

Regional Greenhouse Gas Initiative CO₂ Budget Trading Program



Offset Project Monitoring and Verification Report Forms

Avoided Methane Emissions from Agricultural Manure Management

Version 1.1

Issued by:
Bureau of Energy and Technology Policy
CT Department of Energy & Environmental Protection
<http://www.ct.gov/deep/>

April 2016

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1. Overview

To demonstrate the achievement of CO₂-equivalent emissions reductions from an agricultural manure management offset project that has received a consistency determination from the Connecticut Department of Energy & Environmental Protection (“Department”), a Project Sponsor must submit to the Department in accordance with instructions (see accompanying instructions packet) a fully completed *Offset Project Monitoring and Verification Report – Avoided Methane Emissions from Agricultural Manure Management Version 1.1* (“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 CO₂ Budget Trading Program regulations at [section 22a-174-31a of the Regulations of Connecticut State Agencies](#) (“RCSA”) addressing offset projects and the award of CO₂ offset allowances. All offset project submittal materials and documents are available at www.ct.gov/deep/cwp/view.asp?a=2684&Q=440696&depNav_GID=1619.

2. Submission Instructions

Please complete this form and supporting documents in accordance with [section 22a-174-31a of the RCSA](#), the RGGI Model Rule (www.rggi.org/documents) and accompanying instructions to ensure the proper handling of your application. These instructions are not a substitute for the requirements of the relevant statutes and any regulations thereunder. You should review all applicable laws prior to completing this application. Remember, it is your responsibility to comply with all applicable laws. There is no fee associated with the submission of this application.

Submit one (1) complete hardcopy original and one (1) electronic copy of the *M&V Report* in the form of a CD disk. Submit hardcopies of forms requiring signatures as originally-signed copies and scan such signed forms for electronic submission. Facsimiles of the *M&V Report* are not acceptable under any circumstances.

ATTN: MICHAEL MALMROSE
CO₂ BUDGET TRADING PROGRAM
BUREAU OF ENERGY AND TECHNOLOGY POLICY
CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
10 FRANKLIN SQUARE
NEW BRITAIN, CT 06051

If you have any questions about the *M&V Report*, please contact Michael Malmrose at michael.malmrose@ct.gov or at (860) 827-2933.

The *M&V Report* has three 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.

The Project Sponsor should save an electronic copy for his or her file to serve as a reference for any remediation.

3. M&V Report Forms

The *M&V Report* consists of eight (8) forms divided into three 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

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

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.

Signature of Project Sponsor

/ /
Date (MM/DD/YYYY)

Name of Project Sponsor (printed)

Title

Organization

Notary

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 section 22a-174-31a of the RCSA. 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 section 22a-174-31a of the RCSA is contingent on meeting the requirements of section 22a-174-31a of the RCSA. The Project Sponsor authorizes the Department 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 the Department. 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 the Department or its agent any and all documentation relating to the offset project at the Department's request. The Project Sponsor submits to the legal jurisdiction of Connecticut.

Signature of Project Sponsor

/ /
Date (MM/DD/YYYY)

Name of Project Sponsor (printed)

Title

Organization

Notary

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 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 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.

Offset Project Name	Offset Project ID Code

Form 2.1 – Demonstration of Conformance with M&V Plan

Provide documentation that procedures and protocols specified in the M&V Plan were performed and records specified in the M&V Plan were generated and retained. Check the boxes in the tables below to indicate that the referenced documentation is provided as an attachment to Form 2.1. All attached documentation must include a header that indicates it is an attachment to Form 2.1, identifies the appropriate table number and reference number in the left-hand column of the table, and includes the offset project name and offset project ID code.

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

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
1. Procedures for recording names and contact information for the personnel responsible for project monitoring and documentation	<input type="checkbox"/> List of the individuals responsible for influent monitoring, digester biogas monitoring, and the third-party laboratory used to verify biogas methane concentration, including contact names by location
2. Procedures for recording names and contact information for the personnel responsible for QA/QC of project monitoring and documentation	<input type="checkbox"/> List of the individuals responsible for QA/QC of project monitoring, including contact names by location
3. Procedures for the compilation of an annual QA/QC report summarizing findings of QA/QC activities conducted and any remedial actions taken	<input type="checkbox"/> Annual QA/QC report summarizing all QA/QC activities conducted and remedial actions taken
4. Procedures, if applicable, for annual comparison of methane generated by anaerobic digester, as measured by monitoring equipment, with estimated methane used to generate electricity, as derived from electric generation records	<input type="checkbox"/> Copy of annual comparison of methane generated by the anaerobic digester with estimated methane used to generate electricity, including calculations and data used
5. Procedures for documenting installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration	<input type="checkbox"/> Records of biogas monitoring equipment installed or retired
6. Procedures for quarterly third-party laboratory analysis of methane concentration of sampled digester biogas using U.S. EPA-approved laboratory testing methods, including specification of the testing method to be used	<input type="checkbox"/> List of EPA-approved test procedures used <input type="checkbox"/> Copy of third-party laboratory analysis report of methane concentration of sampled digester biogas and date of analysis

Table 1. Quality Assurance/Quality Control (QA/QC) Program (continued)

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
7. Procedures to ensure that biogas samples will be taken at the same location as the digester biogas flow meter	<input type="checkbox"/> Signed documentation by sampling technician that digester biogas samples were taken at location of digester biogas flow meter
8. Procedures for QA/QC of influent monitoring data for each facility providing manure or organic food waste to the anaerobic digester	<input type="checkbox"/> List of procedures performed during the reporting period
9. For regional-type digesters, procedures for compilation of monthly receipts and records of manure and organic food waste (kg) received for input into the anaerobic digester from each facility providing manure or organic food waste influent	<input type="checkbox"/> Copies of monthly receipts and records of manure and organic food waste (kg) supplied to the anaerobic digester from each off-site facility
10. For regional-type digesters, for each facility providing organic food waste influent, procedures for ensuring that daily food waste input to the on-site storage tank prior to shipment to the anaerobic digester is at least 1/30 of the total storage tank capacity	<input type="checkbox"/> Copy of monthly records of daily monitoring of the timing and quantities of food waste input to the on-site storage tank and the timing and quantity of influent shipped to the anaerobic digester
11. For regional-type digesters, for each facility providing manure influent, procedures for ensuring that daily manure input to the on-site storage tank or pond prior to shipment to the anaerobic digester is at least 1/30 of the total storage tank capacity	<input type="checkbox"/> Copy of monthly records of daily monitoring of the timing and quantities of manure input to the on-site storage tank or pond and the timing and quantity of influent shipped to the anaerobic digester

Table 2. Measuring and Monitoring Equipment Maintenance, Operation, and Calibration

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
1. Monthly records of digester biogas flow rate performance tests to ensure: (1) flow readings are being recorded at least every 15 minutes; (2) the accuracy of digester biogas flow meter readings is within +/- 5 percent of manufacturer specifications; and (3) methane concentration instrument manufacturer specifications for precision and accuracy are met	<input type="checkbox"/> Copy of monthly biogas flow rate performance tests <input type="checkbox"/> Copy of data for one sample day per month of flow meter readings in intervals of at least 15 minutes
2. Records of the type of biogas flow meter installed (differential pressure or hot wire anemometer)	<input type="checkbox"/> Copy of specification sheet for the biogas flow meter installed
3. Records of the date and location of flow meter installation	<input type="checkbox"/> Copy of flow meter installation information, including date and location
4. Records of performance of maintenance schedules for digester biogas flow meter and methane concentration instrument in accordance with manufacturer recommendations and specifications	<input type="checkbox"/> Copies of maintenance schedules and records of maintenance activity conducted <input type="checkbox"/> Copy of manufacturer recommended maintenance schedule and specifications for digester biogas flow meter and methane concentration instrument
5. Daily records of collected digester biogas flow rates	<input type="checkbox"/> Copies of records of daily measured digester biogas flow rates
6. Weekly or daily records of methane concentration (daily records if onsite continuous methane concentration analyzer used)	<input type="checkbox"/> Copies of weekly or daily records of methane concentration (daily records if onsite continuous methane concentration analyzer used)
7. Monthly records of calculation of digester biogas flow rate standardization (in standard cubic feet) to correct for site-specific pressure and temperature measurements (note, this procedure is not necessary when using flow meters that automatically measure temperature and pressure and express digester biogas flow in standard cubic feet)	<input type="checkbox"/> Monthly calculation records of standardization of daily digester biogas flow from recorded cubic feet per day to standard cubic feet per day

Table 2. Measuring and Monitoring Equipment Maintenance, Operation, and Calibration (continued)

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
8. Monthly records of field data used for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements (note, not applicable when using flow meters that automatically measure temperature and pressure and express digester biogas flow in standard cubic feet)	<input type="checkbox"/> Copies of records of field data used for digester biogas flow measurement standardization
9. Monthly records of the number of hours the digester biogas flow meter was inoperable	<input type="checkbox"/> Copies of monthly records of the number of hours the digester biogas flow meter was inoperable (in hours per month)
10. Monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device	<input type="checkbox"/> Copies of monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device
11. Monthly records of electric generation and heat rate (in Btu/kWh) (note, only applicable to offset projects with an electric generation component)	<input type="checkbox"/> Copies of monthly records of electric generation <input type="checkbox"/> Copies of monthly records from source tests showing the measured heat rate, or copies of monthly records used to derive heat rate based on MMBtu of heat input and KWh of electricity generation
12. Annual records of the calibration procedures conducted for digester biogas flow meter in accordance with manufacturer specifications	<input type="checkbox"/> List of calibration activities conducted and receipts for services rendered if performed by outside contractor <input type="checkbox"/> List of manufacturer recommendations for calibration of digester biogas flow meter
13. Records of the dates and results of digester flow meter calibration, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations	<input type="checkbox"/> List of dates of digester flow meter calibration <input type="checkbox"/> Copy of calibration field measurement data and flow calculations, and the portable instrument and procedures used to check installed flow meter accuracy

Table 2. Measuring and Monitoring Equipment Maintenance, Operation, and Calibration (continued)

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
14. Records of calibration procedures conducted for methane concentration monitoring instrument (daily records if applicable to continuous methane concentration monitoring instrument; monthly records if applicable to portable methane concentration monitoring instrument)	<input type="checkbox"/> List of calibration activities conducted and receipts for services rendered if performed by outside contractor <input type="checkbox"/> List of manufacturer recommendations for calibration of methane concentration monitoring instrument
15. Records of the dates and results of methane concentration monitoring instrument calibration (applicable to both continuous methane concentration monitoring instrument and portable methane concentration monitoring instrument)	<input type="checkbox"/> List of dates of methane concentration monitoring instrument calibration <input type="checkbox"/> Copy of calibration field measurement data for methane concentration instrument

Offset Project Name**Offset Project ID Code****Form 2.2 – Determination of Emissions Reduction**

Provide documentation of CO₂-equivalent emissions reductions during the reporting period. Enter information in the fields below and attach documentation, as directed. Each attachment must include a header that indicates it is an attachment to Form 2.2 and includes the offset project name and offset project ID code.

Enter the following information:

	1. Annual baseline emissions (short tons CO ₂ e)
	2. Annual measured volume of methane recovered and destroyed by the anaerobic digester (short tons CO ₂ e)
	3. CO ₂ emissions from transportation of manure and organic food waste to the anaerobic digester (short tons CO ₂ e)
	4. Annual net emission reductions (short tons CO ₂ e)

Enter baseline emissions data for each month in the reporting period (if multiple facilities supplied influent to the digester, provide the sum for all facilities):

Month	VS _p (kg)	VS _{in} (kg)	VS _{out} (kg)	VS _{avail} (kg)	F (unitless)	VS _{deg} (kg)	V _m (scf)	CO ₂ e (short tons)
January	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
February	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
March	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
April	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
May	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
June	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
July	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
August	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
September	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
October	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
November	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
December	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total for Year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Check the boxes below to indicate that the following required documentation is attached:

- 1. **Baseline Emissions.** Spreadsheet documenting the data sources and calculations used to quantify baseline CO₂-equivalent emissions for each facility supplying manure and organic food waste influent to the anaerobic digester and the sum of CO₂-equivalent emissions for all such facilities. Monthly records for each facility of influent flow from the facility into the digester, influent total solids concentration (including specified sampling method), and influent volatile solids concentration (including specified sampling method).
- 2. **Methane Captured and Destroyed Using Anaerobic Digester.** Spreadsheet documenting the procedures, data sources, and calculations used to quantify the annual volume of methane emissions (in standard cubic feet of methane and CO₂-equivalent) captured and destroyed by the anaerobic digester.
- 3. **Transport CO₂ Emissions.** Spreadsheet documenting the procedures, data sources, and calculations used to quantify CO₂ emissions due to transportation of manure and organic food waste from off-site facilities where manure and organic food waste was generated to the anaerobic digester. Monthly records of transport miles, fuel use, and transport tons, as applicable to the documentation method used.

<i>Offset Project Name</i>	<i>Offset Project ID Code</i>

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.

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 section 22a-174-31a of the RCSA and the required documentation 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 reductions in accordance with subsection 22a-174-31a(h) of the RCSA 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 emissions reductions in accordance with subsection 22a-174-31a(h) of the RCSA 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.

Signature of Verifier Representative

/ /
Date (MM/DD/YYYY)

Name of Verifier Representative (printed)

Title

Notary