



**Verified Carbon
Standard**

BLUE SOURCE SPARTANBURG COUNTY LANDFILL GAS COMBUSTION PROJECT



Blue Source Canada ULC

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CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Eligibility	5
1.4	Project Design	6
1.5	Project Proponent	6
1.6	Other Entities Involved in the Project	7
1.7	Ownership.....	7
1.8	Project Start Date	7
1.9	Project Crediting Period	8
1.10	Project Scale and Estimated GHG Emission Reductions or Removals	8
1.11	Description of the Project Activity	9
1.12	Project Location	11
1.13	Conditions Prior to Project Initiation	11
1.14	Compliance with Laws, Statutes and Other Regulatory Frameworks	11
1.15	Participation under Other GHG Programs	13
1.16	Other Forms of Credit.....	14
1.17	Additional Information Relevant to the Project	14
2	SAFEGUARDS	14
2.1	No Net Harm	15
2.2	Local Stakeholder Consultation	15
2.3	Environmental Impact	15
2.4	Public Comments	15
2.5	AFOLU-Specific Safeguards	15
3	APPLICATION OF METHODOLOGY.....	15
3.1	Title and Reference of Methodology	16
3.2	Applicability of Methodology	16
3.3	Project Boundary	Error! Bookmark not defined.
3.4	Baseline Scenario	20
3.5	Additionality	20

3.6	Methodology Deviations	22
4	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	22
4.1	Baseline Emissions	25
4.2	Project Emissions	33
4.3	Leakage.....	33
4.4	Net GHG Emission Reductions and Removals	35
5	MONITORING	36
5.1	Data and Parameters Available at Validation	37
5.2	Data and Parameters Monitored.....	46
5.3	Monitoring Plan.....	61
	APPENDIX	66

1 PROJECT DETAILS

1.1 Summary Description of the Project

The Project is a landfill gas (LFG) capture and combustion project located at the Wellford Landfill (the “Landfill”). The Landfill consists of six phases designated as Phases I through VI. Phases I through IV include approximately 65 acres of unlined cells and Phase V includes an approximately 35 acre Subtitle D lined landfill. The Landfill is currently operating in Phase VI, Cell 1; a 16 acre lined Subtitle D landfill. Landfill gas is actively captured at the solid waste disposal site (SWDS) and combusted in the on-site flare or off-site for heat or electricity generation. Under this project condition, methane is converted to carbon dioxide (CO₂) through combustion which results in measurable emission reductions.

The Blue Source Spartanburg County Landfill Gas Combustion Project (“the Project”) consists of three stages, all implemented at the Wellford Landfill. Stage one (1) of the Project involves the installation of an active gas collection system consisting of 103 wells and associated piping in Phases I through V (with planned future expansion into Phase VI) of the Landfill. During this stage, the gas captured from this system is flared, thereby converting methane to biogenic CO₂. Note that the piping systems and headers for the project LFG collection and control system (LFGCCS) were constructed separately from the pre-project. Since the project’s initial crediting period, the physical piping that allows the pre-project gas stream to mix with the project gas stream has been removed; therefore, accounting for pre-project gas in the emission reduction calculations is impossible.

Stage two (2) of the Project involves the implementation of a beneficial use project, whereby captured biogas will be transported by pipeline approximately 6.5 miles to the Milliken Dewey Chemical Plant (the “Milliken Facility”) for use in its natural gas equipment (i.e. two steam boilers and one hot oil boiler). As part of this stage, gas will be compressed, treated and transported to the Milliken Facility for direct use. The date of commissioning of this phase was June 23, 2011.

Stage three (3) of the Project involves the implementation of a LFG to electricity project, whereby LFG will be sold to Lockhart Power (“Lockhart”) for use in electricity generation. Lockhart will use the captured biogas to generate up to 1.6 MW of electricity using a Caterpillar 3520 engine-generator unit. The unit first ran offline (burning LFG but not generating electricity) on May 3rd 2011. The meter was first turned on on May 12, 2011, but the unit did not run consistently until June 1, 2011. Note that no emission reductions are claimed for offsetting grid connected electricity generation.

Stage one (1) of the Project is owned and operated by Spartanburg County (the “County”). Stage two (2) of the Project is owned and operated by both the County and Milliken Company (“Milliken”). In particular, the County owns the first and second stage LFG treatment system,

the pipeline used to transport gas to the Milliken Facility and associated metering equipment. Lockhart has a contract with the County to maintain and operate control of the gas through to the plant, this includes flow meter equipment, the single gas analyzer, and flow control of pipeline activities. Milliken owns and operates the boilers and all equipment used to produce energy at the Milliken Facility for the facility's use. Stage three (3) of the Project is owned and operated by Lockhart Power. Lockhart owns and operates the energy facility and all equipment used to generate electricity at the site and will operate the first and second stage LFG treatment systems. The County owns and operates the pipeline used to transport gas to Lockhart.

The installation of an active LFG collection system in 2010 was completely voluntary. The objective of this expansion was to increase gas flow and demonstrate the feasibility of developing a future beneficial use project with Milliken. The system was not installed in response to odor complaints or gas migration issues.

No permits were required for the LFG collection system expansion. A South Carolina Department of Health and Environmental Control (SCDHEC) Construction Permit (Permit No. 2060-0489-CA) was obtained for the installation of a generator at the Lockhart facility. A permit will also be required to operate the engine and must be requested within 12 months of initial startup. The application was submitted on January 31st, 2012.

A permit is not required to use LFG at the Milliken Facility. Instead a letter was submitted to the SCDHEC in February 2011 requesting permission to use LFG in the boilers and oil heater at the facility. This change was incorporated into the facility's Title V permit. The existing version (Permit No. TV-2060-0300), was issued on January 2, 2015 with an effective date of April 1, 2015. A renewal application has been submitted to SCDHEC in September 2019 to meet the renewal due date of September 30, 2019. The SCDHEC has confirmed that the Project can continue to operate under the Title V permit issued in 2015 while the renewal application is being reviewed.

The Project was previously validated in accordance with the requirements of the Voluntary Carbon Standard (v.3.2) in March 2012. The estimated total emission reductions for the 10-year renewal period are 1,351,412 tCO₂e. This amounts to an estimated annual emission reductions of 135,141 tCO₂e.

1.2 Sectoral Scope and Project Type

Project Category: Sectoral Scope 13 (Waste Handling and Disposal) and Sectoral Scope 1 (Energy)

Project Type: Individual project

1.3 Project Eligibility

The Project is being quantified using the approved CDM methodology: ACM0001 Flaring or Use of Landfill Gas (version 19.0) (the “Methodology”).

The Project is eligible under the VCS Program as it meets all requirements set out in Section 3.1 of the VCS Standard (version 4.1, April 2021) (the “Standard”). See Appendix A for a list of requirements and justifications as to how the Project meets each requirement.

1.4 Project Design

The Project has been designed to include a single installation of an activity.

Eligibility Criteria

This section is not applicable as this is not a grouped project.

1.5 Project Proponent

Lockhart Power, Milliken & Company and Spartanburg County DPW are identified as the main project proponents and will be denoted as such in the remainder of this report.

Organization name	Lockhart Power
Contact person	Bryan Stone, P.E.
Title	Chief Operating Officer
Address	P.O. Box 10; 420 River St, Lockhart, SC 29364
Telephone	864-545-2575
Email	bstone@lockhartpower.com

Organization name	Milliken & Company
Contact person	Cassidy Carlile
Title	Director of Corporate Environmental
Address	P.O. Box 1926; Spartanburg, SC 29304
Telephone	864.503.1569
Email	Cassidy.Carlile@milliken.com

Organization name	Spartanburg County DPW
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Contact person	Travis Brown
Title	Solid Waste Department Head, Wellford Landfill
Address	P.O. Box 5666; Spartanburg, SC 29304
Telephone	864-949-1658
Email	twbrown@spartanburgcounty.org

1.6 Other Entities Involved in the Project

Blue Source LLC (“Blue Source”) has been contracted by Lockhart Power to create and monetize the greenhouse gas (GHG) emission reduction credits generated by the Project.

Organization name	Blue Source
Role in the project	Project Developer
Contact person	Tooraj Moulai
Title	Director of Engineering & Technical Services
Address	Suite 1605, 840 7 th Avenue SW Calgary, Alberta, T2P 3G2
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1.7 Ownership

The Landfill is owned and operated by Spartanburg County. The gas collection system, gas treatment system and flare are also owned by the County.

Lockhart has contracted with the County to maintain operational control of the gas through to the plant, including meters and analyzers, control of pipeline activities as well as the flow meter. As outlined in Section H of the sales agreement between Lockhart Power and Spartanburg County, dated Dec 29, 2009, Lockhart is entitled to develop the VERs associated with offsetting fossil fuel-based energy generation at the Milliken facility. Revenues are then shared with the County.

Milliken receives gas transported by the pipeline. Milliken owns and operates the boilers and all equipment used to produce energy at the Milliken Facility for the facility’s use.

1.8 Project Start Date

The project start date is April 29, 2010 when these wells were connected and began extracting and combusting landfill gas (LFG). The activity start date is June 3, 2005 when the Landfill began collecting and destructing landfill gas from the project collection system in Stage 1.

1.9 Project Crediting Period

June 15, 2020 – June 14, 2030

The Project's first crediting period was June 15, 2010 – June 14, 2020. This PDD is for the first 10-year renewal period of the Project.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The scale of the project and the estimated annual GHG emission reductions or removals for the project crediting period are illustrated as follows.

Project Scale	
Project	X
Large project	

Table 1: Estimated GHG emission reductions for the Project

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2020	73,649
2021	134,501
2022	134,684
2023	134,858
2024	135,024
2025	135,181
2026	135,331
2027	135,474
2028	135,609
2029	135,738
2030	61,362

Total estimated ERs	1,351,412
Total number of crediting years	10
Average annual ERs	135,141

1.11 Description of the Project Activity

Under Stage one (1) of the Project, the collection system is designed to collect from new wells throughout Phases I through V of the Landfill and is routed on a separate collection system. This prevents the gas collected in the new system from mixing with LFG from the old wells until it is measured for flow rate. The system consists of the following infrastructure and equipment:

- Vertical wells to extract gas from the Landfill;
- Header and lateral piping to collect gas and tie the project system into the existing collection system piping for transportation to the flare;
- Pre-existing blower / flare station; and
- Monitoring equipment including flow meters, gas analyzer, data acquisition unit, etc. to monitor the quantity of LFG collected from the project collection system.

Additional infrastructure required for Stages two (2) and three (3) of the Project includes:

- Piping and controls required to transport LFG from the gas collection system to the gas treatment system;
- First stage gas compression and treatment system to compress, clean up and dehydrate the gas to medium MMBTU gas (MMG) for transportation to the Milliken and Lockhart Facilities. This system will include an inlet moisture separator, two multistage centrifugal blowers, a gas/air aftercooler, a discharge moisture separator, a recirculation valve and associated piping, fittings, valves and other instrumentation;
- Second stage gas compression and treatment system to further treat LFG to the specifications required for use at the Milliken Plant. This system will include two capacity sliding vane compressors, a gas/air aftercooler, a gas/gas economizer, a gas/water heat exchanger, a coalescing filter, a recirculation valve and piping, a glycol/water chiller package and associated piping, fittings, valves and other instrumentation;
- Interconnecting piping, valves and fittings between the first and second stage treatment systems and between the second stage treatment system and the chiller system;
- Oil/water separator;
- SCADA equipment to record the quality and quantity of LFG collected from the project system on a (time period) basis Daily aggregation of data was conducted before SCADA was

implemented. SCADA became operational on June 2, 2011 which records data every second; and

- Other miscellaneous ancillary equipment.

Stage two (2) of the Project will consist of the following additional components:

- Piping and controls required to transport LFG approximately 6.5 miles to the Milliken Facility;
- Modification of Milliken's two boilers (one Cleaver-Brooks 600 HP fire-tube boiler and one Cleaver-Brooks 250 HP fire-tube boiler) and one oil heater (one Carotek 400 HP hot oil heater) for the use of LFG; and
- Three fans to operate the boilers; and
- Metering station including a methane gas analyzer, gas dew point measurement, local control panel, cellular modem for communication with the SCADA system and a flowmeter to monitor LFG flow to the Milliken Facility.

Stage three (3) of the Project consists of the following additional components:

- Piping and controls required to transport LFG to the Lockhart Facility;
- Caterpillar Model No. G3520C Engine Generator Unit with rated capacity of 1.6 MW;
- A radiator to provide cooling for the engine;
- A silencer on the engine exhaust;
- Associated electrical equipment including switchgear, motor control center, transformers and a main breaker; and
- Flowmeter to monitor LFG flow to the Lockhart Facility and associated energy generation from LFG at the Facility.

The Project achieves emission reductions through the collection and flaring of LFG, thereby converting methane into CO₂ and reducing the quantity of methane released to the atmosphere from the Landfill. Note that any CO₂ in the LFG is biogenic and is therefore not considered as a source of emissions in the Project. In the absence of the Project, the methane captured from the expanded LFG system would have been vented to the atmosphere, as per pre-existing operating conditions.

Emission reductions are also achieved in Stage two (2) of the Project through the collection and utilization of methane for thermal energy generation. These emission reductions are claimed for the displacement of fossil fuel based thermal energy generation. VERs are not claimed for the displacement of fossil fuel based electricity generation in Stage three (3). CO₂ emitted as a result of LFG combustion is considered biogenic and is not considered as a source of emissions.

The average lifespan of the installed wellheads, piping, flare, blowers, engines, and other industrial equipment is longer than the crediting period of the Project. In particular, the landfill gas flare has an expected life of 30+ years; the Caterpillar engine generator has an estimated lifespan of 20 years; whereas, the Milliken boilers have an expected lifespan of 25+ years. The monitoring equipment is calibrated regularly in compliance with the manufacturer's recommendations and will be repaired or replaced upon end of life.

1.12 Project Location

The Landfill is a municipal solid waste landfill located on 390 acres in Spartanburg County, South Carolina. It is bordered by Little Mountain Road, Montgomery Road and the North Tyger River.

The address of the facility is:

595 Little Mountain Road

Wellford, South Carolina 29385

The latitude and longitude of the Landfill are as follows:

- Latitude: 35.001193
- Longitude: -82.13042

1.13 Conditions Prior to Project Initiation

In September 1998, the County voluntarily installed an active perimeter gas collection system consisting of 24 extraction wells in Phases I through IV of the Landfill and a 1,000 cfm flare to destruct the gas. This system was installed to mitigate gas migration. From 2002 to 2004 four additional wells were installed. This was prior to the County's 2010 installation, collection, and destruction of LFG from the Project collection system.

Fifteen passive vents were also installed in Phase V of the Landfill to relieve pressure within the Landfill. Gas routed through these vents was allowed to vent to the atmosphere, it was never destroyed.

A summary of the number and location of pre-existing wells is provided below.

Table 2: Pre-Project Well Locations

Phase	Number of Pre Project Wells
I	10
II	3

III	13
IV	0
V	15

The pre-project gas collection and destruction system consists of the following:

- Vertical extraction wells to extract gas from the Landfill;
- LFG header piping to collect gas for transportation to the flare;
- Header valves for LFG flow control;
- A 25 Hp Hoffman Series 383 (Model #38303B) centrifugal blower to create a pressure differential and extract LFG from the wells; and
- A 1,000 cfm capacity LFG Specialties Model PCF82418 open flare (Serial No. 1529) with an eight-inch tip to destruct LFG.

Installation of the pre-project LFG management system required an air quality permit (Permit No. 2060-0300) for operation of the flare. No other water quality or explosive gas permits were required.

The pre-project collection system installed in Phases I through IV of the Landfill is not within the scope of the Project. In the previous crediting period, LFG was collected from this pre-project system and project system gas flow was metered independently. During this crediting period, pre-project LFG no longer comingles with LFG from Project wells.

Odors and Gas Migration

In the late 1990's the County had gas migration issues, and a pre-project LFG management system was installed to address these issues. In March 1998, the County was required to submit a plan to mitigate gas migration and chose to enhance an existing passive system consisting of 28 vent wells into an active collection system. Subsequently, the pre-existing passive wells were tied into a central header and a blower/flare system was installed to destruct the gas.

The County was not required to install an active collection system, and could have instead addressed the issue through passive venting, trenching, etc. There have been no issues with gas migration or odors since the pre-project system was installed.

As discussed, the pre-project system is not included within the scope of the Project.

The pre-project activity consists of the disposal and anaerobic decomposition of waste at the landfill. This activity results in the generation and release of methane emissions to the atmosphere. The project activity of capturing and destructing methane results in the reduction of

these GHG emissions. The project activity does not result in the creation of GHG emissions for the purpose of their subsequent destruction.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Under the 1990 Clean Air Act Amendments, landfills with a permitted capacity of greater than 2.5 million megagrams and 2.5 million cubic meters are subject to the New Source Performance Standards (NSPS), as specified in 40 CFR Part 60 Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills, and are required to install and operate a gas collection and control system if annual non-methane organic compound (NMOC) emissions exceed 50 Megagrams. The objective of these federal landfill emissions regulations is to reduce fugitive emissions of (NMOC) and hazardous air pollutants (HAPs) from landfills.

The Landfill has a design capacity of 3.44 million Megagrams and must comply with 40 CFR Part 60 Subpart WWW and have a Title V Operating Permit. Correspondingly, the County applied for a Title V Operating Permit in July 2008. The permit (Permit No. TV-2060-0300) was issued by the SCDHEC on October 5, 2009, effective January 1, 2010.

In accordance with 40 CFR Part 60.754, the County must submit NMOC emission calculations to the US Environmental Protection Agency (USEPA) every five years. According to the most recent NMOC Emission Rate Report completed in January 2020, the Landfill's NMOC emissions in 2020 are calculated to be 22.3 Mg/year. On August 2016, the USEPA promulgated NSPS XXX for MSW landfills, requiring landfills to install a gas collection system when the NMOC threshold of 34 Mg/year is breached. Because the landfill's NMOC emissions are lower than said threshold, the County is not subject to the collection and control standards of the NSPS and is not required to expand the pre-existing LFG collection system to comply with NSPS XXX requirements.

To ensure regulatory surplus, subsequent Tier II reports will be reassessed to ensure that the Landfill is not required to install a collection system and emission reductions remain surplus to regulatory requirements. If at any time during the Project's crediting period, the Landfill exceeds the NMOC threshold and is required to install a collection system, emission reduction credits will only be claimed until the date when the system is required to be operational.

There are no other applicable state or local regulations requiring the County to collect and destruct LFG at the site and the project activity complies with all local laws and regulations.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The Project has not registered and is not seeking registration for credits in any other GHG program apart from the VCS. Periodic attestation will be supplied to the verifier as needed.

1.15.2 Projects Rejected by Other GHG Programs

The Project has not been rejected under any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The Project does not reduce GHG emissions that are included in any other emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

The Project has not sought or received another form of GHG-related environmental credit. Emissions reductions associated with the production of electricity using renewable natural gas are not quantified under this project. Lockhart Power owns the engines used to generate this electricity and retains all rights to other environmental attributes such as renewable energy certificates generated solely from electricity generation activities.

1.17 Additional Information Relevant to the Project

Leakage Management

The project activity is not known to create any leakage emissions; therefore, no leakage effects are accounted for under this Methodology and no leakage management plan is required.

Commercially Sensitive Information

No commercially sensitive information has been excluded from this PDD.

Sustainable Development

This project is not a part of any nationally stated sustainable development priority and therefore not applicable.

Further Information

In the calculation of baseline emissions, ACM0001 requires that the amount of methane that would have been combusted in the absence of the Project be subtracted from the quantity of methane combusted as a result of the Project Activity. Metering of the quantity of LFG collected from the project system will be conducted to ensure that credits are only claimed for the incremental quantity of methane captured from the project collection system. As such, no baseline deduction is required.

2 SAFEGUARDS

2.1 No Net Harm

There are no potential negative environmental or socio-economic impacts because of the Project.

2.2 Local Stakeholder Consultation

Local stakeholders are encouraged to engage in the Project at any time.

The method used to engage local stakeholders is through the posting of project documents to the public VCS registry where any new changes to the Landfill or project operation are outlined.

Outcomes of local stakeholder consultation will be documented by the project proponent by way of retained email records.

Many channels are open to local stakeholders for on-going communication. Local stakeholder can refer to the project proponent contact information provided in Section 1.5 of this PDD.

No comments or concerns from local stakeholders have been brought forward during this renewal, or during the original 10-year crediting period.

2.3 Environmental Impact

The installation of an LFG gas capture and combustion system is not known to have any negative environmental impacts. The Project reduces greenhouse gases entering the atmosphere and improves local air quality by reducing methane odours from the capture of LFG at the Landfill.

2.4 Public Comments

No comments or concerns from local stakeholders have been brought forward since the Project initiation.

2.5 AFOLU-Specific Safeguards

This section is not applicable as this is a non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The Methodology used for the Project is ACM0001 Large-scale Consolidated Methodology: “Flaring or use of landfill gas” (version 19.0).

The tools applied by the Project are:

TOOL 11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (version 3.0.1)

TOOL 5: “Baseline, project and/or leakage emission from electricity consumption and monitoring of electricity generation” (version 3.0)

TOOL 8: “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 3.0)

TOOL 3: “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (version 3.0).

TOOL 6: “Project emissions from flaring” (version 3.0)

TOOL 9: “Determining the baseline efficiency of thermal or electric energy generation systems.”

3.2 Applicability of Methodology

The applicability criteria for the Project is outlined in Section 2.2 of the Methodology. The Project meets all conditions as described and justified below.

The methodology is applicable under the following conditions:

- (a) Install a new LFG capture system in an existing or new (Greenfield) SWDS where no LFG capture system was or would have been installed prior to the implementation of the project activity; or
- (b) Make an investment into an existing LFG capture system to increase the recovery rate or change the use of the captured LFG, provided that:
 - (i) The captured LFG was vented or flared and not used prior to the implementation of the project activity; and
 - (ii) In the case of an existing active LFG capture system for which the amount of LFG cannot be collected separately from the project system after the implementation of the project activity and its efficiency is not impacted on by the project system: historical data on the amount of LFG capture and flared is available;

Justification: Item (b) is applicable to the Project as the project activity required an investment to expand the existing Pre-Project LFG capture system to increase the recovery and destruction rate of landfill gas that was previously vented and flared. The piping systems and headers for

the project LFG collection and control system (LFGCCS) were constructed separately from the pre-project system.

(c) Flare the LFG and/or use the captured LFG in any (combination) of the following ways:

- (i). Generating electricity;
- (ii). Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace; and/or
- (iii). Supplying the LFG to consumers through a natural gas distribution network;
- (iv). Supplying compressed/liquefied LFG to consumers using trucks;
- (v). Supplying the LFG to consumers through a dedicated pipeline;

Justification: The Project flares the landfill gas and uses captured landfill gas to generate off-site electricity and heat.

(d) Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.

Justification: The Project has no influence on the amount of organic waste that would be recycled in the absence of the project activity. The Landfill is operating under normal conditions with no restrictions on the amount of organic material accepted due to the flaring and electricity generation on-site.

As outlined in Section 3.4, the baseline scenario selection process shows that the most plausible baseline scenario is the continued capture of landfill gas and destruction through flaring as in the Pre-Project phase. This meets applicability criteria 4(a) as outlined in the Methodology.

This Methodology is not applied in conjunction with any other approved methodologies. Further, the Project has not been changed during crediting in order to increase methane generation compared to the situation prior to the implementation of the project activity (i.e.. the Landfill has not increased the amount of organic material accepted for disposal). This satisfies the applicability criteria 5(a) and 5(b) as outlined in the Methodology.

The justification for using each Tool is provided in this document where the function and use of the Tool is described. This satisfies the applicability criteria 6.

3.3 Project Boundary

The Project boundary includes the five areas of the Landfill where LFG is captured and excludes all the LFG captured prior to project condition as described in Section 1.13. The boundary also includes the site of the flare, the boilers that combust LFG for heat in the Milliken Facility, and the engine-generator that combusts LFG for electricity at Lockhart Power. Further, because

electricity is supplied to the Project, the grid-connected power generation source and associated infrastructure is included in the project boundary.

The relevant sources, sinks and reservoirs are outlined in Table 3 below. Sources that were listed in the Methodology but not relevant to the Project have been excluded from the table for clarity.

Table 3: Summary of Sources, Sinks, and Reservoirs

Source		Gas	Included?	Justification/Explanation
Baseline	Emissions from decomposition of waste at the SWDS site	CO ₂	No	CO ₂ emissions from decomposition or organic waste are not accounted for since the CO ₂ is also released under the project activity.
		CH ₄	Yes	The major source of emissions in the baseline.
		N ₂ O	No	N ₂ O emissions are small compared to CH ₄ emissions from SWDS. This is conservative.
	Emissions from electricity generation	CO ₂	No	As detailed in section 1.16.2, baseline emissions from grid electricity generation displaced by project activities are excluded from consideration to allow project proponents to seek alternate forms of environmental credit on these emission reductions.
		CH ₄	No	
		N ₂ O	No	
		Other	No	
	Emissions from heat generation	CO ₂	Yes	CO ₂ emissions are a major emission source if heat generation is included in the project activity
		CH ₄	No	CH ₄ emissions are small compared to CO ₂ emissions from baseline heat generation. This is conservative.
		N ₂ O	No	N ₂ O emissions are small compared to CO ₂ emissions from baseline heat generation. This is conservative.
		Other	No	There are no other emissions released in material amounts from this source.
Project	Emissions from fossil fuel consumption in the project activity	CO ₂	Yes	This is an important emission source.
		CH ₄	No	Excluded for simplification. This emission source is assumed to be very small.
		N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.
		Other	No	There are no other emissions released in material amounts from this source.
	Emissions from electricity consumption	CO ₂	Yes	This is an important emission source.
		CH ₄	No	Excluded for simplification. This emission source is assumed to be very small.

	due to the project activity	N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.
		Other	No	There are no other emissions released in material amounts from this source.
	Emissions from flaring of LFG	CO ₂	No	CO ₂ emissions from the combustion of LFG are considered biogenic in nature.
		CH ₄	Yes	This is an important emission source.
		N ₂ O	No	Emissions are considered negligible.
		Other	No	There are no other emissions released in material amounts from this source.
	Emissions from combustion of LFG in electricity generation engines	CO ₂	No	CO ₂ emissions from the combustion of LFG are considered biogenic in nature
		CH ₄	No	Emissions are considered negligible so long as engine is well maintained and operated under lean burn conditions.
		N ₂ O	No	Emissions are considered negligible.
		Other	No	There are no other emissions released in material amounts from this source.
	Emissions from combustion of LFG in heat generation units	CO ₂	No	CO ₂ emissions from the combustion of LFG are considered biogenic in nature
		CH ₄	No	Emissions are considered negligible so long as engine is well maintained and operated under lean burn conditions.
		N ₂ O	No	Emissions are considered negligible.
		Other	No	There are no other emissions released in material amounts from this source.

A diagram showing the flow of landfill gas and project emissions can be seen in Figure 1.

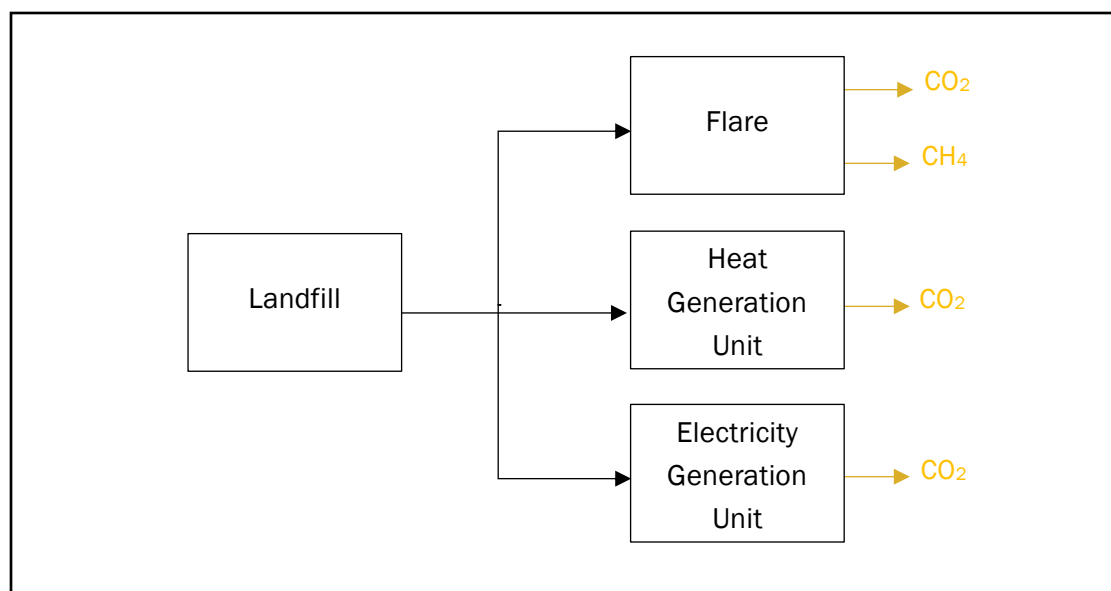


Figure 1: Process Flow Diagram

3.4 Baseline Scenario

This PDD is outlining the Project's 10-year project crediting period renewal. As such, the validity of the original baseline shall be demonstrated as per the Standard Section 3.8.9(2)(b). The CDM Tool 11: "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (version 3.0.1) is used.

The validity of the baseline is assessed using the following sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

The current baseline complies with all relevant mandatory national and sectoral policies which have come into effect since the original project initiation in 2010. Please refer to section 1.14 of this PDD for detailed information on the relevant regulations and information as to how the Landfill meets all stated requirements.

Step 1.2: Assess the impact of circumstances

The baseline scenario was selected in the original validation based on the most feasible option that involved continuation of existing conditions. When compared to the active capture and flaring of landfill gas, this scenario provided the same level of service, but avoids the following capital costs: purchase and installation of an expanded capture system, piping, blowers and a larger flare (to accommodate the increased flow of gas). It also avoids the continuing operating expenses of personnel, electricity and fossil fuel consumption related to the Project.

With respect to the heat and electricity production from LFG, the original validation identified many barriers that justified the Project's additionality. Technical, infrastructure, and institutional

barriers remain valid during the renewal of the crediting period. Without the additional value obtained from the credits, Milliken would instead be using natural gas and other emissions-intensive fuels to generate heat, whereas the electricity being displaced by Lockhart would have been sourced from grid electricity.

The financial additionality of the Project was established at the time of validation in 2010 with offset credits generated in the voluntary market making it feasible to proceed with the Project.

In comparison to the original validation year in 2010, the capital costs associated with the Project (i.e. equipment, labour, engineering, etc.) in 2020 have increased substantially due to inflation. While at the same time the voluntary offset market has not seen the same trend in pricing growth due to excess supply and relatively modest demand. As such, the financial barriers used to determine the baseline scenario in the previous crediting period are still valid and are now actually much higher due to these factors.

Furthermore, the baseline scenario in the previous crediting period was and continues to comply with applicable laws and regulations (see section 1.14) and is not subject to any barriers to implementation and represents the least cost option available to Spartanburg. It is therefore identified as a plausible baseline.

Step 1.3: Assess whether the continuation of use of current baseline equipment or an investment is the most likely scenario for the crediting period for which renewal is requested.

The continuation of the original baseline scenario is the most likely scenario as compared to an investment for the reasons discussed in Step 1.2 above. Furthermore, the only technology installed in the original baseline scenario where an end of technical lifetime is relevant is the existing lower capacity flare. During the Project's initial ten year crediting period, the flare was replaced with a new flare. However, the technical lifetime of this flare continues to be irrelevant to whether an alternate baseline would have been likely. This is because at end of life of the flare, in the absence of the crediting potential generated from the Project, the scenario with the fewest barriers would be to decommission the flare and proceed with venting all quantities that were previously flared. The end of the technical lifetime of electricity and heat generation equipment extend beyond the Project's indicated crediting period.

Regulations do not require the landfill to capture and destroy the gas, and any replacement of the flare would be costly and present increased economic risk without VERs.

Additionally, with the Project system installed, Spartanburg could have taken other measures to address odours and / or surface emissions and provide the same level of service. Spartanburg could also have chosen not to take further action to prevent odour complaints. However, Spartanburg was not required to act, therefore it is also possible that no management activities to reduce odours and gas migration may have been taken. As a result, no incremental costs between the project and baseline are attributed to these activities.

With respect to heat generation at the Milliken facility, as discussed in Step 1.2, Milliken has the capacity to generate heat from natural gas and other fossil fuels.

Step 1.4: Assessment of the validity of the data and parameters

Data and parameters that are determined at the start of the crediting period and do not need to be monitored during the crediting period are listed in Section 5.1 of this PDD (“Data and Parameters Available at Validation”).

These parameters were routinely updated throughout the original 10-year crediting period. For example, where IPCC values were used, such as methane GWP, the value was updated in line with the recommendation from IPCC. Further, electricity grid factors are routinely updated to align with the most accurate information available.

These emission factors, values, and parameters will continue to be updated, as necessary and appropriate, in order to increase the accuracy of the Project. The only parameters that will not be updated regularly are those based on historical information from the Project (i.e. the historic methane content in the baseline scenario).

Conclusion

After evaluating Steps 1.1 – 1.4 from Tool 11, the original baseline scenario is determined to still be plausible and relevant for the 10-year project crediting renewal period. The current baseline remains valid and will not be updated.

Description of Baseline

The baseline scenario is described in Section 1.13.

3.5 Additionality

Per Section 3.8.9(1) of the Standard, a full reassessment of additionality is not required when renewing the project crediting period. An attestation of regulatory surplus will be made available upon request.

3.6 Methodology Deviations

There are eleven methodology deviations that will be used when quantifying the Project:

1. Grid Electricity Emission Factor

Project emissions associated with electricity consumption are calculated in accordance with CDM Tool 5: “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. Following the Tool, a default grid CO₂ emission factor of 1.3 t CO₂/MWh would be applied. However, given the generation mix and emission intensity of electricity generation from the applicable regional grid, this value is not representative of the emissions associated with electricity generation for the Landfill. A deviation from the methodology is used and the emission factor for electricity generation is determined by examining the electricity grid in the region.

The Landfill draws electricity from the SRVC (SERC Virginia/Carolina) region. According to the USEPA’s eGRID database, the emission rate of electricity generation from this grid for 2019

is 675.4 lbs CO₂/MWh. This emission intensity is representative of the actual emissions associated with the generation of electricity used at the site which increases the accuracy of the quantification. This value will be updated in subsequent reporting period to the most recent value available from the eGRID database.

2. Ex Ante Estimate of Emission Reductions

Following the Methodology, project proponents must provide an ex ante estimate of emission reductions by projecting the future GHG emissions of the Landfill.

Instead of estimating ex-ante baseline methane emissions using the CDM “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site”, the USEPA LandGEM Landfill Gas Emissions model is used. This is the accepted standard for developing LFG curves in the United States. The LandGEM model requires the user to input variables to determine the emissions associated with disposal of waste at the solid waste disposal site. For this project, proprietary K and L₀ values are inputted into the LandGEM model. The use of the LandGEM model is generally accepted as the most accurate way to model landfill gas emissions in the United States and only impacts the estimation of ex-ante emission reductions. It does not impact the conservativeness of emission reduction quantification.

3. Efficiency of the Flare

A deviation from the CDM Tool 6: “Project emissions from flaring” (version 3.0) default value is used as this value is not an accurate representation of the flare efficiencies typically achieved in the United States for flares designed in accordance with 40 CFR 60.18. This deviation from the Tool is necessary to reflect the equipment used and destruction efficiencies commonly observed at the flares located in the United States and to increase the accuracy of the emission reduction claim. A flare efficiency value of 98% will be used in project calculations.

The Landfill operates a PEI candlestick flare to destruct landfill gas. The flare’s design limits specify that landfill gas must have a composition of at least 20% methane to maintain a stable flame and a 98% destruction efficiency. The flow range must be between 30 scfm and 1800 scfm. The average monthly methane content and average monthly flow of landfill gas to the flare will be monitored to ensure they are within design limits.

4. Electricity consumed by the Heat Generation Device

The methodology applied for this Project deviates from the CDM Tool 5: “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 3.0). To determine the amount of electricity consumed by the boilers in the project condition, the power rating of the heat generation equipment in MW is multiplied by the time of operation of said equipment. It is assumed that the heat generation equipment is in operation for 24 hours, which is conservative.

5. Net calorific value of methane

The net calorific value of methane from the NIST Chemistry Webbook will be used instead of the one recommended under Parameter Table 4 of ACM0001. The NIST Chemistry Webbook value represents the most accurate and relevant value for the Project.

6. Emissions factor for stationary combustion of natural gas

The emission factor for stationary combustion of natural gas from the USEPA will be used instead of the 2006 IPCC Guidelines on National GHG Inventories as recommended under Parameter table 5 of AMC0001. The USEPA value represents the most accurate and relevant value for the Project.

7. Reference conditions in the project

The Project uses 60F and 1 atm as standard reference conditions, whereas the Methodology uses 32F and 1 atm as the reference conditions. Flowmeters in the Project correct the gas flow data to the project-specific standard reference conditions. Parameters that are a function of temperature and pressure such as density are taken at the project-specific standard reference conditions.

8. Equation to calculate methane emissions that result from LFG combustion in the flare, heat generation device, and electricity generation device

The method to monitor and measure methane emissions related to the LFG that is destroyed in the project will be modified from its original format as written in CDM Tool 8. This modification is permissible under the VCS standard given that the modification will increase the accuracy of the quantification. For conservativeness, if the amount of eligible project LFG is greater than the amount destroyed, then the destroyed amount is used to multiply by the proportion of LFG that is flared, combusted by electricity generation, and combusted by heat generation. Otherwise, the eligible amount of gas is used to multiply by said proportions. This deviation mitigates the overstatement of emission reductions, which is possible if the eligible LFG project is more than the LFG destroyed.

9. Efficiency of Heat Generation Equipment in Project

The quantity of thermal energy produced utilizing LFG which in the absence of the project activity would have been produced from onsite/offsite fossil fuel fired boiler, Given that Milliken uses LFG in three different units, a deviation is applied in monitoring the heat generation equipment efficiency. Because the amount of LFG combusted is not monitored per heat generation equipment, the quantity of thermal energy displaced by LFG-sourced heat is amalgamated.

Moreover, the heat generation efficiency of the Cleaver-Brooks boilers are established by the manufacturer at 82%. The Carotek heater is rarely used, and thus, a deviation is applied to assume that this efficiency is applicable to all equipment used at the Milliken facility.

10. Operation of the Boiler/Air Heater/Heat Generation Equipment

Rather than measuring operation of the boiler/air heater/heat generating equipment in terms of hours of operation (which would not be accurate given Milliken's concurrent use of natural gas in its boilers), to ensure that all LFG sent to the Milliken boilers is burned and not vented to the atmosphere, Milliken has failsafes built into the control system on each boiler gas train that include two automatic valves that shut anytime the landfill gas line is switched off or the boiler goes down. This stops the flow of gas to the boiler. This deviation pertains to measurement of an operational parameter and does not negatively impact conservativeness in any way.

11. Use of Reference density in the project quantification

Because temperature and pressure are determined to be standard reference values, consequently, density used in the project quantification is the density at the reference temperature and pressure. This is a deviation from CDM Tool 8 which requires project proponents to calculate density based on continuous measurement of temperature and pressure.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are calculated with the following equations. No emission reductions are claimed for grid-connected electricity generation that is offset by electricity produced from LFG destructured at Lockhart Power as these environmental attributes are accounted for outside of the VCS system as outlined in Section 1.16.2.

$$BE_y = BE_{CH_4,y} + BE_{HG,y}$$

Where,

BE_y = Baseline emissions in year y (t CO₂e/yr)

$BE_{CH_4,y}$ = Baseline emissions of methane from the SWDS in year y (t CO₂e/yr)

$BE_{HG,y}$ = Baseline emissions associated with heat generation in year y (t CO₂e/yr)

Determination of $BE_{CH_4,y}$

Baseline emissions of methane from the SWDS are determined with the following equation, based on the amount of methane that is captured under the project activity and the amount that would have been captured and destroyed in the baseline. In addition, the effect of methane oxidation that is present in the baseline and absent in the project is considered.

$$BE_{CH_4,y} = \left((1 - OX_{top\ layer}) * F_{CH_4,PJ,y} - F_{CH_4,BL,y} \right) * GWP_{CH_4}$$

Where,

$BE_{CH_4,y}$ = Baseline emissions from the SDWS in year y (t CO₂e/yr)

$OX_{top\ layer}$ = Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)

$F_{CH_4,PJ,y}$ = Amount of methane in the LFG which is flared, used to generate heat, and/or used to generate electricity in the project activity in year y (t CH₄/yr)

$F_{CH_4,BL,y}$ = Amount of methane in the LFG that would have been flared in the baseline year y (t CH₄/yr)

GWP_{CH_4} = Global warming potential of methane (t CO₂e / t CH₄)

Ex Ante Estimation of $F_{CH_4,PJ,y}$

Per the Methodology, it is necessary to provide an ex ante estimate of emission reductions, and methane generation by projecting the future GHG emissions of the landfill. These values are for information only and do not factor into the calculations of baseline or project emissions ex post. They are determined using equation 5 in the Methodology:

$$F_{CH_4,PJ,y} = \eta_{PJ} \times BE_{CH_4,SWDS,y} / GWP_{CH_4}$$

$F_{CH_4,PJ,y}$ = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH₄/yr)

$BE_{CH_4,SWDS,y}$ = Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (t CO₂e/yr)

η_{PJ} = Efficiency of the LFG capture system that will be installed in the project activity (%)

GWP_{CH_4} = Global warming potential of CH₄ (t CO₂e / t CH₄)

Instead of estimating baseline methane emissions using the CDM Tool: "Emissions from solid waste disposal site", the US EPA LandGEM Landfill Gas Emissions model is used as described in Section 3.6(2). This is an accepted standard for developing landfill gas generation curves in the United States.

The LandGEM model requires the following inputs to determine the emissions associated with disposal of waste at the Landfill:

$$BE_{CH_4,SWDS,y} = f(W_y, F, k, L_0)$$

Where,

$BE_{CH_4,SWDS}$ = Modelled methane emissions generated during the year, y, from waste disposal at the Landfill during the time from the start of the project activity to the end of the year, y (t CO₂e)

W_y = Amount of waste disposed in the Landfill in each year from the year the Landfill began accepting waste to present; historic volumes (tonnes)

F	= Fraction of methane in the landfill gas
k	= Decay constant
L ₀	= Methane potential generation capacity (m ³ /Mg)

The LandGEM model (version 3.02) was used to complete this modelling. The resulting estimated methane and LFG emissions that are used in estimating the baseline, project, and emissions reductions that occur in the Project's 10-year crediting renewal period.

Ex Post Determination of $F_{CH_4,PJ,y}$

$F_{CH_4,PJ,y}$ is the sum of quantities of methane flare and used to generate electricity during the reporting period, as follows:

$$F_{CH_4,PJ,y} = F_{CH_4,flared,y} + F_{CH_4,HG,y} + F_{CH_4,EL,y}$$

Where,

$F_{CH_4,PJ,y}$ = Amount of methane in the LFG which is flared, used to generate heat, and/or used to generate electricity in the project activity in year y (t CH₄/yr)

$F_{CH_4,flared,y}$ = Amount of methane in the LFG which is destroyed by flaring in year y (t CH₄/yr)

$F_{CH_4,HG,y}$ = Amount of methane in the LFG which is destroyed for heat generation in year y (t CH₄/yr)

$F_{CH_4,EL,y}$ = Amount of methane in the LFG which is destroyed for electricity generation in year y (t CH₄/yr)

Determination of $F_{CH_4,flared,y}$

$F_{CH_4,flared,y}$ is determined as the difference between the amount of methane supplied to the flare and any methane emissions from the flare as follows:

$$F_{CH_4,flared,y} = F_{CH_4,sent_flare,y} - \frac{PE_{flare,y}}{GWP_{CH_4}}$$

Where,

$F_{CH_4,flared,y}$ = Amount of methane in the LFG which is destroyed by flaring in year y (t CH₄/yr)

$F_{CH_4,sent_flare,y}$ = Amount of methane in the LFG which is sent to the flare in year y (t CH₄/yr)

$PE_{flare,y}$ = Project emissions from flaring of the residual gas stream in year y (t CO₂e/yr)

GWP_{CH_4} = Global warming potential of CH₄ (t CO₂e/t CH₄)

Determination of $F_{CH_4, \text{sent to flare}, y}$

The Project meters the volume of LFG sent to the flare and the composition of this gas on a wet basis. As such, $F_{CH_4, \text{sent to flare}, y}$ is determined using option C in the CDM Tool 8: “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”. Option C includes instructions for determining the volume of greenhouse gas sent to the flare under standard temperature and pressure (STP) conditions (60F, 1atm). As the meters automatically record data under STP conditions, methane density can be considered a reference value and conversion of volumetric flow rate is not necessary. Equation 9 is therefore used to calculate the quantity of methane sent to the flare, while equations 10 and 11 are not used.

$$F_{CH_4, \text{sent flare}, y} = V_{\text{flare}} * v_{CH_4} * \rho_{CH_4}$$

Where,

$F_{CH_4, \text{sent flare}, y}$ = Amount of methane in the LFG which is sent to the flare in year y (t CH₄/yr)

V_{flare} = Volume of landfill gas sent to flare, calculated using the proportion of landfill gas flared as shown in **Determination of V_{flare} , V_{Heat} , and $V_{\text{Electricity}}$** (m³)

v_{CH_4} = Average methane fraction of the LFG (m³ CH₄ / m³ LFG)

ρ_{CH_4} = Density of methane at 60F and 1atm (t CH₄ / m³ CH₄)

Determination of $PE_{\text{flare}, y}$

$PE_{\text{flare}, y}$ is determined directly by using the CDM Tool 6: “Project emissions from flaring” (version 3.0). The flare efficiency that will be applied is 98% as discussed in Section 3.6(3), except in cases when the flare thermocouples detect a flare temperature outside of manufacturer’s recommended settings. In these cases, a flare efficiency of 0% will be used as per section 6.2 of CDM Tool 6. The landfill gas composition is continuously measured at the facility. Therefore, equation 15 from the Tool is used:

$$PE_{\text{flare}, y} = \sum (F_{CH_4, \text{sent flare}, y} * (1 - \eta_{\text{flare}})) * GWP_{CH_4}$$

Where,

$PE_{\text{flare}, y}$ = Project emissions from flaring of the residual gas stream in year y (tCO_{2e}/yr)

$F_{CH_4, \text{sent to flare}, y}$ = Amount of methane in the LFG which is sent to the flare in year y, (t CH₄/yr)

η_{flare} = Efficiency of the flare (%)

GWP_{CH_4} = Global warming potential of methane (tCO_{2e}/tCH₄)

Determination of $F_{CH_4, HG, y}$

The Project meters the volume of LFG sent to Milliken and the composition of this gas. As such, $F_{CH_4,HG,y}$ is determined using option C in the CDM Tool 8. Option C includes instructions for determining the volume of greenhouse gas sent to the heat generation device under STP conditions. As the meters automatically record data under STP conditions, methane density can be considered a reference value and conversion of volumetric flow rate is not necessary. Equation 9 is therefore used to calculate the quantity of methane sent to the flare, while equations 10 and 11 are not used.

$$F_{CH_4,HG,y} = V_{Heat} * v_{CH_4} * \rho_{CH_4}$$

Where,

$F_{CH_4,HG,y}$ = Amount of methane in the LFG which is destroyed for heat generation in year y (t CH₄/yr)

V_{Heat} = Volume of landfill gas sent to heat generation unit, calculated using the proportion of landfill gas destroyed by heat generation as shown in **Determination of V_{flare} , V_{Heat} , and $V_{Electricity}$** (m³)

v_{CH_4} = Average methane fraction of the LFG (m³ CH₄ / m³ LFG)

ρ_{CH_4} = Density of methane (t CH₄ / m³ CH₄)

Determination of $F_{CH_4,EL,y}$

The Project meters the volume of LFG sent to the Lockhart Power and the composition of this gas. As such, $F_{CH_4,sent\ to\ flare,y}$ is determined using option C in the CDM Tool 8. Option C includes instructions for determining the volume of greenhouse gas sent to the flare under STP conditions. As the meters automatically record data under STP conditions, methane density can be considered a reference value and conversion of volumetric flow rate is not necessary. Equation 9 is therefore used to calculate the quantity of methane sent to the flare, while equations 10 and 11 are not used.

$$F_{CH_4,EL,y} = V_{Electricity} * v_{CH_4} * \rho_{CH_4}$$

Where,

$F_{CH_4,EL,y}$ = Amount of methane in the LFG which is destroyed by electricity generation in year y (t CH₄/yr)

$V_{Electricity}$ = Volume of landfill gas sent to power generation unit, calculated using the proportion of landfill gas destroyed by power generation as shown in **Determination of V_{flare} , V_{Heat} , and $V_{Electricity}$** (m³)

v_{CH_4} = Average methane fraction of the LFG (m³ CH₄ / m³ LFG)

ρ_{CH_4} = Density of methane (t CH₄ / m³ CH₄)

Determination of V_{flare} , V_{Heat} , and $V_{Electricity}$

The following equations demonstrate how the volume of landfill gas sent to the different destruction devices will be monitored.

For conservativeness, if the amount of eligible project LFG is greater than the amount destroyed, then the destroyed amount is used to multiply by the proportion of LFG that is flared, combusted by electricity generation, and combusted by heat generation. Otherwise, the eligible amount of gas is used to multiply by said proportions. The proportion of methane collected by the project system and flared, combusted at the Lockhart Facility, and combusted at the Milliken Facility will be calculated as follows:

$$V_{flare} = V_{Project,total} * Proportion_{flare}$$

$$V_{Heat} = V_{Project,total} * Proportion_{Heat}$$

$$V_{Electricity} = V_{Project,total} * Proportion_{Electricity}$$

Where,

$V_{project, total}$ = lesser of eligible project LFG and destroyed amount of LFG volumes (m^3)

And

$$Proportion_{flare} = \frac{V_{Flare,P} * v_{CH4,Flare}}{V_{Flare,P} * v_{CH4,Flare} + V_{Heat,P} * v_{CH4,Heat} + V_{Electricity,P} * v_{CH4,Elec}}$$

$$Proportion_{Heat} = \frac{V_{Heat,P} * v_{CH4,Heat}}{V_{Flare,P} * v_{CH4,Flare} + V_{Heat,P} * v_{CH4,Heat} + V_{Electricity,P} * v_{CH4,Elec}}$$

$$Proportion_{Electricity} = \frac{V_{Electricity,P} * v_{CH4,Elec}}{V_{Flare,P} * v_{CH4,Flare} + V_{Heat,P} * v_{CH4,Heat} + V_{Electricity,P} * v_{CH4,Elec}}$$

Where,

$Proportion_{flare}$ = Proportion of methane combusted by the flare over total methane combusted

$Proportion_{Heat}$ = Proportion of methane combusted by heat generation over total methane combusted

$Proportion_{Electricity}$ = Proportion of methane combusted by electricity generation over total methane combusted

$V_{Flare,P}$ = Volume of LFG sent to the flare (m^3)

$V_{Heat,P}$ = Volume of LFG sent to the heat generation unit (m^3)

$V_{Electricity,P}$ = Volume of LFG sent to the electricity generation unit (m^3)

v_{CH4} = Average methane fraction of the LFG ($m^3 CH_4 / m^3 LFG$)

Determination of $F_{CH_4,BL,y}$

In order to calculate the $BE_{CH_4,y}$ the amount of methane that would have been flared in the absence of the project activity, $F_{CH_4,BL,y}$, must be deducted. LFG from new extraction wells does not mix with LFG from the old wells. The LFG recovered from the new wells is measured for flow rate and methane concentration separately from pre-project wells. Therefore, no discounting is necessary.

$$F_{CH_4,BL,y} = 0$$

Where,

$F_{CH_4,BL,y}$ = Amount of methane in the LFG that would have been flared in the baseline year y (t CH₄/yr)

Determination of $BE_{HG,y}$

The baseline emissions associated with heat generation is quantified by calculating fossil fuel emissions that would have been emitted in the absence of the Project. For the Project's baseline condition, natural gas is assumed to be the fossil fuel that is being displaced.

$$BE_{HG,y} = NCV_{CH_4} * R_{efficiency} * F_{CH_4,HG,dest,j,y} * EF_{CO_2,BL,HG,NG,y}$$

Where,

$BE_{HG,y}$ = Baseline emissions associated with heat generation in year y (t CO₂/yr)

NCV_{CH_4} = Net calorific value of methane at reference conditions (TJ/t CH₄)

$R_{efficiency}$ = Ratio of the project and baseline efficiency of heat equipment (dimensionless)

$F_{CH_4,HG,dest,j,y}$ = Amount of methane in the LFG which is destroyed for heat generation by the heat generation equipment in year y (t CH₄/yr)

$EF_{CO_2,BL,HG,NG}$ = CO₂ emissions factor of the natural gas that would have been combusted in the heat generation equipment in the baseline. (tCO₂/TJ)

Determination of $R_{efficiency,y}$

Equation 18 from the Methodology is used to determine the ratio of the project and baseline efficiency of the heat generation equipment

$$R_{efficiency,y} = \min \left\{ 1, \frac{\eta_{HG,PJ,y}}{\eta_{HG,BL,y}} \right\}$$

Where,

$R_{efficiency,y}$ = Ratio of the project and baseline efficiency of heat equipment in year y (dimensionless)

$\eta_{HG,PJ,y}$ = Efficiency of the heat generation equipment used in the project activity in year y (dimensionless)

$\eta_{HG,BL,y}$ = Efficiency of the heat generation equipment used in the baseline in year y (dimensionless)

Determination of $F_{CH_4,HG,dest,j,y}$

Equation 19 from the Methodology is used to determine the amount of methane in the LFG destroyed for heat generation by the heat generation equipment.

$$F_{CH_4,HG,dest,j,y} = fd_{CH_4,HG,j,default} * F_{CH_4,HG,j,y}$$

Where,

$F_{CH_4,HG,dest,j,y}$ = Amount of methane in the LFG which is destroyed for heat generation by the heat generation equipment (t CH₄/yr)

$fd_{CH_4,HG,j,default}$ = Default value for the fraction of methane destroyed when used for heat generation equipment type j

$F_{CH_4,HG,j,y}$ = Amount of methane in the LFG which is used for heat generation equipment (t CH₄/yr)

Data Substitution Procedures

In cases where data is unavailable for a limited period of time, data substitution procedures will be used to quantify emission reductions for that time period. Data substitution will follow the principle of conservativeness, and the methodology outlined in the appendix of CDM tool 8. This methodology is outlined below:

Table 4: Data Substitution Procedures

Duration of Missing Data	Data Substitution Procedure
Less than six hours	Use the weighted average of the four-hour period immediately before and after the data outage
Six to 24 hours	Use the upper/lower bound of a 95% confidence interval of the data for a time period spanning the 24 hours prior to and 24 hours following the data outage, whichever is more conservative in estimating emission reductions.

One to seven days	Use the upper/lower bound of a 95% confidence interval of the data for a time period spanning the 72 hours prior to and 72 hours following the data outage, whichever is more conservative in estimating emission reductions.
Greater than seven days	No data may be substituted

4.2 Project Emissions

Project emissions come from electricity and fossil fuels consumed in the project activity. These emissions are calculated as follows:

$$PE_y = PE_{EC,y} + PE_{FC,y}$$

Where,

PE_y = Project emissions in year y (t CO₂e / yr)

$PE_{EC,y}$ = Emissions from consumption of electricity due to the project activity in year y (t CO₂e/yr)

$PE_{FC,y}$ = Emissions from consumption of fossil fuels due to the project activity in year y (t CO₂e/yr)

Determination of PE_{FC}

Propane is used in the project activity. Therefore, the equation for $PE_{FC,y}$ is:

$$PE_{FC,y} = PE_{propane}$$

Project emissions from consumption of fossil fuel in the project activity are calculated using equation 1 in the CDM Tool 3: "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" (version 3.0). It is conservative to assume that the propane purchased will be combusted during the reporting period and thus, emissions due to propane are only allocated at the point of sale as opposed to continuous measuring of propane usage during the reporting period. With this considered, the following equations are used:

$$PE_{propane} = FC_{propane} * COEF_{propane}$$

Where,

$PE_{propane}$ = CO₂ emissions from propane combustion in year y (t CO₂/yr)

$FC_{propane}$ = Volume of propane purchased in the project activity in year y (gal)

$COEF_{propane}$ = CO₂ emission coefficient for propane (t CO₂ / gal)

The CO₂ emission coefficients are calculated based on net calorific value and CO₂ emission factor of the fuel type. This is Option B in Tool 3.

$$COEF_{propane} = NCV_{propane} * EF_{CO2,propane}$$

Where,

NCV_{propane} = Net calorific value of propane (MMBtu / gal)

EF_{CO2,propane} = Emission factor of propane (tCO₂ / MMBtu)

The Methodology section 5.5(66)(b) states “If in the baseline a proportion of LFG is captured and flared ($F_{CH4,BL,y} > 0$), then the fossil fuels consumption used in the calculation should refer to the net of that consumed in the baseline.”

There is no historical data for fuel consumed in the baseline. Therefore, it will be assumed the net consumption is only what is consumed in the project activity. This will increase the project emissions which is a conservative approach.

Determination of PE_{EC}

Project emissions from consumption of electricity by the project activity are calculated using equation 1 (the generic approach) from CDM Tool 5: “Baseline, project and/or leakage emission from electricity consumption and monitoring of electricity generation” (version 3.0).

$$PE_{EC,y} = EC_{PJ,y} * EF_{EF} * (1 + TDL)$$

Where,

EC_{PJ,y} = Quantity of electricity consumed by the Project in year y (MWh/yr)

EF_{EF} = Emission factor for the grid that supplies the electricity (t CO₂e/MWh)

TDL = Average transmission and distribution losses for providing electricity to the source (%)

The parameter EF_{EF} is quantified using the methodology described in Methodology Deviation 1, found in section 3.6. This emission factor will be regularly updated to reflect the most recent value for the region published in the USEPA's eGrid database.

The Methodology section 5.5(65)(b) states “If in the baseline a proportion of LFG is destroyed, then the electricity consumption in the tool should refer to the net quantity of electricity consumption (i.e. the increase due to the project activity).”

There was no historical data for electricity consumed in the baseline. Therefore, it will be assumed the net consumption is only what is consumed in the project activity. This will increase the project emissions which is a conservative approach.

Determination of $EC_{PJ,y}$

$EC_{PJ,y}$ is determined by aggregating the amount of electricity used at the flare skid, the treatment skid, and Milliken facility as a result of operating the project to support LFG combustion.

$$EC_{PJ,y} = Elec_{flare} + Elec_{Heat} + Elec_{treatment}$$

Where,

$Elec_{Flare}$ = Amount of electricity consumed by the flare skid (MWh)

$Elec_{Heat}$ = Amount of electricity consumed by the heat generation device (MWh)

$Elec_{treatment}$ = Amount of electricity consumed by the treatment skid (MWh)

$Elec_{Flare}$ and $Elec_{treatment}$ are directly measured whereas the electricity consumed by the boilers to generate heat is calculated as follows:

$$Elec_{Heat} = L_{Milliken} * t_{Milliken}$$

Where,

$L_{Milliken}$ = Load rating of the equipment used to operate the boilers/heater at the Milliken facility (MW)

$t_{Milliken}$ = Hours of operation of the equipment used to operate the boilers/heater at the Milliken facility. It is conservative to assume that the equipment is in operation for 24 hours per day during the entire month.

Load ratings are calculated based on the nameplate horsepower for each piece of equipment. Electricity consumption is calculated based on full load (minus any outages) for conservativeness as follows:

$$L_{Milliken} = Rating (hp) * 0.746 * 0.001$$

Where,

0.746 = Conversion factor from kW to hp

0.001 = Conversion factor from kW to MW

4.3 Leakage

The project activity is not known to create any leakage emissions.

4.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂e/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

Sections 4.1 - 4.3 outline the calculations and equations necessary to quantify baseline, project and leakage emissions in more detail. The table below provides a summary of the estimated emission reductions generated by the project activity for the 10-year renewal period June 15, 2020 – June 14, 2030

Table 5: Estimated baseline, project and leakage emissions for the Project

Year	Estimated Baseline Emissions (tCO ₂ e)	Estimated Project Emissions (tCO ₂ e)	Estimated Leakage Emissions (tCO ₂ e)	Total Estimated ERs (tCO ₂ e)
2020	73,909	260	0	73,649
2021	135,076	575	0	134,501
2022	135,259	575	0	134,684
2023	135,433	575	0	134,858
2024	135,599	575	0	135,024
2025	135,756	575	0	135,181
2026	135,906	575	0	135,331
2027	136,049	575	0	135,474
2028	136,184	575	0	135,609
2029	136,313	575	0	135,738
2030	61,676	315	0	61,362
Total estimated ERs	1,357,159	5,747	0	1,351,412

Ex Ante Estimate of Emission Reductions

Table 5 below illustrates the approximate methane emissions that can be generated in the Project's 10-year crediting renewal period.

Table 1: Ex Ante Emissions

Year	Modelled Methane Emissions (m ³ /yr)
2020	1.53E+07
2021	1.53E+07
2022	1.53E+07
2023	1.54E+07
2024	1.54E+07
2025	1.54E+07
2026	1.54E+07
2027	1.54E+07
2028	1.54E+07
2029	1.55E+07
2030	1.55E+07

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	OX _{top_layer}
Data unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the Landfill in the baseline
Source of data	Methodology
Value applied	0.1
Justification of choice of data or description of measurement methods and procedures applied	Value provided in the Methodology
Purpose of Data	Calculation of baseline emissions

Comments	N/A
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Data / Parameter	$F_{CH_4,BL,y}$
Data unit	t CH ₄
Description	Amount of methane in the LFG that would have been flared in the baseline
Source of data	N/A
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	LFG from new extraction wells does not mix with LFG from the old wells. The LFG recovered from the new wells is measured for flow rate and methane concentration separately from pre-project wells. Therefore, no discounting is necessary and this parameter is set to zero.
Purpose of Data	This is used for baseline emissions
Comments	N/A

Data / Parameter	η_{PJ}
Data unit	Dimensionless
Description	Efficiency of the LFG capture system installed in the project activity
Source of data	Reference
Value applied	50%
Justification of choice of data or description of measurement methods and procedures applied	This is the default value the methodology prescribes.
Purpose of Data	Calculation of ex-ante emissions
Comments	N/A

Data / Parameter	GWP_{CH_4}
Data unit	t CO _{2e} / t CH ₄

Description	Global warming potential of methane
Source of data	Reference
Value applied	28
Justification of choice of data or description of measurement methods and procedures applied	IPCC fifth assessment report
Purpose of Data	Calculation of baseline and project emissions
Comments	N/A

Data / Parameter	ρ_{CH_4}
Data unit	t CH ₄ / m ³ CH ₄
Description	Density of methane at 60F, 1 atm
Source of data	Reference
Value applied	0.000678
Justification of choice of data or description of measurement methods and procedures applied	This value is selected as flow meters are calibrated to standard temperature and pressure conditions (60F, 1atm).
Purpose of Data	Calculation of baseline emissions
Comments	https://www.epa.gov/sites/production/files/2015-09/nganal.xls

Data / Parameter	η_{flare}
Data unit	%
Description	Efficiency of the flare
Source of data	Reference
Value applied	98%
Justification of choice of data or description of	See deviation description in Section 3.6(3). Value is used based on guidance from the USEPA for flares operated within the requirements for 40 CFR 60.18.

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$\eta_{HG,BL,y}$
Data unit	%
Description	Efficiency of the heat generation equipment used in the baseline
Source of data	Guidance from ACM0001
Value applied	100%
Justification of choice of data or description of measurement methods and procedures applied	Value is used using Option F from Tool 9: Determining the baseline efficiency of thermal or electric energy generation systems. The efficiency of baseline heat generation equipment is chosen to be 100% for conservativeness.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$\eta_{HG,PJ,y}$
Data unit	%
Description	Efficiency of the heat generation equipment used in the project
Source of data	Cleaver-Brooks Efficiency Guide
Value applied	82%
Justification of choice of data or description of measurement methods and procedures applied	Value is used from manufacturer-specified efficiency for methane
Purpose of Data	Calculation of baseline emissions
Comments	https://cleaverbrooks.com/Product/cble

Data / Parameter	F
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Data unit	%
Description	Fraction of methane in the LFG (volume fraction)
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories and LandGEM default value.
Value applied	50
Justification of choice of data or description of measurement methods and procedures applied	This is the most accurate estimate available.
Purpose of Data	This is used to conduct ex-ante emissions using LandGEM
Comments	N/A

Data / Parameter	Lo
Data unit	m ³ /Mg
Description	Potential methane generation capacity
Source of data	Clean Air Act default value from LandGEM
Value applied	170
Justification of choice of data or description of measurement methods and procedures applied	This is a default value provided by LandGEM.
Purpose of Data	This is used to conduct ex-ante emissions using LandGEM.
Comments	N/A

Data / Parameter	K
Data unit	year ⁻¹
Description	Decay rate
Source of data	Clean Air Act default value from LandGEM
Value applied	0.05

Justification of choice of data or description of measurement methods and procedures applied	This is a default value provided by LandGEM.
Purpose of Data	This is used to conduct ex-ante emissions using LandGEM.
Comments	N/A

Data / Parameter	EF _{EF}
Data unit	lbs CO ₂ / MWh
Description	Emission factor for the grid electricity
Source of data	Reference
Value applied	675.4
Justification of choice of data or description of measurement methods and procedures applied	Value is obtained using the USEPA eGRID summary tables 2019 Region SRVC. This is the most accurate source of this data.
Purpose of Data	Calculation of project emissions
Comments	This value will be updated to align with the most recent published eGRID values https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid

Data / Parameter	EF _{CO2,BL,HG,NG}
Data unit	tCO ₂ / TJ
Description	CO ₂ emission factor of the fossil fuel type used in the boiler (natural gas) for heat generation in the absence of the project activity The value of 0.05306 tCO ₂ /MMBtu was obtained from USEPA.
Source of data	U.S. EPA Emission Factors for Greenhouse Gas Inventories https://www.epa.gov/sites/production/files/2020-04/documents/ghg-emission-factors-hub.pdf
Value applied	49.34

Justification of choice of data or description of measurement methods and procedures applied	USEPA value represents most accurate public source.
Purpose of Data	This is used for baseline emissions
Comments	Values will be reviewed annually to ensure they are appropriate or following any future revision of USEPA guidelines, as applicable.

Data / Parameter	NCV _{CH4} ,
Data unit	TJ / tCH ₄
Description	Energy content of methane
Source of data	National Institute of Standards and Technology Chemistry WebBook
Value applied	0.0555
Justification of choice of data or description of measurement methods and procedures applied	NIST Chemistry WebBook is an accurate, public source.
Purpose of Data	This is used for baseline and project emissions
Comments	Values will be reviewed annually to ensure they are appropriate EFas applicable.

Data / Parameter	TDL
Data unit	%
Description	Average transmission and distribution losses in the grid
Source of data	Reference
Value applied	5.1%
Justification of choice of data or description of measurement methods and procedures applied	Value is obtained using the USEPA eGRID summary tables 2019 Region SRVC. This is the most accurate source of this data.

Purpose of Data	Calculation of project emissions
Comments	This value will be updated to align with the most recent published eGRID values. https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid

Data / Parameter	COEF _{propane}
Data unit	t CO ₂ / gal
Description	CO ₂ emission coefficient for propane
Source of data	Calculated
Value applied	0.005590 t CO ₂ /gal
Justification of choice of data or description of measurement methods and procedures applied	COEF = NCV * EF which are both reference values
Purpose of Data	Calculation of project emissions
Comments	Values will be reviewed annually to ensure they are appropriate or following any future revision of USEPA guidelines, as applicable.

Data / Parameter	NCV _{propane}
Data unit	MMBtu / gal
Description	Energy content of propane
Source of data	Reference
Value applied	0.09133
Justification of choice of data or description of measurement methods and procedures applied	U.S. EPA Guidelines, Inventory of US Greenhouse Gas Emissions and Sinks, April 2020, Annex 2, Table A-56 https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018
Purpose of Data	Calculation of project emissions
Comments	Values will be reviewed annually to ensure they are appropriate or following any future revision of USEPA guidelines, as applicable.

Data / Parameter	EF _{CO2,propane}
Data unit	t CO ₂ / MMBtu
Description	CO ₂ emission factor for propane
Source of data	Reference
Value applied	0.06153
Justification of choice of data or description of measurement methods and procedures applied	U.S. EPA Guidelines, Inventory of US Greenhouse Gas Emissions and Sinks, April 2020, Annex 2, Table A-56
Purpose of Data	Calculation of project emissions
Comments	Values will be reviewed annually to ensure they are appropriate or following any future revision of USEPA guidelines, as applicable.

Data / Parameter	L _{Milliken}
Data unit	MW
Description	Electricity consumption ratings of the blower fans used to operate Milliken's boilers. Fans are rated at 20 hp (for the 600 hp boiler), 7.5 hp (for the 250 hp boiler) and 15 hp (for the 400 hp boiler).
Source of data	Manufacturer specifications
Value applied	0.01492 MW for 20 hp fan 0.005595 MW for 7.5 hp fan 0.01119 MW for 15 hp fan Total is 0.03171 MW for all three fans
Justification of choice of data or description of measurement methods and procedures applied	Summation of the MW for the three fans based on their rating
Purpose of Data	This is used for project emissions
Comments	Full load will be used in calculations for conservativeness. Relevant equipment and applicable load ratings may change and will be verified during each monitoring period.

Data / Parameter	fd _{CH4,HG,j,default}
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Data unit	--
Description	Default value for the fraction of methane destroyed when used for heat generation equipment
Source of data	The value for boilers and air heaters are based on default values provided in the 2006 IPCC Guidelines (Tier 3 approach for Chapter 2: Stationary Combustion of Volume 2: Energy Use).
Value applied	1
Justification of choice of data or description of measurement methods and procedures applied	1 is the fraction of CH ₄ destroyed for boilers prescribed in the Methodology.
Purpose of Data	This is used to determine fossil fuel that would have been combusted to generate heat but has been displaced due to the use of LFG in the heat generation equipment
Comments	N/A

5.2 Data and Parameters Monitored

Data / Parameter	Management of SWDS
Data unit	N/A
Description	Management of SWDS
Source of data	Original design of the landfill Technical specifications for the management of the SWDS Local or national regulations
Description of measurement methods and procedures to be applied	Management practices of SWDS after the implementation of the project activity will be reviewed.
Frequency of monitoring/recording	Annually
Value applied	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A

Purpose of data	The purpose of this review is to ensure that any practice to increase methane generation have been occurring prior to the implementation of the project activity. Any change in the management of the SWDS will be justified by referring to technical or regulatory specifications.
Calculation method	N/A
Comments	N/A

Data / Parameter	W _y
Data unit	tonnes
Description	Total amount of waste disposed in year y
Source of data	Measured
Description of measurement methods and procedures to be applied	Measured by the Project Proponent
Frequency of monitoring/recording	Annual
Value applied	1,478,829 Mg
Monitoring equipment	Continuous with monthly and annual aggregation of data
QA/QC procedures to be applied	N/A
Purpose of data	This value is used in the ex-ante estimate
Calculation method	N/A
Comments	The quantity of waste disposed is determined based on facility records.

Data / Parameter	BE _{CH₄, SWDS, y}
Data unit	tCO ₂ e/year
Description	Modelled methane emissions generated from waste disposal at the Landfill
Source of data	Landfill weight acceptance records

	Engineering studies and USEPA Default Values USEPA LandGem Model (version 3.02)
Description of measurement methods and procedures to be applied	LandGEM was used to model ex-ante methane emissions
Frequency of monitoring/recording	10 years (every crediting period renewal)
Value applied	140,742 tCO ₂ e/year
Monitoring equipment	Weigh scale to determine landfill weight acceptance and other default values identified in Section 5.1 of this PDD.
QA/QC procedures to be applied	N/A
Purpose of data	The purpose of this parameter is to estimate the methane emissions that the landfill can potentially generate in the crediting period using historical landfill acceptance records.
Calculation method	LandGEM model
Comments	This value is used for the validation only. During verification, baseline emissions are calculated using ex-post quantification methodologies delineated in Section 4.

Data / Parameter	F _{CH4,PJ,y}
Data unit	t CH ₄ /yr
Description	Total amount of methane in the LFG collected and destroyed by the project system at standard temperature and pressure (60 F, 1 atm)
Source of data	Calculated value
Description of measurement methods and procedures to be applied	Flow rates of methane to the landfill gas flare, electricity generation equipment, and heat generation equipment are calculated based on continuous monitoring. F _{CH4,PJ,y} is calculated by summing F _{CH4,flared,y} , F _{CH4,EL,y} , and F _{CH4,HG,y} .
Frequency of monitoring/recording	Continuously monitored
Value applied	3,710 tCH ₄ /yr

Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of baseline emissions
Calculation method	Methane content sent to the flare, the heat generation units and electricity generation units is calculated each month. $F_{CH_4, \text{flared}, y}$, $F_{CH_4, \text{HG}, y}$ and $F_{CH_4, \text{EL}, y}$ are summed to calculate the total methane captured and destroyed by the system. See sample calculations in Section 4 for exact methodologies.
Comments	N/A

Data / Parameter	$F_{CH_4, \text{flared}, y}$
Data unit	t CH ₄ /yr
Description	Amount of methane in the LFG which is sent to the flare in year y
Source of data	Calculated based on V_{flare} , V_{CH_4} and ρ_{CH_4} as per CDM Tool 8: Tool to determine the mass flow of a greenhouse gas in a gaseous stream.
Description of measurement methods and procedures to be applied	Calculated value
Frequency of monitoring/recording	Continuous
Value applied	138 tCH ₄ /yr
Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of baseline emissions
Calculation method	Measured flowrate of landfill gas is multiplied by the measured methane percentage and methane density at standard temperature and pressure. See sample calculations in Section 4 for exact methodologies.
Comments	N/A

Data / Parameter	$PE_{\text{flare},y}$
Data unit	t CO _{2e} /yr
Description	Project emissions from flaring of the residual gas stream in year y
Source of data	Calculated based on $F_{\text{CH}_4,\text{sent to flare}}$ and η_{flare} as per CDM Tool 6: “Project emissions from flaring”.
Description of measurement methods and procedures to be applied	Calculated value
Frequency of monitoring/recording	Annual
Value applied	69 t CO _{2e} /yr
Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of project emissions
Calculation method	Methane sent to the flare is multiplied by the destruction efficiency of the flare and the global warming potential of methane to determine project emissions. See sample calculations in Section 4 for exact methodologies.
Comments	N/A

Data / Parameter	$V_{\text{Project total}}$
Data unit	ft ³
Description	Total amount of LFG collected from the project system at normal temperature and pressure conditions (60 degrees F and 1 atm).
Source of data	FCI Thermal Mass Flowmeter (Serial No. 324341)
Description of measurement methods and procedures to be applied	Measured and compiled into monthly excel files

Frequency of monitoring/recording	Continuous Monitoring; Recording every 15 minutes
Value monitored	230,000,000 LFG ft ³
Monitoring equipment	FCI Thermal Mass Flowmeter (Serial No. 324341)
QA/QC procedures to be applied	Consistent with manufacturer recommendations, the flowmeter should have a “Delta R” check every 18 months should be performed or for landfill applications the flow meter should be calibrated starting at a 12-month interval. If no calibration correction is required for the first two calibrations (i.e. for two years), the calibration interval will be extended to 24 months. Calibration will consist of a “Delta R” check to validate the electronics and resistance values of the sensor element. If test results are within the manufacturer recommended tolerance, calibration is complete. If test results are not within recommended tolerance, in-field recalibration will be conducted.
Purpose of the data	Calculation of baseline emissions
Calculation method	N/A
Comments	Flowmeter corrects recorded data to 60 degrees F and 1 atm.

Data / Parameter	V _{flare}
Data unit	ft ³
Description	Volume of landfill gas sent to flare at standard temperature and pressure.
Source of data	Rosemount 2051 differential pressure flow meters
Description of measurement methods and procedures to be applied	Rosemount 2051 differential pressure flow meters (Serial Nos. 20196, 20198, 20199) Flow is recorded at 60 degrees F and 1 atm.
Frequency of monitoring/recording	Continuous monitoring. Readings are recorded every 15 minutes.
Value applied	7,175,000 ft ³
Monitoring equipment	Rosemount 2051 differential pressure flow meters (Serial Nos. 21997, 21998, 21996)

QA/QC procedures to be applied	SN 21997 was installed May 2019. SN 21998 was installed May 2019. SN 21996 was installed May 2019. The flowmeter will be calibrated every 16 months following manufacturer recommendations.
Purpose of data	Calculation of baseline emissions
Calculation method	N/A
Comments	Flow is measured on a wet basis and the flow meter is located at the flare inlet, after the blowers. There is no liquid or condensate removal between the blower inlet and flare inlet.

Data / Parameter	VCH4
Data unit	m ³ CH ₄ /m ³ LFG
Description	Average methane fraction of the LFG
Source of data	Siemens Ultramat 23 Continuous Gas Analyzer
Description of measurement methods and procedures to be applied	Measured and compiled into monthly excel files
Frequency of monitoring/recording	Continuous monitoring. Recorded every 15 minutes
Value applied	50%
Monitoring equipment	Siemens Ultramat 23 Continuous Gas Analyzer (Serial No. N1 A1 664)
QA/QC procedures to be applied	The unit is currently calibrated once a month, although the OEM recommendation is only once every 6-12 months, and the interval between calibrations may be extended to align with this recommendation. The unit automatically recalibrates the zero point by the AUTO CAL function when connecting nitrogen or air. During monthly calibrations, calibration is done by at least one reading verification with a standard gas. If the unit malfunctions, Lockhart will attempt to repair it on site, calling out an OEM representative if necessary. If a malfunction occurs, the unit will indicate "malfunction" on the screen, and it will be the responsibility of Lockhart personnel to review the malfunction code and correct if applicable. If the unit cannot be repaired on site, Lockhart would either send it to the OEM to repair off-site or order a replacement unit, depending on the cost of repairs versus

	replacement.
Purpose of data	Calculation of baseline emissions
Calculation method	Measured value
Comments	The analyzer is located at the billing gate between Lockhart and the County. Composition is measured on a wet basis.

Data / Parameter	$F_{CH_4,HG,y}$
Data unit	t CH ₄ /yr
Description	Amount of methane in the landfill gas which is destroyed by heat generation.
Source of data	Calculated based on V_{Heat} , V_{CH_4} and p_{CH_4} as per CDM Tool 8: Tool to determine the mass flow of a greenhouse gas in a gaseous stream.
Description of measurement methods and procedures to be applied	Calculated value
Frequency of monitoring/recording	Continuous
Value applied	1,965 t CH ₄ /yr
Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of baseline emissions
Calculation method	Measured flowrate of landfill gas is multiplied by the measured methane percentage and methane density at standard temperature and pressure. See sample calculations in Section 4 for exact methodologies.
Comments	N/A

Data / Parameter	V _{Heat}
Data unit	ft ³
Description	Volume of landfill gas sent to the heat generation units at standard temperature and pressure.
Source of data	Rosemount 2051 SFC compact conditioning orifice plate mass flowmeter with integrated pressure and temperature integration.
Description of measurement methods and procedures to be applied	Gas flow and composition to the Milliken facility are measured for invoicing purposes. This data is compiled into monthly excel files. Flow is recorded at 60 degrees F and 1 atm.
Frequency of monitoring/recording	Continuous monitoring. Readings are recorded every fifteen minutes.
Value applied	102,358,000 ft ³
Monitoring equipment	Rosemount 2051 SFC Serial Number: 0043317
QA/QC procedures to be applied	Rosemount guarantees meter stability for a 10 year period. For enhanced surety, the project developer has the meter inspected and calibrated at least every 3 years. If an alternate flowmeter is purchased it will be calibrated following manufacturer recommendations.
Purpose of data	Calculation of baseline emissions
Calculation method	N/A
Comments	Flow will be metered at the delivery point between the Landfill and the Milliken Facility. The flowmeter will automatically correct flow for temperature and pressure. If process changes materially alter measurement accuracy, calculations will be updated accordingly. To ensure that all LFG sent to the Milliken boilers is burned and not vented to the atmosphere, Milliken has fail-safes built into the control system on each boiler gas train that include two automatic valves that shut anytime the landfill gas line is switched off or the boiler goes down. This stops the flow of gas to the boiler.

Data / Parameter	F _{CH₄,EL,y}
Data unit	t CH ₄ /yr

Description	Amount of methane in the landfill gas which is destroyed by electricity generation.
Source of data	Calculated based on $V_{\text{Electricity}}$, V_{CH_4} and p_{CH_4} as per CDM Tool 8: Tool to determine the mass flow of a greenhouse gas in a gaseous stream.
Description of measurement methods and procedures to be applied	Calculated value
Frequency of monitoring/recording	Continuous
Value applied	1,613 t CH ₄ /yr
Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of baseline emissions
Calculation method	Measured flowrate of landfill gas is multiplied by the measured methane percentage and methane density at standard temperature and pressure. See sample calculations in Section 4 for exact methodologies.
Comments	N/A

Data / Parameter	$V_{\text{Electricity}}$
Data unit	ft ³
Description	Volume of landfill gas sent to power generation unit at standard temperature and pressure.
Source of data	Rosemount 3051 SFC compact conditioning orifice plate mass flowmeter with integrated pressure and temperature integration.
Description of measurement methods and procedures to be applied	Gas flow and composition to the Lockhart facility is measured for invoicing purposes. This data is compiled into monthly excel files. Flow is recorded at 60 degrees F and 1 atm.
Frequency of monitoring/recording	Continuous monitoring. Readings are recorded every fifteen minutes.
Value applied	84,150,000 ft ³

Monitoring equipment	Rosemount 3051 SFC Serial Number: 482561
QA/QC procedures to be applied	The official Emerson manufacturer recommended maintenance practices are that Rosemount orifice plate technologies should be inspected once every 3 years. Emerson also recommends that calibration occur once every 3 years. The sensors do not have separate model numbers from the 3051. Since it is an orifice-based flow meter, calibration is addressed by checking the pressure sensor. The pressure sensor calibration schedule has been extended to the 3-year interval in accordance with the manufacturer's recommendations. The flow meter was configured by a Rosemount technician. A calibration was performed on 01/06/2020. If an alternate flowmeter is purchased it will be calibrated following manufacturer recommendations.
Purpose of data	Calculation of baseline emissions
Calculation method	N/A
Comments	Flow will be measured at the delivery point between the Landfill and the Lockhart facility.

Data / Parameter	EleC _{flare}
Data unit	MWh
Description	Sum of quantity of electricity consumed by the flare skid
Source of data	Electricity supplier invoices
Description of measurement methods and procedures to be applied	There is a dedicated electricity meter that records the sum of electricity consumed by the flare skid
Frequency of monitoring/recording	Monthly
Value applied	828 MWh
Monitoring equipment	Dedicated electricity meter
QA/QC procedures to be applied	3 rd party statements/invoices are used to ensure accuracy of data.
Purpose of data	Calculation of project emissions
Calculation method	N/A

Comments	N/A
Data / Parameter	EleC _{treatment}
Data unit	MWh
Description	Sum of quantity of electricity consumed by the treatment skid
Source of data	Electricity supplier invoices
Description of measurement methods and procedures to be applied	There is a dedicated electricity meter that records the sum of electricity consumed by the treatment skid that treats LFG prior to transportation to be combusted for heat and electricity generation.
Frequency of monitoring/recording	Monthly
Value applied	226 MWh
Monitoring equipment	Dedicated electricity meter
QA/QC procedures to be applied	3 rd party statements/invoices are used to ensure accuracy of data.
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	EleC _{Heat}
Data unit	MWh
Description	Quantity of electricity consumed to operate the boiler fans used by Milliken's boilers
Source of data	Calculated
Description of measurement methods and procedures to be applied	Direct metering and/or calculation based on equipment load ratings. The manufacturer's load rating for all 3 fans is 0.03171 MW/hr.
Frequency of monitoring/recording	Monthly

Value applied	280 MWh
Monitoring equipment	N/A
QA/QC procedures to be applied	In the case of direct metering, 3 rd party statements/invoices are used to ensure accuracy of data. In the case of equipment load ratings, such load ratings are to be verified by the verification body during each verification.
Purpose of data	Calculation of project emissions
Calculation method	See Comments below
Comments	Electricity usage will be calculated by multiplying the manufacturer specified load ratings of the blower motor by the operating hours of the blower on a monthly basis. Relevant equipment and applicable load ratings may change and will be verified during each monitoring period.

Data / Parameter	PE _{propane}
Data unit	t CO ₂ /yr
Description	CO ₂ emissions from propane combustion
Source of data	Calculated based on FC _{propane} and COEF _{propane} as per the CDM "Tool to determine project or leakage CO ₂ emissions from fossil fuel combustion".
Description of measurement methods and procedures to be applied	Calculated value
Frequency of monitoring/recording	Annually
Value applied	1 t CO ₂ /yr
Monitoring equipment	See applicable parameters
QA/QC procedures to be applied	See applicable parameters
Purpose of data	Calculation of project emissions
Calculation method	Quantity of propane combusted is multiplied by an appropriate emission factor to determine total emissions. See sample calculations in Section 4 for exact methodologies.

Comments	N/A
Data / Parameter	FC _{propane}
Data unit	Gallons/yr
Description	Volume of propane combusted in the project activity in year y
Source of data	Supplier invoices
Description of measurement methods and procedures to be applied	Monthly supplier invoices demonstrate the amount of propane consumed at the facility which are recorded by commercial fuel meters.
Frequency of monitoring/recording	Invoiced on an as-delivered basis
Value applied	15 gallons/yr
Monitoring equipment	Commercial fuel meters
QA/QC procedures to be applied	3rd party statements/invoices are used to ensure accuracy of data.
Purpose of data	Calculation of project emissions
Calculation method	Measured Value
Comments	N/A

Data / Parameter	Op _{flare,h}
Data unit	F
Description	This includes data to monitor whether the flare operates within the range of operating conditions specified by the manufacturer.
Source of data	Pyromation thermocouple
Description of measurement methods and procedures to be applied	A Pyromation thermocouple is used to monitor flame temperature and ensure proper operation of the flare. When the flare is not operational no gas is discharged and no flow is recorded.
Frequency of monitoring/recording	Continuous monitoring; Recorded every 15 minutes
Value applied	N/A

Monitoring equipment	Pyromation thermocouple
QA/QC procedures to be applied	Thermocouples are replaced as required and are not calibrated. This will not adversely impact the accuracy of the project as the thermocouples are used to ensure flare operation Landfill gas flow data to the flare will be excluded from emission reduction calculations if temperature measurements are below the temperature cut-off setpoint (currently 300 F but may be adjusted as long as flare operation in accordance with 40 CFR 60.18 continues).
Purpose of data	Verification of flare operation
Calculation method	N/A
Comments	N/A

Data / Parameter	Op _{engine,h}
Data unit	kW
Description	Electricity generated by Lockhart Power during the project period. This is used to ensure operation of the energy plant.
Source of data	Records from commercial electricity meters
Description of measurement methods and procedures to be applied	Records from commercial electricity meters
Frequency of monitoring/recording	Every minute
Value applied	-
Monitoring equipment	Commercial electricity meter
QA/QC procedures to be applied	If it is determined that electricity is not being generated by Lockhart power, emissions related to LFG destruction by the electricity generating facility is assumed to be zero. Because this is a revenue grade meter, it is assumed that the meter is calibrated and maintained appropriately.
Purpose of data	Verification of operation of Lockhart power electricity generation units
Calculation method	N/A

Comments	Landfill gas destruction is double checked against generation data from the Lockhart units to ensure that destruction is not claimed when engines are not operational. The commercial electricity meters record electricity generated by the minute, which far exceeds the hourly requirement stipulated by Parameter table 12 in AMC0001.
Data / Parameter	†Milliken, m
Data unit	Hours
Description	Hours of operation of the boiler fans used to operate the boilers at the Milliken facility in month, m.
Source of data	N/A
Description of measurement methods and procedures to be applied	Hour meter or assumed to be operational 24 hours a day and 365 days per year to be conservative.
Frequency of monitoring/recording	Continuous
Value applied	4,368 hours
Monitoring equipment	Hour Meter (if applicable)
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	Totalized hourly readings or assumption of 24 hour / 365 day operation
Comments	If hourly operational data is not available, it will be assumed that the equipment is operational 24 hours a day and 365 days per year. This is conservative.

5.3 Monitoring Plan

The purpose of monitoring is to measure the quantity of methane captured by the project activity that would have been released to the atmosphere in the baseline condition. The estimate of GHG emission reductions claimed for this project relies on data provided by Lockhart Power, the owner and operator of the Project. Lockhart Power has sustainably and

reliably served their customers in South Carolina for over 100 years. The Project is overseen by Lockhart Power's General Manager and Chief Operating Officer and the Gas to Energy Site Operator is responsible for the day to day operations of this facility.

Lockhart Power provides access to an online data acquisition system with the following raw data: flow rate of eligible landfill gas captured and flared, composition of landfill gas and flare temperature. Lockhart Power also provides supplier invoices documenting the quantity of electricity and fossil fuels consumed. Lockhart Power has personnel located at the landfill, monitoring the gas analyzer and flow data to ensure readings are normal and accurate. If any data is deemed inaccurate, corrective action is taken as necessary to make certain the data is as complete and accurate as possible.

Baseline Emissions

Monitoring Equipment

The flow rate of LFG is metered at four locations: the main gas stream from the field, at the flare inlet, prior to delivery to the Milliken Facility and prior to delivery to Lockhart.

LFG flow from the project system is monitored using an FCI Thermal Mass flowmeter that normalizes flow to standard temperature and pressure conditions. Composition is metered using a Siemens Ultramat 23 continuous gas analyzer at the point prior to where gas flow splits to the three different combustion devices. Gas flow and composition data are recorded at least once every fifteen minutes. There is an automatic control valve located after the moisture separator that directs the flow through the 1st stage gas treatment skid. If the skid would shut down, the landfill gas would be directed through the moisture separator, blower and directly to the flare to be destroyed. Otherwise any gas that goes to the flare goes through the 1st stage gas treatment skid.

Landfill gas flow is separated into three lines (primary, secondary, and pilot flow) at the flare skid. These three lines are each monitored individually with three Rosemount 2051 differential pressure flow meters. A Pyromation thermocouple is used to ensure the flare is burning. Flow, composition, and temperature data from the flare is recorded at least once every fifteen minutes. Additionally, an ultraviolet flame detector is in place to monitor the presence of a flame and activate the safety interlock system.

For the LFG to electricity phase of the Project, the gas flow to Lockhart (location '3') is metered continuously using a Rosemount 3051 SFC compact conditioning orifice plate mass flowmeter with integrated pressure and temperature integration. Flow data from location '3' is recorded at least once every fifteen minutes.

A schematic diagram showing each metering location is provided below:

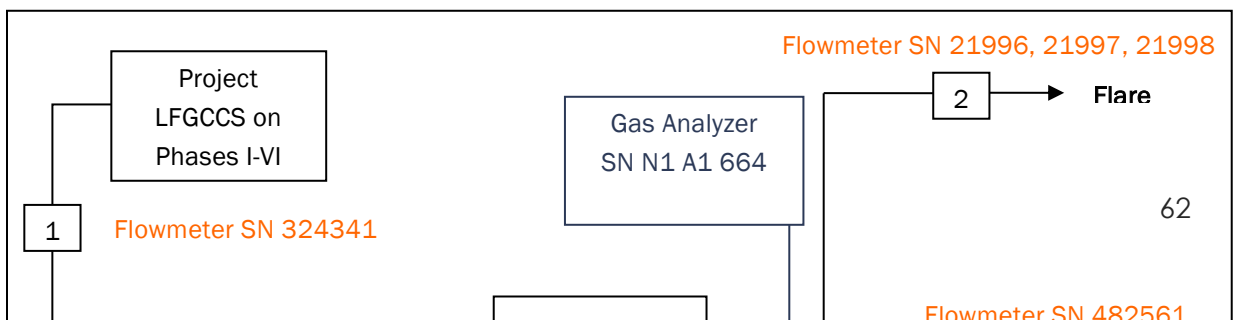


Figure 2: Simplified Schematic Diagram of the Project

For the LFG to heat phase of the Project, the gas flow to the Milliken Facility (location '4') is metered continuously using a Rosemount 2051 SFC compact conditioning orifice plate mass flowmeter with integrated pressure and temperature integration. Flow data from location '4' is recorded at least once every fifteen minutes.

The flowmeter used to record gas flow at location '1' will be calibrated every 12 to 24 months following manufacturer recommendations. The set of flowmeters used to record gas flow at location '2' will be calibrated every 12 to 18 months following manufacturer recommendations. This set was installed May 2019. The flowmeters used to record gas at locations '3' and '4' will be calibrated following manufacturer recommendations.

The gas analyzer is currently calibrated once a month, although the OEM recommendation is every 6-12 months, and the interval between calibrations may be extended to align with this recommendation. It was also factory calibrated on the following dates: July 30, 2015, August 1, 2016, August 2, 2017, August 30, 2018, and January 13, 2020. If the unit malfunctions, Lockhart will attempt to repair it on site, calling out an OEM representative if necessary. If a malfunction occurs, the unit will indicate "malfunction" on the screen, and it will be the

responsibility of Lockhart personnel to review the malfunction code and correct if applicable. If the unit cannot be repaired on site, Lockhart would either send it to the OEM to repair off-site or order a replacement unit, depending on the cost of repairs versus replacement.

Record Keeping

The flow rate and methane concentration of project LFG, the flow rate of LFG delivered to the flare, flare temperature, the flow rate of LFG delivered to the Lockhart Power facility, Lockhart Power facility electricity generation, and the flow rate of LFG to the Milliken Facility are documented in the SCADA system. Before the SCADA system data from the flow meters, methane meters, and thermocouples was recorded using an Automation Direct DL-250 process logic controller (PLC). The PLC on the gas analyzer started 6/15/2010 and ran until the SCADA took over. A PLC on the skid also captured data from 6/8/2011 until the SCADA became fully operational on July 11, 2011.

When the Lockhart Facility came online, a supervisory control and data acquisition system (SCADA) system began to be used to record data. The SCADA operates Wonderware, Historian In-Touch, Active Factory, and Microsoft Terminal Server 2003 software on a Dell Power Edge server located at the Lockhart facility.

The data collected by the original PLC as being stored on an offsite SCS FTP site. Once the SCADA system came online the data is stored on site on a separate server in the Lockhart switch gear facility. The data is also backed up on the technician's laptop. The SCADA system uploads data to the on-site server on a monthly basis and data will also be aggregated on a monthly and yearly basis.

Lockhart and the County will conduct a detailed data review to identify any data gaps or data sets that are outside expected operating ranges at least once per week. Suspect data will be flagged and causes for suspect data will be investigated to correct any future data issues.

Project Emissions

Project emissions associated with flaring LFG, electricity consumption and fuel usage are estimated using both measured and default values.

Flaring Emissions

The emissions associated with methane destruction by flaring are determined based on the flare's destruction efficiency and the mass flow rate of methane in the gas stream (determined from the volumetric flow rate of LFG and the volumetric fraction of methane in the LFG being flared). The composition and flow rate of LFG gas that is flared are determined as outlined above.

Following ACM0001, the flare's operating parameters are to be continuously monitored to ensure compliance with manufacturer specifications. Accordingly, the temperature of the flare

is monitored using a thermocouple and ultraviolet flame detector. However, only the temperature measured by the thermocouple is recorded.

Electricity and Fossil Fuel Combustion Emissions

Project emissions related to electricity consumption and fossil fuel usage are estimated based on the quantity of electricity and fossil fuels consumed to operate the Project, according to direct metering or supplier invoices.

Monitoring Roles and Responsibilities

County and Lockhart staff will oversee monitoring activities at monitoring locations '1', '2', '3' and '4'. Initially, electronic data was recorded by the PLC and records were maintained on the County and Lockhart's off-site servers. When the Lockhart facility came online, Lockhart began to manage the monitoring system / data, and the SCADA system for its engines began collecting all of the project data beginning on June 2, 2011. Records will be maintained on the County and Lockhart's on-site server.

The County, Lockhart and / or SCS will submit data to Blue Source for integration into emission reductions calculations. Blue Source saves the raw data files and then after applying the appropriate emission reduction parameters creates the emission reduction calculations that undergoes an internal QA/QC checklist.

Note that all relevant documents and records will be retained for a period of at least two years following the end of the Project's crediting period. All records will be available for review by a verification body.

A listing of the variables that will be monitored, including the source of data and a description of measurement methods and QA/QC calibration procedures are provided in Section 3.2 above. It will be the responsibility of County and Lockhart staff to measure all variables and retain records for verification.

APPENDIX A: SUPPORTING INFORMATION

	Requirements in VCS Standard	Justification
3.1.1	<i>Projects shall meet all applicable rules and requirements set out under the VCS Program, including this document. Projects shall be guided by the principles set out in Section 2.2.1 [of the Standard].</i>	The Project meets all rules and requirements of the VCS Program as outlined in this PDD.
3.1.2	<i>Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in Section 3.13.1. The list of methodologies and their validity periods is available on the Verra website.</i>	The Project applies the eligible CDM Methodology: ACM0001, and subsequent tools described in the Methodology.
3.1.3	<i>Projects and the implementation of project activities shall not lead to the violation of any applicable law, regardless of whether or not the law is enforced.</i>	The Project does not violate any laws.
3.1.4	<i>Where projects apply methodologies that permit the project proponent its own choice of model (see the VCS Program document Program Definitions for definition of model), such model shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model will lead to an appropriate quantification of GHG emission reductions or removals).</i>	This is not applicable as the Project does not apply its own choice of model.
3.1.5	<i>Where projects apply methodologies that permit the project proponent its own choice of third party default factor or standard to ascertain GHG emission data and any supporting data for</i>	All default factors used in the Project are detailed and justified in Section 5.1 of this PDD. All meet the

	<i>establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements.</i>	requirements set out in VCS Methodology Requirements.
3.1.6	<i>Projects shall preferentially apply methodologies that use performance methods (see the VCS Program document VCS Methodology Requirements for further information on performance methods) where a methodology is applicable to the project that uses a performance method for determining both additionality and the crediting baseline (i.e., a project shall not apply a methodology that uses a project method where such a performance method is applicable to the project). Methodologies approved under the VCS Program that use performance methods provide a list of similar methodologies that use project methods (that were approved under the VCS Program or an approved GHG program at the time the performance method was developed). Such lists are not necessarily exhaustive but can serve as the starting point for determining whether a performance method is applicable to the project. Following the approval of a methodology that uses a performance method, projects may use any applicable pre-existing methodology that uses a project method for a six-month grace period.</i>	The Project applies the eligible CDM Methodology: ACM0001. There are no other LFG methodologies approved by the VCS Program.
3.1.7	<i>Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.</i>	The Project follows all rules and requirements of the VCS Program.
3.1.8	<i>Where projects apply methodologies from approved GHG programs, they shall comply with any specified capacity limits (see the VCS Program document Program Definitions for definition of capacity limit) and any other relevant requirements set out with respect to the application of the methodology and/or tools</i>	The methodology used in the Project does not have any capacity limits. The Project meets all relevant requirements set out in the

	<i>referenced by the methodology under those programs.</i>	methodology and corresponding tools.
3.1.9	<i>Where Verra issues new requirements relating to projects, registered projects do not need to adhere to the new requirements for the remainder of their project crediting periods (i.e., such projects remain eligible to issue VCUs through to the end of their project crediting period without revalidation against the new requirements). The new requirements shall be adhered to at project crediting period renewal, as set out in Section 3.8.9.</i>	The Project meets all requirements set out by Verra.