

McKinney Landfill

Monitoring Plan for Landfill Gas Collection and Destruction

Purpose

This document will guide data collection relating to the quantification of greenhouse gas emissions reductions for the LFG flaring project at the McKinney Landfill. The primary parameters to be monitored at the project are gas flow and gas quality (See **Table 1: Project Parameters Monitored**). McKinney will integrate the following requirements into its operation and monitoring plan for the site to ensure the required data is collected and records are maintained to adequately support its planned greenhouse gas emissions reduction assertions.

Responsibilities

- The McKinney Field Technician will be responsible for the maintenance of all equipment and instruments at the site associated with the project. The Field Technician will also be responsible for downloading, reducing and ensuring the accuracy of all monitored data using the Data Acquisition and QC procedures identified below.
- The Environmental Manager will be responsible for implementing quality assurance audits of the project data and regulatory requirements in accordance with the methods outlined below. The Environmental Manager will quantify and document the greenhouse gas emission reductions in accordance with the methods contained in the registry protocol. The Environmental Manager will also maintain project records in accordance with the record keeping methods identified.

Gas Flow

Landfill Gas Flow Data Collection

- Gas flow will be monitored on a continuous basis using a Thermal Instrument Company flow meter Model # 62-9/9500 and recorded on a Yokogawa recorder Model # FX 106-4-2 (Suffix # C3/C7/M1).
- All flow data will be digitally entered into the Yokogawa recorder and electronically transmitted to the Montauk ftp internet site on an hourly basis. The continuous flow data will be downloaded weekly and the total flow for each day will be entered on the McKinney Flare Log in accordance with the Data Acquisition and QC Procedures. As indicated in the Data Acquisition and QC Procedures starting 3/23/09 the data acquisition process will be streamlined. The data that the Field Technician will download weekly will include daily flow total reports created by the Yokogawa software.
- The automatic valve used to stop flow to the flare if the flame is extinguished, shall be tested in accordance with the manufacturer's instructions to ensure it is working correctly. The test results will be documented by the indication of zero flow.

Instrument Calibration

- The accuracy of the flow meter will be field checked at least quarterly. This check will consist of site personnel using a Pitot tube and manometer or an equivalent check. Results of the field check will be documented.
- If the flow meter is found to be out of calibration by greater than $\pm 5\%$, then site personnel will evaluate the results and take appropriate actions. These may include but are not limited to: conducting another field check, cleaning the meter, adjusting the meter or recording device, having a third party field check, and sending the meter to the manufacturer for adjustment. Any corrective actions taken will be documented.
- If corrective action is needed, a subsequent field check will be conducted immediately following the corrective action and approximately 1 – 2 weeks following to confirm the corrective actions were appropriate. Results of these checks will also be documented. (See Missing Data Section)
- The flow meter will be factory calibrated annually in accordance with the manufacturer's recommendations.

Gas Quality

Landfill Gas Methane Content Data Collection

- Gas quality will be continuously monitored and recorded using an ABB Natural Gas Chromatography System Model # NGC 8200. All data from the gas chromatograph is digitally entered into the Yokogawa recorder and electronically transmitted to the Montauk ftp internet site on an hourly basis. The continuous gas quality data will be downloaded weekly and the average methane content of the landfill gas for each day will be entered on the McKinney Flare Log in accordance with the Data Acquisition and QC Procedures. As indicated in the Data Acquisition and QC Procedures starting 3/23/09 the data acquisition process will be streamlined. The data that the Field Technician will download weekly will include daily methane average value reports created by the Yokogawa software.

Gas Analyzer Calibration

- This instrument conducts self-calibrations daily. Additional calibrations will take place in accordance with the manufacturer's instructions. Records of the calibrations will be maintained.

Flare

- Site personnel will monitor the flame at the flare continuously using a thermocouple located on the flare to record the temperature. Temperature readings are transmitted to the Yokogawa recorder and electronically transmitted to the Montauk ftp internet site on an hourly basis.
- Periods of down time, due to maintenance of the system or other causes, will be logged in a separate Downtime Log starting 3/1/09.

Missing Data

- In the event that either the flow meter or the gas chromatograph are found to be out of calibration (tested to be outside of allowable 5% margin of error), or is missing data, the data substitution methods provided in the U.S. EPA Acid Rain Program (40 CFR Part 75 Subpart D 75.33) will be applied to the data in question. The 5% discount factor will be applied to the total estimated quantity of methane collected and destroyed during the period affected.

Troubleshooting

- The malfunction or failure of each piece of equipment and/or instrument associated with the project will be addressed in accordance with the methods and in the timeframes shown in Table 3: Flare Skid Component Troubleshooting. Spare units will be maintained for the components as noted.

Quality Control (QC)

- Reference attached "Data Acquisition and QC Procedures for McKinney Landfill"

Quality Assurance

- Data
 - The McKinney Flare Log that is received once a month will be reviewed for content, general accuracy days for which any missing data procedures had to be implemented.
 - One day per month from the McKinney Flare Log will be randomly selected for a QA check. The QA check will consist of a comparison of the daily totals flows and average methane values reported on the McKinney Flare Log against the raw data for the day.
 - Results of the QA checks will be documented on the "McKinney QA Monthly Data Checks" sheet.
 - If results of QA check indicates a discrepancy in the reduced versus raw data then the Field Technician will be notified in order to investigate and correct the data.
- Environmental Regulatory QA
 - An audit of the environmental requirements associated with the project will be conducted on an annual basis using the "McKinney Environmental Quality Assurance Audit Checklist"
 - The *Attestation of Regulatory Compliance Form* (provided by registry) will be signed following completion of the annual audit. Records of the Audit Checklist and Attestation of Regulatory Compliance Forms will be maintained.

Records Management

- The records listed in Table 2 will be maintained in the locations noted. All documents will be retained for the life of the project in the locations and formats as identified. Copies of certain documents (e.g. Monitoring Plan, PDD) as identified by verifier and CAR will be uploaded onto the CAR website.
- *FTP Website – remote server managed by Intermedia*
 - The continuous raw LFG Flow, Gas Quality and Temperature readings are maintained on the FTP Website.
 - The raw data is downloaded from the Yokogawa recorder at the site once per hour and stored on the website in site specific folders for each month (e.g. McKinney, February 2009).
 - The FTP website can only be accessed with a user name and password as authorized by corporate IT personnel.
 - Data on the FTP site is backed up by the 2GB compact flash card on the Yokogawa recorder.
 - Data from the FTP site will be downloaded weekly by the Field Technician who will transfer the raw data to an excel spreadsheet. The Field Technician will reduce the continuous data into daily summaries using excel spreadsheets in accordance with the Data Acquisition and QC Procedures. A CD that contains the raw data and reduced summaries in an excel spreadsheet format will be downloaded for separate storage quarterly.
- *Common L-Drive*
 - The verification documents (e.g., calibration records, electricity invoices, permits, calculations, etc) are maintained on Montauk Energy Capital's (MEC) Common L-Drive.
 - Any updates or changes to the verification documents will be added to the Common L-Drive on a quarterly basis. Data from the previous quarter will be downloaded and stored on a CD.
 - The L-drive is accessible to MEC personnel within the Pittsburgh office, only one user (computer service provider) has VPN access to the L-drive.
 - The L-drive is backed up monthly to a tape drive which is taken offsite monthly.
- *Hard Copies*
 - The verification documents will also be maintained by the Environmental Manager on hard paper copies in the Pittsburgh office.
 - The bound copy of the project verification documents will be updated quarterly with a separate file of data as required from the previous quarter(s) also maintained.

Project Emissions

- Electricity consumed by the project equipment will be tracked through invoices.

- Other fuels consumed by project equipment, such as propane will be tracked through invoices to the extent possible. Where direct consumption records are not practicable, such as with contractor equipment, appropriate engineering assumptions will be used to estimate fuel consumed.

Reporting Cycle

- Greenhouse gas emissions reductions will be quantified and verified on a quarterly basis.

Table 1: Project Parameters Monitored

Parameter	Monitoring Equipment	Frequency of Measurement	Frequency of Calibration
LFG Flow	Thermal Instrument Company Model 62-9/9500 Serial No. 2008178	Continuous; Field Tech downloads daily totalized flows on weekly basis	Quarterly field check; Factory calibrations annually.
Gas Quality (% CH ₄ in LFG)	ABB Natural Gas Chromatography System Model NGC 8203 Serial No. 80000005	Continuous; Field Tech downloads average daily gas quality values on a weekly basis	Self-calibrations conducted daily. Factory calibrations quarterly.
Flare Operation	Thermocouple	Continuous	Maintain per manufacturer's specifications. Replace upon failure
Electricity Use	Utility Meter	Monthly on invoices	N/A
Project Fuel Consumption	Various	Monthly	N/A

Table 2: Records

Parameter	Record Type	Record Format	Location
LFG Flow	Raw Data Reduced Data	Electronic from Yokogawa Excel Spreadsheets- Electronic & Hard Copy	FTP Site L-Drive , Pittsburgh Office
Gas Quality (% CH ₄ in LFG)	Raw Data	Electronic from Yokogawa Excel Spreadsheets- Electronic & Hard Copy	FTP Site L-Drive, Pittsburgh Office
Flare Operation	Temperature readings	Electronic from Yokogawa Excel Spreadsheets- Electronic & Hard Copy	FTP Site L-Drive, Pittsburgh Office
Flow Meter Calibration	Calibration results from field checks; Calibration results from factory calibrations	Electronic Hard Copies	L-Drive Pittsburgh Office
Gas Analyzer Calibration	Alarms; Calibration results from factory calibrations	Electronic Hard Copies	L-Drive Pittsburgh Office
Electricity Use	Invoices	Electronic Hard Copies	L-Drive Pittsburgh Office
Project Fuel Consumption	Invoices; Raw data used to make assumptions	Electronic Hard Copies	L-Drive Pittsburgh Office
Environmental Permits	Documents from Regulatory Agencies	Electronic Hard Copies	L-Drive Pittsburgh Office
Monitoring Plan	Updated as Needed	Electronic Hard Copies	L-Drive Pittsburgh Office, CAR site
Project Design Document	Updated as Needed	Electronic Hard Copies	L-Drive Pittsburgh Office, CAR site
Quality Control /Quality Assurance	Procedures, Annual Audits, Calculation, Attestation	Electronic Hard Copies	L-Drive Pittsburgh Office, CAR site
Emission Reduction Calculations	Calculation Summary	Excel Spreadsheet- Electronic & Hard Copy	L-Drive Pittsburgh Office

Table 3: Flare Skid component Troubleshooting

Component	Estimated Delivery Time	Estimated Replacement Time (on site)	Spare Unit at site	Additional Information
Yokogawa Recorder	4-6 weeks	1 day	Yes	Not site repairable
Thermocouples	2 weeks	1 day	Yes	Not repairable/equip. rental required
Blower Assembly	4-6 weeks	2 days	No	Equip. rental required/ two man job (new blower)
Gas Chromatograph	1-2 weeks	2 days	No	ABB Technician required: NGC 8200
Sample Train Assembly	2 weeks	1 day	Yes	Not repairable
Actuator Valve	2 weeks	1 day	Yes	Not site repairable/ two man job
PLC	1-2 weeks	1 day	Yes	Not repairable/outside tech. required (Allen Bradley Micrologix 1200 w/Ethernet and thermocouple modules)
Flow Meter	2-4 weeks	1 day	Yes	Thermal Instruments 62-9/9500
Pilot Assembly	1 week	1-2 days	Yes	Not repairable/equip. rental required
Condensate Pump	2-4 weeks	1 day	Yes	Not site repairable/two man job
Misc. Elec. Component	1 week	1 day	Yes	e.g. Motor Starter, Transformer, Relay, etc.

*Note: These estimated times and costs are based on total Unit Replacement – For minor malfunctions allow 1 week for repair.