

**MARYLAND DEPARTMENT OF THE ENVIRONMENT**

1800 Washington Boulevard ● Baltimore Maryland 21230  
(410) 537-3000 ● 1-800-633-6101 ● <http://www.mde.state.md.us>

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**MARYLAND CO<sub>2</sub> BUDGET TRADING PROGRAM**  
**COMAR 26.09.03**

Instructions for Submitting Applications for Offsets Projects

**Consistency Applications**

1. Complete and sign Section I - Consistency Application.
2. Attach all required documentation in Section I, including reports, diagrams, statements, specifications, plans, calculations, and certifications.
3. Check the box on Section II – Independent Verifier Report for Consistency Application.
4. Complete and sign Section II – Independent Verifier Report.
5. Attach all required documentation in Section II, including reports, diagrams, statements, specifications, plans, calculations, and certifications.
6. Submit to the Department: 1) hard copies of all required documentation and 2) electronic copies of all required documentation on a CD or DVD. Identify the offset project name and I.D. code on the face of the CD or DVD. Mail original applications and documentation to:

Maryland Department of the Environment  
Air Quality Planning Program, Offsets  
1800 Washington Boulevard  
Baltimore MD 21230

**Monitoring and Verification Applications**

1. Check the box on Section II – Independent Verifier Report for Monitoring and Verification.
2. Complete and sign Section II – Independent Verifier Report.
3. Attach all required documentation in Section II, including reports, diagrams, statements, specifications, plans, calculations, and certifications.
4. Complete and sign Section III – Monitoring and Verification.
5. Attach all required documentation in Section III, including reports, diagrams, statements, specifications, plans, calculations, and certifications.
6. Submit to the Department: 1) hard copies of all required documentation and 2) electronic copies of all required documentation on a CD or DVD. Identify the offset project name and I.D. code on the face of the CD or DVD. Mail original applications and documentation to:

Maryland Department of the Environment  
Air Quality Planning Program, Offsets  
1800 Washington Boulevard  
Baltimore MD 21230

- For offsets projects commenced before January 1, 2009, a consistency application must be submitted by June 30, 2009.
- For offsets projects commenced on or after January 1, 2009, a consistency application must be submitted within 6 months after the commencement of the offset project.
- Contact Scott Zacharko, Air Quality Planning Program at (410) 537-4177 with questions or for further guidance.



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**MARYLAND CO<sub>2</sub> BUDGET TRADING PROGRAM  
 COMAR 26.09.03**

<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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**Avoided Methane Emissions from Agricultural Manure Management Operations Offset Application  
 Section I – Consistency Application**

**An indication of “Yes” to any of the following will deem the project ineligible under COMAR 26.09.03.**

<b><i>Eligibility Requirements</i></b>		
<b>E.1</b>	Did the offset project initially commence before December 20, 2005? <small>COMAR 26.09.03.02A</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.2</b>	Is the offset project required by a local, state, or federal law, regulation or administrative or judicial order? <small>COMAR 26.09.03.02D(2)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.3</b>	Does the offset project include an electric generation component that is additionally being used for compliance with a renewable energy portfolio standard or other regulatory requirement? <small>COMAR 26.09.03.02D(4)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.4</b>	Does the offset project receive funding or other incentives provided through the Strategic Energy Investment Fund? <small>COMAR 26.09.03.02D(5)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.5</b>	Is the offset project awarded credits or allowances under any other mandatory or voluntary greenhouse gas program? <small>COMAR 26.09.03.02D(6)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No

**An indication of “No” to any of the following will deem the project ineligible under COMAR 26.09.03.**

<b><i>Eligibility Requirements</i></b>		
<b>E.6</b>	Does the offset project consist of the destruction of that portion of methane generated by an anaerobic digester that would have been generated in the absence of the offset project through the uncontrolled anaerobic storage of manure or organic food waste? <small>COMAR 26.09.03.07B</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.7</b>	Does the offset project employ only manure-based anaerobic digester systems that use livestock manure that is more than 50 percent of the mass input into the digester on an annual basis? <small>COMAR 26.09.03.07C</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.8</b>	If organic food waste is used by an anaerobic digester, is it that which would have been stored in anaerobic conditions in the absence of the offset project? <small>COMAR 26.09.03.07C</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.9</b>	Does the offset project employ a system that provides metering of biogas volumetric flow rate and determination of CH <sub>4</sub> concentration? <small>COMAR 26.09.03.07I(1)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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The answer to at least one of the following must be "Yes" for the project to be eligible under COMAR 26.09.03.

<b><i>Eligibility Requirements</i></b>		
<b>E.10</b>	Is the offset project located in a state that has a market penetration rate for anaerobic digester projects of 5 percent or less? <small>COMAR 26.09.03.07D(1)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>E.11</b>	Is the offset project located at a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds, or, if the project is a regional-type digester, total annual manure input to the digester is designed to be less than the average annual manure produced by a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds? <small>COMAR 26.09.03.07D(2)</small>	<input type="checkbox"/> Yes <input type="checkbox"/> No

Complete the following information (all fields are required):

<b><i>Project Sponsor Information</i></b>			
<i>Organization Name</i>		<i>Project Sponsor Name</i>	
<i>Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>
<i>Telephone and Facsimile Transmission Number</i>		<i>E-Mail Address</i>	
<i>COATS General Account Number</i>		<i>Offset Project Date of Commencement</i> <small>See COMAR 26.09.03.02G(2)</small>	



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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<b><i>Point of Contact Information</i></b>			
<i>Point of Contact Name</i>			
<i>Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>
<i>Telephone and Facsimile Transmission Number</i>		<i>E-Mail Address</i>	

<b><i>Offset Project Location</i></b>			
<i>Facility Name</i>			
<i>Facility Physical Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>

**All applicants must provide the following information as attachments to this application. Each attachment must be identified by attachment number as provided below, as well as the offset project name and offset project I.D. code.**

<b><i>Attachment Number:</i></b>	
<b>I.1</b>	A detailed narrative of the actions to be taken as part of the offset project, including an explanation of how the projected reduction or avoidance of atmospheric loading, or the sequestration of carbon is to be quantified, monitored, and verified. COMAR 26.09.03.02H(1)(b), COMAR 26.09.03.02H(1)(e), COMAR 26.09.03.07F(1)
<b>I.2</b>	Documentation that the offset project meets applicable Eligibility Requirements (E.1 through E.11 on pages 1-2 of this application) and baseline emissions. COMAR 26.09.03.02H(1)(c)
<b>I.3</b>	The emissions baseline determination, unless otherwise requested in COMAR 26.09.03.07G. COMAR 26.09.03.02H(1)(d)
<b>I.4</b>	A statement and certification report certifying that all offset projects for which the project sponsor has received CO <sub>2</sub> offset allowances under the project sponsor's ownership or control are in compliance with all applicable requirements in all participating states. COMAR 26.09.03.02H(1)(g)
<b>I.5</b>	A statement regarding the adequacy of the monitoring and verification plan and other evaluations and statements as required by the Department. COMAR 26.09.03.02H(1)(j)



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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<b><i>Attachment Number:</i></b>	
<b>I.6</b>	Disclosure of any voluntary or mandatory programs to which greenhouse gas emissions data related to the offset project has been or will be reported. COMAR 26.09.03.02H(1)(k)
<b>I.7</b>	For offset projects located in a state or United States jurisdiction that is not a participating state, a demonstration that the project sponsor has complied with all requirements of the cooperating regulatory agency in the state or United States jurisdiction where the offset project is located. COMAR 26.09.03.02H(1)(l)
<b>I.8</b>	The market penetration determination which utilizes the most recent market data available at the time of submission of the consistency application. COMAR 26.09.03.07E
<b>I.9</b>	The name, address, email address, telephone number, and facsimile transmission number of the: <ul style="list-style-type: none"> <li>• Owner and operator of the offset project</li> <li>• Owner and operator of the facility where the offset project will occur</li> </ul> COMAR 26.09.03.07F(2)(a), COMAR 26.09.03.07F(2)(c)
<b>I.10</b>	Specifications of the facility where the offset project will occur, including specifications of the equipment to be installed and a technical schematic of the offset project. COMAR 26.09.03.07F(2)(b), COMAR 26.09.03.07F(2)(d)
<b>I.11</b>	Location and specifications of the facilities from which anaerobic digester influent will be received, if different from the facility where the offset project will occur. COMAR 26.09.03.07F(2)(e)
<b>I.12</b>	A monitoring and verification plan as part of the consistency application that includes a quality assurance and quality control program associated with equipment used to determine biogas volumetric flow rate and CH <sub>4</sub> composition, which: <ul style="list-style-type: none"> <li>• Is specified in accordance with the applicable monitoring requirements</li> <li>• Includes provisions for ensuring that measuring and monitoring equipment is maintained, operated, and calibrated based on the manufacturer's recommendations and the retention of maintenance records for audit purposes</li> <li>• Is certified by an independent accredited verifier</li> </ul> COMAR 26.09.03.07I(4), COMAR 26.09.03.07I(5)

<b><i>Consistency Application Agreement</i></b>
<p>"The undersigned project sponsor recognizes and accepts that the application for, and the receipt of, CO<sub>2</sub> offset allowances under the CO<sub>2</sub> Budget Trading Program is predicated on the project sponsor complying with all applicable requirements. I have been granted all the necessary authority to carry out the duties and responsibilities for the offset project under this subtitle. I understand that eligibility for the award of CO<sub>2</sub> offset allowances is contingent on meeting all applicable requirements. I authorize 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 this application. I understand that the Department's right to audit shall include the right to enter the physical location of the offset project. I submit to the legal jurisdiction of the State."</p> <p>COMAR 26.09.03.02H(1)(f)</p>

<b><i>Access Agreement Statement</i></b>
<p>"The undersigned project sponsor agrees to provide the Department access to the physical location of the offset project to inspect for compliance. For offset projects located in any state or other U.S. jurisdiction that is not a participating state, the undersigned project sponsor agrees to provide the cooperating regulatory agency with access to the physical location of the offset project to inspect for compliance."</p> <p>COMAR 26.09.03.02F(1)</p>



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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<p><b><i>Statement of Truth, Accuracy, and Completeness</i></b></p> <p>"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision and in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."</p> <p>COMAR 26.09.03.02H(1)(i)</p>
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_____ <b>Signature of Applicant (Project Sponsor)</b>	_____ <b>Date</b>
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_____ <b>Applicant's (Project Sponsor's) Name (Print)</b>	_____ <b>Title</b>
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For questions regarding this application form, please contact the Department at (410) 537-3240



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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**Avoided Methane Emissions from Agricultural Manure Management Operations Offset Application  
Section II – Independent Verifier Report**

The following information is being provided for:	<input type="checkbox"/> Consistency Application <input type="checkbox"/> Monitoring and Verification
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**Complete the following information (all fields are required):**

<b><i>Independent Verifier Information (Required for Consistency Application and Monitoring and Verification Report)</i></b>			
<i>Independent Verifier Organization Legal Name</i>			
<i>Independent Verifier Point of Contact</i>			
<i>Physical Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>
<i>Telephone Number</i>		<i>E-Mail Address</i>	

**All applicants must provide the following information as attachments to this application. Each attachment must be identified by attachment number as provided below, as well as the offset project name and offset project I.D. code.**

<b><i>Attachment Number, (if submitting for Consistency Application):</i></b>	
<b>II.1</b>	A verification report. COMAR 26.09.03.02H(1)(h)
<b><i>Attachment Number, (if submitting for Monitoring and Verification):</i></b>	
<b>II.2</b>	Verification that measuring and monitoring equipment is maintained, operated, and calibrated based on manufacturer recommendations. COMAR 26.09.03.07I(5)(b) and (c)
<b>II.3</b>	Verification of maintenance records for audit purposes. COMAR 26.09.03.07I(5)(b) and (c)



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D.Code</i>
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<b><i>Certification Statement</i></b>
“I certify, under penalty of law, that I, the independent verifier, have reviewed the entire application and evaluated the report in relation to all applicable requirements and any applicable guidance issued by the Department.” COMAR 26.09.03.02H(1)(h)

<b><i>Statement of Truth, Accuracy, and Completeness</i></b>
“I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision and in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” COMAR 26.09.03.02H(1)(i)

\_\_\_\_\_

**Signature of Independent Verifier**

**Date**

\_\_\_\_\_

**Independent Verifier’s Name (Print)**

**Title**

For questions regarding this application form, please contact the Department at (410) 537-3240



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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**Avoided Methane Emissions from Agricultural Manure Management Operations Offset Application  
Section III – Monitoring and Verification**

**Complete the following information (all fields are required):**

<b><i>Project Sponsor Information</i></b>			
<i>Organization Name</i>		<i>Project Sponsor Name</i>	
<i>Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>
<i>Telephone and Facsimile Transmission Number</i>		<i>E-Mail Address</i>	
<i>COATS General Account Number</i>		<i>Offset Project Date of Commencement</i> <small>See COMAR 26.09.03.02G(2)</small>	

<b><i>Point of Contact Information</i></b>			
<i>Point of Contact Name</i>			
<i>Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>
<i>Telephone and Facsimile Transmission Number</i>		<i>E-Mail Address</i>	



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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<b><i>Offset Project Location</i></b>			
<i>Facility Name</i>			
<i>Facility Physical Street Address</i>			
<i>City</i>	<i>State/Province</i>	<i>Postal Code</i>	<i>Country</i>

**All applicants must provide the following information as attachments to this application. Each attachment must be identified by attachment number as provided below, as well as the offset project name and offset project I.D. code.**

<b><i>Attachment Number:</i></b>	
<b>III.1</b>	A statement regarding the adequacy of the monitoring and verification plan. COMAR 26.09.03.02H(j)
<b>III.2</b>	The name, address, email address, telephone number, and facsimile transmission number of the: <ul style="list-style-type: none"> <li>• Owner and operator of the offset project</li> <li>• Owner and operator of the facility where the offset project will occur</li> </ul> COMAR 26.09.03.07F(2)(a), COMAR 26.09.03.07F(2)(c)
<b>III.3</b>	The emissions baseline determination, as per COMAR 26.09.03.07G as appropriate. (Attach all calculations)
<b>III.4</b>	The calculated emissions reductions. (Attach all calculations and documentation) COMAR 26.09.03.07H
<b>III.5</b>	Annual monitoring and verification report that includes monthly biogas volumetric flow rate and CH <sub>4</sub> concentration determination. COMAR 26.09.03.07I(1)
<b>III.6</b>	Documentation that manure and organic food waste from each distinct source supplying to the anaerobic digester are sampled monthly to determine the amount of volatile solids present, if the offset project is a regional-type digester, including calculations and supporting material and receipts. COMAR 26.09.03.07I(2)
<b>III.7</b>	Documentation that organic food waste is sampled monthly to determine the amount of volatile solids present before digestion and apportioned accordingly, if the offset project includes the digestion of eligible organic food waste. COMAR 26.09.03.07I(3)
<b>III.8</b>	A monitoring and verification plan that includes a quality assurance and quality control program associated with equipment used to determine biogas volumetric flow rate and CH <sub>4</sub> composition, which: <ul style="list-style-type: none"> <li>• Is specified in accordance with the applicable monitoring requirements</li> <li>• Includes provisions for ensuring that measuring and monitoring equipment is maintained, operated, and calibrated based on the manufacturer's recommendations and the retention of maintenance records for audit purposes</li> <li>• Is certified by an independent accredited verifier</li> </ul> COMAR 26.09.03.07I(4), COMAR 26.09.03.07I(5)
<b>III.9</b>	Quarterly verification by the project sponsor of biogas CH <sub>4</sub> composition through gas sampling and third-party laboratory analysis using applicable U.S. EPA test methods described in §H(7) of the regulation. COMAR 26.09.03.07I(6)



<i>COATS Offset Project Name</i>	<i>COATS Offset Project I.D. Code</i>
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<b><i>Statement of Truth, Accuracy, and Completeness</i></b>
<p>"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision and in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."  COMAR 26.09.03.02H(1)(i)</p>

_____	_____
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**Signature of Project Sponsor**

**Date**

_____	_____
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**Project Sponsor's Name (Print)**

**Title**

For questions regarding this application form, please contact the Department at (410) 537-3240

TECHNICAL GUIDANCE DOCUMENT  
AVOIDED METHANE EMISSIONS FROM AGRICULTURAL MANURE MANAGEMENT OPERATIONS  
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## GENERAL INSTRUCTIONS

**The instructions for completing the offset project application are identified in the guidance document. It is necessary to read the entire guidance document to fully understand the requirements and instructions for completing the offset project application. In addition to the instructions below, the prospective Project Sponsor's application should be organized and numbered in the same order as provided in the guidance document.**

**Print or type all information where requested.**

**Attach all requested information to the application. Ensure each attachment is identified properly.**

- **Submit hard copies of all attached documents. The Project Sponsor and Independent Verifier signatures must be originals.**
- **Submit electronic copies of all attached documents on a CD or DVD. Ensure that all Microsoft Excel spreadsheets are non-encrypted and accessible by the Department. Spreadsheets and calculations in the .pdf format will not be accepted.**

**Upload all requested information to COATS. See [www.rggi.org](http://www.rggi.org) for instructions.**

## SUGGESTED PROCESS

**The following is the Department's suggested process for applicants:**

1. Create a COATS Account at <https://rggi-coats.org/eats/rggi/>.
2. Complete the Consistency Application and Independent Verifier Report. Provide both hard copies and electronic copies of all documents.
3. Upload all requested information into COATS. This information will not be made publicly available until the Department determines the application's completeness.
4. The Department will make a completeness determination within 30 days of receipt of the application, at which point the offset project information uploaded to COATS will be made publicly available.
5. The Department will make a consistency determination within 60 days after the completeness determination.
6. Complete the Monitoring and Verification Report and the Independent Verifier Report. Provide both hard copies and electronic copies of all documents.
7. Allowances will be awarded at the discretion of the Department after approval of the Monitoring and Verification Report.
8. A Monitoring and Verification Report and Independent Verifier Report must be submitted annually to maintain eligibility.



**AVOIDED METHANE EMISSIONS FROM AGRICULTURAL MANURE MANAGEMENT OPERATIONS  
OFFSET PROJECT  
SECTION I – CONSISTENCY APPLICATION**

**For all fields where information must be provided, print of type all required information.**

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**COATS OFFSET PROJECT NAME**

- Provide the COATS offset project name, which is the same as the RGGI COATS General Account Name. The RGGI COATS general account is the RGGI COATS account into which any awarded CO<sub>2</sub> offset allowances related to the offset project will be transferred. Complete this field on every page of the offset project application.

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**COATS OFFSET PROJECT I.D. CODE**

- Provide the COATS offset project I.D. code, which is the alphanumeric code automatically generated when the Project Sponsor makes the initial entry of the offset project in the RGGI CO<sub>2</sub> Allowance Tracking System (RGGI COATS). See the RGGI COATS User’s Guide at <http://www.rggicoats.org> for information about creating an offset project record. Complete this field on every page of the offset project application.

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**ELIGIBILITY REQUIREMENTS**

**Complete the Eligibility Requirements by indicating “Yes” or “No” to each requirement on the application. Indicating “Yes” to E.1 through E.6 or indicating “No” to E.7 will deem the project ineligible.**

- E.1 – Check the “No” box if the offset project was initially commenced on or after December 20, 2005. Offset projects commenced before December 20, 2005 are not eligible for the award of CO<sub>2</sub> offset allowances.
- E.2 – Check the “No” box if the offset project is not required by any local, state, or federal law, regulation or administrative or judicial order. Offset projects required by local, state, or federal law, regulation or administrative or judicial order are not eligible for the award of CO<sub>2</sub> offset allowances.
- E.3 – Check the “No” box if the offset project does not include an electric generation component that is additionally being used for compliance with a renewable energy portfolio standard or other regulatory requirement. If the offset project includes an electric generation component, CO<sub>2</sub> offset allowances may not be awarded if the project is additionally being used for compliance with a renewable portfolio standard or other regulatory requirement.
- E.4 – Check the “No” box if the offset project does not and will not receive funding or other incentives provided through the Strategic Energy Investment Fund. Offset projects are not eligible for the award of CO<sub>2</sub> offset allowances if funding or other incentives are received from the Strategic Energy Investment Fund or from any state fund resulting from the auction of CO<sub>2</sub> allowances.
- E.5 – Check the “No” box if the offset project will not be awarded credits or allowances under any mandatory or voluntary greenhouse gas program. Offset projects that are awarded credits or allowances under mandatory or voluntary greenhouse gas programs are not eligible for the award of CO<sub>2</sub> offset allowances.
- E.6 – Check the “Yes” box if the offset project consists of the destruction of that portion of methane generated by an anaerobic digester that would have been generated in the absence of the offset project through the uncontrolled anaerobic storage of manure or organic food waste. Offset projects that do not consist of the destruction of that portion of methane



generated by an anaerobic digester that would have been generated in the absence of the offset project through the uncontrolled anaerobic storage of manure or organic food waste are not eligible for the award of CO<sub>2</sub> offset allowances.

- E.7 – Check the “Yes” box if the offset project employs only manure-based anaerobic digester systems that use livestock manure that is more than 50 percent of the mass input into the digester on an annual basis. Offset projects that do not only employ manure-based anaerobic digester systems that use livestock manure that is more than 50 percent of the mass input into the digester on an annual basis are not eligible for the award of CO<sub>2</sub> offset allowances.
- E.8 – Check the “Yes” box if organic food waste that would have been stored in anaerobic conditions in the absence of the offset project is used by an anaerobic digester.
- E.9 – Check the “Yes” box if the offset project employs a system that provides metering of biogas volumetric flow rate and determination of CH<sub>4</sub> concentration. Offset projects that do not employ a system that provides metering of biogas volumetric flow rate and determination of CH<sub>4</sub> concentration are not eligible for the award of CO<sub>2</sub> offset allowances.
- The “Yes” box must be checked for at least one of the following eligibility requirements for the offset project to be eligible for the award of CO<sub>2</sub> offset allowances:
  - E.10 – Check the “Yes” box if the offset project is located in a state that has a market penetration rate for anaerobic digester projects of 5 percent or less.
  - E.11 – Check the “Yes” box if the offset project is located at a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds, or, if the project is a regional-type digester, total annual manure input to the digester is designed to be less than the average annual manure produced by a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds.

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## PROJECT SPONSOR INFORMATION

**Print or type all required information pertaining to the Project Sponsor in the spaces provided.**

- Organization Name and Project Sponsor Name: Provide the full legal name of the organization the Project Sponsor represents and the name of the Project Sponsor. If the Project Sponsor is representing him or herself, provide the name of the individual. The Project Sponsor is the person who is the Authorized Account Representative for the RGGI COATS general account.
- Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the full contact address of the organization the Project Sponsor represents.
- Telephone and Facsimile Transmission Number: Provide the primary contact telephone number and the facsimile transmission number for the Project Sponsor.
- E-Mail Address: Provide the primary contact E-mail address for the Project Sponsor.
- COATS General Account Number: Provide the COATS General Account Number established by the Project Sponsor in COATS. The Project Sponsor must establish a general account in the RGGI CO<sub>2</sub> Allowance Tracking System (RGGI COATS). For information about establishing a RGGI COATS general account, consult the RGGI COATS User’s Guide, available at <http://www.rggi-coats.org>.
- Offset Project Date of Commencement: Provide the date that the offset project initially commenced. For offset projects commenced between December 20, 2005 and December 31, 2008, the Consistency Application must be submitted by June



30, 2009. For offset projects commenced on or after January 1, 2009, the Consistency Application must be submitted within six months after the project is commenced.

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### POINT OF CONTACT INFORMATION

**Print or type all required information pertaining to the Point of Contact in the spaces provided.**

- Point of Contact Name: Provide the full legal name of the Point of Contact for the offset project.
- Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the full contact address for the Point of Contact for the offset project.
- Telephone and Facsimile Transmission Number: Provide the primary contact telephone number and the facsimile transmission number for the Point of Contact for the offset project.
- E-Mail Address: Provide the primary contact E-mail address for the Point of Contact for the offset project.

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### OFFSET PROJECT LOCATION

**Print or type all required information pertaining to the offset project location in the spaces provided.**

- Facility Name: Provide the full legal name of the facility used in the offset project.
- Facility Physical Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the complete physical address of the facility used in the offset project.

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### ATTACHMENT NUMBER

**Attach all of the following requested information with the application. Clearly indicate the corresponding attachment number (i.e.: I.1, I.2, etc.), the offset project name, and the offset project I.D. on all attached documents.**

- I.1 – Attach a detailed description of the actions to be taken as part of the offset project. Include the type of project and explain how the reduction of atmospheric loading or the sequestration of carbon will be quantified, monitored, and verified.
- I.2 – Attach documentation verifying that each of the Eligibility Requirements and the baseline emissions has been met.
  - a. E.1 – Provide records verifying that the offset project commenced between December 20, 2005 and December 31, 2008, or that the offset project commenced on or after January 1, 2009.
  - b. E.2 – Provide records that verify that the offset project is not required pursuant to any local, state, or federal law, regulation, or administrative or judicial order.
  - c. E.3 – Provide records that verify that, if applicable, the electric generation component included in the offset project is not additionally being used for compliance with a renewable portfolio standard or other regulatory requirement.





- d. E.4 – Provide records or statements that document the offset project has not and will not receive any funding or other incentives from the Strategic Energy Investment Fund (the Fund), incentives derived from the Fund, or any states' fund receiving proceeds resulting from the auction of CO<sub>2</sub> allowances.
- e. E.5 – Provide records or statements that the offset project has not and will not be awarded credits or allowances under any other greenhouse gas program.
- f. E.6 – Provide records that verify that the offset project consists of the destruction of that portion of methane generated by an anaerobic digester that would have been generated in the absence of the offset project through the uncontrolled anaerobic storage of manure or organic food waste.
- g. E.7 – Provide records that verify that the offset project employs only manure-based anaerobic digester systems that use livestock manure that is more than 50 percent of the mass input into the digester on an annual basis.
- h. E.8 – Provide records or statements that document that if organic food waste is used by an anaerobic digester, it is that which would have been stored in anaerobic conditions in the absence of the offset project.
- i. E.9 – Provide records that verify that the offset project employs a system that provides metering of biogas volumetric flow rate and determination of CH<sub>4</sub> concentration.
- j. E.10 – Provide records or statements that document that the offset project is located in a state that has a market penetration rate for anaerobic digester projects of 5 percent or less.
- k. E.11 – Provide records that show that the offset project is located at a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds, or, if the project is a regional-type digester, total annual manure input to the digester is designed to be less than the average annual manure produced by a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (pounds per cow) of 1,400 pounds.
- l. Baseline Emissions – See Attachment Number I.3.

- I.3 – The emissions baseline will be determined in the Monitoring and Verification Report, as required by COMAR 26.09.03.07G.
- I.4 – Attach a statement and certification report signed by the project sponsor to document that the offset project is in compliance with all applicable requirements of COMAR 26.09.01 to .04 and the CO<sub>2</sub> Budget Trading Program in all participating states.
- I.5 – Attach a statement to document that the monitoring and verification plan has adequately met all of the Department requirements.
- I.6 – Attach appropriate documentation if greenhouse gas emissions data related to the offset project have been or will be reported to any voluntary or mandatory programs, other than COMAR 26.09.01 to .04. For each program for which data have been or will be reported, provide the following:
  - a. Program name
  - b. Program type (voluntary or mandatory)
  - c. Program contact information (website or street address)
  - d. Categories of emissions data reported
  - e. Frequency of reporting
  - f. Commencement date of reporting
  - g. Reporting status (prior, current, future)



Attach a statement in place of the above information if no greenhouse gas emissions data have been or will be reported to any voluntary or mandatory programs, other than COMAR 26.09.01 to .04.

- I.7 – If the offset project is located in a state or United States jurisdiction that is not a participating state, attach documentation that demonstrates that the Project Sponsor has complied with all requirements of the cooperating regulatory agency in the state or United States jurisdiction where the offset project is located.
- I.8 – Attach documentation to determine the market penetration rate for anaerobic digester in Maryland is five (5) percent or less. The documentation must use the following formula:

a. 
$$MP(\%) = \left( \frac{MG_{AD}}{MG_{STATE}} \right) \cdot 100$$

b. Where:

- i.  $MG_{AD}$  = Average annual manure generation from dairy cows and swine serving all anaerobic digester projects in Maryland (in pounds of manure per year) when the Consistency Application is submitted
- ii.  $MG_{STATE}$  = Average annual manure generation of all dairy cows and swine in Maryland (in pounds of manure per year) when the Consistency Application is submitted

- c. To determine the average annual manure generation,  $MG_{AD}$ , serving anaerobic digesters in Maryland, contact the Maryland Department of Agriculture for information on the population of dairy cows and swine that currently serve anaerobic digester projects in Maryland.
- d. If the above resources do not provide information for manure generation serving anaerobic digester projects in Maryland, use data of operational anaerobic digester project available from the U.S. EPA AgStar Program to derive manure generation estimates for anaerobic digesters in Maryland (see <http://www.epa.gov/agstar/operational.html>).
- e. If the U.S. EPA AgStar data indicate Maryland has no operational anaerobic digesters,  $MG_{AD}$  equals zero and the market penetration criterion is met.
- f. If the U.S. EPA AgStar data indicate operational anaerobic digesters in Maryland that serve a flare or other non-electric generation use, derive an estimate of manure generated annually by the animals providing influent to the anaerobic digester using Table 1 below and U.S. EPA AgStar data of the number of animals and animal type serving the anaerobic digester.
- g. If the U.S. EPA AgStar data indicate operational anaerobic digester in Maryland that serve electric generator, estimate the quantity of manure influent associated with anaerobic digester project in Maryland using the following equation:

$$MG_{AD} (\text{lb of manure per year}) = \frac{\left[ \left( \text{Electricity production} \left( \frac{kWh}{\text{year}} \right) \cdot \text{Generator heat rate} \left( \frac{Btu}{kWh} \right) \right) \right]}{\text{Methane heat content} \left( \frac{Btu}{\text{scf methane}} \right)} \cdot \text{Methane potential from manure} \left( \frac{\text{scf methane}}{\text{lb manure}} \right)$$



i. Where:

1. Generator heat rate = 14,000 Btu/kWh, used by AgStar for typical digester gas fueled engine generators
2. Methane heat content = 1012 Btu/scf methane
3. Methane potential from manure = 0.5 scf of methane per lb wet manure, a typical value for digester conversion of manure to methane according to AgStar

- ii. To determine the average annual population of dairy cows and swine in Maryland, use the most current National Agricultural Statistics Service USDA Census of Agriculture (<http://www.nass.usda.gov/census>) or other USDA resources, such as “Quick Stats” ([http://www.nass.usda.gov/Data\\_and\\_Statistics/Quick\\_Stats](http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats)). Calculate the average annual manure generation of all dairy cows and swine in Maryland,  $MG_{STATE}$ , using Table 1 below and the following equation:

$$MG_{STATE} = \text{Population of dairy cows and swine} \bullet \text{Pounds of manure per day per animal} \bullet 365 \frac{\text{days}}{\text{year}}$$

h. Table 1. Default Manure Excretion Rate:

Type of Animal	Weight <sup>a</sup> (lbs)	Manure <sup>b</sup> (lbs/d/1000 lb weight)
<b>Dairy</b>		
Lactating Cow	1, 332	80
Dry Cow	1, 332	82
Heifer	1, 049	85
Calf	260	65.8
<b>Swine</b>		
Sow: Lactating	436	60
Sow: Gestating	436	27.2
Nursing Pigs	35	106
Weaned Pigs	90	106
Feeder Pigs	201	63.4
Boars	400	20.5

<sup>a</sup> Average estimated weights from U.S. EPA, U.S. Manure Management Inventory, 2004.

<sup>b</sup> USDA National Resource Conservation Service, Manure Production Nutrient Content Data (as excreted).

Source: U.S. EPA, *AgStar Handbook, Appendix C, FarmWare Users Manual Version 3.0*, 2007,

<http://www.epa.gov/agstar/resources/handbook.html>.

- I.9 – Attach documentation of the full legal name, address, email address, telephone number, and facsimile transmission number of both the owner and operator of the offset project, and the owner and operator of the facility where the offset project will occur.
- I.10 – Attach documentation of specifications of the facility where the offset project will occur. Include the following information:
  - a. Offset Project Facility Location and Specifications: Provide the following information about the facility where the offset project occurs or will occur:
    - i. Name of the facility
    - ii. Physical address (including city, state, zip code) of the facility
    - iii. Organization legal name(s), address, and point(s) of contact information for the owner and operator of the facility; provide organization legal name(s), point(s) of contact information, and physical address for the parent company if the owner or operator of the facility is a subsidiary



- iv. Specifications of the facility where the offset project is or will be located, if not one of the listed facilities in I.10.b; if one of the facilities listed at I.10.b, identify the facility
- b. Influent Facility Location and Specifications: Provide the following information in narrative or table form for each facility that will provide influent (manure and/or organic food waste) to the anaerobic digester:
- i. Name of the facility
  - ii. Physical address (including city, state, zip code) of the facility
  - iii. Type(s) of manure and/or organic food waste influent from the facility to be added to the digester (for manure: dairy cow, swine, specify other, for food waste: dairy, vegetable, fruit, meat-processing, oil-based, or specify other)
  - iv. Type(s) of manure and/or organic food waste storage practices used prior to offset project commencement (liquid/slurry, pit below animal confinements, uncovered anaerobic lagoons, or specify other), total capacity of such storage (volume in cubic feet or gallons), and length of storage time (days)
  - v. Type of manure collection employed at the facility (mechanical scrape or flush)
  - vi. Estimated manure production in pounds per day for the facility, and the water used to clean milking parlors, barns, or other installations in gallons per day
  - vii. Volume of manure and/or organic food waste influent, which includes water content, produced by the facility (gallons per day); specify whether the estimate is based on water meter measurements or derived from the daily volume change in manure storage and/or organic food waste storage at the facility, in gallons per day or cubic feet per day
  - viii. Volume of manure and/or organic food waste influent from the facility to be added to the anaerobic digester (gallons per day)
- c. Equipment Specification and Project Schematic: Provide the following information in narrative or table form (information should be identical to that from a state or local permit, if applicable):
- i. Identify the type(s) of anaerobic digester installed or to be installed as part of the offset project:
    - 1. Complete mix digester
    - 2. Plug flow digester
    - 3. Covered lagoon digester
    - 4. Other digester type (specify)
  - ii. For each anaerobic digester installed or to be installed as part of the offset project, provide the following information:
    - 1. Name of manufacturer
    - 2. Date of installation
    - 3. Design capacity (in cubic feet or gallons)
    - 4. Hydraulic retention time (HRT) in days
      - a. 
$$HRT = \frac{\text{Volume of digester}}{\text{Average volume of manure added per day}}$$
  - 5. Digester biogas collection, flow, and composition monitoring equipment specifications including:
    - a. Type(s) of equipment and manufacturer(s)
    - b. Dates of installation
    - c. Dates of initial calibration
    - d. Design digester biogas flow capacity (standard cubic feet per minute)
    - e. Installed digester biogas flow meter accuracy



- f. Methane concentration instrument thresholds (percent by volume) and precision and accuracy levels as specified by the manufacturer
  - g. Whether methane concentration instrument provides for continuous or periodic monitoring of digester biogas
- iii. For each anaerobic digester installed or to be installed as part of the offset project, provide the following information about how methane from the digester is utilized or will be utilized, as applicable:

1. Electricity Generation:

- a. Type of electric generation unit (internal combustion engine, microturbine, fuel cell, or specify other type)
- b. Make or model, manufacturer, and date of installation of electric generation unit
- c. Design electricity generation capacity in MWe, as specified by the manufacturer
- d. Heat rate (Btu/kW), as specified by the manufacturer

2. On-Site Direct Combustion:

- a. Type of combustion unit (flare, boiler, water heater, space heater, or specify other)
- b. Make or model, manufacturer, and date of installation of combustion unit

- iv. Attach a technical schematic of the anaerobic digestion system that illustrates the manure flow from animal pens, food waste added (if any), collection system (whether scrape or flush), digester, gas handling system (generator, flare, boiler, or other gas utilization device), effluent storage for the digester manure, and ultimate disposal. Include mass flow of the manure, food waste, and water quantities on a daily basis. Include all mass and energy flows. Include manure and food waste flow for all facilities that will provide influent to the anaerobic digester.

- **I.11 – Influent Facility Location and Specifications:** Provide the following information in narrative or table form for each facility that will provide influent (manure and/or organic food waste) to the anaerobic digester:

- a. Name of the facility
- b. Physical address (including city, state, zip code) of the facility
- c. Type(s) of manure and/or organic food waste influent from the facility to be added to the digester (for manure: dairy cow, swine, specify other, for food waste: dairy, vegetable, fruit, meat-processing, oil-based, or specify other)
- d. Type(s) of manure and/or organic food waste storage practices used prior to offset project commencement (liquid/slurry, pit below animal confinements, uncovered anaerobic lagoons, or specify other), total capacity of such storage (volume in cubic feet or gallons), and length of storage time (days)
- e. Type of manure collection employed at the facility (mechanical scrape or flush)
- f. Estimated manure production in pounds per day for the facility, and the water used to clean milking parlors, barns, or other installations in gallons per day
- g. Volume of manure and/or organic food waste influent, which includes water content, produced by the facility (gallons per day); specify whether the estimate is based on water meter measurements or derived from the daily volume change in manure storage and/or organic food waste storage at the facility, in gallons per day or cubic feet per day



- h. Volume of manure and/or organic food waste influent from the facility to be added to the anaerobic digester (gallons per day)
- I.12 – Attach a monitoring and verification plan as part of the consistency application that includes the following:
  - a. Documentation of Methane Generation Calculation Procedures: Attach a spreadsheet documenting the equations and project-specific data sources for each influent-generating facility that will be used to calculate the monthly baseline methane emissions from the degradation of volatile solids during the annual reporting period, including the following:
    - i. Baseline emissions (short tons CO<sub>2</sub>-equivalent)
    - ii. Volatile solids degraded
    - iii. Calculations of van't Hoff-Arrhenius factor (“f factor”)
    - iv. Calculation of volatile solids available for degradation
    - v. Calculation of mass of volatile solids available at the start of each reporting month
    - vi. Calculation of mass of volatile solids available at the end of each reporting month
    - vii. Calculation of mass of volatile solids removed from storage during each reporting month
    - viii. Calculation of volume of methane produced
    - ix. The equations used must be consistent with those specified at COMAR 26.09.03.07G. The documentation of data sources must account for how facility-specific data obtained through the influent monitoring procedures specified under item I.12.b will be applied in the methane generation equations.
  - b. Influent Monitoring Procedures: Document the monitoring procedures to be used at each facility providing manure and/or organic food waste influent to the anaerobic digester, including the following:
    - i. Monthly influent flow (in kg, wet weight) from the facility into the digester, based on either recorded weight or derived from digester influent pump flow. Provide specified quantification procedures.
    - ii. Monthly influent total solids concentration as a percent of a sample, using U.S. EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020). Provide specified sampling procedures and method and the testing facility to be used.
    - iii. Monthly influent volatile solids concentration as a percent of total solids in a sample, using U.S. EPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020). Provide specified sampling procedures and method and the testing facility to be used.
    - iv. Monthly average ambient temperature (degrees Celsius) based on reading from the nearest National Weather Service certified weather station. Provide the procedures for collecting temperature data, the location of the closest certified weather station, and the distance from the influent-generating facility.
  - c. Documentation of Methane Captured and Destroyed: Attach a spreadsheet documenting the calculations and project-specific data sources that will be used to quantify the annual volume of methane (in standard cubic feet) captured and destroyed by the anaerobic digester during the reporting period, including the following:
    - i. If a direct continuous monitoring system is measuring methane concentration of digester biogas:
      - 1. Daily methane recover as measured in standard cubic feet of methane per day from the continuous monitoring system
      - 2. Sum of daily methane recovery on a monthly basis
      - 3. Sum of monthly methane recover to obtain total annual methane recovery from the digester
    - ii. If a direct continuous monitoring system is monitoring digester biogas flow only:



1. Daily digester biogas flow as measured in standard cubic feet of digester biogas from the continuous monitoring system
  2. Sum of daily digester biogas flow on a weekly basis
  3. Weekly methane concentration measurements (in percent by volume) using calibrated digester biogas analyzer
  4. Weekly methane recovery as measured in standard cubic feet, derived by multiplying weekly digester biogas flow by the respective week's methane concentration measurement (in percent by volume)
  5. Sum of weekly methane recovery on a monthly basis
  6. Sum of monthly methane recovery to obtain total annual methane recovery from the digester in standard cubic feet of methane
- d. Documentation of Transport of CO<sub>2</sub> Emissions (applicable only to regional-type digesters): If the offset project is a regional-type digester, attach a spreadsheet documenting the procedures to be used to quantify CO<sub>2</sub> emissions due to transportation of manure and organic food waste from the facilities where the manure and organic food waste were generated to the anaerobic digester during the reporting period. Specify data sources and calculations for one of the following two methods:
- i. Method 1: Emission factors for type and quantity of fuel used
    1. Identify data sources and calculations for fuel use for all shipments of manure and organic food waste from off-site facilities to the anaerobic digester during each reporting year. Specify how transport miles and quantity of fuel used for each shipment will be determined and recorded. Specify the emissions factors to be used, which may include:
      - a. Diesel fuel: 22.912 lbs CO<sub>2</sub>/gallon
      - b. Gasoline: 19.878 lbs CO<sub>2</sub>/gallon
      - c. Other fuel: emissions factor approved by the Department
  - ii. Method 2: Emission factors for type of fuel by ton-mile
    1. Identify data sources and calculations to determine total tons of manure and organic food waste transported from off-site facilities for input into the anaerobic digester during each reporting period. Specify how transport tons, transport miles, and fuel type used for each shipment will be determined and recorded. Specify the emissions factors to be used, which may include:
      - a. Diesel fuel: 0.131 lbs CO<sub>2</sub> per ton-mile
      - b. Gasoline: 0.133 lbs CO<sub>2</sub> per ton-mile
      - c. Other fuel: emission factor approved by the Department
- e. Quality Assurance/Quality Control (QA/QC) Procedures: Document the QA/QC procedures for equipment used to measure biogas volumetric flow and methane concentration, including the following:
- i. Procedures for recording names and contact information for the personnel responsible for project monitoring and documentation, including manure and organic food waste influent monitoring, recording of digester biogas flow and methane concentration and identification of third-party analytical laboratories used to verify biogas methane composition
  - ii. Procedures for recording names and contact information for the personnel responsible for QA/QC of project monitoring data and documentation
  - iii. Procedures, if applicable, for annual comparison of methane generated by the anaerobic digester, as measured by monitoring equipment, against estimated methane used to generate electricity, as derived



from electric generation records. The recommended procedure for the estimation of methane used to generate electricity is as follows:

1. Annual methane recovered (scf) = [(annual kWh of electricity produced from digester biogas methane) x (heat rate in Btu/kWh of electric generation unit)] / 1012 Btu/scf
- iv. Procedures, if applicable, for documenting annual electricity generation and electric generation unit heat rate
  - v. Procedures for documenting installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration
  - vi. Procedures and calculations for standardization of digester biogas flow that correct for documented site-specific temperature and pressure measurements. (This procedure is not necessary when using flow meters that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.)
  - vii. Procedures for QA/QC of methane concentration measurements. If using gas analyzer instruments inside the digester or in the biogas collection pipe for continuous methane concentration measurement, procedures for maintenance of the following data:
    1. Accuracy and precision of analyzer, in accordance with manufacturer specifications
    2. Proof of initial calibration (documentation provided by manufacturer)
    3. Records of periodic instrument calibration in accordance with manufacturer instructions
    4. Records of methane concentration in at least 15 minute intervals
    5. Records of calibration procedure followed at least once per year against a gas sample with a known methane concentration in the range of 60 to 70 percent by volume
  - viii. Procedures for quarterly third-party laboratory analysis of methane concentration of sampled biogas using U.S. EPA-approved laboratory testing methods, including specification of the testing method to be used
  - ix. Procedures for ensuring that biogas samples will be taken at the location of the digester biogas flow meter
  - x. Procedures for QA/QC of influent monitoring data for each facility supplying manure and/or organic food waste to the anaerobic digester
  - xi. For regional-type digesters, procedures for the compilation of monthly receipts and records of manure and/or organic food waste (in kg) received for input into the anaerobic digester from each facility supplying manure and/or organic food waste influent
  - xii. For regional-type digesters, for each facility supplying organic food waste influent, procedures for ensuring that the daily food waste input to the on-site storage tank prior to shipment to the anaerobic digester is greater than 1/30 of the total storage tank capacity
  - xiii. For regional-type digesters, for each facility supplying manure influent, procedures for ensuring that the daily manure input to the on-site storage tank or pond prior to shipment to the anaerobic digester is greater than 1/30 of the total storage tank or pond capacity
  - xiv. Procedures for the compilation of annual QA/QC report summarizing findings of QA/QC activities conducted and any remedial actions taken





f. Documentation of Measuring and Monitoring Equipment Maintenance, Operation, and Calibration: Document the record keeping protocol that will be used to ensure that the following required actions are performed and documented for each reporting period:

i. Maintenance of Measuring and Monitoring Equipment

1. Monthly records of digester biogas flow rate performance tests to ensure
  - a. Flow readings are being recorded at least every 15 minutes
  - b. The accuracy of digester biogas flow meter readings is within +/- 5 percent of manufacturer specifications
  - c. Methane concentration instrument manufacturer specifications for precision and accuracy are met
2. Records of the type of biogas flow meter installed (differential pressure or hot wire anemometer)
3. Records of the date and location of flow meter installation
4. Records of performance of maintenance schedules for digester biogas flow meter and methane concentration instrument accordance with manufacturer recommendations and specifications

ii. Operation of Measuring and Monitoring Equipment

1. Daily records of collected digester biogas flow rates in at least 15-minute intervals
2. Weekly records of methane concentration (if methane concentration is not continuously monitored) or daily records of methane concentration (if onsite continuous methane concentration analyzer is used)
3. Monthly records of calculation of digester biogas flow rate standardization (in standard cubic feet per day) 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.)
4. Daily records of field data used for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements. (Note, this is not applicable when using flow meters that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.)
5. Monthly records of the number of hours the digester biogas flow meter device was inoperable
6. Monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device
7. Monthly records of electricity generation and measured heat rate, based on source tests or derived from heat input (MMBtu) and electricity generation (KWh) (applicable to offset projects with an electric generation component)

iii. Calibration of Measuring and Monitoring Equipment

1. Records of the calibration procedures conducted for the digester biogas flow meter in accordance with manufacturer specifications, but conducted no less than annually



2. Records of the dates and results of digester biogas flow meter calibration, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations
  3. Records of the calibration procedures conducted for the methane concentration monitoring instrument. (Daily records if applicable to continuous methane concentration monitoring instrument; monthly records if applicable to portable methane concentration monitoring instrument.)
  4. Records of the dates and results of methane concentration monitoring instrument calibration, including field measurement data. (Applicable to both continuous methane concentration monitoring instrument and portable methane concentration monitoring instrument.)
- g. Record Keeping and Records Retention Protocol: Document the record keeping and records retention protocol that will be used to maintain documentation throughout the duration of the offset project, including maintenance of an electronic index or hardcopy of information. Document the record keeping protocol that will be used to ensure that the following documentation for each reporting year is maintained:
- i. Influent Monitoring: For each facility providing manure and/or organic food waste influent to the digester:
    1. Records of monthly influent flow (in kg, wet weight) into the digester and quantification procedures used
    2. Records of monthly influent total solids concentration as a percent of total solids in sample, and sampling procedures, method, and testing facility used
    3. Records of monthly influent volatile solids concentration as percent of total solids in sample, and sampling procedures, method, and testing facility used
    4. Records of average monthly ambient temperature, and data collection method used
  - ii. Methane Captured and Destroyed:
    1. If a direct continuous monitoring system is measuring methane concentration of recovered digester biogas:
      - a. Records of daily methane recovery as measured in standard cubic feet from the continuous monitoring system
    2. If a direct continuous monitoring system is measuring the flow of digester biogas only:
      - a. Records of daily digester biogas flow as measured in standard cubic feet of digester biogas from the continuous monitoring system
      - b. Records of weekly methane concentration measurements (in percent by volume) using a calibrated digester biogas analyzer
  - iii. Transport CO<sub>2</sub> Emissions:
    1. If Method 1 (see item I.12.d.i. above) is used to document transport CO<sub>2</sub> emissions:
      - a. Records of transport miles and quantity of fuel used for each shipment of manure or organic food waste from an off-site facility for input into the digester
    2. If Method 2 (see item I.12.d.ii. above) is used to document transport CO<sub>2</sub> emissions:



- a. Records of tons of manure or organic food waste transported, transport miles, and fuel type used for each shipment of manure or organic food waste from an off-site facility for input into the digester

iv. Quality Assurance/Quality Control (QA/QC) Program:

1. Names and contact information for the personnel responsible for project monitoring and documentation
2. Names and contact information for personnel responsible for QA/QC of project monitoring and documentation
3. Annual QA/QC report and the associated findings and remedial actions taken
4. Annual comparison of methane generated by the anaerobic digester, as measured by monitoring equipment, with estimated methane used to generate electricity, as derived from electric generation records (applicable to offset projects with an electric generation component)
5. Annual electricity generation and electric generation heat rate (applicable to offset projects with an electric generation component)
6. Records of installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration
7. Records of monthly calculation results for standardizing digester biogas flow that correct for documented site-specific 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.) Includes daily records of field data collected for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements
8. Results of quarterly third-party laboratory analysis of methane concentration of sampled biogas using U.S. EPA-approved laboratory testing methods
9. Documentation that biogas samples were taken at the location of the digester biogas flow meter
10. For regional-type digesters, monthly receipts and records of manure and organic food waste (in kg, wet weight) received for input into the anaerobic digester from each off-site facility supplying manure and/or organic food waste influent
11. For regional-type digesters, monitoring records of daily organic food waste input to storage at each off-site facility supplying manure and/or organic food waste influent (in mass or volume, and as a fractions of total tank storage capacity)

v. Maintenance of Measuring and Monitoring Equipment:

1. Records of digester biogas flow meter performance test results for each month
2. Records of the type of biogas flow meter installed during the reporting period (differential pressure or hot wire anemometer)
3. Records of the date and location of flow meter installation
4. Records of maintenance performed on digester biogas flow meter and methane concentration instrument

vi. Operation of Measuring and Monitoring Equipment:

1. Records of daily digester biogas flow rates (with flow rate recorded at least every 15 minutes)
2. Records of weekly methane concentration (if methane concentration not continuously monitored) or records of daily methane concentration (if direct continuous methane concentration analyzer is used)
3. Records of number of hours digester biogas flow meter device was inoperable each month
4. Records of combustion device operation hours for each month
5. Records of the daily amount of biogas combusted in at least 15 minute intervals



vii. Calibration of Measuring and Monitoring Equipment:

1. Records of digester biogas flow meter calibration results, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations

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**PROJECT SPONSOR SIGNATURE**

**Read and agree to the following by signing the Signature of Applicant.**

**An original signature is required for the following:**

- Consistency Application Agreement
- Access Agreement Statement
- Statement of Truth, Accuracy, and Completeness



**AVOIDED METHANE EMISSIONS FROM AGRICULTURAL MANURE MANGAEMENT OPERATIONS  
OFFSET PROJECT  
SECTION II – INDEPENDENT VERIFIER REPORT**

**Check the Consistency Application box if the Independent Verifier Report is being submitted with the Consistency Application.**

**Check the Monitoring and Verification box if the Independent Verifier Report is being submitted with the Monitoring and Verification Report.**

**Print or type all required information in all required fields.**

**INDEPENDENT VERIFIER INFORMATION**

**Print or type all required information pertaining to the Project Sponsor in the spaces provided.**

- Independent Verifier Organization Legal Name: Provide the full legal name of the organization the Independent Verifier represents.
- Independent Verifier Point of Contact: Provide the full name of the Independent Verifier.
- Physical Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the contact address for the Independent Verifier represents.
- Telephone Number: Provide the primary contact telephone number for the Independent Verifier.
- E-Mail Address: Provide the E-mail address for the Independent Verifier.

**ATTACHMENT NUMBER**

**Attach the following requested information to the end of the application. Clearly indicate the corresponding attachment number (i.e.: II.1, II.2, etc.), the offset project name, and the offset project I.D. on all attached documents.**

**Attach II.1 if the information is being submitted with the Consistency Application.**

**Attach II.2 and II.3 if the information is being submitted with the Monitoring and Verification Report.**

- II.1 – Attach a verification report.
  - a. The verification report must document the following:
    - i. The verifier has reviewed the entire Consistency Application and evaluated the contents of the application in relation to the applicable requirements of COMAR 26.09.03.02.
    - ii. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to demonstrate that the offset project meets the applicable eligibility requirements of COMAR 26.09.03.02.



- iii. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to demonstrate baseline emissions pursuant to the applicable requirements of COMAR 26.09.03.07G.
    - iv. The verifier has evaluated the adequacy of the Monitoring and Verification Plan submitted pursuant to COMAR 26.09.03.07I.
  - b. The verification report must include the following contents:
    - i. Cover page with report title and date
    - ii. Table of contents
    - iii. List of acronyms and abbreviations
    - iv. Executive summary
    - v. Description of objective of report
    - vi. Identification of the client, including name, address, and other contact information
    - vii. Identification of the offset project
    - viii. Description of evaluation criteria (applicable regulatory provisions and documentation requirements specified in Consistency Application)
    - ix. Description of the review and evaluation process, including any site visits and interviews
    - x. Identification of individuals performing the verification work, including the verification team leader and key personnel, and contact information for the team leader
    - xi. Description of the materials provided to the verifier by the Project Sponsor
    - xii. Evaluation conclusions and findings, including level of assurance provided
- II.2 – Attach documentation verifying that measuring and monitoring equipment is maintained, operated, and calibrated based on manufacturer recommendations. Include the following:
  - a. Monthly records of digester biogas flow rate performance tests to ensure:
    - i. Flow readings are being recorded at least every 15 minutes
    - ii. The accuracy of digester biogas flow meter readings is within +/- 5 percent of manufacturer specifications
    - iii. Methane concentration instrument manufacturer specifications for precision and accuracy are met
  - b. Records of the type of biogas flow meter installed (differential pressure or hot wire anemometer)
  - c. Records of the date and location of flow meter installation
  - d. Records of performance of maintenance schedules for digester biogas flow meter and methane concentration instrument in accordance with manufacturer recommendations and specifications
  - e. Daily records of collected digester biogas flow rates in at least 15-minute intervals
  - f. Weekly records of methane concentration (if methane concentration is not continuously monitored) or daily records of methane concentration (if onsite continuous methane concentration analyzer is used)
  - g. Monthly records of calculation of digester biogas flow rate standardization (in standard cubic feet per day) 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 gas flow in standard cubic feet.)
  - h. Daily records of field data used for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements. (Note, this is not applicable when using flow meters that automatically measure temperature and pressure, and express digester biogas gas flow in standard cubic feet.)
  - i. Monthly records of the number of hours the digester biogas flow meter device was inoperable



- j. Monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device
  - k. Monthly records of electricity generation and measured heat rate, based on source tests or derived from heat input (MMBtu) and electricity generation (KWh) (applicable to offset projects with an electric generation component)
  - l. Records of the calibration procedures conducted for the digester biogas flow meter in accordance with manufacturer specifications, but conducted not less than annually
  - m. Records of the dates and results of digester biogas flow meter calibration, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations
  - n. Records of the calibration procedures conducted for the methane concentration monitoring instrument. (Daily records if applicable to continuous methane concentration monitoring instrument; monthly records if applicable to portable methane concentration monitoring instrument.)
  - o. Records of the dates and results of methane concentration monitoring instrument calibration, including field measurement data. (Applicable to both continuous methane concentration monitoring instrument and portable methane concentration monitoring instrument.)
- II.3 – Attach documentation verifying the recordkeeping protocol that will be used throughout the duration of the offset project. Include maintenance of an electronic index of all material to be collected and storage procedures to ensure maintenance of collected information in electronic and/or hardcopy form. Include the following:
    - a. Influent Monitoring
      - i. For each facility providing manure and/or organic food waste influent to the digester:
        - 1. Records of monthly influent flow (in kg, wet weight) into the digester and quantification procedures used
        - 2. Records of monthly influent total solids concentration as a percent of total solids in sample, and sampling procedures, method, and testing facility used
        - 3. Records of monthly influent volatile solids concentration as percent of total solids in sample, and sampling procedures, method, and testing facility used
        - 4. Records of average monthly ambient temperature, and data collection method used
    - b. Methane Captured and Destroyed
      - i. If a direct continuous monitoring system is measuring methane concentration of recovered digester biogas:
        - 1. Records of daily methane recovery as measured in standard cubic feet from the continuous monitoring system
      - ii. If a direct continuous monitoring system is measuring the flow of digester biogas only:
        - 1. Records of daily digester biogas flow as measured in standard cubic feet of digester biogas from the continuous monitoring system
        - 2. Records of weekly methane concentration measurements (in percent by volume) using as calibrated digester biogas analyzer
    - c. Transport CO<sub>2</sub> Emissions
      - i. If Method 1 (see item I.12.d.i. above) is used to document transport CO<sub>2</sub> emissions:



1. Records of transport miles and quantity of fuel used for each shipment of manure or organic food waste from an off-site facility for input into the digester
  - ii. If Method 2 (see item I.12.d.ii. above) is used to document transport CO<sub>2</sub> emissions:
    1. Records of tons of manure or organic food waste transported, transport miles, and fuel type used for each shipment of manure or organic food waste from an off-site facility for input into the digester
- d. Quality Assurance/Quality Control (QA/QC) Program
- i. Names and contact information for the personnel responsible for project monitoring and documentation
  - ii. Names and contact information for personnel responsible for QA/QC of project monitoring and documentation
  - iii. Annual QA/QC report and the associated findings and remedial actions taken
  - iv. Annual comparison of methane generated by the anaerobic digester, as measured by monitoring equipment, with estimated methane used to generate electricity, as derived from electric generation records (applicable to offset projects with an electric generation component)
  - v. Annual electricity generation and electric generation heat rate (applicable to offset projects with an electric generation component)
  - vi. Records of installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration
  - vii. Records of monthly calculation results for standardizing digester biogas flow that correct for documented site-specific temperature and pressure measurements. (Note, no applicable when using flow meters that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.) Includes daily records of field data collected for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements
  - viii. Results of quarterly third-party laboratory analysis of methane concentration of sampled biogas using U.S. EPA-approved laboratory testing methods
  - ix. Documentation that biogas samples were taken at the location of the digester biogas flow meter
  - x. For regional-type digesters, monthly receipts and records of manure and organic food waste (in kg, wet weight) received for input into the anaerobic digester from each off-site facility supplying manure and/or organic food waste influent
  - xi. For regional-type digesters, monitoring records of daily organic food waste input to storage at each off-site facility supplying manure and/or organic food waste influent (in mass or volume, and as a fraction of total tank storage capacity)
- e. Maintenance of Measuring and Monitoring Equipment
- i. Records of digester biogas flow meter performance test results for each month
  - ii. Records of the type of biogas flow meter installed during the reporting period (differential pressure or hot wire anemometer)
  - iii. Records of the date and location of flow meter installation
  - iv. Records of maintenance performed on digester biogas flow meter and methane concentration instrument
- f. Operation of Measuring and Monitoring Equipment
- i. Records of daily digester biogas flow rates (with flow rate recorded at least every 15 minutes)
  - ii. Records of weekly methane concentration (if methane concentration not continuously monitored) or records of daily methane concentration (if direct continuous methane concentration analyzer is used)
  - iii. Records of number of hours digester biogas flow meter device was inoperable each month
  - iv. Records of combustion device operation hours for each month
  - v. Records of the daily amount of biogas combusted in at least 15 minute intervals





g. Calibration of Measuring and Monitoring Equipment

- i. Records of digester biogas flow meter calibration results, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations

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**INDEPENDENT VERIFIER SIGNATURE**

**Read and agree to the following by signing the Signature of Independent Verifier.**

**An original signature is required for the following:**

- Certification Statement
- Statement of Truth, Accuracy, and Completeness



**AVOIDED METHANE EMISSIONS FROM AGRICULTURAL MANURE MANAGEMENT OPERATIONS  
OFFSET PROJECT  
SECTION III – MONITORING AND VERIFICATION**

**For all fields where information must be provided, print or type all required information.**

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**PROJECT SPONSOR INFORMATION**

**Print or type all required information pertaining to the Project Sponsor in the spaces provided.**

- Organization Name and Project Sponsor Name: Provide the full legal name of the organization the Project Sponsor represents and the name of the Project Sponsor. If the Project Sponsor is representing him or herself, provide the name of the individual. The Project Sponsor is the person who is the Authorized Account Representative for the RGGI COATS general account.
  - Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the full contact address of the organization the Project Sponsor represents.
  - Telephone and Facsimile Transmission Number: Provide the primary contact telephone number and the facsimile transmission number for the Project Sponsor.
  - E-Mail Address: Provide the primary contact E-mail address for the Project Sponsor.
  - COATS General Account Number: Provide the COATS General Account Number established by the Project Sponsor in COATS. The Project Sponsor must establish a general account in the RGGI CO<sub>2</sub> Allowance Tracking System (RGGI COATS). For information about establishing a RGGI COATS general account, consult the RGGI COATS User's Guide, available at <http://www.rggi-coats.org>.
  - Offset Project Date of Commencement: Provide the date that the offset project initially commenced. For offset projects commenced between December 20, 2005 and December 31, 2008, the Consistency Application must be submitted by June 30, 2009. For offset projects commenced on or after January 1, 2009, the Consistency Application must be submitted within six months after the project is commenced.
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**POINT OF CONTACT INFORMATION**

**Print or type all required information pertaining to the Point of Contact in the spaces provided.**

- Point of Contact Name: Provide the full legal name of the Point of Contact for the offset project.
  - Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the full contact address for the Point of Contact for the offset project.
  - Telephone and Facsimile Transmission Number: Provide the primary contact telephone number and the facsimile transmission number for the Point of Contact for the offset project.
  - E-Mail Address: Provide the primary contact E-mail address for the Point of Contact for the offset project.
- 



## OFFSET PROJECT LOCATION

**Print or type all required information pertaining to the offset project location in the spaces provided.**

- Facility Name: Provide the full legal name of the facility used in the offset project.
- Facility Physical Street Address, City, State/Province, Postal Code, Country: In the appropriate areas, provide the complete physical address of the facility used in the offset project.

## ATTACHMENT NUMBER

**Attach all of the following requested information to the end of the application. Indicate the corresponding attachment number (i.e.: III.1, III.2, etc.), the offset project name, and the offset project I.D. on all attached documents.**

**When submitting electronic copies of the following, ensure that all Microsoft Excel spreadsheets are non-encrypted and accessible by the Department. Files in the .pdf format will not be accepted.**

- III.1 – Attach a statement to document that the monitoring and verification plan has adequately met all Department requirements.
- III.2 – Attach documentation of the full legal name, address, email address, telephone number, and facsimile transmission number of both the owner and operator of the offset project, and the owner and operator of the facility where the offset project will occur.
- III.3 – Attach calculations showing how the emissions baseline was determined. Emissions baseline calculations should be determined for all facilities supplying manure and/or organic food waste influent to the anaerobic digester, in short tons of CO<sub>2</sub>-equivalent. For each facility, document calculation of baseline methane emissions for each month of the reporting period. The baseline methane emissions (in CO<sub>2</sub>e) represent potential emissions due to methane production under site-specific anaerobic storage and weather conditions. You must use the following formula:

a. 
$$\text{Emissions (short tons CO}_2\text{e)} = \left[ \frac{(V_m \cdot M)}{2000} \right] \cdot GWP$$

b. 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<sub>2</sub>e global warming potential of methane)

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

i. 
$$VS_{\text{deg}} = VS_{\text{avail}} \cdot f$$

ii. Where:

- $VS_{\text{deg}}$  = volatile solids degrade each month (kg)



2.  $VS_{avail}$  = volatile solids available for degradation in manure or organic food waste storage each month (kg)
3.  $f$  = van't Hoff-Arrhenius factor for the specific month

d. 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:

$$i. f = \exp \frac{[E(T_2 - T_1)]}{(GC \cdot T_1 \cdot T_2)}$$

ii. Where:

1.  $f$  = van't Hoff-Arrhenius factor
2.  $E$  = activation energy constant (15,175 cal/mol)
3.  $T_2$  = average monthly ambient temperature (in Kelvin) for facility where manure or organic food waste is generated if reported temperature is greater than 5° C
4.  $T_1$  = 303.15 K (30° C converted to K)
5.  $GC$  = ideal gas constant (1.987 cal/K mol)
6. If reported temperature is less than 5° 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

e. 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:

$$i. VS_{avail} = VS_p + \frac{1}{2}VS_{in} - VS_{out}$$

ii. Where:

1.  $VS_{avail}$  = volatile solids available for degradation each month
2.  $VS_p$  = volatile solids present in manure or organic food waste storage at beginning of the month (kg)
3.  $VS_{in}$  = 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
4.  $VS_{out}$  = volatile solids removed from manure or organic food waste storage for land application or export

f. 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:

$$i. VS_p = (M_m \cdot TS_{\%} \cdot VS_{\%})_p$$

ii. Where:

1.  $VS_p$  = volatile solids present in manure or organic food waste storage at the beginning of each month (kg)
2.  $M_m$  = mass (kg) of manure or organic food waste present in storage at the beginning of the month



3.  $TS_{\%}$  = 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))
4.  $VS_{\%}$  = 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. 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:

i.  $VS_{in} = (M_m \bullet TS_{\%} \bullet VS_{\%})_{in}$

ii. Where:

1.  $VS_{in}$  = volatile solids added to manure or organic food waste storage during the course of each month (kg)
2.  $M_m$  = mass (kg) of manure or organic food waste added to storage at the beginning of the month
3.  $TS_{\%}$  = 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))
4.  $VS_{\%}$  = 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))

h. Mass of Volatile Solids Removed During Month: Document calculation of the volatile solids removed from manure or organic food waste storage for the 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:

i.  $VS_{out} = (M_m \bullet TS_{\%} \bullet VS_{\%})_{out}$

ii. Where:

1.  $VS_{out}$  = volatile solids removed from manure or organic food waste storage during the course of each month (kg)
2.  $M_m$  = mass (kg) of manure or organic food waste removed from storage during the month
3.  $TS_{\%}$  = 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))
4.  $VS_{\%}$  = 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))

i. 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:



i.  $V_m = (VS_{deg} \cdot B_o) \cdot 35.3147$  cubic feet per cubic meter

ii. Where:

1.  $V_m$  = volume of methane produced (scf)
2.  $VS_{deg}$  = volatile solids degraded (kg)
3.  $B_o$  = 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)

• III.4 – Attach all emissions reductions calculations. These calculations must include:

a. 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<sub>2</sub>-equivalent) captured and destroyed by the anaerobic digester. Indicate whether methane concentration of digester biogas is continuously monitored.

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

1. Daily methane recovery (in standard cubic feet of methane) from the continuous monitoring system for each day in the reporting period
2. Sum of the daily methane recover (in standard cubic feet of methane) on a monthly basis
3. 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<sub>2</sub>-equivalent per year) from the digester

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

1. Tabulation of daily digester biogas flow (in standard cubic feet) from the continuous monitoring system for each day in the reporting period
2. Sum of daily digester biogas flow on a weekly basis (in standard cubic feet)
3. Weekly methane concentration measurements (in percent of sample by volume) using calibrated digester biogas analyzer
4. 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)
5. Sum of weekly methane recovery (in standard cubic feet of methane) on a monthly basis
6. 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<sub>2</sub>-equivalent)

b. Transport CO<sub>2</sub>-Equivalent Emissions: If the offset project is a regional-type digester, attach a spreadsheet documenting quantification of CO<sub>2</sub> 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<sub>2</sub> emissions, the spreadsheet must document use of one of the following two methods:

i. Method 1: Emissions factors for type and quantity of fuel used



1. 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:

- a. Diesel fuel: 22.912 lbs CO<sub>2</sub>/gallon
- b. Gasoline: 19.878 lbs CO<sub>2</sub>/gallon
- c. Other fuel: emission factor approved by the Department

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

1. 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:

- a. Diesel fuel: 0.131 lbs CO<sub>2</sub> per ton-mile
- b. Gasoline: 0.133 lbs CO<sub>2</sub> per ton-mile
- c. Other fuel: emission factor approved by the Department

- c. Determination of Emissions Reductions: Enter the emissions reductions achieved by the offset project in short tons of CO<sub>2</sub>-equivalent. 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<sub>2</sub>-equivalent), whichever is less. For regional-type digester, emissions reductions must be the net emissions reductions achieved after subtraction of any transport-related CO<sub>2</sub> emissions.

• III.5 – Attach an annual monitoring and verification report that includes the following:

a. Monthly volumetric flow rate and CH<sub>4</sub> concentration data

- i. Include documentation that the CH<sub>4</sub> was actually supplied to the combustion source

b. Procedures for quantifying the annual volume of methane collected (in standard cubic feet)

- i. Specify the data sources and calculations to be used

c. Procedures for quantifying the mass of methane per cubic foot of methane

- i. Specify whether the default value of 0.04246 lbs/ft<sup>3</sup> at 1 atmosphere and 20° C will be used, or

ii. Specify the procedures that will be used to:

1. Monitor temperature and pressure
2. Derive and alternate representative temperature

iii. Specify the data sources and value for the appropriate mass of CH<sub>4</sub> per standard cubic foot of methane (lbs/ft<sup>3</sup>)

• III.6 – Attach documentation that manure and organic food waste from each distinct source supplying to the anaerobic digester are sampled monthly to determine the amount of volatile solids present, if the offset project is a regional-type digester. Include calculations and supporting material and receipts. For each facility providing manure and/or organic food waste influent to the digester, provide:



- a. Records of monthly influent flow (in kg, wet weight) into the digester and quantification procedures used
  - b. Records of monthly influent total solids concentration as a percent of total solids in sample, and sampling procedures, method, and testing facility used
  - c. Records of monthly influent volatile solids concentration as percent of total solids in sample, and sampling procedures, method and testing facility used
  - d. Records of average monthly ambient temperature, and data collection method used
- III.7 – Attach documentation that organic food waste is sampled monthly to determine the amount and type of volatile solids present before digestion and apportioned accordingly, if the offset project includes the digestion of eligible organic food waste.
  - III.8 – Attach a monitoring and verification plan that includes:
    - a. A quality assurance and quality control program associated with equipment used to determine biogas volumetric flow rate and CH<sub>4</sub> composition. Documentation must include:
      - i. Procedures for recording names and contact information for the personnel responsible for project monitoring and documentation, including manure and organic food waste influent monitoring, recording of digester biogas flow and methane concentration and identification of third-party analytical laboratories used to verify biogas methane composition
      - ii. Procedures for recording names and contact information for the personnel responsible for QA/QC of project monitoring data and documentation
      - iii. Procedures, if applicable, for annual comparison of methane generated by the anaerobic digester, as measured by monitoring equipment, against estimated methane used to generate electricity, as derived from electric generation records. The recommended procedure for the estimation of methane used to generate electricity is as follows:
        - 1. Annual methane recovered (scf) = [(annual kWh of electricity produced from digester biogas methane) x (heat rate in Btu/kWh of electric generation unit)] / 1012 Btu/scf
      - iv. Procedures, if applicable, for documenting annual electricity generation and electric generation unit heat rate
      - v. Procedures for documenting installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration
      - vi. Procedures and calculations for standardization of digester biogas flow that correct for documented site-specific temperature and pressure measurements. (This procedure is not necessary when using flow meters that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.)
      - vii. Procedures for QA/QC of methane concentration measurements. If using gas analyzer instruments inside the digester or in the biogas collection pipe for continuous methane concentration measurement, procedures for maintenance of the following data:
        - 1. Accuracy and precision of analyzer in accordance with manufacturer specifications
        - 2. Proof of initial calibration (documentation provided by manufacturer)
        - 3. Records of periodic instrument calibration in accordance with manufacturer instructions
        - 4. Records of methane concentration in at least 15 minute intervals
        - 5. Records of calibration procedure followed at least once per year against a gas sample with a known methane concentration in the range of 60 to 70 percent by volume





- viii. Procedures for quarterly third-party laboratory analysis of methane concentration of sampled biogas using U.S. EPA-approved laboratory testing methods, including specification of the testing method to be used
  - ix. Procedures for ensuring that biogas samples will be taken at the location of the digester biogas flow meter
  - x. Procedures for QA/QC of influent monitoring data for each facility supplying manure and/or organic food waste to the anaerobic digester
  - xi. For regional-type digesters, procedures for the compilation of monthly receipts and records of manure and/or organic food waste (in kg) received for input into the anaerobic digester from each facility supplying manure and/or organic food waste influent
  - xii. For regional-type digesters, for each facility supplying organic food waste influent, procedures for ensuring that the daily food waste input to the on-site storage tank prior to shipment to the anaerobic digester is greater than 1/30 of the total storage tank capacity
  - xiii. For regional-type digesters, for each facility supplying manure influent, procedures for ensuring that the daily manure input to the on-site storage tank or pond prior to shipment to the anaerobic digester is greater than 1/30 of the total storage tank or pond capacity
  - xiv. Procedures for the compilation of annual QA/QC report summarizing findings of QA/QC activities conducted and any remedial actions taken
- b. Documentation verifying that measuring and monitoring equipment is maintained, operated, and calibrated based on the manufacturer's recommendations. Documentation must include:
- i. Maintenance of Measuring and Monitoring Equipment
    - 1. Monthly records of digester biogas flow rate performance tests to ensure:
      - a. Flow readings are being recorded at least every 15 minutes
      - b. The accuracy of digester biogas flow meter readings is within +/- 5 percent of manufacturer specifications
      - c. Methane concentration instrument manufacturer specifications for precision and accuracy are met
    - 2. Records of the type of biogas flow meter installed (differential pressure or hot wire anemometer)
    - 3. Records of the date and location of flow meter installation
    - 4. Records of performance of maintenance schedules for digester biogas flow meter and methane concentration instrument accordance with manufacturer recommendations and specifications
  - ii. Operation of Measuring and Monitoring Equipment
    - 1. Daily records of collected digester biogas flow rates in at least 15-minute intervals
    - 2. Weekly records of methane concentration (if methane concentration is not continuously monitored) or daily records of methane concentration (if onsite continuous methane concentration analyzer is used)
    - 3. Monthly records of calculation of digester biogas flow rate standardization (in standard cubic feet per day) to correct for site-specific pressure and temperature measurements. (Note, this



procedure is not necessary when using flow meter that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.)

4. Daily records of field data used for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements. (Note, this is not applicable when using flow meters that automatically measure temperature and pressure, and express digester biogas flow in standard cubic feet.)
5. Monthly records of the number of hours the digester biogas flow meter device was inoperable
6. Monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device
7. Monthly records of electricity generation and measured heat rate, based on source tests or derived from heat input (MMBtu) and electricity generation (KWh) (applicable to offset projects with an electric generation component)

iii. Calibration of Measuring and Monitoring Equipment

1. Records of the calibration procedures conducted for the digester biogas flow meter in accordance with manufacturer specifications, but conducted no less than annually
2. Records of the dates and results of digester biogas flow meter calibration, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations
3. Records of the calibration procedures conducted for the methane concentration monitoring instrument. (Daily records if applicable to continuous methane concentration monitoring instrument; monthly records if applicable to portable methane concentration monitoring instrument.)
4. Records of the dates and results of methane concentration monitoring instrument calibration, including field measurement data. (Applicable to both continuous methane concentration monitoring instrument and portable methane concentration monitoring instrument.)

c. Document the record keeping and records retention protocol that will be used to maintain documentation throughout the duration of the offset project, including maintenance of an electronic index or hardcopy of information. Document the record keeping protocol that will be used to ensure that the following documentation for each reporting year is maintained. Documentation must include:

- i. Influent Monitoring: For each facility providing manure and/or organic food waste influent to the digester:
  1. Records of monthly influent flow (in kg, wet weight) into the digester and quantification procedures used
  2. Records of monthly influent total solids concentration as a percent of total solids in sample, and sampling procedures, method, and testing facility used
  3. Records of monthly influent volatile solids concentration as percent of total solids in sample, and sampling procedures, method, and testing facility used
  4. Records of average monthly ambient temperature, and data collection method used

ii. Methane Captured and Destroyed:



1. If a direct continuous monitoring system is measuring methane concentration of recovered digester biogas:
    - a. Records of daily methane recovery as measured in standard cubic feet from the continuous monitoring system
  2. If a direct continuous monitoring system is measuring the flow of digester biogas only:
    - a. Records of daily digester biogas flow as measured in standard cubic feet from the continuous monitoring system
    - b. Records of weekly methane concentration measurements (in percent by volume) using a calibrated digester biogas analyzer
- iii. Transport CO<sub>2</sub> Emissions:
1. If Method 1 (see item I.12.d.i above) is used to document transport CO<sub>2</sub> emissions:
    - a. Records of transport miles and quantity of fuel used for each shipment of manure or organic food waste from an off-site facility for input into the digester
  2. If Method 2 (see item I.12.d.ii above) is used to document transport CO<sub>2</sub> emissions:
    - a. Records of tons of manure or organic food waste transported, transport miles, and fuel type used for each shipment of manure or organic food waste from an off-site facility for input into the digester
- iv. Quality Assurance/Quality Control (QA/QC) Program:
1. Names and contact information for the personnel responsible for project monitoring and documentation
  2. Names and contact information for personnel responsible for QA/QC of project monitoring and documentation
  3. Annual QA/QC report and the associated findings and remedial actions taken
  4. Annual comparison of methane generated by the anaerobic digester, as measured by monitoring equipment, with estimated methane used to generate electricity, as derived from electric generation records (applicable to offset projects with an electric generation component)
  5. Annual electricity generation and electric generation heat rate (applicable to offset projects with an electric generation component)
  6. Records of installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration
  7. Records of monthly calculation results for standardizing digester biogas flow that correct for documented site-specific 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.) Includes daily records of field data collected for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements
  8. Results of quarterly third-party laboratory analysis of methane concentration of sampled biogas using U.S. EPA-approved laboratory testing methods
  9. Documentation that biogas samples were taken at the location of the digester biogas flow meter
  10. For regional-type digesters, monthly receipts and records of manure and organic food waste (in kg, wet weight) received for input into the anaerobic digester from each off-site facility supplying manure and/or organic food waste influent



11. For regional-type digesters, monitoring records of daily organic food waste input to storage at each off-site facility supplying manure and/or organic food waste influent (in mass or volume, and as a fractions of total tank storage capacity)

v. Maintenance of Measuring and Monitoring Equipment:

1. Records of digester biogas flow meter performance test results for each month
2. Records of the type of biogas flow meter installed during the reporting period (differential pressure or hot wire anemometer)
3. Records of the date and location of flow meter installation
4. Records of maintenance performed on digester biogas flow meter and methane concentration instrument

vi. Operation of Measuring and Monitoring Equipment:

1. Records of daily digester biogas flow rates (with flow rate recorded at least every 15 minutes)
2. Records of weekly methane concentration (if methane concentration not continuously monitored) or records of daily methane concentration (if direct continuous methane concentration analyzer is used)
3. Records of number of hours digester biogas flow meter device was inoperable each month
4. Records of combustion device operation hours for each month
5. Records of the daily amount of biogas combusted in at least 15 minute intervals

vii. Calibration of Measuring and Monitoring Equipment:

1. Records of digester biogas flow meter calibration results and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations

- III.9 – Attach documentation of quarterly verification by the project sponsor of biogas CH<sub>4</sub> composition through gas sampling and third-party laboratory analysis using applicable U.S. EPA test methods.

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**PROJECT SPONSOR SIGNATURE**

**Read and agree to the following by signing the Signature of Project Sponsor.**

**An original signature is required for the following:**

- Statement of Truth, Accuracy, and Completeness.

