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**Delaware CO2 Budget Trading Program**

**Offset Project Monitoring and Verification Report**

**Avoided Methane from Agricultural Manure Management**

**March 2019**

*Offset Project Name*

|  |
| --- |
|       |

*Offset Project ID Code*

|  |
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|       |

**COVERSHEET**

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| Each of the following Forms must be completed. Check the boxes below to indicate that the submitted *Monitoring & Verification Report* includes each of the required Forms: |
| **PART 1. Preliminary Information Forms** |
| [ ]  Form 1.1 – General Information |
| [ ]  Form 1.2 – Project Sponsor Attestations |
| [ ]  Form 1.3 – Project Sponsor Statement |
| [ ]  Form 1.4 – Disclosure of Greenhouse Gas Emissions Data Reporting |
|  **PART 2. Category-Specific Information and Documentation Forms** |
| [ ]  Form 2.1 – Demonstration of Conformance with M&V Plan |
| [ ]  Form 2.2 – Determination of Emissions Reduction |
| **PART 3. Independent Verification Form** |
| [ ]  Form 3.1 – General Information |
| [ ]  Form 3.2 – Certification Statement and Report |

**Form 1.1 – General Information**

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| --- |
| Project Sponsor (RGGI COATS Authorized Account Representative) |
|       |
| Telephone Number | Fax Number | Email Address |
|       |  |       |  |       |
| Street Address |
|       |
| City | State/Province | Postal Code | Country |
|       |  |       |  |       |  |       |
|  |
| RGGI COATS General Account Name |
|       |
| RGGI COATS General Account Number |
|       |
|  |
| Offset Project ID Code | Application Date |
|       |  |       |
| Brief Description of Offset Project |
|       |
| Project City | Project Country | Project State | Project Commencement Date |
|       |  |       |  |       |  |       |
|  |
| Project Sponsor Organization |
|       |
| Primary Street Address |
|       |
| City | State/Province | Postal Code | Country |
|       |  |       |  |       |  |       |
| Brief Description of Project Sponsor Organization |
|       |
| Telephone Number | Website URL |
|       |  |       |

**Form 1.2 – Project Sponsor Attestations**

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

**Form 1.3 – Project Sponsor Statement**

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| The undersigned Project Sponsor hereby confirms and attests that the offset project upon which this *Monitoring and Verification Report* is based is in full compliance with all of the requirements of 7 DE Reg. 1147. The Project Sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. The Project Sponsor understands that eligibility for the award of CO2 offset allowances under 7 DE Reg. 1147 is contingent on meeting the requirements of 7 DE Reg. 1147. The Project Sponsor authorizes the Department or its agent to audit this offset project for purposes of verifying that the offset project, including the Monitoring and Verification Plan, has been implemented as described in the Consistency Application that was the subject of a consistency determination by the Department. The Project Sponsor understands that this right to audit shall include the right to enter the physical location of the offset project and to make available to the Department or its agent any and all documentation relating to the offset project at the Department’s request. The Project Sponsor submits to the legal jurisdiction of State of Delaware. |
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| Project Sponsor Signature |  |  |  |
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|       |  |  |  |
| Printed Name |  |  |  |
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|       |  |  |  |
| Title |  |  |  |
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|       |  |  |  |
| Organization |  |  |  |
|  |  |  |  |
|       |  |  |       |
| Date |  |  | Notary |

**Form 1.4 – Disclosure of Greenhouse Gas Emissions Data Reporting**

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| Check the box below that applies:[ ]  No greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the CO2 Budget Trading Program.[ ]  Greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the CO2 Budget Trading Program. Information for all such programs to which greenhouse gas emissions data have been or will be reported is provided below. |
| **Name of Program to which GHG Emissions Data Reported** |
|       |
| Check all that apply | Enter Frequency of Reporting |
| [ ]  Reporting is currently ongoing |       |
| [ ]  Reporting was conducted in the past | Enter Reporting Start Date |
| [ ]  Reporting will be conducted in the future |       |
| [ ]  Reporting is mandatory | Program Website |
| [ ]  Reporting is voluntary |       |
| Program Contact Information – Address |
|       |
| Categories of Emissions Data Reported |
|       |
| **Name of Program to which GHG Emissions Data Reported** |
|       |
| Check all that apply | Enter Frequency of Reporting |
| [ ]  Reporting is currently ongoing |       |
| [ ]  Reporting was conducted in the past | Enter Reporting Start Date |
| [ ]  Reporting will be conducted in the future |       |
| [ ]  Reporting is mandatory | Program Website |
| [ ]  Reporting is voluntary |       |
| Program Contact Information – Address |
|       |
| Categories of Emissions Data Reported |
|       |
| *Add extra pages as needed.* |

**Form 2.1 – Demonstration of Conformance with M&V Plan**

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

Table 1. Quality Assurance/Quality Control

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| Attach documentation that procedures and protocols specified in the M&V Plan were performed and records specified in the M&V Plan were generated and retained. Each attachment must include a header that indicates it is an attachment to Form 2.1 and includes the offset project name and offset project ID code. |
| **Procedures and Documentation Required by the M&V Plan** | **Documentation Provided (check the boxes to indicate attachment of required documentation)** |
| 1. Procedures for recording names and contact information for the personnel responsible for project monitoring and documentation  | [ ]  List of the individuals responsible for influent monitoring, digester biogas monitoring, and the third-party laboratory used to verify biogas methane concentration, including contact names by location  |
| 2. Procedures for recording names and contact information for the personnel responsible for QA/QC of project monitoring and documentation  | [ ]  List of the individuals responsible for QA/QC of project monitoring, including contact names by location |
| 3. Procedures for the compilation of an annual QA/QC report summarizing findings of QA/QC activities conducted and any remedial actions taken  | [ ]  Annual QA/QC report summarizing all QA/QC activities conducted and remedial actions taken  |
| 4. Procedures, if applicable, for annual comparison of methane generated by anaerobic digester, as measured by monitoring equipment, with estimated methane used to generate electricity, as derived from electric generation records  | [ ]  Copy of annual comparison of methane generated by the anaerobic digester with estimated methane used to generate electricity, including calculations and data used  |
| 5. Procedures for documenting installation and retirement of equipment for monitoring biogas volumetric flow and methane concentration  | [ ]  Records of biogas monitoring equipment installed or retired  |
| 6. Procedures for quarterly third-party laboratory analysis of methane concentration of sampled digester biogas using U.S. EPA-approved laboratory testing methods, including specification of the testing method to be used  | [ ]  List of EPA-approved test procedures used [ ]  Copy of third-party laboratory analysis report of methane concentration of sampled digester biogas and date of analysis  |
| 7. Procedures to ensure that biogas samples will be taken at the same location as the digester biogas flow meter  | [ ]  Signed documentation by sampling technician that digester biogas samples were taken at location of digester biogas flow meter  |
| 8. Procedures for QA/QC of influent monitoring data for each facility providing manure or organic food waste to the anaerobic digester  | [ ]  List of procedures performed during the reporting period  |
| 9. For regional-type digesters, procedures for compilation of monthly receipts and records of manure and organic food waste (kg) received for input into the anaerobic digester from each facility providing manure or organic food waste influent  | [ ]  Copies of monthly receipts and records of manure and organic food waste (kg) supplied to the anaerobic digester from each off-site facility  |
| 10. For regional-type digesters, for each facility providing organic food waste influent, procedures for ensuring that daily food waste input to the on-site storage tank prior to shipment to the anaerobic digester is at least 1/30 of the total storage tank capacity  | [ ]  Copy of monthly records of daily monitoring of the timing and quantities of food waste input to the on-site storage tank and the timing and quantity of influent shipped to the anaerobic digester  |
| 11. For regional-type digesters, for each facility providing manure influent, procedures for ensuring that daily manure input to the on-site storage tank or pond prior to shipment to the anaerobic digester is at least 1/30 of the total storage tank capacity  | [ ]  Copy of monthly records of daily monitoring of the timing and quantities of manure input to the on-site storage tank or pond and the timing and quantity of influent shipped to the anaerobic digester |

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

|  |  |
| --- | --- |
| **Procedures and Documentation Required by the M&V Plan** | **Documentation Provided (check the boxes to indicate attachment of required documentation)** |
| 1. Monthly records of digester biogas flow rate performance tests to ensure: (1) flow readings are being recorded at least every 15 minutes; (2) the accuracy of digester biogas flow meter readings is within +/- 5 percent of manufacturer specifications; and (3) methane concentration instrument manufacturer specifications for precision and accuracy are met  | [ ]  Copy of monthly biogas flow rate performance tests [ ]  Copy of data for one sample day per month of flow meter readings in intervals of at least 15 minutes  |
| 2. Records of the type of biogas flow meter installed (differential pressure or hot wire anemometer)  | [ ]  Copy of specification sheet for the biogas flow meter installed  |
| 3. Records of the date and location of flow meter installation  | [ ]  Copy of flow meter installation information, including date and location  |
| 4. Records of performance of maintenance schedules for digester biogas flow meter and methane concentration instrument in accordance with manufacturer recommendations and specifications  | [ ]  Copies of maintenance schedules and records of maintenance activity conducted [ ]  Copy of manufacturer recommended maintenance schedule and specifications for digester biogas flow meter and methane concentration instrument  |
| 5. Daily records of collected digester biogas flow rates  | [ ]  Copies of records of daily measured digester biogas flow rates  |
| 6. Weekly or daily records of methane concentration (daily records if onsite continuous methane concentration analyzer used)  | [ ]  Copies of weekly or daily records of methane concentration (daily records if onsite continuous methane concentration analyzer used) |
| 7. Monthly records of calculation of digester biogas flow rate standardization (in standard cubic feet) to correct for site-specific pressure and temperature measurements (note, this procedure is not necessary when using flow meters that automatically measure temperature and pressure and express digester biogas flow in standard cubic feet)  | [ ]  Monthly calculation records of standardization of daily digester biogas flow from recorded cubic feet per day to standard cubic feet per day  |
| 8. Monthly records of field data used for flow measurement standardization, including barometric pressure and biogas temperature and pressure measurements (note, not applicable when using flow meters that automatically measure temperature and pressure and express digester biogas flow in standard cubic feet)  | [ ]  Copies of records of field data used for digester biogas flow measurement standardization |
| 9. Monthly records of the number of hours the digester biogas flow meter was inoperable  | [ ]  Copies of monthly records of the number of hours the digester biogas flow meter was inoperable (in hours per month) |
| 10. Monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device  | [ ]  Copies of monthly records of the amount of methane combusted (in standard cubic feet) in the combustion device  |
| 11. Monthly records of electric generation and heat rate (in Btu/kWh) (note, only applicable to offset projects with an electric generation component)  | [ ]  Copies of monthly records of electric generation [ ]  Copies of monthly records from source tests showing the measured heat rate, or copies of monthly records used to derive heat rate based on MMBtu of heat input and KWh of electricity generation |
| 12. Annual records of the calibration procedures conducted for digester biogas flow meter in accordance with manufacturer specifications  | [ ]  List of calibration activities conducted and receipts for services rendered if performed by outside contractor [ ]  List of manufacturer recommendations for calibration of digester biogas flow meter  |
| 13. Records of the dates and results of digester flow meter calibration, and the portable instrument and procedures used to check installed flow meter accuracy, including field measurements and flow calculations  | [ ]  List of dates of digester flow meter calibration [ ]  Copy of calibration field measurement data and flow calculations, and the portable instrument and procedures used to check installed flow meter accuracy  |
| 14. Records of calibration procedures conducted for methane concentration monitoring instrument (daily records if applicable to continuous methane concentration monitoring instrument; monthly records if applicable to portable methane concentration monitoring instrument)  | [ ]  List of calibration activities conducted and receipts for services rendered if performed by outside contractor [ ]  List of manufacturer recommendations for calibration of methane concentration monitoring instrument  |
| 15. Records of the dates and results of methane concentration monitoring instrument calibration (applicable to both continuous methane concentration monitoring instrument and portable methane concentration monitoring instrument)  | [ ]  List of dates of methane concentration monitoring instrument calibration [ ]  Copy of calibration field measurement data for methane concentration instrument  |

**Form 2.2 – Determination of Emission Reduction**

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

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| Enter the following information: |
|  |
|  |       |  | 1. Annual baseline emissions (short tons CO2e)  |
|  |       |  | 2. Annual measured volume of methane recovered and destroyed by the anaerobic digester (short tons CO2e)  |
|  |
|  |       |  | 3. CO2 emissions from transportation of manure and organic food waste to the anaerobic digester (short tons CO2e)  |
|  |
|  |       |  | 4. Annual net emission reductions (short tons CO2e)  |
|  |
| Enter baseline emissions data for each month in the reporting period (if multiple facilities supplied influent to the digester, provide the sum for all facilities):  |
|  |
| **Month** | **VSp (kg)** | **VSin (kg)** | **VS­out (kg)** | **VSavail (kg)** | **F (unitless)** | **VSdec (kg)** | **Vm­ (ft3)** | **CO2e****(short tons)** |
| January |       |       |       |       |       |       |       |       |
| February |       |       |       |       |       |       |       |       |
| March |       |       |       |       |       |       |       |       |
| April |       |       |       |       |       |       |       |       |
| May |       |       |       |       |       |       |       |       |
| June |       |       |       |       |       |       |       |       |
| July |       |       |       |       |       |       |       |       |
| August |       |       |       |       |       |       |       |       |
| September |       |       |       |       |       |       |       |       |
| October |       |       |       |       |       |       |       |       |
| November |       |       |       |       |       |       |       |       |
| December |       |       |       |       |       |       |       |       |
| Total for Year |       |       |       |       | N/A |       |       |       |

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

**Form 3.1 – Independent Verifier General Information**

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| Independent Verifier | States Where Verifier is Accredited/Recognized |
|       |  |       |
| Primary Street Address | Website URL |
|       |  |       |
| City | State/Province | Postal Code | Country |
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| Point of Contact for Project |
|       |
| Telephone Number | Fax Number | Email Address |
|  |  |  |  |  |
| Contact Street Address |
|       |
| City | State/Province | Postal Code | Country |
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**Form 3.2 – Independent Verifier Certification Statement and Report**

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| I certify that the accredited independent verifier identified reviewed the *M&V Report*, including all Forms and attachments, in its entirety, including a review of the following:1. The verifier has reviewed the entire *M&V Report* and evaluated the contents of the report in relation to the applicable requirements of 7 DE Reg. 1147and the required information that must be provided in the *M&V Report*.
2. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to determine CO2-equivalent sequestration in accordance with 7 DE Reg. 1147and the required documentation that must be provided in the *M&V Report*.
3. The verifier has evaluated the adequacy and consistency of methods used by the Project Sponsor to quantify, monitor, and verify CO2-equivalent sequestration in accordance with the applicable requirements of 7 DE Reg. 1147 and the Monitoring and Verification Plan submitted as part of the *Consistency Application*.
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| Verifier Representative Signature |  |  |  |
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|       |  |  |  |
| Printed Name |  |  |  |
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| Title |  |  |  |
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| Organization |  |  |  |
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|       |  |  |       |
| Date |  |  | Notary |
|  |
| [ ]  A verification report is attached that documents the verifier’s review of the entire *M&V Report* in relation to the applicable requirements of 7 DE Reg. 1147 and includes evaluation, conclusions, and findings. |