CLIMATE ACTION RESERVE

Landfill Protocol QA/QC Requirements Training

October 29, 2024

Housekeeping

All attendees are in listen-only mode

Please submit your questions in the Q&A box.
We will answer questions at the end of the training

All attendees will be able to see, comment, and up-vote questions in the Q&A box.

We will follow up via email to answer any questions not addressed during the webinar

The slides and a recording of the presentation will be posted online

Why QA / QC?

- QA/QC required in protocol
  - Ensure the quality of the data being reported
- Identify and correct issues more quickly
- Ease the verification and review process

Project Monitoring Requirements

Monitoring Requirements

- Total flow of landfill gas to each destruction device
  - Measured continuously and recorded every 15 minutes or totalized and recorded at least daily
  - Must be standardized by meter to 60ºF and 1 atm, or corrected using independent temperature and pressure readings (MX: 0ºC, 1 atm)
- Fraction of methane in the landfill gas
  - Measured with a continuous analyzer, data is recorded every 15 minutes and averaged at least daily (preferred) (OR)
  - Weekly measurements require a 10% discount (portable analyzer)
- Table 6.1 Project Monitoring Parameters: refer to this table to review all 37 parameters

Operational Activity of Destruction Devices (6.1)

- Operational status (on/off) must be monitored and documented at least hourly, or the presence of safety shut off valve
- GHG reductions are not accounted for during periods which the destruction device was not operational
- For flares, operation is defined as thermocouple readings above 500ºF / 260ºC
- All other destruction devices, the means of demonstration will be determined by the project developer and subject to verifier review
- For offsite gas delivery, reasonable effort must be made to obtain data demonstrating operational status of the destruction device(s)

Metering Layout

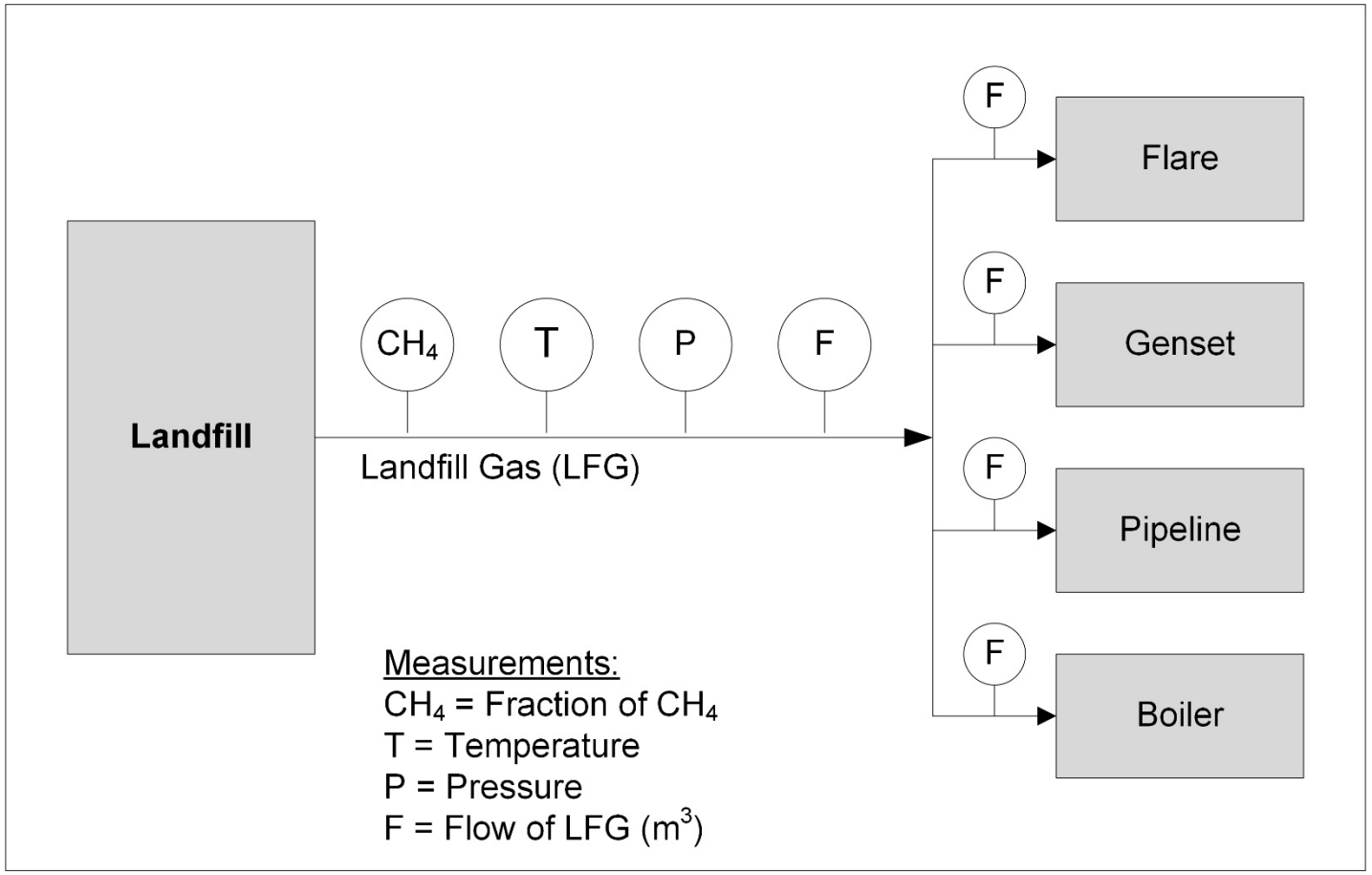
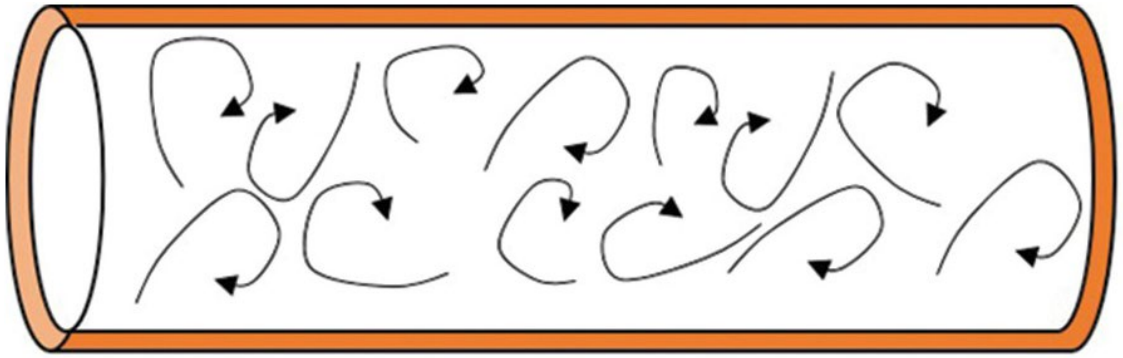
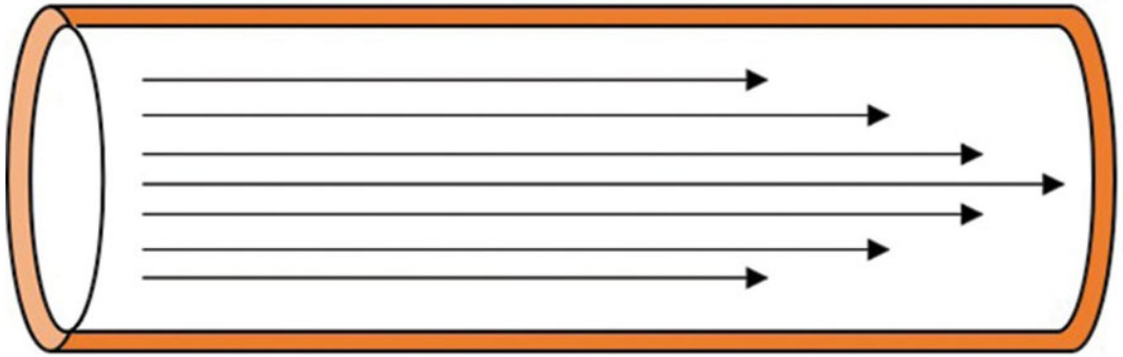


Figure 6.1

Laminar Flow



Turbulent flow



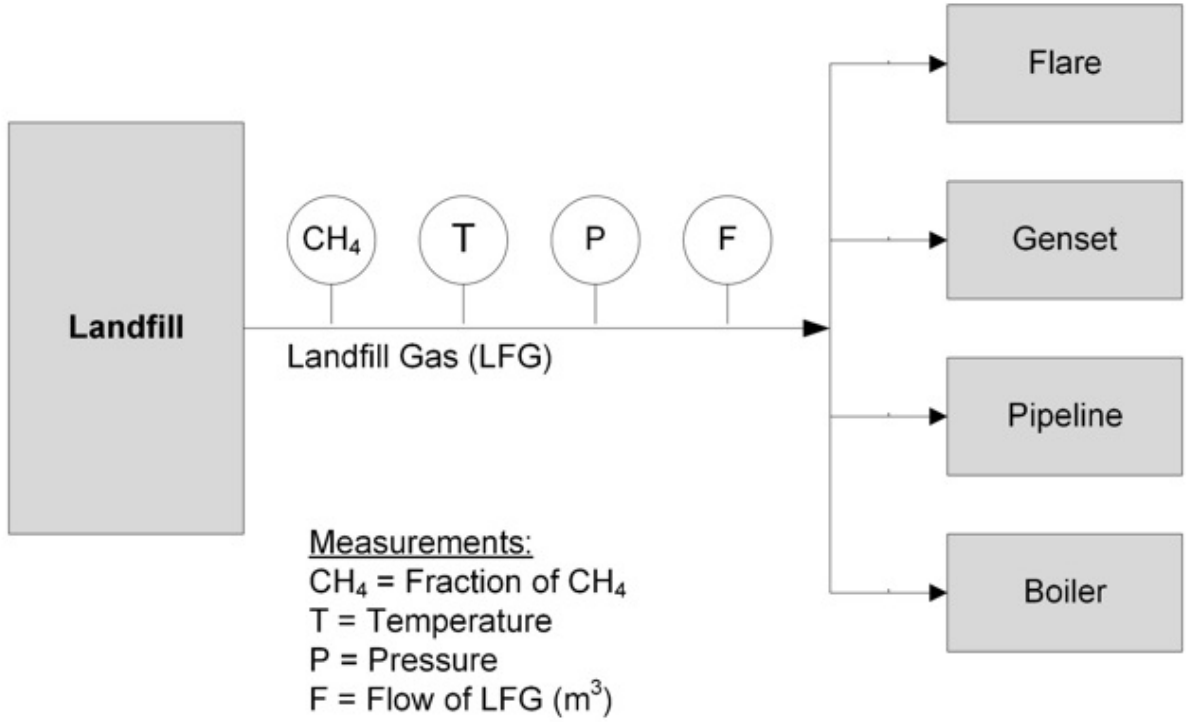
Laminar flow

- Meters must be placed in areas conducive to proper laminar flow
- Ensures accurate readings

- Citation for image:Ebrahim H, Balla S, Rudge J. Behaviour of Fluids. In: Ebrahim H, Ashton-Cleary D, eds. *Maths, Physics and Clinical Measurement for Anaesthesia and Intensive Care*. Cambridge University Press; 2019:53-69.

Single Flow Meter Option (6.1)

- A single flow meter may be allowed for multiple destruction devices under certain conditions:
  - All devices are monitored to be operational
  - If all devices have same Biogas Destruction Efficiency (BDE), no additional steps required
  - If devices have different BDE, then:
    - The least efficient value is applied to all devices;
    - All devices should have a safety shut off valve or designed in a manner preventing gas from flowing to a device when non-operational; and
    - If device is non-operational, remaining devices must have capacity to compensate for additional gas flow



Indirect Monitoring Alternative (6.1.1)

- Projects may choose to indirectly measure LFG using output data for their destruction device
  - A project may use a commercial transfer meter to measure output data to use as the basis for determining the volume of CH_4 destroyed
  - QA/QC requirements in Section 6.2 (Instrument QA/QC) still apply, unless the maintenance of the meter is out of the project's control, in which case reasonable efforts must be made to demonstrate maintenance requirements have been met
  - Monitoring methodology must be demonstrated to satisfaction of the verifier and the Reserve

Monitoring Plan

Monitoring Plan

- Serves as the basis for verification bodies to confirm that
  - monitoring and reporting requirements have been met
  - consistent, rigorous monitoring and record-keeping is ongoing at the project site.
- Must include:
  - Data collection procedures
  - QA/QC practices
  - Roles and responsibilities
- Must also include procedures to ascertain and demonstrate that projects pass:
  - Legal Requirement Test
  - Regulatory Compliance
- Detailed system diagram including all sources within the GHG Assessment Boundary
  - Submitted at listing and any time the system changes

Monitoring Plan vs. Monitoring Report

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Monitoring Plan

- Standard Operating Procedure for the project
- Which staff, which activities, when, how will it be documented
- Helps with continuity in cases of staff turn over

Monitoring Report

- Specific to reporting period
- Clear, organized record showing the data, dates, and documentation from the reporting period.
- This is created by carrying out the monitoring plan

QA/QC Requirements

SECTION 6.2

Instrument QA/QC Requirements

- All gas flow meters and continuous methane analyzers must be:
  - **Cleaned and inspected**
  - **Field checked** for calibration accuracy by a third-party
  - **Calibrated** by the manufacturer or a certified third-party
- Portable methane analyzers must also meet QA/QC requirements
- If the QA/QC requirements are not performed and properly documented per protocol requirements, no GHG credits may be generated for that reporting period

Cleaning and Inspection

- Cleaning and inspection procedures and frequency must, at a minimum, follow the manufacturer's recommendations
- Must be specified in the project's monitoring plan:
  - Be specific: include date, serial number, activities, staff, photos, etc.
  - Specify activities and schedule for field staff
  - Include a reporting form
  - Document results by site personnel

Field Check

- Field checks for calibration accuracy by a **third-party technician** with the **percent drift ("as-found condition")** documented is required
- Conducted using either a portable instrument (such as a pitot tube) or manufacturer specified guidance
- Must occur within two months of the end date of the reporting period (before or after)
- Procedures and schedule should be included in your monitoring plan

Field Check

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Q1			Q2			Q3			Q4				
										Field Check Required			

RP Start

RP End

Who is Considered “Third Party”

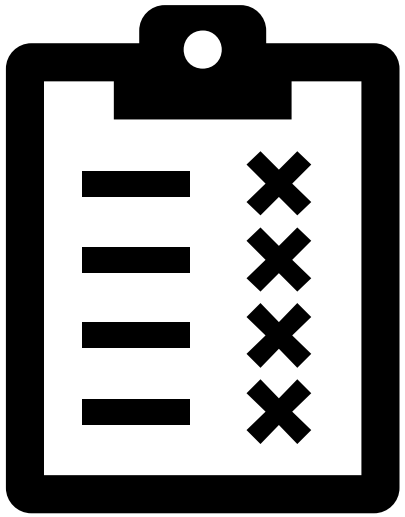
Party	Description
Non-third Party	Project Developers, landfill staff, technical consultants, subcontractors, all other stakeholders with material interest in party
Third Party	Eligible stakeholder with ZERO material interest in the project. The check is the only role they play in the project.

As-found vs. As-left

- "As-found“: is the accuracy reading of the device taken prior to field check or calibration.
- "As-left" is the accuracy reading of the device after calibration.
- Some manufacturers such as Ecotec do not record "as found" readings unless requested.
- As-found and as-left conditions must be within +/-5% accuracy.
  - Ensure the accuracy of data and credits issued

Calculating Percent Drift

- (Actual value – expected value) / expected value
- Not based on full scale reading
- Example: If a known 50% methane concentration meter reads 55%
  - (55% - 50%) / 50% = 10% drift
  - **NOT**: (55% - 50%) / 100% = 5% drift



Failed Field Check

- If a field check reveals **drift outside +/-5%** (as compared to the "true" reading from the field check), the project developer will record percent drift, then clean equipment and conduct a second field check
  - If second field check indicates measurement accuracy within +/-5% no further calibration required
  - If second field check confirms drift outside +/-5%, calibration by manufacturer/certified service provider is required

Failed Field Check

- Required adjustments for entire time period since last successful field check until properly calibrated meter is in place:
  - For calibrations that indicate under-reporting, metered values must be used without correction
  - For calibrations that indicate over-reporting, metered values must be adjusted based on the greatest calibration drift recorded at the time of calibration
- May perform more frequent field checks by non-third-party technician
  - Ensure that the name of staff, their training, and procedures are documented.
  - More frequently checks are performed, the less data will need to be adjusted

Calibration Requirements

- Calibration is required by the manufacturer or a certified third-party calibration service per manufacturer's guidance or every 5 years when calibration frequency is not specified by the manufacturer
- Include all information in your monitoring report:
  - Include dates and results of previous calibration – verifier should easily be able to see that the meter has been in compliance with protocol
- This requirement is often missed, i.e., calibrations occurring outside of the required window.
- If you are 1 day late, you don't meet the requirements of the protocol

Meter Brought Back into Use on Project

- Example: A meter was:
  - Calibrated in January of 2018
  - Removed from project in 2020, left unused on shelf
  - Re-entered project in 2023
- Meter is not eligible after January 2023 (5 years) without a new manufacturer calibration
  - Based on time since last calibration
  - Not based on time meter is in use

Errata and Clarification – April 5, 2023

- A stationary meter in use for 60 days or more that is removed and not reinstalled during the same reporting period shall be
  - field-checked for calibration accuracy within 2 months of removal; or
  - calibrated (with percent drift documented) by the manufacturer or a certified calibration service (with as-found results recorded) no more than 12 months prior to use of the meter to quantify emission reductions and no later than the commencement of verification activities for the relevant reporting period.“
- Required in protocol

Lessons Learned / Best Practices

Monitoring Plan

- Standard Operating Procedure for the project
- Verification is a records-based exercise – have clear records
- Include templates for field staff
- Clear timelines, clear activities by specific staff

Templates for Cleanings and Inspections by Field Staff

- Serial number
- Personnel
- Photos with time stamps
- Date
- As-found vs. as-left documentation
- Activities completed checklist
- Last calibration date, next due date
- Notes

Best Practices

- Visit projects on site
- Train your landfill staff – read protocol and monitoring plan
- Prepare monitoring documentation in an organized way
- Traceable data (e.g., include equations in excel files)
- More frequent field checks by landfill staff
- Stay current with Errata and Clarifications

Alternative Monitoring Equipment

- New technology has been developed for landfill systems that are not mentioned in the Protocol (e.g., LoCi meters and Veris Verabar)
- Can be used in tandem with project monitoring equipment but may not be considered a replacement.
- Contact the Reserve for guidance if you are interested in using LoCi meters, Veris Verabar meters, or other “non-traditional” equipment

Variance Process

- If QA/QC requirement is missed, you may request a variance
- To submit a variance request, the project developer must complete and submit a Request for Project Variance form and pay the associated fee.
- The Reserve will review the request and issue a determination letter.
- The Reserve retains the right to reject a variance, request further documentation or impose additional constraints and/or discount factors on the proposed monitoring or measuring methods
- They are not precedent setting, and the Res will not approve the same variance twice.

Questions / Discussion

Contact

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