

Regional Greenhouse Gas Initiative
CO₂ Budget Trading Program



Massachusetts
Department of Environmental Protection

Massachusetts CO₂ Budget Trading Program

Offset Project Monitoring and Verification Report

Landfill Methane Capture and Destruction

Version 1.0

Issued by

Issued on

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1. Overview

To demonstrate the achievement of carbon dioxide (CO₂)-equivalent (CO₂e) emissions reductions from a landfill methane capture and destruction offset project that has received a consistency determination from the Massachusetts Department of Environmental Protection (MassDEP), a Project Sponsor must submit to MassDEP in accordance with the instructions (see accompanying instructions packet), a fully completed *Massachusetts Offset Project Monitoring and Verification Report – Landfill Methane Capture and Destruction Version 1.0 (M&V Report)*, consisting of the coversheet and all forms and related attachments. Following these instructions will ensure that the *M&V Report* contains all necessary information and is submitted properly.

The Project Sponsor should review the Massachusetts CO₂ Budget Trading Program regulations, 310 CMR 7.70(10) for information regarding offset projects and the award of CO₂ offset allowances. All Massachusetts offset project submittal materials and documents are available at <http://www.rggi.org/offsets>.

2. Submission Instructions

The Project Sponsor should submit the completed *M&V Report*, and all attachments, via the Regional Greenhouse Gas Initiative (RGGI) CO₂ Allowance Tracking System (COATS) at <http://www.rggi-coats.org> under the established general account identified in the Massachusetts *Consistency Application* for the project. For additional information, consult the RGGI COATS User's Guide, available at <http://www.rggi-coats.org>.

The *M&V Report* includes three (3) parts, as described below. Each part comprises specified forms and required documentation. The *M&V Report* has been created as a Microsoft Word document with editable fields. Enter information directly in the fields provided or submit information or documentation as an attachment, as instructed. Include headers on all attachments indicating the form to which each is attached, the offset project name, and offset project ID code. If attachments are being submitted as separate electronic documents, please include the form numbers in the file names of the documents.

When submitting documents electronically via RGGI COATS, it is not necessary to submit a scanned or paper hardcopy of the application forms. The Project Sponsor must retain the completed original copy of the *M&V Report* and attachments with the original signed documents. MassDEP reserves the right to request the original signed application documents at any time.

A completed hardcopy and/or CD of the *M&V Report* may also be mailed to: Climate Strategies Group, Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, 6th Floor, One Winter Street, Boston, MA 02108-4747.

Questions about this form and how to submit it should be directed to climate.strategies@state.ma.us or 617-574-6815.

3. M&V Report Forms

The *M&V Report* consists of eight (8) forms divided into three (3) parts, as follows:

Part 1. General Information Forms

- Form 1.1 – Coversheet
- Form 1.2 – General Information
- Form 1.3 – Attestations
- Form 1.4 – Project Sponsor Statement
- Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

Part 2. Category-Specific Information and Documentation Forms

- Form 2.1 – Demonstration of Conformance with M&V Plan
- Form 2.2 – Determination of Emissions Reduction

Part 3. Independent Verification Form

- Form 3.1 – Independent Verifier Certification Statement and Report

Note that although the forms include many embedded instructions, Project Sponsors are advised to consult the accompanying instructions packet for full instructions and documentation requirements.

Offset Project Name

Offset Project ID Code

Form 1.1 – Coversheet

Project Sponsor (RGGI COATS Authorized Account Representative)

Project Sponsor Organization

Reporting Period

RGGI COATS General Account Name

RGGI COATS General Account Number

Check the boxes below to indicate submission of the following required forms:

- Form 1.2 – General Information
- Form 1.3 – Attestations
- Form 1.4 – Project Sponsor Statement
- Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting
- Form 2.1 – Demonstration of Conformance with M&V Plan
- Form 2.2 – Determination of Emissions Reduction
- Form 3.1 – Independent Verifier Certification Statement and Report

Offset Project Name **Offset Project ID Code**

Form 1.2 – General Information

Project Sponsor (RGGI COATS Authorized Account Representative)

Telephone Number **Fax Number** **Email Address**

Street Address

City **State/Province** **Postal Code** **Country**

RGGI COATS General Account Name

RGGI COATS General Account Number

Name of Offset Project **Project Commencement Date**

Summary Description of Offset Project

Project City **Project County** **Project State**

Project Sponsor Organization

Primary Street Address

City **State/Province** **Postal Code** **Country**

Brief Description of Project Sponsor Organization

Telephone Number **Website URL**

Independent Verifier (Company/Organization) **States Where Verifier Accredited**

Primary Street Address **Website URL**

City **State/Province** **Postal Code** **Country**

Point of Contact for Project

Contact Telephone Number **Contact Fax Number** **Contact Email Address**

Contact Street Address

City **State/Province** **Postal Code** **Country**

Offset Project Name

Offset Project ID Code

Form 1.3 – Attestations

The undersigned Project Sponsor certifies the truth of the following statements:

1. All offset projects for which the Project Sponsor or project sponsor organization has received CO₂ offset allowances, under the Project Sponsor's or project sponsor organization's ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the Project Sponsor or project sponsor organization) are in compliance with all applicable requirements of the CO₂ Budget Trading Program in all participating states.
2. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this *M&V Report* and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Project Sponsor Signature

Date

Printed Name

Title

Organization

Offset Project Name

Offset Project ID Code

Form 1.4 – Project Sponsor Statement

The undersigned Project Sponsor hereby confirms and attests that the offset project upon which this Monitoring and Verification Report is based is in full compliance with all of the requirements of 310 CMR 7.70(10). The Project Sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. The Project Sponsor understands that eligibility for the award of CO₂ offset allowances under 310 CMR 7.70(10) is contingent on meeting the requirements of 310 CMR 7.70(10). The Project Sponsor authorizes MassDEP or its agent to audit this offset project for purposes of verifying that the offset project, including the Monitoring and Verification Plan, has been implemented as described in the *Consistency Application* that was the subject of a consistency determination by MassDEP. The Project Sponsor understands that this right to audit shall include the right to enter the physical location of the offset project and to make available to MassDEP or its agent any and all documentation relating to the offset project at MassDEP's request. The Project Sponsor submits to the legal jurisdiction of Massachusetts.

Project Sponsor Signature

Date

Printed Name

Title

Organization

Offset Project Name

Offset Project ID Code

Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

Check the box below that applies:

- No greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the Massachusetts CO₂ Budget Trading Program.
- Greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the Massachusetts CO₂ Budget Trading Program. Information for all such programs to which greenhouse gas emissions data have been or will be reported is provided below.

Name of Program to which GHG Emissions Data Reported

Check all that apply:

- Reporting is currently ongoing
- Reporting was conducted in the past
- Reporting will be conducted in the future
- Reporting is mandatory
- Reporting is voluntary

Enter Frequency of Reporting

Enter Reporting Start Date

Program Contact Information – Address

Program Website

Categories of Emissions Data Reported

Name of Program to which GHG Emissions Data Reported

Check all that apply:

- Reporting is currently ongoing
- Reporting was conducted in the past
- Reporting will be conducted in the future
- Reporting is mandatory
- Reporting is voluntary

Enter Frequency of Reporting

Enter Reporting Start Date

Program Contact Information – Address

Program Website

Categories of Emissions Data Reported

Add extra pages as needed. Each attachment must include a header that indicates it is an attachment to Form 1.5, identifies the number of the appropriate table and the reference number in the left-hand column of the table, and includes the offset project name and offset project ID code. If attachments are being submitted as separate electronic documents, please include the form numbers in the file names of the documents.

Offset Project Name

Offset Project ID Code

Form 2.1 – Demonstration of Conformance with M&V Plan

Using the checklist provided in the right hand column of the tables below, attach documentation that demonstrates that the required elements of the submitted M&V Plan described in the left hand column of the tables were performed. Indicate that the required documentation is provided as an attachment to Form 2.1 by checking the appropriate boxes. Each attachment must include a header that indicates it is an attachment to Form 2.1, identifies the number of the appropriate table and the reference number in the left-hand column of the table, and includes the offset project name and offset project ID code. If attachments are being submitted as separate electronic documents, please include the form numbers in the file names of the documents.

Table 1. Quality Assurance/Quality Control (QA/QC) Program for Measuring Equipment

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
Quality Assurance/Quality Control (QA/QC) Program for Measuring Equipment	
1. Procedures for recording names and contact information for: personnel responsible for recording measurements and data entry, QA/QC managers, and third party analytical laboratory	<input type="checkbox"/> Copy of the organizational structure of the landfill gas measurement and monitoring team, including names and contact information; contact information for third-party laboratory
2. Procedures for designated personnel to keep landfill gas sales records, in million British thermal units (MMBtu) or standard cubic feet (scf), electricity sales records, records of measured heat rate of combustion device if applicable, and records of newly installed equipment and retired equipment	<input type="checkbox"/> List of specific procedures performed by designated personnel <input type="checkbox"/> Sales receipts showing amount of landfill gas, in million British thermal units (MMBtu) or standard cubic feet (scf), or electricity in kilowatt hour (kWh) sold <input type="checkbox"/> Copies of records of measured heat rate of combustion and equipment installation/retirement
3. Procedures for annual comparison of collected methane as measured by monitoring equipment with calculated methane used to generate electricity or calculated methane in landfill gas sold, noting any discrepancies	<input type="checkbox"/> Copy of annual comparison calculation, including data sources and assumptions
4. Calculation procedures for standardizing landfill gas flow that correct for documented site-specific temperature and pressure measurements (only necessary if landfill gas flow meter does not automatically adjust landfill gas measurement to standard units)	<input type="checkbox"/> Records of daily standardization calculations of landfill gas flow, to standard cubic feet (scf), using daily site-specific measurements of temperature and pressure
5. Description of the contents of an annual quality control report describing the procedures taken to QA/QC landfill gas collection and monitoring equipment	<input type="checkbox"/> Annual quality control report that describes landfill gas collection system, updates or equipment changes, procedures taken to QA/QC landfill gas collection and monitoring equipment, findings of quarterly reviews, issues encountered, and remedial actions taken

Offset Project Name

Offset Project ID Code

Form 2.1 – Demonstration of Conformance with M&V Plan (continued)**Table 2. Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment**

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
<i>Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment</i>	
1. Landfill gas flow rate performance tests will be conducted at least monthly to ensure flow readings are being recorded at least every 15 minutes	<input type="checkbox"/> Copy of monthly performance tests <input type="checkbox"/> Copy of data for one (1) sample day per month of flow meter readings recorded in intervals of at least 15 minutes
2. Monthly performance tests will be conducted to show that the accuracy of flow meter readings is within +/- 5 percent of manufacturer specifications	<input type="checkbox"/> Copy of monthly performance tests <input type="checkbox"/> List of specific procedures followed and equipment used to verify flow meter accuracy
3. Monthly performance tests will be conducted of methane concentration instrument showing that manufacturer specifications are met for precision and accuracy	<input type="checkbox"/> Copy of monthly performance tests <input type="checkbox"/> List of specific procedures followed and equipment used to verify methane concentration instrument accuracy and precision
4. Maintenance schedules for landfill gas flow meter and methane concentration instrument are performed in accordance with manufacturer recommendations and specifications	<input type="checkbox"/> Copies of maintenance schedules <input type="checkbox"/> Copy of manufacturer recommended maintenance schedule for landfill gas flow meter and methane concentration instrument (permanent and portable equipment)
5. Collected landfill gas flow rates and methane concentration recorded at least daily	<input type="checkbox"/> Copies of at least daily measured landfill gas flow rates and methane concentration
6. Records kept on a monthly basis of the number of hours that the landfill gas collection system was not in operation	<input type="checkbox"/> Records of monthly landfill gas collection system operation status (in hours per month)
7. Records kept on a monthly basis of the number of hours that the combustion device (e.g., flare, boiler, electricity generation unit) was not in operation	<input type="checkbox"/> Records of monthly combustion device operation status (in hours per month)
8. Records kept on a monthly basis of calculation of landfill gas flow rate standardization, in standard cubic feet per day (scf/day), to correct for site-specific pressure and temperature measurements (only required if landfill gas flow meter does not automatically adjust landfill gas flow to standard units)	<input type="checkbox"/> Records of daily landfill gas flow rate calculation into standard cubic feet including site-specific pressure and temperature measurements

Offset Project Name

Offset Project ID Code

Form 2.1 – Demonstration of Conformance with M&V Plan (continued)**Table 2. Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment (continued)**

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
9. Records kept on an annual basis of measured heat rate of combustion, in British thermal units per kilowatt hour (Btu/kWh), in accordance with manufacturer specifications for landfill gas, if applicable to the offset project (required for offset projects with an electric generation component)	<input type="checkbox"/> List of manufacturer specifications for combustion device heat rate, in British thermal units per kilowatt hour (Btu/kWh) <input type="checkbox"/> Copies of annual records from source tests showing the measured heat rate of combustion device
10. Records kept on a monthly basis on the amount of landfill gas combusted, in standard cubic feet (scf), in the combustion device	<input type="checkbox"/> Copies of records of the monthly amount of landfill gas combusted, (in standard cubic feet (scf), in the combustion device
11. Records kept of calibration procedures for landfill gas flow monitoring equipment as specified by the manufacturer	<input type="checkbox"/> List of calibration activities and receipt of services rendered if performed by outside contractor <input type="checkbox"/> List of manufacturer specifications for landfill gas flow meter calibration
12. Records kept of calibration procedures for both portable and permanent methane concentration measurement equipment as specified by the manufacturer	<input type="checkbox"/> List of calibration activities and receipt of services rendered if performed by outside contractor <input type="checkbox"/> Calibration data from field measurements for methane concentration instrument <input type="checkbox"/> List of manufacturer recommendations for landfill gas concentration measurement equipment
13. Records kept of calibration schedules for landfill gas flow meter and methane concentration instrument (for both permanent and portable equipment) in accordance with manufacturer recommendations and specifications	<input type="checkbox"/> Copies of calibration schedule performed for landfill gas flow meter and methane concentration instrument (for both permanent and portable equipment)

Offset Project Name

Offset Project ID Code

Form 2.1 – Demonstration of Conformance with M&V Plan (continued)

Table 3. Records Retention

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
Records Retention	
<p>1. Document recordkeeping protocol that will be used to maintain record keeping throughout the duration of the offset project, including maintenance of an electronic index of all material to be collected, and storage procedures for such material</p>	<p><input type="checkbox"/> Index of all project documentation materials collected during the reporting period</p>

Table 4. Independent Verification of Landfill Gas Methane Composition

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
Independent Verification of Landfill Gas Methane Composition	
<p>1. Document process used to perform annual third-party laboratory analysis of sampled landfill gas using U.S. EPA-approved laboratory testing methods</p>	<p><input type="checkbox"/> List of EPA-approved test procedure followed</p> <p><input type="checkbox"/> Copy of third-party analysis report of sampled landfill gas and date of analysis</p>
<p>2. Document protocol used to ensure landfill gas samples taken at the same location as the landfill gas flow meter</p>	<p><input type="checkbox"/> Signed documentation by sampling technician that methane concentration measurements were taken at location of landfill gas flow meter</p>

Offset Project Name

Offset Project ID Code

Form 2.2 – Determination of Emissions Reduction

Provide documentation of CO₂-equivalent (CO₂e) emissions reductions during the reporting period. Attach a spreadsheet documenting the calculations and data sources used to determine CO₂-equivalent (CO₂e) emissions reductions, volume of methane collected, and mass of methane per standard cubic foot. The attachment must include a header that indicates it is an attached to Form 2.2 and includes the offset project name and offset project ID code. If attachments are being submitted as separate electronic documents, please include the form numbers in the file names of the documents.

Enter calculated values:

Emissions reductions in tons of CO₂-equivalent emissions (tons CO₂e)

Volume of methane collected in standard cubic feet (scf)

Mass of methane in pounds per standard cubic feet (lbs/scf)

Offset Project Name

Offset Project ID Code

Form 3.1 – Independent Verifier Certification Statement and Report

An accredited independent verifier must sign and date the form. Attach the accredited verifier report. The attached verifier report must include a header that indicates it is an attachment to Form 3.1 and includes the offset project name and offset project ID code. If attachments are being submitted as separate electronic documents, please include the form numbers in the file names of the documents. Note that the Project Sponsor must retain the completed original copy of the *M&V Report* and attachments, including the verifier’s original signed documents. MassDEP reserves the right to request the original signed documents at any time.

Name of Accredited Independent Verifier

I certify that the accredited independent verifier identified above reviewed this *M&V Report*, including all forms and attachments, in its entirety, including a review of the following:

1. The verifier has reviewed the entire *M&V Report* and evaluated the contents of the report in relation to the applicable requirements of 310 CMR 7.70(10) and the required information that must be provided in the *M&V Report*.
2. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to determine CO₂-equivalent emissions (CO₂e) reductions in accordance with 310 CMR 7.70(10)(e)1., and the required documentation that must be provided in the *M&V Report*.
3. The verifier has evaluated the adequacy and consistency of methods used by the Project Sponsor to quantify, monitor, and verify CO₂-equivalent (CO₂e) emissions reductions in accordance with the requirements of 310 CMR 7.70(10)(e)1., and the Monitoring and Verification Plan submitted as part of the *Consistency Application*.

A verification report is attached that documents the verifier’s review of the items listed above and includes evaluation conclusions and findings.

<hr/> Verifier Representative Signature	<hr/> Date
<hr/> Printed Name	
<hr/> Title	