

Based on the evidence collected and the assessments performed, First Environment concludes that the Project's GHG emissions reductions achieved through the collection and combustion of landfill gas for the period June 10, 2018 through June 9, 2019 can be considered with a reasonable level of assurance:

- in conformance with the verification criteria, and
- without material discrepancy.

Verified results show:

June 10, 2018 to December 31, 2018	Total
Baseline Emissions (tCO₂e)	118,847
Project Emissions (tCO₂e)	53
Emissions Reductions (tCO₂e)	118,794

January 1, 2019 to June 9, 2019	Total
Baseline Emissions (tCO₂e)	91,036
Project Emissions (tCO₂e)	43
Emissions Reductions (tCO₂e)	90,993

8. Lead Verifier Signature



Jeff Daley
Environmental Specialist

9. Senior Internal Reviewer Signature



Michael Carim
Senior Associate