Regional Greenhouse Gas Initiative
CO_2 Budget Trading Program

MODEL

Offset Project Monitoring and Verification Report

Avoided Methane Emissions from Agricultural Manure Management

Version 1.0

Issued by _____

Issued on _____

Contents

1. Overview

To demonstrate the achievement of CO_2-equivalent emissions reductions from an agricultural manure management offset project that has received a consistency determination from the [Regulatory Agency], a Project Sponsor must submit to the [Regulatory Agency] in accordance with these instructions a fully completed *Offset Project Monitoring and Verification Report – Avoided Methane Emissions from Agricultural Manure Management 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 CO_2 Budget Trading Program regulations at [State Regulations; Model Rule XX-10] addressing offset projects and the award of CO_2 offset allowances. All offset project submittal materials and documents are available at [website].

2. Submission Instructions

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.

[state-specific submission address]

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

The following instructions address each of the forms in numerical order. Note that the forms themselves include many embedded instructions.

Part 1. General Information Forms

The five (5) forms in Part 1 of the *M&V Report* address general requirements applicable to agricultural manure management offset projects. Instructions for the Part 1 forms are provided below.

Form 1.1 Coversheet

Enter the requested information in the editable text fields in the form. Check the boxes to indicate that all forms are being submitted. For information about entering the Project Sponsor, offset project name and offset project ID code, and RGGI COATS account name and number, see instructions below for Form 1.2, General Information.

Submission of all forms, including the Coversheet, is required. If a form is not submitted, the *M&V Report* will not be considered complete for commencement of review by the [Regulatory Agency]

Form 1.2 General Information

Enter the requested information in the editable text fields in the form. If a text field is not applicable or is unanswerable, enter "NA." Note the following:

Offset Project ID Code: Enter the offset project ID code. The offset project ID code is the alphanumeric code generated when the Project Sponsor creates a record of the offset project in the RGGI CO_2 Allowance Tracking System (RGGI COATS). See the RGGI COATS User's Guide for more information about creating an offset project record in RGGI COATS, available at http://www.rggi-coats.org.

Project Information: Enter project information. The name of the offset project should be the same name entered by the Project Sponsor when creating a project record in RGGI COATS. The project location entered should be the primary location of the project if the project consists of actions at multiple locations. The summary narrative of the project should indicate all locations where project actions occur or will occur.

Project Sponsor: Identify the Project Sponsor and provide his or her contact information. The Project Sponsor is the natural person who is the Authorized

Account Representative for the RGGI COATS general account identified in the *Consistency Application*.

Project Sponsor Organization: Provide the full legal name of the organization the Project Sponsor represents, including any alternative names under which the organization also may be doing business (e.g., John Doe Enterprises, Inc., d/b/a JDE). If the Project Sponsor is representing himself or herself as an individual, enter "NA".

RGGI COATS General Account Name and Number: Enter the RGGI COATS general account name and number. The RGGI COATS general account identified in the *Consistency Application* is the RGGI COATS account into which any awarded CO_2 offset allowances related to the offset project will be transferred.

Form 1.3 Attestations

Sign and date the form. Submit the originally signed form as part of the paper hardcopy *M&V Report*. Scan the signed and dated form for submission as part of the electronic version of the *M&V Report*.

Form 1.4 Project Sponsor Statement

Sign and date the form. Submit the originally signed form as part of the paper hardcopy *M&V Report*. Scan the signed and dated form for submission as part of the electronic version of the *M&V Report*.

Form 1.5 Disclosure of Greenhouse Gas Emissions Data Reporting

Check the appropriate box in the form to indicate whether greenhouse gas emissions data related to the offset project have been or will be reported to any voluntary or mandatory programs, other than the CO_2 Budget Trading Program. For each program for which data have been or will be reported, provide the program name, the program type (voluntary or mandatory), program contact information (website or street address), the categories of data reported, the frequency of reporting, when the reporting began or will begin, and reporting status (prior, current, future). The Project Sponsor must disclose future reporting related to current commitments made to voluntary programs as well as future reporting mandated by current statutes, regulations, or judicial or administrative orders.

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***

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 CO_2 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 CO_2 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	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 [State Regulations; Model Rule XX-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 CO_2 offset allowances under [State Regulations; Model Rule XX-10] is contingent on meeting the requirements of [State Regulations; Model Rule XX-10]. The Project Sponsor authorizes the [Regulatory Agency] 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 [Regulatory Agency]. 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 [Regulatory Agency] or its agent any and all documentation relating to the offset project at the [Regulatory Agency's] request. The Project Sponsor submits to the legal jurisdiction of [State].

Project Sponsor signature	date
printed name	
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 CO_2 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 CO_2 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.

Part 2. Category-Specific Information and Documentation Forms

The two (2) forms in Part 2 of the *M&V Report* address documentation of conformance with the Monitoring and Verification Plan (M&V Plan) and determination of CO_2-equivalent emissions reductions during the reporting period. Instructions for the Part 2 forms are provided below.

Form 2.1 Demonstration of Conformance with M&V Plan

Provide documentation as an attachment to Form 2.1 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 on Form 2.1 to indicate that the referenced documentation is provided as an attachment to Form 2.1. Each attachment must include a header that identifies it as an attachment to Form 2.1, identifies the appropriate table number and the reference number in the left-hand column of the table, and includes the offset project name and offset project ID code.

Form 2.2 Determination of Emissions Reduction

Provide documentation of CO_2-equivalent emissions reductions achieved during the reporting period. Enter requested information where indicated in Form 2.2 and attach documentation to Form 2.2, as directed below. Each attachment must include a header that indicates it is an attachment to Form 2.2 and identifies the offset project name and offset project ID code. Multiple attachments may be integrated into a single document, as appropriate, as long as each element is clearly identified, as specified below. For submission of the electronic version of the *M&V Report*, spreadsheets must be provided as a distinct electronic file or files (distinct spreadsheets may be incorporated into a single spreadsheet file, as appropriate, as long as each spreadsheet element is clearly identified, as specified below). Check the boxes in Form 2.2 to indicate that requested documentation is attached.

1. Baseline Emissions. Enter calculated baseline methane emissions during the reporting period for all facilities supplying manure and/or organic food waste influent to the anaerobic digester, in short tons of CO_2-equivalent, where indicated in the form. For each reporting month, enter values for the data parameters identified in the form, as a sum of each parameter (except for the van't Hoff-Arrhenius factor), for all facilities supplying manure and/or organic food waste influent to the anaerobic digester. Enter the calculated methane emissions in short tons of CO_2-equivalent for each reporting month, for all facilities supplying manure and/or organic food waste influent to the anaerobic digester. Attach a spreadsheet that documents the calculation of baseline CO_2-equivalent emissions *for each facility* and the sum of CO_2-equivalent emissions for all facilities. The spreadsheet must also document for each facility the calculation of each monthly data parameter identified in the form and specify the units for all relevant data parameters, as specified below.

For each facility, document calculation of baseline methane emissions for each month of the reporting period in accordance with the procedures at a. through g. below. The baseline methane emissions (in CO_2e) represent potential emissions due to methane production under site-specific anaerobic storage and weather conditions.

$$\text{Baseline Emissions (short tons } CO_2e) = [(V_m \times M)/2000] \times GWP$$

where:

V_m = Volume of methane produced (scf) each month from degradation of volatile solids

M = Mass of methane per cubic foot (lbs/scf) (note that 0.04246 lbs/scf is the default value at one atmosphere and 68°F or 20°C)

GWP = 23 (CO_2e global warming potential of methane)

a. Volatile Solids Degraded. Document calculation of the estimated amount (kg) of volatile solids degraded each month under the uncontrolled anaerobic storage baseline scenario in accordance with the following equation:

$$VS_{deg} = VS_{avail} \times f$$

where:

VS_{deg} = volatile solids degraded each month (kg)

VS_{avail} = volatile solids available for degradation in manure or organic food waste storage each month (kg)

f = van't Hoff-Arrhenius factor for the specific month

b. Application of van't Hoff-Arrhenius Factor. Document calculation of the van't Hoff-Arrhenius factor for each month, which specifies conversion efficiency of volatile solids to methane, in accordance with the following equation:

$$f = \exp\{[E(T_2 - T_1)]/[(GC \times T_1 \times T_2)]\}$$

where:

f = van't Hoff-Arrhenius factor

E = activation energy constant (15,175 cal/mol)

T_2 = average monthly ambient temperature (in Kelvin) for facility where manure or organic food waste is generated if reported temperature is greater than 5^o C

T_1 = 303.15 K (30^o C converted to K)

GC = ideal gas constant (1.987 cal/K mol)

If reported temperature is less than 5^o C, as determined from the nearest National Weather Service certified weather station for the facility where manure or organic food waste is managed, then f equals 0.104.

c. Volatile Solids Available for Degradation. Document calculation of the volatile solids available for degradation in manure or organic food waste storage for each month in accordance with the following equation:

$$VS_{avail} = VS_p + ½\ VS_{in} - VS_{out}$$

where:

VS_{avail} = volatile solids available for degradation each month

VS_p = volatile solids present in manure or organic food waste storage at beginning of the month (kg)

VS_{in} = volatile solids added to manure or organic food waste storage during the course of the month (kg); multiply this number by the factor of ½ to represent the average mass of volatile solids available for degradation for the entire duration of the month

VS_{out} = volatile solids removed from manure or organic food waste storage for land application or export

d. Mass of Volatile Solids Available at Start of Month. Document calculation of the volatile solids present in manure or organic food waste storage at the beginning of each month in accordance with the equation below:

$$VS_p = (M_m \times TS_{\%} \times VS_{\%})_p$$

where:

VS_p = volatile solids present in manure or organic food waste storage at the beginning of each month (kg)

M_m = mass (kg) of manure or organic food waste present in storage at the beginning of the month

$TS_{\%}$ = concentration (percent) of total solids in manure and organic food waste as determined through U.S. EPA 160.3 testing method (U.S. EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

$VS_{\%}$ = concentration (percent) of volatile solids in total solids as determined through U.S. EPA 160.4 testing method (U.S. EPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

e. Mass of Volatile Solids Added During Month. Document calculation of the volatile solids added to manure or organic food waste storage during the course of each month in accordance with the following equation:

$$VS_{in} = (M_m \times TS_{\%} \times VS_{\%})_{in}$$

where:

VS_{in} = volatile solids added to manure or organic food waste storage during the course of each month (kg)

M_m = mass (kg) of manure or organic food waste added to storage at the beginning of the month

$TS_{\%}$ = concentration (percent) of total solids in manure and organic food waste as determined through U.S. EPA 160.3 testing method (U.S. EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

$VS_{\%}$ = concentration (percent) of volatile solids in total solids as determined through U.S. EPA 160.4 testing method (U.S. EPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

f. Mass of Volatile Solids Removed During Month. Document calculation of the volatile solids removed from manure or organic food waste storage for land application or export for each month (document assumed value based on practices the farm employed prior to the commencement of the offset project consistent with standard practice) in accordance with the following equation:

$$VS_{out} = (M_m \times TS_{\%} \times VS_{\%})_{out}$$

where:

VS_{out} = volatile solids removed from manure or organic food waste storage during the course of each month (kg)

M_m = mass (kg) of manure or organic food waste removed from storage during the month

$TS_{\%}$ = concentration (percent) of total solids in manure or organic food waste as determined through U.S. EPA 160.3 testing method (U.S. EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

$VS_{\%}$ = concentration (percent) of volatile solids in total solids as determined through U.S. EPA 160.4 testing method (U.S. EPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020))

g. Volume of Methane Produced. Document calculation of the volume of methane produced from degradation of volatile solids each month in accordance with the following equation:

$$V_m = (VS_{deg} \times B_o) \times 35.3147 \text{ cubic feet per cubic meter}$$

where:

V_m = volume of methane produced (scf)

VS_{deg} = volatile solids degraded (kg)

B_o = manure or organic food waste type-specific maximum methane generation constant (m^3 methane/kg VS_{deg}). For dairy cow manure, B_o = 0.24 m^3 methane/kg VS_{deg}. For other types of manure, use the methane generation constants cited in U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004, Annex 3, Table A-162 (U.S. EPA, April 2007)

2. Methane Emissions Captured and Destroyed Using Anaerobic Digester. Attach a spreadsheet documenting the data sources and calculations used to quantify the annual volume of methane emissions (in standard cubic feet of methane and CO_2-equivalent) captured and destroyed by the anaerobic digester. Indicate whether methane concentration of digester biogas is continuously monitored.

If a direct continuous monitoring system is measuring methane concentration of recovered digester biogas, the spreadsheet must include the following data and calculations:

- Daily methane recovery (in standard cubic feet of methane) from the continuous monitoring system for each day in the reporting period

- Sum of the daily methane recovery (in standard cubic feet of methane) on a monthly basis
- Sum of the monthly methane recovery to obtain total annual methane recovery (in standard cubic feet of methane per year and short tons of CO_2-equivalent per year) from the digester

If a direct continuous monitoring system is monitoring digester biogas flow only, the spreadsheet must include the following data and calculations:

- Tabulation of daily digester biogas flow (in standard cubic feet) from the continuous monitoring system for each day in the reporting period
- Sum of daily digester biogas flow on a weekly basis (in standard cubic feet)
- Weekly methane concentration measurements (in percent of sample by volume) using calibrated digester biogas analyzer
- Weekly methane recovery (in standard cubic feet of methane), obtained by multiplying the weekly digester biogas flow rate by the respective week's methane concentration measurement (in percent of sample by volume)
- Sum of weekly methane recovery (in standard cubic feet of methane) on a monthly basis
- Sum of monthly methane recovery to obtain total annual methane recovery from the digester (in standard cubic feet of methane and short tons of CO_2-equivalent)

3. Transport CO_2-Equivalent Emissions. If the offset project is a regional-type digester, attach a spreadsheet documenting quantification of CO_2 emissions due to transportation of manure and/or organic food waste from the off-site facilities where the manure and/or organic food waste was generated to the anaerobic digester. The spreadsheet must specify data sources and calculations. To determine transport CO_2 emissions, the spreadsheet must document use of one of the following two methods:

a. Method 1: Emission factors for type and quantity of fuel used

Identify data sources and calculations used to determine fuel use for all shipments of manure and organic food waste from off-site facilities to the anaerobic digester during the reporting period. Specify how transport miles and quantity of fuel used for each shipment were determined and recorded. Specify the emissions factors used, which may include:

- Diesel fuel: 22.912 lbs CO_2/gallon
- Gasoline: 19.878 lbs CO_2/gallon
- Other fuel: emission factor approved by the [Regulatory Agency]

b. Method 2: Emission factors for type of fuel used by the ton-mile

Identify data sources and calculations used to determine total tons of manure and organic food waste transported from off-site facilities for input into the anaerobic digester during the reporting period. Specify how transport tons, transport miles, and fuel type used for each shipment were determined and recorded. Specify the emissions factors used, which may include:

- Diesel fuel: 0.131 lbs CO_2 per ton-mile
- Gasoline: 0.133 lbs CO_2 per ton-mile
- Other fuel: emission factor approved by the [Regulatory Agency]

4. Determination of Emissions Reductions. Enter the emissions reductions achieved by the offset project in short tons of CO_2-equivalent where indicated in Form 2.2. Emissions reductions are equivalent to the annual baseline methane emissions or annual methane captured and destroyed by the anaerobic digester (both in short tons of CO_2-equivalent), whichever is less. For regional-type digesters, emissions reductions must be the net emissions reductions achieved after subtraction of any transport-related CO_2 emissions.

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	☐ 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	☐ 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	☐ 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	☐ 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	☐ 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	☐ List of EPA-approved test procedures used ☐ 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	☐ 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	☐ 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	☐ 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	☐ 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	☐ 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

Offset Project Name	*Offset Project ID Code*

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	☐ Copy of monthly biogas flow rate performance tests ☐ 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)	☐ Copy of specification sheet for the biogas flow meter installed
3. Records of the date and location of flow meter installation	☐ 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	☐ Copies of maintenance schedules and records of maintenance activity conducted ☐ 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	☐ 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)	☐ 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)	☐ 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)	☐ 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	☐ 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	☐ 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)	☐ Copies of monthly records of electric generation ☐ 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	☐ List of calibration activities conducted and receipts for services rendered if performed by outside contractor ☐ 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	☐ List of dates of digester flow meter calibration ☐ 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)	☐ List of calibration activities conducted and receipts for services rendered if performed by outside contractor ☐ 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)	☐ List of dates of methane concentration monitoring instrument calibration ☐ 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 CO_2-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_2e)
2. Annual measured volume of methane recovered and destroyed by the anaerobic digester (short tons CO_2e)
3. CO_2 emissions from transportation of manure and organic food waste to the anaerobic digester (short tons CO_2e)
4. Annual net emission reductions (short tons CO_2e)

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_2e (short tons)
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
Total for Year					n/a			

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 CO_2-equivalent emissions for each facility supplying manure and organic food waste influent to the anaerobic digester and the sum of CO_2-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 CO_2-equivalent) captured and destroyed by the anaerobic digester.

☐ 3. Transport CO_2 Emissions. Spreadsheet documenting the procedures, data sources, and calculations used to quantify CO_2 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.

Part 3. Independent Verification Form

The form in Part 3 of the *M&V Report* addresses requirements and documentation related to the independent verifier certification statement and report. Instructions for the form in Part 3 are provided below.

Form 3.1 Independent Verifier Certification Statement and Report

An accredited independent verifier must sign and date the form. Submit the originally signed form as part of the paper hardcopy *M&V Report*. Scan the signed and dated form for submission as part of the electronic version of the *M&V Report*.

Provide the independent verifier's report as an attachment to Form 3.1. The 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.

The verifier report must document 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 [State Regulations; Model Rule XX-10].

2. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to determine CO_2-equivalent emissions reductions in accordance with [State Regulations; Model Rule XX-10.5(e)], and the documentation required 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 CO_2-equivalent emissions reductions in accordance with the applicable requirements of [State Regulations; Model Rule XX-10.5(e)] and the Monitoring and Verification Plan submitted as part of the *Consistency Application*.

The verifier report must include the following contents, in the order listed below:

- Cover page with report title and date
- Table of contents
- List of acronyms and abbreviations
- Executive summary
- Description of objective of report
- Identification of the client, including name, address, and other contact information
- Identification of the offset project
- Description of evaluation criteria (applicable regulatory provisions and documentation required in the *M&V Report*)
- Description of the review and evaluation process, including any site visits and interviews
- Identification of individuals performing the verification work, including the verification team leader and key personnel, and contact information for the team leader

- Description of the materials provided to the verifier by the Project Sponsor
- Evaluation conclusions and findings, including level of assurance provided

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.

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 [State Regulations; Model Rule XX-10] 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 CO_2-equivalent emissions reductions in accordance with [State Regulations; Model Rule XX-10.5(e)] 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 CO_2-equivalent emissions reductions in accordance with [State Regulations; Model Rule XX-10.5(e)] 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.

Verifier Representative signature

date

printed name

title

notary